Thank you for choosing a NIVELCO instrument.
We are convinced that you will be satisfied with our product!

NIVOPOINT

MR

MAGNETIC FLOAT LEVEL SWITCH

User's manual

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1. INTRODUCTION

The interaction of the magnetic float and the reed relays (incorporated in the protection tube) is the basis of the **NIVOPOINT** magnetic float level switch series operation. They are suitable for level indication of normal and explosive liquids and can be used for level control tasks. The protecting tube contains a max. of 5 relays. Parts of the instrument are a probe tube with magnetic float and a housing containing the connection terminal.
The magnetic float moves alongside the protection tube tracking the level of the liquid and activating the reed relays. As the float passes a relay it changes the output state of the relay which retains this state latching until the level decreases and the float moves again along the respective relay to switch its state back.

2. TECHNICAL DATA

2.1. General data

TYPE	MR□-□□□	MP□-□□□	MR□-□□□-7Ex	MR□-□□□-8Ex
Insertion length	0.25…3 m (0.85…10 ft)			
Material of wetted parts				
Material of probe rod	Stainless steel (DIN 1.4571 / BS 316Ti)	PFA / PP coated	Stainless steel (DIN 1.4571 / BS 316Ti)	
Material of float	1.4404	PVDF, PP	1.4404	
Float sizes (standard included)*	∅53.5 × 60 mm (∅2.1" × 2.36")	∅76 × 87 mm (∅3" × 3.42")	∅53.5 × 60 mm (∅2.1" × 2.36")	
Max. process pressure	2.5 MPa (25 bar) [363 psig] at +20 °C (68 °F)	0.6 MPa (6 bar) [88 psig] at +20 °C (68 °F)	2.5 MPa (25 bar) [363 psig] at +20 °C (68 °F)	
Medium-density (Specific gravity)	min. 0.8 kg/dm³	min. 0.7 kg/dm³	min. 0.8 kg/dm³	
Medium temperature	–40…+150 °C (–40…+302 °F)	–40…+80 °C (–40…+176 °F)	See: Temperature limit data for Ex approved models table	
Ambient temperature	–40…+95 °C (–40…+203 °F)			
Output	1…5 × reed-switches, connecting one side of each, NO/NC			
Switching rate	120 W / VA, 250 V AC/DC, 3 A /reed relay, summary max. 9 A			
Switching differential	<10 mm (0.4")			
Distance between reed-switches	min. 110 mm (4.35")			
Electrical connection	M20x1.5 ∅6…∅12 for cables (0.25…0.5")		M20x1.5 ∅7…∅12 for cables (0.28…0.47")	without cable gland **
	terminal, wire cross section: 0.5…2.5 mm² (AWG20…AWG14)			
Process connection	1", 1½", 2" BSP 1", 1½", 2" NPT 1", 1½", 2½", 3", 4" TriClamp	PP flange DN80, DN100	1", 1½", 2" BSP 1", 1½", 2" NPT 1", 1½", 2½", 3", 4" TriClamp	
Sealing material	Klingerit for BSP	—	Klingerit for BSP	
Electrical protection	Class I, Protecting cable 4 mm² (AWG25)			
Ingress protection	IP67 (as per MSZ EN 60529:2015)			
Dimension of the housing	116 × 80 × 65 mm (4.56 × 3.15 × 2.56")		124 × 80 × 65 mm (4.9 × 3.15 × 2.56")	
Mass	0.4 kg + 0.3 kg/m (0.88 lb + 0.2 lb/ft)		0.45 kg + 0.3 kg/m (1 lb + 0.2 lb/ft)	

* For details of non-standard floats, see 2.6. Float selection
** Note: the device must be installed with Ex d IIC certified explosion-proof cable gland.

2.2. Explosion protection, EX markings, EX limit data

2.2.1 ATEX Certificate No.: ExNB 17 ATEX 0003 X/1

Type	With cable gland MR□-□□□-7Ex	Without cable gland MR□-□□□-8Ex
Ex marking (ATEX)	Ⓔx II 1/2 G Ex db IIC T6...T3 Ga/Gb	
Reference document number	mra1053m0600h_12	

2.2.2 Temperature limit data for Ex approved models

Class	T6	T5	T4	T3
Max. ambient temperature from –40 °C (–40 °F)	+80 °C (176 °F)	+95 °C (203 °F)	+95 °C (203 °F)	+95 °C (203 °F)
Max. medium temperature from –40 °C (–40 °F)	+80 °C (176 °F)	+95 °C (203 °F)	+130 °C (266 °F)	+150 °C (302 °F)

2.3. Accessories

- User's Manual,
- Warrant Card,
- EU declaration of Conformity,
- 1 × Gasket (for threaded versions)

2.4. Order code (*Not all combinations possible!*)

NIVOPOINT M R □ – □ □ □ – □ *

Process connection	Code
1" BSP	A
2" BSP	C
1" NPT	D
2" NPT	G
1½" BSP	B
1½" NPT	E
1" TriClamp	F
1½" TriClamp	T
2½" TriClamp	O
3" TriClamp	P
4" TriClamp	R

Switching points	Code
1 × NO/NC	1
2 × NO/NC	2
3 × NO/NC	3
4 × NO/NC	4
5 × NO/NC	5

Probe length**	Code
0 m	0
1 m	1
2 m	2
3 m	3
4 m	4

Probe length**	Code
0 m	0
0.1 m	1
:	:
0.8 m	8
0.9 m	9

Certificate	Code
Standard	3
Ex	7
Ex without cable gland	8

Notes:
** The order code of an Ex-version should end in 'Ex'*
*** For Ex version, max. probe length up to 3 m (9.84 ft)!*

NIVOPOINT M P □ – □ □ □ – □

Process connection	Code
DIN DN80, PN16	P
DIN DN100, PN16	R

Switching points	Code
1 × NO/NC	1
2 × NO/NC	2
3 × NO/NC	3
4 × NO/NC	4
5 × NO/NC	5

Probe length	Code
0 m	0
1 m	1
2 m	2
3 m	3

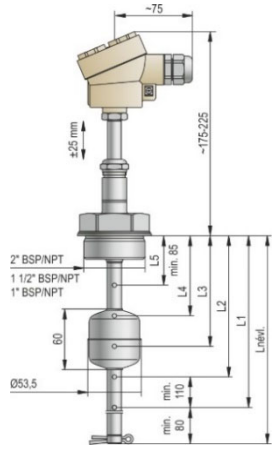
Probe length	Code
0 m	0
0.1 m	1
:	:
0.8 m	8
0.9 m	9

Float / Certificate	Code
∅76 PVDF or PP/ standard	3

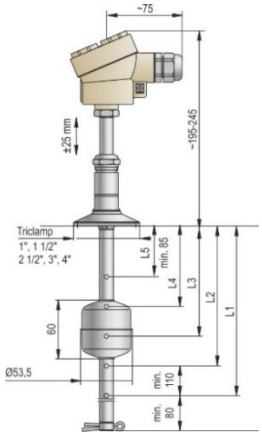
Notes: The type of float should be specified in the text part of the order.

2.5. Dimensions

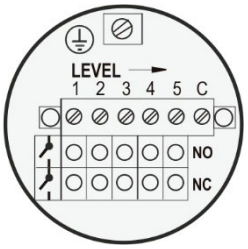
Standard version MR□-□□□



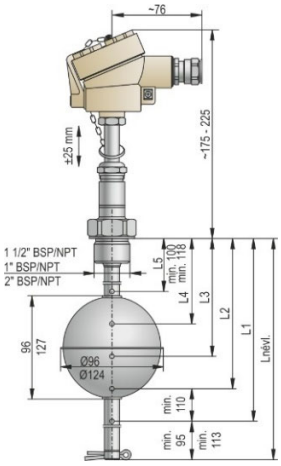
Standard version MR□-□□□



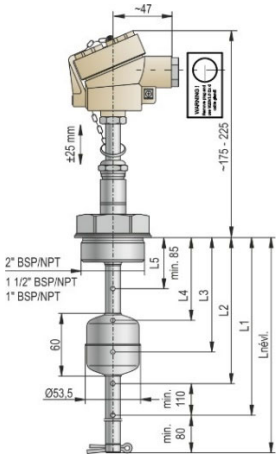
Terminal box



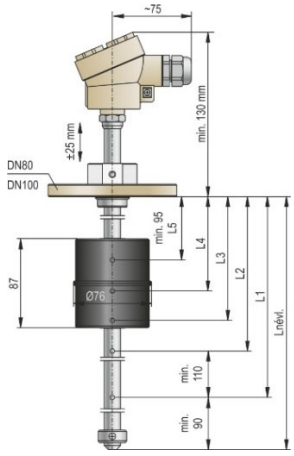
Ex version MR□-□□□-7M



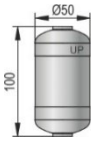
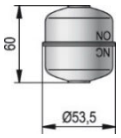
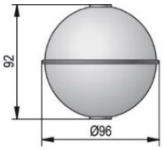
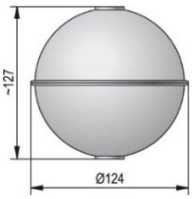
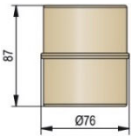
Ex version MR□-□□□-8M



Standard version MP□-□□□



2.6. FLOAT SELECTION

TYPE	MRC-106-7M-900-00	MRC-105-7M-900-00	MRC-105-7M-600-00	MRC-105-7M-700-00	MRC-105-7M-800-00	MPP-105-3M-200-00	MPP-105-3M-900-00
Dimensions							
Standard type	■	■		■	■	–	–
Plastic co. type	–	–		–	–	■	■
Ex type	■	■		■	■	–	–
Medium-density (Specific gravity) min.	0.45 kg/dm³	0.55 kg/dm³	0.8 kg/dm³	0.55 kg/dm³	0.4 kg/dm³	0.7 kg/dm³	0.4 kg/dm³
Material	Titanium		1.4404	1.4435	1.4401	PVDF	PP
Med. pressure	2 MPa (20 bar) [290 psi]	2.5 MPa (25 bar) [363 psi]				0.6 MPa (6 bar) [87 psi]	0.3 MPa (3 bar) [43.5 psi]

3. INSTALLATION

For mounting the unit 1", 1½", 2" BSP or NPT threads or 1", 1½", 2½", 3", 4" TriClamp can be used. Minimal gap diameter for the float is ∅55 mm (∅2.16").
Use the M20×1.5 cable gland for electrical connection.
If a protection tube is used the minimum tube diameter should be ∅75 mm (∅2.95") (for insertion length < 1.5 m and ∅95 mm (∅3.74") for insertion length > 1.5m). When using a ∅96 mm (∅3.8") float the tube diameter should be min. ∅130 mm (∅5.1").

W A R N I N G !
Do not loosen the gland nut that ensures a ±25 mm (±0.98") adjustment of the sensors in a pressurized container!
The unit should be mounted in vertical position via its process connection and handled with care to avoid any damage or bend of the protection tube during transportation or installation!

4. SET UP, ADJUSTMENT

After screwing in and before tightening the sliding sleeve the direction of the cable gland and the position of the reed-relay set can be adjusted. an open-end wrench should be used when loosening or screwing tight the sliding sleeve!

The position of the reed-relay set can be vertically adjusted by a max. of ±25 mm (±0.98").

5. WIRING

Depending on the grounding system either the inner or the outer grounding terminal should be connected to the EP network.

Standard version

Remove the cover. Feed the electrical cables through the cable gland and connect them in accordance with the sketch on the cover where the (NO/NC) states of the relays are marked. The terminal of the lowest switch point has to be number 1.
"C" is common terminal.
The cross section of the connecting cable has to be between 0.5 and 2.5 mm² (AWG20…AWG14). After connecting, secure the cable with the cable gland, check and screw the cover back on with at least 25 Nm of torque.

Ex version

Remove the safety clamp and screw the cover off. Feed the electrical cables through the cable gland and connect them in accordance with the sketch on the cover where the (NO/NC) states of the relays are marked.
After connecting, secure the cable with the cable gland, check and screw the cover back on with at least 25 Nm of torque. Fasten the safety clamp by setting it into one of the notches of the cover.

6. SPECIAL CONDITIONS OF SAFE USE

– Make sure the installation is complete with no visible defects before turning on the device.
– The device may only be used within the limitations specified in the technical specifications.
– The installation of the device must be carried out in a way that the IP20 ingress protection is maintained throughout the installation!
– The thermal resistance of the connection cable insulation must correspond to the permissible ambient temperature at the place of application.
– The metal housing of the device must be connected to the EP (equipotential) network!

W A R N I N G !

– Use exclusively Ex d IIC cable entry for devices with "Ex d" flameproof protection!
– The plastic protective cap should be removed before installing NIVOPOINT MR□–□□□–8Ex, and the device must be equipped with a properly assembled and sealed and cable gland with "Ex d" protection type.
– The housing and measuring tube must be protected against mechanical impact! The location and method of installation must be such that they are protected against external mechanical influences during operation!
– The aluminum content of the metal die-cast housing exceeds the threshold; which require protection of the equipment against any possible sources of spark or ignition resulted by impact or friction!
– Devices with order code MR□–□□□–7Ex may only be installed with wiring and cable ducts that complies with MSZ EN 60079-14: 2014 standard 10.6.2. b!

7. MAINTENANCE, REPAIR

The unit does not require regular maintenance. In some instances, however, the probe may need occasional cleaning to remove surface deposits. This must be carried out gently, without harming the probe.
All repairs will be carried out at the manufacturer's premises.
Before returning the device for repairs, it must be cleaned carefully, the parts in contact with the medium that might contain harmful substances must be decontaminated. Our official form (Returned Equipment Handling Form) must be enclosed. Download it from our website www.nivelco.com. The device must be sent with a declaration of decontamination. Please provide a statement in the declaration that the decontamination process is completed, the device is clean and free from harmful materials, and there are no hazardous substances on it.

8. STORAGE CONDITIONS

Ambient temperature: –20… +60 °C (–4…+140 °F)

mra105en2112h
April 2021.