

Bypass Level Measurement



measuring
•
monitoring
•
analyzing

NBK-03, -06, -07, -10,
-31, -32



- Measuring Length: 18' Max over 18' Two-Part or Multipart
- Pressure: Max. Class 1500
- Temperature:
 - 40 ... 750 °F (Ceramic rollers)
 - 4 ... 250 °F (POM-rollers)
 - 155 ... 390 °F (Ball display)
- Viscosity: Max. 200 mm²/s Standard (Option: 460 mm²/s, only NBK-03)
- Connection:
 - ANSI Flange ½" ... 2"
 - NPT Threads ½" ... 1¼"
- Material: 316-Ti Stainless Steel
- Magnetically Coupled Magnet Roller or Ball Indicating Displays
- Limit Contacts
- Analog Output, HART®, PROFIBUS® PA, Foundation™ Fieldbus, & Digital Display Options



KOBOLD companies worldwide:

ARGENTINA, AUSTRALIA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHILE, CHINA, COLOMBIA, CZECH REPUBLIC, EGYPT, FRANCE, GERMANY, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, REPUBLIC OF KOREA, ROMANIA, SINGAPORE, SPAIN, SWITZERLAND, TAIWAN, THAILAND, TUNISIA, TURKEY, UNITED KINGDOM, USA, VIETNAM

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Description

KOBOLD bypass level indicators are used for continuous measurement, display, and monitoring of liquid levels. The bypass tube is attached to the side wall of the tank. According to the laws of hydrostatic pressure, the level in the bypass tube will equal the level in the tank. A float, with embedded circular magnets, is located in the bypass tube and follows the liquid level, transferring the level in a non-contacting manner to a display attached to the outside of the bypass tube or to a sensing device.

The following indication and sensing 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 sense 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 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 bypass 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 bypass tube.

Applications

- Storage tanks
- Tanks on ships
- Agitator vessel
- Water tanks

Technical Details

| | |
|--------------------------------|---|
| Process Connection: | Flange ASME B 16.5 RF-2009 ½", ¾", 1", 1¼", 1½", 2" NPT ANSI/ASME B1.20.1 ½", ¾", 1", 1¼" |
| Bypass Tube: | Ø 2.374", 316-Ti SS (NBK-03/.../10) Ø 2.8", 316-Ti SS (NBK-31/32) Flat gasket: <390 °F; PTFE, ≥390 °F, Klinger SIL® |
| NBK-03/06/07: | Reinforced graphite RTJ-seal |
| NBK-10: | |
| NBK-31/32: | |
| Operating Pressure: | ANSI 150/300/400/600/900/1500 PN 16/40/63/100/160/250/320 |
| Media Temperature: | -4...250 °F (POM-rollers) -40...750 °F (ceramic rollers) -155...390 °F (ball display) (With NBK-31/32, the operating temperature is restricted to 212 °F) |
| Viscosity: | Max. 200 mm ² /s standard (Option: up to max. 460 mm ² /s for NBK-03) |
| Max. Meas. Length: | 18' over 18', two-part or multipart |
| Overall Length: | See dimensional drawing |
| ATEX - approval: | See separate description |
| Roller Display RP | (Max. continuous length 18') |
| Roller Material: | POM |
| Display Glass: | PMMA |
| Carrier Frame Material: | Aluminum, black anodized |
| Media Temperature: | -4...250 °F |
| Ambient Temperature: | -4...175 °F |
| Protection: | IP54 |
| Roller Display RK | (Max. continuous length 18') |
| Roller Material: | Ceramic |
| Display Glass: | Borosilicate glass |
| Carrier Frame Material: | Aluminium, black anodized |
| Media Temperature: | -40...750 °F |
| Ambient Temperature: | -40...480 °F |
| Protection: | IP54 |
| Ball Display - Model KP | (Max. continuous length 12.5') |
| Ball Material: | PA |
| Sight Tube: | PMMA |
| Sealing Plug: | Aluminum |
| Seal: | NBR |



Ball Support Rail: Aluminum, black anodized
Carrier Frame: 304 stainless steel
Scale: Hard-PVC,
 304 stainless steel (Option MV)
Media Temperature: -4 ... 175 °F
Ambient Temperature: -4 ... 175 °F
Protection: IP 66

Ball Display - Model KM (Max. continuous length 9.8')
Ball Material: PA - High temperature strength
Sight Tube: PC
Sealing Plug: Aluminum
Seal: FKM
Ball Support Rail: Aluminum, black anodized
Carrier Frame: 304 stainless steel
Scale: Hard-PVC,
 304 stainless steel (Option MV)
Media Temperature: -75 ... 250 °F
Ambient Temperature: -4 ... 175 °F
Protection: IP 66

Ball Display - Model KF (Max. continuous length 12.5')
Filling: Silicone oil
Ball Material: PA - High temperature strength
Sight Tube: PC
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 ... 250 °F
Ambient Temperature: -4 ... 175 °F
Protection: IP 66

Ball Display - Model KG (Max. continuous length 9.8')
Ball Material: PA - High temperature strength
Sight Tube: Borosilicate glass
Sealing Plug: 304 stainless steel
Seal: FKM
Ball Support Rail: Aluminum, black anodized
Carrier Frame: 304 stainless steel
Scale: 304 stainless steel
Media Temperature: -4 ... 390 °F
Ambient Temperature: -4 ... 390 °F
Protection: IP 66

Limit Contacts - Model NBK-R

Contact Operation: Bistable SPDT contact
Switching Hysteresis: Approx. 15 mm
Max. Switching Capacity: 60 W/VA, 230 V_{AC/DC}, 1 A
Resistance: 100 mΩ
Media Temperature: -40...212 °F
Ambient Temperature: -40...165 °F
Connection: 3 m PVC-cable
Housing: Polycarbonate
Protection: IP 67

**Limit Contact High Temperature - Model NBK-RT200/
 NBK-RT400**

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...390 °F/750 °F
Ambient Temperature: -40...290 °F/660 °F
Housing: Aluminum pressure-cast,
 terminal connection
Cable Entry Protection: M16 x 1.5, brass nickel-plated
 IP 65

Limit Contact - Model NBK-RV200NO

Sensor Type: Reed contact
Switching Pattern: Normally open, bistable
Switching Hysteresis: Approx. 7 mm
Media Temperature: -155...390 °F
Ambient Temperature: -40...160 °F
Max. Housing Temperature: 175 °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

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

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 - Model ..W..

Total Resistance: 0.5 ... 5 kΩ
Meas. Circuit Voltage: Max. 24 V_{DC}
Measuring Current: Max. 0.1 A
Max. Length: 18"
Media Temperature: -40 ... 390 °F,
-40 ... 750 °F with heat shield (option N)
Ambient Temperature: Max. 265 °F
Resolution: 0.4" (ML < 6.5")
0.8" (ML ≥ 6.5")
Housing: Aluminum pressure-cast
Protection: IP 65

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

Output: 4 ... 20 mA
Supply Voltage: 16 ... 32 V_{DC}
Max. Length: 18"
Load: (U_B - 9 V) / 0.02 A [Ω]
Media Temperature: -40 °F ... 250 °F
Ambient Temperature: -24 °F ... 175 °F
Resolution: 0.4" (ML < 6.5")
0.8" (ML ≥ 6.5")
Housing: Aluminum pressure-cast
Protection: IP 65

Reed Contact Resistor Chain with 2-Wire Transmitter: 4 ... 20 mA - Option ..MS

Like Model: ... M ... however with 100 mm thermal stand-off of connection head includes heat shield
Media temperature: -40 ... 570 °F

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

Like Model: ... M ... however with 16.4" silicone cable between connection box/Bypass
Media Temperature: -40 ... 750 °F

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: 13.1"
Media Temperature: -40 ... 250 °F
Ambient Temperature: -4 ... 175 °F
Accuracy: ±1 mm
Housing: Aluminum pressure-cast
Protection: IP 65

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) / 0.023 [Ω]
Sensor Error Detection:
Programmable: 3.5 ... 23 mA
Media Temperature: -40 ... 250 °F
(with option N up to 480 °F)
Ambient Temperature: -4 ... 175 °F
Resolution: 0.4" (ML < 6.5")
0.8" (ML ≥ 6.5")
Housing: Aluminum 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: 5335A
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: $\leq (V_{\text{supply}} - 8) / 0.023 [\Omega]$
Sensor Error Detection:
Programmable: 3.5...23 mA
Media Temperature: -40...250°F (with Option N up to 480°F)
Ambient Temperature: -4...175°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 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 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...250°F (with option N up to 480°F)
Ambient Temperature: -4...175°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





Bypass Level Indicators Model NBK

Order Details (Example: **NBK-03 A15 RP 0 A 0**)

| Model | Rated pressure | Connection | Nominal Size | Roller/ Ball Indicator | Sensor/ Transmitter | Media Density Float | Options |
|----------------------|--|---|---|--|--|--|--|
| NBK-03... | Class 150 PN 16 | A = ASME-flange F = DIN-flange N³⁾ = NPT-male thread R³⁾ = R-male thread S⁴⁾ = welding-nipple | 15 = ½", DN 15 20 = ¾", DN 20 25 = 1", DN 25 32 = 1 ¼", DN 32 40 = 1 ½", DN 40 50 = 2", DN 50 XX⁶⁾ = Special Connection | 00 = without RP = POM-roller RK = ceramic roller KP = ball display with Plexiglas sight tube KM = ball display with Makrolon® sight tube KF = as KM however with oil filling KG = ball display with borosilicate sight tube | 0 = without transmitter T = magnetostrictive probe/ 4 ... 20 mA, 4-wire W = reed chain/ without M = reed chain/ 4 ... 20 mA, 2-wire A⁹⁾ = reed chain/ 4 ... 20 mA, 2-wire H = reed chain/ 4 ... 20 mA, HART®, 2-wire F = reed chain/ PROFIBUS® PA FOUNDATION™ Fieldbus | A = 1.0 kg/dm ³ , titanium for viscosity up to 200 cP B = 0.90 kg/dm ³ , titanium for viscosity up to 200 cP C = 0.80 kg/dm ³ , titanium for viscosity up to 200 cP D = 0.70 kg/dm ³ , titanium for viscosity up to 200 cP E = 0.60 kg/dm ³ , titanium for viscosity up to 200 cP F⁶⁾ = 0.54 kg/dm ³ , titanium for viscosity up to 200 cP V⁹⁾ = 1.0 kg/dm ³ , stainless steel for viscosity up to 460 mm ² /s W⁹⁾ = 0.8 kg/dm ³ , stainless steel for viscosity up to 460 mm ² /s | 0 = without options or options as in list and description (see separate options list) |
| NBK-06... | Class 300 PN 40 | | | | | | |
| NBK-07... | Class 400 PN 63 | | | | | | |
| NBK-10... | Class 600 PN 100 | | | | | | |
| NBK-31 ⁷⁾ | Class 900 PN 160 | | | | | | |
| NBK-32 ⁷⁾ | Class 1500 PN 250 | | | | | | |
| NBK-R | standard limit contact (bistable SPDT contact) | | | | | | |
| NBK-RT200 | limit contact high-temperature max. 390 °F | | | | | | |
| NBK-RT400 | limit contact high-temperature max. 750 °F | | | | | | |
| NBK-RV200NO | limit contact, bistable, N/O, max. 390 °F (suitable for tanks with strong vibrations) | | | | | | |
| NBK-RV200NC | limit contact, bistable, N/C, max. 390 °F (suitable for tanks with strong vibrations) | | | | | | |
| NBK-RN200NO | limit contact, bistable, NAMUR, N/O, max. 390 °F (suitable for tanks with strong vibrations) | | | | | | |
| NBK-RN200NC | limit contact, bistable, NAMUR, N/C, max. 390 °F (suitable for tanks with strong vibrations) | | | | | | |

³⁾ Only possible with nominal size code 15/20/25/32 (Female thread on request) ⁴⁾ Only possible with NBK-03/06 and nominal size code 15/20/25/32





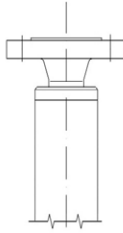
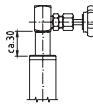


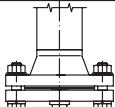
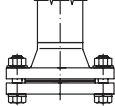
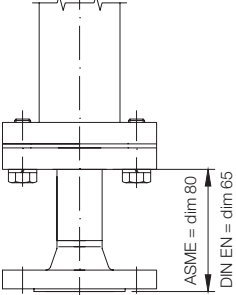
⁵⁾ Only possible with NBK-03 ⁶⁾ Not possible with NBK-10 ⁷⁾ Only possible for ½", ¾" and 1" ASME, DN 15, and DN 25 ⁸⁾ Specify in clear text

⁹⁾ Only with options AE and AC

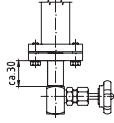
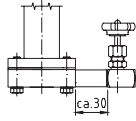
*Additional Information Required for Order:

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.

Options

| Code | Description | Drawing | Availability |
|---------------------------------------|---|--|--|
| Top Bypass Tube Connections | | | |
| V0 | Without vent plug |  | for NBK-03/06/07, Standard for NBK-10/31/32 |
| VN | With vent plug G 1/2 |  | for NBK-10/31/32, Standard for NBK-03/06/07 1/2" NPT |
| VA ^{1) 4)} | Flange connection 2" ASME (pressure rating as process flange) |  | NBK-03/06/07/10 NBK-31/32 |
| VJ ^{1) 4)} | Flange connection DIN (pressure rating as process flange) with vent plug 1/2" NPT |  | NBK-03/06 |
| V7 ⁴⁾ | Vent flange 1/2" ASME, stainless steel 316Ti (pressure rating as process flange) |  | NBK-03/06 |
| V8 ⁴⁾ | Vent flange 3/4" ASME, stainless steel 316Ti (pressure rating as process flange) | | NBK-03/06 |
| V9 ⁴⁾ | Vent flange 1" ASME, stainless steel 316Ti (pressure rating as process flange) | | NBK-03/06 |
| V2 | Vent valve, 1/2" NPT, stainless steel 316Ti, max. temperature: 250 °F |  | NBK-03/06 |
| Bottom Bypass Tube Connections | | | |
| D0 | Without drain plug |  | for NBK-03/06/07, Standard for NBK-10/31/32 |
| DN | With drain plug G 1/2 |  | for NBK-10/31/32, Standard for NBK-03/06/07 1/2" NPT |
| DA | Flange connection 2" ASME (pressure rating as process flange), with drain plug 1/2" NPT |  | NBK-03/06 |
| DD | Flange connection 2" ASME (pressure rating as process flange), without drain plug |  | NBK-03/06/07 |
| E7 | Drain flange 1/2" ASME, stainless steel 316Ti (pressure rating as process flange) |  | NBK-03/06 |
| E8 | Drain flange 3/4" ASME, stainless steel 316Ti (pressure rating as process flange) | | NBK-03/06 |
| E9 | Drain flange 1" ASME, stainless steel 316Ti (pressure rating as process flange) | | NBK-03/06 |

Options

| Code | Description | Drawing | Availability |
|--|---|---|-----------------------|
| F2 | Drain valve, 1/2" NPT, stainless steel 316Ti, max. temperature: 250 °F |  | NBK-03/06 |
| D2 | Drain valve, 1/2" NPT, horizontally mounted, stainless steel 316Ti, max. temperature: 250 °F |  | NBK-03/06 |
| Process Connection Options | | | |
| ST ⁴⁾ | 1 x process connection side, 1 process connection vertical on top | see drawing | NBK-03/06/07/10 |
| TS ⁴⁾ | 1 x process connection side, 1 process connection vertical at bottom | see drawing | NBK-03/06/07/10 |
| TT ⁴⁾ | 2 x process connection vertical, up to DN25 or 1" ASME | see drawing | NBK-03/06/07/10 |
| Scales | | | |
| (Ball displays are always delivered with scales, see technical data/sketch for resolution) | | | |
| M2 | Measuring scale, media temperature -40°F ... 300°F, scale backing made of aluminum laser etched | see drawing | NBK-03/06/07/10/31/32 |
| M1 | Measuring scale, media temperature -40 °F ... +750 °F, engraved scale made of aluminum | see drawing | NBK-03/06/07/10/31/32 |
| MV | Scale made of 304 stainless steel (only with ball display model KP/KM/KF, standard with model KG) | see drawing | NBK-03/06/07/10/31/32 |
| Thermal Screening | | | |
| N | Heat Shield for sensor | see drawing | NBK-03/06/07/10/31/32 |
| Heating Jacket | | | |
| LA | Connection for heating jacket 1/2" Class 150 RF ASME B16.5-2003 (Class 300 flanges on request) | see drawing | NBK-03/06/07/10 |
| LB | Connection for heating jacket 3/4" Class 150 RF ASME B16.5-2003 (Class 300 flanges on request) | | NBK-03/06/07/10 |
| LC | Connection for heating jacket 1" Class 150 RF ASME B16.5-2003 (Class 300 flanges on request) | | NBK-03/06/07/10 |
| LD | Connection for heating jacket 1 1/4" Class 150 RF ASME B16.5-2003 (Class 300 flanges on request) | | NBK-03/06/07/10 |
| Electrical Outputs | | | |
| MU | Option M with connection box at bottom, for easy access to connection box | | NBK-03/06/07/10/31/32 |
| MS | Option M including heat shield and connection box at 4" distance, max. media temperature = 570 °F | | NBK-03/06/07/10/31/32 |
| MK | Option M including heat shield and connection box 16.4' silicone cable, max. media temperature = 750 °F | | NBK-03/06/07/10/31/32 |

¹⁾ not possible with transmitter options H/F

²⁾ with NBK-31/32 is flange connection always 2 1/2" ASME, as standard without drain plug or vent plug



³⁾ only possible with option T (magnetostrictive sensor or option M (reed chain with transmitter)

⁴⁾ not possible with option T

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



Options

| Code | Description | Drawing | Availability |
|---------------------------|--|---|-----------------------|
| Display Options | | | |
| AE | Aluminum die-cast housing, LED digital display, connection box at bottom (only in combination with transmitter option A) |  | NBK-03/06/07/10/31/32 |
| AC | Aluminum die-cast housing, LCD digital display, connection box at bottom (only in combination with transmitter option A) | as AE, however with LCD display | NBK-03/06/07/10/31/32 |
| HE | Aluminum die-cast housing, LED digital display, connection box at bottom (only in combination with transmitter option H) |  | NBK-03/06/07/10/31/32 |
| HC | Aluminum die-cast housing, LCD digital display, connection box at bottom (only in combination with transmitter option H) | as HE, however with LCD display | NBK-03/06/07/10/31/32 |
| C³⁾ | Indicating unit ADI-1 with bargraph and digital display, rugged aluminium housing, mounted at bypass tube, for description see brochure Z2 | see cover page / drawing | NBK-03/06/07/10/31/32 |
| Additional Options | | | |
| A | Connection flange for 2-part version (not possible with sensor), split roller display and scale possible | see drawing | NBK-03/06/07/10/31/32 |
| HL | Retaining plate, centric between process connections, necessary from L 16.4' (alternative option HF) | see drawing | NBK-03/06/07/10/31/32 |
| HF | Retaining flange, centric between process connections, necessary from L > 16.4' (alternative option HL) | see drawing | NBK-03/06/07/10/31/32 |
| K | Armaflex-insulation (heat co-efficient 0.025 kcal/m °C, to 220 °F) | - | NBK-03/06/07/10/31/32 |
| Tests/Certificates | | | |
| P | Radiographic examination per DIN 54 111 T1 | - | NBK-03/06/07/10/31/32 |
| Q | Dye penetration test per DIN EN 571-1 | - | NBK-03/06/07/10/31/32 |
| X | Pressure test with water (1.5 x PN) | - | NBK-03/06/07/10/31/32 |
| Z | 3.1 Inspection Certificate per EN 10204 | - | NBK-03/06/07/10/31/32 |
| MR | Material acc. to NACE MR 0103/ISO15156 (MR0175), declaration of conformance | - | NBK-03/06/07/10/31/32 |
| WV | Positive Material Identification (PMI) | - | NBK-03/06/07/10/31/32 |
| SF | Oil and fat free | - | NBK-03/06/07/10/31/32 |

¹⁾ not possible with transmitter options H/F

²⁾ with NBK-31/32 is flange connection always 2½" ASME, as standard without drain plug or vent plug

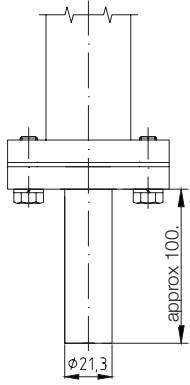
³⁾ only possible with option T (magnetostrictive sensor or option M (reed chain with transmitter)

⁴⁾ not possible with option T

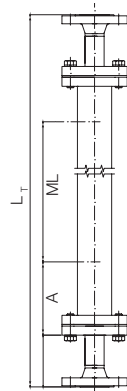
Note: Please pay attention to max. permissible temperature limits of individual components

Drawings of Selected Options

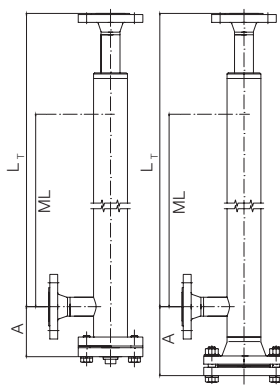
Option DS



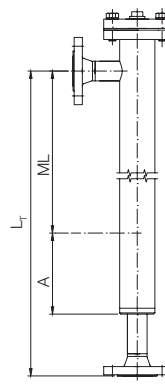
Option TT



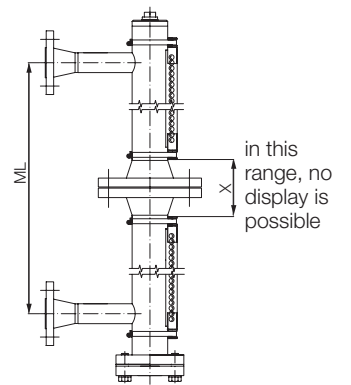
Option ST



Option TS

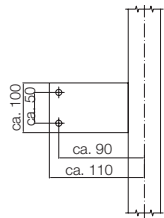


Option A



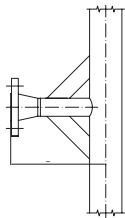
Option HL

(centered to dimens. L)



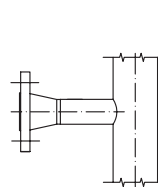
Option HF

(centered to dimens. L)

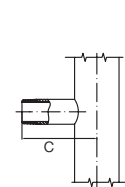


Options Process Connection

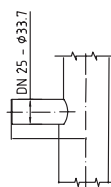
Option F/A



Option N/R



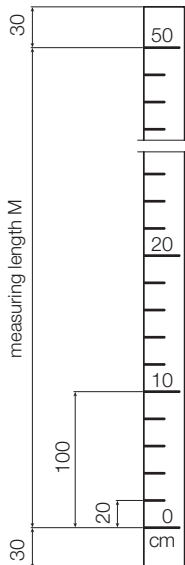
Option S



| Model | Dimension X |
|--------|-------------|
| NBK-03 | 92 |
| NBK-06 | 98 |
| NBK-07 | 127 |
| NBK-10 | 139 |

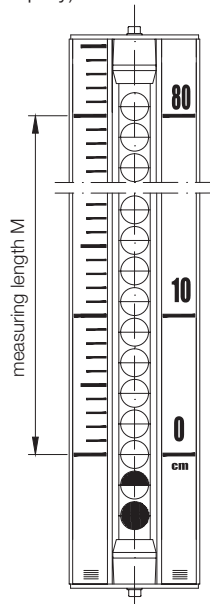
Measuring Scale, Aluminum

- Option M1 - Engraved Scale
- Option M2 - Laser Etched



Measuring Scale Screen Print, Stainless Steel Carrier

(standard scope of supply with ball display)



Float Options

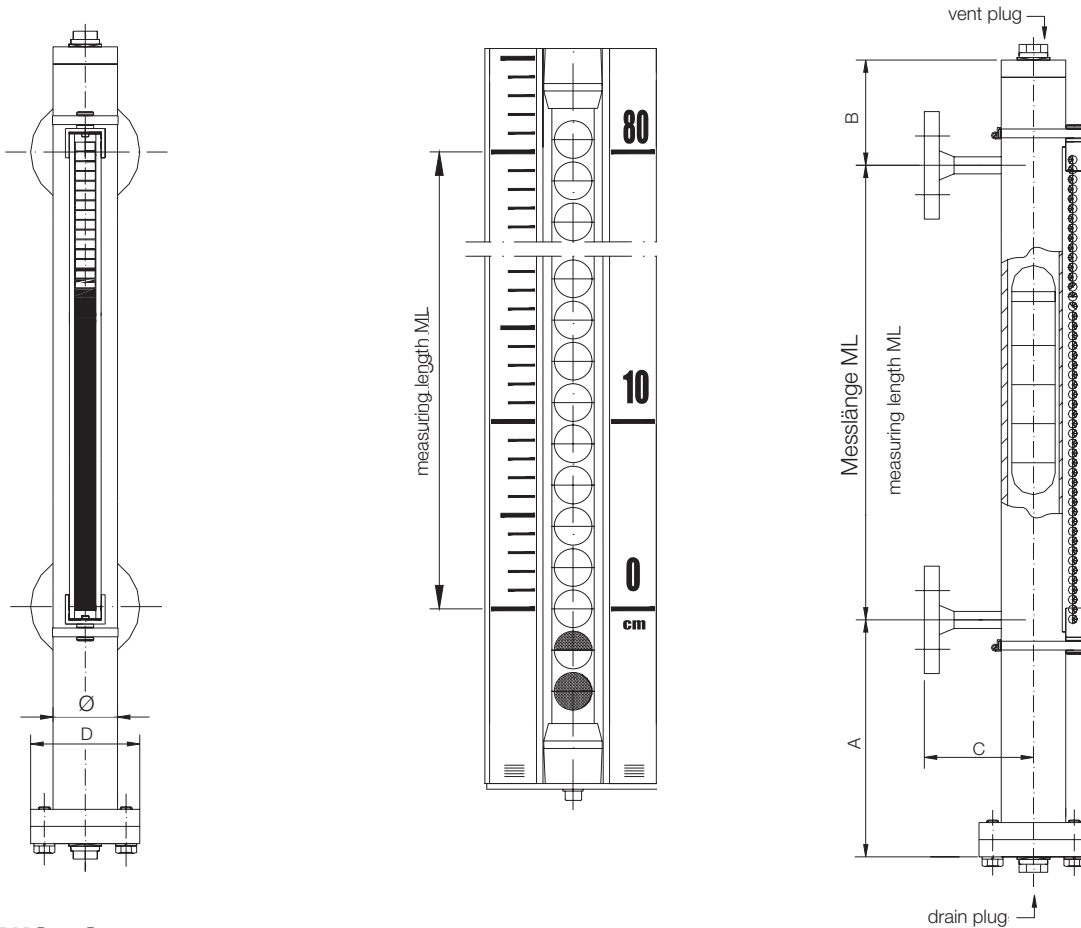
| Model | Min. Density [kg/dm³] | Material |
|-----------------|--|-----------------|
| A | 1.0 | titanium |
| B | 0.9 | titanium |
| C | 0.8 | titanium |
| D | 0.7 | titanium |
| E | 0.6 | titanium |
| F* | 0.54 | titanium |
| V | 1.0 | stainless steel |
| W | 0.8 | stainless steel |
| H | 0.8 | CF340 |
| Interface Float | min. density difference = 150 kg/dm³ (indicate both densities) | titanium |

*Heat Shield option N not possible and/or not for NBK-10.

Special floats for special media densities (weighting) or reduced length dimension A on request.

Dimensions

NBK-03/06/07 with Roller Indicator/Ball Display

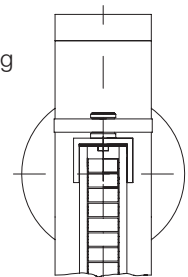


Dimension NBK [mm]

| Model | Rated Pressure | Ø | B | D | C | | | |
|-----------|----------------|------|-----|-----|-----------|-----|-----|-----|
| | | | | | x15...x25 | x32 | A40 | A50 |
| NBK-03... | Class 150 | 60.3 | 130 | 115 | 110 | 110 | 145 | 160 |
| NBK-06... | Class 300 | | | | | | 155 | 165 |
| NBK-07... | Class 400 | | | 180 | 150 | 150 | 160 | 175 |
| NBK-10... | Class 600 | | | 195 | | | 160 | 175 |
| NBK-31... | Class 900 | 71 | 150 | 245 | 180 | | | |
| NBK-32... | Class 1500 | 76.1 | | | | | | |

NBK 10/31/32

Always without vent plug and without drain plug



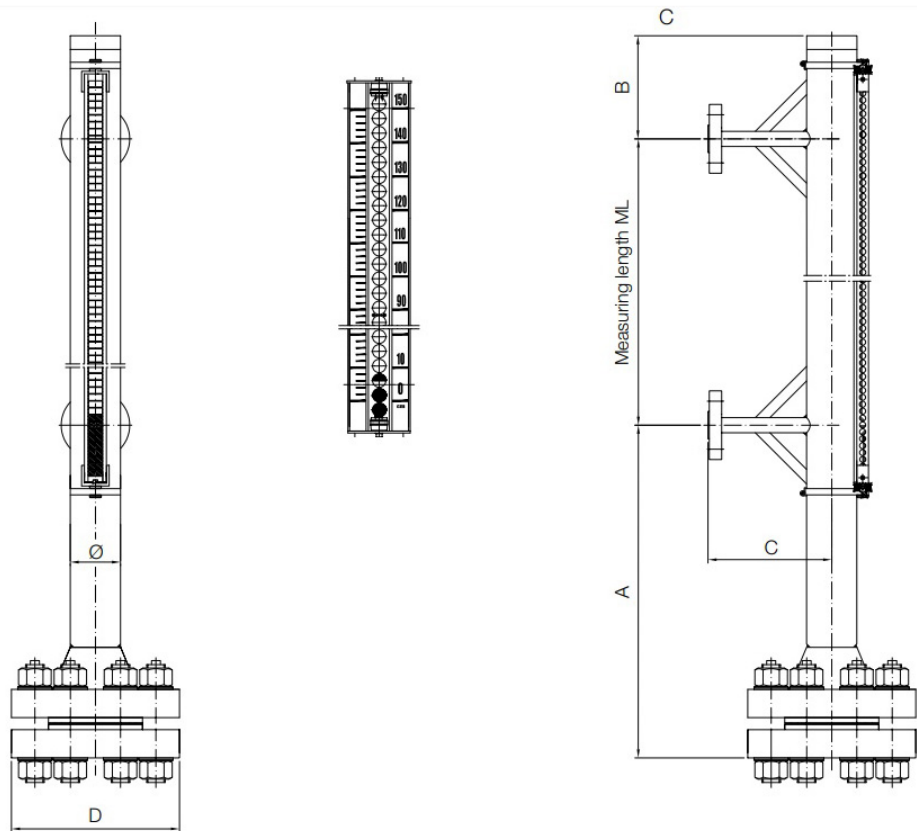
Clearance Dimension A [mm]

| Model | Rated Pressure | Media Density | | | | | |
|-----------|----------------|---------------|--------------|--------------|--------------|--------------|------------|
| | | 0.54 [kg/dm³] | 0.6 [kg/dm³] | 0.7 [kg/dm³] | 0.8 [kg/dm³] | 0.9 [kg/dm³] | 1 [kg/dm³] |
| NBK-03... | Class 150 | 320 | 320 | 320 | 320 | 320 | 210 |
| NBK-06... | Class 300 | 410 | 410 | 320 | 320 | 320 | 210 |
| NBK-07... | Class 400 | 410 | 410 | 320 | 320 | 320 | 210 |
| NBK-10... | Class 600 | - | 700* | 410** | 320 | 320 | 210 |
| NBK-31... | Class 900 | - | - | - | 540 | 415 | 345 |
| NBK-32... | Class 1500 | - | - | - | 540 | 415 | 345 |

* 800 for units with thermal screening

** 450 at apparatus with thermal screening

NBK-31/32 with Roller Indicator/Ball Display



Pressure-Temperature-Assignment for Stainless Steel Flange

| ASME B 16.5 RF-2009 | | | | | | | | | | |
|---------------------|------------------------------|------------------------------|------|------|------|-----|-----|-----|-----|--|
| Flange Rating | Material | Maximum Temperature TS in °F | | | | | | | | |
| | | Ambient | 200 | 300 | 400 | 500 | 600 | 700 | 750 | |
| | | Maximum Pressure PS in PSI | | | | | | | | |
| 150 | 316-Ti Stainless Steel | 275 | 235 | 215 | 195 | 170 | 140 | 110 | 95 | |
| 300 | | 720 | 620 | 560 | 515 | 480 | 450 | 435 | 425 | |
| 400 | | 960 | 825 | 745 | 685 | 635 | 600 | 580 | 570 | |
| 600 | | 1440 | 1240 | 1120 | 1025 | 955 | 900 | 870 | 855 | |
| 900 | | 2160 | 1860 | | | | | | | |
| 1500 | | 3600 | 3095 | | | | | | | |

Remarks:

Ambient = -20...100°F

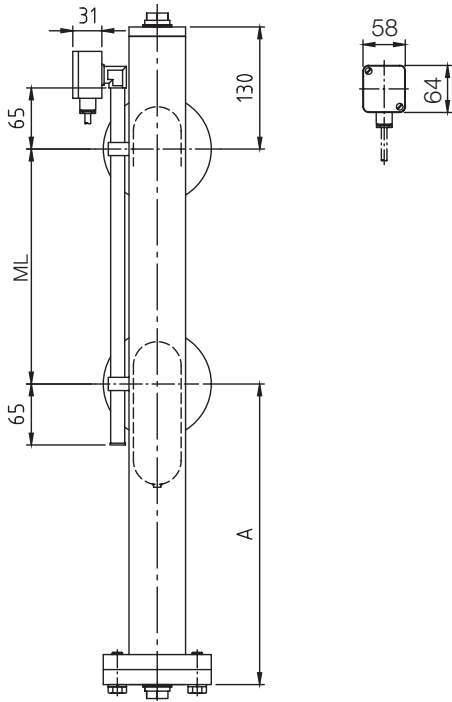
TS = maximum allowable temperature in °F, temperature which is defined by pressure equipment manufacturer, for which the pressure equipment is designed

PS = maximum allowable pressure, pressure which is defined by pressure equipment manufacturer, for which the plant is designed. 316-Ti was calculated with help of creep resistance values of 100 000 h acc. to EN-Material Norms considering the safety value.

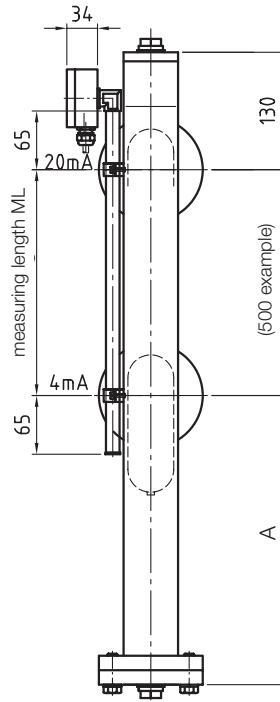
At intermediate temperatures e.g. 250 °F, a linear interpolation is to be carried out between 2 following creep resistance values, e.g. of 212 °F and 300 °F.

The pressure/temperature assignment is valid for the following flange models with sizes up to ASME Class 1500 used by KOBOLD.

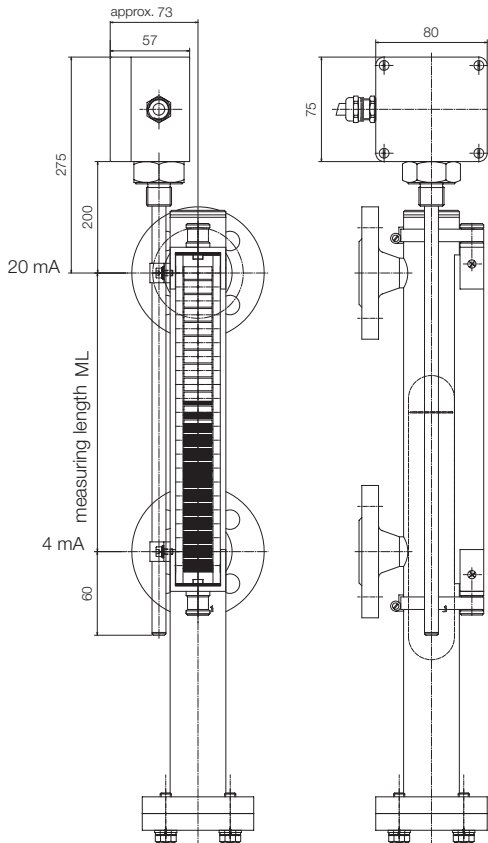
NBK... with Reed Chain - Model W



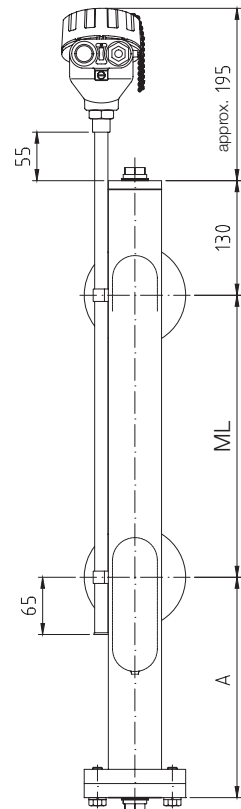
NBK... with Transmitter - Model M



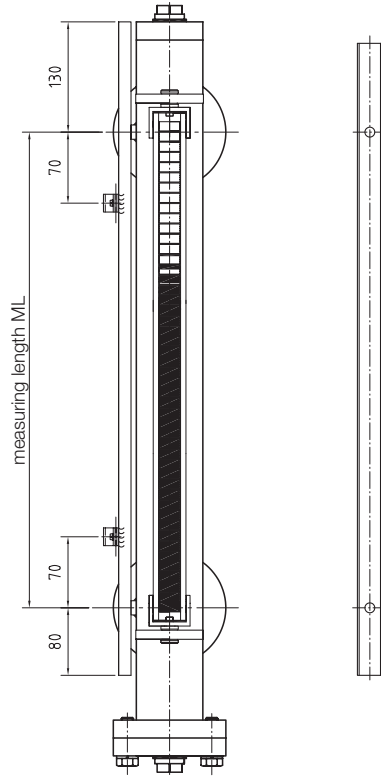
NBK... with Transmitter - Model T



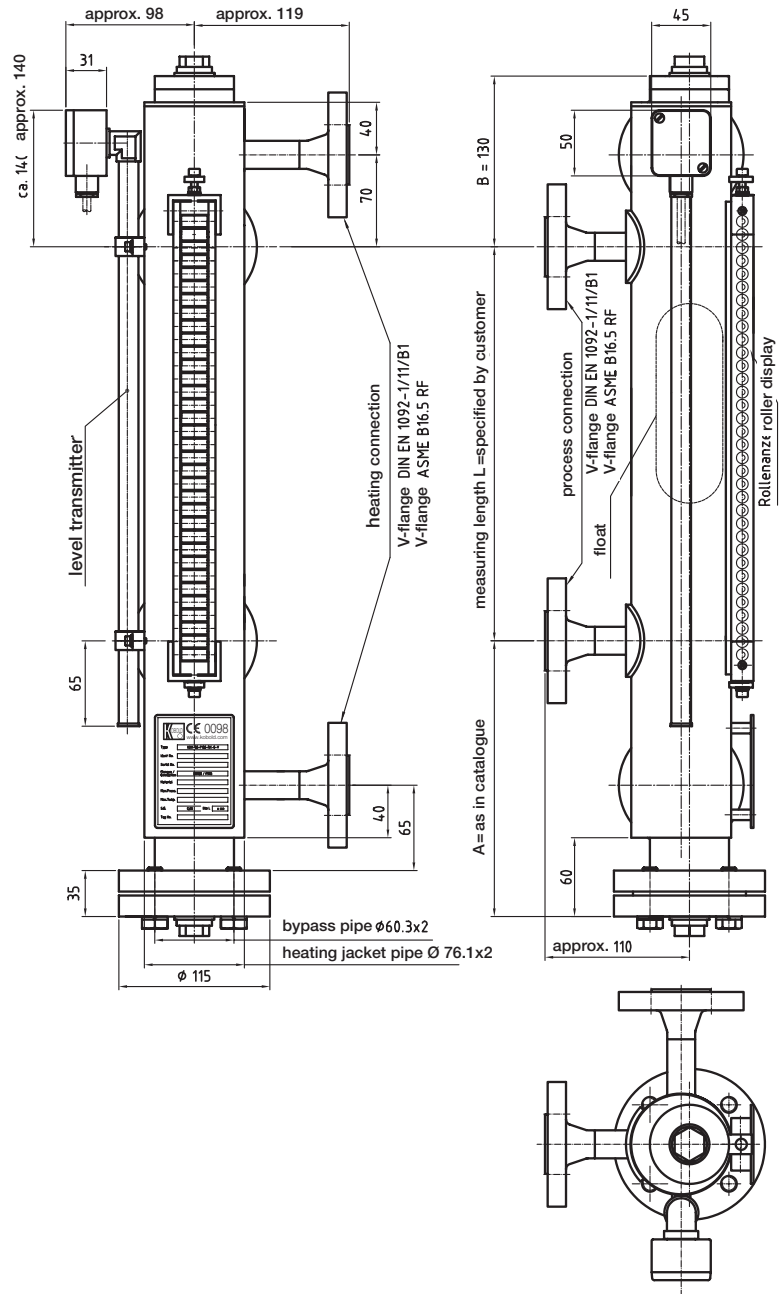
NBK... with Transmitter - Options H/F
(not possible with options VA/VF)



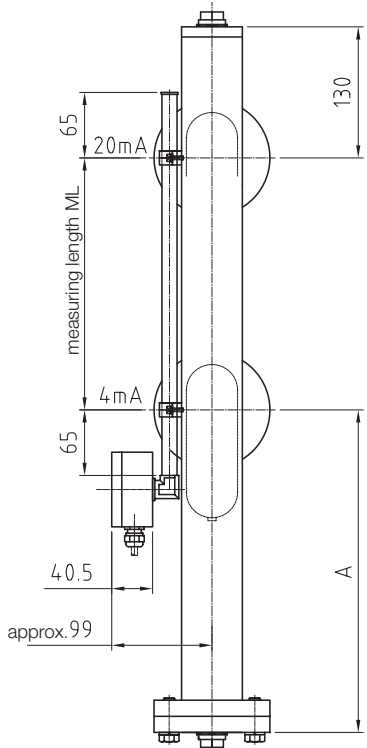
NBK-... with Thermal Screen - Option N



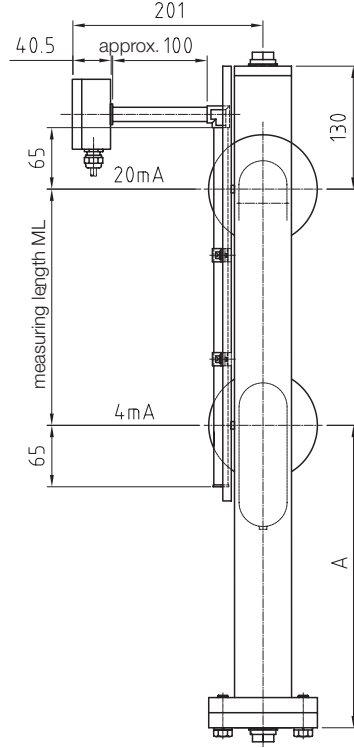
NBK-... with Heating Jacket - Option LX



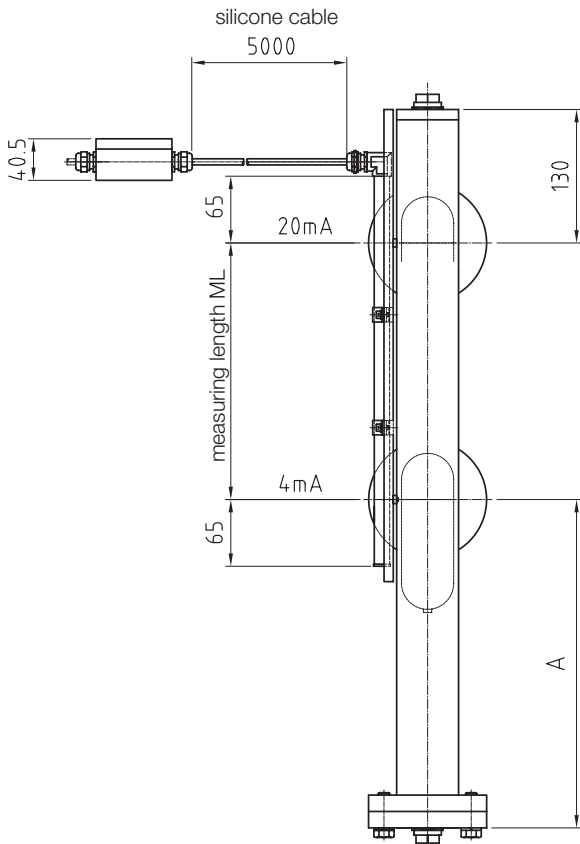
NBK... with Transmitter - Option MU



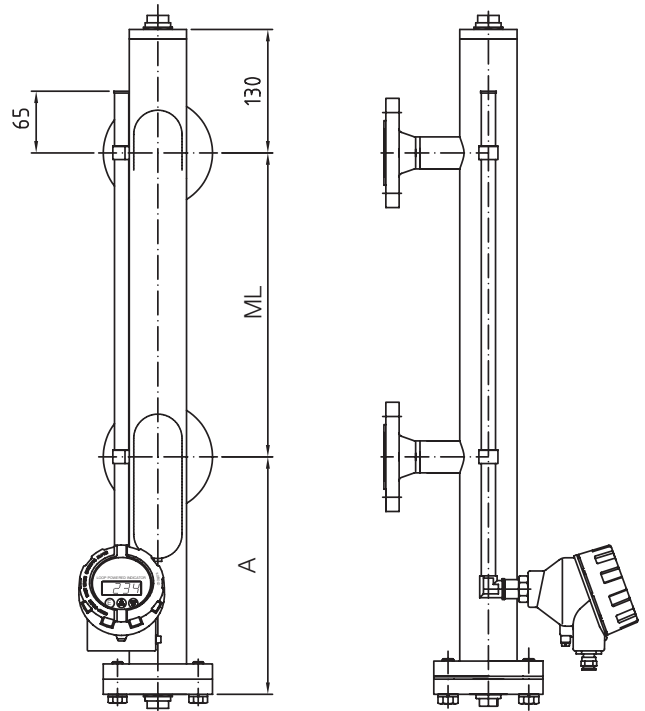
NBK... with Transmitter - Option MS



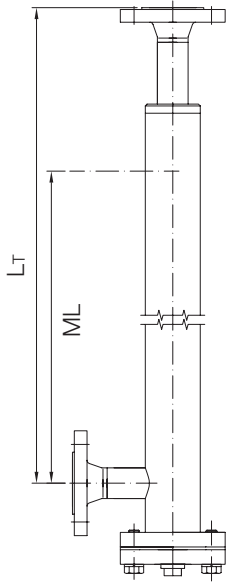
NBK... with Transmitter - Option MK



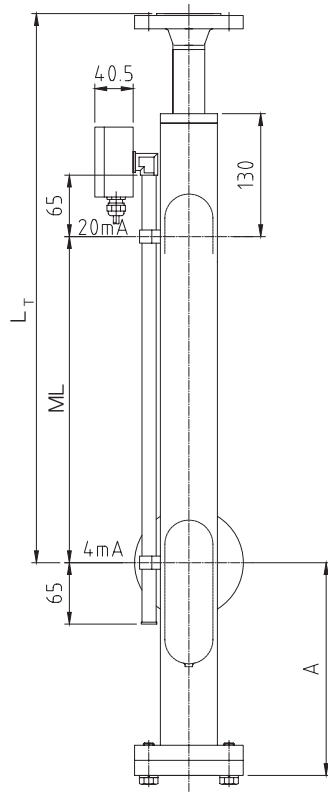
NBK... with Transmitter Display - Options AE/HE or AC/HC



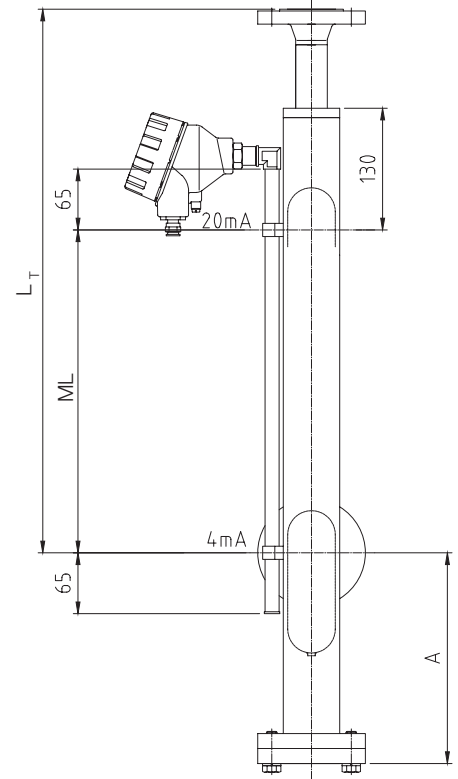
Process Connection - Option ST



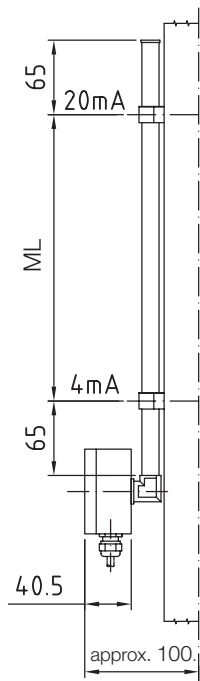
NBK... with Transmitter - Model M - Option ST



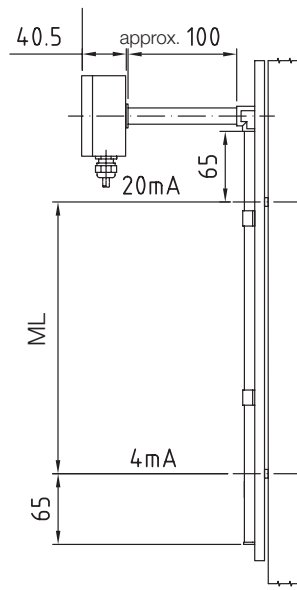
NBK... with Transmitter - Model H/F - Option ST



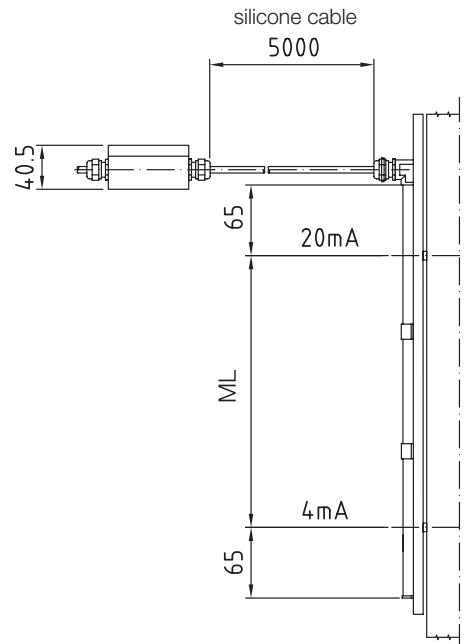
NBK... with Transmitter - Options MU and ST



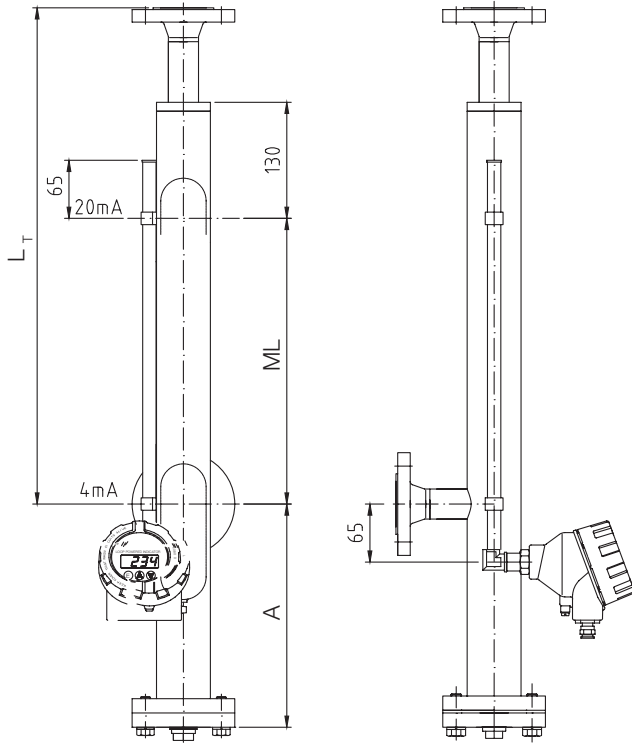
NBK... with Transmitter - Options MS and ST



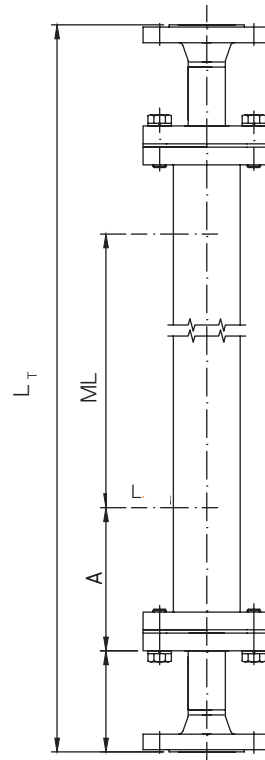
NBK... with Transmitter - Options MK and ST



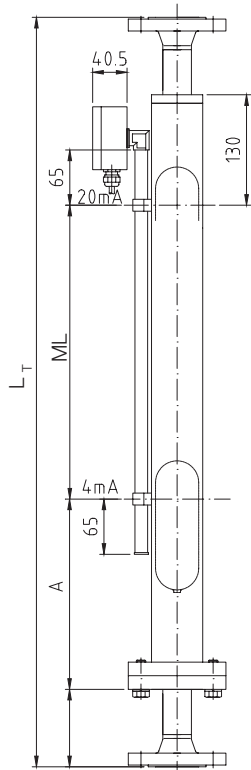
NBK... with Transmitter
- Display Options AE/HE or AC/HC and Option ST



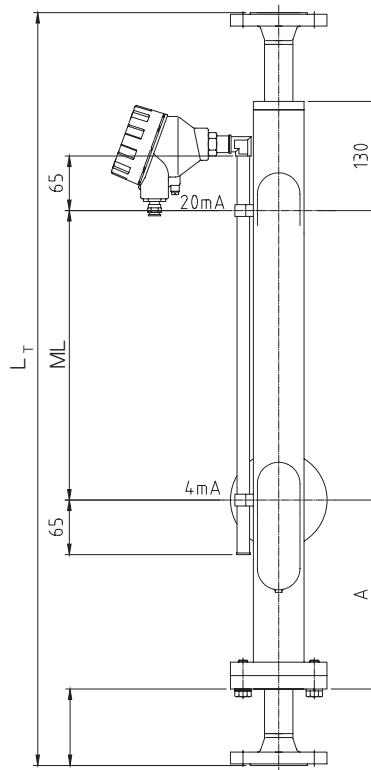
Process Connection - Option TT



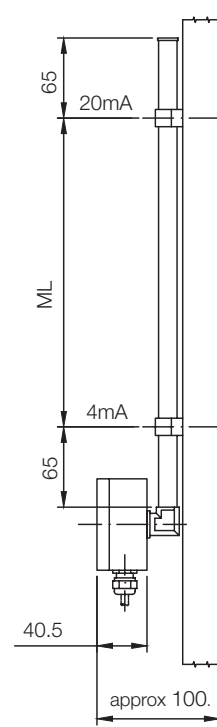
NBK... with Transmitter
- Model M - Option TT



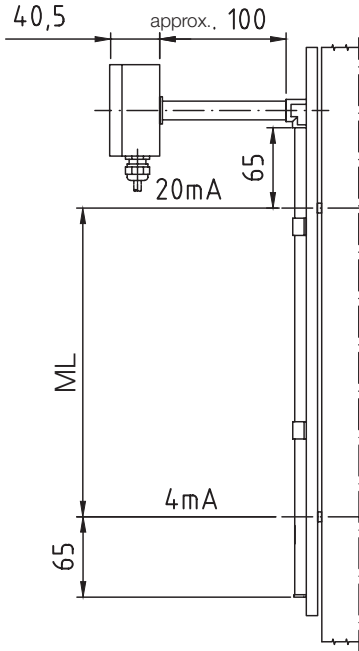
NBK... with Transmitter
- Model H/F - Option TT



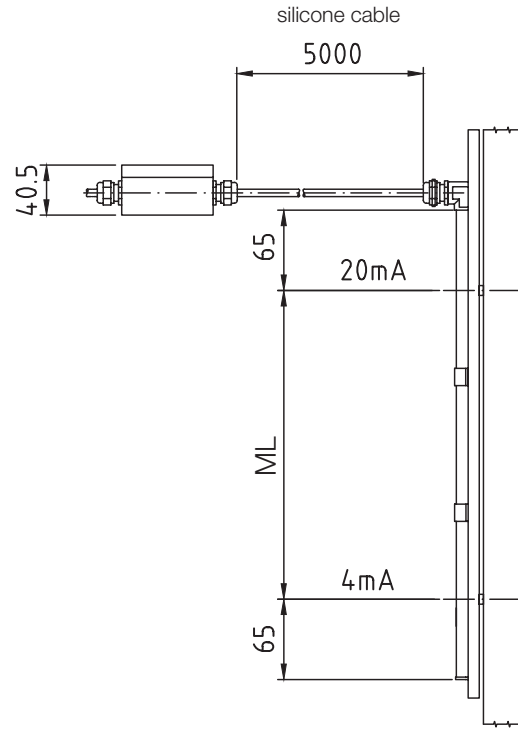
NBK... with Transmitter
- Options MU and TT



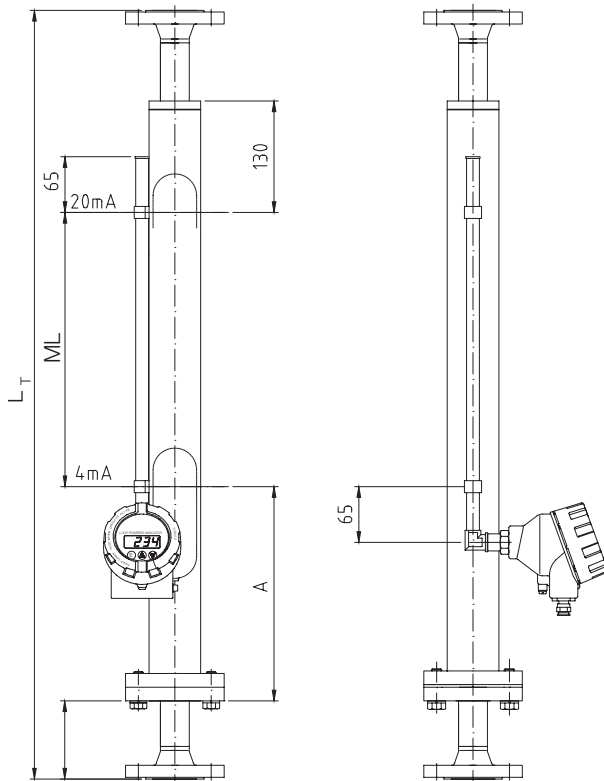
NBK-... with Transmitter
- Options MS and TT



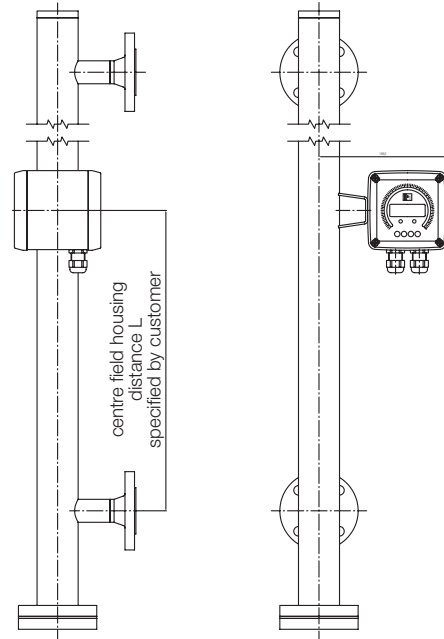
NBK-... with Transmitter
- Options MK and TT



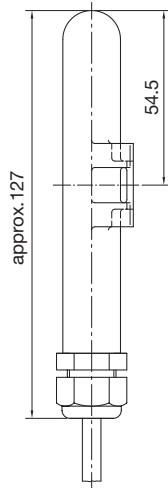
NBK-... with Transmitter - Display Options
AE/HE or AC/HC and Option TT



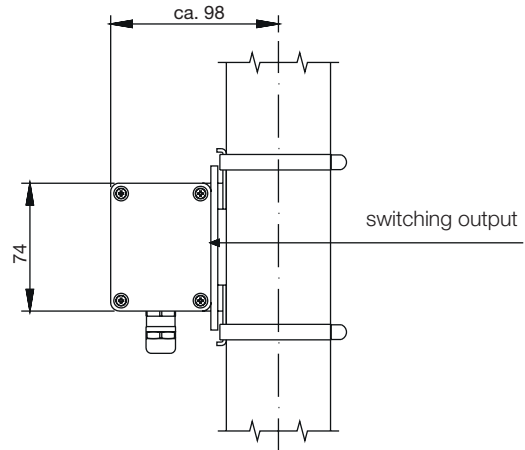
NBK-... with Indication Unit ADI-1 - Option C



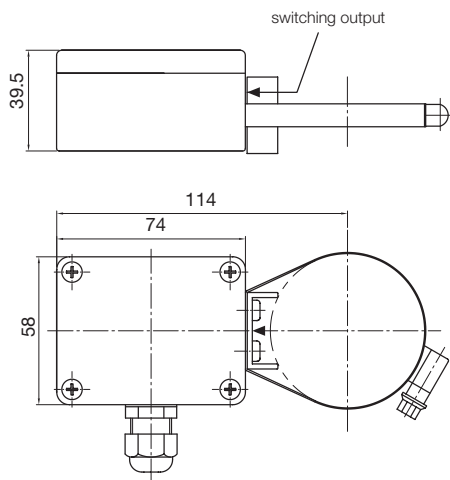
NBK-R



NBK-RV/RN



NBK-RT200



NBK-RT400

