

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

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 | MRO-□□□□ | MP□-□□□□ | MRO-□□□□-7Ex | MRO-□□□□-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/dm ³ | min. 0.7 kg/dm ³ | min. 0.8 kg/dm ³ | |
| 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 mm ² (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 mm ² (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") | |
| 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) | |

* 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 MRO-□□□□-7Ex | Without cable gland MRO-□□□□-8Ex |
|---------------------------|-------------------------------------|-------------------------------------|
| Ex marking (ATEX) | Ex 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) | +65 °C (149 °F) | +80 °C (176 °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) |

NIVOPOINT

MR
MAGNETIC FLOAT LEVEL SWITCH

User's manual



NIVELCO



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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 | SWITCHING POINTS | CODE | PROBE LENGTH** | CODE | PROBE LENGTH** | CODE | CERTIFICATE | CODE |
|--------------------|------|------------------|------|----------------|------|----------------|------|------------------------|------|
| 1" BSP | A | 1× NO/NC | 1 | 0 m | 0 | 0 m | 0 | Standard | 3 |
| 2" BSP | C | 2× NO/NC | 2 | 1 m | 1 | 0.1 m | 1 | Ex | 7 |
| 1" NPT | D | 3× NO/NC | 3 | 2 m | 2 | : | : | Ex without cable gland | 8 |
| 2" NPT | G | 4× NO/NC | 4 | 3 m | 3 | 0.8 m | 8 | | |
| 1½" BSP | B | 5× NO/NC | 5 | 4 m | 4 | 0.9 m | 9 | | |
| 1½" NPT | E | | | | | | | | |
| 1" TriClamp | F | | | | | | | | |
| 1½" TriClamp | T | | | | | | | | |
| 2½" TriClamp | O | | | | | | | | |
| 3" TriClamp | P | | | | | | | | |
| 4" TriClamp | R | | | | | | | | |

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 - -

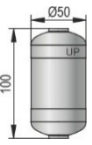
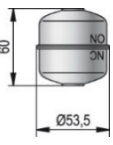
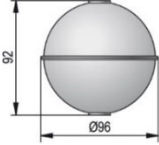
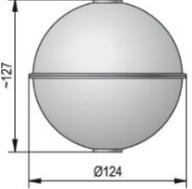
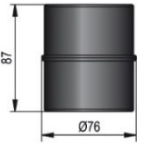
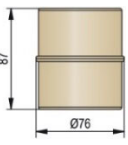
| PROCESS CONNECTION | CODE | SWITCHING POINTS | CODE | PROBE LENGTH | CODE | PROBE LENGTH | CODE | FLOAT / CERTIFICATE | CODE |
|--------------------|------|------------------|------|--------------|------|--------------|------|-----------------------------|------|
| DIN DN80, PN16 | P | 1× NO/NC | 1 | 0 m | 0 | 0 m | 0 | Ø76 PVDF or PP/ standard | 3 |
| DIN DN100, PN16 | R | 2× NO/NC | 2 | 1 m | 1 | 0.1 m | 1 | | |
| | | 3× NO/NC | 3 | 2 m | 2 | : | : | | |
| | | 4× NO/NC | 4 | 3 m | 3 | 0.8 m | 8 | | |
| | | 5× NO/NC | 5 | | | 0.9 m | 9 | | |

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

2.5. DIMENSIONS

| STANDARD VERSION MRO-000 | STANDARD VERSION MRO-000 | TERMINAL BOX |
|-----------------------------|-----------------------------|-----------------------------|
| | | |
| EX VERSION MRO-000-7M | EX VERSION MRO-000-8M | STANDARD VERSION MPO-000 |
| | | |

2.6. FLOAT SELECTION

| | 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/dm ³ | 0.55 kg/dm ³ | 0.8 kg/dm ³ | 0.55 kg/dm ³ | 0.4 kg/dm ³ | 0.7 kg/dm ³ | 0.4 kg/dm ³ |
| 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 Ø55 mm (Ø2.16").

Use the M20×1.5 cable gland for electrical connection.

If a protection tube is used the minimum tube diameter should be Ø75 mm (Ø2.95") (for insertion length < 1.5 m and Ø95 mm (Ø3.74") for insertion length > 1.5m). When using a Ø96 mm (Ø3.8") float the tube diameter should be min. Ø130 mm (Ø5.1").

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□–□□□–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 device does not require regular maintenance. The warranty card contains the terms and conditions. Before returning the device for repairs, it must be cleaned thoroughly. The parts in contact with the medium may contain harmful substances; therefore, they must be decontaminated. Our official form ([Returned Equipment Handling Form](#)) must be filled and enclosed in the parcel. Download it from our website www.nivelco.com. The device must be sent back with a declaration of decontamination. A statement must be provided in the declaration that the decontamination process was successfully completed and that the device is clean from any hazardous substances.

8. STORAGE CONDITIONS

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

mra105en2213h

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NIVELCO reserves the right to change technical data without notice!