

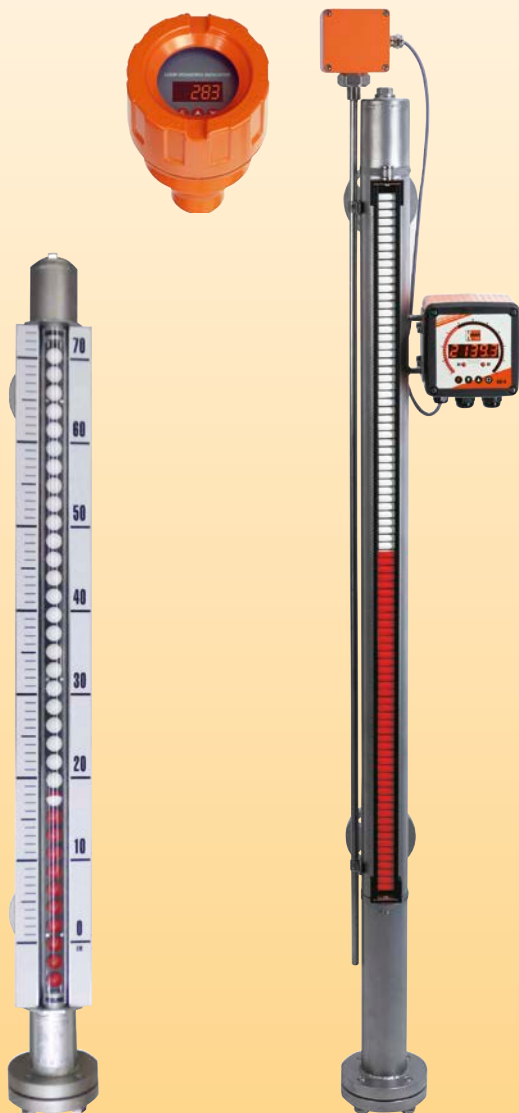


Bypass Level Indicators



measuring
•
monitoring
•
analysing

NBK-03/-06/-07/-10/
-31/-32/-33



- Measuring length:
single-part max. 5 500 mm
over 5 500 mm two-part or multipart
- Pressure: max. PN 320
- Temperature:
- 40 ... + 400 °C (ceramic rollers)
- 20 ... + 120 °C (POM-rollers)
- 104 ... + 200 °C; (ball display)
- 60 ... + 100 °C; (high pressure)
- Viscosity: max. 200 mm²/s standard
(Option: 460 mm²/s, only NBK-03)
- Connection:
DIN flange DN 15 ... DN 50
ANSI flange ½" ... 2"
R and NPT threads
welding nipple DN 15 ... DN 32
- Material: stainless steel 1.4571
- Insensitive magnet roller or
ball display without auxiliary energy
- Limit contacts
- Analogue output, HART®,
Profibus® PA,
Foundation™ Fieldbus®



N2

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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 onto the side wall of the vessel.

According to the law of communicating tubes the level in the bypass tube equals the level in the vessel. A float with embedded circular magnets in the bypass tube follows the liquid level and transfers it in a non-contacting manner to a display fitted outside the tube or to a monitoring device.

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
- Tanks on ships
- Agitator vessel
- Water tanks

Technical Details

Process connection:	flange DIN EN 1092-1 type 11, forme B DN 15, DN 20, DN 25, DN 32, DN 40, DN 50, flange ASME B 16.5 RF-2009 ½", ¾", 1", 1¼", 1½", 2" R-thread DIN EN 10226-1 ½", ¾", 1", 1¼" NPT ANSI/ASME B1.20.1 ½", ¾", 1", 1¼"
Bypass tube:	Ø 60.3 mm, 1.4571 (NBK-03/.../10) Ø 71.0 mm, 1.4571 (NBK-31) Ø 76.1 mm, 1.4571 (NBK-32/33)
NBK-03/06/07:	flat gasket: <200 °C; PTFE, ≥200 °C, Klinger SIL®
NBK-10:	reinforced graphite
NBK-31/32/33:	RTJ-seal
Operating pressure:	PN 16/40/63/100/160/250/320
Temperature of medium:	-20...+120 °C (POM-rollers) -40...+400 °C (ceramic rollers) -104...+200 °C (ball display) -60...+100 °C (NBK-31, -32, -33)
Viscosity:	max. 200 mm ² /s standard (Option: up to max. 460 mm ² /s for NBK-03)
max. meas. length:	to 5500 mm single-part; longer two-part or multipart
Overall length:	see dimension drawing
ATEX-approval:	see separate description

Roller display RP (max. length 5500 mm)

Material roller:	POM
Display glass:	PMMA
Carrier frame material:	aluminium, black anodised
Temperature of medium:	-20...+120 °C
Ambient temperature:	-20...+80 °C
Protection:	IP 54

Roller display RK (max. length 5500 mm)

Material roller:	ceramic
Display glass:	borosilicate glass
Carrier frame material:	aluminium, black anodised
Temperature of medium:	-40...+400 °C
Ambient temperature:	-40...+250 °C
Protection:	IP 54



Ball display model KP (max. L = 3800 mm one-piece)

Material ball:	PA
Sight tube:	PMMA
Sealing plug:	aluminium
Seal:	NBR
Ball support rail:	aluminium, black anodised
Carrier frame:	stainless steel 1.4301
Scale:	Hard-PVC, stainless steel 1.4301 (Option MV)
Temperature of medium:	-20 ... +80 °C
Ambient temperature:	-20 ... +80 °C
Protection:	IP66

Ball display model KM (max. L = 3800 mm one-piece)

Material ball:	PA – high temperature strength
Sight tube:	PC
Sealing plug:	aluminium
Seal:	FPM
Ball support rail:	aluminium, black anodised
Carrier frame:	stainless steel 1.4301
Scale:	Hard-PVC, stainless steel 1.4301 (Option MV)
Temperature of medium:	-60 ... +120 °C
Ambient temperature:	-20 ... +80 °C
Protection:	IP66

Ball display model KF (max. L = 3800 mm one-piece)

Filling:	silicone oil
Material ball:	PA – high temperature strength
Sight tube:	PC
Sealing plug:	stainless steel 1.4301
Seal:	FKM
Ball support rail:	aluminium, black anodised
Carrier frame:	stainless steel 1.4301
Scale:	Hard-PVC, stainless steel 1.4301 (Option MV)
Temperature of medium:	-105 ... +120 °C
Ambient temperature:	-20 ... +80 °C
Protection:	IP66

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

Material ball:	PA – high temperature strength
Sight tube:	borosilicate glass
Sealing plug:	stainless steel 1.4301
Seal:	FKM
Ball support rail:	aluminium, black anodised
Carrier frame:	stainless steel 1.4301
Scale:	stainless steel 1.4301
Temperature of medium:	-20 ... +200 °C
Ambient temperature:	-20 ... +200 °C
Protection:	IP66

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/NBK-RT400

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 ... +200 °C/400 °C
Ambient temperature:	-40 ... +145 °C/350 °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:	-104 ... +200 °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
Electrical connection:	cable gland M20x1.5 (PVC)
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

* In case of multi-part design, a display (ball) length of 32 mm 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: 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: 5500 mm
 Medium temperature: -40 ... +200 °C,
 -40 ... +400 °C with thermal
 screening (option N)
 Ambient temperature: max. 130 °C
 Resolution: 10 mm
 Housing: aluminium pressure-cast
 Protection: IP65

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

Output: 4 ... 20 mA
 Supply voltage: 16 ... 32 V_{DC}
 max. length: 5500 mm
 Load resistance: $(V_{supply} - 9 V) / 0.02 A [\Omega]$
 Medium temperature: -40 ... +120 °C
 Ambient temperature: -20 ... +80 °C
 Resolution: 10 mm
 Housing: aluminium pressure-cast
 Protection: IP65

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 incl. thermal screening
 Medium temperature: -40 ... +300 °C

Reed contact resistor chain with 2-wire transmitter: 4 ... 20 mA Option MK

Like model: ... M ... however with 5000 mm silicone cable between connection box/bypass, incl. thermal screening
 Medium temperature: -40 °C ... +400 °C

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

Sensor error detection:

Programmable: 3.5 ... 23 mA
 (23 mA factory default)
 Medium temperature: -40 ... +120 °C
 (with option N up to +250 °C)
 Ambient temperature: -20 ... +80 °C
 Resolution: 10 mm
 Housing: aluminium pressure-cast
 Cable entry: M 20 x 1.5
 Protection: IP65

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

Sensor error detection:

Programmable: 3.5 ... 23 mA
(23 mA factory default)
Medium temperature: -40 ... +120 °C (with option N up to +250 °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. 2.5V

**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

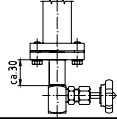
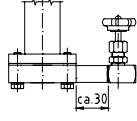
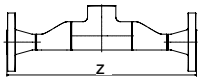
Profibus® PA connection:

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
(with option N up to +250 °C)
Ambient temperature: -20 ... +80 °C
Resolution: 10 mm
Housing: aluminium pressure-cast
Cable entry: M 20 x 1.5
Protection: IP 66





Options

Code	Description	Sketch/picture	Availability
Top bypass tube connections			
V0	Without vent plug		for NBK-03/06/07 , Standard for NBK-10/31/32/33
VG	With vent plug G 1/2 (DIN-flanges) 1/2" NPT (ASME-flanges)		for NBK-10 , Standard for NBK-03/06/07
VF ^{1) 3)}	Flange connection DN50 (pressure rating as process flange)		NBK-03/06/07/10
VA ^{1) 3)}	Flange connection 2" ASME (pressure rating as process flange)		NBK-03/06/07/10
V4 ³⁾	Vent flange DN15, stainless steel 1.4571 (pressure rating as process flange)		NBK-03/06
V5 ³⁾	Vent flange DN20, stainless steel 1.4571 (pressure rating as process flange)		NBK-03/06
V6 ³⁾	Vent flange DN25, stainless steel 1.4571 (pressure rating as process flange)		NBK-03/06
V7 ³⁾	Vent flange 1/2" ASME, stainless steel 1.4571 (316Ti) (pressure rating as process flange)		NBK-03/06
V8 ³⁾	Vent flange 3/4" ASME, stainless steel 1.4571 (316Ti) (pressure rating as process flange)		NBK-03/06
V9 ³⁾	Vent flange 1" ASME, stainless steel 1.4571 (316Ti) (pressure rating as process flange)		NBK-03/06
V2	vent valve NAD-MMN15, 1/2" NPT, stainless steel 316Ti, max. temperature: +120 °C		NBK-03/06
V3	Vent valve NAD-MMR15, G 1/2, stainless steel 1.4571, max. temperature: +120 °C		NBK-03/06
Bottom bypass tube connections			
D0	Without drain plug		for NBK-03/06/07 Standard for NBK-10/31 ... 33
DG	With drain plug G 1/2 (DIN-flanges) 1/2" NPT (ASME-flanges)	NBK-03/06 NBK-07/10	for NBK-10 Standard for NBK-03/06/07
DF	Flange connection DN50 (pressure rating as process flange), with drain plug G 1/2		NBK-03/06
DA	Flange connection 2" ASME (pressure rating as process flange), with drain plug 1/2" NPT		NBK-03/06
DC	Flange connection DN50 (pressure rating as process flange), without drain plug		NBK-03/06/07
DD	Flange connection 2" ASME (pressure rating as process flange), without drain plug		NBK-03/06/07
EF	Drain flange DN15, stainless steel 1.4571 (pressure rating as process flange)		NBK-03/06
E5	Drain flange DN20, stainless steel 1.4571 (pressure rating as process flange)		NBK-03/06
E6	Drain flange DN25, stainless steel 1.4571 (pressure rating as process flange)		NBK-03/06
E7	Drain flange 1/2" ASME, stainless steel 1.4571 (316Ti) (pressure rating as process flange)		NBK-03/06
E8	Drain flange 3/4" ASME, stainless steel 1.4571 (316Ti) (pressure rating as process flange)		NBK-03/06
E9	Drain flange 1" ASME, stainless steel 1.4571 (316Ti) (pressure rating as process flange)		NBK-03/06

Code	Description	Sketch/picture	Availability
F1	Drain valve NAD-MMR15, G ½, stainless steel 1.4571, max. temperature: +120 °C		NBK-03/06
F2	Drain valve NAD-MMN15, ½" NPT, stainless steel 1.4571 (316Ti), max. temperature: +120 °C		NBK-03/06
DS	Drain socket DN15	see sketch	NBK-03/06
D2	Drain valve NAD-MMN15, ½" NPT, horizontally mounted, stainless steel 1.4571 (316Ti), max. temperature: +120 °C		NBK-03/06
D3	Drain valve NAD-MMR15, G ½, horizontally mounted, stainless steel 1.4571 (316Ti), max. temperature: +120 °C		NBK-03/06
RF	Dead space free version DN25, stainless steel 1.4571 (pressure rating as process flange)		NBK-06
RA	Dead space free version 1" ASME, stainless steel 1.4571 (316Ti) (pressure rating as process flange)		NBK-03/06
Process connection options			
ST ³⁾	1 x process connection side, 1 process connection vertical on top	see sketch	NBK-03/06/07/10
TS ³⁾	1 x process connection side, 1 process connection vertical at bottom	see sketch	NBK-03/06/07/10
TT ³⁾	2 x process connection vertical, up to DN25 or 1" ASME	see sketch	NBK-03/06/07/10
Scales			
(Ball displays are always delivered with scales, see technical data/ sketch for resolution)			
MV	Scale made of stainless steel 1.4301 (only with ball display model KP/KM/KF, standard with model KG)	see sketch	NBK-03/06/07/10/31/32/33
M1	Measuring scale, medium temperature -40 °C ... +400 °C, engraved scale made of aluminium	see sketch	NBK-03/06/07/10/31/32/33
M2	Measuring scale, medium temperature -40 °C ... +150 °C, scale backing made of aluminium with polyester foil	see sketch	NBK-03/06/07/10/31/32/33
Thermal screening			
N	Thermal screening for sensor	see sketch	NBK-03/06/07/10/31/32/33
Heating jacket			
L1	Connection for heating jacket DN15/PN16 Form B1 DIN-EN 1092-1	see sketch	NBK-03/06/07/10
L2	Connection for heating jacket DN20/PN16 Form B1 DIN-EN 1092-1		NBK-03/06/07/10
L3	Connection for heating jacket DN25/PN16 Form B1 DIN-EN 1092-1		NBK-03/06/07/10
L4	Connection for heating jacket DN32/PN16 Form B1 DIN-EN 1092-1		NBK-03/06/07/10
LA	Connection for heating jacket ½" Class 150 RF ASME B16.5-2003 (Class 300 flanges on request)		NBK-03/06/07/10
LB	Connection for heating jacket ¾" 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 1¼" Class 150 RF ASME B16.5-2003 (Class 300 flanges on request)		NBK-03/06/07/10



Bypass Level Indicators Model NBK-03/-06/-07/-10/-31/-32/-33

Code	Description	Sketch/picture	Availability
Electrical Outputs			
MU	Option M with connection box at bottom, for easy access to connection box		NBK-03/06/07/10/31/32/33
MS	Option M and connection box at 100 mm distance, max. medium temperature = + 300 °C (Thermal screening option N mandatory with this option)		NBK-03/06/07/10/31/32/33
MK	Option M and connection box 5000 mm silicone cable, max. medium temperature = + 400 °C (Thermal screening option N mandatory with this option)		NBK-03/06/07/10/31/32/33
Display options			
AE	Aluminium die-cast housing, LED digital display, connection box at bottom (only in combination with transmitter option A)		NBK-03/06/07/10/31/32/33
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-03/06/07/10/31/32/33
HE	Aluminium die-cast housing, LED digital display, connection box at bottom (only in combination with transmitter option H)		NBK-03/06/07/10/31/32/33
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-03/06/07/10/31/32/33
C²⁾	Indicating unit ADI-1 with bargraph and digital display, rugged aluminium housing, mounted at bypass tube, for description see data sheet ADI-1	see cover page / sketch	NBK-03/06/07/10/31/32/33
Additional options			
A	Connection flange for 2-part version (not possible with sensor), split roller display and scale possible	see sketch	NBK-03/06/07/10
HL	Retaining plate, centric between process connections, necessary from L > 5000 mm (alternative option HF)	see sketch	NBK-03/06/07/10/31/32/33
HF	Retaining flange, centric between process connections, necessary from L > 5000 mm (alternative option HL)	see sketch	NBK-03/06/07/10/31/32/33
K	Armaflex-insulation (heat co-efficient 0.025 kcal/m °C, up to 105 °C)	-	NBK-03/06/07/10
Tests / certificates			
P	Radiographic examination DIN 54 111 T1	-	NBK-03/06/07/10/31/32/33
Q	Dye penetration test DIN EN 571-1	-	NBK-03/06/07/10/31/32/33
X	Pressure test with water 1.5 x PN	-	NBK-03/06/07/10/31/32/33
Z	3.1 Inspection certificate acc. EN 10204	-	NBK-03/06/07/10/31/32/33
MR	Material acc. to NACE MR 0103/ISO15156 (MR0175), declaration of conformance	-	NBK-03/06/07/10/31/32/33
WV	Positive Material Identification (PMI)	-	NBK-03/06/07/10/31/32/33
SF	Oil and fat free	-	NBK-03/06/07/10/31/32/33

¹⁾ Not possible with transmitter options H/F

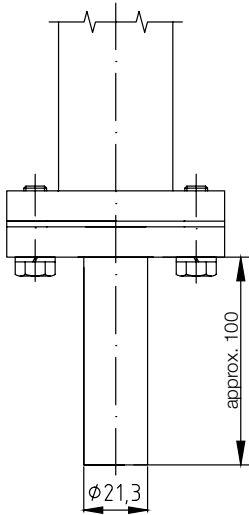
²⁾ Only possible with option T (magnetostrictive sensor or option M (reed chain with transmitter)

³⁾ Not possible with option T

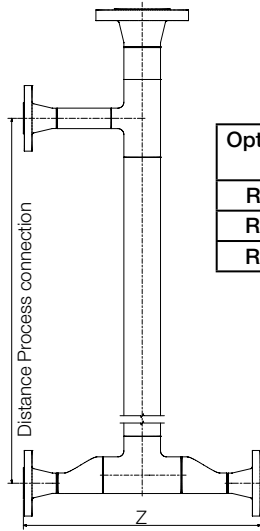
Note: Please pay attention to max. permissible temperature limits of individual components

Sketches of selected options

Option DS

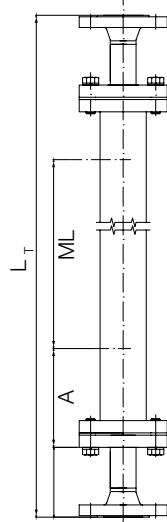


Option RF/RA

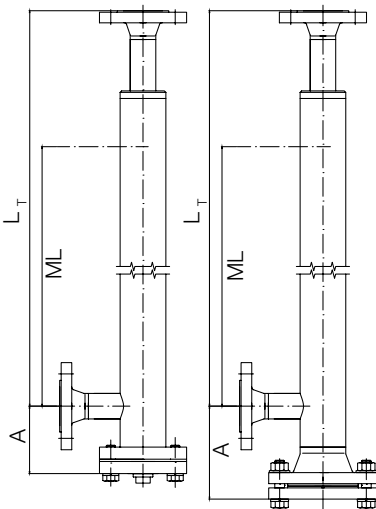


Option	Process connection below	Dimension Z
RF	V-flange DN25 PN40	approx. 360
RA	V-flange CI 150 1"	approx. 390
RA	V-flange CI 300 1"	approx. 405

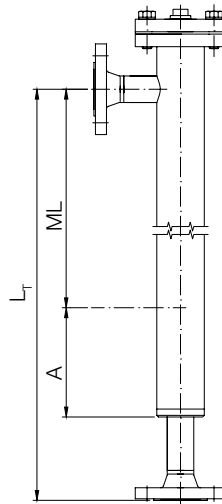
Option TT



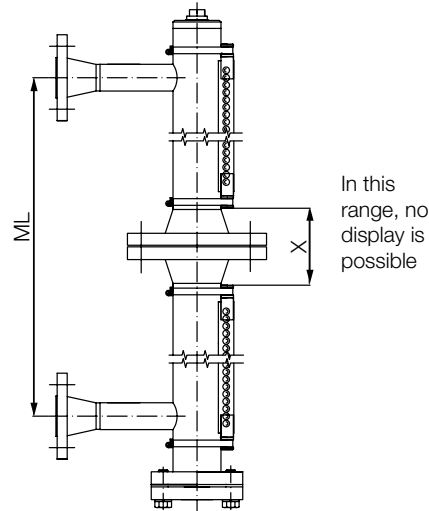
Option ST



Option TS

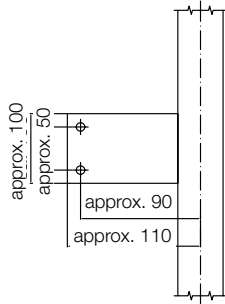


Option A

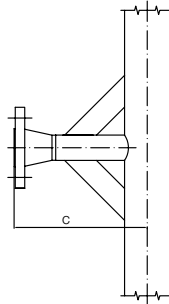


Model	Dimension X
NBK-03	92
NBK-06	98
NBK-07	127
NBK-10	139

Option HL
(centred to dimens. L)

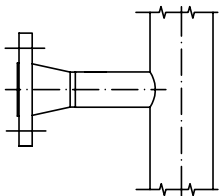


Option HF
(centred to dimens. L)

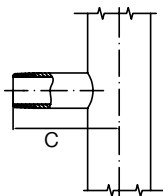


Options process connection

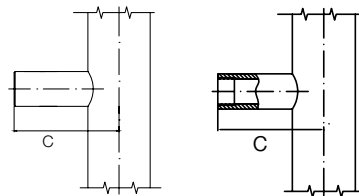
Option F/A



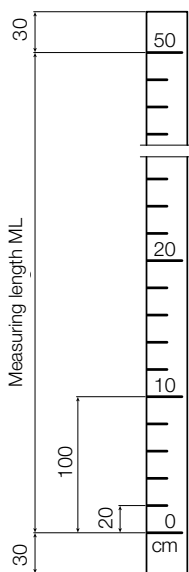
Option R/N



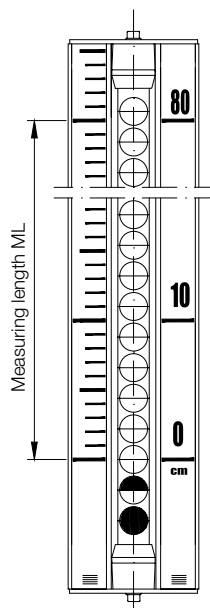
Option S



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



Measuring scale screen print, stainless steel carrier
(standard scope of supply with ball display)



Float models (closed design)

Model	Min. density [kg/dm ³]	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/dm ³ (indicate both densities)	titanium

*Option N not possible. Not for NBK-10, special float for special medium densities (taring) or reduced length A on request.



Order Details (Example: NBK-03 F15 00 0 A)

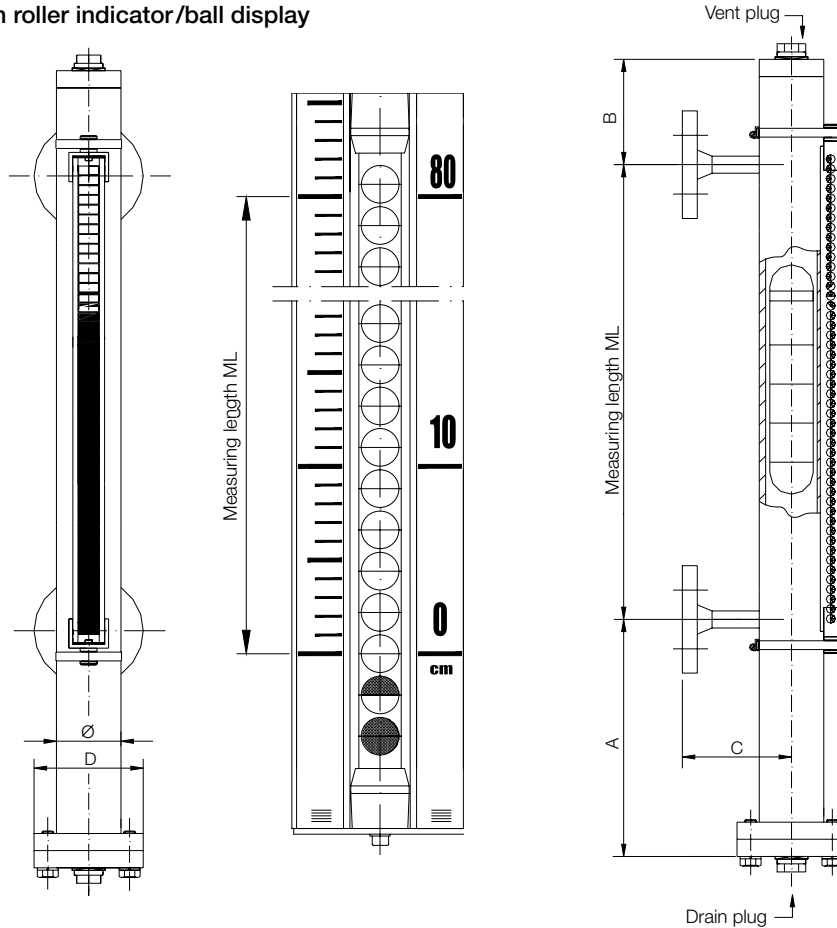
Model	Rated pressure	Connection	Nominal size	Roller/ ball indicator	Sensor/ Transmitter	Medium density float	Options
NBK-03...	PN 16/ Class 150					A = 1.0 kg/dm ³ , titanium for viscosity up to 200 cP B = 0.90 kg/dm ³ , titanium for viscosity up to 200 cP C = 0.80 kg/dm ³ , titanium for viscosity up 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 F ⁶⁾ = 0.54 kg/dm ³ , titanium for viscosity up to 200 cP V ⁵⁾ = 1.0 kg/dm ³ , stainless steel for viscosity up to 460 mm ² /s W ⁵⁾ = 0.8 kg/dm ³ , stainless steel for viscosity up to 460 mm ² /s Y = special density, titanium (specify in clear text)	
NBK-06...	PN 40/ Class 300						
NBK-07...	PN 63/ Class 400	F = DIN-flange A = ASME-flange R ³⁾ = R-male thread N ³⁾ = NPT-male thread S ⁴⁾ = welding-nipple	15 = DN 15, 1/2" 20 = DN 20, 3/4" 25 = DN 25, 1" 32 = DN 32, 1 1/4" 40 = DN 40, 1 1/2" 50 = DN 50, 2" XX ⁸⁾ = 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 transmitter M = reed chain/ 4...20 mA, 2-wire A ⁹⁾ = reed chain/ 4...20 mA, 2-wire H = reed chain/ 4...20 mA, HART [®] , 2-wire F = reed chain/ Profibus [®] PA Foundation [™] Fieldbus		
NBK-10...	PN 100/ Class 600						
NBK-31	PN 160/ Class 900	F = DIN flange	15 = DN 15, 1/2"			H = high pressure floater, CF340 viscosity up to 200 cP (medium S.G.: ≥ 0.8; specify in clear text)	
NBK-32	PN 250/ Class 1500		20 ⁷⁾ = 3/4"				
NBK-33	PN 320	A = ASME flange	25 = DN 25, 1"				
NBK-R	standard limit contact (bistable change-over contact)						
NBK-RT200	limit contact high-temperature max. 200 °C						
NBK-RT400	limit contact high-temperature max. 400 °C						
NBK-RV200NO	limit contact, bistable, N/O, max. +200 °C (suitable for vessels with strong vibrations)						
NBK-RV200NC	limit contact, bistable, N/C, max. +200 °C (suitable for vessels with strong vibrations)						
NBK-RN200NO	limit contact, bistable, NAMUR, N/O, max. +200 °C (suitable for vessels with strong vibrations)						
NBK-RN200NC	limit contact, bistable, NAMUR, N/C, max. +200 °C (suitable for vessels with strong vibrations)						

³⁾ Only possible with nominal diameter 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 connection A, ASME ⁸⁾ Specify in clear text
⁹⁾ Only with options AE and AC

Measuring length L, density and temperature please specify in clear text!

Dimensions [mm]

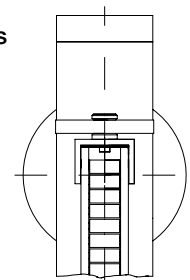
NBK-03/06/07/10 with roller indicator/ball display



Dimensions NBK [mm]

Model	Rated pressure	Ø	B	D	C						
					x15...x25	x32	F40	A40	F50	A50	
NBK-03...	PN 16	60.3	130	115	110	110	130	-	140	-	
	Class 150						-	145	-	160	
NBK-06...	PN 40						130	-	145	-	
	Class 300						-	155	-	165	
NBK-07...	PN 63			180	150	150	145	-	160	-	
	Class 400			-			160	-	175		
NBK-10...	PN 100			195			-	165	-		
	Class 600			-			160	-	175		
NBK-31...	PN 160			71	150	245	180				
Class 900											
NBK-32...	PN 250	76.1									
	Class 1500										
NBK-33...	PN 320	170	265	210							

NBK-10/-31/-32/-33 always without vent plug and without drain plug

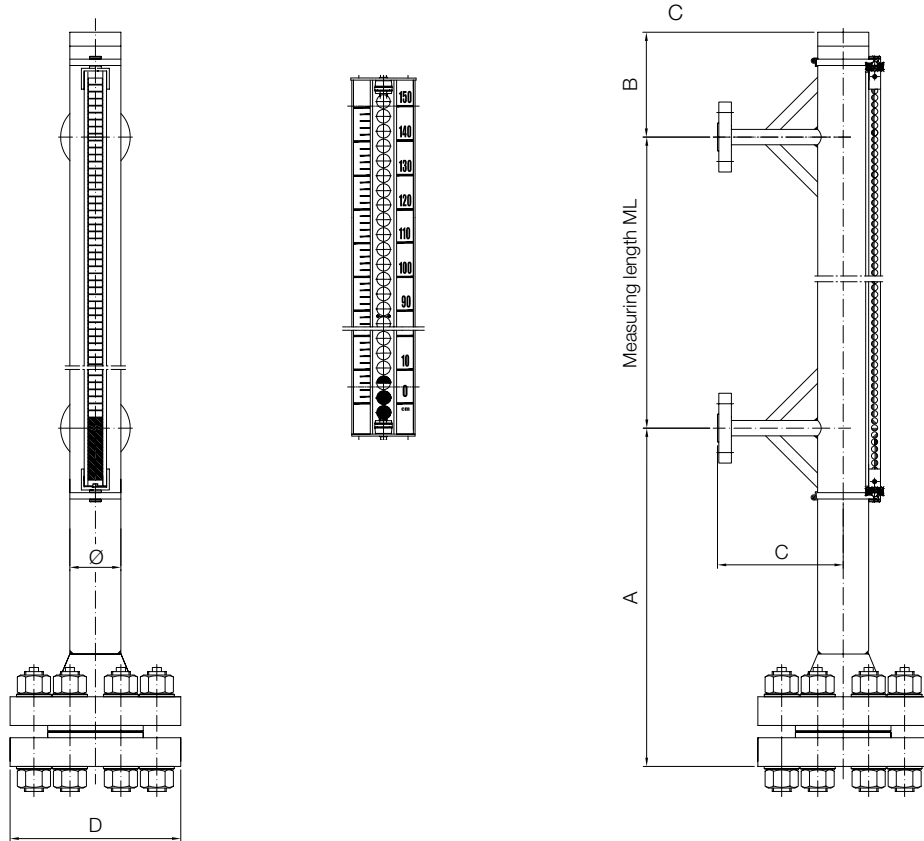


Clearance dimension A [mm]

Model	Rated pressure	Medium 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...	PN 16 / Class 150	320	320	320	320	320	210
NBK-06...	PN 40 / Class 300	410	410	320	320	320	210
NBK-07...	PN 63 / Class 400	410	410	320	320	320	210
NBK-10...	PN 100 / Class 600	-	700*	410**	320	320	210
NBK-31...	PN 160 / Class 900	-	-	-	540	415	345
NBK-32...	PN 250 / Class 1500	-	-	-	540	415	345
NBK-33...	PN 320	-	-	-	595	460	385

* 800 for units with thermal screening; **450 for units with thermal screening

NBK-31/32/33 with roller indicator /ball display



Pressure-/temperature-assignment for flange made of stainless steel

DIN EN 1092-1:2008-09 (extract)										
PN	Material	Maximum allowable temperature TS in °C								
		RT	100	150	200	250	300	350	400	
		Maximum allowable pressure PS in bar								
6	1.4571 (15E0)	6.0	6.0	5.8	5.6	5.3	5.0	4.8	4.6	
16		16.0	16.0	15.6	14.9	14.1	13.3	12.8	12.4	
40		40.0	40.0	39.2	37.3	35.4	33.3	32.1	31.2	
63		63.0	63.0	61.8	58.8	55.8	52.5	50.7	49.2	
100		100.0	100.0	98.0	93.3	88.5	83.3	80.4	78.0	
160		160.0	160.0							
250		250.0	250.0							
320		320.0	320.0							

Remarks:

RT = -10 °C... +50 °C

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

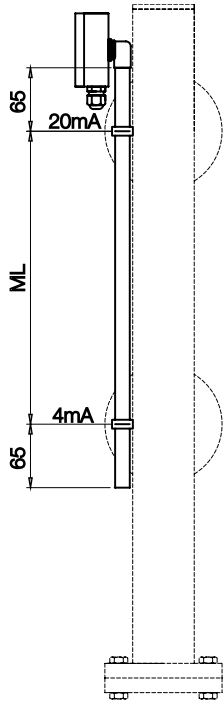
PS = maximum allowable pressure, pressure which is defined by pressure equipment manufacturer, for which the plant is designed. 1.4571 (15E0) was calculated with help of creep resistance values of 100000 h acc. to EN-Material Norms considering the safety value.

At intermediate temperatures e.g. 120 °C, a linear interpolation is to be carried out between 2 following creep resistance values, e.g. of 100 °C and 150 °C.

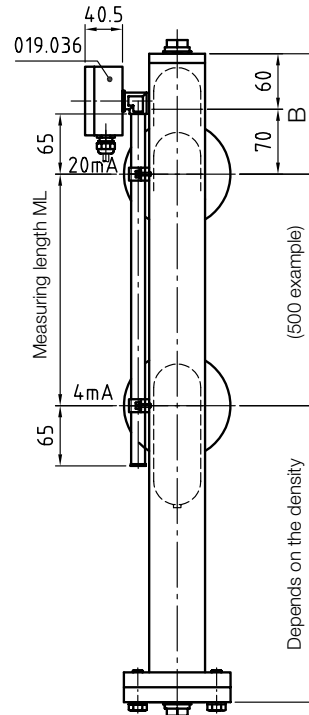
The pressure/temperature assignment is valid for the following flange models with sizes up to DN 100 used by KOBOLD.

Model No. and nomination: 05 Blind flange, 11 Welding neck flange

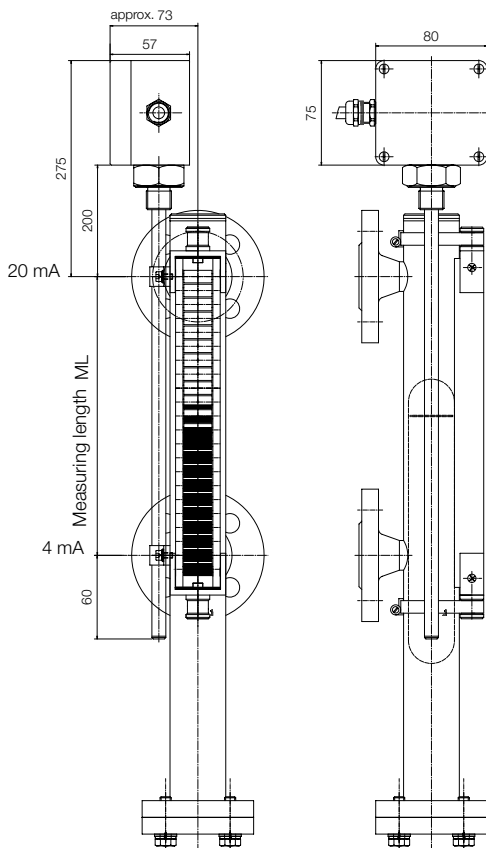
NBK... with reed chain model W



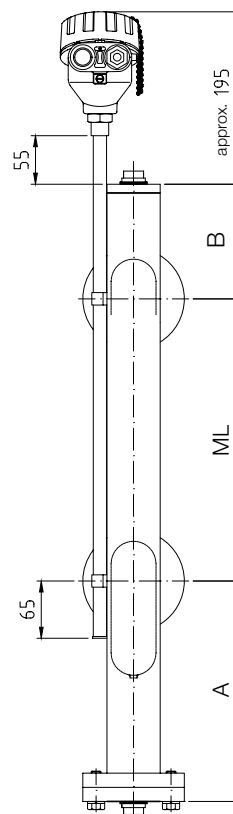
NBK... with transmitter model M



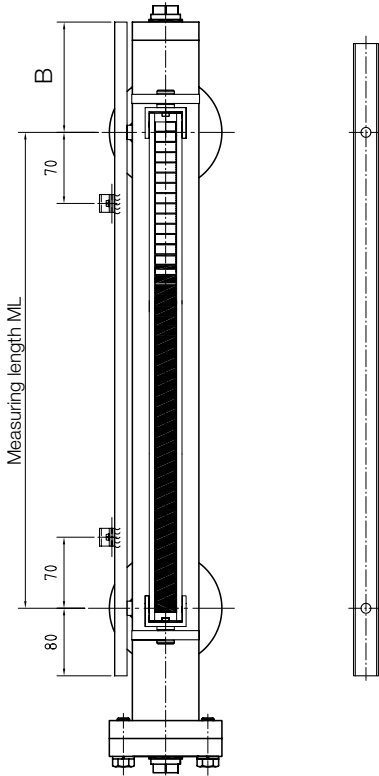
NBK... with transmitter model T



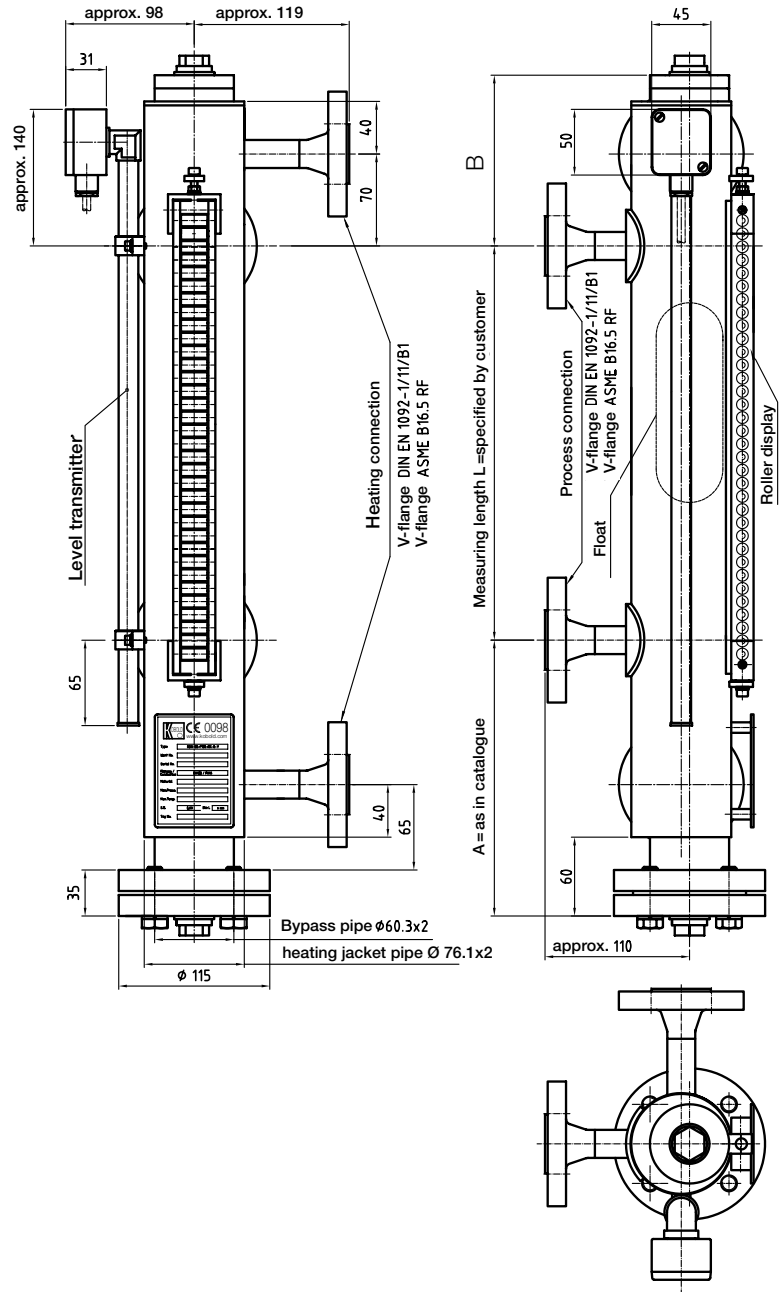
NBK... with transmitter options H/F (not possible with options VA/VF)



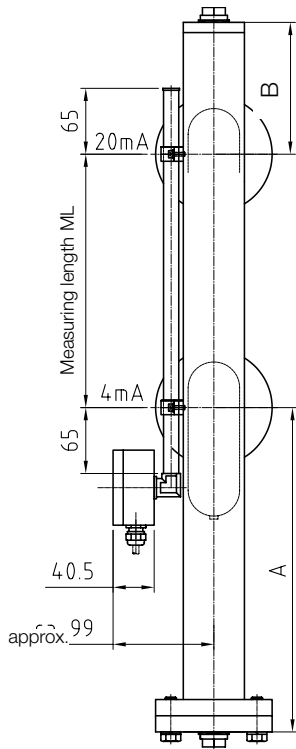
NBK-... with thermal screen option N



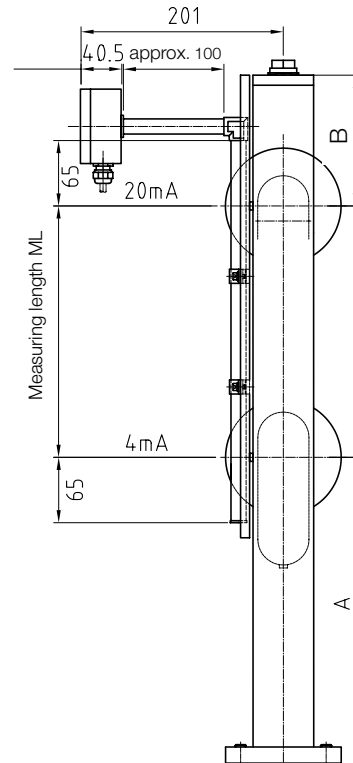
NBK-... with heating jacket option LX



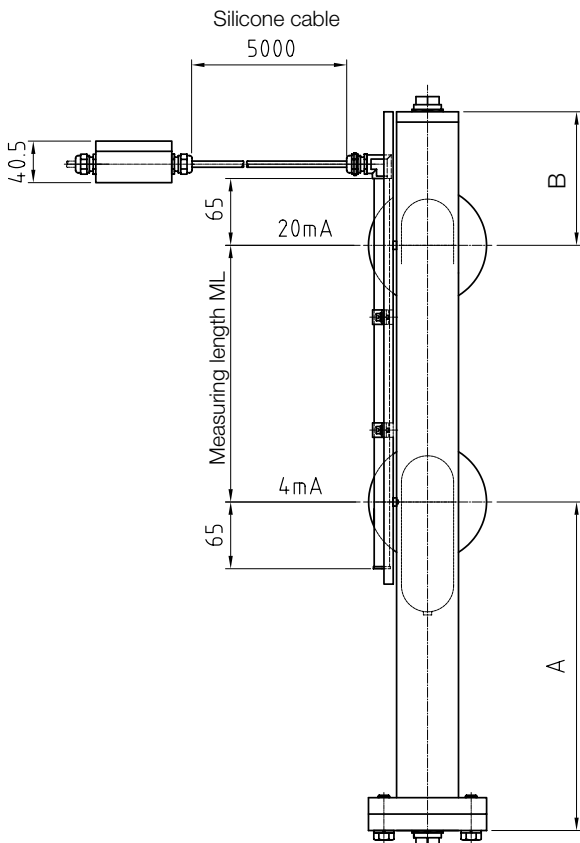
NBK... with transmitter option MU



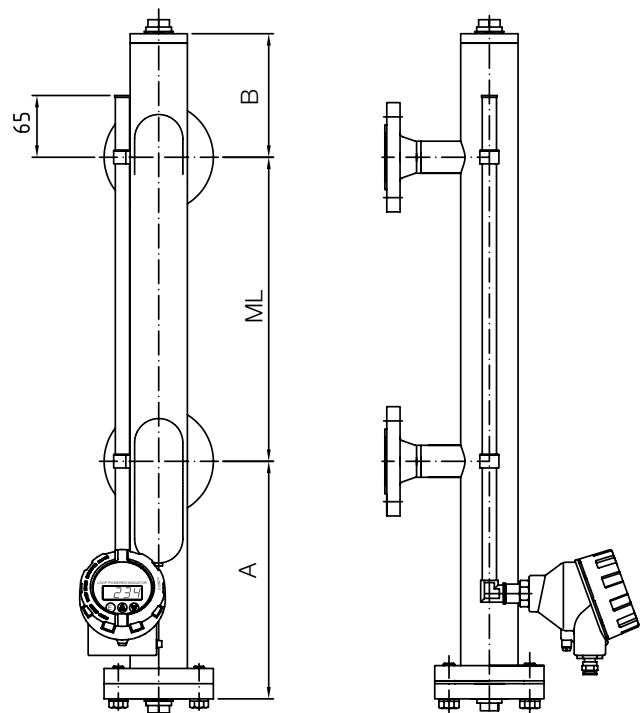
NBK... with transmitter option MS



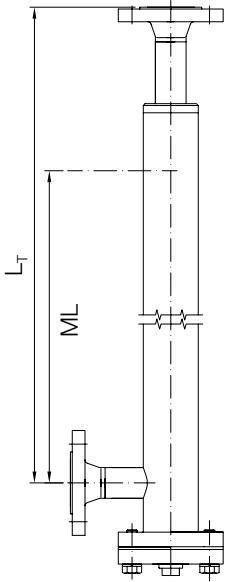
NBK... with transmitter option MK



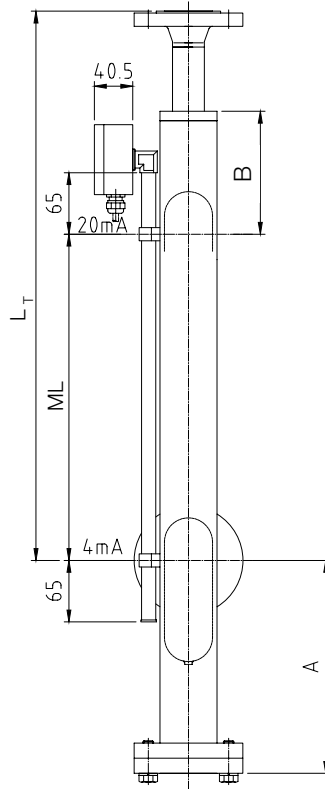
NBK... with transmitter display options AE/HE or AC/HC



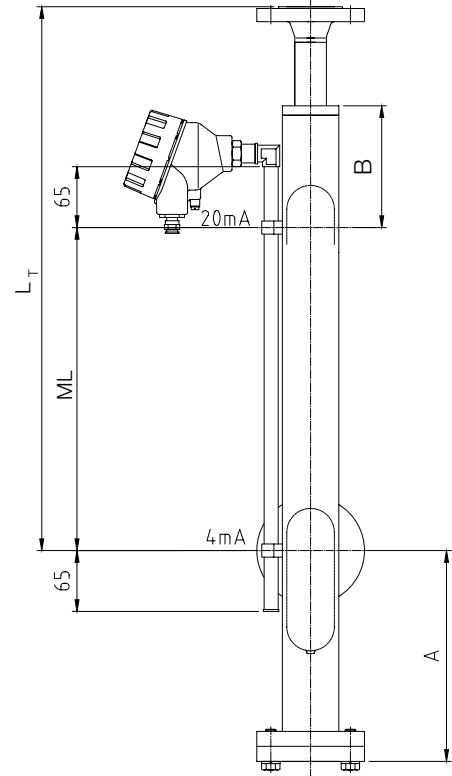
Process connection option ST



NBK... with transmitter model M option ST

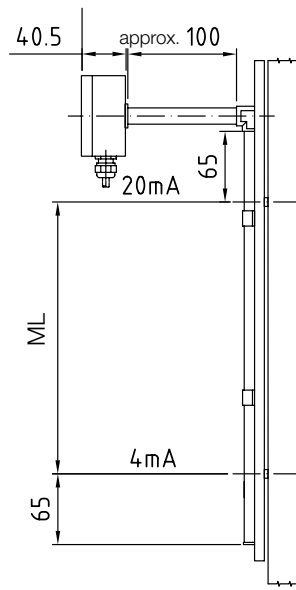
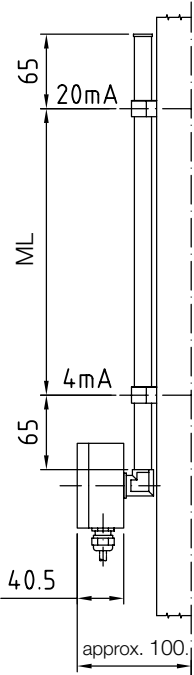


NBK... with transmitter model H/F option ST

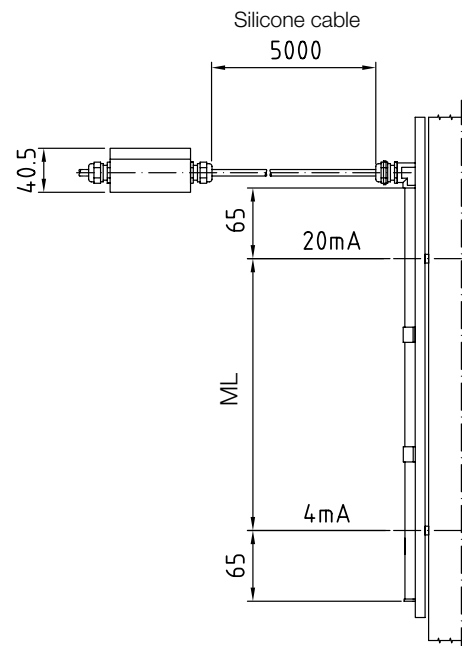


NBK... with transmitter options MS and ST

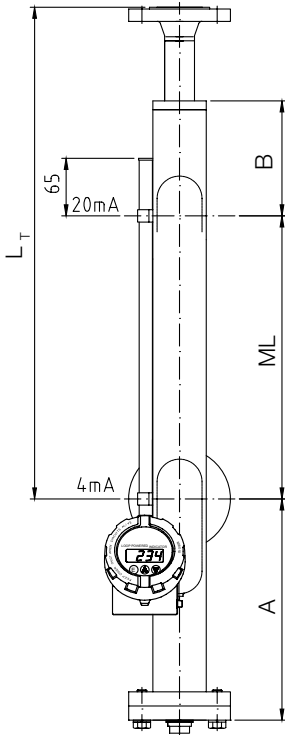
NBK... with transmitter options MK and ST



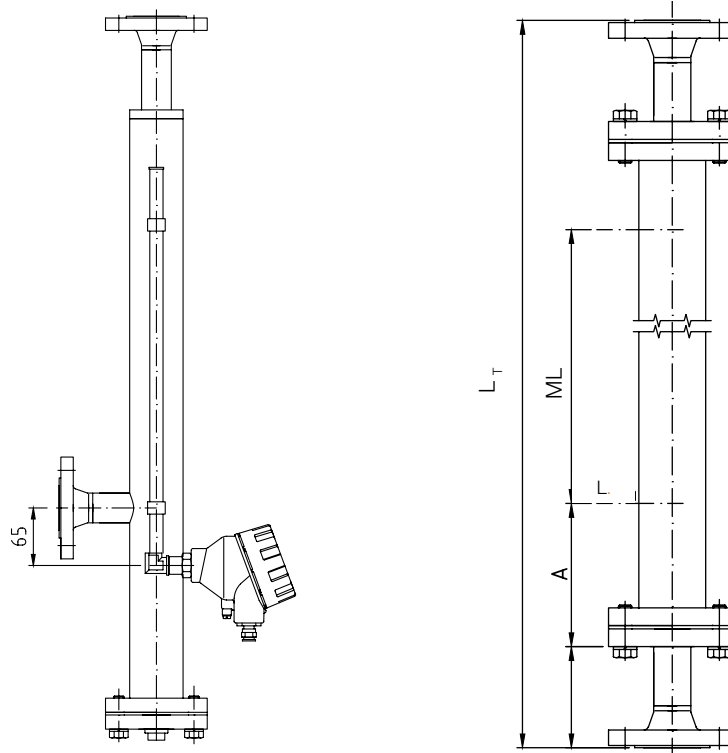
NBK... with transmitter options MK and ST



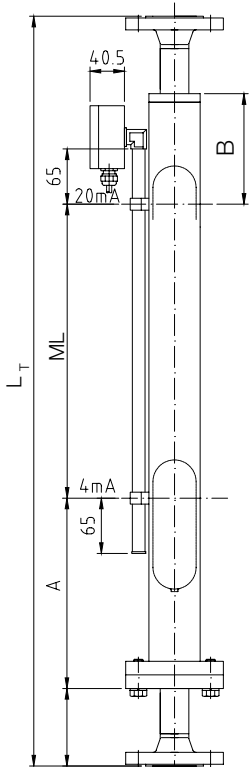
NBK... with transmitter
display options AE/HE or AC/HC and option ST



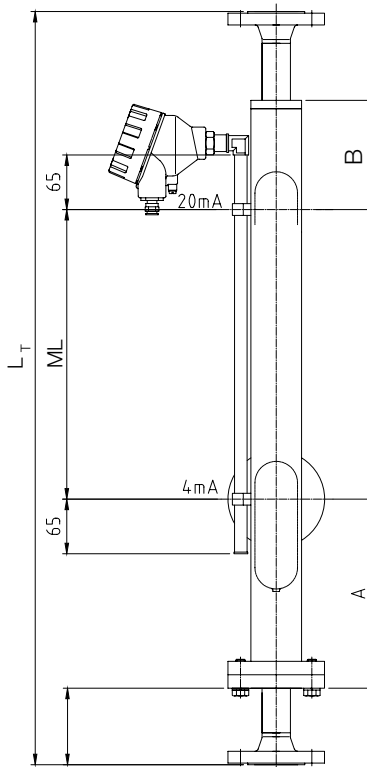
Process connection
option TT



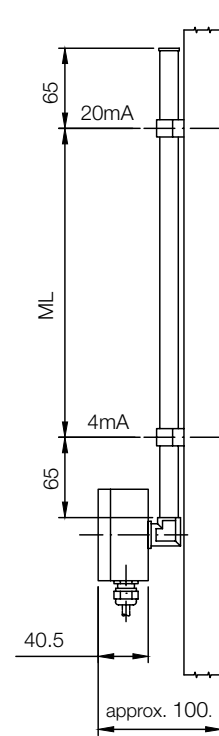
NBK... with transmitter
model M option TT



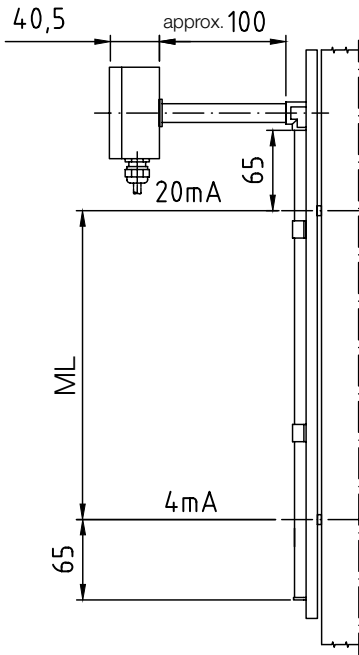
NBK... with transmitter
model H/F option TT



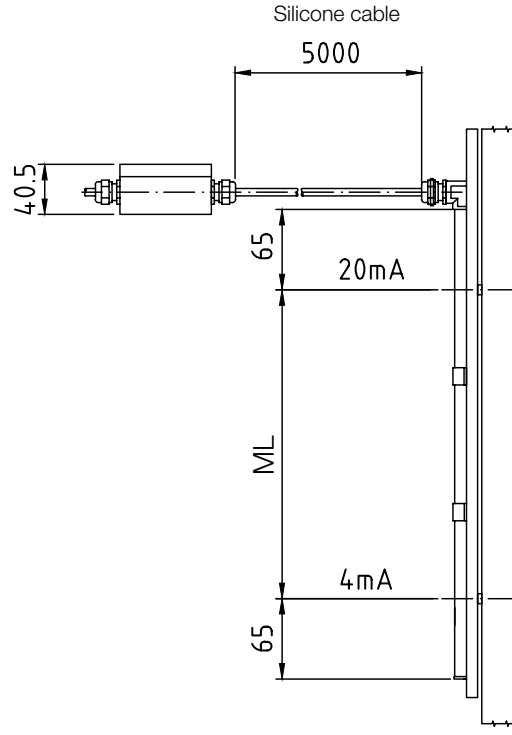
NBK... with transmitter
options MU and TT



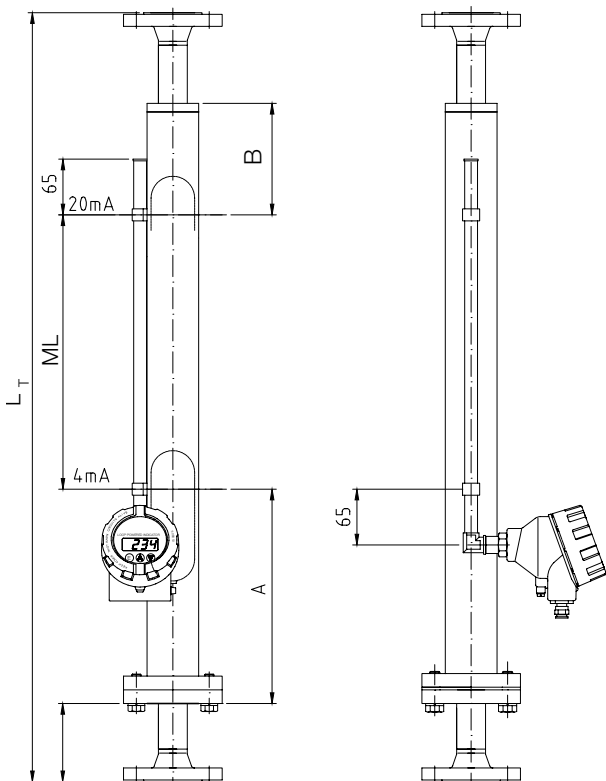
NBK... with transmitter options MS and TT



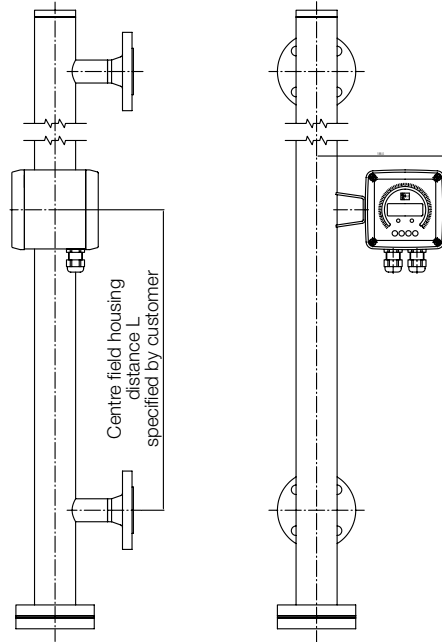
NBK... with transmitter options MK and TT



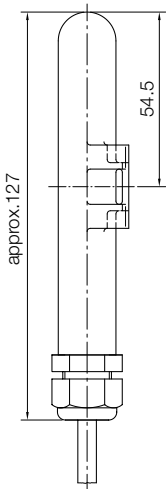
NBK... with transmitter display options AE/HE or AC/HC and option TT



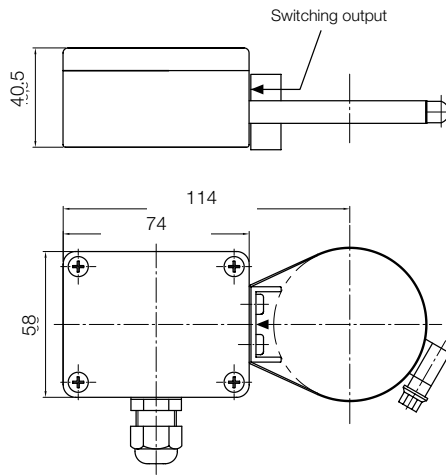
NBK-... with indicating unit ADI-1, option C



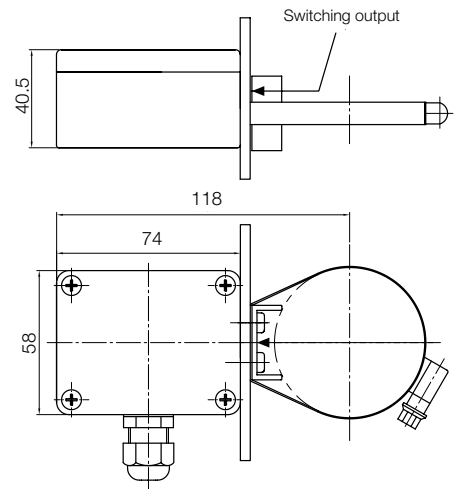
NBK-R



NBK-RT200



NBK-RT400



NBK-RV/RN

