Thank you for choosing a NIVELCO instrument.

NIVOMAG

MAGNETIC COUPLING LEVEL SWITCH

USER'S MANUAL

Manufacturer:
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1. APPLICATION

The **NIVOMAG MK□-2□□-□** series magnetic float level switches are designed for level point detection of a wide range of liquids and are suitable for use in various industries including chemical, pharmaceutical, and more. These level switches can be easily installed horizontally or vertically in tanks. A permanent magnet operated by a float's movement will activate another magnet inside the switching enclosure. This second magnet operates a special switch. So the float movement is transferred to the potted switch through separated magnetic coupling ensuring the requirements of the wet process and Ex application. The cable is connected via a gland (maximum wire cross-section: 2.5 mm² [AWG13]).
Level switches are available in both standard and explosion-proof versions, with explosion protection provided by a resin-filled microswitch. The unit switches at approximately ±10° to the centerline of the installation, with a maximum deflection of approximately ±16°. Design considerations must be made to ensure correct operation, taking into account the specified parameters. If the conditions of use change, various accessories can be ordered to adjust the standard unit's functionality and switching parameters. For the **MKA-23□-□** type with vertical float and adjustable switch differential, different rod lengths can be accommodated by adjusting the counterweight to the correct position. The switching points can be set by adjusting the sliding rings on the rod. It is recommended to tie up the end of the rod to a length of 40 mm (1.57") for safe operation in wave or flowing media. During installation, ensure there is free movement of the toggle, with a minimum clearance of 120 mm (4.7") from the center of the installation and at least 27 mm (1.06") from the seal face. The optional counter flange (MFF) tester (MMK) is not suitable for this type.
The **MMK-□□□-□** tester is specifically designed for checking switching capability without mechanically disturbing the system, and is only compatible with 92 × 92 mm (3.6" × 3.6") square flange versions.

2. TECHNICAL DATA

2.1 General

Type		Horizontal float				Vertical float
		MKA-□1□-□	MKA-□2□-□	MKU, MKV, MKZ-□1□-□	MKS, MKG-□1□-□	MK□-□3□-□
Nominal pressure		25 bar (363 psi) [MKU, MKV, MKZ: 2/25 bar (29/363 psi)]				16 bar (232 psi)
Process temperature		−40…+250 °C (−40…+482 °F)		0…+80 °C (32…+176 °F)	MKS: 0…+200 °C (32…+392 °F) MKG: 0…+100 °C (32…+212 °F)	−40…+250 °C (−40…+482 °F)
		Ex variant: see Temperature specification table				
Ambient temperature		−20…+80 °C (−4…+176 °F), Ex variant: see "2.4.1 Temperature specification for Ex variants" table				
Liquid density		Minimum 0.7…0.85 kg/dm³ (S.G.), see "2.3 Additional technical data" table				
Switching differential		Fixed	Adjustable	Fixed[1]		Adjustable
Insertion length		202…521 mm (7.95…20.5")	254…573 mm (10…22.5")	202…521 mm[1] (7.95…20.5")[1]		1265…3265 mm (4.15…10.7 ft)
Material of wetted parts		Stainless steel (1.4571 [316Ti], 1.3960 [316LN], 1.4404 [316L]); MKG, MKV: rubber (NBR); MKS, MKZ: silicone				
Housing material		Painted aluminum or stainless steel				
Microswitch		1 or 2 microswitches with closing and opening contact (NO and NC) [2]				
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")[3] (Ex version: Ø10…14 mm [Ø0.39…0.55"]), wire cross section: 5× 0.75…2.5 mm² [AWG18…14]) (MKU, MKV, MKZ: integrated cable NSSHöu-J 5× 1.5 mm² [AWG16], Ø14mm [Ø0.6"])[4]				
Ingress protection		IP65 (MKU, MKV, MKZ: IP68, up to 20 m [65.6 ft] water column)				
Electrical protection		Class I				
Safety Integrity Level		SIL 1				
Weight		~1.8…3.5 kg (~3.95…7.7 lb)				

[1] MKU type is also available with adjustable switching differential. In this case, the extension length is 254…573 mm (10"…22.56")
[2] NO and NC terminals must be connected to an equipotential circuit. *[3] For explosion-proof version, see chapter 2.4* *[4] Cable length must be specified when ordered.*

2.2 Accessories

- User's Manual
- Warranty Card
- EU Declaration of Conformity
- Cable glands (type dependent)

2.3 Additional technical data

Arm length	0…100 mm (0…3.94")	200 mm (7.87")	300 mm (11.81")	1000…3000 mm (3.28…9.84 ft)
Float Ø max.	Minimum Liquid density (kg/dm³, S.G.)			
52 mm (2")	0.7	0.8	0.85	–
64 mm (2.52")			0.8	
124 mm (4.88")	–			0.7

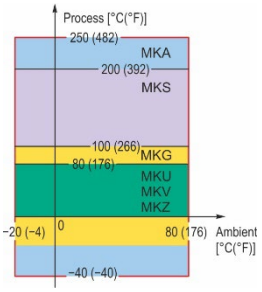
2.4 Explosion Protection, Designation, Limit Values

Ex marking	**ATEX**	Ex II 1/2 G Ex db eb mb IIC T6…T2 Ga/Gb
	IEC Ex	Ex db eb mb IIC T6…T2 Ga/Gb
	INMETRO	Ex db eb mb IIC T6…T2 Ga/Gb
Reference document number	**ATEX**	mka2100m0600h_10
	IEC Ex	mka210en1811h-b
	INMETRO	mka2100p0600h_11
Ex power supply		For AC power supply: $U_0 \leq 250$ V, $I_0 \leq 2.5$ A For DC power supply: $U_0 \leq 220$ V, $I_0 \leq 0.3$ A
Process and ambient temperature		See "2.4.1 Temperature specification for Ex variants" table
Cable entry		M20×1.5 cable glands with "Ex e" protection
Cable outer diameter		Ø10…14 mm (Ø0.39…0.55")
Electrical connection		Wire cross section: 5× 0.75…2.5 mm² (AWG18…14)

2.4.1 Temperature specification for Ex variants

Temperature classes		T6	T5	T4	T3	T2
Ambient temperature range		−20…+70 °C (−4…+158 °F)	−20…+80 °C (−4…+176 °F)			
Process temperature range	MKA	−40…+80 °C (−40…+176 °F)	−40…+95 °C (−40…+203 °F)	−40…+130 °C (−40…+166 °F)	−40…+200 °C (−40…+392 °F)	−40…+250 °C (−40…+482 °F)
	MKS				−40…+200 °C (−40…+392 °F)	
	MKG	−20…+80 °C (−4…+176 °F)	−20…+95 °C (−4…+203 °F)			
	MKU, MKV, MKZ	−20…+70 °C (−4…+158 °F)	−20…+80 °C (−4…+176 °F)			

2.5. Temperature diagram



2.6 Order code (Not all combinations are available!)

MK□–□1□–□ with fixed switch differential

NIVOMAG M K □ – □ 1 □ – □ Ex*

Version	Code
Standard	A
With rubber protective sleeve	G
With silicon protective sleeve	S
Submersible (IP68)	U
Submersible (IP68) with rubber protective sleeve	V
Submersible (IP68) with silicon protective sleeve	Z

Output / Housing material	Code
1× SPDT / Aluminum	2
1× SPDT / Stainless steel	4
2× SPDT / Aluminum	5(3)
2× SPDT / Stainless steel	6(3)

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

Protrusion / Lever length / Ex	Code
Standard version	
202 mm / 0 mm	0
321 mm / 100 mm	1
421 mm / 200 mm	2
521 mm / 300 mm	3
"L" or "Z" lever (2)	4
Ex d e mb G version	
202 mm / 0 mm	9
321 mm / 100 mm	5
421 mm / 200 mm	6
521 mm / 300 mm	7
"L" or "Z" lever (2)	8

**The order code of an Ex version product should end in "Ex"!*

(1) Not available with protection sleeve
(2) The type of the lever profile ("L" or "Z") and the upper (Lsh) or the lower (Lsl) switching point must be specified in text of the order.
(3) Ex version not available

MK□–□2□–□ with adjustable switch differential

NIVOMAG M K □ – □ 2 □ – □ Ex*

Version	Code
Standard	A
Submersible (IP68)	U

Output / Housing material	Code
1× SPDT / Aluminum	2
1× SPDT / Stainless steel	4
2× SPDT / Aluminum	5(3)
2× SPDT / Stainless steel	6(3)

Process connection	Code
92 × 92 mm, PN square flange	0
DIN DN80, PN40/25/16/10 carbon steel	1
DIN DN100, PN40/25 carbon steel	2
DIN DN80, PN40/25/16/10, 1.4571 stainless steel	5
DIN DN100, PN40/25, 1.4571 stainless steel	6

Protrusion / Lever length / Ex	Code
Standard version	
254 mm / 0 mm	0
373 mm / 100 mm	1
473 mm / 200 mm	2
573 mm / 300 mm	3
Ex d e mb G version	
254 mm / 0 mm	9
373 mm / 100 mm	5
473 mm / 200 mm	6
573 mm / 300 mm	7

**The order code of an Ex version product should end in "Ex"!*

(3) Ex version not available

MK□–□30–□ with adjustable switch differential, side-mounted

NIVOMAG M K A – □ 3 0 – □ Ex*

Version	Code
Standard	A

Output / Housing material	Code
1× SPDT / Aluminum	2
1× SPDT / Stainless steel	4
2× SPDT / Aluminum	5(3)
2× SPDT / Stainless steel	6(3)

Process connection	Code
92 × 92 mm, PN square flange	0

Protrusion / Lever length / Ex	Code
Standard version	
1265 mm / 1000 mm	1
2265 mm / 2000 mm	2
3265 mm / 3000 mm	3
Ex d e mb G version	
1265 mm / 1000 mm	5
2265 mm / 2000 mm	6
3265 mm / 3000 mm	7

**The order code of an Ex version product should end in "Ex"!*

(3) Ex version not available

Counter flange: NIVOMAG M F F – 1 □ □ – 0

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

Process connection	Code
Standard	0
For units with MMK–1□0 tester	1

Tester: NIVOMAG MKK – 1 □ 0 – 0

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

Available parts, components (See chapter 2.9)

Variants:

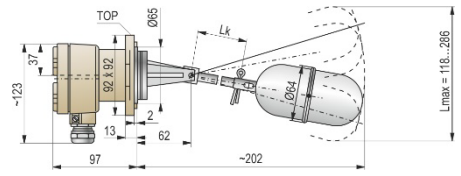
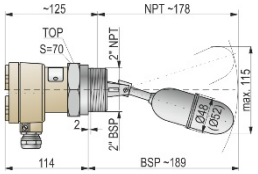
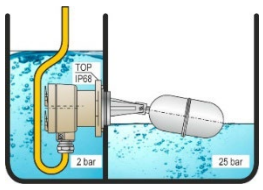
	MK□–□1□	MK□–□2□	MK□–□3□
Fixed switching differential	■	–	–
Adjustable switching differential	–	■	■
Straight lever	■	■	■
"L" or "Z" lever	■	■	–
Side mounted	■	■	–
Top mounted	■ (4)	■ (4)	■
Submersible	■	■	■
Protective Rubber Sleeve	■	–	–
Flanged process connection	■	■	■ (5)
Threaded process connection	■		
Ex variant	■	■	■
Tester	■	■ (6)	–

(4) With "L" lever
(5) Only with 92 × 92 mm (3.6" × 3.6") square flange
(6) Only with special counter flange

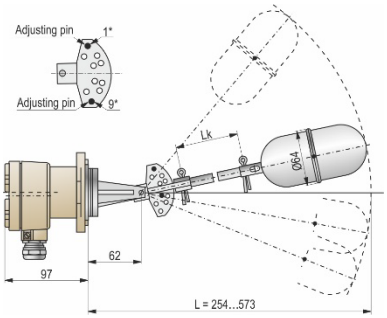
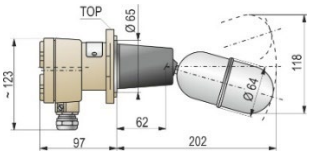
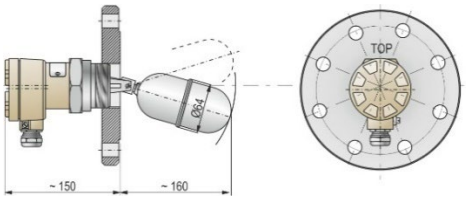
2.7 Dimensions

Always specify the desired switching points from the seal surface of the device.

STANDARD DEVICE, SUITABLE FOR HORIZONTAL INSTALLATION

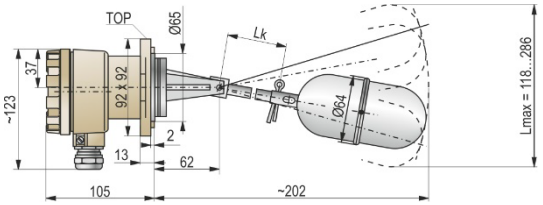
Standard device with 92 × 92 mm (3.6" × 3.6") square flange MKA–210–0, MKA–210–9 Ex	Standard device with threaded connection MKA–21B–0, MKA–21N–0, MKA–21B–0 Ex, MKA–21N–0 Ex	Submersible device with 92 × 92 mm (3.6" × 3.6") square flange MKU–210–0, MKU–210–9 Ex
		
Extension arm 100…300 mm (3.94…11.81")		
"Z" lever		
"L" lever (for vertical installation)		
Adjustable switch differential		Adjustable switch differential
Rubber protective sleeve		Rubber protective sleeve

Available parts, accessories

Device with adjustable switch differential MKA–220–0, MKA–220–9 Ex	Submersible device with 92 × 92 mm (3.6" × 3.6") square flange and rubber protective sleeve MKG / MKS / MKV / MKZ–210–0 MKG / MKS / MKV / MKZ–210–9 Ex	Standard device with threaded connection and flange MKA–211…8–0 MKA–211…8–9 Ex
 * *The desired switching level can be set by moving the adjusting pin from 1 to 9.*		 *It is also available with a JIS and ASME B16.5 flange of the same classification as the flange in Table 2.6 Ordering Code.*
Extension arm 100…300 mm (3.94…11.81")		
"Z" lever		
"L" lever (for vertical installation)		
		Adjustable switch differential

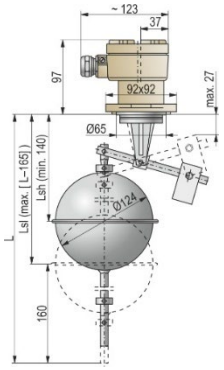
Available parts, accessories

STANDARD DEVICE, SUITABLE FOR HORIZONTAL INSTALLATION

Standard device with 92 × 92 mm (3.6" × 3.6") square flange MKA–510–0

Adjustable switch differential
Rubber protective sleeve

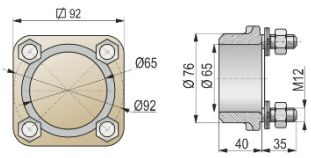
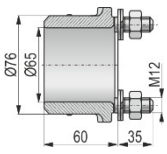
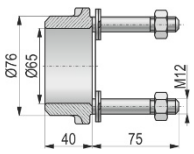
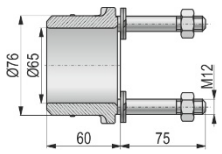
Available parts, accessories

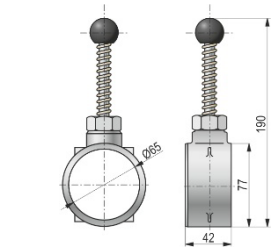
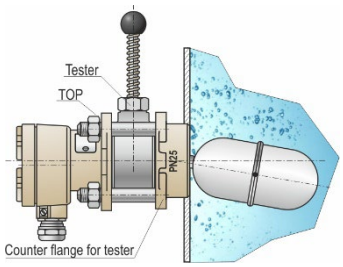
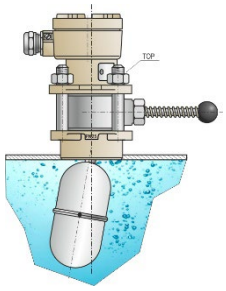
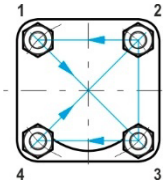
VERTICAL INSTALLATION

Vertically mounted device with 92 × 92 mm (3.6" × 3.6") square flange MKA–230–1, MKA–230–5 Ex
 Determining the switching level: – Always specify from the seal surface – Upper switching point (min): 140 mm (5.51") – Lower switching point: Rod length – 60 mm (2.36") – Rod length required for lower switching point: Lower switching level + 60 mm (2.36")

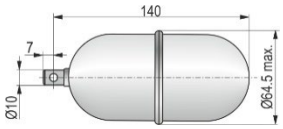
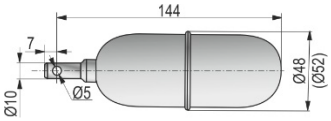
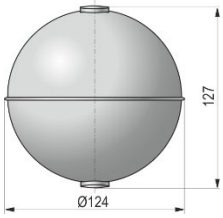
2.8 Available accessories

Flanges

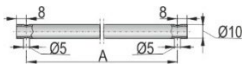
Counter flange MFF–110–0 (1.7218) MFF–120–0 (1.4409)	Extended counter flange MFF–112–0 (1.7218) MFF–122–0 (1.4409)	Counter flange for MMK tester MFF–111–0 (1.7218) MFF–121–0 (1.4409)	Extended counter flange for MMK tester MFF–113–0 (1.7218) MFF–123–0 (1.4409)
			
To create the mounting surface of devices with 92 × 92 mm (3.6" × 3.6") square flange			
	Extended connector size	Extended stud bolt length, for tester	Extended connector size and stud bolt length, for tester
			Applies only for extension arms types
			Device with adjustable switch differential cannot be used with this counter flange

Tester MMK–110–0 (1.7218) MMK–120–0 (1.4409)	Installation of the tester		
 – Applicable for in-service monitoring of devices with 92 × 92 mm (3.6" × 3.6") square flange – Not for use with rubber protective sleeve!	Horizontal installation 	Vertical installation 	Be sure gaskets are in place and clamp bolts are tightened evenly! 

2.9 Available parts, components

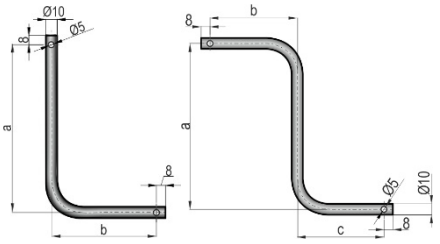
Float Ø64 mm (Ø2.52") MKA–210–0M–200–00	Float Ø48 mm (Ø52 mm) (Ø1.889" [Ø2.05"]) MKA–21B–0M–000–02	Float Ø124 mm (Ø4.88") MKA–230–0M–100–00
		

Extension arm



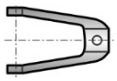
A	Order code
100 mm (3.94")	MKA-110-1M-000-01
200 mm (7.87")	MKA-110-2M-000-01
300 mm (11.81")	MKA-110-3M-000-01

"L" – "Z" lever MKA–210–4M–000–01

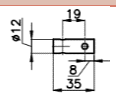


When ordering, specify type and corresponding dimensions a-b or a-b-c or upper and lower switching points.

Components for adjustable switch differential

Component	Component name / number
	Adjusting unit MKA–120–0M–000–02
	Adjusting fork MKA–120–0M–000–04
	Tilting pin long MKA–220–0M–000–07
	Adjusting pin MKA–120–0M–000–03
	Cotter pin Ø5 × 25 mm (Ø0.2 × 0.98") 4cesa5x25koa4
	Cotter pin Ø2 × 10 mm (Ø0.079 × 0.39") 4cesa2x10koa4

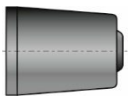
Components for mounting



Mounting sleeve MKA–110–1M-000–02

Cotter pin Ø5 × 25 mm (Ø0.2 × 0.98") 4cesa5x25koa4

Rubber protective sleeve

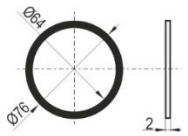


Material	Order code
NBR	MKA-140-0M-000-01
Silicone	MKA-150-0M-000-01

Cant't be used with threaded connections, adjustable switch differential, and vertical floats.

Seals

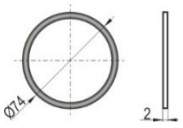
Flat seal



Material	Order code
REINZ AFM34	4gu2x76klinge

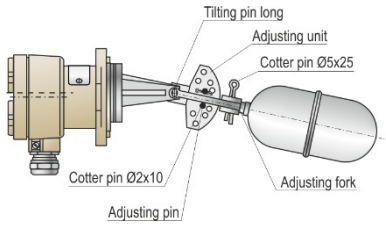
Connector sealing for devices with 92 × 92 mm (3.6" × 3.6") square flange and tester

O-ring (Cover seal)



Material	Order code
EPDM	4guo74x2epdmy

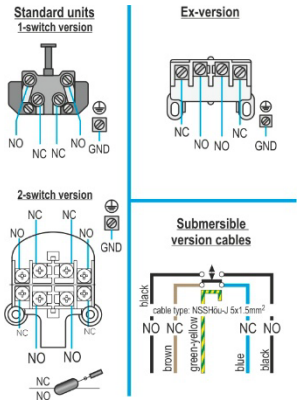
Installation of components



3. MOUNTING

Installation according to the requested application must be done on the specifications outlined in the drawings and tables provided. Before mounting, make sure that there is enough space for the float to move freely! For horizontal installation, the seal face must be vertical and the position of the fixing screws must be chosen according to the specifications. The "TOP" marking on the unit must always be at the top. For vertical installation, the seal face must be horizontal. Slightly different applications are possible, but this will change the connection points of the unit, which must be taken into account during installation. For the vertical floating version (MKA–230), the seal surface must be horizontal. Failure to observe this during installation may result in unstable operation or switching failure.

4. WIRING



5. CONDITIONS FOR Ex APPLICATION

The device must be connected to the earth of the EP network via its GND screw. The NIVOMAG MK float switch must be protected against overload with a 2.5 A circuit breaker marked "T"!

If the device is installed in a place subject to overvoltage, the device must be protected with at least class II overvoltage protection!

The NIVOMAG MK float switch must be connected to the local EP circuit with a 4 mm² (AWG12) copper wire.

6. MAINTENANCE, REPAIR

The device does not require regular maintenance. Refer to the warranty card for warranty information. The device returned for repair must be cleaned by the user, all chemical deposits must be removed, and the device must be disinfected before sending it back. In addition, the return package must include a properly filled Returned Equipment Handling Form, in which the sender declares that the device is free of all contamination and substances hazardous to health.

7. STORAGE CONDITIONS

Ambient temperature: –25…+80 °C (–13…+176 °C)
Relative humidity: max. 98%

mka210en24h12
February 2024