

**Operating Instruction
for
Bypass-
Level Indicator
Cable version**

Model: NBK-19

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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.

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.

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:

- Measuring tube
- Float
- Magnet system
- 2 x deflection pulleys
- 2 or 3 fastening clamps
- cable with 2 simplex-clamps

4. Regulation Use

Any use of the Bypass-Level Indicator, model: NBK-19, which exceeds the manufacturer's specifications, 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

The Kobold bypass level indicator type NBK-19 is based on the simple principle of cable and deflection pulley. The tank float, made of PPH or stainless steel, is moved upwards and downwards by the medium according to the liquid level in the tank. The tank float has a counter float (counterweight) which moves in a transparent PVC tube depending on the liquid level. The two floats are connected to each other through a cable and 2 deflection pulleys. The magnetic counter float has a ring marker for reading of the scale on the bypass PVC tube.

The following options are available:

- **Magnet roller indicator**

When the counter float travels past the red/white rollers, they rotate through 180°. The rollers change from white to red when the liquid level rises and from red to white when the level falls. The liquid level is continuously indicated as a red column, even in the event of a power outage.

- **Measurement transducer:**

For remote transmission of the liquid level, a measurement transducer with reed chain or a magnetostrictive sensor can be mounted on the outside of the bypass tube. Using a built in transducer, a continuous standard signal of 4 to 20 mA is transmitted. This standard signal can be displayed using an analogue or digital indicator device.

- **Universal indicator device:**

An ADI series universal indicator device can be connected to indicate and evaluate the standard signal (4 to 20 mA) produced by the measurement transducer. For reasons of stability, this device is not mounted on the bypass tube, but is supplied with wall mountings.

- **Limit contacts:**

One or more reed contacts can be attached to the bypass tube to monitor the limit values or to control the liquid level.

Maximum values	Standard contact
Switching capacity:	60 W/VA
Switching current:	1 A
Switching voltage:	230 V _{AC/DC}



Warning! Always observe the allowable power/current carrying capacity and maximum voltage for the limit contacts.

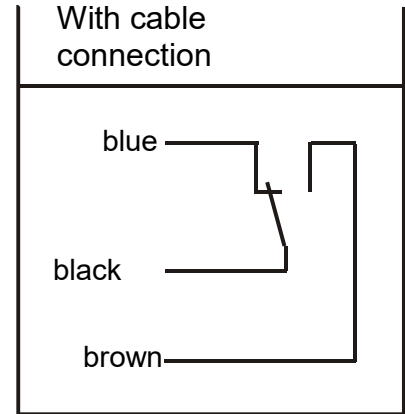
6. Mechanical connection

- Affix the pipe clamps supplied at the relevant vertical height (for sizes, see section 12 Dimensions) to the tank or in an appropriate manner.
- Remove the packaging from the bypass float, pull the float a little upwards in the tube and fix in place.
- Snap the bypass tube into the pipe clamps, adjust and place the lower end of the tube onto a support (floor).
- Bolt the bypass tube to the pipe clamps.
- Affix the loose roller bearings supplied onto the tank, such that a cable can be introduced into the tank without being impeded.
- Run the cable over the pulley into the tank and affix the tank float using the simplex clamps, such that the level in the tank corresponds to the scale on the bypass tube.

7. Electrical connection

7.1 Limit contact (optional)

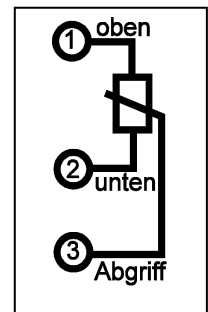
- Connect the limit contact, where used, as shown in the wiring diagram and connect to the electrical control system.
- When connecting inductive loads such as contactors, relays, etc, it must be ensured that the electrical limit values are not exceeded, even for short periods such as with voltage spikes.
- To prevent overloading of the reed contact, it is recommended that a contact protection relay is used.



7.2 Measurement transducer Reed contact chain (option ..W..)

- Ensure that the electrical power supply is deenergised.
- To avoid disturbances from electric fields of other electrical circuits, the cable should not be laid together with other high voltage cables.
- Remove the cover and run the power supply cable through the cable gland.
- Connect the measurement transducer to the electronic system in accordance with the following table.

	Measurement transducer "upper" 1	Measurement transducer "lower" 2	Tap 3
Connector housing	Clamp 1	Clamp 2	Clamp 3
Internal*	yellow	red	black



upper
lower
tap

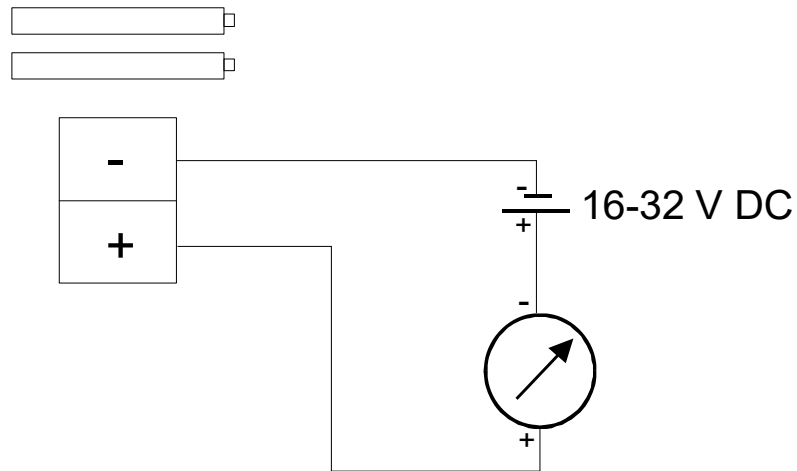


Please note: The colours of the internal cables are for internal connections only, and are therefore only visible for measurement transducers which have a connector housing.

If connecting the measurement transducer to a Kobold transmitter, such as type ADI, please read the relevant operating instructions.

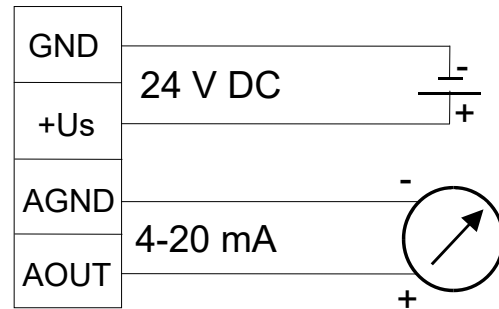
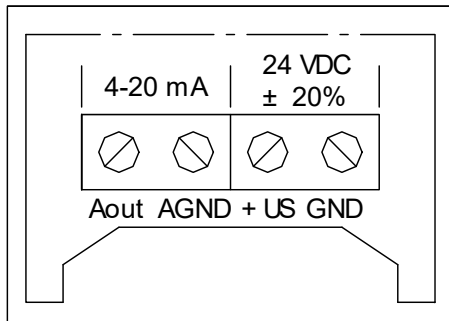
7.3 Measurement transducer: Reed chain with 2-wire transmitter (option ..M..)

- Ensure that the electrical power supply is deenergised.
- To avoid disturbances from electric fields of other electrical circuits, the cable should not be laid together with other high voltage cables.
- Remove the cover and run the power supply cable through the cable gland.
- Connect the transmitter as shown in the following wiring diagram.



7.4 Measurement transducer: Magnetostrictive sensor with 4-wire transmitter (option ..T..)

- Ensure that the electrical power supply is deenergised.
- To avoid disturbances from electric fields of other electrical circuits, the cable should not be laid together with other high voltage cables.
- Remove the cover and run the power supply cable through the cable gland.
- Connect the transmitter as shown in the following wiring diagram.



8. Operation

8.1 Operation of the level indicator

The screw connections should be checked and tightened where necessary. Fill the container and switch on the electrical control system, where used. The liquid, which now enters the tank, raises the tank float and lowers the bypass float, which then shows the level of liquid in the tank in the bypass tube and on the scale or the roller indicator where present.

8.2 Operation of the electrical limit contact

Function of the limit contacts

All contacts have three terminals (black, blue and brown). The black wire represents the common terminal for both switches (N/C and N/O).

So that the switch function corresponds to the wiring diagram / the table below, the float must pass the contact once in both directions.

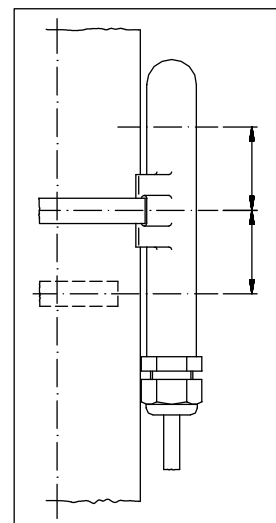
This point is frequently neglected where an alarm light is connected directly, and it is assumed that the contact is defective.

The contact is ready for operation once the contact has been passed and does not require any maintenance.

	Black / blue	Black / brown
Float above	open	electrically conducting
Float below	electrically conducting	open

Hysteresis

The difference between the points at which the contact switches on and off is known as the hysteresis. Factory tuning of the float magnet contact strength gives a hysteresis of about 15 mm of vertical travel of the float.



9. Fault diagnosis and dealing with malfunctions

Fault / malfunction	Possible cause
The cable is loose when the tank is full	The bypass float is resting on the base of the tube. The cable is too long.
The bypass float knocks against the head of the tube.	The tank float is partly or completely out of the medium in the tank. The cable is too short.
The tank and bypass floats no longer move.	The cable is caught.

10. Technical information

Bypass tube:	PVC, transparent, Ø 63 x 3 mm Head, PVC, grey
Measurement range:	0.2 m to 4.8 m
Density of the medium:	1 g/dm ³
Fastening bow:	PP
Counterweight:	Ø 54 x 82.5; enamelled steel
Float:	PPH Ø 98, cylindrical
Float:	Stainless steel 1.4301; 200 x 100, lenticular
Cable:	PP; Ø 2 mm Stainless steel 1.4401; Ø 1 mm
Deflection pulley:	PA6, bracket 1.4301
Scale:	Polyester; transparent, glued to the tube
Roller indicator:	Red – white, PP
t _{max} :	60 °C
p _{max} :	Unpressurised
Viscosity:	1-200 mm ² /s

Limit contact type NBK-R

Contact function:	bi-stable SPDT contact
Switching hysteresis:	about 15 mm
Max. switch capacity:	60 W/VA; 230 V _{AC/DC} ; 1.0 A (NBK-R)
Environmental temperature:	max. 60 °C
Protection index:	IP 67
Connection:	3 m PVC cable
Housing:	Plastic

Measurement transducer type: ...W...

Reed contact chain

Total resistance:	approx. 5 kΩ
Measuring voltage:	max. 24 V _{DC}
Measurement current:	max. 0.1 A
Environmental temperature:	max. 60 °C
Protection index:	IP 65
Resolution:	10 mm (ML < 2000 mm) 20 mm (ML ≥ 2000 mm)

Measurement transducer type: ...M...**Reed contact chain with 2-wire transmitter**

Output:	4-20 mA
Power supply voltage:	16-32 V _{DC}
Working resistance:	$(U_B - 9 \text{ V}) / 0.02 \text{ A} [\Omega]$
Environmental temperature:	max. 60 °C
Protection index:	IP 65
Resolution:	10 mm (ML < 2000 mm) 20 mm (ML ≥ 2000 mm)

Measurement transducer type: ...T...**Magnetostrictive sensor with 4-wire transmitter**

Output:	4-20 mA
Working resistance:	max. 500 Ω
Max. length:	4000 mm
Power supply voltage:	24 V _{DC} , max. 150 mA
Power consumption:	< 5 W (without load)
Accuracy:	± 1 mm
Environmental temperature:	max. 60 °C
Protection index:	IP 65

11. Order information

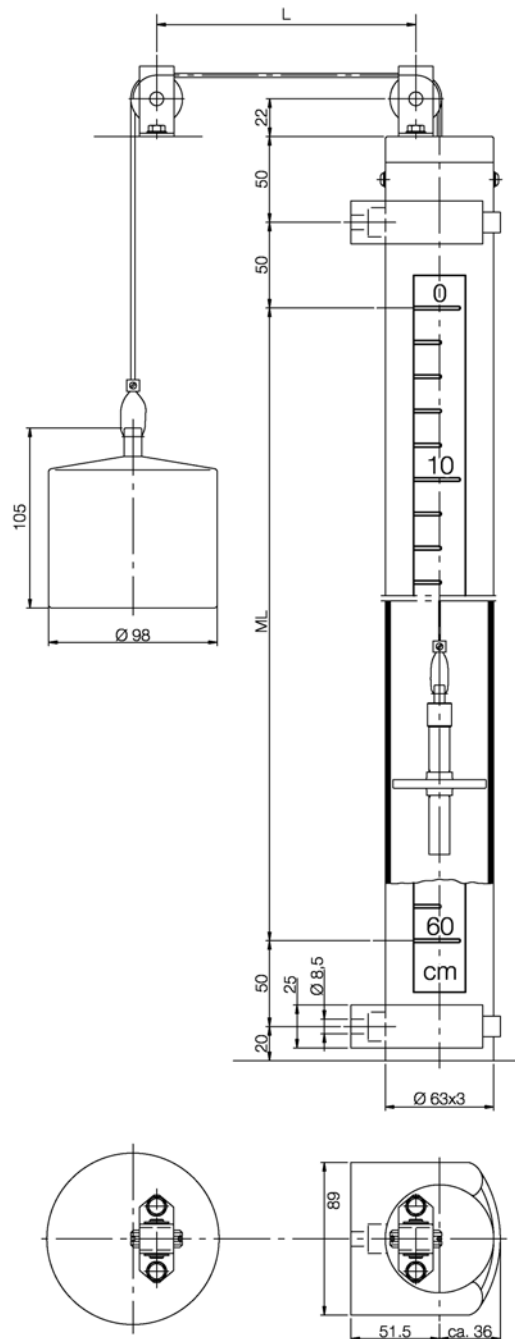
Sample order: NBK-19K00 00 0 W 0)

Type	Roller indicator	Measurement transducer	Tank float and cable	Option
NBK-19K00	00 = without RP = with roller indicator	0 = without T = Magnetostrictive sensor W = reed contact chain M = Reed contact chain with transmitter	W = PPH Z = 1.4301	0 = without M = Polyester scale
NBK-R	Standard limit contact			
NBK-19BF	Fastening clamps			
NBK-19P	Additional roller with mounting			
NBK-CP	Replacement counterweight (magnet system)			

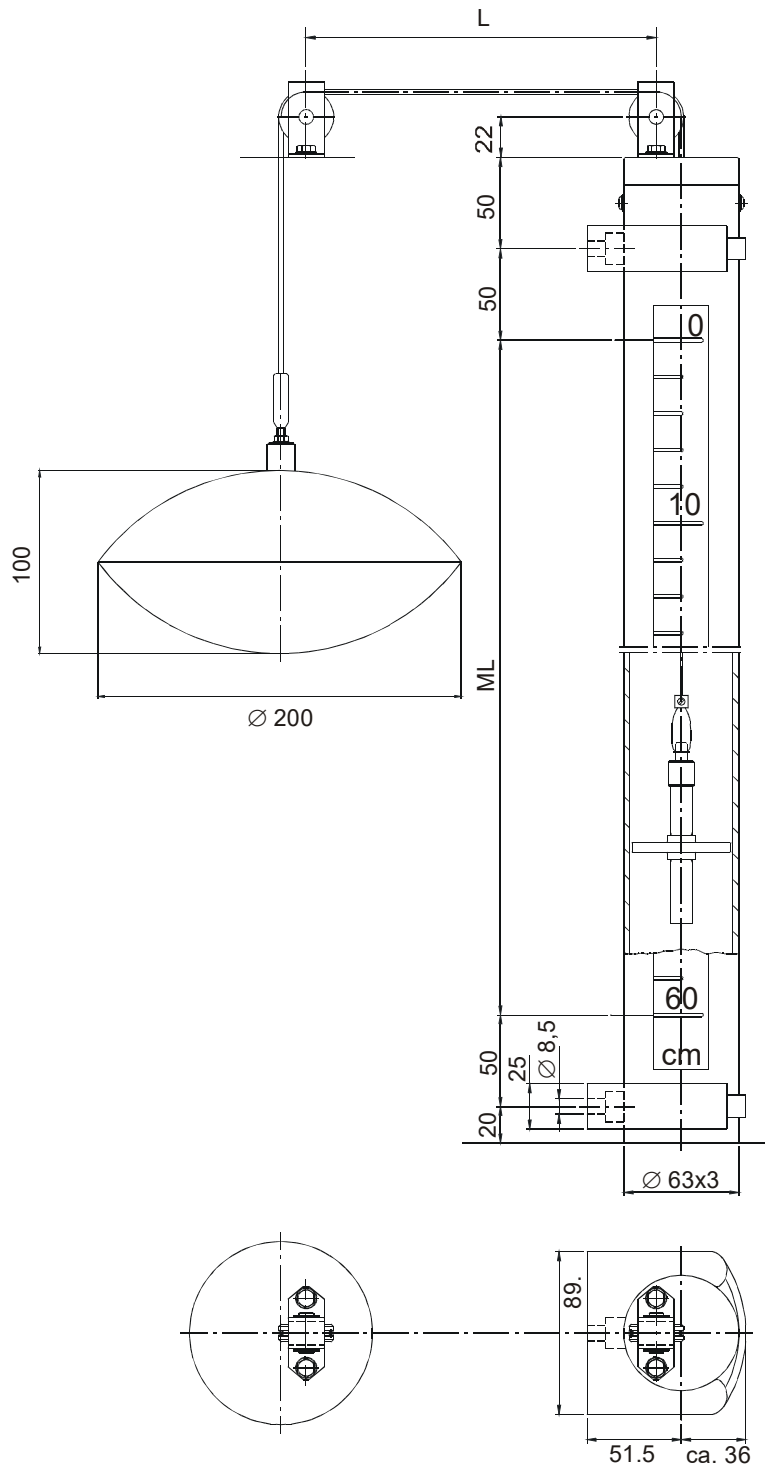
Length ML (measurement length) and L (distance between the rollers) must be clearly stated in the order.

12. Dimensions

NBK-19 with Option W,
PPH float



NBK-19 mit Option Z,
stainless steel float



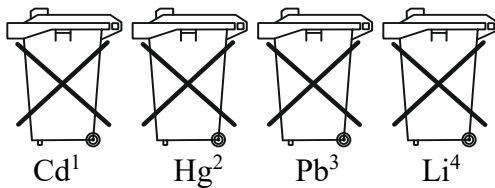
13. Disposal

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, Hofheim-Ts. Federal Republic of Germany, declare that the bypass level indicator fulfils the following criteria:

The **NBK-R** bypass level indicator limit contacts conform to the standards listed below:

EN 61010-1:2011

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements

EN 60529:2014

Degrees of protection provided by enclosures (IP Code)

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

The **bypass level indicators with measurement transducer**

Type NBK-...M...

Type NBK-...T...

Type NBK-...W...

meet the standards listed below:

EN 61000-6-4:2011

Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

EN 61000-6-2:2006

Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 61010-1:2011

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements

EN 60529:2014

Degrees of protection provided by enclosures (IP Code)

The following EEC guidelines have been fulfilled:

2014/35/EU	Low Voltage Directive
2014/30/EU	EMC Directive
2011/65/EU	RoHS (category 9)
2015/863/EU	Delegated Directive (RoHS III)



Hofheim, 29 July 2021

H. Volz
General Manager



M. Wenzel
Proxy Holder

15. UK Declaration of Conformity

We, Kobold-Messring GmbH, Hofheim-Ts. Federal Republic of Germany, declare that the bypass level indicator fulfils the following criteria:

The **NBK-R** bypass level indicator limit contacts conform to the standards listed below:

BS EN 61010-1:2010

Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements

BS EN 60529:1992+A2:2013

Degrees of protection provided by enclosures (IP-Code)

BS EN IEC 63000:2018

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

The **bypass level indicators with measurement transducer**

Type NBK-...M...

Type NBK-...T...

Type NBK-...W...

meet the standards listed below:

BS EN 61000-6-4:2007+A1:2011

Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments

BS EN 61000-6-2:2005

Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments

BS EN 61010-1:2010

Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements

BS EN 60529:1992+A2:2013

Degrees of protection provided by enclosures (IP-Code)

The following UK guidelines have been fulfilled:

S.I. 2016/1101

Electrical Equipment (Safety) Regulations 2016

S.I. 2016/1091

Electromagnetic Compatibility Regulations 2016

S.I. 2012/3032

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012



H. Volz
General Manager



M. Wenzel
Proxy Holder

Hofheim, 29 July 2021