Operating Instructions
for
Plastic
Bypass Level Indicator

Model: NBK -16

1. Contents

Manufactured and sold by:

Kobold Messring GmbH
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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-machine guidelines.

as per PED 2014/68/EU, category I

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:
- Bypass Level Indicator model: NBK-16

4. Regulation Use

Any use of the Bypass Level Indicator, model: NBK-16 or 17, 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.

5. Operating Principle

Kobold plastic level indicators are used for continuous measurement, display and monitoring of liquid levels. The bypass tube is attached to the sidewall of the vessel. According to the hydrostatic pressure principle the level in the bypass tube equals the level in the vessel. A float with embedded circular magnets in the bypass tube follows the liquid level and transfers it in a non-contacting manner to a display on the tube. Additionally, the NBK can be fitted with level switches or transmitters for remote indication and monitoring of liquid levels. The following indication and monitoring devices are available:

Magnetic roller indicator
As the float passes by, the red/white rollers are rotated in succession by 180° around their own axes. The rollers change from white to red as the level rises and from red to white as the level falls. The level is continuously displayed as a red column. As the indicator is magnetically activated and requires no power to operate, it will continue to provide local indication even in the event of power failure.

Transmitter (option W or M)
If remote transmission of the level is required, a sensor with a resistance chain can be mounted outside the bypass pipe. A continuous standard signal of 4 to 20 mA is obtained with the aid of the built-in measuring transducer (option M).

Limit Contacts (NBK-RPVC)
One or more reed contacts can be attached to the bypass tube for limit value detection or level control.
Please see separate instruction manual under www.kobold.com/qr/NBK

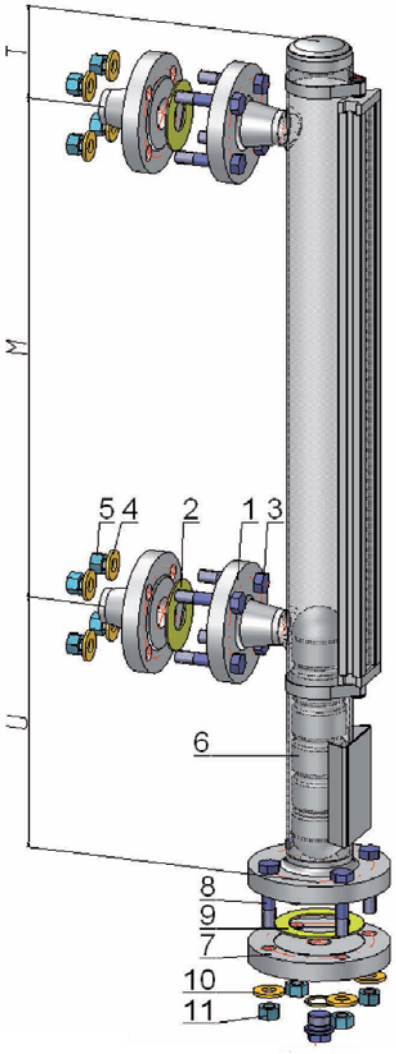
6. Commissioning/operation of Bypass Level Indicator

- Observe all instructions given on the shipment packaging for removing the transportation safety devices.
- Remove the bypass level indicator carefully from the packaging!
- When unpacking, check all components for any external damage.

6.1 Mounting preparation

- Detach the float attached to the bypass level indicator from the bypass chamber and remove the transport sleeve.
- Remove the protection caps of the process connections.
- Ensure that the sealing faces of the vessel or bypass level indicator are clean and do not show any mechanical damage.
- Check the connection dimensions (centre-to-centre distance) and the alignment of the process connections on the vessel.

Initialisation of magnetic display and magnetic switch
Slowly move the enclosed float from bottom to top on the magnetic display and then back down again.Align additionally mounted magnetic switches on the basis of the same principle. For bypass level indicators with insulation and magnetic displays with Plexiglass attachments, the float must be moved up and down inside the tube.For magnetic displays with purge gas connections, these connections must have an airtight seal. Please refer in this case to the mounting and operating instructions for magnetic displays with purge gas connections as well.



6.2 Mounting

- Observe the torque values of screws specified in pipefitting work.
- Install the bypass level indicator without tension.
- In the selection of the mounting material (sealings, screws, washers and nuts), take the process conditions into account. The suitability of the sealing must be specified with regard to the medium and its vapours.

T = upper projection
M = centre-to-centre distance
U = lower projection

In addition, ensure it has corresponding corrosion resistance.
The bypass level indicator is mounted in a vertical position on the vessel to be monitored using the process connections (1) provided. Seals (2), screws (3), washers (4) and nuts (5) suitable for the process connection must be used for mounting. If necessary, shut-off valves must be mounted between the vessel and the bypass.

Installing the float

- Clean the float of anything stuck on it in the area of the float magnet system.
- Remove the bottom flange (7) and insert the float (6) into the tube from the bottom (the marking “top” or a legible model code marks the top side of the float).
- Place the seal (9) onto the bottom flange. Replace the bottom flange and fix it in place using the screws (8).

6.3 Commissioning

If the bypass level indicator is fitted with shut-off valves between process connections and tank, proceed as follows:

- Close drain and vent fittings on the bypass level indicator
- Slowly open the shut-off valve at the upper process connection
- Slowly open the shut-off valve at the lower process connection
  As liquid flows into the bypass chamber, the float rises to the top. The magnetic system turns the elements of the magnetic display from “light” to “dark”. The current filling level is shown after liquid equalisation between the vessel and the bypass level indicator.
- **Always observe the mounting and operating instructions of accessories before putting them into operation**

Attachment of accessories to the bypass level indicator
For the mounting of accessories (e.g. sensors or switches), the relevant maximum values for the instrument must be considered. The applicable laws and directives for the assembly and the planned purpose of application must be observed.

7. Commissioning of the reed sensor "W"

- Observe all instructions given on the shipment packaging for removing the transportation safety devices.
- Remove the reed sensor carefully from the packaging!
- When unpacking, check all components for any external damage.

7.1 Functional check

Prior to installation, a functional test of the reed sensor can be carried out with a resistance measuring instrument and manual movement of the float.

The following table describes the measurements and the expected measured values for the movement of the float, from bottom to top.

Resistance measurement of the wire colours	**Measured value**
BK-BN (R1)	Resistance value rises proportionally with the position of the float.
BU-BN (R2)	Resistance value drops in inverse proportion to the position of the float.
BK-BU (Ri)	Total resistance value. Resistance value remains constant, irrespective of the position of the float.

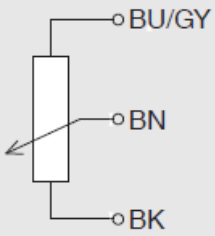
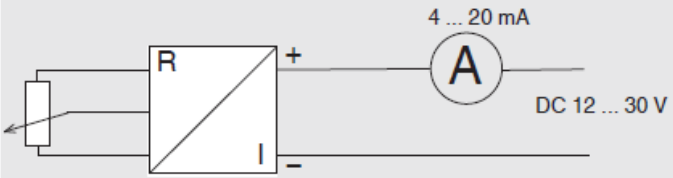
WARNING!
Ensure that the functional check does not start any unintended processes.

7.2 Mounting

The reed sensor, in normal cases, is premounted on the bypass or on the top-mounted level indicator. With this, please pay attention to the position of the measuring range marking as well as the distance between the reed sensor and the bypass chamber. The distance should be as low as possible.

7.3 Electrical connection

- The electrical connection must only be made by qualified skilled personnel.
- Wire the reed sensor in accordance with the connection diagram of the electrical output (see product label). The connection terminals are appropriately marked.

Electrical output	Connection diagram
3-wire potentiometer circuit	
Head-mounted transmitter with 4 ... 20 mA	

- Seal the cable bushing at the connection housing.

WARNING!
Malfunctions through voltage spikes due to running cables together with mains connection leads or due to large cable lengths.
This can lead to a malfunction in the plant and thus lead to injury to personnel or damage to equipment.

- **Use shielded connection leads**
- **Ground connection leads at one end**

Always observe the mounting and operating instructions of accessories when commissioning them.

7.4 Tightening torques for cable glands

Cable gland	Plastic version max. torque in Nm	Metal version max. torque in Nm
M12 / PG7	1.2 ... 1.5 (depending on version)	3 – 8 (depending on version)
M16 / PG9	3	4 - 10 (depending on version)
PG11	2.5	6.2 – 12 (depending on version)
M20 / PG13	1 - 6 (depending on version)	8 – 12 (depending on version)
NPT ½"		7 – 12 (depending on version)
NPT ¾"		7 – 12 (depending on version)

Determination of the exact torque

In accordance with IEC/EN 62444, test mandrels are used to determine the tightening torque of the cable gland clamp nut. The determination of the tightening torque of the cable gland clamp nut in practical use, however, inevitably results in deviating values, since the operating temperature, degree of hardness and surface of the cables used can differ extremely. The values given in Table 1 are therefore only to be understood as guide and maximum values.

However, the correct torque of the clamp nut can be determined visually. It is achieved when the sealing insert of the cable gland is flush with or slightly protrudes the clamp nut as in Fig. 1.

A greater overlap of the sealing insert, as in Fig. 2, is not correct. In this case, the cable gland cap clamp nut was tightened with too high a torque. Please note that excessive torque can damage the cable sheath. If the sealing insert is not flush but too deep in the cable gland clamp nut, the clamp nut was tightened with too low a torque. This can lead to the specified IP ingress of protection of the device not being achieved.

Fig. 1

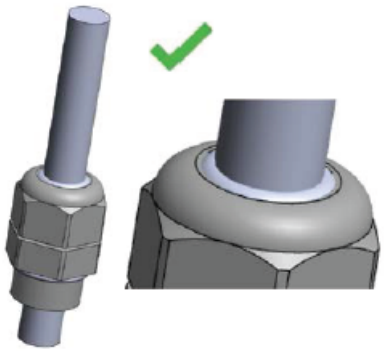
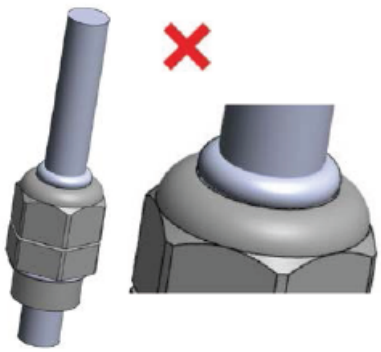


Fig. 2



8. Commissioning of the transmitter "M"

Personnel: Skilled electrical personnel
Tools: Screwdriver (see chapter “Electrical connection”)

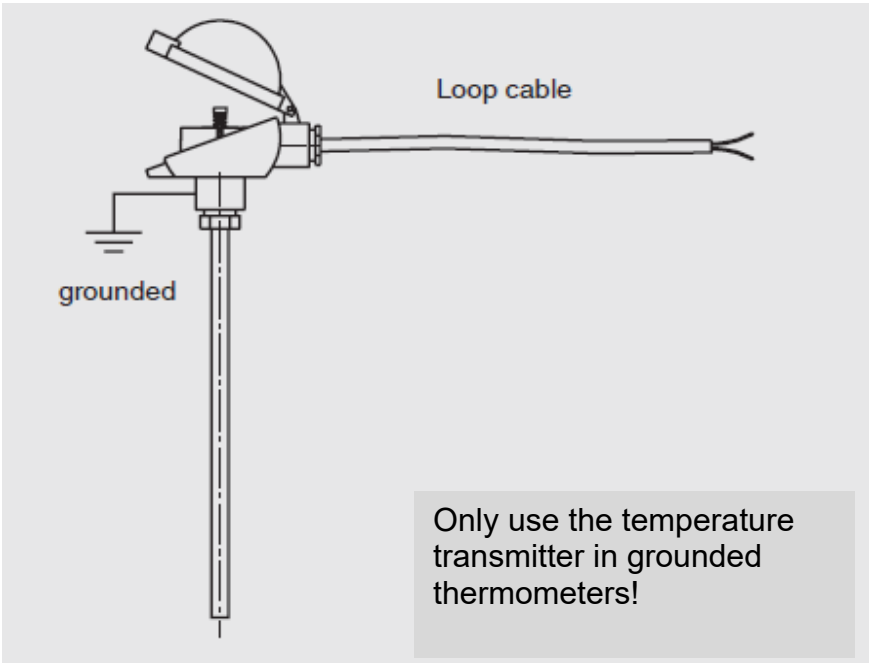
DANGER!
Danger to life from explosion!
Through working in flammable atmospheres, there is a risk of explosion which can cause death.

- **Only carry out set-up work in non-hazardous environments!**
- **In hazardous areas, only use temperature transmitters that are approved for those hazardous areas. Observe the approvals on the product label.**

8.1 Grounding

WARNING!
Prevention of electrostatic discharge
When working during a running process operation, measures to prevent electrostatic discharge from the connection terminals should be taken, as a discharge could lead to temporary corruption of the measured value.

- **Only use model “M” temperature transmitters in grounded thermometer**

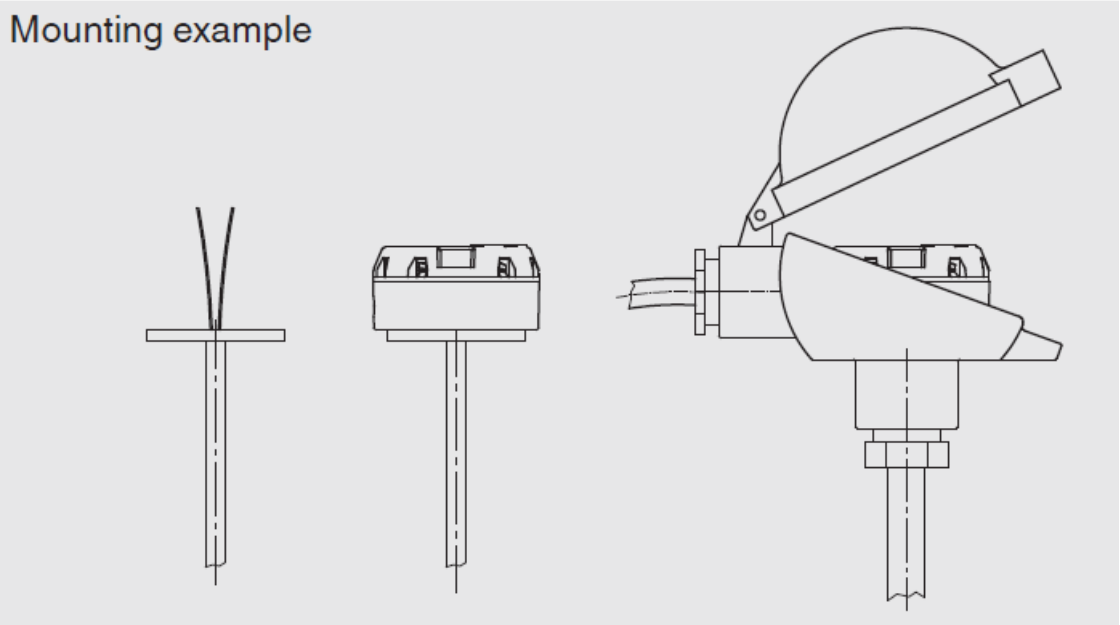


8.2 Mounting

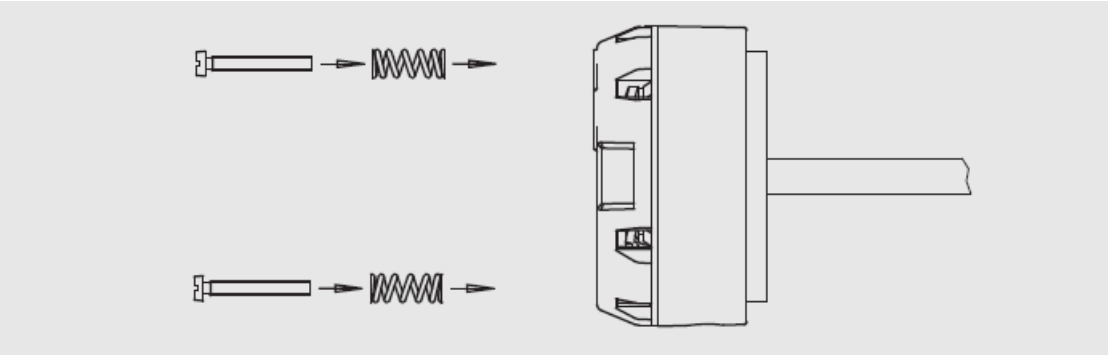
8.2.1 Transmitter in head mounting version

When fitting the head-mounted version of the transmitter, do not exceed a torque of 1 Nm!

The transmitters for head mounting are designed to be mounted on a measuring insert within a form B, DIN connection head. The connection wires of the measuring insert must be approx. 50 mm long and insulated.



Mounting in connection head
Insert the measuring insert with the mounted transmitter into the protective fitting and secure into the connection head using screws in pressure springs.



Mounting in the connection head cover
When mounting it in the cover of a connection head, use suitable screws and matching washers.

8.2.2 Power supply, 4 ... 20 mA current loop

The model “M” is a 2-wire, powered temperature transmitter. Depending on the version, it can be supplied with various types of power supply.

With flexible leads we recommend the use of crimped connector sleeves.
The integrated reverse polarity protection (wrong polarity on the terminals ⊕ and ⊖) prevents the transmitter from being damaged.

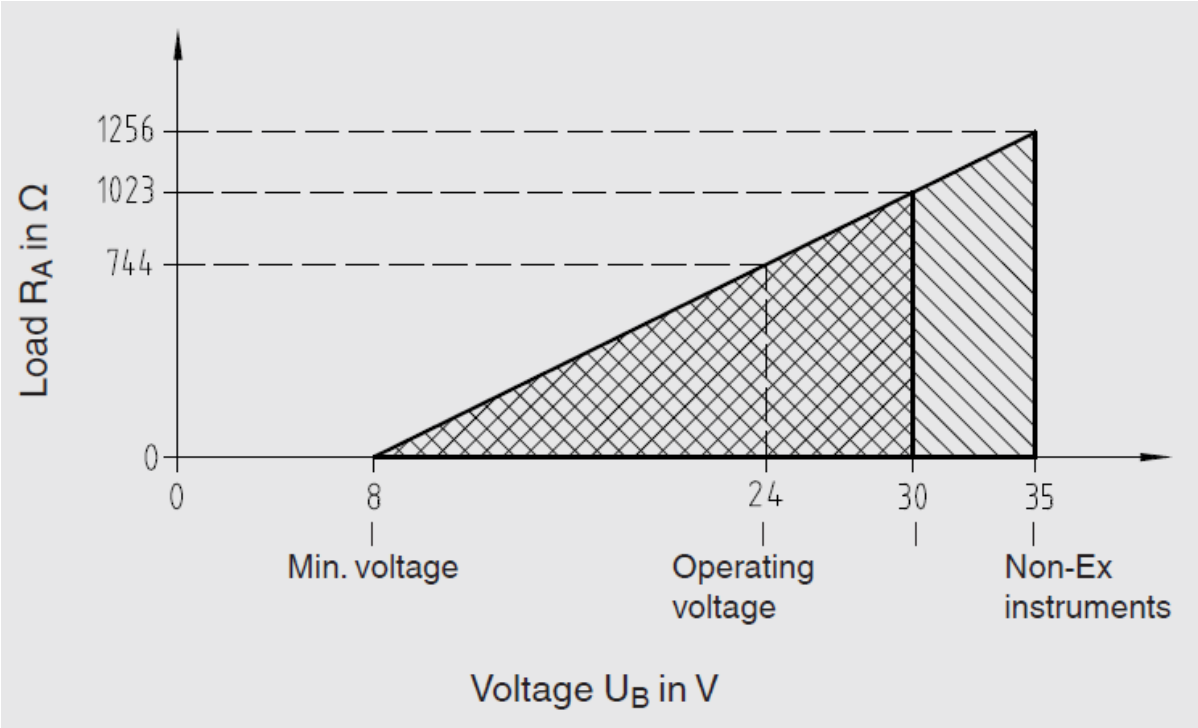
Maximum values
DC 30 V

Minimum terminal voltage
DC 8 V

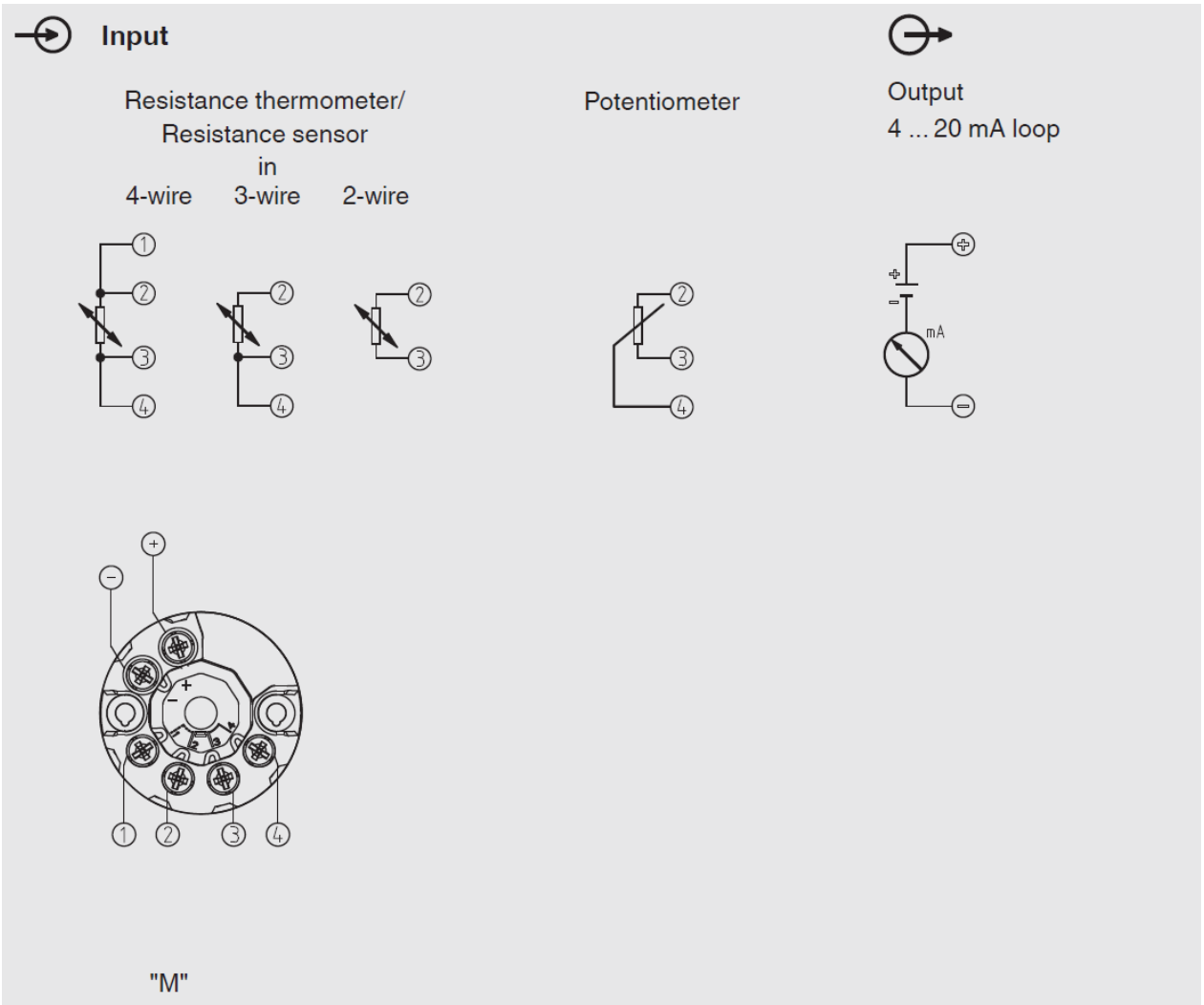
The load must not be too high, as otherwise, in the case of relatively high currents, the terminal voltage at the transmitter will be too low.

Maximum permissible load depending on the supply voltage

Load diagram



8.2.3 Sensors



Designation of connection terminals

Resistance thermometer (RTD) and resistance sensor
The connection of a resistance thermometer (e.g. per DIN EN 60751) in a 2-, 3- or 4-wire connection is possible or the connection of a potentiometer in a 3-wire connection. The sensor input of the transmitter must be configured in accordance with the sensor connection type actually used, otherwise a complete use of the possibilities of connection cable compensation is not possible and may potentially cause additional measuring errors.

For the safety-relevant maximum values for the connection of the voltage supply and the sensors, see chapter “Specifications”.

9. Faults

9.1 Bypass Level Indicator

The following table contains the most frequent causes of faults and the necessary countermeasures.

Faults	Causes	Measures
Bypass level indicator cannot be fitted at the planned place on the vessel	The thread sizes or flange sizes for the bypass level indicator do not match	Modification of the vessel
		Return to the factory
	Thread on the screwed coupling on the vessel is faulty	Rework the thread or replace the screwed coupling
	Mounting thread on the bypass level indicator is faulty	Return to the factory
	Centre-to-centre distance of the vessel does not correlate with the bypass level indicator	Modification of the vessel
		Return to the factory
	Process connections are not attached parallel to one another	Modification of the vessel

CAUTION!
Physical injuries and damage to property and the environment
If faults cannot be eliminated by means of the listed measures, the instrument must be taken out of operation immediately.

- **Ensure that there is no longer any pressure present and protect against being put into operation accidentally.**
- **Contact the manufacturer.**

9.2 Reed transducer

The following table contains the most frequent causes of faults and the necessary countermeasures.

Faults	Causes	Measures
No signal, non-linear or undefined signals	Electrical connection incorrect	See chapter "Electrical connection". Check assignment with the aid of the connection diagram.
	Measuring chain defective	Return to the manufacturer
	Head-mounted transmitter defective	
	Head-mounted transmitter adjusted incorrectly	

CAUTION!
Physical injuries and damage to property and the environment
If faults cannot be eliminated by means of the listed measures, the instrument must be taken out of operation immediately.

- **Ensure that there is no longer any pressure present and protect against being put into operation accidentally.**
- **Contact the manufacturer.**

10. Maintenance

10.1 Bypass Level Indicator

10.1.1 Maintenance

When used properly, the reed sensors work maintenance-free. They must be subjected to visual inspection within the context of regular maintenance, however, and included in the vessel pressure test.

DANGER!
Work on containers involves the danger of intoxication and suffocation. No work is allowed to be carried out unless by taking suitable personal protective measures (e.g. respiratory protection apparatus, protective outfit etc.).

Repairs must only be carried out by the manufacturer.

Perfect functioning of the reed sensors can only be guaranteed when original accessories and spare parts are used.

10.1.2 Cleaning

CAUTION!
Physical injuries and damage to property and the environment
Improper cleaning may lead to physical injuries and damage to property and the environment. Residual media in the dismounted instrument can result in a risk to persons, the environment and equipment.

- **Rinse or clean the dismounted instrument.**
- **Sufficient precautionary measures must be taken.**

Prior to cleaning, properly disconnect the instrument from the process and the power supply.
Clean the instrument carefully with a moist cloth.
Electrical connections must not come into contact with moisture!

CAUTION!
Damage to property
Improper cleaning may lead to damage to the instrument!

- **Do not use any aggressive cleaning agents.**
- **Do not use any hard or pointed objects for cleaning.**

10.2 Reed transducer for NBK-16

10.2.1 Maintenance

When used properly, the reed sensors work maintenance-free. They must be subjected to visual inspection within the context of regular maintenance, however, and included in the vessel pressure test.

DANGER!
Work on containers involves the danger of intoxication and suffocation. No work is allowed to be carried out unless by taking suitable personal protective measures (e.g. respiratory protection apparatus, protective outfit etc.).

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CAUTION!
Damage to property
Improper cleaning may lead to damage to the instrument!
Do not use any aggressive cleaning agents.
Do not use any hard or pointed objects for cleaning.

10.3 Transmitter for NBK-16

Contact details see page 2

The temperature transmitter described in these operating instructions is maintenance-free. The electronics are completely encapsulated and incorporate no components which could be repaired or replaced.

Repairs must only be carried out by the manufacturer. Only use original parts.

11. Technical Information

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

12. Order Codes

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

13. Dimensions

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

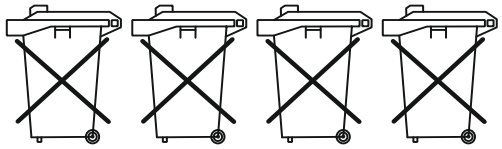
14. Disposal

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

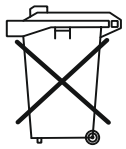
Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



Cd[1] Hg[2] Pb[3] Li[4]

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

Electrical and electronic equipment



15. EU Declaration of Conformance

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

Bypass Level Indicator model: NBK -16

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

2014/68/EU **PED**, category I, module A
2011/65/EU **RoHS**

Also, the following standards are fulfilled:

EN 13445 Unfired pressure vessels

Hofheim, 22 May 2024

H. Volz
General Manager

J. Burke
Compliance Manager