



## Over-Head Level Indicators



measuring  
•  
monitoring  
•  
analysing

### NBK-04-ATEX



- Measuring length: max. 4000 mm
- $p_{max}$ : PN 16/CL150
- Temperatur: -20 ... +120 °C (POM roller)  
-104 ... +120 °C (ball display)
- Viscosity: max. 200 mm<sup>2</sup>/s
- Connection:  
DIN EN 1092-1 flange DN 50/65/80/100  
ASME B16.5 flange 2", 2½", 3", 4"
- Material: stainless steel 1.4571
- Insensitive roller display/ball display  
without auxiliary energy
- Limit contacts
- Analogue output or resistance output,  
HART®, Profibus-PA®, Foundation™,  
Fieldbus®



N2

KOBOLD companies worldwide:

AUSTRALIA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHINA, CZECHIA, FRANCE, GERMANY,  
GREAT BRITAIN, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS,  
PERU, POLAND, REPUBLIC OF KOREA, RUSSIA, SPAIN, SWITZERLAND, THAILAND, TUNISIA,  
TURKEY, USA, VIETNAM

KOBOLD Messring GmbH  
Nordring 22-24  
D-65719 Hofheim/Ts.  
Head Office:  
+49(0)6192 299-0  
+49(0)6192 23398  
info.de@kobold.com  
www.kobold.com




## Description

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.

## ATEX version

The bypass level indicators are supplied with ATEX approval. Limit contacts and an immersible magnetic probe (reed contact chain) with ATEX approval are available for level measurement and monitoring. The electrical components have their own ATEX-certification.

ATEX approval:


Bypass-level indicator:  II 2G Ex mb IIC T5/T6 Gb

Limit contact NBK-RA:  II 2D Ex mb IIIC IP67 T 105°C Db

Reed contact

resistance chain:  II 1GD Ex ia IIC T6 Ga

 II 1/2G Exd IIC T6 Ga/Gb

 II 1/2D Ex tb IIIC T85°C Da/Db

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 advantage of a ball display 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 fails.

## Transmitter

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...20mA is generated by means of a fitted transmitter. This standard signal can then be displayed on analogue or digital indicating devices. Optionally, HART®, PROFIBUS®-PA or Foundation™ Fieldbus® communication protocols are possible.

## Universal indicating unit

A universal indicating unit of type series ADI can be mounted on the bypass to display and evaluate the standard signal (4...20mA) generated by the transmitter.

## Limit Contacts

One or more reed contacts for limit-value acquisition or also for level control can be secured to the bypass tube.

## Applications

- Storage tanks
- Aggressive media
- Mixing vessels
- Water tanks

## Technical Details

Over-head tube:	Ø 60.3 x 2 mm
Tank tube:	Ø 60.3 x 2 mm or 76.1 x 2 mm
Initial measurement:	270 mm from end of tank tube
Material:	stainless steel 1.4571
Float:	titanium
Connecting rod:	rod or tube made of titanium or stainless steel 1.4571 (depending on medium density and measuring length)
Flange nominal size:	DIN DN 50, 65, 80, 100, PN 16 ANSI 2", 2½", 3", 4", Class 150
Max. operating pressure:	PN 16
Operating temperature:	-20...+120°C (POM-roller) -104...+120°C (ball display)
Viscosity:	max. 200 mm <sup>2</sup> /s
Measuring length:	min. 600 mm max. 4000 mm
Total length:	see dimension drawing
Min. density:	0.43 kg/dm <sup>3</sup>

## Roller display model RP (max. length 4000 mm)

Material roller:	POM
Display glass:	PMMA
Carrier frame material:	aluminium, black anodised
Operat. temperature:	-20...100°C
Protection:	IP54

## Ball display model KP (max. length 3800 mm)

Material ball:	PA
Sight tube:	PMMA
Sealing plug:	aluminium
Seal:	NBR
Ball support rail:	aluminium, black anodised
Carrier frame:	stainless steel 1.4301
Scale:	PVC, stainless steel 1.4301 (option MV)
Medium temperature:	-20...+80°C
Ambient temperature:	-20...+80°C
Protection:	IP66

## Ball display model KM (max. length 3800 mm)

Material ball:	PA - high temperature strength
Sight tube:	PC
Sealing plug:	aluminium
Seal:	FKM
Ball support rail:	aluminium, black anodised
Carrier frame:	stainless steel 1.4301
Scale:	PVC, stainless steel 1.4301 (option MV)
Medium temperature:	-60...+120°C

**Technical Details** (continuation)

Ambient temperature: -20...+80 °C  
 Protection: IP66

**Ball display model KF**  
(max. length 3800 mm)

Filling: silicone oil  
 Material ball: PA - high temperature strength  
 Sight tube: PC  
 Sealing plug: stainless steel 1.4571  
 Seal: FKM  
 Ball support rail: aluminium, black anodised  
 Carrier frame: stainless steel 1.4301  
 Scale: Hart-PVC,  
 stainless steel 1.4301 (option MV)  
 Medium temperature: -104...+120 °C  
 Ambient temperature: -20...+80 °C  
 Protection: IP66

**Ball display model KG** (max. length 3000 mm)

Material ball: PA - high temperature strength  
 Sight tube: borosilicate glass  
 Sealing plug: stainless steel 1.4571  
 Seal: FKM  
 Ball support rail: aluminium, black anodised  
 Carrier frame: stainless steel 1.4301  
 Scale: stainless steel 1.4301  
 Medium temperature: -20...+120 °C  
 Ambient temperature: -20...+120 °C  
 Protection: IP66

**ATEX approval****ATEX limit contact, model NBK-RA**

Contact operation: bistable changeover contact en-  
 capsulated  
 Switching hysteresis: approximately 15 mm  
 Max. switch. capacity: 45 VA, 230 V<sub>AC/DC</sub>, 0.6 A  
 Temperature class: T5/T6  
 Max. ambient temp.: 70 °C/85 °C  
 Connection: 3 m PVC-cable  
 Housing: metallic, cast  
 (GD-ZN Al 4 Cu1)  
 Protection: IP67  
 ATEX marking: II 2G Ex mb IIC T5/T6 Gb  
 II 2D Ex mb IIIC IP67 T 105 °C  
 Db

**ATEX reed contact resistor chain model: ...2....**

**In protection type intrinsically safe Ex ia IIC only for  
 connection to a certified intrinsically safe current loop  
 with the following maximum values:**

Total resistance: 0.7...7 kΩ  
 Max. voltage: U<sub>i</sub> = 24 V

Max. capacity: P<sub>i</sub> = 1.2 W  
 Temperature class: T6  
 Resolution: 10 mm  
 Housing: aluminium pressure-cast  
 Protection: IP65  
 ATEX marking: II 1GD Ex ia IIC T6 Ga

**ATEX immersible reed contact resistor chain options  
E/R/B only in connection with an external intrinsically  
safe power supply****Option E**

**Transmitter model: 5333D**

**Common specifications:**

Power supply: 8.0...35 V<sub>DC</sub>  
 Communication  
 interface: Loop Link 5905  
 Linear resistance input: 0...10 kΩ

**Current output:**

Signal range: 4...20 mA  
 Min. signal range: 16 mA  
 Updating time: 135 ms  
 Load resistance: ≤ (V<sub>supply</sub> - 8V)/0.023 [Ω]

**Sensor error detection:**

Programmable: 3.5...23 mA  
 NAMUR NE43 upscale: 23 mA (factory default)  
 NAMUR NE43  
 Downscale: 3.5 mA  
 Data for intrinsically  
 safe current circuit: see instruction manual  
 U<sub>i</sub>: 28 V<sub>DC</sub>  
 I<sub>i</sub>: 120 mA<sub>DC</sub>  
 P<sub>i</sub>: 0.84 W  
 L<sub>i</sub>: 10 μH  
 C<sub>i</sub>: 1.0 nF

**ATEX approval transmitter:**

KEMA 03ATEX1535: II 1G Ex ia IIC T4 or T6  
 II 1D Ex iaD

Max. ambient temp.  
 for T1...T4: 85 °C  
 Max. ambient temp.  
 for T5 and T6: 60 °C  
 Applicable in zone: 0, 1, 2, 20, 21 or 22  
 Medium temperature: -40...+120 °C  
 Ambient temperature: -40...+80 °C  
 Resolution: 10 mm  
 Housing: aluminium pressure-cast  
 Protection: IP66

**Option R**

**Transmitter model: 5337D**

**Common specifications:**

Power supply: 8.0...35 V<sub>DC</sub>



**Technical Details** (continuation)

Communication interface: Loop Link 5905A and HART®  
Linear resistance input: 0...7 kΩ

**Current output:**

Signal range: 4...20 mA  
Min. signal range: 16 mA  
Updating time: 440 ms  
Load resistance:  $\leq (V_{\text{supply}} - 8V)/0.023$  [Ω]

**Sensor error detection:**

Programmable: 3.5...23 mA  
23 mA (factory default)

Data for intrinsically safe current circuit: see instruction manual

**ATEX approval transmitter:**

KEMA 03 ATEX 1537: II 1G Ex ia IIC T6 or T4 Ga  
 II 1D Ex ia IIIC Da

Max. ambient temp. for T1...T4: 85°C  
Max. ambient temp. for T5 or T6: 60°C  
Applicable in zone: 0, 1, 2, 20, 21 or 22  
Medium temperature: -40...+120°C  
Ambient temperature: -40...+80°C  
Resolution: 10 mm  
Housing: aluminium pressure-cast  
Protection: IP66

**Option B**

**Transmitter model:** 5350B

**Common specifications:**

Power supply: 9...32 V<sub>DC</sub>  
Consumption: < 11 mA  
Isolation voltage, test/operation: 1.5 kV<sub>AC</sub>/50 V<sub>AC</sub>  
Signal/noise ratio: min. 60 dB  
Response time (programmable): 1...60 s  
Updating time: < 400 ms  
Dimensions: Ø 44 x 20.2 mm  
Linear resistance input: 0...10 kΩ

**Output:**

**Foundation™ Fieldbus® connection:**

Foundation™ Fieldbus® version: ITK 4.6  
Foundation™ Fieldbus® capability: basic or LAS  
Foundation™ Fieldb. function blocks: 2 analogue and 1 PID

**Profibus® PA connection:**

Profibus® PA protocol standard: EN 50170 vol. 2  
Profibus® PA function blocks: 2 analogue  
Data for intrinsically safe current circuit: see instruction manual

**ATEX approval transmitter:**

KEMA 02ATEX1318X: II 1 G Ex ia IIC T6...T4 Ga  
 II 2 (1) G Ex ib [ia Ga] IIC T6..T4 Gb  
II 1 D Ex ia IIIC Da

Applicable in zone: 0, 1, 2, 20, 21 or 22  
Medium temperature: -40...+120°C  
Ambient temperature: -40...+80°C  
Resolution: 10 mm  
Housing: aluminium pressure-cast  
Protection: IP66

**Option 4**

Total resistance: 0.7...7 kΩ  
Max. voltage: U: 24 V<sub>DC</sub>  
Max. capacity: 125 mW  
Temperature class: T6  
Resolution: 10 mm  
Housing: aluminium pressure-cast  
Protection: IP66  
Explosion proof version: II 1/2G Ex d IIC T6 Ga/Gb

**Option L**

**Transmitter model:** 5333D

**Common specifications:**

Power supply: 8.0...35 V<sub>DC</sub>  
Communication interface: Loop Link 5905  
Linear resistance input: 0...10 kΩ  
**Current output:**  
Signal range: 4...20 mA  
Min. signal range: 16 mA  
Updating time: 135 ms  
Load resistance:  $\leq (V_{\text{supply}} - 8V)/0.023$  [Ω]

**Sensor error detection:**

Programmable: 3.5...23 mA  
NAMUR NE43 upscale: 23 mA (factory default)  
NAMUR NE43 downscale: 3.5 mA

**Technical Details** (continuation)**LED or LCD display (options LE/LC):**

Power supply:	loop powered
Voltage:	LED 3.3 V at 4 mA 3.7 V at 20 mA LCD max. 2.5 V
Medium temperature:	-40 ... +120 °C (with option N up to 250 °C)
Ambient temperature:	-40 ... +80 °C
Resolution:	10 mm
Housing:	aluminium pressure-cast
Protection:	IP 66

**Option K****Transmitter model:** 5337D**Common specifications:**

Power supply:	8.0 ... 35 V <sub>DC</sub>
Communication interface:	Loop Link 5905A and HART®
Linear resistance input:	0 ... 7 kΩ

**Current output:**

Signal range:	4 ... 20 mA
Min. signal range:	16 mA
Updating time:	440 ms
Load resistance:	$\leq (V_{\text{supply}} - 8) / 0.023$ [Ω]

**Sensor error detection:**

Programmable:	3.5 ... 23 mA 23 mA (factory default)
---------------	--

**LED or LCD display (Options KE/KC):**

Power supply:	Loop powered
Voltage drop:	LED 3.3 V at 4 mA 3.7 V at 20 mA LCD max. 2.5V
Medium temperature:	-40 ... +120 °C (with option N up to 250 °C)
Ambient temperature:	-40 ... +80 °C
Resolution:	10 mm
Housing:	aluminium pressure-cast
Protection:	IP 66

**Option N****Transmitter model:** 5350A**Common specifications:**

Power supply:	9 ... 32 V <sub>DC</sub>
Consumption:	<11 mA
Isolation voltage, test/operation:	1.5 kV <sub>AC</sub> / 50 V <sub>AC</sub>
Signal/noise ratio:	min. 60 dB
Response time (programmable):	1 ... 60 s
Updating time:	<400 ms
Dimensions:	Ø 44 x 20.2 mm
Linear resistance input:	0 ... 10 kΩ

**Output:****Foundation™ Fieldbus® connection:**

Foundation™	
Fieldbus® version:	ITK 4.6
Foundation™	
Fieldbus® capability:	basic or LAS
Foundation™	
Fieldb. function blocks:	2 analogue and 1 PID

**Profibus® PA connection:**

Profibus® PA	
protocol standard:	EN 50170 vol. 2
Profibus® PA	
function blocks:	2 analogue
Medium temperature:	-40 ... +120 °C (with option N up to 250 °C)
Ambient temperature:	-40 ... +80 °C
Resolution:	10 mm
Housing:	aluminium pressure-cast
Protection:	IP 66



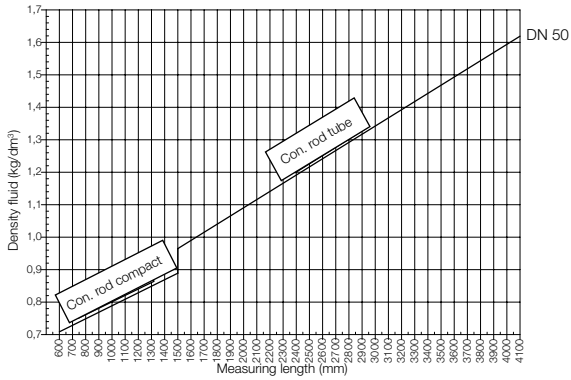
**Options**

Code	Discription	Sketch/picture	Availability
<b>Scales</b>			
<b>(Ball displays are always delivered with scales, see technical data/ sketch for resolution)</b>			
<b>MV</b>	Scale made of stainless steel 1.4301 (option for roller display KP/KM/KF) (Scale made of stainless steel 1.4301 standard with roller display KG)	see sketch	<b>NBK-04</b>
<b>M1</b>	Measuring scale, medium temperature -40°C... +120°C, engraved scale made of aluminium	see sketch	<b>NBK-04</b>
<b>M2</b>	Measuring scale, medium temperature -40°C... +120°C, scale backing made of aluminium with polyester foil	see sketch	<b>NBK-04</b>
<b>Tests / certificates</b>			
<b>P</b>	Radiographic examination DIN 54 111 T1	-	<b>NBK-04</b>
<b>Q</b>	Dye penetration test DIN EN 571-1	-	<b>NBK-04</b>
<b>X</b>	Pressure test with water 1.5 x PN	-	<b>NBK-04</b>
<b>Z</b>	3.1 Inspection certificate acc. DIN EN 10204	-	<b>NBK-04</b>
<b>MR</b>	Material acc. to NACE MR 0103/ISO15156 (MR0175), declaration of conformance	-	<b>NBK-04</b>
<b>WV</b>	Positive Material Identification (PMI)	-	<b>NBK-04</b>
<b>SF</b>	Oil and fat free	-	<b>NBK-04</b>

**Note:** Please pay attention to max. permissible temperature limits of individual components



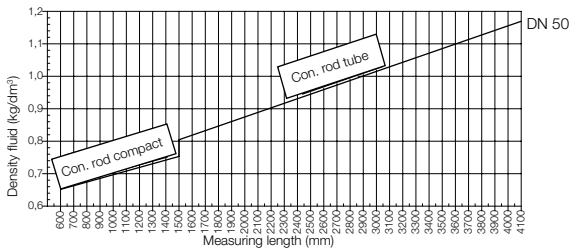
**Density/length of measuring tube diagram\***  
**NBK-04...8, Diagram 8**



**NBK-04...8**

Float: titanium  
 Connection rod: stainless steel, 1.4571  
 Process connection: DIN EN 1092-1 flange, DN 50, 80, 100  
 ASME flange, 2", 3", 4"  
 Overhead and tank tube: Ø 60.3 mm, continuous  
 Min. medium density: 0.71 kg/dm<sup>3</sup> at ML = 600 mm

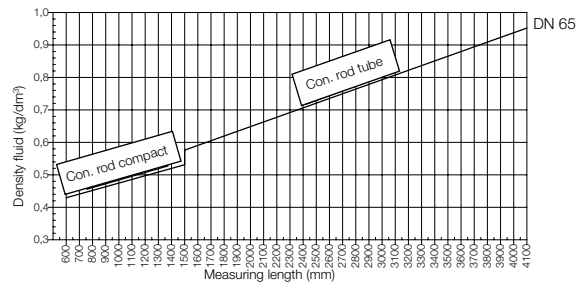
**NBK-04...6, Diagram 6**



**NBK-04...6**

Float: titanium  
 Connection rod: titanium  
 Process connection: DIN EN 1092-1 flange, DN 50, 80, 100  
 ASME flange, 2", 3", 4"  
 Overhead and tank tube: Ø 60.3 mm, continuous  
 Min. medium density: 0.65 kg/dm<sup>3</sup> at ML = 600 mm

**NBK-04...4, Diagram 4**



**NBK-04...4**

Float: titanium  
 Connection rod: stainless steel, 1.4571  
 Process connection: DIN EN 1092-1 flange, DN 65, 100  
 ASME flange, 2½", 4"  
 Overhead and tank tube: Ø 60.3 mm  
 Tank tube: Ø 76.1 mm  
 Min. medium density: 0.43 kg/dm<sup>3</sup> at ML = 600 mm

\* The floats could be adjusted to the densities above the graph (Curve shifts upward)



Order Details (Example: NBK-04 F50 00 0 8)

Model	Material	Connection and nominal size	Roller indication/ Ball display	Transducers/ Transmitters	Medium density and meas. length	Options
NBK-04...	Stainless steel 1.4571	<b>F50</b> = DIN EN flange DN 50 <b>F80</b> = DIN EN flange DN 80 <b>F1H</b> = DIN EN flange DN 100 <b>A50</b> = ASME flange 2" <b>A80</b> = ASME flange 3" <b>A1H</b> = ASME flange 4"	<b>00</b> = without <b>RP</b> = POM roller indication <b>KP</b> = ball display with PMMA sight tube <b>KM</b> = ball display with PC sight tube <b>KF</b> = as KM but with oil filling <b>KG</b> = ball display with borosilicate sight tube	<b>1</b> = without electrical attached parts ATEX II 1G/2G D <b>2</b> = with reed contact chain II 1GD Exia IIC T6 <b>E</b> = immersible magnetic probe (reed chain)/ 4...20 mA, 2-wire, ATEX Exia <b>R</b> = immersible magnetic probe (reed chain)/ 4...20 mA, HART®, 2-wire, ATEX Exia <b>B</b> = immersible magnetic probe (reed chain)/ Profibus® PA, Foundation™ Fieldbus®, ATEX Exia <b>4<sup>1)</sup></b> = with reed contact chain ATEX II 1/2G Exd IIC T6 Ga/Gb <b>L<sup>1)</sup></b> = immersible magnetic probe (reed chain)/ 4...20 mA, 2-wire, ATEX Exd <b>K<sup>1)</sup></b> = immersible magnetic probe (reed chain)/ 4...20 mA, HART®, 2-wire, ATEX Exd <b>N<sup>1)</sup></b> = immersible magnetic probe (reed chain)/ Profibus® PA, Foundation™ Fieldbus®, ATEX Exd	<b>8</b> = see diagram 8 <b>6</b> = see diagram 6  <b>4</b> = see diagram 4	without = without options or options as in list and description (see separate options list)
		<b>F65</b> = DIN EN flange DN 65 <b>F1H</b> = DIN EN flange DN 100 <b>A65</b> = ASME flange 2 1/2" <b>A1H</b> = ASME flange 4"				
NBK-RA	ATEX limit contact, encapsulated, Ex II2G EEx m II T6/T5					
REL-5114B1A	ATEX transmitter for immersible magnetic probe (Reed contact chain) EX II (1) G [EEx ia] IIC, DIN rail mounting					

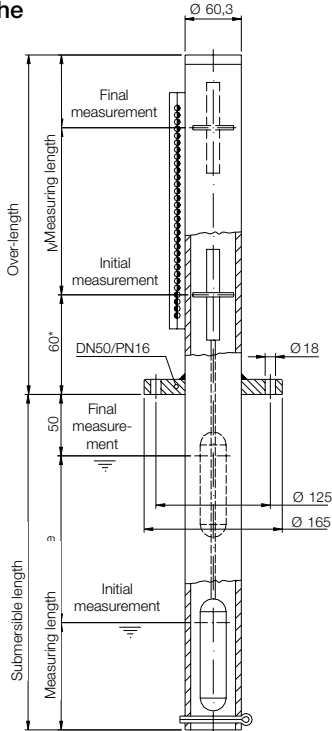
<sup>1)</sup> See separate ATEX certification of model MM-...

Please specify measuring length L, density, pressure, temperature and options in writing!

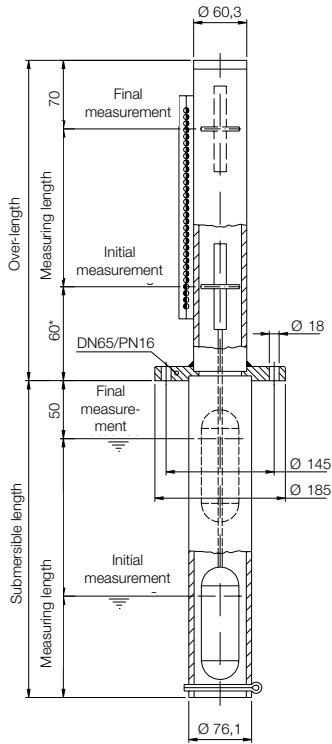


**Dimensions**

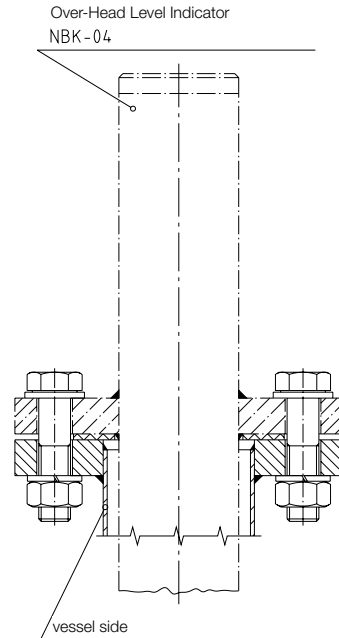
**NBK-04...8/6 the**



**NBK-04...4**



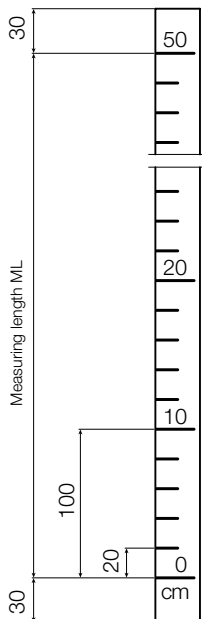
**Required size of the mounting tube of vessel side**



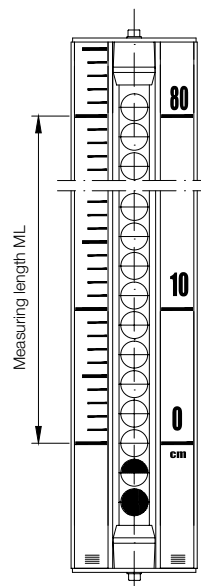
Ø NBK-04 tube	Minimum-Ø of the mounting tube of the vessel side
Ø 76.1 mm	Ø 88.9 mm x 2
Ø 60.3 mm	Ø 76.1 mm x 2

\* In case of using a transmitter:  
 dimension = 100/130/200 mm depending on transducer model  
 dimension = 130 mm in case of using a ball display  
 Submersible length = measuring length +320 mm  
 Measuring length = submersible length -320 mm

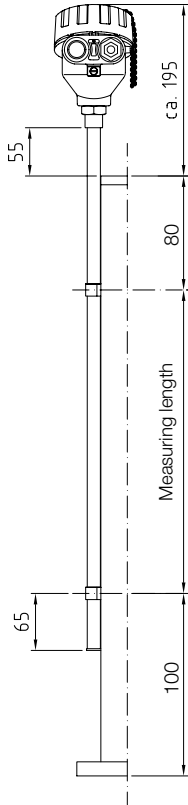
**Measuring scale, aluminium**  
**Option M1 - engraved scale**  
**Option M2 - polyester foil**



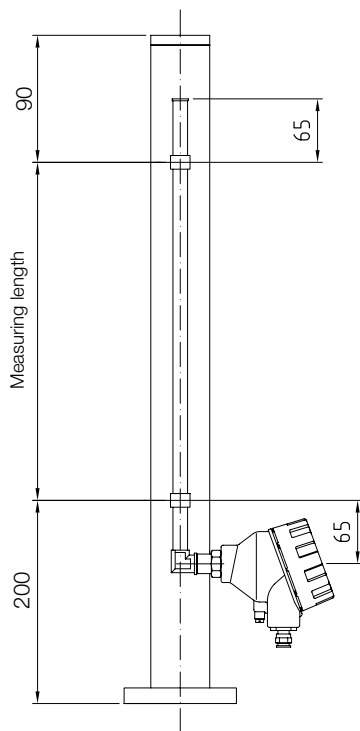
**Measuring scale on stainless steel carrier**  
**Scale from hard PVC or print on 1.4301**  
 (standard scale with ball display)



NBK-... with transmitter options 2/E/R/B/4/L/K/N



NBK-... with transmitter display options LE/KE or LC/KC



NBK-RA

