

Level Indicator for Tank-Top Mounting



measuring
•
monitoring
•
analyzing

NBK-04



- Max. Measuring Length: 13'
- p_{max} : 230 PSI
- t_{max} : 250 °F
- Max. Viscosity: 200 cPs
- Connection: ASME B16.5
Flange 2", 2-1/2", 3" or 4"
- Material: 316-Ti Stainless Steel
- Roller Display / Ball Display
- Limit Contacts
- Analog Outputs



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Description

KOBOLD NBK-04 level indicators are used for continuous measurement, display, and monitoring of liquid levels. The measuring/indicating tube is mounted to the top of a tank. According to the laws of hydrostatic pressure, the level displayed on the indicating tube will follow the level in the tank. A float with an attached guide rod and circular magnet, is located within the measuring tube and follows the liquid level, transferring the level in a non-contacting manner via the guide rod and magnet to a display, transmitter, or switch attached to the outside of the indicating tube.

The following indication and sensing devices are available:

Magnetic Roller Indicator

As the float moves, 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 sense the level, a transmitter with a chain of resistors or a magnetostrictive transducer can be mounted outside the indicating 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 analog or digital indicating devices. Optionally, HART®, PROFIBUS®-PA or Foundation™ Fieldbus communication protocols are possible.

Universal Indicating Unit

A universal indicating unit, series ADI-1, can be mounted on the indicating tube to display and evaluate the standard signal (4 ... 20 mA) generated by the transmitter.

Limit Contacts

One or more reed contacts, for point level sensing or for level control, can be mounted to the indicating tube.

Applications

- Storage Tanks
- Tanks on Ships
- Agitator Vessel
- Water Tanks

Technical Details

Over-Head Tube:	Ø 2.374"
Tank Tube:	Ø 2.374" or Ø 2.996"
Material:	316-Ti Stainless Steel
Initial Measurement:	10.7" from End of Tank Tube
Float:	Titanium
Connecting Rod:	Rod or Tube in Titanium or 316-Ti SS (Depending on Media Density and Measuring Length)
Flange Nominal Size:	ASME B16.5 2", 2-1/2", 3", 4" Class 150
Operating Pressure:	230 PSIG
Operat. Temperature:	-4...248 °F (POM Rollers) -155...248 °F (Ball Display)
Viscosity:	Max. 200 cPs
Measuring Length:	23.62" ... 157.4"
Total Length:	See Dimensional Drawing
ATEX Approval:	See Separate Description

Roller Display RP	(Max. Continuous Length 13')
Roller Material:	POM
Display Glass:	Plexiglas®
Carrier Frame:	Aluminum, Anodized
Operat. Temperature:	-4...248 °F
Protection:	IP 54

Ball Display - Model KP	(Max. Continuous Length 12.4')
Ball Material:	Ultramid™
Sight Tube:	Plexiglas®
Sealing Plug:	Aluminum
Seal:	NBR
Ball Support Rail:	Aluminum, Anodized
Carrier Frame:	304 Stainless Steel
Scale:	Hard-PVC, 304 Stainless Steel (Option MV)
Operat. Temperature:	-4...176 °F
Ambient Temperature:	-4...176 °F
Protection:	IP 66

Ball Display - Model KM	(Max. Continuous Length 12.4')
Ball Material:	Ultramid B®
Sight Tube:	Makrolon®
Sealing Plug:	Aluminum
Seal:	FKM
Ball Support Rail:	Aluminum, Anodized
Carrier Frame:	304 Stainless Steel
Scale:	Hard-PVC, 304 Stainless Steel (Option MV)
Operat. Temperature:	-76...248 °F
Ambient Temperature:	-4...176 °F
Protection:	IP 66



Ball Display - Option KF	(Max. Continuous Length 12.4')
Filling:	Silicone Oil
Ball Material:	Ultramid B®
Sight Tube:	Makrolon®
Sealing Plug:	304 Stainless Steel
Seal:	FKM
Ball Support Rail:	Aluminum, Anodized
Carrier Frame:	304 Stainless Steel
Scale:	Hard-PVC, 304 Stainless Steel (Option MV)
Operat. Temperature:	-155...248 °F
Ambient Temperature:	-4...176 °F
Protection:	IP 66

Ball Display - Option KG	(Max. Continuous Length 9.8')
Material Ball:	Ultramid B®
Sight Tube:	Borosilicate Glass
Sealing Plug:	304 Stainless Steel
Seal:	FKM
Ball Support Rail:	Aluminum, Anodized
Carrier Frame:	304 Stainless Steel
Scale:	304 Stainless Steel
Operat. Temperature:	-4...248 °F
Ambient Temperature:	-4...248 °F
Protection:	IP 66

* In case of multi-part design, a display (ball) length of 1.3" is not readable

Limit Contacts - Model NBK-R

Contact Operation:	Bistable SPDT Contact
Switching Hysteresis:	Approx. 15 mm
Max. Switch Capacity:	60 W/VA, 230 V _{AC/DC} , 1 A
Resistance:	100 mΩ
Media Temperature:	-40...212 °F
Ambient Temperature:	-40...167 °F
Connection:	9.8' PVC-cable
Housing:	Polycarbonate
Protection:	IP 67

Limit Contact High Temperature - Model NBK-RT200

Contact Operation:	Bistable SPDT Contact
Switching Hysteresis:	Approx. 15 mm
Max. Switching Capacity:	80 VA, 250 V _{AC/DC} , 1 A
Resistance:	<20 mΩ
Media Temperature:	-40...248 °F
Ambient Temperature:	-40...293 °F
Housing:	Aluminum Pressure-cast, Terminal Connection
Cable Entry:	M16 x 1.5, Brass Nickel-plated
Protection:	IP 65

Limit Contact - Model NBK-RV200NO

Sensor Type:	Reed Contact
Switching Pattern:	Normally Open, Bistable
Switching Hysteresis:	Approx. 7 mm
Media Temperature:	-58...248 °F
Ambient Temperature:	-40...158 °F
Max. Housing Temperature:	176 °F
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:	Aluminum Pressure-cast, Terminal Connection
Protection:	IP 65

Limit Contact - Model NBK-RV200NC

Sensor Type:	Reed Contact
Switching Pattern:	Normally Closed, Bistable
Other Parameters:	Same as 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:	Same as NBK-RV200NO

Limit Contact - Model NBK-RN200NC

Sensor Type:	NAMUR Contact
Switching Pattern:	Normally Closed, Bistable
Other Parameters:	Same as NBK-RV200NO

Reed Contact Resistor Chain - Option ..W..

Total Resistance:	0.7 ... 7 kΩ
Meas. Circuit Volt.:	Max. 24 V _{DC}
Measuring Current:	Max. 0.1 A
Max. Length:	13'
Media Temperature:	-40...248 °F
Ambient Temp.:	Max. 266 °F
Resolution:	0.4" (ML < 6.5') 0.8" (ML ≥ 6.5')
Housing:	Aluminum Pressure-cast
Cable Gland:	M16x1.5
Protection:	IP 65

Reed Contact Resistor Chain with 2-Wire Transmitter - Option ..M

Output: 4...20 mA
 Supply Voltage: 16...32 V_{DC}
 Max. Length: 13.1'
 Load: (V_{vers}-9 V)/0.02 A [Ω]
 Media Temperature: -40...248 °F
 Ambient Temp.: -4...176 °F
 Resolution: 0.4" (ML<6.5')
 0.8" (ML≥6.5')
 Housing: Aluminum Pressure-Cast
 Protection: IP65

Linear Resist. 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) / 0.023 [Ω]
 Sensor Error Detection
 Programmable: 3.5...23 mA
 Media Temperature: -40...248 °F
 Ambient Temperature: -4...176 °F
 Resolution: 0.4" (ML<6.5')
 0.8" (ML ≥6.5')

Magnetostrictive Sensor with 4-Wire Transmitter, 4..20 mA - Option ..T.

Output: 4...20 mA
 Supply Voltage: 24 V_{DC}, Max. 150 mA
 Load: Max. 500 Ω
 Max. Length: 13.1'
 Media Temperature: -40...248 °F
 Ambient Temperature: -4...176 °F
 Accuracy: ±1 mm
 Housing: Aluminum Pressure-Cast
 Protection: IP65

Housing: Aluminum Pressure-cast
 Cable Entry: M 20 x 1.5
 Protection: IP66
 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 2-Wire Transmitter, 4...20 mA - Option 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 Resist. 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) / 0.023 [Ω]
 Sensor Error Detection
 Programmable: 3.5...23 mA
 Media Temperature: -40...248 °F
 Ambient Temperature: -4...176 °F
 Resolution: 0.4" (ML <6.5')
 0.8" (ML ≥6.5')
 Housing: Aluminum Pressure-cast
 Cable Entry: M 20 x 1.5
 Protection: IP66
 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 Transmitter, - Option 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 Func. Blocks: 2 Analog and 1 PID
 PROFIBUS® PA Connection:
 PROFIBUS® PA
 Protocol Standard: EN 50170 vol. 2
 PROFIBUS® PA
 Function Blocks: 2 Analog
 PROFIBUS® PA
 Address (at Delivery): 126
 Media Temperature: -40...248 °F
 Ambient Temperature: -4...176 °F
 Resolution: 0.4" (ML <6.5')
 0.8" (ML ≥6.5')
 Housing: Aluminum Pressure-cast
 Cable Entry: M 20 x 1.5
 Protection: IP66

Reed Contact Resistor Chain with 2-Wire Transmitter, 4...20 mA, HART® - Option 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®



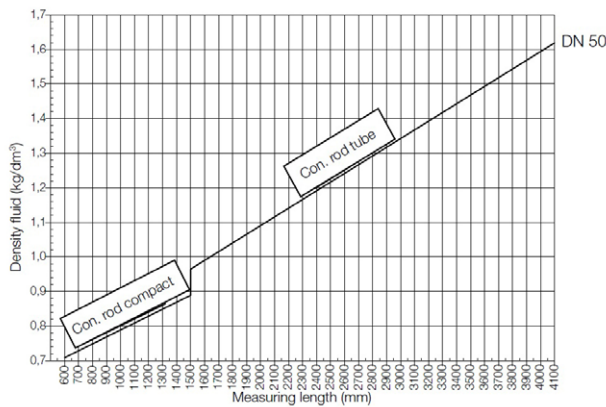
Order Details (Example: NBK-04 F50 00 0 8) (continued on page 6)

Model	Connection Type	Indicator Type	Output Transmitter Type	Media Density per Meas. Length
NBK-04..	..A50.. = ASME Flange 2" ..A80.. = ASME Flange 3" ..A1H.. = ASME Flange 4"	..00.. = without ..RP.. = POM Roller Indication ..KP.. = Ball Display with Plexiglas® Sight Tube ..KM.. = Ball Display with Makrolon® Sight Tube	..0.. = without ..W.. = Reed Chain ..M.. = Reed Chain/4...20 mA, 2-wire ..T.. = Magnetostrictive Probe/ 4...20 mA, 4-wire	..8 = See Diagram 8 ..6 = See Diagram 6
	..A65.. = ASME Flange 2-1/2" ..A1H.. = ASME Flange 4"	..KF.. = as KM but with Oil Filling ..KG.. = Ball Display with Borosilicate Sight Tube	..A ¹⁾ .. = Reed Chain/ 4...20 mA, 2-wire ..H.. = Reed Chain/ 4...20 mA, HART® ..F.. = Reed Chain/ Profibus® PA Fieldbus® FOUNDATION™	..4 = See Diagram 4
Accessory Switches (to be ordered separately)				
NBK-R	Standard limit contact (Bistable SPDT Contact)			
NBK-RT200	High temperature limit contact (Bistable SPDT contact), max temperature 248°F			
NBK-RV200NO	High vibration limit contact (Bistable N/O contact), max temperature 248°F			
NBK-RV200NC	High vibration limit contact (Bistable N/C contact), max temperature 248°F			
NBK-RN200NO	High vibration limit contact (Bistable NAMUR N/O contact), max temperature 248°F			
NBK-RN200NC	High vibration limit contact (Bistable NAMUR N/C contact), max temperature 248°F			

¹⁾ Only with Options AE or AC

NBK-04...8:

Diagram 8*

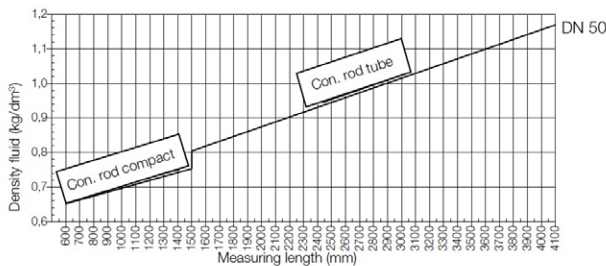


NBK-04...8

Float: Titanium
Connection Rod: 316-Ti Stainless Steel
Process Connection: ASME Flange, 2", 3", 4"
Overhead/Tank Tube: Ø 2.374", Continuous
Min. Media Density: 0.71 kg/dm³ at ML = 23.62"

NBK-04...6:

Diagram 6*

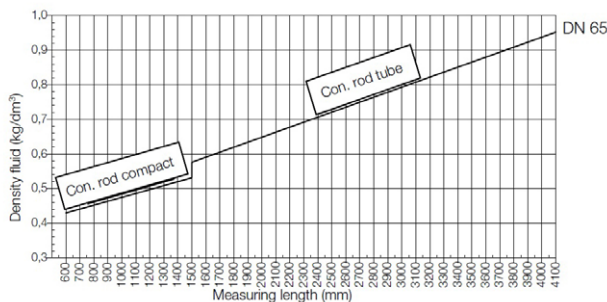


NBK-04...6

Float: Titanium
Connection Rod: Titanium
Process Connection: ASME Flange, 2", 3", 4"
Overhead/Tank Tube: Ø 2.374", Continuous
Min. Media Density: 0.65 kg/dm³ at ML = 23.62"

NBK-04...4:

Diagram 4*





NBK-04...4

Float: Titanium
Connection Rod: 316-Ti Stainless Steel
Process Connection: ASME Flange, 2 1/2", 4"
Overhead/Tank Tube: Ø 2.374", Ø 2.996"
Min. Media Density: 0.43 kg/dm³ at ML = 23.62"

* Valid specific gravity per length combinations are located above the line.

No responsibility taken for errors;
 subject to change without prior notice.

Options

Code	Description	Diagram/Picture
Scales		
(Ball displays are always delivered with scales, see technical data / sketch for resolution)		
MV	Scale Made of 304 Stainless Steel (Only with Ball Display Models KP/KM/KF as it's Standard with Model KG)	See Sketch Page 8
M1	Measuring Scale, Media Temperature - 40 ...250 °F, Engraved Scale Made of Aluminum	See Sketch Page 8
M2	Measuring Scale, Media Temperature - 40...250 °F, Scale Backing Made of Laser-etched Aluminum	See Sketch Page 8
Electrical Outputs		
MU	Option M with Connection Box at Bottom, for Easy Access to Connection Box	See Sketch Page 10
Display Options		
AE	Aluminum Die-cast Housing, LED Digital Display, Connection Box at Bottom (only in Combination with Transmitter Option A)	
AC	Aluminum Die-cast Housing, LCD Digital Display, Connection Box at Bottom (only in Combination with Transmitter Option A)	Same as AE, however with LCD Display
HE	Aluminum Die-cast Housing, LED Digital Display, Connection Box at Bottom (only in Combination with Transmitter Option H)	
HC	Aluminum Die-cast Housing, LCD Digital Display, Connection Box at Bottom (only in Combination with Transmitter Option H)	Same as HE, however with LCD Display
C¹⁾	Indicating Unit ADI-1V00W2F0 with Bargraph and Digital Display, Rugged Aluminum Housing, Mounted on Indicating Tube	See Sketch Page 10
Tests/Certificates		
P	Radiographic Examination DIN 54 111 T1	
Q	Dye Penetration Test DIN EN 571-1	
X	Pressure Test with Water 1.5 x PN	
Z	3.1 Sketch Acc. EN 10204	
MR	Material Acc. to NACE MR 0103/ISO15156 (MR0175), Declaration of Conformance	
WV	Positive Material Identification (PMI)	
SF	Oil and Fat Free	

¹⁾ only possible with option T (magnetostrictive sensor or option M (reed chain with transmitter)

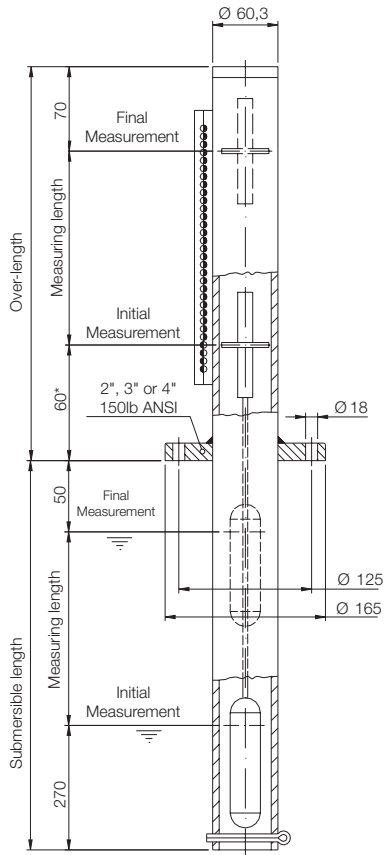
Note: Please pay attention to max. permissible temperature limits of individual components

***Additional Information Required for Order:**

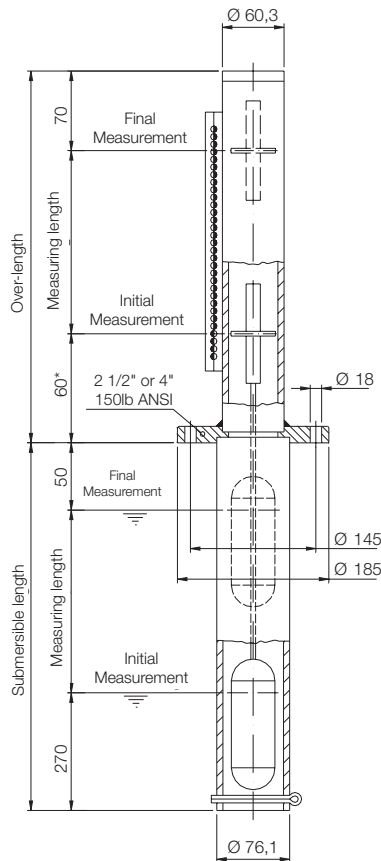
To ensure proper operation, this product requires a completed application guide form to be submitted with any order. Please refer to the 'documentation' tab on the bottom of the product page for this product on our website in order to obtain the correct form. You can also contact your KOBOLD representative for this form.

Dimensions (mm)

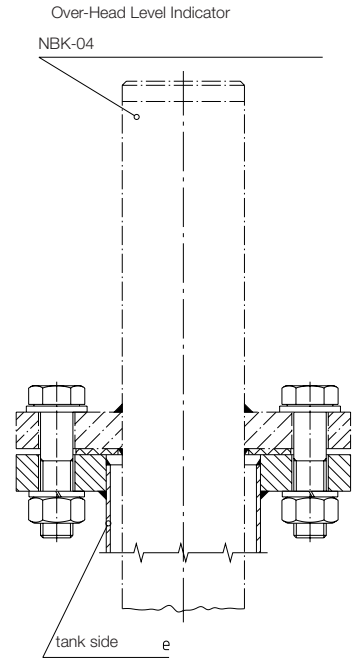
NBK-04..8/6



NBK-04..4



Required Size of the Mounting Tube of the Tank Side



Ø NBK-04 Tube	Minimum-Ø of the Mounting of the Tank 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:

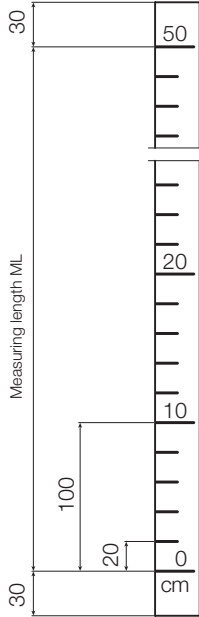
Dimension = 100/130/200 mm depending on transmitter model

Dimension = 130 mm in case of using a ball display

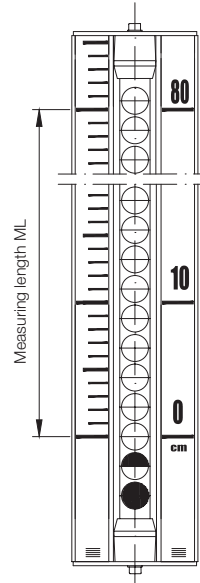
Submersible length = measuring length + 320 mm

Measuring length = submersible length - 320 mm

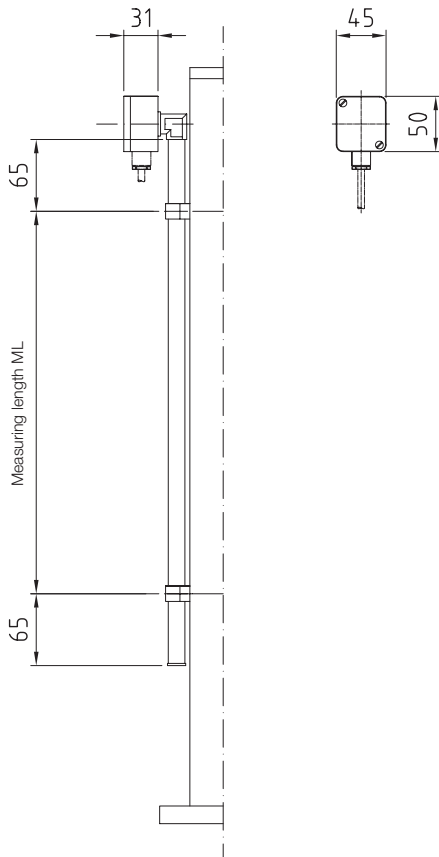
Measuring Scale, Aluminum
 Option M1 - Engraved Scale
 Option M2 - Polyester Foil



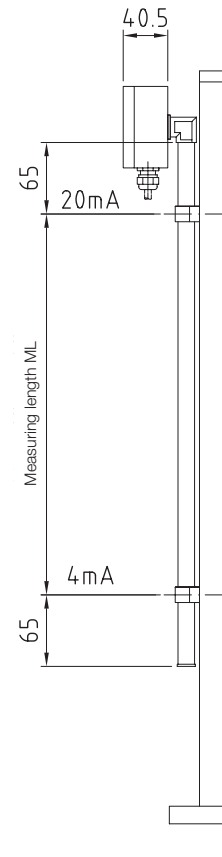
Measuring Scale on Stainless Steel Carrier
 Scale from Hard PVC or Print on 304 SS
 (Standard Scale with Ball Display)



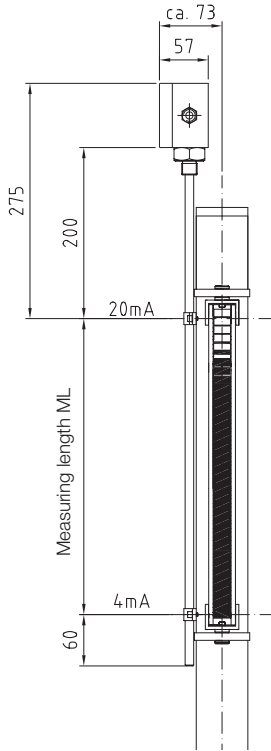
NBK-04.. with Reed Chain Model W



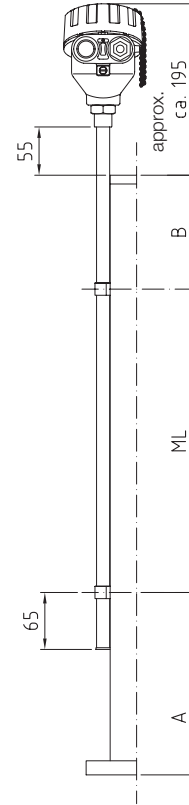
NBK-04.. with Transmitter Model M



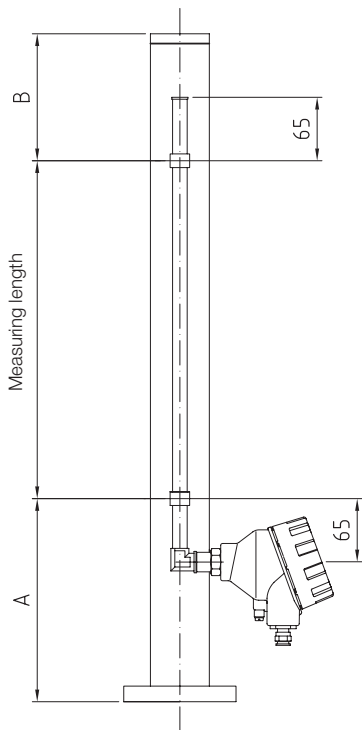
NBK-04.. with Transmitter Model T



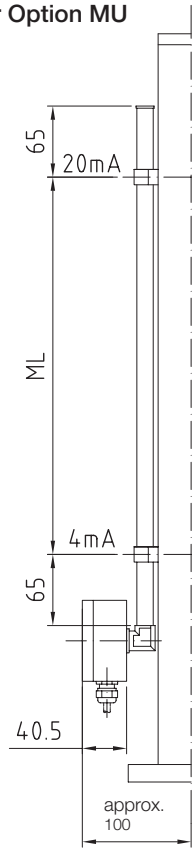
NBK-04.. with Transmitter Options H/F



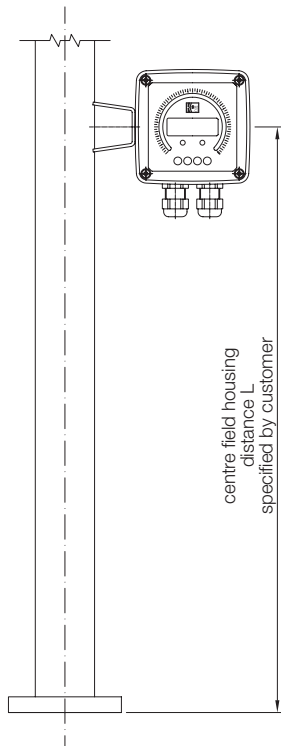
NBK-04.. with Transmitter Display Options AE/HE or AC/HC



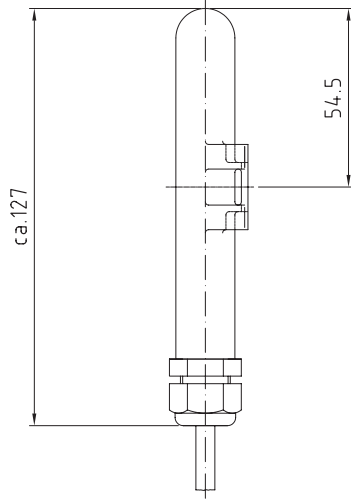
NBK-04.. with Transmitter Option MU



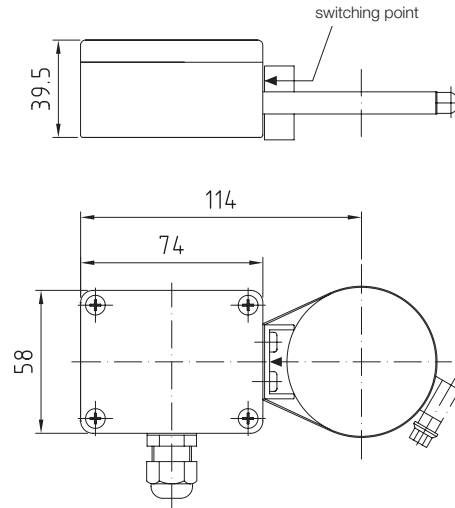
NBK-04...with Indicating Unit ADI-1V..2F, Option C



NBK-R



NBK-RT200



NBK-RV/RN

