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Operating manual

for the level switches (vertical installation): NBS, NM-, NMS-, SB, NR, LC-, NA, NB

Table of contents

1 General safety notes, usage

This operating manual must be locally stored so that it can always be accessed.
All procedures described within this operating manual may only be performed by trained personnel authorised by the operator with corresponding protective gear.

1.1 Safety signs and symbols

Danger signs and symbols are marked as noted below for this operating manual:

	Warning! Symbol warns of ensuing danger, death, grave bodily injury and/or severe material damages due to carelessness.
	Attention! Symbol warns of possible dangers or harmful situations that arise due to not observing damage to the device and/or to the surroundings.
	Note! Symbol refers to procedures that have an indirect influence on operation due to carelessness, or which can trigger an unforeseen reaction.

Table 1

1.2 Safety notes

Read the product information before activating the device. Ensure that the product is indefinitely suitable for the usage in question.
The operator is responsible for the error-free operation of the device. He is obligated to determine and observe adherence to the required work and safety measures of the respectively valid stipulations during the full duration of application.

1.3 Product liability and warranty

This operating manual contains the instructions for assembling and operating the device safely in the stipulated manner. Should any difficulties arise that cannot be solved by using the operating manuals and product information, additional information must be retrieved from the manufacturer. The manufacturer reserves all rights to technical changes and improvements. Usage of this operating manual requires the appropriate qualification of the user. The operating personnel is also subject to the operating manual.

1.4 Standards and guidelines[1]

- DIN EN 60947-5-1
- Low-voltage directive 2014/35/EU
- RoHS - Guideline 2011/65/EU

2 Product description

Oftentimes, with applications, the necessity arises to ensure a minimal level, e.g. with lubrication or coolants. With the level switches (vertical installation), based on installation position[2], various levels may be monitored. To this end a change in state of the microswitch/reed switch is conducted. A safeguard against shortage can thereby be achieved. It is also possible to monitor increasing level values.

[1] The specified standards and guidelines apply to products with an electrical connection.
[2] Find the permitted installation positions in the product information

2.1 Active principle

Vertical installation

With the device group level/limit/extent the controller is installed in the lid or in the base of the container. With an increasing/decreasing level a magnet-mounted floater controls the reed switch hermetically moulded in the pipe[3] contact-free. The functionality (e.g. min. or max. supervision) depends on the current installation position.

Sight glass

Via the level display (NBS/NA/NB) an optical monitoring of the current level can be performed. The level is directly displayed.

2.2 Product contents[4]

- Enclosed with the product are an operating manual and the corresponding product information.
- To avoid any transportation damages, the devices are equipped with threaded plugs or protective bags.
- When operating the device with valve connector DIN 43650-A, the mating plug is provided with the product contents.

3 Structure of the devices

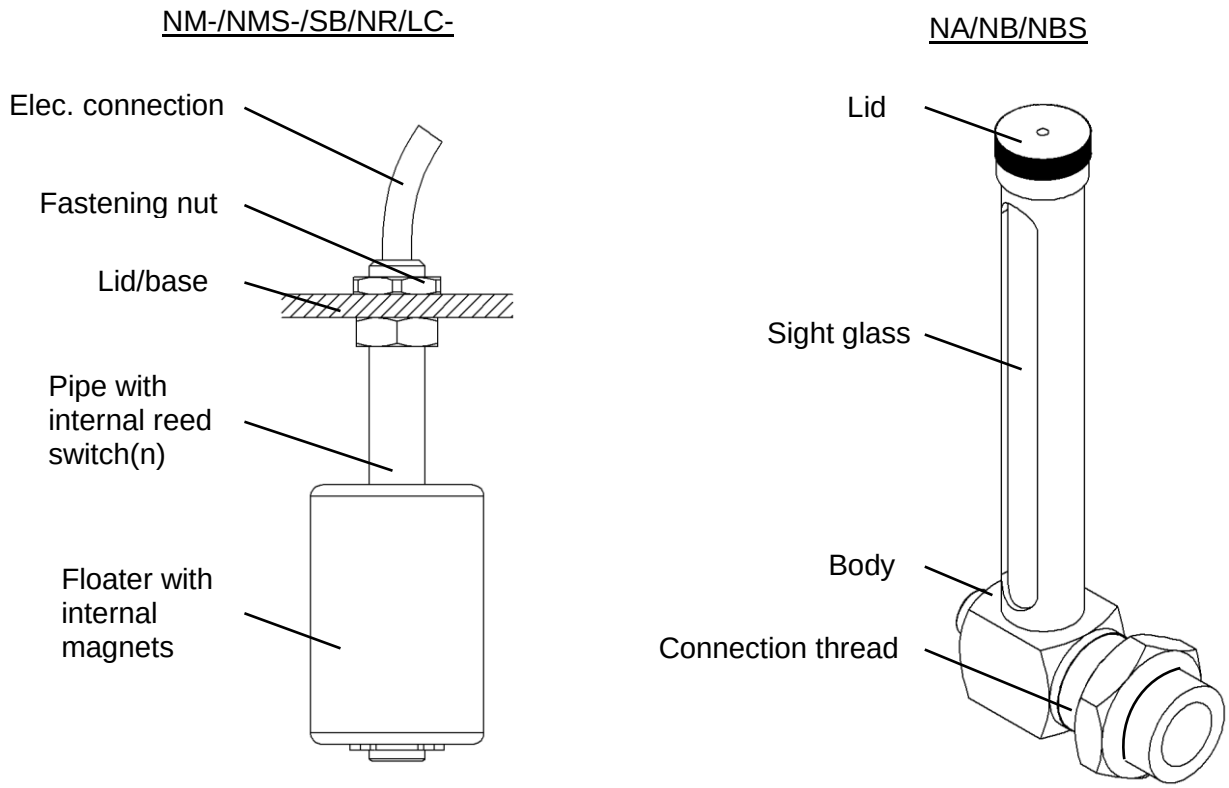

Figure 1: Schematic diagram of the devices NM-/NMS-/SB/NR/LC- and NA/NB/NBS

[3] The device NBS is a level indicator. The level is shown in a sight glass via a sight ring. The level switch LC- can supervise various levels via multiple vertically aligned contacts.
[4] A deviating schematic can be provided with special devices.

3.1 Appropriate usage

The level switch captures the current level of the fluid medium and activates the microswitch/reed switch depending on the installation position. The device may only be employed for the medium stated in the product information.
The level display is not intended for operation with gaseous media or ferritically loaded media. This product is intended for application in machinery and facilities and for the application of media of the fluid group II as per Guideline 2014/68/EU. The product does not fall under Guideline 2014/68/EU and also receives no CE label in accordance with this guideline.
The stated limit values may never be exceeded (the data can be found in the product information).

4 Assembly and installation

To ensure flawless usage of our devices, the following points must be observed during assembly and installation:

4.1 Mechanical assembly

- Take the appropriate measures to prevent freezing of the medium. Should the device later be subjected to an ambient temperature <4°C, no operation with pure water may be performed. Frost damage may be caused by water remaining in the device.
- Note the permitted installation positions from the product information.
  By retrofitting the floater the switch function can be changed.
- The device may never serve as a fixed point.
- The connector flanges/threads must be compatible.
- A filter should be provided for heavily spoiled media.
- Note that external magnetic fields in the immediate vicinity of the device can influence the functionality of the device. Assembling the device on ferromagnetic materials also changes the switch point/display value.
- For devices with flanges, the seal between the flanges must be centred.
- Do not exceed the operating pressure stated in the product information, and do not exceed/undercut the stated temperature range.
- When soldering/welding the process connections, the device as well as all O-rings must be dismantled to avoid damages.
- The devices must be mounted vertically for flawless functionality.
- Corrugation and sideways flow can lead to a faulty indicator. This influence can be reduced via a so-called "surge pipe".

4.2 Electrical installation

The device may only be installed by an electrical specialist. The respective national and international regulations on installing electrical facilities of the respective operator country apply.

- The schematic must be the reference for wiring the device.[5]
- When connecting a power supply, a load must be serially connected.
- The electrical statements for switches apply to ohmic loads. Capacitive and inductive loads should be operated with a protective circuit (see 4.4).
- Always set the electrical unit to be volt-free before installing the connection cable!

[5]The schematic is provided with the device or can be found in the respective product information.

4.3 Electrical connection-panel connector DIN 43650-A

- Loosen the fastening screw pos. 3 (M3x30) and pull socket pos. 2 from connector plug pos. 1 (Fig. 2). Remove the fastening screw.
- Open the inner portion of the socket pos. 2, e.g. with a screwdriver (Fig. 3)
- Loosen the cable screw gland pos. 4 (Fig. 4)
- Lead the connection line through the cable screw gland pos. 9, the pressure ring pos. 8 and the rubber insert pos. 7 into the socket (Fig. 5).
- Connect the connection lead according to the schematic.
- Press the inner portion until it locks in the socket pos. 2. After introducing the fastening bolt, tighten the cable screw gland (Fig. 6).
- Plug socket no. 2 into connector plug pos. 1 and refasten the fastening bolt pos. 3.

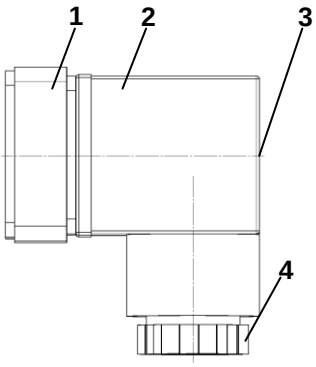

Figure 2

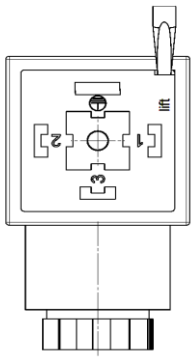
Figure 3

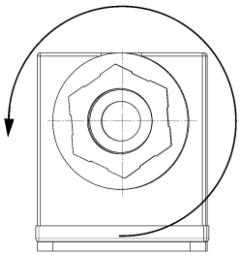
Figure 4

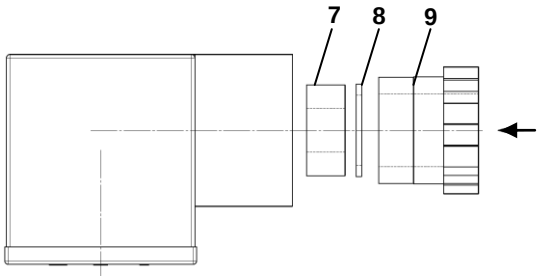

Figure 5

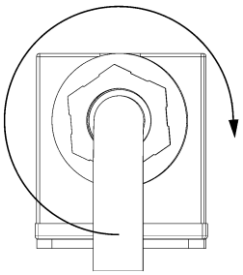
Figure 6

4.4 Contact protection measures for devices, especially reed switches

With capacitive and inductive loads or when operating light bulbs, current or voltage peaks may influence the lifespan of the contacts. To achieve a maximal lifespan or to prevent damage to the contacts, a protective circuit should be undertaken in such cases.

Contact protection with inductive load.
With inductive loads a break spark (electric arc) forms when opening the reed switch. There are two common protective circuits for reducing self-inductance:

- For AC voltage, the user protects the reed switch with an R-C element.
- With an inductive load and DC voltage, the reed switch is protected by a catch diode (e.g. 1N4007).

Contact protection with capacitive load.
Capacitive loads primarily arise due to long conduits (>50m). To counteract the loads it is often sufficient to serially switch a resistor. The resistance value should correspond in the voltage value (e.g. 24 V = 24 Ω).

Contact protection for lamp load.
The resistance of a filament is some 10 times smaller in a cold state than in a glowing state. During activation this leads to a 10-fold starting current, if perhaps briefly. To circumvent the problem we recommend LEDs (for instance) instead of light bulbs.

5 Operation elements and functions

5.1 Function/setting

The devices NM- and NMS- can alternate their switch function via the optional lid or base assembly.
With the device NR there exists the possibility, to select up to four contact units aligned vertically in the pipe as a switching point. These can be individually set through a perforated strip.[6]

6 Activation, operation and maintenance

6.1 Activation

Before activation note the limit values stated in the product information, such as for power, voltage, pressure stage, temperature range or maximum permitted flow.

- If present, the transport lock must be removed.
- When operating with protective covers, remove them immediately before assembly.
- Properly tighten the device during assembly.
- Note that the switching point/display value can change during fluctuating viscosity.
- Endurance must be assessed with aggressive media.
- A change in medium and/or its composition may result in a faulty indicator and/or a flawed switching point.
- The medium to be assessed may never fall below the min. stated density (g/cm³).[7]
- To avoid heavy pressure surges we recommend that you fill and ventilate the system before activation. Pressure surges may not exceed the value of PN/PS.
- The stated switching range is strictly based on decreasing level (shortage protection). Stop position + hysteresis[8]= switch-on point.
- Ensure that both the assembly as well as the electrical connection is conducted properly.
- Observe the re-attachment/repeated maintenance of any present safety installations.
- The devices NBS/NA/NB have a ventilation hole in the lid. The lid must always rest higher than the highest level in the sheeted container so that no medium can exit.
- Ferritic particles can remain stuck to the magnets of the level switches and thus cause a blockage.
  Media with ferritic particles should be cleaned with a magnetic filter or other monitoring techniques for level supervision must be applied; e.g. type MWI.

6.2 Operation/maintenance

With the devices NBS/NA/NB it may be necessary, to clean the ventilation hole in the lid when possible.
The devices operate with pure medium free of repairs.

[6] The switch contacts NR-000/001 must be separately ordered for the NR devices. The exact activation and installation of the switch contacts can be found in the product information.
[7] See product information.
[8] Hysteresis: all mechanical devices exhibit a hysteresis (switching point, display difference between increasing and decreasing level).

7 Technical information

The technical information can be found in the product information. This is included with the product or may be downloaded at http://www.ghm-messtechnik.de/en/products/b-sensors-and-instrumentation/b3-fill-level-limit-value-level.html.

8 Device transportation and storage

Storage

- Please observe the storage temperature.[9]
- A desiccant or heating against the formation of condensation is recommended in moist areas.

Transport

- Please observe the transportation temperature.[10]
- Prevent environmental influences such as impacts, blows, dust and vibrations.

9 Return

The legal regulations for protecting the environment and our personnel require that returned devices which have come into contact with toxic and hazardous materials can be treated with no risks to personnel and the environment.
Should you return a device to us for evaluation, repair or disposal we ask that you strictly adhere to the following regulation:

A return form can be downloaded on our homepage at:
http://www.ghm-messtechnik.de/en/downloads/ghm-forms.html.
Acceptance from GHM-Honsberg can only occur if

1. a filled-out form is provided with each return,
2. packing is applied that prevents damage to the device,
3. the device is cleaned so that no dangers are present,
4. the filled-out form and, if necessary (hazardous materials), a safety data sheet of the measurement medium is applied to the outside of the packaging.

10 Disposal

During disposal, a material separation and recycling of the device components as well as the packaging must be observed. The legal stipulations and guidelines valid at this point in time must be adhered to.
The device may not be disposed of in a residual waste bin. Should a disposal of the device take place, send it directly to us with the return form filled out under point 9. We take over the appropriate and professional disposal.

11 Disclaimer

[9] See product information: ambient temperature
[10] See product information: transportation temperature