

1. INTRODUCTION

The interaction of the magnetic float and the reed relays (incorporated in the protection tube) is the basis of the **NIVOPPOINT** 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. The instrument consists of a probe tube with a magnetic float and a housing that includes 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 until the level decreases and the float moves again along the respective relay, switching its state back.

2. TECHNICAL DATA

2.1 General Data

	Standard	Plastic-coated	Explosion-proof	
	MR□-□□□	MP□-□□□	MR-□□□-7 Ex	MR□-□□□-8 Ex
Insertion length	0.25...3 m (0.85...9.84 ft) ⁽¹⁾			
Material of wetted parts	Titanium / 1.4404 / 1.4435 (316L eq.) float; 1.4571 (316Ti eq.) probe tube	PVDF / PP float; PFA / PP-coated probe tube	Titanium / 1.4404 / 1.4435 (316L equivalent) float; 1.4571 (316Ti equivalent) probe tube	
Maximum process pressure ⁽²⁾	16 bar / 25 bar (232 / 363 psi)	3 bar / 6 bar (43.5 / 87 psi)	16 bar / 25 bar (232 / 363 psi)	
Min. medium density (specific gravity)	0.45...0.8 kg/dm ³ (28.09...49.95 lb/ft ³)	0.4 / 0.7 kg/dm ³ (25 / 43.7 lb/ft ³)	0.45...0.8 kg/dm ³ (28.09...49.95 lb/ft ³)	
Nominal float sizes	See: 2.6 Float selection			
Process temperature	-40...+150 °C (-40...+302 °F)	-40...+80 °C (-40...+176 °F)	See: 2.2.2 Temperature limit data for Ex approved models	
Ambient temperature	-40...+95 °C (-40...+203 °F)			
Output	1...5 reed switches, one connecting point of each is common NO/NC			
Switching rate ⁽³⁾	120 W / VA, 250 V AC/DC, If process temperature is ≤ +100 °C (+212 °F), then 2 A per Reed-relay, max. 6 A in total If process temperature is > +100 °C (+212 °F), then 1 A per Reed-relay, max. 3 A in total			
Switching differential	<10 mm (0.4")			
Distance between reed switches	≥110 mm (4.33")			
Electrical connection	M20×1.5 cable gland, cable diameter: Ø6...Ø12 mm (0.25...0.5")		M20×1.5 cable gland, cable diameter: Ø7...Ø12 mm (0.28...0.47")	Without cable glands ⁽⁴⁾
	Terminal block, 0.5...2.5 mm ² (20...14AWG) wire cross section			
Process connection	As per order code			
Seal	Klingerit (only for BSP)	—	Klingerit (only for BSP)	
Electrical protection	Class I (protective cable 4 mm ² [12AWG])			
Ingress protection	IP67 (NEMA 6 equivalent)			
Housing dimensions	116 × 80 × 65 mm (4.55 × 3.15 × 2.55")		124 × 80 × 65 mm (4.88 × 3.15 × 2.55")	
Weight	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)	

⁽¹⁾ 3...4 m (9.8...13.1 ft) as per special offer, Ex version not available. ⁽²⁾ @ +20 °C (68 °F).

⁽³⁾ For inductive loads, it is not recommended to apply a current exceeding 10% of the rated current, as this may significantly reduce the lifespan of the switching element. In the case of capacitive loads, it must be ensured that the inrush current does not exceed 300% of the rated current.

⁽⁴⁾ 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□-□□□-7 Ex	Without cable gland MR□-□□□-8 Ex
Ex marking (ATEX)	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
Highest ambient temperature	+65 °C (149 °F)	+80 °C (176 °F)	+95 °C (203 °F)	+95 °C (203 °F)
Highest medium temperature	+80 °C (176 °F)	+95 °C (203 °F)	+130 °C (266 °F)	+150 °C (302 °F)
Minimum ambient temperature	-40 °C (-40 °F)			

NIVOPPOINT

MR MAGNETIC FLOAT LEVEL SWITCH

USER'S MANUAL



Manufacturer:
NIVELCO Process Control Co.
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Tel.: +36-1-889-0100
E-mail: sales@nivelco.com ■ www.nivelco.com

2.3 Accessories

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

2.4 Order Code (Not all combinations are available)

2.4.1 Order Code of Standard and Ex Versions

NIVOPOINT **M** **R** — — *

Process connection	Code	Switching points	Code	Probe length ⁽¹⁾	Code	Probe length ⁽¹⁾	Code	Ex certificate	Code
1" BSP	A	1× NO/NC	1	0	0	0	0	For non-hazardous area	3
2" BSP	C	2× NO/NC	2	1 m (3.3 ft)	1	0.1 m (0.3 ft)	1	Ex d G	7
1" NPT	D	3× NO/NC	3	2 m (6.6 ft)	2	0.2 m (0.7 ft)	2	Ex d G without cable gland	8
1¼" NPT	H	4× NO/NC	4	3 m (10 ft)	3	0.3 m (1 ft)	3		
1½" NPT	E	5× NO/NC	5	4 m (13.1 ft)	4	0.4 m (1.3 ft)	4		
2" NPT	G					0.5 m (1.6 ft)	5		
1½" BSP	B					0.6 m (2 ft)	6		
1" TriClamp	F					0.7 m (2.3 ft)	7		
1½" TriClamp	T					0.8 m (2.6 ft)	8		
2½" TriClamp	O					0.9 m (3 ft)	9		
3" TriClamp	P								
4" TriClamp	R								

** For explosion-proof devices, the article number is followed by "Ex" on the data plate.*

⁽¹⁾ 3...4 m (10...13.1 ft) as per special offer, Ex version not available.

2.4.2 Order Code of Plastic-coated Version

NIVOPOINT **M** **P** — — *

Process connection	Code	Switching points	Code	Probe length ⁽²⁾	Code	Probe length ⁽²⁾	Code	Float / material	Code
DIN DN80, PN16	P	1× NO/NC	1	0	0	0	0	Ø76 × 87 (Ø3" × 3.4") / PVDF	3
DIN DN100, PN16	R	2× NO/NC	2	1 m (3.3 ft)	1	0.1 m (0.3 ft)	1		
		3× NO/NC	3	2 m (6.6 ft)	2	0.2 m (0.7 ft)	2		
		4× NO/NC	4	3 m (10 ft)	3	0.3 m (1 ft)	3		
		5× NO/NC	5			0.4 m (1.3 ft)	4		
						0.5 m (1.6 ft)	5		
						0.6 m (2 ft)	6		
						0.7 m (2.3 ft)	7		
						0.8 m (2.6 ft)	8		
						0.9 m (3 ft)	9		

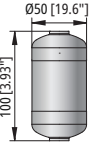
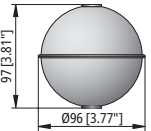
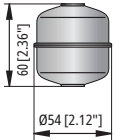
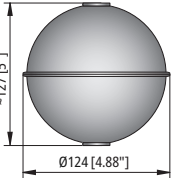
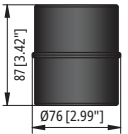
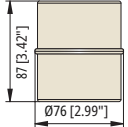
⁽²⁾ Max. 3 m (10 ft).

Note: If a float type different from the standard version is required, it must be specified in the text part of the order. See: Table 2.6 Float Selection.

2.5 Dimensions

Standard Version		Ex Version	
with BSP/NPT Connection MR□-□□□-3	with TriClamp Connection MR□-□□□-3	MR□-□00-7 Ex + MRC-105-7M-800-00	without Cable Gland MR□-□□□-8 Ex
Plastic-coated Version MP□-□□□-□	MR□-□00-3 + MRC-106-7M-900-00	Terminal Box	

2.6 Float Selection

Type	MRC-106-7M-900-00	MRC-105-7M-700-00	MRC-105-7M-		MRC-105-7M-800-00	MPP-105-3M-200-00 ⁽²⁾	MPP-105-3M-900-00
			900-00	600-00 ⁽¹⁾			
Dimensions							
Standard	■	■	■		■	—	—
Plastic-coated	—	—	—		—	■	■
Explosion-proof	■	■	■		■	—	—
Min. medium density (Specific Gravity) [kg/dm ³]	0.45	0.55	0.55	0.8	0.4	0.7	0.4
Material	Titanium	Austenitic stainless steel ⁽³⁾	Titanium	Austenitic stainless steel ⁽³⁾		PVDF	PP
Process pressure	16 bar (232 psi)		25 bar (363 psi)			6 bar (88 psi)	3 bar (43.5 psi)

⁽¹⁾ MR□-□□□-□ standard float.

⁽²⁾ MP□-□□□-□ standard float.

⁽³⁾ 1.4401 (316), 1.4404, 1.4435 (316L), 1.4571 (316Ti), etc.

3. INSTALLATION

For mounting the unit BSP or NPT threads or TriClamp can be used. Minimal gap diameter for the float is $\varnothing 55$ mm ($\varnothing 2.16$ ").

Use the M20×1.5 cable gland for electrical connection.

If a protection tube is used the minimum tube diameter should be $\varnothing 75$ mm ($\varnothing 2.95$ " (for insertion length < 1.5 m and $\varnothing 95$ mm ($\varnothing 3.74$ " for insertion length > 1.5m). When using a $\varnothing 96$ mm ($\varnothing 3.8$ " float the tube diameter should be min. $\varnothing 130$ mm ($\varnothing 5.1$ ").

WARNING!

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!

WARNING!

- 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□-□□□-8 Ex, and the device must be equipped with a properly assembled and sealed 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□-□□□-7 Ex 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 device does not require regular maintenance. The warranty terms are detailed in the warranty card. For repairs, the user must clean and disinfect the device, neutralize any chemical residues, and complete the [Returned Equipment Handling Form](#), which is available for download on our website. On the form, the user must declare the defect, provide the reason for return, and confirm that the device is clean and free of hazardous substances.

8. STORAGE CONDITIONS

Ambient temperature: $-20...+60$ °C ($-4...+140$ °F)