

Operating Instructions for Bypass Level Indicator

Model: NBK-03/-06/-07/
-10/-31/-32/-33



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2. Note

Please read these operating instructions before unpacking and setting 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-guidelines.

Classification according to Pressure Equipment Directive 2014/68/EU NBK-03 to NBK-33

Category assignment for dangerous media (from diagram 1)												
	Density [kg/dm ³]	PN [bar]	Category	ML [mm]	Category	ML [mm]	Category	ML [mm]	Category	ML [mm]	Category	ML [mm]
NBK-03	1,0	16	← Art.4, Para. 3←	≤317	← Cat. I →	945	← Cat. II →	4711	← Cat. III →	24795	- / -	
	0,9/0,8/0,7/ 0,6/0,54			≤207		835		4600		24685	- / -	
NBK-06	1,0	40				192		1698		9732	∞	
	0,9/0,8/0,7				82	1588	9622	∞				
NBK-07	1,0	63			-----	128		1060		6504	∞	
	0,9/0,8/0,7				-----	18	950	6394		∞		
NBK-10	1,0	100			-----	140		577		4084	∞	
	0,9/0,8				-----	30	467	3974		∞		
NBK-31	1,0	160								≤2090	← Cat. IV →	5600
	0,9							≤2020		5600		
	0,8						≤1900	5400				
NBK-32	1,0	250						≤1180	5600			
	0,9						≤1110	5600				
	0,8						≤985	5400				
NBK-33	1,0	320						≤1040	5600			
	0,9						≤970	5500				
	0,8						≤830	5400				

ATTENTION! If the calculated bypass length is exactly within the range limit, then the stricter test method must be used

Classification according to Pressure Equipment Directive 2014/68/EU NBK-03 to NBK-33

Category assignment for not dangerous media (from diagram 2)														
	Density [kg/dm ³]	PN [bar]	Category	ML [mm]	Kategorie	ML [mm]	Category	ML [mm]	Category	ML [mm]	Category	ML [mm]		
NBK-03	1,0	16	← Art.4, Para. 3←	≤945	← Cat. I →	4711	← Cat. II →	24795	← Cat. III →	75007	- / -			
	0,9/0,8/0,7/ 0,6/0,54			≤835		4600		24685		74897	- / -			
NBK-06	1,0	40		≤192		1698		9732		29816	- / -			
	0,9/0,8/0,7			≤82		1588		9622		29706	- / -			
NBK-07	1,0	63		≤128		1060		6504		20112	← Cat. IV →	∞		
	0,9/0,8/0,7			≤18		950		6394		20002		∞		
NBK-10	1,0	100		≤140		577		4084		12849		∞		
	0,9/0,8			≤30		467		3974		12739		∞		
NBK-31	1,0	160								≤2090			5600	- / -
	0,9									≤2020			5600	- / -
	0,8					≤1900		5400	- / -					
NBK-32	1,0	250				≤1180		4410	5600					
	0,9					≤1110		4340	5600					
	0,8					≤985		4220	5400					
NBK-33	1,0	320				≤1040		4090	5600					
	0,9					≤970		4010	5500					
	0,8					≤830		3870	5400					

ATTENTION! If the calculated bypass length is exactly within the range limit, then the stricter test method must be used

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

4. Regulation Use

Any use of the Bypass level Indicator, model: NBK, 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.

The NBK Bypass Level Indicator is used for continuous measurement, indication, and monitoring of liquids in tanks, vessels, reservoirs, basins etc. The indication occurs via a magnetically coupled roller indicator.

4.1. Bypass Measuring Tube System

The bypass tube is attached at the side of the vessel with a connecting flange or a threaded pipe. The installation position is always vertical. The NBK should only be used for liquids with the medium density specified on the nameplate. Otherwise, the indication will deviate (float too high or submerged).

Vessel inner pressure and medium temperature should not exceed the specified maximum values, as this can lead to the destruction and malfunction of the bypass system. It is imperative that the materials used are compatible with the liquid being measured.

Proper operation is also impaired by:

- High degree of soiling
- Suspended solids
- Crystallisation
- Ferrite particles

5. Electrical connection

Optional electrical add-on parts (transmitter and limit contacts)

There is a separate operating manual for the assembly and commissioning of the optional electrical add-on parts: MM, NMT/NBK-T, NBK-R

These operating instructions document the following electrical add-on parts:

Transmitter:

Reed contact resistor chain model **W**

Reed contact resistor chain with transmitter model **M**

Magnetostrictive sensor with transmitter model **T**

Reed contact resistor chain with transmitter model **AE/AC**

Reed contact resistor chain with transmitter HART model **HE/HC**

Reed contact resistor chain with transmitter FF model **F**

Limit Contacts:

Reed switch limit contact model **NBK-R**

Limit contact high temperature model **NBK-RT200/RT400**

Reed switch limit contact model **NBK-RV200NO/RV200NC**

Reed switch limit contact NAMUR model **NBK-RV200NO/RV200NC**

6. Operating Principle

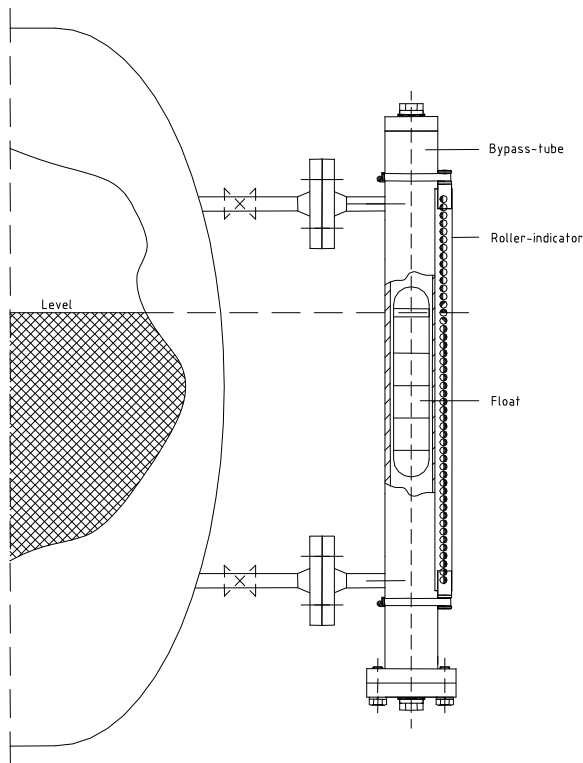
Kobold Bypass Level Indicators are used for continuous measurement, display and monitoring of liquid levels. The bypass tube is attached onto the side wall of the vessel. According to the law of communicating tubes the level in the bypass tube equals the level in the vessel. A float with embedded circular magnets in the bypass tube follows the liquid level and transfers it in a non-contacting manner to a display fitted outside the tube or to a monitoring device. The following indication and monitoring devices are available:

Magnetic roller indicator

As the float passes by, the red/white* rollers/balls 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 advantage of ball displays is the higher protection category, good visibility of 180 ° and higher vibration resistance with filled version. The level in a tank or a mixer is continuously displayed as a red column, even when the power supply fails.

* ceramic rollers in orange/beige

7. Mechanical Connection



Remove bottom flange from bypass tube, and insert the cylindrical float in the NBK bypass tube with the designation "TOP" at the top. Reposition the gasket and close the bottom flange again; firmly tighten with screws.

Mount the bypass tube to the vessel to be monitored via the process connection and seal with an appropriate device. Normally it is sufficient to fix the complete NBK with both process connections. However, should the NBK be subjected to constant shock or strong vibrations it is recommended that the instrument is secured with rubber-damped tube clips. No welding is allowed on the bypass tube.

Mount and tighten the **magnetic roller indicator** - if not already mounted - on the bypass tube with the two provided ribbon clamps.

8. Commissioning

Because of the setting behaviour of seals, all screw connections must be retightened.

Fill vessel and switch on electrical controller, if available. If there are gate valves between bypass process connection and tank, first slowly open the upper valve (pressure relief) and then the lower valve (liquid side). If vent and drain valves have been installed, close them before filling.

The liquid that now enters the bypass tube raises the float until the level between tank and bypass tube is balanced. The roller indicator indicates the liquid level.



For media with high operating temperatures, the surface of the level indicator also heats up. The operator must take appropriate measures to prevent accidental contact with such surfaces (protective cage). If this is not structurally possible under certain conditions, appropriate protective clothing must be worn in the area of the level indicator.

9. Trouble Shooting

Error: The tank is full but there is no indication

- Check that both flanges (process connection), top and bottom, are open to the vessel, and that the bypass tube fills with liquid.
- Check that there is a float in the system.
- When the float is installed, check whether it is being blocked by foreign objects or dirt deposits.

Error: The tank is full but the indication is too low.

- Check that the density of the liquid is the same as the density given on the nameplate.
- Check that the float has been correctly installed with the marking "TOP" at the top.
- Check if dirt deposits in the bypass tube are blocking the float.

10. Maintenance

The drain plug should be opened occasionally, to wash out any deposits in case the liquid to be measured contains dirt particles, which could settle in the bypass tube.

If crust formation or crystallisation has taken place, the tank must be emptied or shut off; the lower cover flange must then be removed. The float should then be removed carefully out of the bypass. The bypass tube can now be mechanically cleaned.

The inspection window for the roller indication is made of high-quality plexiglass (glass for high-temperature display). It should be cleaned with a suitable cleaning agent.

The indicator requires no further maintenance.

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

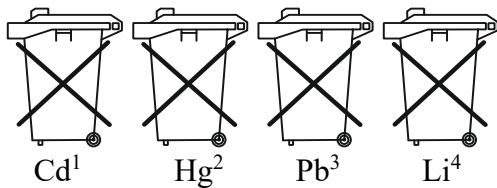
14. Disposal

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.

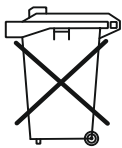
Batteries

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:



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. EC Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare that the Bypass Level Indicators fulfil the following standards:

Model	Pressure stage	Category as per PED	EC type examination test
NBK-03	PN 16	III	PEDB000004D
NBK-06	PN 40	III	PEDB000004D
NBK-07	PN 63	III	PEDB000004D
NBK-10	PN 100	IV	PEDB000004D
NBK-31	PN 160	IV	PED-B-171
NBK-32	PN 250	IV	PED-B-171
NBK-33	PN 320	IV	PED-B-171

and are in conformity with the standards noted below:

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

Also, the following EC guidelines are fulfilled:

2011/65/EU
2015/863/EU
2014/68/EU

RoHS (category 9)
Delegated Directive (RoHS III)
PED

- Category III (IV) Diagram 1, vessel, group 1 dangerous fluids
- Module D, marking CE0575
- Notified body: DNV AS
- Certificate No. PEDD000000R

Hofheim, 21 Feb. 2023



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