

**Thank you for purchasing a NIVELCO product.**

## 1. APPLICATION

The **NIVOFLIP** bypass level indicator is typically used for level indication in pressurized vessels, enabling accurate measurement of the medium level. The operation of the device is based on the principle of communicating vessels. The welded bypass chamber, which forms the body of the indicator, and the tank together constitute a single pressurized system. A magnetic float inside the tube follows the medium's level changes. As it moves, the built-in magnet flips the bi-colored magnetic flaps of the lamellar display, providing a clear visual indication.

## 2. TECHNICAL DATA

### 2.1 General Data

| Type <sup>(1)</sup>                   |                  | Standard version<br>ML□-□□□-□ Ex                                                                            | High-temperature version<br>MH□-□□□-□ Ex |
|---------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Display type                          |                  | Two-toned magnetic flaps                                                                                    |                                          |
| Display                               | Scale            | cm / inch                                                                                                   |                                          |
|                                       | Accuracy         | ±10 mm (±0.4")                                                                                              |                                          |
|                                       | Resolution       | 5 mm (0.2")                                                                                                 |                                          |
|                                       | Error indication | Lower 100 mm (4"), inverse polarized flaps                                                                  |                                          |
| Tube diameter                         |                  | Ø60.3 mm (Ø2.35")                                                                                           |                                          |
| Flange distance (center to center)    |                  | 500...5500 mm (1.6...18 ft) (as per order codes)                                                            |                                          |
| Process connection                    |                  | DIN, ANSI flanges, ¾", 1" BSP / NPT (as per order codes)                                                    |                                          |
| Vent connection                       |                  | M20×1.5                                                                                                     |                                          |
| Drain connection                      |                  | DN50 / M20×1.5                                                                                              |                                          |
| Process pressure                      |                  | See 2.4 table                                                                                               |                                          |
| Test pressure                         |                  | 1.5× nominal pressure                                                                                       |                                          |
| Material of wetted parts              |                  | Housing: 1.4571 (316Ti equivalent) stainless steel, float: TiGr2 titanium                                   |                                          |
| Ambient temperature                   |                  | -60...+60 °C (-76...+140 °F)                                                                                |                                          |
| Process temperature                   |                  | -60...+130 °C (-76...+266 °F)                                                                               | -60...+250 °C (-76...+482 °F)            |
| Minimum medium density <sup>(2)</sup> |                  | 0.7 kg/dm <sup>3</sup> (0.7 S.G.)                                                                           |                                          |
| PED (2014/68/EU) approval             |                  | Category III, Module B + C2                                                                                 |                                          |
| Level switch                          |                  | Optional, externally mounted, freely adjustable MAK-100/200 level switch <sup>(3)</sup>                     |                                          |
| Level transmitter                     |                  | Optional, externally mounted NIVOTRACK<br>M□L-500/600/700 magnetostrictive level transmitter <sup>(3)</sup> |                                          |

<sup>(1)</sup> The bypass chamber version does not include a magnetic float or flip indicator and cannot be combined with a magnetic level switch or transmitter.

<sup>(2)</sup> When applying the MAK-100 level switch, the minimum medium density increases by 0.1 kg/dm<sup>3</sup> compared to the previously specified value.

<sup>(3)</sup> When using the NIVOTRACK level transmitter or the MAK-100/200 level switch, please refer to the diagram for the highest process temperature values.

| Approvals                                                                          |                                                                        | Reference Document Number |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------|
|  | ExNB ATEX, Certificate No.: ExNB20ATEX0035X                            | mld1050m0600h_10          |
|  | PED Certificate, Category II, III, Module B + C2, Category I, Module A | —                         |

## 2.3 Explosion Protection, Ex Markings, Ex Limit Data

### 2.3.1 ATEX Approval

| Type       | ML□-□□□-□ Ex, MH□-□□□-□ Ex                                                                                          |
|------------|---------------------------------------------------------------------------------------------------------------------|
| Ex marking |  II 1/2 G Ex h IIC T6...T2 Ga/Gb |

### Temperature Data for Ex Certified Models

Lowest ambient and process temperature: -60 °C (-76 °F)

| Temperature Data            | Hazardous Gas Atmospheres        |                  |                   |                                          |
|-----------------------------|----------------------------------|------------------|-------------------|------------------------------------------|
|                             | Standard version<br>ML□-□□□-□ Ex |                  |                   | High-temperature version<br>MH□-□□□-□ Ex |
| Highest process temperature | +80 °C (+176 °F)                 | +95 °C (+203 °F) | +130 °C (+266 °F) | +250 °C (+482 °F)                        |
| Highest ambient temperature | +60 °C (+140 °F)                 |                  |                   |                                          |
| Highest surface temperature | +80 °C (+176 °F)                 | +95 °C (+203 °F) | +130 °C (+266 °F) | +250 °C (+482 °F)                        |
| Temperature class           | <b>T6</b>                        | <b>T5</b>        | <b>T4</b>         | <b>T2</b>                                |

# NIVOFLIP

BYPASS LEVEL INDICATOR

USER'S MANUAL



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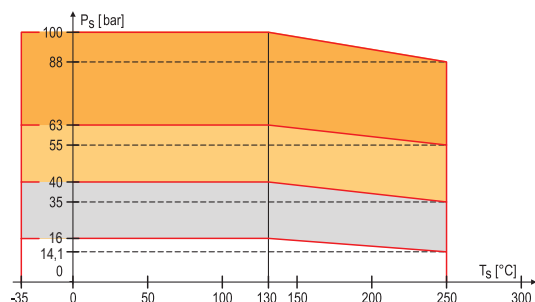
## 2.4 Highest Process Pressure

| Process Connection         | Flange Rating | Highest Process Temperature          |                          |                                      |
|----------------------------|---------------|--------------------------------------|--------------------------|--------------------------------------|
|                            |               | T <sub>MAX</sub> = +130 °C (+266 °F) |                          | T <sub>MAX</sub> = +250 °C (+482 °F) |
|                            |               | Standard Version                     | High-temperature Version |                                      |
|                            |               | Maximum Process Pressure             |                          |                                      |
| DIN flanges<br>DN15...DN50 | PN16          | 16 bar                               | 14.1 bar                 |                                      |
|                            | PN40          | 40 bar                               | 35 bar                   |                                      |
|                            | PN63          | 63 bar                               | 55 bar                   |                                      |
|                            | PN100         | 100 bar                              | 88 bar                   |                                      |
| ANSI flanges<br>½"...2"    | Class 150     | 232 psi                              | 204 psi                  |                                      |
|                            | Class 400     | 580 psi                              | 500 psi                  |                                      |
|                            | Class 600     | 930 psi                              | 800 psi                  |                                      |
|                            | Class 900     | 1440 psi                             | 1275 psi                 |                                      |

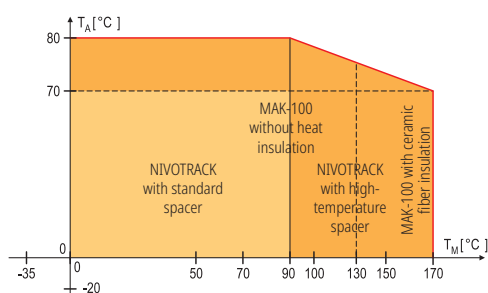
## 2.5 Temperature Diagram

### Temperature ( $T_S$ ) – Pressure ( $P_S$ ) diagram

When the high-temperature version is used in a lower temperature range, the maximal process pressure can be increased in accordance with the following diagram:



### Process temperature ( $T_M$ ) – Ambient temperature ( $T_A$ ) diagram when NIVOTRACK level transmitter or MAK-100/200 level switch is mounted on NIVOFLIP



## 2.6 Accessories

- User's manual
- EU-Declaration of Conformity
- Product Assessment Report
- Warranty Card
- Material Document of all applied parts

## 2.7 Order Codes (Not all combinations are possible)

| Type                                    |      | Process connection     |      | Nom. Pressure / Lamella housing material |      | Measuring range (center to center) <sup>(4)</sup> |            | Scale                                 |      |
|-----------------------------------------|------|------------------------|------|------------------------------------------|------|---------------------------------------------------|------------|---------------------------------------|------|
| Code                                    | Code | Size                   | Type | Code                                     | Code | Code                                              | Code       | Code                                  | Code |
| Standard <sup>(1)</sup>                 | L    | DN15                   | A    | PN40; Class 400 / Aluminum               | 1    | 0                                                 | 0          | mm scale                              | 1    |
| High-temperature version <sup>(2)</sup> | H    | DN20                   | B    | PN63; Class 600 / Aluminum               | 3    | 1                                                 | 1 m (40")  | feet/inch scale                       | 3    |
|                                         |      | DN25                   | C    | PN100; Class 900 / Aluminum              | 4    | 2                                                 | 2 m (80")  | Bypass chamber version <sup>(5)</sup> |      |
|                                         |      | DN40                   | D    | PN16; Class 150 / Aluminum               | 5    | 3                                                 | 3 m (120") | Device connection                     |      |
|                                         |      | DN50                   | E    | PN40; Class 400 / Stainless steel        | 6    | 4                                                 | 4 m (160") | ¾" BSP                                | A    |
|                                         |      | ANSI ½"                |      | PN63; Class 600 / Stainless steel        | 7    | 5                                                 | 5 m (200") | ¾" NPT                                | B    |
|                                         |      | ANSI ¾"                |      | PN100; Class 900 / Stainless steel       | 8    |                                                   |            | 1" BSP                                | C    |
|                                         |      | ANSI 1"                |      | PN16; Class 150 / Stainless steel        | 9    |                                                   |            | 1" NPT                                | D    |
|                                         |      | ANSI 1½"               |      |                                          |      |                                                   |            | 1½" BSP                               | E    |
|                                         |      | ANSI 2"                |      |                                          |      |                                                   |            | 1½" NPT                               | F    |
|                                         |      | ¾" BSPT <sup>(3)</sup> |      |                                          |      |                                                   |            | 2" BSP                                | G    |
|                                         |      | ¾" NPT <sup>(3)</sup>  |      |                                          |      |                                                   |            | 2" NPT                                | H    |
|                                         |      | 1" BSPT <sup>(3)</sup> |      |                                          |      |                                                   |            |                                       |      |
|                                         |      | 1" NPT <sup>(3)</sup>  |      |                                          |      |                                                   |            |                                       |      |

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

<sup>(1)</sup> Up to +130 °C (+266 °F). <sup>(2)</sup> Up to +250 °C (+482 °F), as per pressure diagram.

<sup>(3)</sup> Up to 40 bar (580 psi).

<sup>(4)</sup> Up to 5.5 m (18 ft).

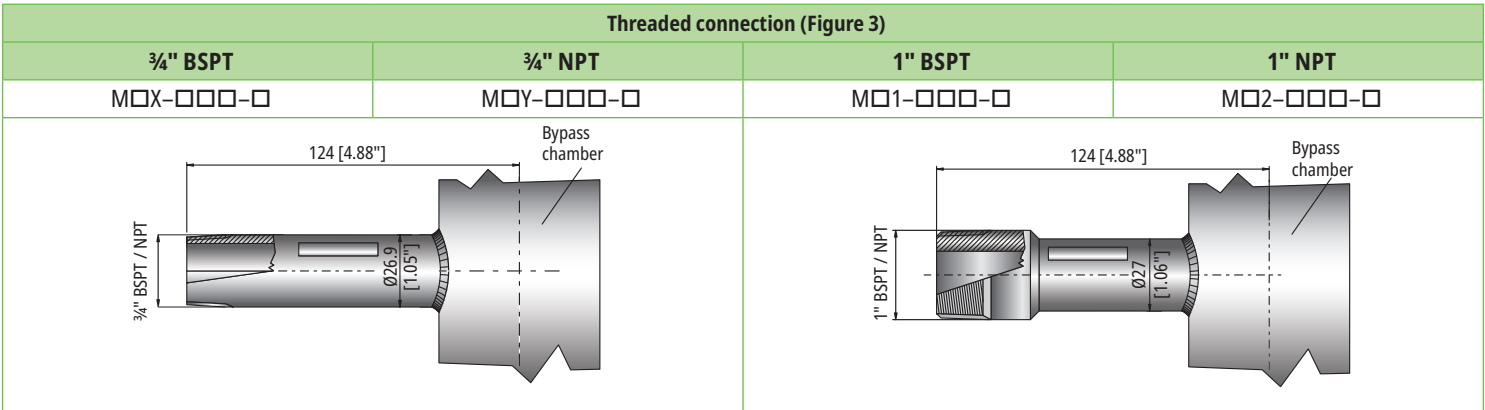
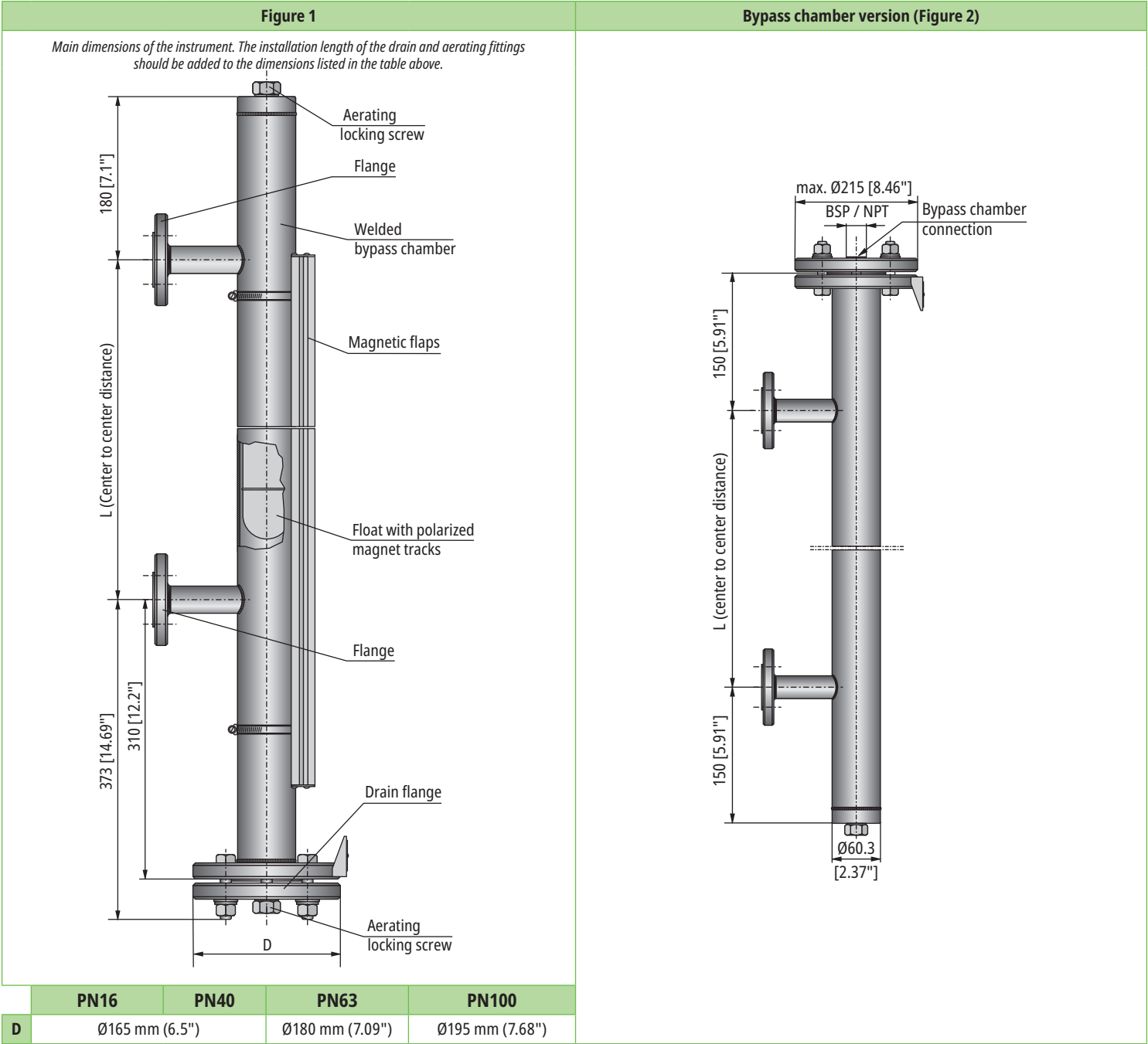
<sup>(5)</sup> Without float and flip.

2.8 Mechanical Construction

The main components of the device are shown in Figure 1:

- Welded measuring tube (the medium to be measured or displayed flows through this tube)
- Float incorporating a polarized magnet (follows the level of moving medium, operates the bi colored flaps, or the sensor of a magnetostrictive transmitter via magnetic coupling)
- Magnetic flap display (visually indicates the level change by flipping the bi-colored magnetic flaps)
- Drain connection (pressure-tight closure of the bottom opening of the welded measuring tube)
- Aerating connection (seals the top of the measuring tube and allows for venting)
- Drain screw (used to discharge the medium from the measuring tube or tank and to close the pressure vessel)

In the case of bypass chamber versions (Figure 2) the device does not come with a magnetic float and magnetic flaps indicator



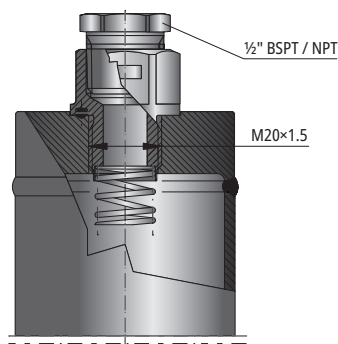


Figure 4. Aerating screw

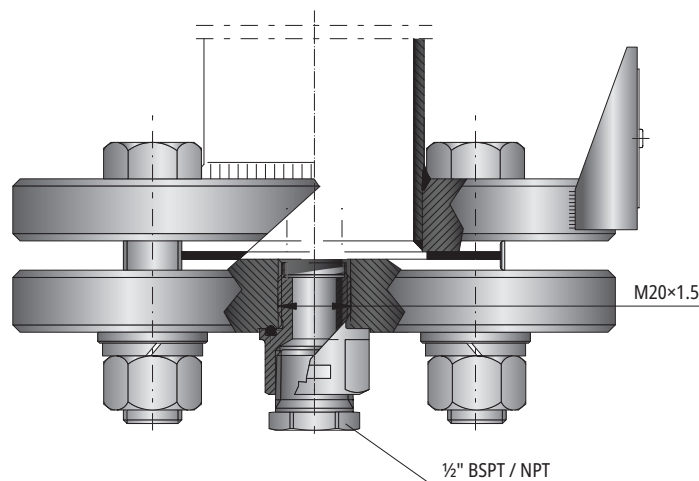


Figure 5. Drain screw

## Aerating Screw Selection

Material: 1.4571 (316Ti equivalent), PED 3.1

| Name                    | Description                                          | Code              |
|-------------------------|------------------------------------------------------|-------------------|
| Plug                    | M20×1.5 plug                                         | standard          |
| Threaded nipples + plug | M20×1.5 / 1/2" M-BSP inner                           | MLD-105-0M-611-00 |
|                         | M20×1.5 / 1/2" M-NPT inner                           | MLD-105-0M-621-00 |
|                         | M20×1.5 / 3/4" M-BSP inner                           | MLD-105-0M-631-00 |
|                         | M20×1.5 / 3/4" M-NPT inner                           | MLD-105-0M-641-00 |
|                         | M20×1.5 / 1/2" M-BSP inner, high-temperature version | MHD-105-0M-611-00 |
|                         | M20×1.5 / 1/2" M-NPT inner, high-temperature version | MHD-105-0M-621-00 |
|                         | M20×1.5 / 3/4" M-BSP inner, high-temperature version | MHD-105-0M-631-00 |
|                         | M20×1.5 / 3/4" M-NPT inner, high-temperature version | MHD-105-0M-641-00 |

## Aerating End Section / Drain End Section Selection

Material: 1.4571 (316Ti equivalent), PED 3.1

| Name       | Description                                            | Overhang from standard | Code           |
|------------|--------------------------------------------------------|------------------------|----------------|
| Ball valve | 1/2" BSP MF. 63 bar / 914 psi (max. +180 °C [+356 °F]) | 60 mm (~2.5")          | MLD-105-0M-711 |
|            | 1/2" NPT MF. 63 bar / 914 psi (max. +180 °C [+356 °F]) |                        | MLD-105-0M-721 |

## 2.9 Floats

| Code                              | MLC-105-1M-700-00            | MLC-405-1M-200-00  |
|-----------------------------------|------------------------------|--------------------|
| Dimensions                        |                              |                    |
| Medium density (Specific gravity) | 0.7...1.1 kg/dm <sup>3</sup> |                    |
| Material                          | Titanium                     |                    |
| Process pressure                  | 63 bar (913 psi)             | 100 bar (1450 psi) |

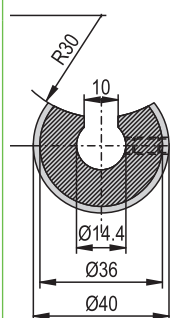
### 3. MOUNTING

Before installing the unit, ensure that the process connection has the proper dimensions and that the size and position of the screws are suitable for secure mounting.

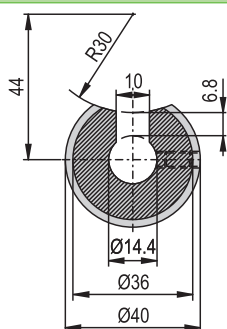
The unit is to be mounted on suitable connection flanges located on the side of the pressurized vessel. The distance between the flanges, center-to-center, is within the nominal range of the unit. The two flanges are at the low and high levels that need to be indicated or measured. The sealing of the welded chamber and the closing flanges must be pressure-resistant, and the sealing material must be chemically resistant to the measured medium. Always use the delivered sealings if the application does not require any other special sealings. Using two layers to increase the thickness of the sealing is not permitted. Avoid the over-tightening of the sealing. Usage of reinstalled sealing is not permitted. A unit with a damaged sealing surface cannot be sealed properly.

The plastic protecting plug and the locking element should be removed from the process connection to provide free movement of the float and the medium. In the event of further transportation of the unit, the float must be fixed to the bottom process connection to protect it against mechanical impacts.

#### Standard version



#### High-temperature version, heat-resistant design, 1.4301 (304 equivalent) stainless steel plate housing



### 3.1 NIVOTRACK Mounted on NIVOFLIP

The length of the magnetostrictive level transmitter's probe must be 300 mm (11.8") longer than the center-to-center distance of the bypass tube, which may vary depending on the float type. The transmitter is positioned so that the starting point of the magnetostrictive probe aligns with the top of the bypass tube. The bottom end of the probe must extend at least 100 mm (3.94") below the lower process connection. The aluminum spacers supplied with the transmitter are fixed to the probe stem using grub screws, and the assembly is clamped onto the bypass tube. In high-temperature versions, a ceramic fiber insulation fabric covered with a stainless steel sheet is installed between the bypass tube and the probe to provide thermal protection.

### 4. COMMISSIONING AND SETTING UP

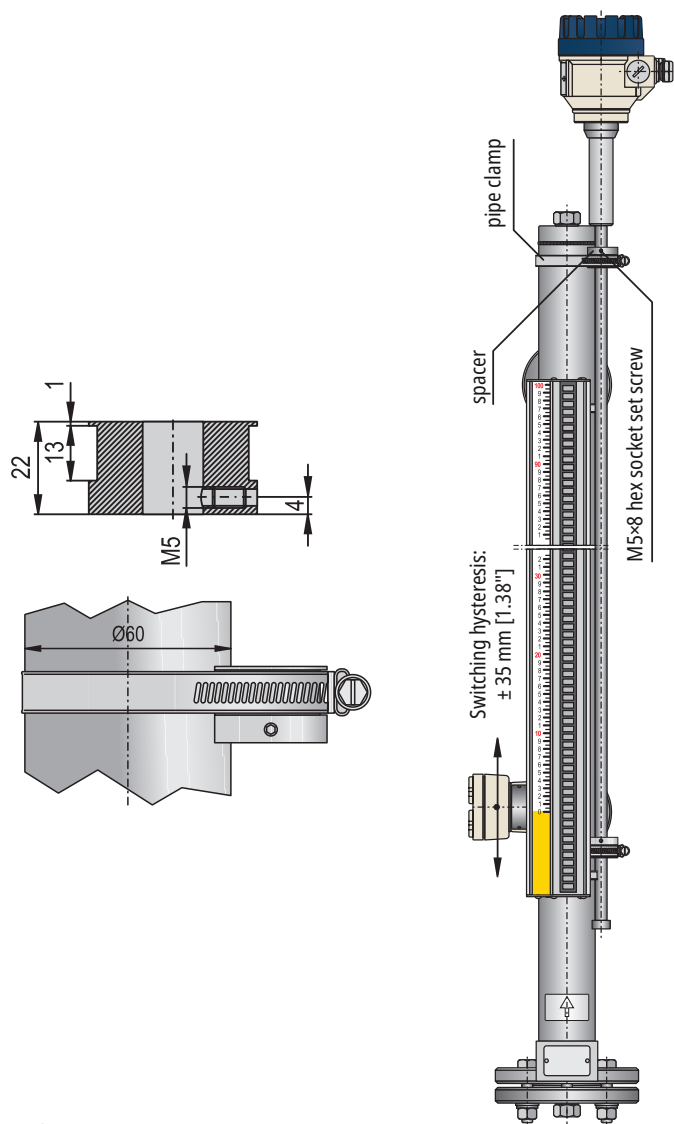
Before putting the system under process pressure, proper sealing of the connection flanges should be checked. Units are adjusted at the manufacturer to material with 1.0 kg/dm<sup>3</sup> medium density (specific gravity). When the measured medium has a different density, the magnetic flaps display can be adjusted by loosening the fixing clamps. The stickered scale helps to find the right position. After finding the right position, fixing clamps should be fastened.

### 5. CONDITIONS FOR SAFE OPERATION

- Before switching on the device, ensure that the installation is correct and that there are no visible defects.
- The device may only be used within the limitations specified in the technical specifications.
- **Attention!** The device may contain plastic components capable of accumulating static charge. The presence of electrostatic charge poses a risk of spark generation and ignition; therefore, in Ex environments, electrostatic charges must be completely prevented!
  - Avoid friction on plastic surfaces!
  - Do not clean the device using dry methods!
  - For example, use a damp cloth.

### 6. 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.



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Information is accurate to the best of NIVELCO's knowledge.  
We reserve the right to change specifications at any time