Operating Instructions

for

Over-Head Level Indicator

Model: NBK-04

Order from: C A Briggs Company
622 Mary Street; Suite 101; Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118
Sales@cabriggs.com - www.cabriggs.com

1. Contents

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.

as per PED 97/23/EG

Model	Over-length*	p max [bar]	Medium no dangerous (diagr. 2)	Medium dangerous (diagr. 1)
NBK-04	≤ 645	16	Art.3, Para.3	Art.3, Para.3
NBK-04	≤ 1270	16	Art.3, Para.3	I
NBK-04	≤ 4230	16	I	II

* see dimensions in section 14

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:
- Over-Head Level Indicator model: NBK-04
- Operating Instructions

Please inspect the devices using the packing slip. All options are listed here.

4. Regulation Use

Kobold over-head level indicators are used for continuous measurement, display and monitoring of liquid levels. The float inside the tank is attached by means of a connecting rod to the magnet carrier in the over-head tube. The magnet fitted in the magnet carrier operates, in a non-contacting manner, the display and monitoring devices fitted outside tube.

The over-head measuring tube system
The over-head tube is attached with the vessel with a connection flange. The installation position is always vertical. The NBK should only be used for liquids with the medium density specified on the unit label. Otherwise the indication may be inaccurate and the float may submerge.
System pressure and temperature should not exceed the specified maximum values, as this can lead to the destruction and malfunction of the over-head system. Ensure that the liquids contacting the level indicator internals are chemically compatible with the materials used in the construction of this unit.

Proper operation is also impaired by:
- High degree of soiling
- Large particulate
- Crystallisation
- Ferrite particles

Electrical limit switches (option)
The optional electrical limit switch serves to signal a preset level.

Attention! Observe the allowed electrical ratings for the limit switch.

Maximum values	Standard contact	Ex-contact*
Switching capacity:	60 VA	20 W / 45 VA
Switching current:	1 A	0.8 A
Switching voltage:	230 $V_{AC}/_{DC}$	220 V

*in preparation

Transducer Reed contact-resistor chain (option ..M..)
The optional electrical transducer detects and converts the liquid level to a variable resistance value. In this manner, liquid level is transmitted as an electrical quantity. Subsequent control electronics transforms the signal to a standard signal (e.g., 4–20 mA), or controls the liquid level.
For correct operation, please take note of max. medium and ambient temperatures.

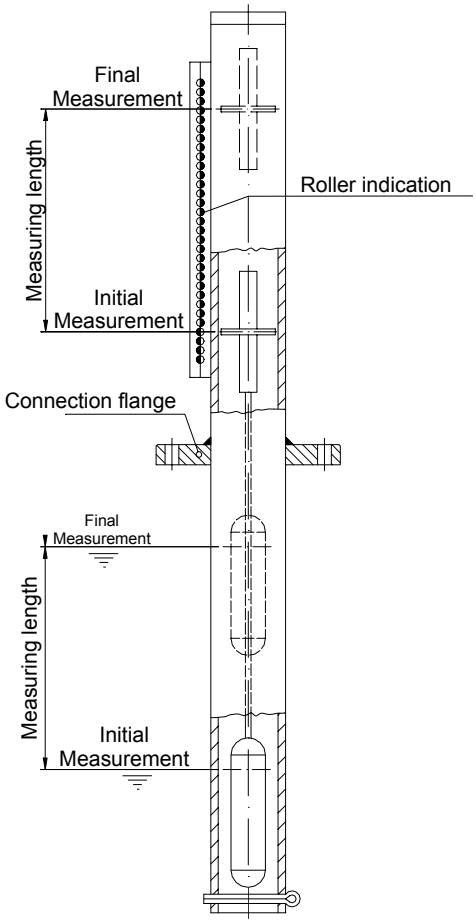
Magnetostrictive Transducer (option ..T..)
To remotely transmit the level a transmitter with a chain of resistors or a magnetostrictive transducer can be mounted outside the bypass tube. A continuous standard signal of 4 to 20 mA is generated by means of a fitted transmitter.
This standard signal can then be displayed with analogue or digital indicating devices.

5. Operating Principle

A float in a dip pipe is connected with the magnet actuator inside the over-head tube via a connecting rod.
The built-in magnet inside the magnet carrier triggers the mounted display and other options (e.g. switches/transmitters) attached to the tube externally, in a non-contacting manner.

Magnet roller indication
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 in a tank or a mixer is continuously displayed as a red column, even when the power fails.

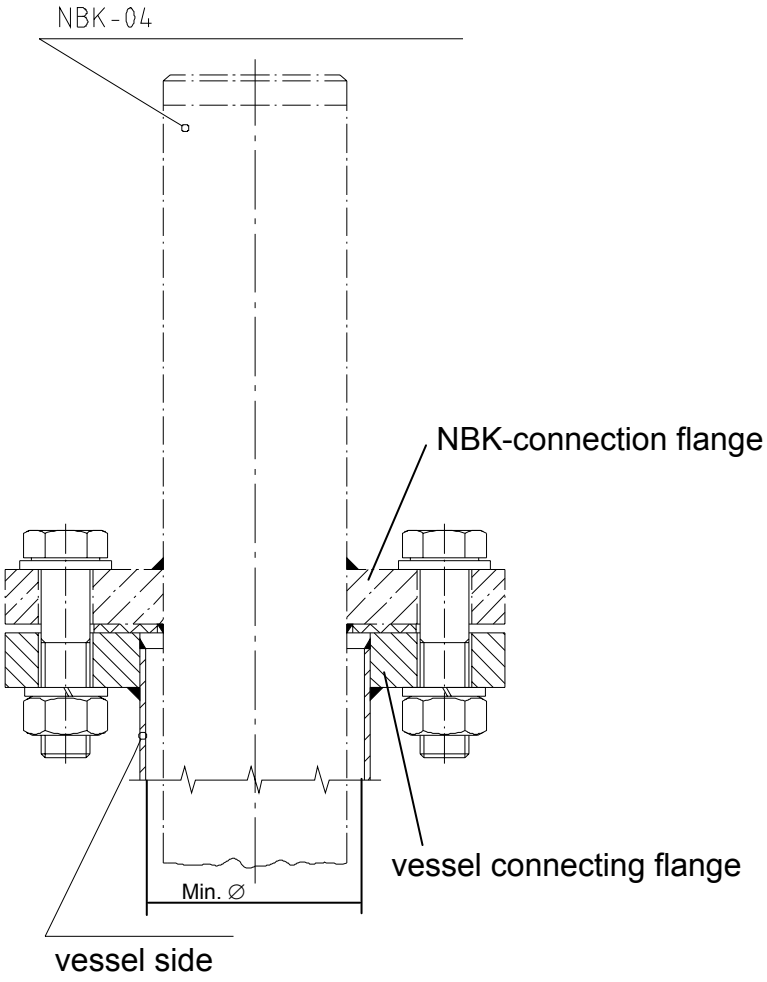
6. Mechanical Connection



Remove the cotter pin from bottom end of the dip pipe, next, remove the transport lock of the float. Fix the float with the magnet system towards top and make sure, there are no remains of packing material or other impurities inside the tube.
Set the cotter pin back and widen it. Secure the measurement system by means of a connecting flange on your container/drum/vessel.
Should the NBK be subjected to constant shock or strong vibrations, it is recommended that the instrument will be secured with damping-rubber tube clips. In any case, the over-head tube should never be welded onto the tank.

Needed size of the assembly tube of the vessel side

Over-Head Level Indicator

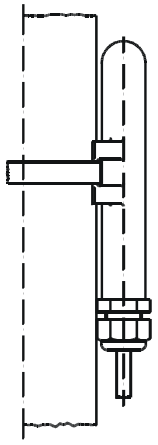


Flange	Diameter ∅ NBK-04-tube	Min. diameter ∅ of the submerged tube on the vessel side
PN 16 DN 65/ 2 ½“ ANSI	∅ 76,1mm	∅ 88,9 x 2 mm
PN 16 DN 50/ 2“ ANSI	∅ 60,3mm	∅ 76,1 x 2 mm

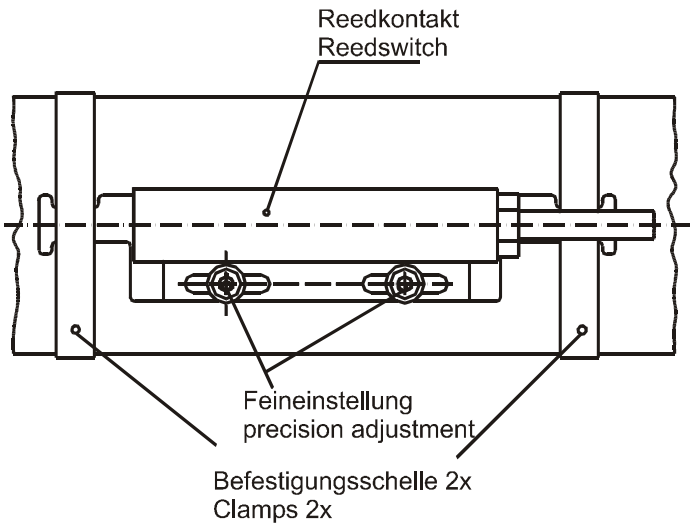
Reed Contacts

- The reed switch, if provided is not mounted on the indicator for shipping. It is to be fastened and secured with the help of supplied pipe clamp (EX-contact: two clamps) on the reverse side of the roller display (see attached: fastening instructions)
- The switch contacts may be installed at any point within the range of the indication on the measuring tube to achieve the desired setpoint.
- The cable connection must be pointing downwards.
- The switch must remain firmly positioned against the level tube.
- The switching function of the switch is impaired by an enlarged air gap.

Standard-Reed-Contact



EX-Contact*



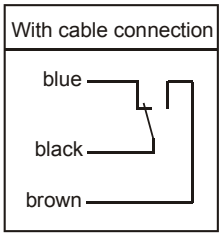
* in preparation

Level Transducer

The transducer is typically mounted at the factory. If it is not, mount and tighten the transducer, on the over-head tube using pipe clamps included with the shipment. The transducer must cover the full measurement range. The cable terminal box is situated at the top of the installation.

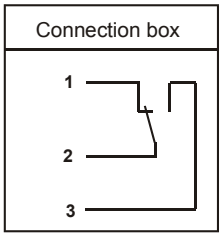
7. Electrical Connection

7.1. Switch (option)



Connect switch (if available) according to the diagram.

When switching inductive loads, such as, contactors, relays, etc, electrical limit values should not be exceeded (even for short periods) e.g. by voltage peaks. The use of a contact protection relay is recommended to avoid overloading the reed contacts.



Valid regulations for hazardous areas and installation regulations (DIN/VDE 0165), should be observed when installing the NBK level indicator in zone 1 or 2 hazardous areas (no flammable liquids).

7.2. Reed Contact Resistor Chain (option ..W..)

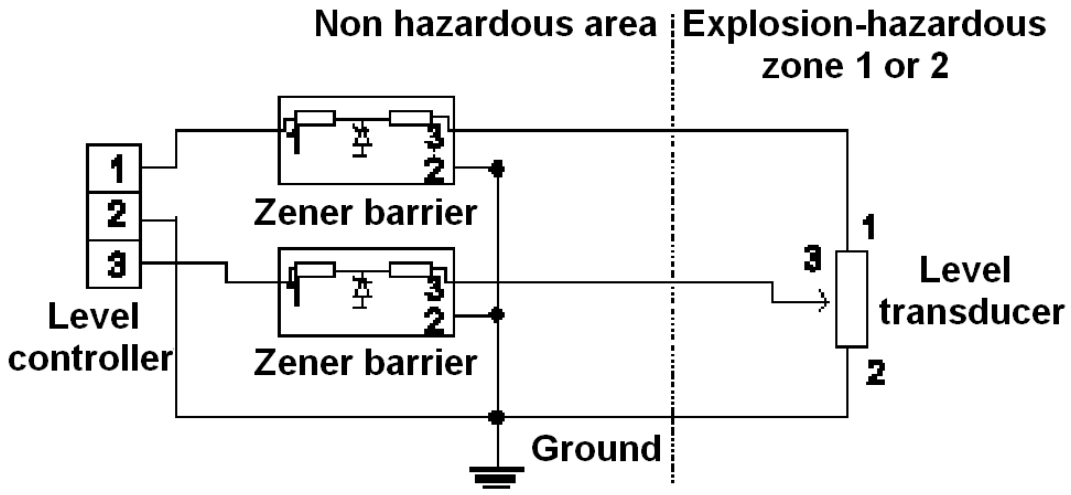
- Ensure that the electrical supply lines are powerless.
- To avoid faults caused by electrical fields from other circuits, the cable should not be laid with other high voltage cables.
- Unscrew cover and pull supply lines through cable gland.
- Connect the transmitter to the electronics according to the following table.

	Transducer "top"	**Transducer "bottom"**	**Pick-up**	
Silicon cable	White	brown	green	
PVC cable	White	brown	green	
FEP cable	Brown	blue	black	
Terminal box	Terminal 1	terminal 2	terminal 3	
Internal*	Yellow	red	black	

***Please note: The colours of internal cables are for internal connections only and therefore can only be seen in transducers with terminal box.**

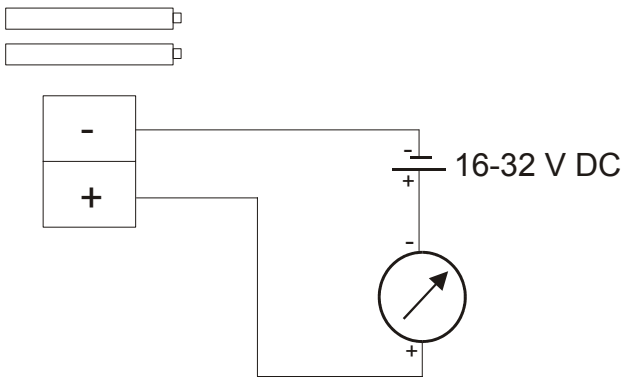
When connecting transducer to a Kobold transmitter, for example models DFA, DST or DFM, please read the relevant operating instructions.

Service in zone 1 or zone 2 hazardous areas
To operate the transducer in hazardous areas zone 1 or zone 2, the measuring circuit must contain 2 safety barriers to separate intrinsically safe circuits from non-intrinsically safe circuits. Specially designed liquid level transducers with a total resistance of 40 k Ohm are required for this purpose.



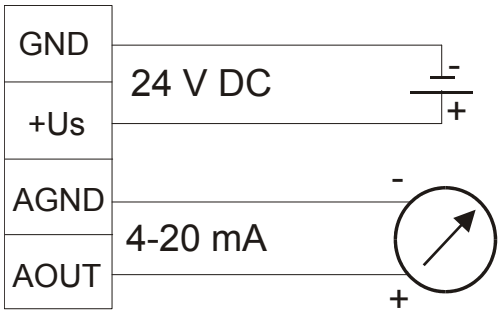
7.3. Transducer: Resistor Chain with 2-wire Transmitter (option ..M..)

- Ensure that the electrical supply lines are powerless.
- To avoid faults caused by electrical fields from other circuits, the cables should not be laid with high voltage cables.
- Unscrew cover and pull supply lines through the cable gland.
- Connect the transmitter according to the terminal connection diagram below.



7.4. Transducer: Magnetostrictive Pick-up with 4-wire Transmitter (option ..T..)

- Ensure that the electrical supply lines are powerless.
- To avoid faults caused by electrical fields from other circuits, the cables should not be laid with high voltage cables.
- Unscrew cover and pull the supply lines through the cable gland.
- Connect the transmitter according to the terminal connection diagram below.



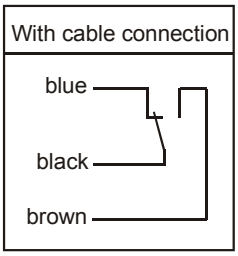
8. Commissioning

Fill vessel, and switch on the electrical controller, if present.
The entering liquid lifts up the float and thus the coupled magnet actuator. The roller indicator indicates the liquid level.

Commissioning of electrical reed switches

Function of switches
All switches have three connection poles (black (2), blue (1) and brown (3)).
The black wire (2) is the common pole for both switching functions
(N/C and N/O contact).

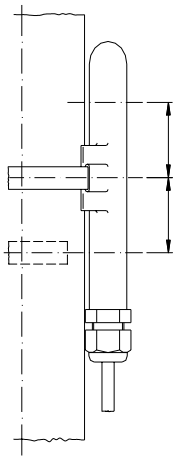
	black (2) / blue (1)	**black (2) / brown (3)**
float above	open	electroconductive
float below	electroconductive	open



The float must pass the switch once in both directions so that the switching function is in line with the wiring diagram and table on page 11.
Note that the switch cable must point downwards.
These instructions are often ignored when an alarm lamp is connected and it is assumed that the switch is damaged.
When the switch has passed in both the directions, it is ready for operation and requires no maintenance.

Hysteresis

Hysteresis is the difference between contact closing and opening points. A hysteresis of approximately 15 mm float movement is achieved by factory tuning of the float magnet and the contact.



9. Trouble Shooting

Error: The tank is full but there is no indication

- Check that the float is present in the system.
- If the float is present, check whether it is being blocked by foreign objects or dirt deposits.
- Check the op. SG of the float and the medium.

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

- Check that the density of the liquid is in accordance with the density prescribed on the unit-label.
- Check that the float has been correctly installed.
- Check if dirt deposits in the over-head tube are blocking the float.

10. Technical Information

Over-head tube:	Ø 60.3 mm x 2 mm
Dip pipe:	Ø 60.3 mm x 2 mm or Ø 76.1mm x 2mm
Measuring start:	270 mm from tube end
Material:	St. Steel 1.4571
Float:	Titanium
Connecting rod:	rod or tube made of Titanium or St. Steel 1.4571 (dependant on density and measuring length)
Flange:	DIN DN 50 or 65, PN 16 ANSI 2" or 2 1/2", 150 lbs
Max. operating pressure	PN 16
Max. operating temperature:	up to 120 °C
Viscosity:	max. 200 mm ^{2}/s
Measuring length:	min. 600 mm Max. 4000 mm
Overall length:	according to meas. length, see dimensions
Min. density:	0,43 kg/dm^3
Roller indication:	aluminium section with polypropylene rollers

Limit contacts model NBK-R, NBK-REx*

Contact function:	bistable changeover contact
Max. switching hysteresis:	approximately 15 mm
Housing:	polycarbonate
Protection class:	IP 67
Max. switching capacity:	60 W/VA; 230 $V_{AC/DC}$; 1 A (NBK-R) 20 W/45 VA; 220 V; 0.4A (NBK-REx)
Electrical connection:	3 m PVC cable
Ambient temperature:	max. 75 °C
Protection:	IP 67
Explosion Protection category:	EEx-d-IIc-T6 (NBK-REx only)

* in preparation

Transmitter reed contact resistor chain model: ...W...

Total resistance:	approximately 5 kΩ
Measuring-circuit voltage:	max. 24 V_{DC}
Measuring current:	max. 0.1 A
Medium temperature:	max. 200 °C
Ambient temperature:	max. 130 °C
Resolution:	10 mm (ML<2000 mm)
	20 mm (ML≥2000 mm)
Protection:	IP 65

Transducer- model: ...M...
Reed contact resistor chain with 2-wire transmitter

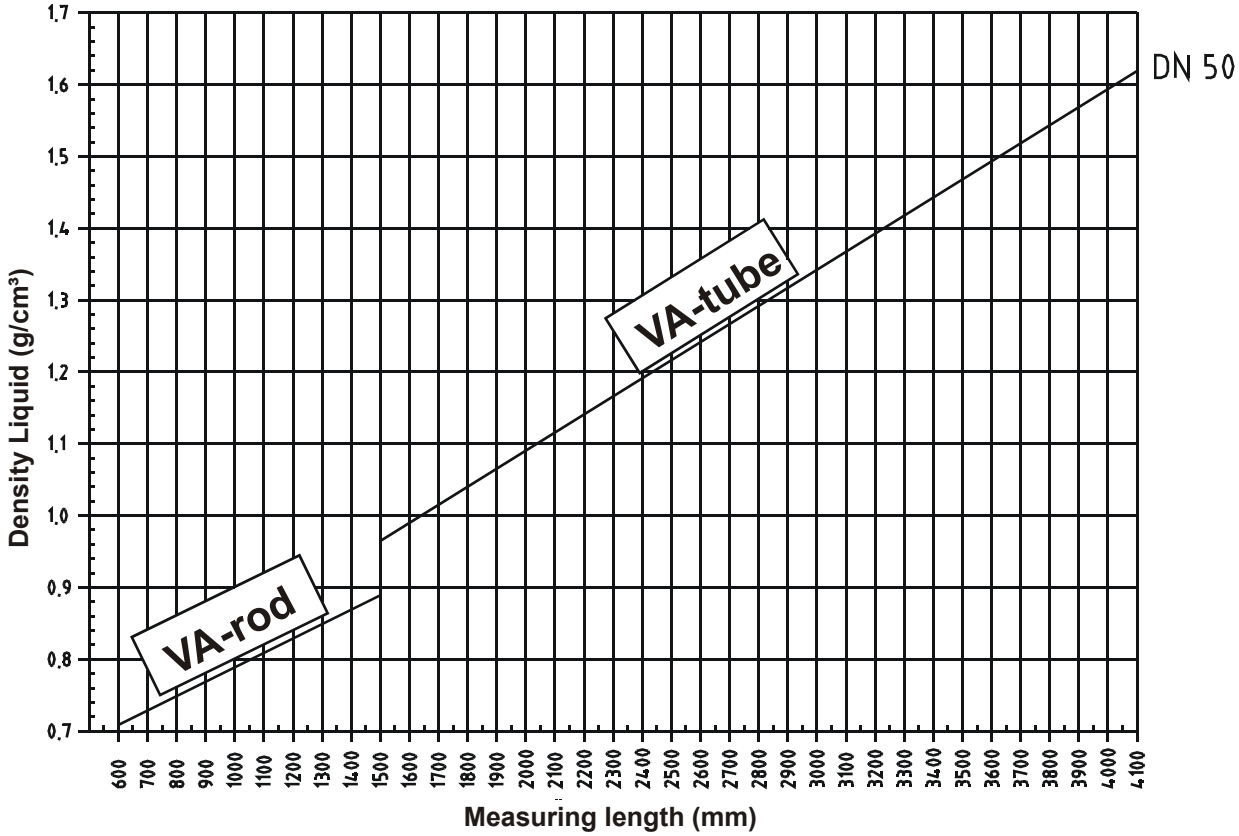
Output:	4-20 mA
Power supply:	16-32 V_{DC}
Load:	(U_B -9V) /0.02A [Ω]
Medium temperature:	max. 130 °C
Ambient temperature:	max. 80 °C
Resolution:	10 mm (ML<2000 mm)
	20 mm (ML≥2000 mm)
Protection:	IP 65

Transducer- model: ...T...
Magnetostrictive pick-up with 4-wire transmitter

Supply voltage:	24 V_{DC}, max. 150 mA
Output:	4-20 mA, 4-wire
Load:	max. 500 Ω
Accuracy:	± 1mm
Max. length:	4000 mm
Medium temperature:	max. 120 °C
Ambient temperature:	max. 80° C
Protection:	IP 65

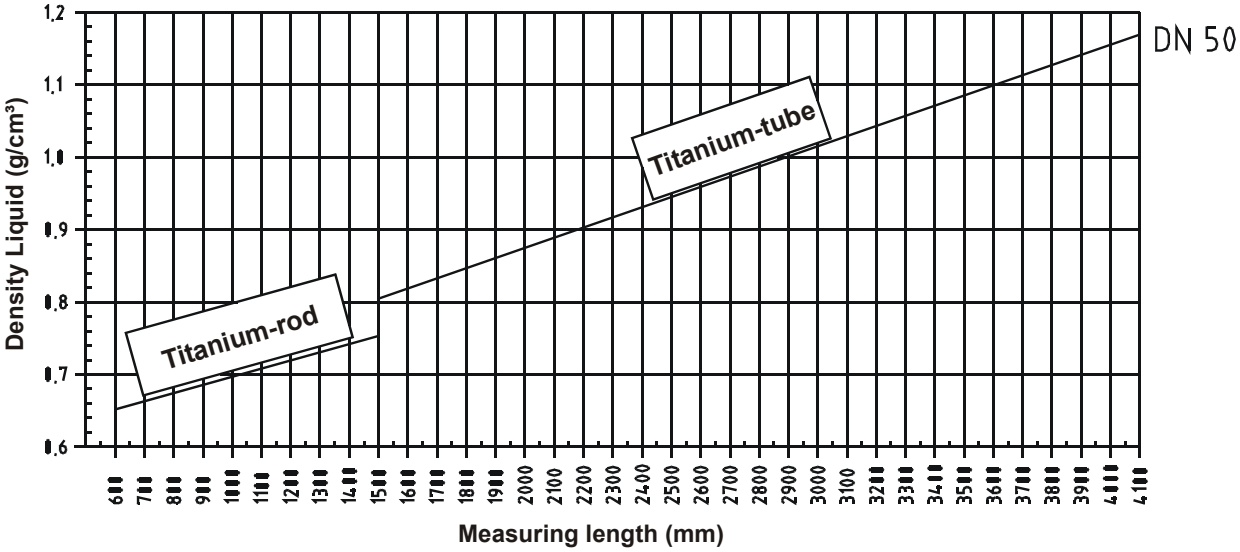
11. Diagram Density / Length of Measuring Tube

11.1. NBK-04...8, diagram 8



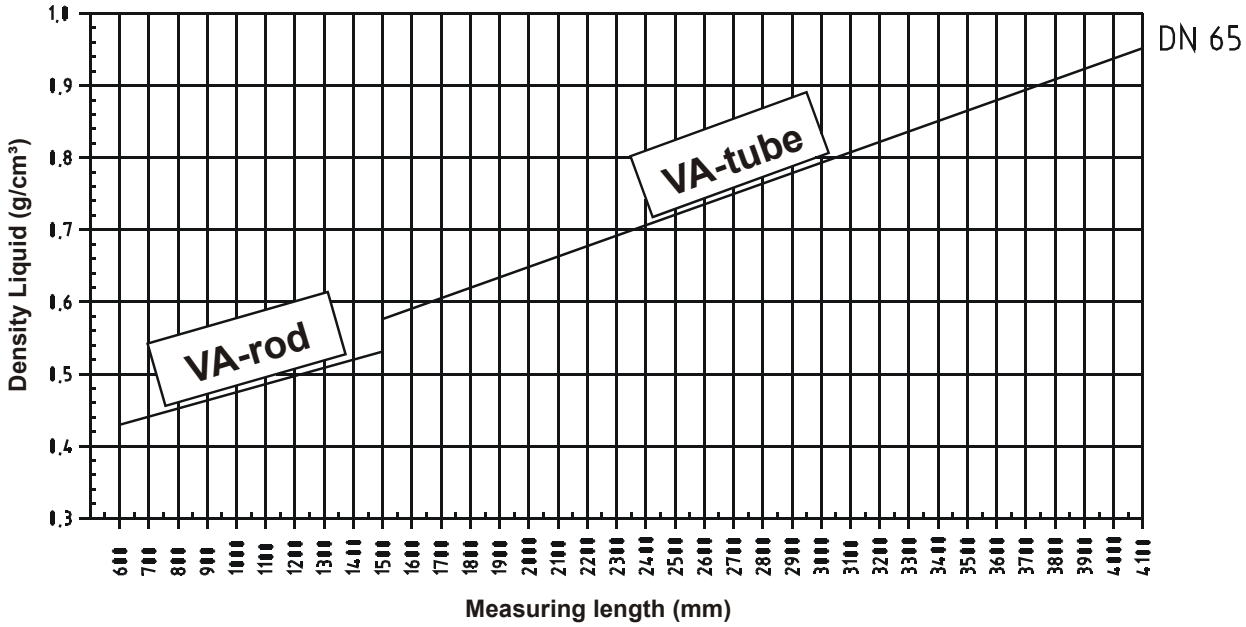
NBK-04 ...8:	Float:	Titanium
	Connecting rod:	VA, 1.4571
	Process connection:	DIN flange PN 16, DN 50 ANSI flange, 150 lbs, 2“
	Bypass tube:	Ø 60.3 mm, continuous
	Min. density:	0.71 g/cm^3

11.2. NBK-04...6, diagram 6



NBK-04 ...6:	Float:	Titanium
	Connecting rod:	Titanium
	Process connection:	DIN flange PN 16, DN 50 ANSI flange, 150 lbs, 2“
	Bypass tube:	Ø 60.3 mm, continuous
	Min. density:	0.65 g/cm^3

11.3. NBK-04...4, diagram 4



NBK-04 ...4:	Float:	Titanium
	Connecting rod:	VA, 1.4571
	Process connection:	DIN flange PN 16, DN 65
		ANSI flange, 150 lbs, 2 1/2“
	Bypass tube:	Ø 60.3 mm
	Tank tube:	Ø 76.1 mm
	Min. density:	0.43 g/cm^3

12. Order Codes

Order details: (Example: **NBK-04 F50 000 8**)

<table>
<tr><th>Model</th><th>Material</th><th>Connection and nominal size</th><th>Roller indication</th><th>Transmitter</th><th>Medium density and meas.length</th></tr>
<tr><td rowspan="2">NBK-04...</td><td rowspan="2">Stainless steel PN16</td><td>F50=DIN flange DN 50
A50=ANSI flange 2“</td><td>00=without
RP=PP (polypro-pylene) rollers</td><td rowspan="5">0=without
W=reed contact chain
M=reed contact chain
With head mounted transmitter
T=magnetorestrictive
6*=without transmitter,
ATEX-II 2 G EEx d
7*=without transmitter,
ATEX-II 1G EEx d
8*=with chain of resistors,
ATEX-II 1G EEx iaIIC
9*=with chain of resistors,
ATEX-II 1G EEx ia IIC (transmitter)
ATEX-II 1 G Eexd
(standpipe inside)</td><td>8=see diagram 8
6=see diagram 6</td></tr>
<tr><td>F65=Din flange DN 65
A65=ANSI flange 2 ½“</td><td>00=without
RP=PP (polypro-pylene) rollers</td><td>4=see diagram 4</td></tr>
<tr><td>NBK-R</td><td colspan="2">Standard limit contact (bistable changeover contact)</td><td></td></tr>
<tr><td>NBK-RD100</td><td colspan="2">ATEX-limit contact</td><td></td></tr>
<tr><td>NBK-RD200</td><td colspan="2">ATEX-limit-contact</td><td></td></tr>
</table>

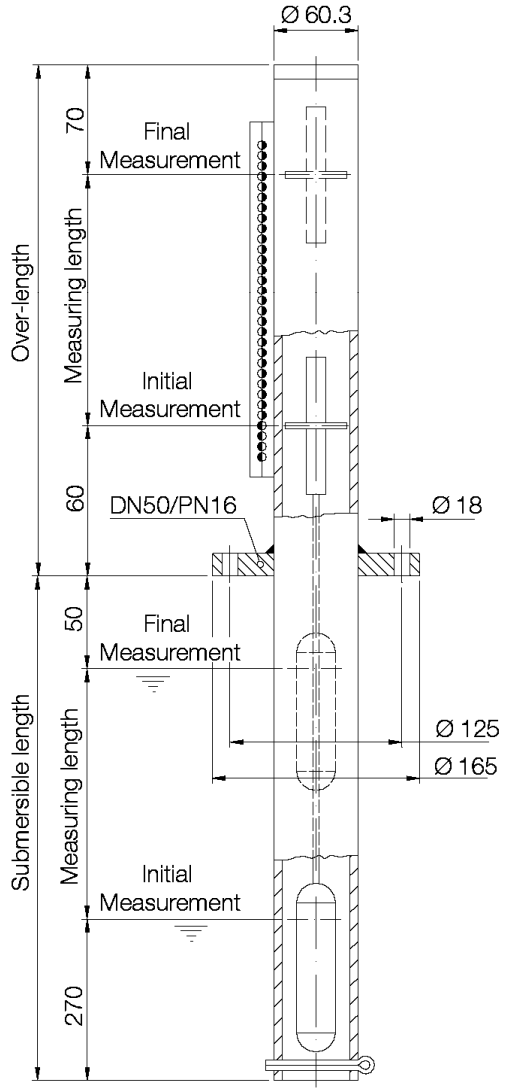
*ATEX-approval in preparation, not in conjunction with PP-roller indication.
Please specify measuring length L, pressure and temperature in writing!

13. Maintenance

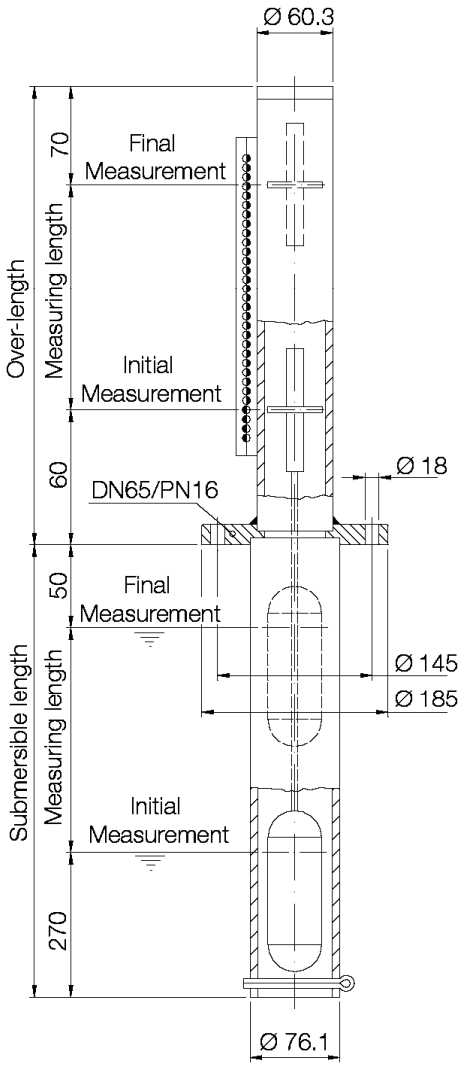
Should any incrustations or crystallisation particles deposit inside the immersion tube, the measuring system must be removed and mechanically cleaned.
The sight glass of the roller indication is made of high-quality plexiglass and it should be cleaned with a suitable detergent if necessary.
The indicator requires no further maintenance.

14. Dimensions

NBK-04...F50...



NBK-04...F65...



Submersible length = measuring length + 320 mm

15. Declaration of Conformance

We, KOBOLD-Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Over-Head Level Indicator **Model: NBK-04...**

is in conformity with the following EWG guidelines

97/23/EG **PED**
notified body: Germanischer Lloyd Germany

Model	Over-length*	p max [bar]	Medium no dangerous (diagr. 2)	Medium dangerous (diagr. 1)
NBK-04	≤ 645	16	Art.3, Para.3	Art.3, Para.3
NBK-04	≤ 1270	16	Art.3, Para.3	I
NBK-04	≤ 4230	16	I	II

* see dimensions in section 14

Signed: date: 02.10.03

H. Peters M. Wenzel