



Magnetostrictive Level Transmitters

Expert Line



measuring
•
monitoring
•
analysing

NMB



HART
COMMUNICATION FOUNDATION

- 0.1 mm (0.004") or 1 mm (0.04") resolution
- Insertion length up to 15 m (50 ft)
- Rigid or flexible guide tube
- Plastic-coated version for chemicals
- 4...20 mA and HART® output
- Graphic display
- 99 point linearisation table
- Volume measurement
- Interface measurement
- ATEX certified variants
- IP67 (IP68)



NMB-
TF/-BF

NMB-C

NMB-T

NMB-G



NRM-300P



N2

KOBOLD companies worldwide:

AUSTRALIA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHINA, CZECHIA, FRANCE, GERMANY, GREAT BRITAIN, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, REPUBLIC OF KOREA, SPAIN, SWITZERLAND, THAILAND, TUNISIA, TURKEY, USA, VIETNAM

KOBOLD Messring GmbH
Nordring 22-24
D-65719 Hofheim/Ts.
Head Office:
+49(0)6192 299-0
+49(0)6192 23398
info.de@kobold.com
www.kobold.com

**Description**

NMB magnetostrictive level transmitters are an ideal solution for accurately measuring clean liquids. Their accuracy makes them an excellent choice for custody transfer measurement of liquids such as fuels, solvents, and alcohol derivatives.

Flexible tube units allow accurate measurements in tanks as high as 15 meters (50 ft). Plastic-coated models can be used with aggressive materials. Integrating the transmitter into a process control system is easy with intelligent signal processing, communication software, and a wide range of accessories.

Operating Principle

A float containing a magnetic disc moves along a guide tube with the specific magnetostrictive wire in it. A pulse generated by the electronics travels along the magnetostrictive wire.

At the point the pulse reaches the float's magnetic field, a torsion develops. Reflected from the torsion point, the pulse creates an acoustic wave that travels back along the wire.

The 4...20 mA output of the transmitter is proportional to the elapsed time between the excitation and detection.

Applications

- Oil, gas and chemical industry
- Fuels and gasoline products
- Pharmaceutical industry
- Alcohols and beverages, food industry
- Installation in bypass tubes possible
- Supplementary level transmitter for NBK bypass level indicator

Certificates

Ex II 1 G Ex ia IIB T6...T5 Ga

Ex II 2 G Ex db IIB T6...T5 Gb

Ex II 1/2 G Ex db ia IIB T6...T5 Ga/Gb

Technical Details

		Rigid probe	Flexible probe	Plastic coated rigid probe	Mini version with rigid probe
Measured process value		Liquid level, distance, volume			
Nominal length (L)		0.5...4.5 m (1.5...14.5 ft)	2...15 m (6.5...50 ft)	0.5...3 m (1.5...10 ft)	0.5...1.5 m (1.5...4.5 ft)
Material of the tube		1.4571 (316Ti) stainless steel		PFA-coated stainless steel	1.4571 stainless steel
Highest process pressure ¹⁾		25 bar (2.5 MPa, 363 psi)	16 bar (1.6 MPa, 232 psi)	3 bar (0.3 MPa, 43.5 psi)	10 bar (1 MPa, 145 psi)
Process temperature		-40...+90 °C (-40...+194 °F), see temperature diagram			
Standard float diameter / material ²⁾		Ø53.5x60 mm (Ø2x2.35") cylindrical / 1.4404 (316L)	Ø96 mm (Ø4") ball / 1.4435 (316L)	Ø76x87 mm (Ø3x3.45") cylindrical / PVDF / PP	Ø28x28 mm (Ø1 x 1.15") cylindrical 1.4404 (316L)
Medium density		See "Floats"			
Material of wetted parts		Titanium, Stainless Steel		PFA, PVDF, PP	Titanium, Stainless Steel
Ambient temperature		-40...+70 °C (-40...+158 °F), plastic housing: -25...+70 °C (-13...+158 °F), with display: -25...+70 °C (-13...+158 °F), Ex variant: see temperature diagram in the user's manual			
Output	Analogue	4...20 mA (limit values: 3.9...20.5 mA)			
	Digital	HART® (lowest loop resistance: 250 Ω)			
	Display	Graphic display NRM-300P			
Damping time		Adjustable 0...99 s			
Error indication		22 mA or 3.8 mA or holding			
Output load		$R_L = (U_s - 12.5 \text{ V})/0.02 \text{ A}$, U_s = supply voltage			
Supply voltage		12.5...36 V _{DC}			
Electrical protection		Class III			
Ingress protection		IP67, IP68 for output code "9" (4 m water column for 4 hours)			
Process connection		As per order code			
Electric connection		2x M20x1.5 plastic cable glands for Ø6...Ø12 mm (Ø0.23...0.47") cable, + 2x internally threaded ½" NPT connection for protective pipes for 0.5...1.5 mm² (AWG20...15) wire cross section, IP68 protection: up to 20 m (65 ft), LiY-CY 6x0.5 mm (0.24x0.02"), fitted with 500 V cable			
Housing		Plastic (PBT) or painted aluminium or stainless steel			
Weight		1.7 kg (3.75 lb) + m. probe: 0.6 kg/m (0.4 lb/ft)	2.9 kg (6.4 lb) + m. probe: 0.3 kg/m (0.2 lb/ft) + counterweight 3.5 kg (7.7 lb)	1.7 kg (3.75 lb) + m. probe: 0.7 kg/m (0.45 lb/ft)	1.7 kg (3.75 lb) + m. probe: 0.6 kg/m (0.4 lb/ft)

¹⁾ Depends on selected float, with sliding sleeve connection the highest process pressure is 3 bar (0.3 MPa)

²⁾ Requested float version must be specified in the order



Measurement Details





	1 mm resolution	0.1 mm resolution
Resolution ³⁾	1 mm (0.04")	0.1 mm (0.004")
Nonlinearity ^{3) 4)} (up to 10 m [32.8 ft] order length)	±2 mm (±0.08") or ±0.02% F.S. whichever is greater	±1 mm (0.04") or ±0.01% F.S. whichever is greater
Nonlinearity ^{3) 4)} (above 10 m [32.8 ft] order length)	±3 mm (±0.12") or ±0.02% F.S. whichever is greater	
Hysteresis ⁵⁾	±1 mm (±0.04")	±0.25 mm (±0.01") (up to 10 m [32.8 ft] length)
		±1 mm (±0.04") (above 10 m [32.8 ft] length)
Zero span (in LEVEL mode)	Anywhere within the active range	
Measuring Range (reducing)	Minimum distance: 200 mm (7.87"); maximum distance: as per probe length	
Temperature error	0.04 mm / 10 °C (0.0015" / 50 °F) between (–25...+50 °C [–13...+122 °F])	
Current Output Properties	Resolution: 2 µA, accuracy: 10 µA, temperature error: 200 ppm/°C	

³⁾ For displayed and HART® transmitted values

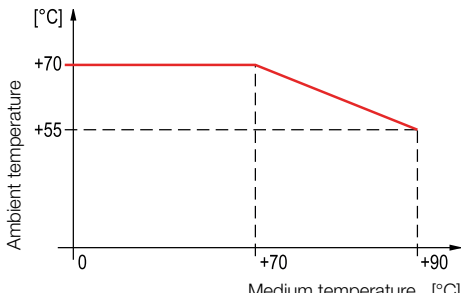
⁴⁾ Under reference conditions, accuracy data only valid in case of factory setting. When used with a bypass float, the values given are not valid. With factory-calibrated float for NBK, accuracy 5 mm.

⁵⁾ In case of a different factory setting the accuracy data is not valid!

Technical Description concerning explosion safety

Type	NMB-xxxxxxx5x NMB-xxxxxxx6x NMB-xxxxxxx7x NMB-xxxxxxx8x	NMB-xxxxxxxCx NMB-xxxxxxxDx	NMB-xxxxxxxAx NMB-xxxxxxxBx	NMB-xxxxxxx9x
Ex marking (ATEX)	 Ex ia IIB T6...T5 Ga 0 ... 18 m	 Ex db ia IIB T6...T5 Ga/Gb 0 ... 10 m	 Ex db IIB T6...T5 Gb 0 ... 10 m	 Ex ia IIB T6...T5 Ga 0 ... 18 m
Ex marking (IECEx)	Ex ia IIB T6...T5 Ga 0 ... 18 m	Ex db ia IIB T6...T5 Ga/Gb 0 ... 10 m	Ex db IIB T6...T5 Gb 0 ... 10 m	-
Cable entry	M20x1.5 cable gland	M20x1.5 Certified "Ex d" metal cable gland		-
Cable outer diameter	Ø 7 ... 13 mm	Ø 9 ... 11 mm		
Ex power supply, Intrinsically safety data	$U_i = 30 \text{ V}$, $I_i = 140 \text{ mA}$, $P_i = 1 \text{ W}$, $C_i \leq 15 \text{ nF}$, $L_i \leq 200 \mu\text{H}$		$U_i: 12.5 \dots 36 \text{ V}_{\text{DC}}$	$U_i = 30 \text{ V}$, $I_i = 140 \text{ mA}$, $P_i = 1 \text{ W}$, $C_i \leq 25 \text{ nF}$, $L_i \leq 210 \mu\text{H}$
Comment	The NMB-xxxxx5xx9x type instrument is IP68-rated. The cover, cable gland, cable, and the plug are glued and cannot be opened!			

Temperature limits

Device measuring tube version	Temperature class	Ambient temperature*	Medium temperature
Rigid probe	T6	-40 ... +70 °C	+80 °C
Flexible probe			+70 °C
Rigid probe	T5	-40 ... +55 °C	+90 °C
Comment	* In the case of models equipped with a display, the lower ambient temperature is limited to -25 °C.		
			

Wiring



Order Details NMB (Example: NMB-T RR25 A 051 S)

Model	Design	Probe Type / Process connection	Housing	Probe length
NMB-	T = Transmitter B¹⁾ = Transmitter + Display E = Transmitter with PFA-coated probe G¹⁾ = Transmitter with PFA-coated probe + display M²⁾ = Transmitter mini C²⁾ = Transmitter mini + display	For NMB-T/-B RR25 = rigid / G 1 RR50 = rigid / G 2 RN25 = rigid / 1" NPT RN50 = rigid / 2" NPT RT65 = rigid / 2½" TriClamp RT80 = rigid / 3" TriClamp RT1H = rigid / 4" TriClamp R00U³⁾ = rigid / without (for sliding sleeve) FR50⁴⁾ = flexible / G 2 FN50⁴⁾ = flexible / 2" NPT	A = Aluminium, housing position "A" L = Aluminium, housing position "B" P = Plastic, housing position "A" (not for Ex) F = Plastic, housing position "B" (not for Ex) E = St. Steel, housing position "A" G = St. Steel, housing position "B"	05 = 0.5 m 06 = 0.6 m ... 15 = 1.5 m (max. length with rigid probe, mini version) ... 17 = 1.7 m ... 21 = 2.1 m ... 30 = 3.0 m (max. length with PFA-coated rigid probe) ... 45 = 4.5 m (max. length with probe type "rigid") ... A0 = 10 m A1 = 10.1 m ... A9 = 10.9 m B0 = 11.0 m ... C0 = 12.0 m ... D0 = 13.0 m ... E0 = 14.0 m ... F0 = 15.0 m (max. length with probe type "flexible")
		For NMB-E/-G R00U³⁾ = rigid / without (for sliding sleeve)		
		For NMB-M/-C RR25 = rigid / G 1 RN25 = rigid / 1" NPT RT40 = rigid / 1½" TriClamp RT50 = rigid / 2" TriClamp RT65 = rigid / 2½" TriClamp RT80 = rigid / 3" TriClamp RT1H = rigid / 4" TriClamp		

Electrical output / Resolution	Float options
1 = 4 ... 20 mA / 0,1 mm 2 = 4 ... 20 mA / 1 mm 3 = 4 ... 20 mA + HART® / 0.1 mm 4 = 4 ... 20 mA + HART® / 1 mm 5 = 4 ... 20 mA / 0.1 mm / Ex ia 6 = 4 ... 20 mA / 1 mm / Ex ia 7 = 4 ... 20 mA + HART® / 0.1 mm / Ex ia 8 = 4 ... 20 mA + HART® / 1 mm / Ex ia A⁶⁾ = 4 ... 20 mA / 0.1 mm / Ex d B⁶⁾ = 4 ... 20 mA + HART® / 0.1 mm / Ex d C⁶⁾ = 4 ... 20 mA / 0.1 mm / Ex d + Ex ia D⁶⁾ = 4 ... 20 mA + HART® / 0.1 mm / Ex d + Ex ia	For NMB-TR/BR S = Standard float (see table for "floats") 2 = Float Ø124 mm stainless steel (1.4401) ball float (for min. 0.4 kg/dm³ liquids) 3 = Float Ø53.5 mm titanium float (for min. 0.55 kg/dm³ liquids) 4 = Float Ø50x100 mm titanium float (min. 0.45 kg/dm³) 6 = Float Ø53.5 mm st. st. 1.4404, min. 0.8 kg/dm³ 0⁵⁾ = no float (only for assembly with NBK, includes 2x mounting brackets) For NMB-TF/BF 2 = Float Ø124 mm stainless steel (1.4401) ball float (for min. 0.4 kg/dm³ liquids) 4 = Float Ø50x100 mm titanium float (min. 0.45 kg/dm³) For NMB-E/G S = Standard float (see table for "floats") 5 = Float made of PP

¹⁾ Standard display in Position "A"

²⁾ Insertion length max. 1500 mm

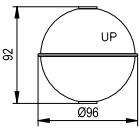
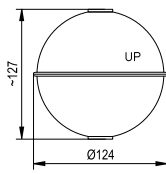
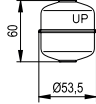
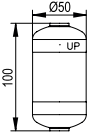
³⁾ If not used with NBK, optional threaded sliding sleeve should be ordered separately

⁴⁾ Insertion length max. 10 000 mm. Not for NMB-M/-C

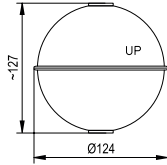
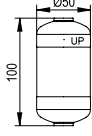
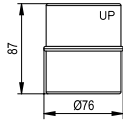

⁵⁾ Probe length NMB = (150 + ML + B) mm, see sketch on following page and data sheet NBK for details of dimensions.

⁶⁾ Not for NMB-M/-C

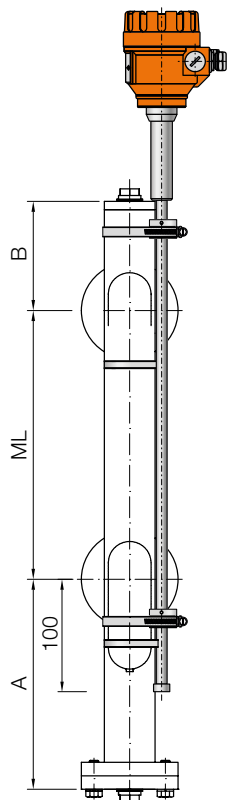
Float selection

Type	for NMB-TR/BR				
	Standard	Code "2"	Code "3" ¹⁾	Code "6" ¹⁾	Code "4" ¹⁾
Dimensions [mm]					
Medium Density (min.)	0.55 kg/dm ³	0.4 kg/dm ³	0.55 kg/dm ³	0.8 kg/dm ³	0.45 kg/dm ³
Material	1.4435	1.4401	Titan	1.4404	Titan
Medium pressure	16 bar		25 bar		16 bar

¹⁾ Designed for min. 2" process connection.

Type	for NMB-TF/BF		for NMB-E/G		for NMB-M
	Code "2"	Code "4" ¹⁾	Standard	Code "5"	Standard
Dimensions [mm]					
Medium Density (min.)	0.4 kg/dm ³	0.45 kg/dm ³	0.7 kg/dm ³	0.4 kg/dm ³	0.8 kg/dm ³
Material	1.4401	Titan	PVDF	PP	1.4404
Medium pressure	25 bar	16 bar	3 bar		10 bar


Sketch for mounting with NMB





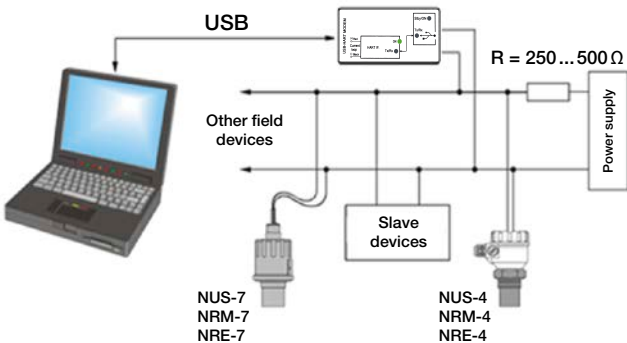
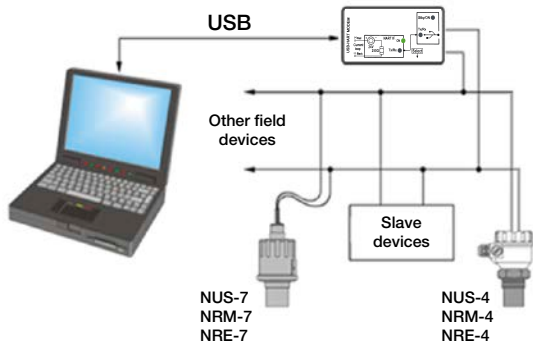
Order Details Connections NMS/NMB (Example: ZUB-NMS/B CER25)

Model	Connection/ Material/ Size
ZUB-NMS/B	For NMS-S/NMB-TR/BR
	CER25 = Sliding sleeve, 1.4571, 1" BSP
	CER50 = Sliding sleeve, 1.4571, 2" BSP
	CEN25 = Sliding sleeve, 1.4571, 1" NPT
	CEN50 = Sliding sleeve, 1.4571, 2" NPT
	For NMS-K/NMB-E/G
	CPR25 = Sliding sleeve, PVDF, 1" BSP
	CPN25 = Sliding sleeve, PVDF, 1" NPT
	F6F80 = PP flange FF DN80, PN16 + 1" BSP sliding sleeve model CPR25 must be ordered
	F6F1H = PP flange FF DN100, PN16 + 1" BSP sliding sleeve model CPR25 must be ordered

Accessories

Code	Description	Image
NRM-300P	Plug-in graphical display module	
NUS-NTB-NRM-SW	Configuration software for remote programming with PC (FREE download)	

Order Details HART® modem

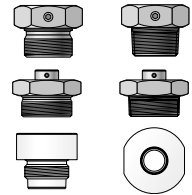
Order no. HART® modem: HARTCOM-0	Order no. HART® modem: HARTCOM-1
with external 24 V _{DC} transmitter supply and 250 Ω resistor	Loop Powered 24V _{DC} and 250Ω integrated resistor
	
Wiring examples	
	

Download of configuration software NUS-NTB-NRM-SW at www.kobold.com



Magnetostrictive Level Transmitters Model NMB

Process Connections*

Code	Description	Image
ZUB-NMS/B...	Sliding sleeve 1.4571 (316Ti) or PVDF: 1", 2" BSP/ NPT process connection	

* The process connections and special seals are ordered separately and must be specified in the text part of the order

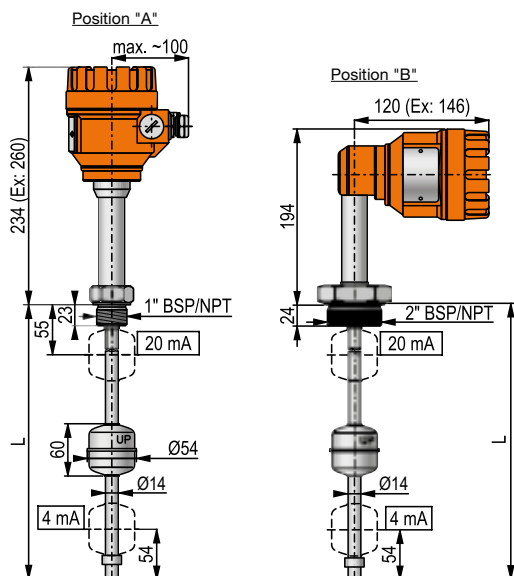
Order Details ZGF (Example: ZGF-A1 D51)

Model	Version	Standard / Flange Material/ Form
ZGF = Flange as accessory e.g. for NRE	A = Flat Face (A) T = Raised Face (B1) C = Tongue (C) D = Groove (D)	1 = DIN / Carbon steel / EN 1092 B1 2 = DIN / Stainless steel / EN 1092 B1 3 = DIN / Polypropylene / EN 1092 A 5 = ANSI / Carbon Steel / ASME B16.5 RF 6 = ANSI / Stainless steel / ASME B16.5 RF 7 = ANSI / PP / ASME B16.5 FF A = JIS / Carbon steel / B 2220 RF B = JIS / Stainless steel / B 2220 RF C = JIS / PP / B 2220 FF

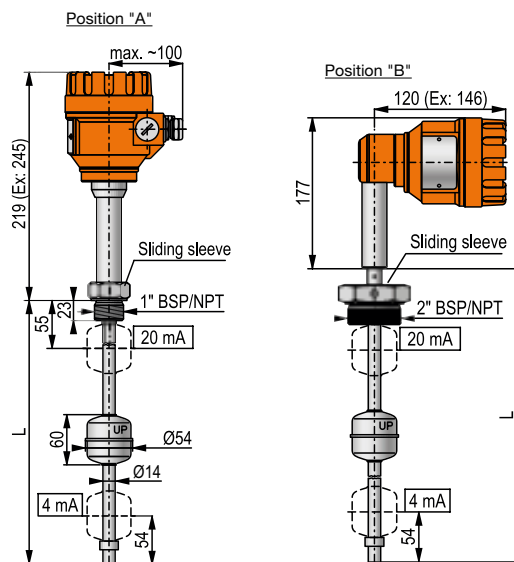
Process connection DIN / ANSI / JIS	Nominal pressure DIN / ANSI / JIS	Instrument side connection
D = DN15 / ½" / 15A A = DN20 / ¾" / 20A B = DN25 / 1" / 25A C = DN32 / 1¼" / 32A 7 = DN40 / 1½" / 40A 0 = DN50 / 2" / 50A 1 = DN65 / 2½" / 65A 2 = DN80 / 3" / 80A 3 = DN100 / 4" / 100A 4 = DN125 / 5" / 125A 5 = DN150 / 6" / 150A 6 = DN200 / 8" / 200A 8 = DN250 / 10" / 250A 9 = DN300 / 12" / 300A	5 = PN6 / - / 5K 6 = PN10 / - / 10K 1 = PN16 / 150 psi / 16K 2 = PN25 / 300 psi / 30K 3 = PN40 / 600 psi / 40K 4 = PN63 / 900 psi / 63K	1 = ¼" BSP C = ½" BSP D = ½" NPT E = ¾" BSP 4 = ¾" NPT 2 = 1" BSP 5 = 1" NPT 7 = 1½" BSP 8 = 1½" NPT 3 = 2" BSP 6 = 2" NPT 9 = M20x1.5 J = Weldable to NGS (stainless steel only) L = Weldable to NRM-4/ NRE-4 (stainless steel only)

Dimensions [mm]

Rigid probe with threaded process connection



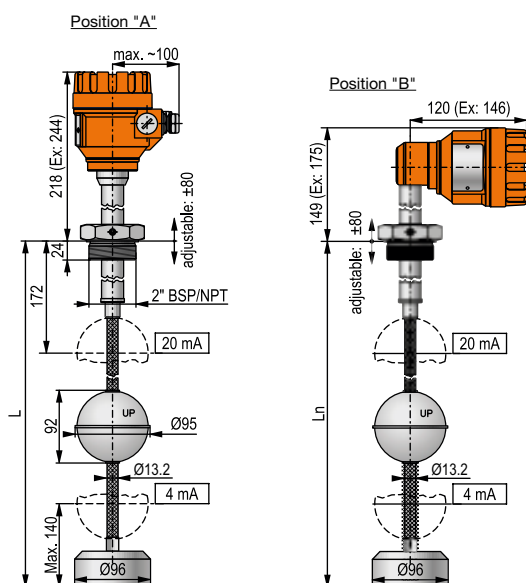
Rigid probe without process connection ¹⁾²⁾



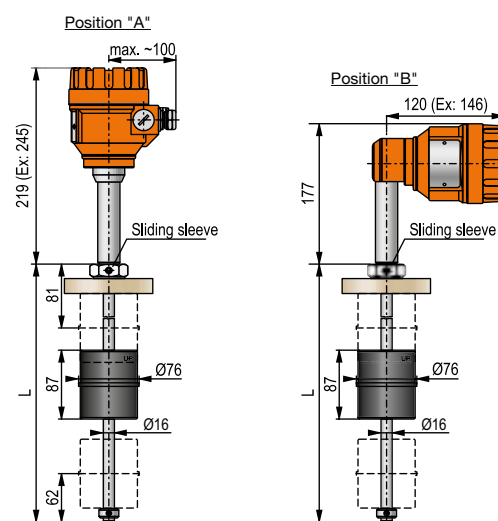
¹⁾ Sliding sleeve and flange to be ordered separately

²⁾ NMB-T(B)R00L is without float and without process connection for NBK

Flexible probe with sliding sleeve and counterweight



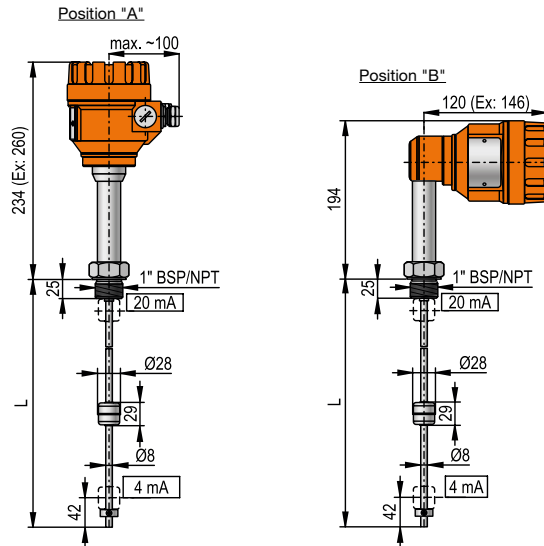
Rigid probe with plastic coating without process connection ¹⁾



¹⁾ Sliding sleeve and flange to be ordered separately

Dimensions [mm] (cont'd)

Mini type rigid probe transmitter with threaded process connection

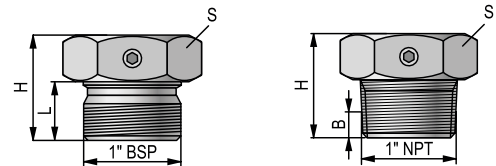


Accessories

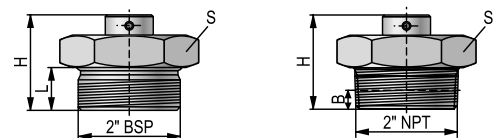
Sliding Sleeve

	Material	Proc. conn.	Dimensions			
			S	H	L	B
ZUB-NMB/S-CER25	1.4571 (316Ti)	1" BSP	41 mm (1.61")	36 mm (1.42")	20 mm (0.79")	-
ZUB-NMB/S-CER50		2" BSP	60 mm (2.36")	55 mm (2.17")	24 mm (0.94")	-
ZUB-NMB/S-CEN25		1" NPT	41 mm (1.61")	37 mm (1.46")	-	10 mm (0.39")
ZUB-NMB/S-CEN50		2" NPT	60 mm (2.36")	44.5 mm (1.75")	-	11 mm (0.43")
ZUB-NMB/S-CPR25	PVDF	1" BSP	46 mm (1.81")	42 mm (1.65")	22 mm (0.87")	-
ZUB-NMB/S-CPN25		1" NPT	-	-	25 mm (0.98")	-

ZUB-NMB/S-CER25/-CEN25



ZUB-NMB/S-CER50/-CEN50



ZUB-NMB/S-CPR25

