Operating Instructions

for

Magnetostrictive Level Transmitters

Model: NMS

We don't accept warranty and liability claims neither upon this publication nor in case of improper treatment of the described products.

The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.
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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC machinery directive.

3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.
Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:
The standard delivery includes:

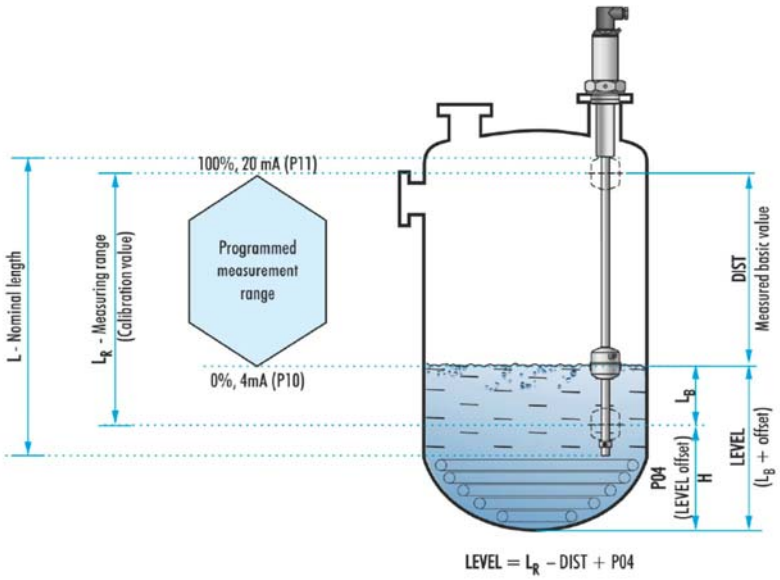
- Magnetostrictive Level Transmitters model: NMS
- 1 x gasket (klingerit oilit) for BSP threads only

4. Regulation Use

Any use of the device, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

NMS series working on the magnetostrictive principle are suitable for high accuracy level measurement of storage tanks. Due to their high temperature and pressure rating these units can also be used for level gauging of technological tanks. The 2-wire magnetostrictive level transmitters are an ideal solution for high accuracy measurement of clean fluids.

5. Operating Principle



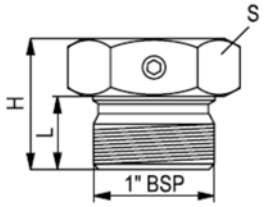
The magnetostrictive transmitter is using the special feature of the magnetostrictive wire spanned in the rigid probe. A magnetic field excited in the magnetostrictive wire develops an acoustic wave in the wire. From the interference point with the magnetic disc placed in the float the wave travels back to the electronics with defined velocity. Measurement is based on the time of flight of the acoustic wave since it is proportional with the distance of the float from the electronics.
The above distance constitutes the basis for all output signals of the NMS! With the help of further mechanical data level can be calculated.

5.1 Accessories to be ordered

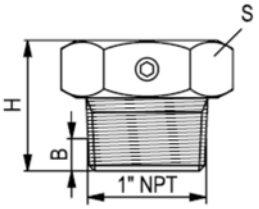
Model	Connection/Material/Size
ZUB-NMB/S	**For NMS-S** **CER25** = Sliding sleeve/stainless steel 1.4571/1” BSP **CER50** = Sliding sleeve/stainless steel 1.4571/2” BSP **CEN25** = Sliding sleeve/stainless steel 1.4571/1” NPT **CEN50** = Sliding sleeve/stainless steel 1.4571/2” NPT **For NMS-K** **CPR25** = Sliding sleeve / PVDF (sleeve), PP (flange) / 1" BSP **CPN25** = Sliding sleeve / PVDF (sleeve), PP (flange) / 1" NPT **F6F80*** = PP flange / PVDF (sleeve), PP (flange) / DN80, PN16 **F6F1H*** = PP flange / PVDF (sleeve), PP (flange) / DN100, PN16

* sliding sleeve CPR25 must be ordered in addition

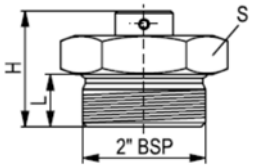
ZUB-NMB/S-CER25



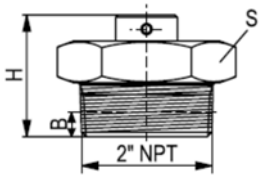
ZUB-NMB/S-CEN25



ZUB-NMB/S-CER50

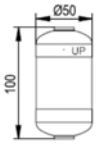
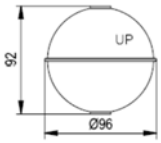
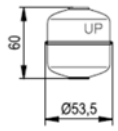
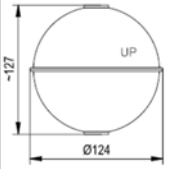
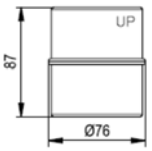
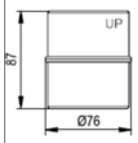


ZUB-NMB/S-CEN50



ATTENTION! During installing or removing the device when screwing the sliding sleeve into or out of the flange, make sure that the measuring tube is not twisted as this may cause the device malfunction. Hold the rigid tube section to prevent the unit from turning. Do not loosen the sliding sleeve when the tank is under pressure!

5.2 Float selection

Type	Code "4" [1]	Standard	Code "3" [1]	Standard [1]	Code "2"	Standard	Code "5"	Standard [2]
Dimensions								
Medium Density (min.)	0.45 kg/dm^3	0.55 kg/dm^3	0.55 kg/dm^3	0.8 kg/dm^3	0.4 kg/dm^3	0.7 kg/dm^3	0.4 kg/dm^3	0.8 kg/dm^3
Material	Titanium	1.4435	Titanium	1.4404	1.4401	PVDF	PP	1.4404
Medium pressure	1.6 MPa (16 bar)		2.5 MPa (25 bar)			0.3 MPa (3 bar)		1 MPa (10 bar)

[1] Designed for min. 2" process connection.
[2] Designed for min. 1" process connection, only with mini version.

If the float removed, when reinstalling it, make sure that the "UP" marking is on the top of the float. Ensures that the float is mounted back in the correct position and that the fastening nut is securely fixed in the position before dismantling. If a float larger than 2" is used, it is recommended to order a pre-mounted flange.

ATTENTION! If the fastening nut is not secured properly, the float may slide off the measuring tube when the tank is empty, causing the instrument to be unable to measure!

6. Integration into the technological process (installation, wiring)

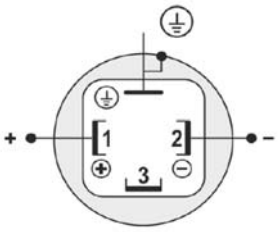
- When choosing the installation place please ensure proper space for later calibrations, verification or maintenance service.
- Waving, vortex or vibration effects have negative influence on the measurement accuracy. To avoid these effects, the mounting placement should be as far as possible from the sources of these disturbing effects for instance from openings of filling or emptying. These effects can be attenuated in applications with rigid tube probes by the use of stilling pipe along the whole probe. Please consult with a KOBOLD MESSRING distributor!
- To ensure consistent and durable operation the measurement medium should be free of suspended solid materials, which could stick between the float and the probe.
- **The unit should be protected against direct heat radiation.**
- Prior to the installation the mounting dimensions of the unit and the tank as well as the calculations should be checked carefully.
- Prior to the installation a preliminary operation check is suggested.
- If necessary to change the default factory settings the programming should be performed in accordance to the description in the 7th chapter.
- The units are offering a wide variety of process connections according to the available order codes. The tank opening should be fit for the selected level transmitter by means of the insertion hole is bigger than the float diameter. If this is not possible the float has to be removed from the probe and when the unit is mounted into the tank the float can be mounted from inside of the vessel. The “UP” marking on the float ensures that the float is mounted back in the correct position. See the drawing! Prior to finishing the mounting, the spacer needed to assemble back between the float and the counterweight.

ATTENTION!
In order to avoid damaging the probe, do not put it to torsion when installing or removing the unit. Therefore, special care has to be taken when the process connection is being screwed into or out of the flange. The best is to hold the rigid part of the probe with a suitable tool as long as the process connection is tightened to its place. Sliding sleeve must not be loosened during operation.

6.1 Wiring

This transmitter is designed to operate on 12.5…36 V DC power only.

The measured voltage on the terminals of the unit should be at least 12.5 V. Using transmitter with HART® a terminal resistance with a minimum value of 250 Ω should be applied.



CAUTION! the enclosure of the transmitter should be grounded. Grounding resistance should be R ≤ 1 Ω. Shielding of the interconnecting cable should be grounded at the control room side. To avoid disturbing noises the interconnecting cable must not be led near to high voltage cables. Especially critical are inductive couplings of AC harmonics against which the protection of shielding is not effective.

7. Programming

LED display:

- continuously lit: normal operation
- off, 1 brief flash: no echo
- off, 2 short flashes: excitation signal generation error
- off, 3 short flashes: current generator fault, current output does not match device set program
- lit, 1 short-term non-lighting: saturation

Parameters can set using a HART ® modem Typ HARTCOMM or configuration software NUS-NTB-NRM-SW abailable for download at www.kobold.com.
Parameters are entered as 4 place value decimal numbers for the parameters where it's indicated. Indication of each place value ' **d c b a** ', unused place values in the description: (-). The instrument ignores unused place values.

P0: - c b -: Measuring unit, Dimension of the measuring unit
Parameter: **P0:c**, Measuring unit
Description: This should be configured as the first step of the programming. Here you can choose the default unit system:

- c = 0: EU – European unit system
- c = 1: US – Anglo-Saxon unit system

Default measuring unit system: c = 0: EU
Parameter: **P0: b**, Dimension of the measuring unit
Description: The dimension of the unit can be specified in this menu:

- EU European unit system: b = 0: m; b = 1: cm; b = 2: mm
- US Anglo-Saxon unit system: b = 0: ft; b = 1: inch

Default measuring unit: b = 2: mm

ATTENTION! If the unit system or measuring unit is changed, after a warning message the device resets all the parameters.

P1: - - - a: Primary value (PV) source
Parameter: P1: a
This mode determines the primary value and the displayed value. It also determines the value which will be proportional to the output current.
• • a=0: DISTANCE
• • a=1: LEVEL
Default value: a=0 (DISTANCE)

P4: Zero-point offset
Description: This Parameter is used for zero-point offset. In level measurement mode the zero level is meant at the lowest position of the float. Due to the construction of the device, it cannot able to measure the level through the whole height of the tank, because it may not reach the bottom of the tank. In this Parameter the distance between the lowest position of the float and the bottom of the tank can be entered.
The offset value will be a negative value (the value of the Parameter is always the distance between the lowest position of the float and the zero-point offset of the measurement) this negative number should be entered into the Parameter if the measurement range needs to be decreased virtually. The absolute value of this number shall be less than the active measurement range. Wrong configuration of the zero-point offset can result negative level display. The current output can go below 4 mA, but saturates at 3.9 mA.
If there is no need to use Zero-point offset, enter zero in the parameter.
Default value: 0.

P8: Fixed output current
Description: Parameter for setting the fixed output current, but this only appears on the output when parameter P12: b is set to MANUAL.
Values between 3.8 and 20.5 can be entered. The output current will be set to the entered value and analogue transmission will be suspended. This error indication overrides all other error indication.
Default value: 4 mA

P10: Output current value 4 mA
Description: Measured value assigned to 4 mA. The transmitted value is in accordance to the primary value (PV) (P01:a).
Assignment can be done that the change in measured value and the change in the output value are the same (normal), or opposite directional (inverse operation). For example: 1 m level is 4 mA, 10 m level is 20 mA, or 1 m level is 20 mA and 10 m level is 4 mA.
Default value: 0 mm

P11: Output current value 20 mA
Description: Measured value assigned to 20 mA. The transmitted value is in accordance to the primary value (PV) (P01:a).
Assignment can be done that the change in measured value and the change in the output value are the same (normal), or opposite directional (inverse operation). For example: 1 m level is 4 mA, 10 m level is 20 mA, or 1 m level is 20 mA and 10 m level is 4 mA.
Default value: Maximum measurement range accordance to the nominal length of the device (mm).

P12: - - b a: Output current mode, Error mode
Parameter: P12: b, Output current mode
Description: Current transmitter mode [AUTO, MANUAL]

- b = 0: AUTO, output current value is calculated from the measured value.
- b = 1: MANUAL, The Output current is the fixed current set-in parameter P8. In this case, the output current error setting is not valid either!

Default value: AUTO Parameter: P12: a, Error mode
Description: “Error indication” by the current output

- a = 0: HOLD, Error indication has no effect on the output current. In this case, it holds the last valid measurement result at the output.
- a = 1: 3.8 mA, Error indication: the output current gets 3.8 mA.
- a = 2: 22 mA, Error indication: the output current gets 22 mA.

Attention! This error indication is active unless the failure is fixed, or until the failure terminates. Default value: HOLD

P19: HART polling address
Description: HART polling address of the device (0…15).
The polling address can be set between 0 and 15. For a single instrument the polling address is 0 and the output is 4…20 mA (analogue output).
If multiple units are used in HART Multidrop mode (max. 15 pcs.) the polling addresses should differ from 0 (1…15), in this case the output current will be fixed at 4 mA.
Default value: 0

P20: Damping time
Description: Damping time is used to damp the unwanted fluctuations of the output and display. If the measured value changes rapidly the new value will settle with 1% accuracy after this set time. (damping according to an exponential function).
Adjustable values: 0…99 sec.
Default value: 0 sec

8. Maintenance and repair

NMS units do not require maintenance on a regular basis. The warranty conditions are included in the warranty card.
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 Material Authorisation) must be enclosed. 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.

9. Storage conditions

Unused devices must be stored within the ambient temperature range specified in the technical data, and a maximum of 98% relative humidity.

10. Technical Information

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

11. Order Codes

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

12. Dimensions

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

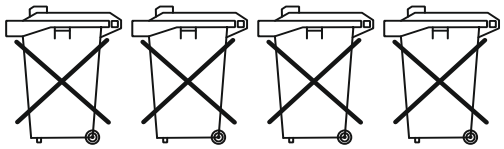
13. Disposal

Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

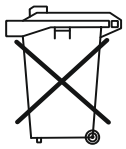
Batteries

Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

Electrical and electronic equipment



14. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Nordring 22-24, 65719 Hofheim, Germany, declare under our sole responsibility that the product:

Magnetostrictive Level Transmitters **Model: NMS**

to which this declaration relates is in conformity with the following EU directives stated below:

2014/30/EU	**EMC Directive**
2011/65/EU	**RoHS** (category 9)
2015/863/EU	Delegated Directive (RoHS III)

Also, the following standards are fulfilled:

EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

EN 61326-2-3:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning

EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Hofheim, 04 Jan. 2024

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