

**Operating Instructions
for
Liquid Level Transducer**

Model: NM-..

1. Contents

| | |
|--|----|
| 1. Contents..... | 2 |
| 2. Note | 3 |
| 3. Regulation Use | 3 |
| 4. Operating Principle | 4 |
| 5. Instrument Inspection..... | 5 |
| 6. Mechanical Connection..... | 5 |
| 7. Electrical Connection | 6 |
| 7.1. General..... | 6 |
| 7.2. Level Sensors with remote Sensor | 6 |
| 7.3. Operation in explosion-hazardous zones 1 or 2 | 7 |
| 8. Technical Information..... | 8 |
| 9. Order Codes | 8 |
| 10. Maintenance | 9 |
| 11. Assistance in Case of Problems | 10 |

Manufactured and sold by:

Kobold Messring GmbH
Nordring 22-24
D-65719 Hofheim
Tel.: +49(0)6192-2990
Fax: +49(0)6192-23398
E-Mail: info.de@kobold.com
Internet: www.kobold.com

2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

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 EWG-machine guidelines.

3. Regulation Use

Kobold level transducers are used for the continuous level indication and level control of all kinds of liquids. The simple design with only one moving part (the float) allows for demanding applications where special reliability is demanded. Kobold level transducers allow the continuous level indication and level control of liquids unaffected by electrical conductivity, temperature, pressure or viscosity. The level transducer may only be used in liquids that will assure free movement of the float. The following points must be noted:

- no large particles
- density of the fluid must not be less than that specified for the float type
- viscosity, pressure and temperature to be held within the limits given in the technical specifications.
- no corrosive media

A variety of transducers in various designs, connecting configurations and materials are available for the acquisition of the measuring values. The analogue control instruments provide an electrical output signal which can be changed over from 0-20 to 4-20 mA and stepless adjustable relay contacts for level control.

They may also contain integral level indicating circuitry (option RM).

4. Operating Principle

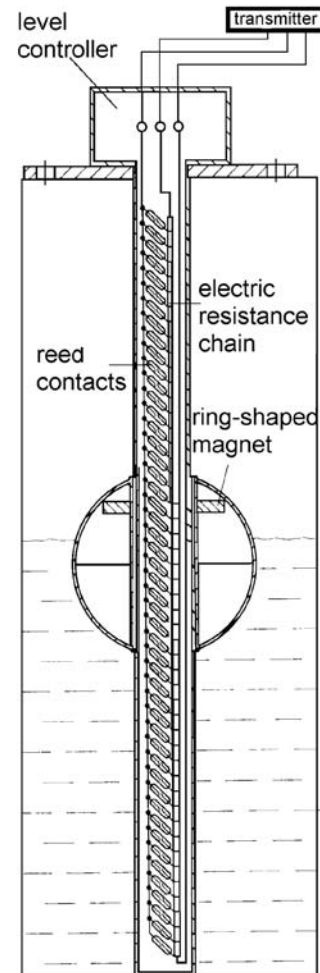
The KOBOLD–Liquid Level Transducers consist of a tube on which a float travels with inserted magnet, similar to the Kobold level float switch; however, in the NM, the magnet remotely actuates the reed contacts inside the tube.

The well-known principle of the level float switch has been changed however, such that the tube of the level transducer contains an electric resistance chain and a reed contact chain.

The float remotely actuates the contacts through the tube wall and a voltage proportional to the liquid level can be taken from the chain. This voltage sensing corresponds to the function of the slide of a resistance potentiometer.

The sensed voltage is fed into a controller which, depending on model chosen, generates a current signal equivalent to the liquid level (model DFM), additionally allows the control of (2) adjustable alarms (model DST) or, in addition to the above two functions, allows a direct level indication (model DFA). Alternately, with option “RM”, the unit outputs a 4-20mA signal directly.

In order to meet the requirements for high measuring and control accuracy, the electric resistance chain is designed for measurement in 10 mm increments up to an instrument length of 2 m and in 20 mm increments for longer instruments.



5. 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:

- Liquid Level Transducer, model: NM
- Operating Instructions

Caution: Heavy mechanical stress such as bending, impact or shock loads to the level transducer could damage the transducer and/or the magnet.

6. Mechanical Connection

The transducer has to be screwed into the flange, cap or the tank wall from the outside or inside of the tank. For inside mounting the cable has to be routed through the opening prior to mounting. Sealing of the connection threads should be done with Teflon tape or similar. If the connection is not threaded the transducer has to be inserted through a borehole and then secured with a counter nut. Please pay close attention to correct sealing.

If the float has to be removed, pay attention to correct orientation when replacing the float. The mark "**TOP BI**" indicates the top of the float.

7. Electrical Connection

7.1. General

- Ensure that the supply wires are de-energized.
- To reduce the possibility of interference from other electric circuits the cables should be wired separately.
- Please pay attention to the potentially detrimental operating conditions regarding the placement of the cable.
- Connect the level transducer to the electronics in accordance with the connection diagram below.

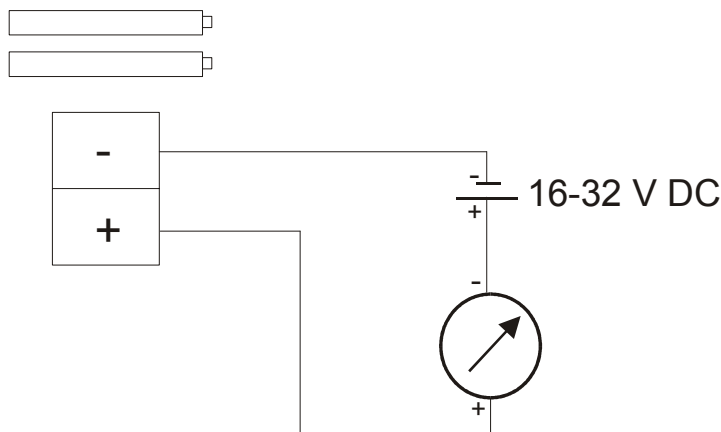
| | Level transducer "top" | Level transducer "down" | Signal | |
|------------------------|------------------------|-------------------------|--------|--|
| Silicone cable | white | brown | green | |
| PVC cable | white | brown | green | |
| FEP cable | brown | blue | black | |
| Terminal box internal* | yellow | red | black | |

***Attention:** The colours of the internal wires are only used for the internal wiring and therefore only visible on level transducers with terminal box.

- When connecting the level transducer to the Kobold transmitters model DFA, DST and DFM, please read the operating instructions of these units.

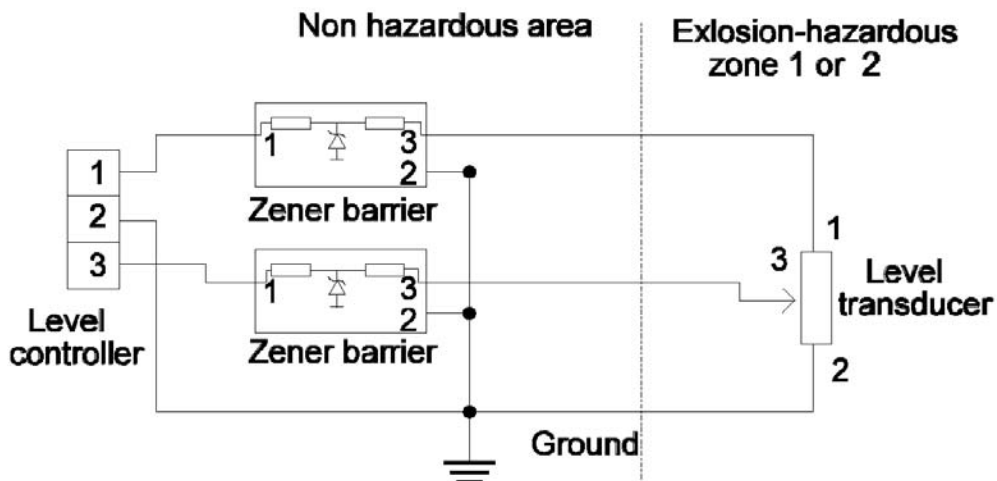
7.2. Level Sensors with remote Sensor

- Ensure that the electrical supply lines are powerless.
- To avoid faults caused by electrical fields from other circuits, the cables should not be installed adjacent to other cables.
- Unscrew cover and run supply lines through cable gland.
- Connect the remote sensor to the electronics according to the wiring diagram below.



7.3. Operation in explosion-hazardous zones 1 or 2

For operation of the level transducer in hazardous zones 1 or 2, two safety barriers to separate the intrinsically safe and non-intrinsically safe circuits must be installed in the transducer circuit. This is possible only for special level transducers with a total internal resistance of 40 kΩ.



8. Technical Information

| | |
|-------------------|--|
| Control voltage: | max. 24 V |
| Control current: | max. 0,1 A |
| Hysteresis: | approx. half of resolution |
| Total resistance: | approx. 5 kΩ (intrinsically safe: approx. 40 kΩ) |

| Model | Resolution | Temperature of media | Max. operating pressure | Density of media |
|-----------------|------------------------|----------------------|---------------------------------|-----------------------------|
| NM-298... | 15 mm | -20..+130 °C | 15 bar | min. 0,87 g/cm ³ |
| NM-299... | 15 mm | -20..+130 °C | 15 bar | min. 0,72 g/cm ³ |
| NM-310...PVC | 10 mm (20 mm > 2 m) | -20..+60 °C | 6 bar | min. 0,72 g/cm ³ |
| NM-320...PPH | 10 mm [20 mm > 2 m) | -20..+90 °C | 6 bar | min. 0,72 g/cm ³ |
| NM-301... | 10 mm (20 mm > 2 m) | -20..+130 °C | 15 bar (depending on flange) | min. 0,8 g/cm ³ |
| NM-302... | 10 mm (20 mm > 2 m) | -20..+130 °C | 15 bar (depending on flange) | min. 0,8 g/cm ³ |
| NM-318...(PVC) | 10 mm (20 mm > 2 m) | -20..+60 °C | 6 bar | min. 0,6 g/cm ³ |
| NM-328...(PPH) | 10 mm (20 mm > 2 m) | -20..+90 °C | 6 bar | min. 0,59g/cm ³ |
| NM-338...(PTFE) | 10 mm (20 mm > 2 m) | -20..+130 °C | 6 bar | min. 0,79 g/cm ³ |

9. Order Codes

| Mechanical connection | Model | Electrical connection | Resistance |
|-----------------------|---------------|--|---------------------------|
| G 3/8 | NM-298 R10... | ...S= Silicone cable ...Y= special connection | ...0= 5 kΩ ...E= 40 kΩ |
| G 1 ½ | NM-302 R40... | ...R= connection box ...M= with transmitter ...Y= special connection | |
| Flange DN 50 PN 10 | NM-302 F50... | | |
| Flange DN 65 PN 10 | NM-302 F65... | | |
| Flange DN 80 PN 10 | NM-302 F80... | | |
| Flange DN 100 PN 10 | NM-302 F1H... | | |

Please specify measuring length "L" and cable length in writing.

| Mechanical connection | Model | Electrical connection | Resistance |
|-----------------------|---------------|--|---------------------------|
| G ½ | NM-299 R15... | ...C = PVC cable ...S = silicone cable ...Y = special connection | ...0= 5 kΩ ...E= 40 kΩ |
| G ½ | NM-301 R15... | ...R = connection box | |
| Flange DN 100 PN 10 | NM-301 F1H... | ...M = with transmitter ...Y = special connection | |

Please specify measuring length “L” and cable length in writing.

| Mechanical connection | Model | Electrical connection | Resistance |
|-----------------------|---------------|--|---------------------------|
| G2/ PVC | NM-310 R50... | ...R= connection box ...M= with transmitter ...Y= special connection | ...0= 5 kΩ ...0= 40 kΩ |
| G2/ PPH | NM-320 R50... | | |
| Flange DN 65/ PVC | NM-310 F65... | | |
| Flange DN 65/ PPH | NM-320 F65... | | |

Please specify measuring length “L” and cable length in writing.

| Mechanical connection/ material | Model | Electrical connection | Resistance |
|------------------------------------|---------------|--|---------------------------|
| G1/ PVC | NM-318 R25... | ...R= connection box ...M= with transmitter ...Y= special connection | ...0= 5 kΩ ...0= 40 kΩ |
| Flange DN 80 PN 10/ PVC | NM-318 F80... | | |
| G 1/ PPH | NM-328 R25... | | |
| Flange DN 80 PN 10/ PPH | NM-328 F80... | | |
| G 1/ PTFE | NM-338 R25... | | |
| Flange DN 80 PN 10/ PTFE | NM-338 F80... | | |

Please specify measuring length “L” in writing.

10. Maintenance

The level transducer requires no maintenance. The tube and float should occasionally be inspected for deposits or corrosion, and should be cleaned from time to time.

11. Assistance in Case of Problems

| Problem | Possible Cause | Remedy |
|-----------------------------|---|--|
| no function | <ul style="list-style-type: none"> • Wire in terminal box is loose • Resistance chain is defekt. | <ul style="list-style-type: none"> • Reconnect wire to appropriate terminal • Measure the resistance between contact 1 and 2. If it is infinite contact our customer service. |
| output inverse | <ul style="list-style-type: none"> • Level transducer is mounted in bottom of tank. • Wires at clamp 1 and 2, or white and brown wires or brown and blue wires are exchanged. | <ul style="list-style-type: none"> • Exchange wire at clamp 1 and 2 or white and brown wire or brown and blue wire |
| 100 % -value is not reached | <ul style="list-style-type: none"> • One reed contact of the measuring chain is defect. | <ul style="list-style-type: none"> • Pull the float magnet along the transducer pipe and measure the resistance between clamp 1 and 3 or between white and green wire or between brown and black wire. If at any point the resistance is infinite or the resistance does not change from one to the other point, please contact us. |