



## 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  
ASME B16.5 flange 2", 2½"
- 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

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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.

## 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 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:	stange or tube from titanium or stainless steel 1.4571 (depending on medium density and measuring length)
Flange nominal size:	DIN DN 50 or 65, PN 16 ANSI 2" or 2½", 150 lbs
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: IP 66

**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: 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

**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: IP 67  
 ATEX marking: II 2G Ex mb IIC T5/T6 Gb  
 II 2D Ex mb IIIC IP67 T 105°C  
 Db

**Limit contacts high temperature, model NBK-RT200 in  
 conjunction with an external, intrinsically safe Isolated  
 Switch Amplifier as «Simple Apparatus»**

Contact operation: bistable changeover contact  
 Switching hysteresis: approx. 15 mm  
 Max. switching capacity: 80 VA; 250 V<sub>AC/DC</sub>, 1 A

Resistance: < 20 mΩ  
 Medium temperature: max. 200 °C  
 Ambient temperature: max. 145 °C  
 Housing: aluminium pressure-cast,  
 terminal connection  
 Protection: IP 65

**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: IP 65  
 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

**Technical Details** (continuation)

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: IP 66

**Option R**

**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  
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 IIC 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: IP 66

**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 02ATEX1318:  II 1 G Ex ia IIC T4...T6 or  
 II 2 (1) G Ex ib [ia] IIC T4...T6  
 II 1 D Ex iaD

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: IP 66

**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: IP 65  
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:  $\leq (V_{\text{supply}} - 8V)/0.023 [\Omega]$

**Technical Details** (continuation)**Sensor error detection:**

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

**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  
 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

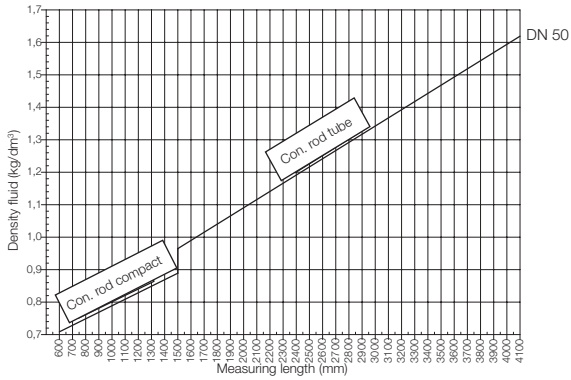
**Output:****Foundation™ Fieldbus® connection:**

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

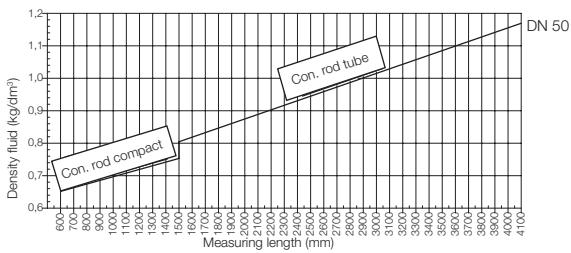
Density/length of measuring tube diagram\*  
NBK-04...8, Diagram 8



**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/dm<sup>3</sup> at ML = 600 mm

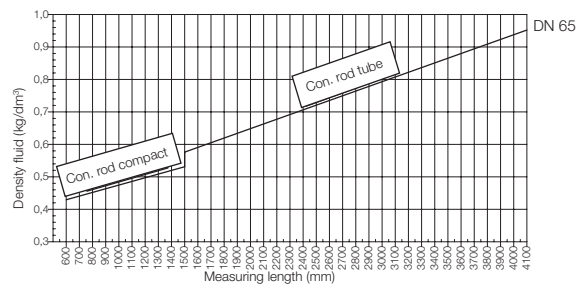
NBK-04...6, Diagram 6



**NBK-04...6**

Float: titanium  
 Connection rod: titanium  
 Process connection: DIN EN 1092-1 flange, DN 50, ASME flange, 2"  
 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, ASME flange, 2½"  
 Overhead and tank tube: Ø 60.3 mm  
 Tankrohr: 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)

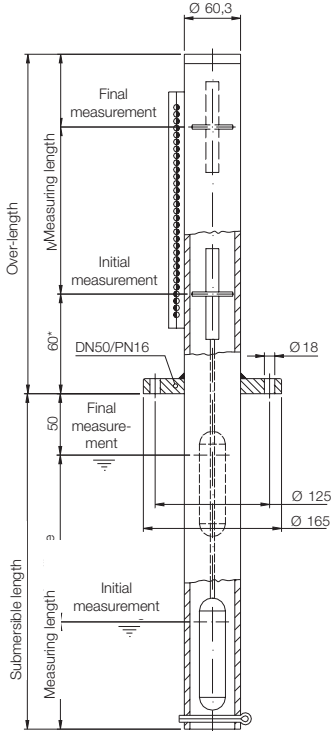
Model	Material	Connection and nominal size	Roller indication/ Ball display	Transducers/ Transmitters	Medium density and meas. length
NBK-04...	Stainless steel 1.4571	F50 = DIN EN flange DN 50 A50 = ASME flange 2"	00 = without RP = POM roller indication KP <sup>1)</sup> = ball display with PMMA sight tube KM <sup>1)</sup> = ball display with PC sight tube KF <sup>1)</sup> = as KM but with oil filling KG <sup>1)</sup> = ball display with borosilicate sight tube	1 = without electrical attached parts ATEX II 1G/2G D 2 = with reed contact chain II 1GD Exia IIC T6 E = immersible magnetic probe (reed chain)/ 4...20 mA, 2-wire, ATEX Exia R = immersible magnetic probe (reed chain)/ 4...20 mA, HART®, 2-wire, ATEX Exia B = immersible magnetic probe (reed chain)/ Profibus® PA, Foundation™ Fieldbus®, ATEX Exia 4 <sup>2)</sup> = with reed contact chain ATEX II 1/2G Exd IIC T6 Ga/Gb L <sup>2)</sup> = immersible magnetic probe (reed chain)/ 4...20 mA, 2-wire, ATEX Exd K <sup>2)</sup> = immersible magnetic probe (reed chain)/ 4...20 mA, HART®, 2-wire, ATEX Exd N <sup>2)</sup> = immersible magnetic probe (reed chain)/ Profibus® PA, Foundation™ Fieldbus®, ATEX Exd	8 = see diagram 8 6 = see diagram 6  4 = see diagram 4
NBK-RA	ATEX limit contact, encapsulated, Ex II2G EEx m II T6/T5				
NBK-RT200	High temperature limit contact, in conjunction with an external, intrinsically safe Isolated Switch Amplifier as «Simple Operator»				
REL-5114B1A	ATEX transmitter for immersible magnetic probe (Reed contact chain) EX II (1) G [EEx ia] IIC, DIN rail mounting				

<sup>1)</sup> In preparation    <sup>2)</sup> See separate ATEX certification of model MM-...

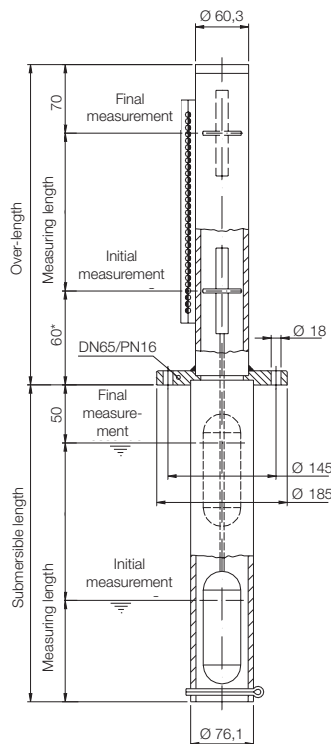
Please specify measuring length L, density, pressure, temperature and options in writing!

**Dimensions**

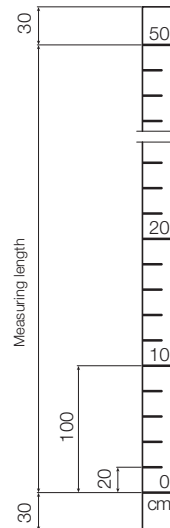
**NBK-04...F50...**



**NBK-04...F65...**



**Measuring scale engraved, aluminium backum, Option M1**

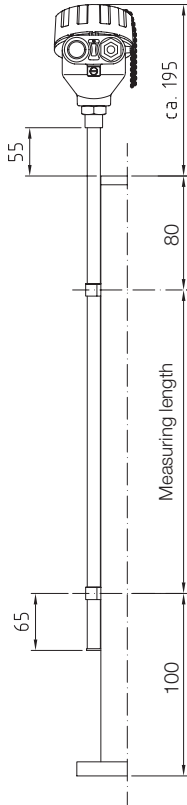


Flange	Ø NBK-04 tube	Minimum-Ø of the mounting tube of the vessel side
PN 16 DN 65	Ø 76.1 mm	Ø 88.9 mm x 2
PN 16 DN 50	Ø 60.3 mm	Ø 76.1 mm x 2

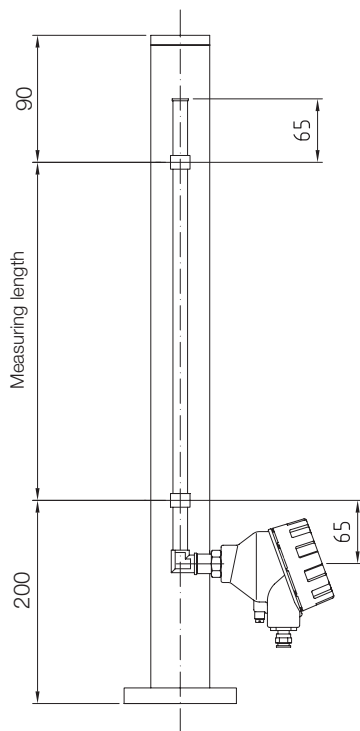
\* In case of using a transmitter: dimension = up to 200 mm

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

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

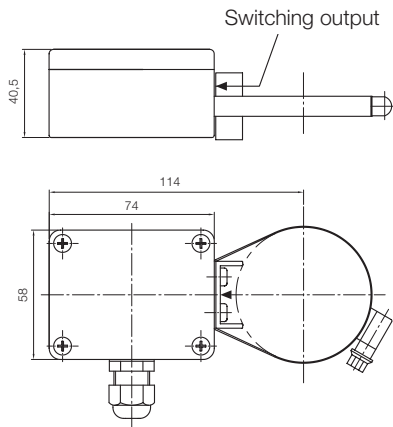


NBK-... with transmitter display options LE/KE or LC/KC

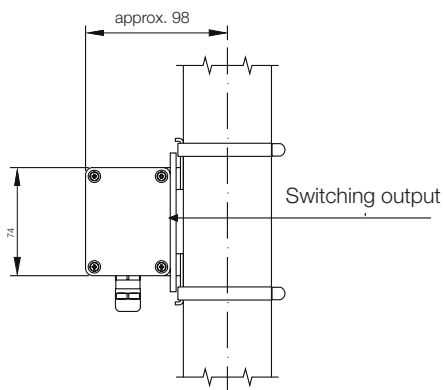




**NBK-RT200**



**NBK-RV/RN**



**NBK-RA**

