



## Over-Head Level Indicators



measuring  
•  
monitoring  
•  
analysing

### NBK-04



- Measuring length: max. 4000 mm
- $p_{\max}$ : PN 16/CL150;  $t_{\max}$ : 120 °C
- 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 magnet roller display or ball display without auxiliary energy
- Limit contacts
- Analogue output, HART®



NBK-RS



N2

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### 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.

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 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...20 mA is generated by means of a fitted transmitter. This standard signal can then be displayed on analogue or digital indicating devices. Optionally, HART® communication protocol is 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...20 mA) 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
Material:	stainless steel 1.4571
Initial measurement:	270 mm from end of tank tube
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 EN 1092-1 DN 50, 65, 80, 100, PN 16 ASME B16.5 2", 2½", 3", 4", Class 150

Max. operating pressure:	PN 16
Operating temperature:	-20 ... +120°C (POM rollers) -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>
ATEX approval:	see separate description

### Roller display model RP (max. length 4 000 mm)

Material roller:	POM
Display glass:	PMMA
Carrier frame material:	aluminium, black anodised
Operat. temperature:	-20 ... 100 °C
Protection:	IP 54

### Ball display model KP (max. length 3 800 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:	IP 66

### Ball display model KM (max. length 3 800 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
Ambient temperature:	-20 ... +80 °C
Protection:	IP 66

### Ball display model KF (max. length 3 800 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:	IP 66

**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:	IP 66

**Technical Details additional Features****Limit contacts, model NBK-R**

Contact operation:	bistable changeover contact
Switching hysteresis:	approx. 15 mm
Max. switching capacity:	60 W/VA; 230 V <sub>AC/DC</sub> , 1 A
Resistance:	100 mΩ
Medium temperature:	-40 ... +100 °C
Ambient temperature:	-40 ... +75 °C
Connection:	3 m PVC-cable
Housing:	Polycarbonate
Protection:	IP 67

**Limit contact model NBK-RS**

Contact operation:	bistable changeover contact
Switching hysteresis:	approx. 15 mm
Max. switching capacity:	230 V <sub>AC/DC</sub> , 1A, 60 W/VA
Resistance:	approx. 100 mΩ
Ambient temperature:	NBK-RS -40 ... +100 °C
Medium temperature:	NBK-RS -40 ... +120 °C
Cable connection:	silicone cable, colour coded 4Gx1 mm <sup>2</sup>
Cable gland:	M16x1.5 brass
Housing:	stainless steel 1.4301
Protection:	IP 67

**Limit contact model NBK-RV200NO**

Sensor type:	reed contact
Switching pattern:	normally open, bistable
Switching hysteresis:	approx. 7 mm
Medium temperature:	-50 ... +120 °C
Ambient temperature:	-40 ... +70 °C
Max. housing temperature:	+80 °C
Max. operating voltage U <sub>max</sub> :	75 V <sub>DC</sub> / 50 V <sub>AC</sub>
Max. load current I <sub>max</sub> :	0.5 A
Max. switching power P <sub>max</sub> :	5 W
Housing:	Aluminium pressure-cast
Electrical connection:	terminal connection, cable gland M20x1.5 (PA) Cable clamping range 6 -13 mm
Protection:	IP 65
Take into account that none of the three parameters U <sub>max</sub> , I <sub>max</sub> , P <sub>max</sub> may be exceeded!	

**Limit contact model NBK-RV200NC**

Sensor type:	reed contact
Switching pattern:	normally closed, bistable
Other parameters:	exactly as for NBK-RV200NO

**Limit contact model NBK-RN200NO**

Sensor type:	NAMUR contact
Switching pattern:	normally open, bistable
Max. operating voltage	
U <sub>max</sub> :	15 V <sub>DC</sub>
R <sub>on</sub> :	1 kΩ
R <sub>off</sub> :	11 kΩ
Other parameters:	exactly as for NBK-RV200NO

**Limit contact model NBK-RN200NC**

Sensor type:	NAMUR contact
Switching pattern:	normally closed, bistable
Other parameters:	exactly as for NBK-RV200NO

**Reed contact resistor chain model: ...W...**

Total resistance:	0.7 ... 7 kΩ
Meas. circuit voltage:	max. 24 V <sub>DC</sub>
Measuring current:	max. 0.1 A
Max. length:	4000 mm
Medium temperature:	-40 ... +120 °C,
Ambient temperature:	max. 130 °C
Resolution:	10 mm
Housing:	Aluminium pressure-cast
Cable gland:	M16x1,5
Protection:	IP 65

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

Output:	4 ... 20 mA
Supply voltage:	16 ... 32 V <sub>DC</sub>
Max. length:	4000 mm
Load:	(V <sub>vers</sub> - 9V) / 0,02 A [Ω]
Medium temperature:	-40 ... +120 °C
Ambient temperature:	-20 ... +80 °C
Resolution:	10 mm
Housing:	Aluminium pressure-cast
Protection:	IP 65

**Magnetostrictive sensor with 4-wire transmitter: 4 ... 20 mA model: ...T...**

Output:	4 ... 20 mA
Supply voltage:	24 V <sub>DC</sub> , max. 150 mA
Load:	max. 500 Ω
Max. length:	4000 mm
Medium temperature:	-40 ... +120 °C
Ambient temperature:	-20 ... +80 °C
Accuracy:	±1 mm
Housing:	Aluminium pressure-cast
Protection:	IP 65

**Magnetostrictive sensor with 2-wire transmitter 4 ... 20 mA model: ...D/J...**

Output:	4 ... 20 mA
Supply:	12,5 ... 36 V <sub>DC</sub>
max. length:	3500 mm
Medium temperature*:	-40 ... +90 °C
Ambient temperature:	-40 (-25**) ... +70 °C
Resolution ***:	±1 mm
Accuracy****:	5 mm

(see separate data sheets for probe types NMB)

\* see temperature diagram

\*\* with display



**Magnetostrictive sensor**

**with 2-wire transmitter 4 ... 20 mA model: ...I...**

Output: 4 ... 20 mA  
Supply: 12,5 ... 36 V<sub>DC</sub>  
max. length: 3500 mm  
Medium temperature: -40 ... +90 °C  
Ambient temperature: -40 ... +70 °C  
Resolution \*\*\*: ±1 mm  
Accuracy\*\*\*\*: 5 mm

Cable entry: M 20 x 1.5  
Protection: IP 66

**LED or LCD display (Options HE/HC):**

Power supply: Loop powered  
Voltage drop: LED 3.3 V at 4 mA  
3.7 V at 20 mA  
LCD max. 2.5 V

(see separate data sheets for probe types NMS)

\*\*\* for displayed and HART® transmitted values

\*\*\*\*under reference conditions and with factory setting, with factory calibrated float for NBK

**Reed contact resistor chain with 2-wire transmitter:  
4 ... 20 mA model A**

(only with display options AE or AC)

Transmitter model: 5333D

**Common specifications:**

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

**Current output:**

Signal range: 4 ... 20 mA  
Min. signal range: 16 mA  
Updating time: 135 ms  
Load resistance:  $\leq (V_{\text{supply}} - 8V) / 0.023 [\Omega]$

**Sensor error detection:**

Programmable: 3.5 ... 23 mA  
Medium temperature: -40 ... +120 °C  
Ambient temperature: -20 ... +80 °C  
Resolution: 10 mm  
Housing: Aluminium pressure-cast  
Cable entry: M 20 x 1.5  
Protection: IP 66

**LED or LCD display (options AE/AC):**

Power supply: Loop powered  
Voltage: LED 3.3 V at 4 mA  
3.7 V at 20 mA  
LCD max. 2.5 V

**Reed contact resistor chain with 2-wire transmitter:  
4 ... 20 mA HART® model H and display options  
HE or HC**

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:  $\leq (V_{\text{supply}} - 8V) / 0.023 [\Omega]$

**Sensor error detection:**

Programmable: 3.5 ... 23 mA  
Medium temperature: -40 ... +120 °C  
Ambient temperature: -20 ... +80 °C  
Resolution: 10 mm  
Housing: Aluminium pressure-cast

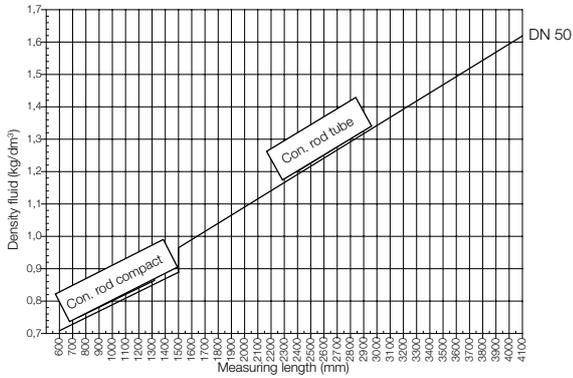
## Options

Code	Description	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>Electrical Outputs</b>			
<b>MU</b>	Option M with connection box at bottom, for easy access to connection box		<b>NBK-04</b>
<b>Display options</b>			
<b>AE</b>	Aluminium die-cast housing, LED digital display, connection box at bottom (only in combination with transmitter option A)		<b>NBK-04</b>
<b>AC</b>	Aluminium die-cast housing, LCD digital display, connection box at bottom (only in combination with transmitter option A)	as AE, however with LCD display	<b>NBK-04</b>
<b>HE</b>	Aluminium die-cast housing, LED digital display, connection box at bottom (only in combination with transmitter option H)		<b>NBK-04</b>
<b>HC</b>	Aluminium die-cast housing, LCD digital display, connection box at bottom (only in combination with transmitter option H)	as HE, however with LCD display	<b>NBK-04</b>
<b>C<sup>1)</sup></b>	Indicating unit ADI-1V00W2F0 with bargraph and digital display, rugged aluminium housing, mounted at bypass tube, for description see data sheet ADI-1	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>

<sup>1)</sup> Only possible with option T (magnetostrictive sensor or option M (reed chain with transmitter)

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

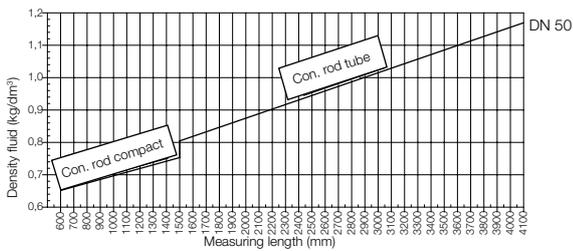
Density/ length of measuring tube diagram\*  
NBK-04...8, Diagram 8



**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

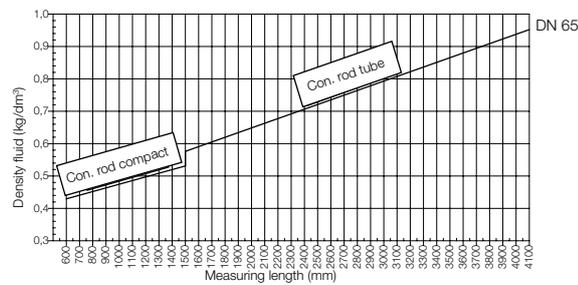
NBK-04...6, Diagram 6



**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 Plexiglas® sight tube <b>KM</b> = ball display with Makrolon® sight tube <b>KF</b> = as KM but with oil filling <b>KG</b> = ball display with borosilicate sight tube	<b>0</b> = without <b>W</b> = reed chain/without <b>M</b> = reed chain/4...20 mA, 2-wire <b>T</b> = magnetostrictive probe/ 4...20 mA, 4-wire <b>A<sup>1)</sup></b> = reed chain/ 4...20 mA, 2-wire <b>H</b> = reed chain/ 4...20 mA, HART® <b>D<sup>3)</sup></b> = magnetostrictive probe / 4...20 mA, 2-wire, 1 mm <b>J<sup>3)</sup></b> = magnetostrictive probe / 4...20 mA HART®, 2-wire, 1 mm <b>I<sup>4)</sup></b> = magnetostrictive probe / 4...20 mA HART®, 2-wire, 1 mm, 1 mm, DIN plug	<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"				
<b>NBK-R</b>	Standard limit contact (bistable change-over contact)					
<b>NBK-RV200NO</b>	Limit contact, bistable, N/O, max. +200 °C (suitable for vessels with strong vibrations)					
<b>NBK-RV200NC</b>	Limit contact, bistable, N/C, max. +200 °C (suitable for vessels with strong vibrations)					
<b>NBK-RN200NO</b>	Limit contact, bistable, NAMUR, N/O, max. +200 °C (suitable for vessels with strong vibrations)					
<b>NBK-RN200NC</b>	Limit contact, bistable, NAMUR, N/C, max. +200 °C (suitable for vessels with strong vibrations)					
<b>NBK-RS01U03<sup>2)</sup></b>	Limit contact, bistable, change-over contact, max. +120 °C, 3 m silicone cable, weight: 505 g					
<b>NBK-RS01U06<sup>2)</sup></b>	Limit contact, bistable, change-over contact, max. +120 °C, 6 m silicone cable, weight: 826 g					
<b>NBK-RS01U10<sup>2)</sup></b>	Limit contact, bistable, change-over contact, max. +120 °C, 10 m silicone cable, weight: 1254 g					

<sup>1)</sup> Only with options AE and AC

<sup>2)</sup> Add Suffix „/NBK“, when ordered together with NBK

<sup>3)</sup> Model NMB-TR00UAxx2(4)0 (see separate data sheet for model NMB).

<sup>4)</sup> Model NMS-S000UExxM0 (see separate data sheet for model NMS).

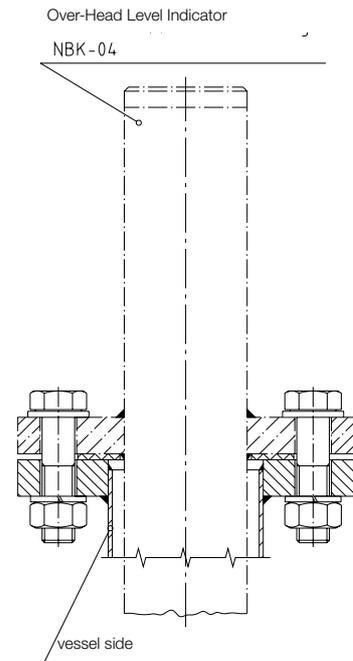
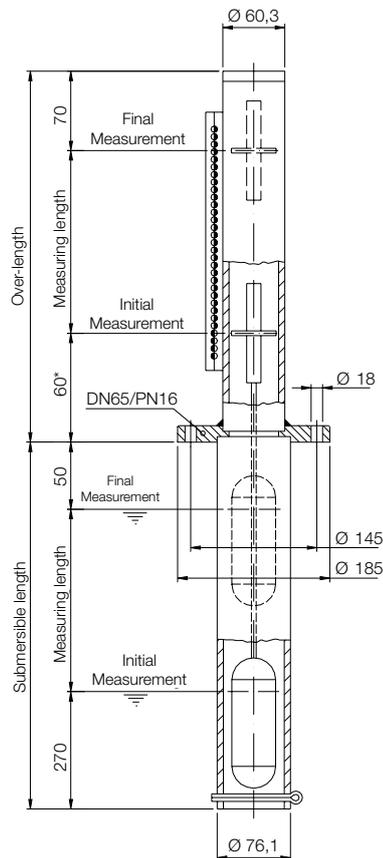
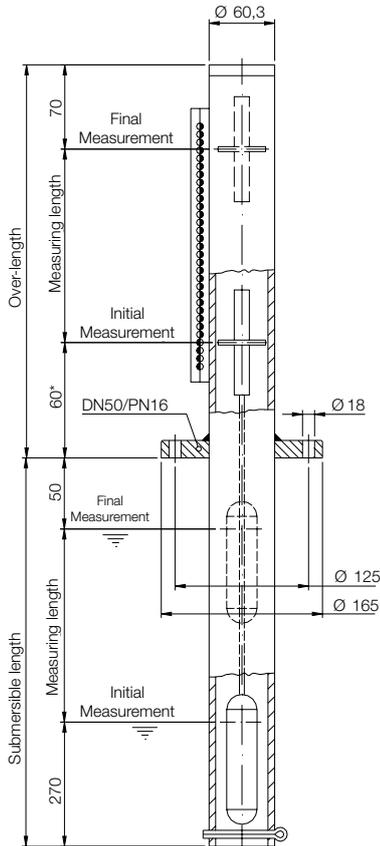
Please specify measuring length L, density, pressure, temperature and options in writing!

**Dimensions**

NBK-04...8/6

NBK-04...4

Required size of the mounting tube of the vessel side

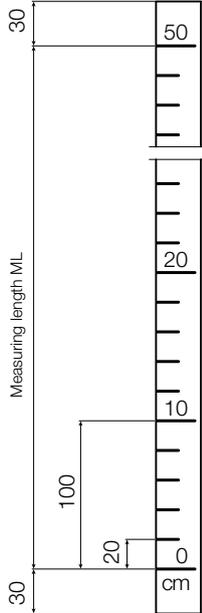


Ø NBK-04 tube	Minimum-Ø of the mounting tube of the vessel side
Ø 76.1 mm	Ø 88.9 mm x 2
Ø 60.3 mm	Ø 76.1 mm x 2

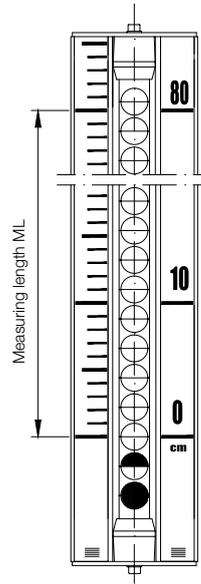
\* In case of using a transmitter:  
 dimension = 100 mm for transmitter MODEL W/M/T/H/F  
 dimension = 150 mm for transmitter option D/J/I  
 dimension = 200 mm for transmitter MODEL MU/AE/HE/AC/HC  
 dimension = 130 mm in case of using a ball display

Submersible length = measuring length +320 mm  
 Measuring length = submersible length -320 mm

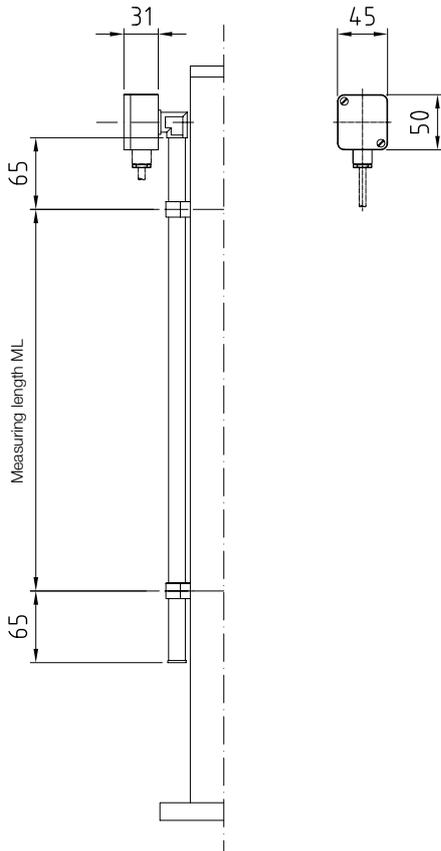
Measuring scale, aluminium  
 Option M1 - engraved scale  
 Option M2 - polyester foil



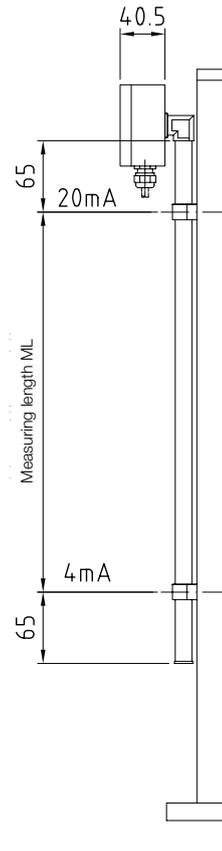
Measuring scale on stainless steel carrier  
 Scale from hard PVC or print on 1.4301  
 (standard scale with ball display)



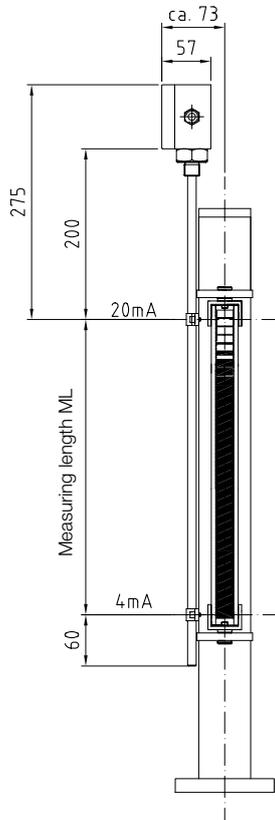
NBK-... with reed chain model W



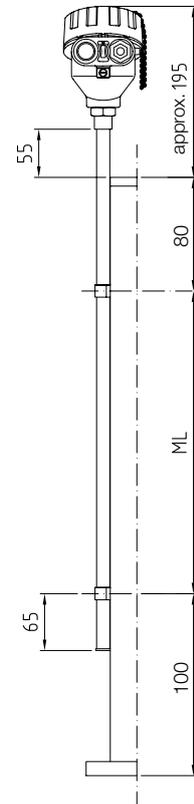
NBK-... with transmitter model M



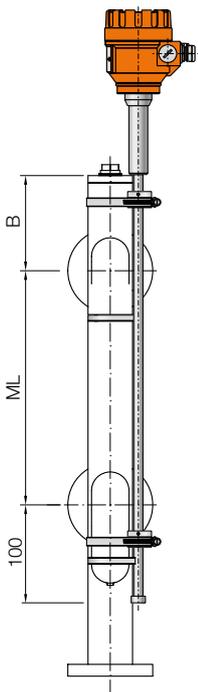
NBK-... with transmitter model T



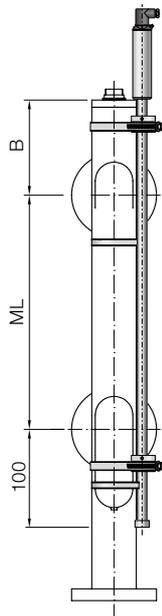
NBK-... with transmitter options H/F



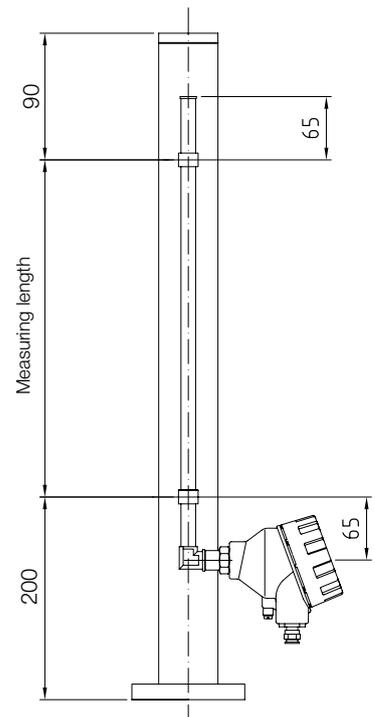
NBK-... with transmitter options D/J



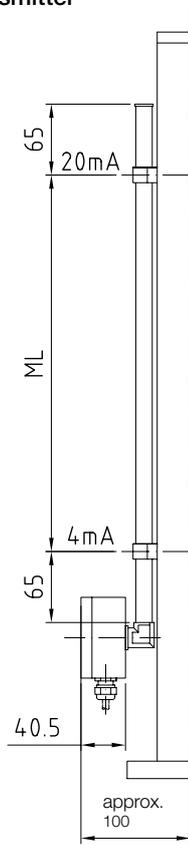
NBK-... with transmitter option I



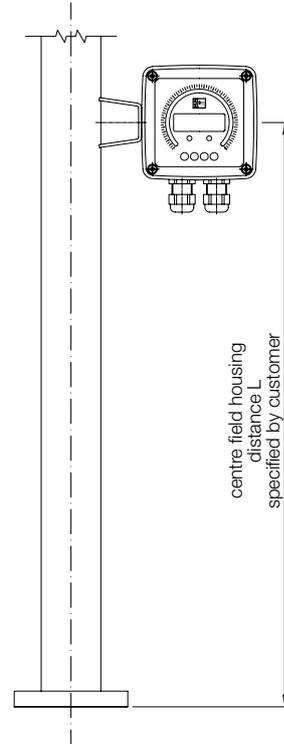
NBK-... with transmitter display options AE/HE or AC/HC



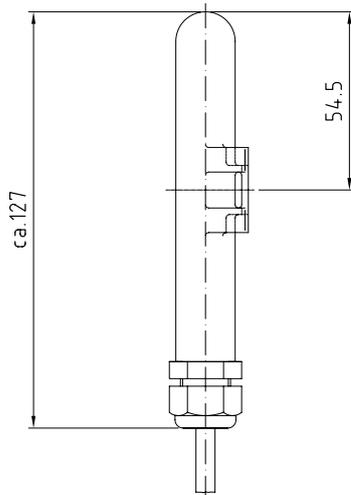
NBK-... with transmitter options MU



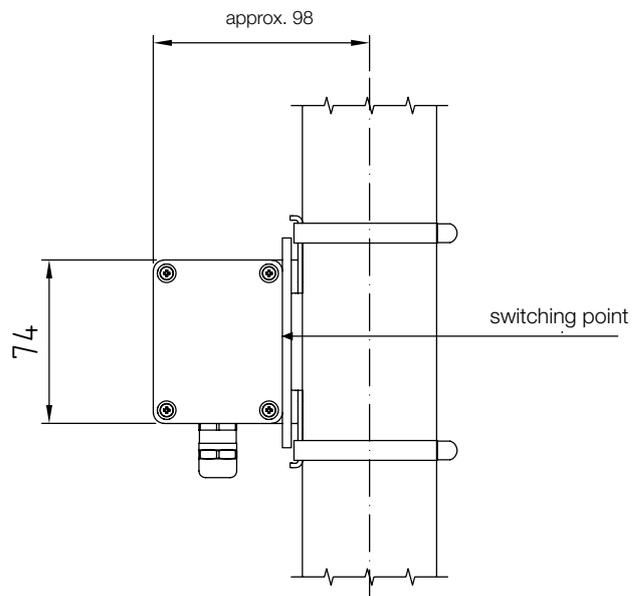
NBK- ... with indicating unit ADI-1V00W2F0, option C



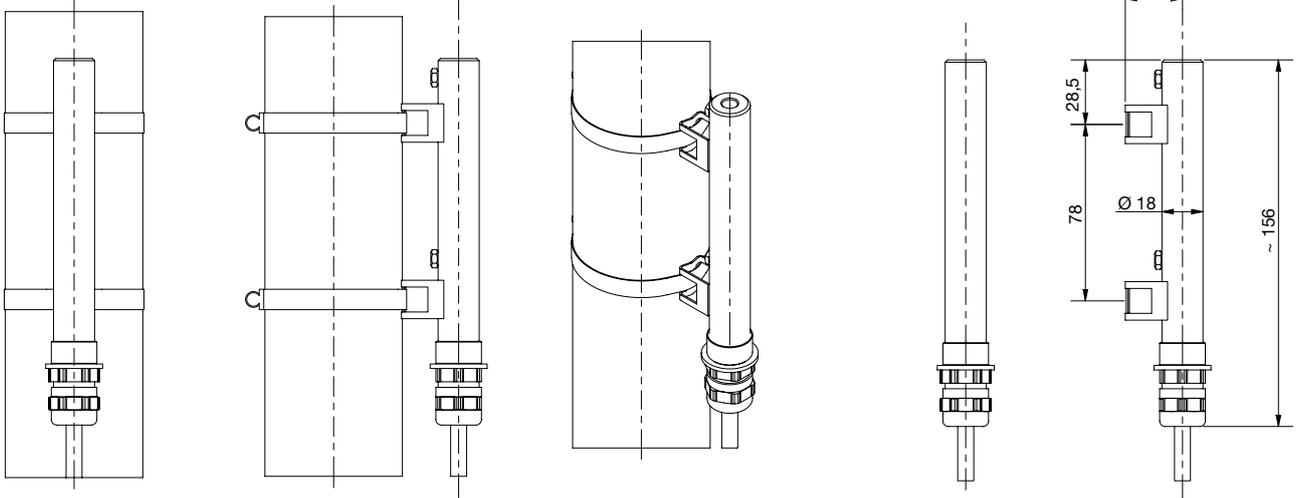
NBK-R



NBK-RV/RN



NBK-RS



NBK-RH

