Over-Head Level Indicators

NBK-04

- Measuring length: max. 4000 mm
- p_{max}: PN 16/CL150; t_{max}: 120 °C
- Viscosity: max. 200 mm²/s
- Connection:
  DIN EN 1092-1 flange DN 50/65
  ASME B16.5 flange 2"; 2½"
- Material:
  stainless steel 1.4571
- Insensitive magnet roller display or ball display without auxiliary energy
- Limit contacts
- Analogue output, HART®, Profibus-PA®, Foundation™ Fieldbus®

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®, 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 ... 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 from titanium or stainless steel 1.4571 (depending on medium density and measuring length)
Flange nominal size:	DIN EN 1092-1 DN 50 or 65, PN 16 ASME B16.5 2" 2" or 2½", CL150 lbs
Max. operating pressure:	PN 16
Operating temperature:	-50 °C ... +120 °C
Viscosity:	max. 200 mm^2/s
Measuring length:	min. 600 mm max. 4000 mm
Total length:	see dimension drawing
Min. density:	0,43 kg/dm^3
ATEX approval:	see separate description

Roller display RP (max. length 4 000 mm)

Material roller:	Polypropylene
Display glass:	Plexiglas®
Carrier frame material:	Aluminium, brown anodised
Operat. temperature:	0 ... 120 °C
Protection:	IP 54

Ball display model KP (max. L = 3 800 mm one-piece)*

Material ball:	Ultramid®
Sight tube:	Plexiglas®
Sealing plug:	Aluminium
Seal:	NBR
Ball support rail:	Aluminium, brown anodised
Carrier frame:	Stainless steel 1.4301
Scale:	Hard-PVC, stainless steel 1.4301 (Option MV)
Operat. temperature:	-20 ... +80 °C
Protection:	IP 66

Ball display model KM (max. L = 3 800 mm one-piece)*

Material ball:	Ultramid® B
Sight tube:	Makrolon®
Sealing plug:	Aluminium
Seal:	FKM
Ball support rail:	Aluminium, brown anodised
Carrier frame:	Stainless steel 1.4301
Scale:	Hard-PVC, stainless steel 1.4301 (Option MV)
Operat. temperature:	-50 ... +120 °C
Protection:	IP 66

Ball display model KF (max. L = 3 800 mm one-piece)*

Filling:	Silicone oil
Material ball:	Ultramid® B
Sight tube:	Makrolon®
Sealing plug:	Stainless steel 1.4301
Seal:	FKM
Ball support rail:	Aluminium, brown anodised
Carrier frame:	Stainless steel 1.4301
Scale:	Hard-PVC, stainless steel 1.4301 (Option MV)
Operat. temperature:	-50 ... +120 °C
Protection:	IP 66

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Ball display model KG (max. L = 3000 mm one-piece)*

Material ball:	Ultramid® B
Sight tube:	Borosilicate glass
Sealing plug:	Stainless steel 1.4301
Seal:	FKM
Ball support rail:	Aluminium, brown anodised
Carrier frame:	Stainless steel 1.4301
Scale:	Stainless steel 1.4301
Operat. temperature:	-20 ... +120 °C
Protection:	IP66

* In case of multi-part design, a display (ball) length of 32 mm is not readable

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 $V_{AC/DC}$, 1 A
Resistance:	100 mΩ
Medium temperature:	-40 ... +100 °C
Ambient temperature:	-40 ... +75 °C
Connection:	3 m PVC-cable
Housing:	Polycarbonate
Protection:	IP67

Limit contact high temperature, model NBK-RT200

Contact operation:	bistable changeover contact
Switching hysteresis:	approx. 15 mm
Max. switching capacity:	80 VA, 250 $V_{AC/DC}$, 1 A
Resistance:	<20 mΩ
Medium temperature:	-40 ... +120 °C
Ambient temperature:	-40 ... +145 °C
Housing:	Aluminium pressure-cast, terminal connection
Cable entry	M16 x 1.5, brass nickel-plated
Protection:	IP65

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_{max}:	400 V_{DC} / 250 V_{AC}
Max. load current I_{max}:	0.5 A
Max. switching power P_{max}:	5 W
Housing:	Aluminium pressure-cast, terminal connection
Protection:	IP65

Take into account that none of the three parameters U_{max}, I_{max}, P_{max} 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_{max}:	15 V_{DC}
R_{on}:	1 kΩ
R_{off}:	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_{DC}
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:	IP65

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

Output:	4 ... 20 mA
Supply voltage:	16 ... 32 V_{DC}
Max. length:	4000 mm
Load:	(V_{Vers} -9V) / 0,02 A [Ω]
Medium temperature:	-40 ... +120 °C
Ambient temperature:	-20 ... +80 °C
Resolution:	10 mm
Housing:	Aluminium pressure-cast
Protection:	IP65

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

Output:	4 ... 20 mA
Supply voltage:	24 V_{DC}, 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:	IP65

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_{DC}
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:	≤ (V_{supply} - 8 V) / 0.023 [Ω]

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_{DC}
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:	≤ (V_{supply} - 8 V) / 0.023 [Ω]

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 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

Reed contact resistor chain with transmitter: Model F (Profibus-PA®, Foundation™ Fieldbus®)
Transmitter model: 5350A
Common specifications:

Supply voltage:	9 ... 32 V_{DC}
Consumption:	< 11 m
Isolation voltage, test / operation:	1.5 kV_{AC} / 50 V_{AC}
Signal / noise ratio:	min. 60 dB
Response time (programmable):	1 ... 0 s
Updating time:	< 400 ms
Dimension:	Ø 44 x 20.2 mm
Linear resistance input:	0 … 10 kΩ

Output:
Foundation™ Fieldbus® connection:

Foundation™ Fieldbus® Version:	ITK 4.51
Foundation™ Fieldbus® capability:	basic or LAS
Foundation™ Fieldbus® function blocks:	2 analogue and 1 PID

Profibus-PA® connection:

Profibus-PA® protocol standard:	EN 50170 vol. 2
Profibus-PA® function blocks:	2 analogue
Profibus-PA® address (at delivery):	126
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

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Options

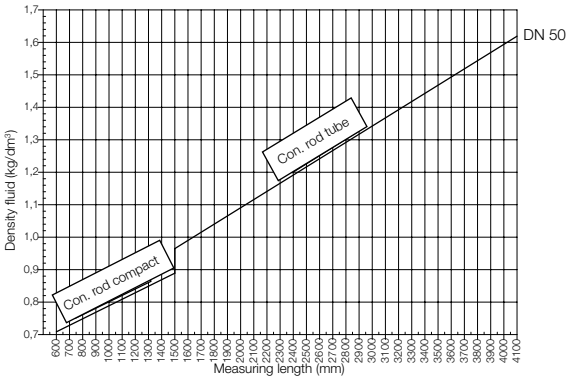
Code	Discription	Sketch/picture	Availability
		Scales	
(Ball displays are always delivered with scales, see technical data/ sketch for resolution)			
MV	Scale made of stainless steel 1.4301 (option for roller display KP/KM/KF (Scale made of stainless steel 1.4301 standard with roller display KG)	see sketch	**NBK-04**
M1	Measuring scale, medium temperature -40 °C ... +120 °C, engraved scale made of aluminium	see sketch	**NBK-04**
M2	Measuring scale, medium temperature -40 °C ... +120 °C, scale backing made of aluminium with polyester foil	see sketch	**NBK-04**
		Electrical Outputs	
MU	Option M with connection box at bottom, for easy access to connection box		**NBK-04**
		Display options	
AE	Aluminium die-cast housing, LED digital display, connection box at bottom (only in combination with transmitter option A)		**NBK-04**
AC	Aluminium die-cast housing, LCD digital display, connection box at bottom (only in combination with transmitter option A)	as AE, however with LCD display	**NBK-04**
HE	Aluminium die-cast housing, LED digital display, connection box at bottom (only in combination with transmitter option H)		**NBK-04**
HC	Aluminium die-cast housing, LCD digital display, connection box at bottom (only in combination with transmitter option H)	as HE, however with LCD display	**NBK-04**
C[1)]	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	**NBK-04**
		Tests / certificates	
P	Radiographic examination DIN 54 111 T1	-	**NBK-04**
Q	Dye penetration test DIN EN 571-1	-	**NBK-04**
X	Pressure test with water 1.5 x PN	-	**NBK-04**
Z	3.1 Inspection certificate acc. DIN EN 10204	-	**NBK-04**
MR	Material acc. to NACE MR 0103/ISO15156 (MR0175), declaration of conformance	-	**NBK-04**
WV	Positive Material Identification (PMI)	-	**NBK-04**
SF	Oil and fat free	-	**NBK-04**

[1)] 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*

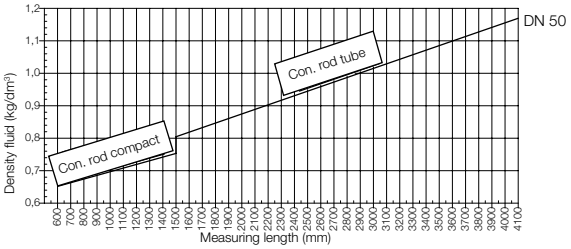
NBK-04...8, Diagram 8



NBK-04...8

Float:	titanium
Connection rod:	stainless steel, 1.4571
Process connection:	DIN EN 1092-1 flange, DN 50, ASME flange, 2"
Overhead and tank tube:	Ø 60.3 mm, continuous
Min. medium density:	0.71 kg/dm³ at ML = 600 mm

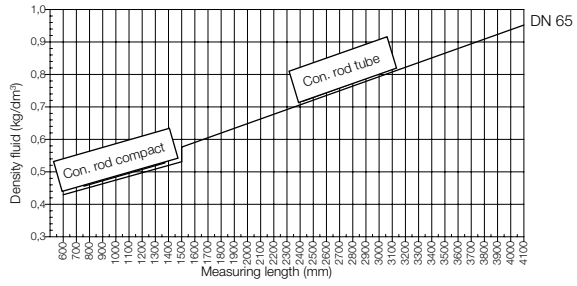
NBK-04...6, Diagram 6



NBK-04...6

Float:	titanium
Connection rod:	titanium
Process connection:	DIN EN 1092-1 flange, DN 50, ASME flange, 2"
Overhead and tank tube:	Ø 60.3 mm, continuous
Min. medium density:	0.65 kg/dm³ 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, ASME flange, 2½"
Overhead and tank tube:	Ø 60.3 mm
Tank tube:	Ø 76.1 mm
Min. medium density:	0.43 kg/dm³ 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**)

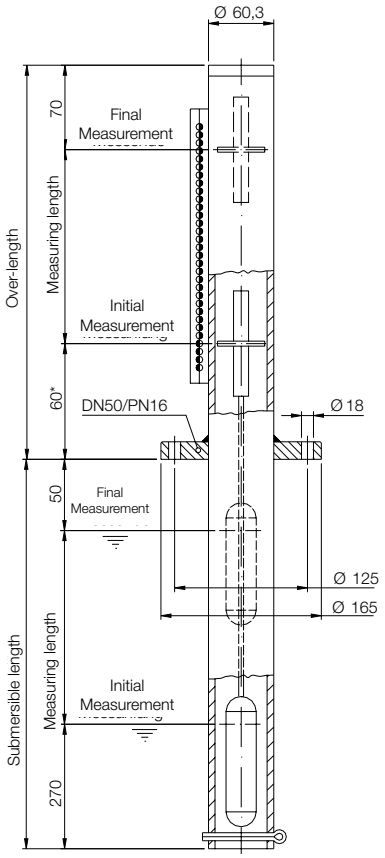
Model	Material	Connection and nominal size	Roller indication/ Ball display	Transducers / Transmitters	Medium density and meas. length
NBK-04...	Stainless steel 1.4571	**F50** = DIN EN flange DN 50 **A50** = ASME flange 2"	**00** = without **RP**= PP-roller indication **KP** = ball display with Plexiglas® sight tube **KM** = ball display with Makrolon® sight tube **KF** = as KM but with oil filling **KG** = ball display with borosilicate sight tube	**0** = without **W** = reed chain/without **M** = reed chain/4...20 mA, 2-wire **T** = magnetostrictive probe/ 4...20 mA, 4-wire **A**[1)] = reed chain/ 4...20 mA, 2-wire **H** = reed chain/ 4...20 mA, HART® **F** = reed chain/ Profibus-PA®, Foundation™ Fieldbus®	**8** = see diagram 8 **6** = see diagram 6
		F65 = DIN EN flange DN 65 **A65** = ASME flange 2½"			**4** = see diagram 4

[1)] Only with options AE and AC

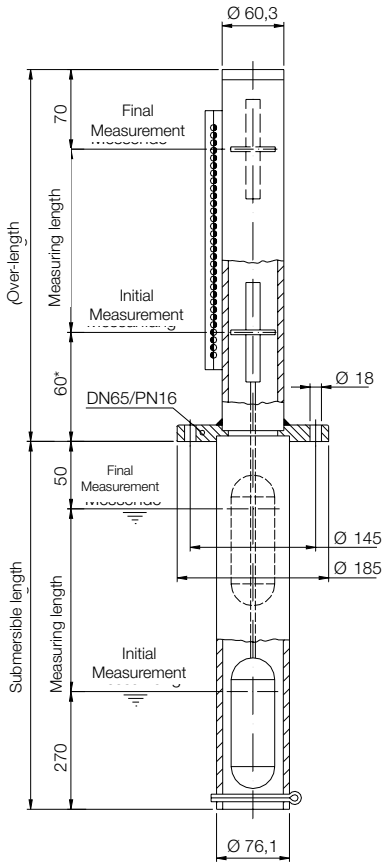
Please specify measuring length L, density, pressure, temperature and options in writing!

Dimensions

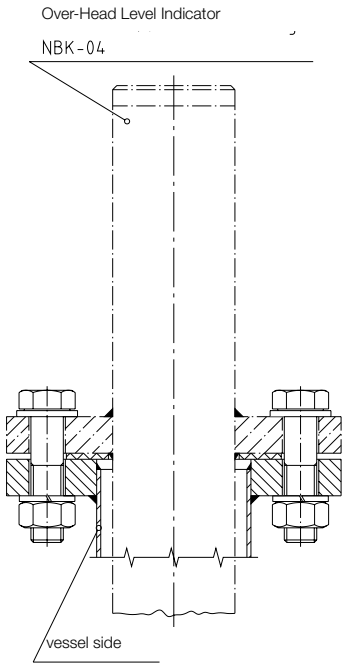
NBK-04...F50...



NBK-04...F65...



Required size of the mounting tube of the vessel side

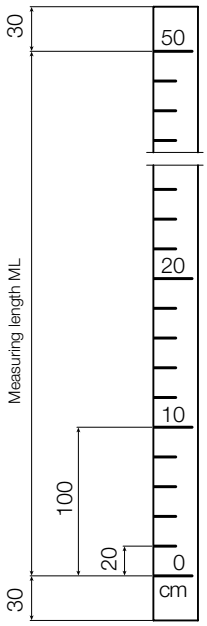


Flange	Ø NBK-04 tube	Minimum-Ø of the mounting tube of the vessel side
PN 16 DN 65	Ø 76.1 mm	Ø 88.9 mm x 2
PN 16 DN 50	Ø 60.3 mm	Ø 76.1 mm x 2

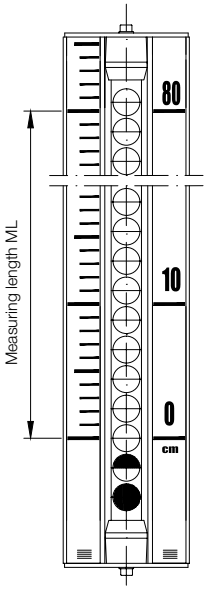
* In case of using a transmitter:
dimension = 100/130 mm depending on transducer model

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

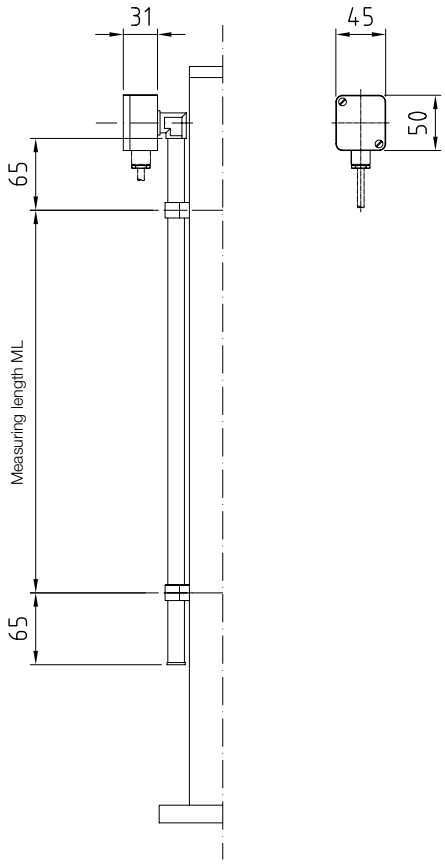
Measuring scale, aluminium
Option M1 - engraved scale
Option M2 - polyester foil



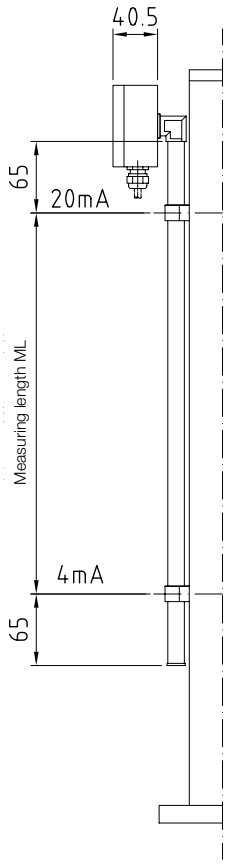
Measuring scale on stainless steel carrier
Scale from hard PVC or print on 1.4301
(standard scale with ball display)



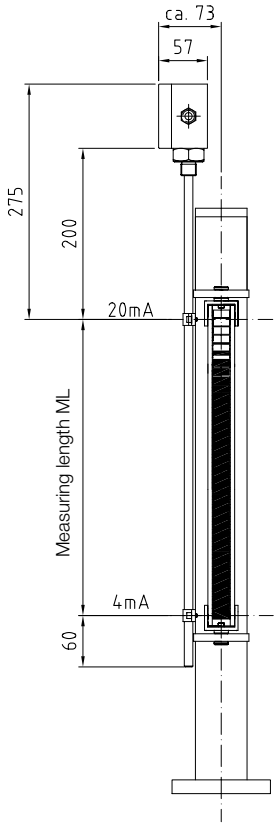
NBK-... with reed chain model W



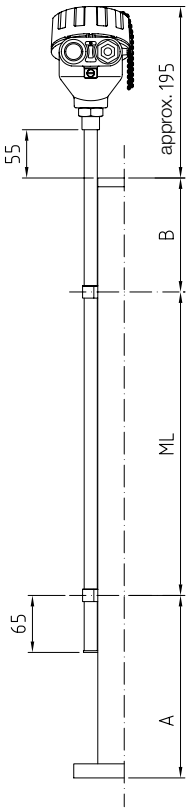
NBK-... with transmitter model M



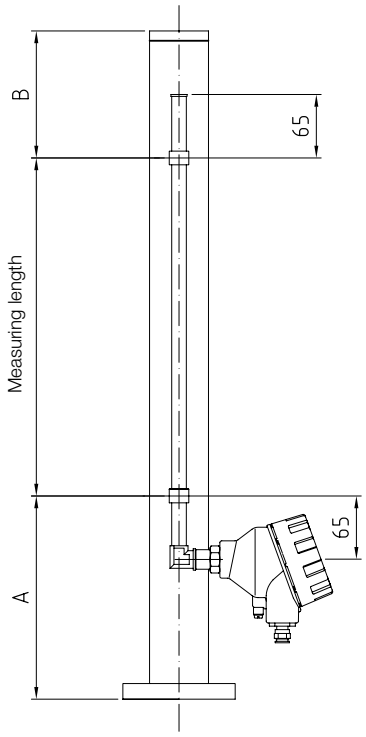
NBK-... with transmitter model T



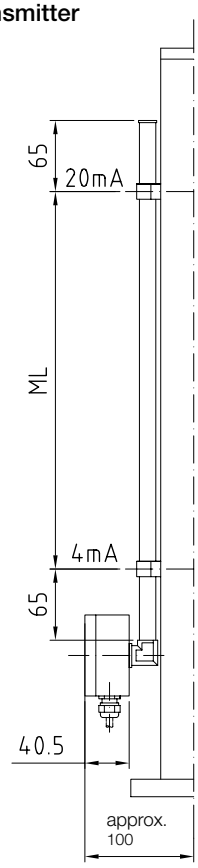
NBK-... with transmitter options H/F



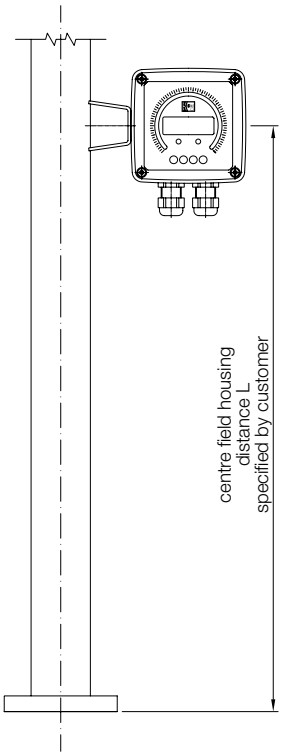
NBK-... with transmitter display options AE/HE or AC/HC



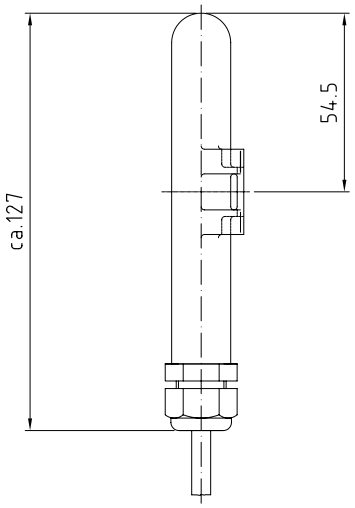
NBK-... with transmitter options MU



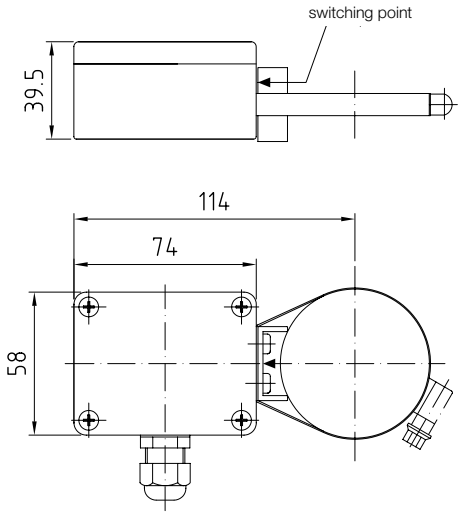
NBK-...with indicating unit ADI-1V00W2F0, option C



NBK-R



NBK-RT200



NBK-RV/RN