NIVOTRACK

MAGNETOSTRICTIVE LEVEL TRANSMITTER

- **1 mm or 5 mm accuracy**
- **Rigid or flexible guide tube**
- **Intrusion length maximum 10 m**
- **Stainless steel or plastic versions**
- **4 … 20 mA and HART capability**
- **Plug in field display module**
- **ATEX certified versions**
- **Tank content measurement**

ABOUT NIVOTRACK

NIVOTRACK M-300 series working on the magnetostrictive principle is high accuracy float level transmitter.

Due to its high temperature and pressure rating they can also be used for level measurement of production technologies.

Its high precision renders the NIVOTRACK suitable for custody transfer measurement of valuable liquids such as fuels, solvents alcohol derivatives etc.

Most suitable applications are with liquids free of solid particles and with low viscosity both in ordinary and hazardous locations.

Plastic coated versions of the NIVOTRACK substantially expand the field of application by a wide range of aggressive materials.
Units with flexible tube do not only make this accurate measurement for higher tanks possible, but offer a more convenient way for delivery and installation.

Weight at the bottom end of the flexible tube provides for the spanning and fixing of the guide. The spanning weight is integral part of the NIVOTRACK.

OPERATING PRINCIPLE

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. When the pulse reaches the float's magnetic field, a twist develops in the wire.

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.

Output fluctuation caused by surface waving can be eliminated by modification of damping.

TECHNICAL DATA

TYPE		RIGID TUBE VERSION M□A..., M□C... M□D..., M□G... MTU..., MBU...	FLEXIBLE TUBE VERSION M□K... M□N...	RIGID PLASTIC VERSION MEU... MGU...
Measured process values		Level		
Nominal length (L)		0,5 m ... 4,5 m	2 m ... 10 m	0,5 m ... 3 m
Material of the tube		Stainless steel: 1.4571 (DIN)		PFA coated st. st.
Max. medium pressure*		2,5 MPa (25 bar)	1,6 MPa (16 bar)	0,3 MPa (3 bar)
Medium temperature		-40 °C ... +130 °C see temperature diagram and chart		
Linearity with dry calibration		± 1 mm		
Resolution		1 mm or 5 mm		
Temperature coefficient		0,04 mm / °C		
Range (M)		Maximum: see calculating formula under DIMENSIONS		Minimum: 200 mm
Zero span		Anywhere within the range		
Float diameter / material**		∅ 53,5 x 59 mm cylinder / 1.4571 or ∅ 95 mm ball / 1.4571 *		∅ 76 x 87 mm cylinder / PVDF
Medium density		min. 0.8 g/cm³; with ball float ∅ 95 mm: min. 0.5 g/cm³		
Material of wetted parts		Stainless steel: 1.4571 (DIN)		PFA + PVDF
Ambient temperature		-40 ºC ... +70 ºC see temperature diagram and chart		
Outputs	Analogue	4…20 mA (limit values: 3,9 ... 20,5 mA)		
	Serial comm.	HART interface (close end resistor 250 Ohm)		
	Display	with SAP-201 6 digits (7 mm character) icon, bargraph		
Damping		programmable 10 s, 30 s, 60 s or 0 ...60 s		
Error indication		By the current output: 3.8 mA or 22 mA		
Output load		Rs= (Us-12V) / 0.02 A, Us = voltage of the power supply		
Power supply		12 V ... 36 V DC		
Electric protection		Class III		
Ingress protection		IP 67		
Process connection		According to the order codes		
Electric connection		Cable gland M 20 x1,5 cable: ∅ 6 ...∅12 mm, wire cross section: max.1,5 mm²		
Housing		Aluminium (powder paint coated) or plastic (PBT fibre-glass reinforced, flame retardant)		
Mass		1,7 kg + tube: 0,6 kg/m	2,9 kg + tube: 0,3 kg/m	1,7 kg + tube: 0,7 kg/m

**Max. medium pressure for ball float 1.6 MPa (16 bar) ** Float dimensions should be specified with ordering*

SPECIAL DATA FOR EX CERTIFIED MODEL

TYPES	M □□-3 □□-6Ex / 8Ex	M □□-3 □□-A Ex / B Ex	M □□-3 □□-C Ex / D Ex
Ex marking (depending on nominal probe length)	⟨Ex⟩ II 1 G EEx i_a IIB T6...T4 0,5...5m	⟨Ex⟩ II 2 G EEx d IIB T6...T4	⟨Ex⟩ II 1/2 G EEx d i_a IIB T6...T4 0,5...5m
	⟨Ex⟩ II 1 G EEx i_a IIA T6...T4 5...10m		⟨Ex⟩ II 1/2 G EEx d i_a IIA T6...T4 5...10m
Electric data for power supply and signal circuit	U_{imax} = 30 V I_{imax} = 140 mA P_{imax} = 1 W C_i < 15 nF L_i < 200 μH		
Electric protection	Class III		
Ingress protection	IP 67		
Process connection	According to the order code		
Cable gland	M 20 x1,5 cable gland		
Cable	Ø 7 ...13 mm	Ø 9 ...11 mm	
Wire	Wire cross section: 0,5...1,5 mm²		
Housing	Aluminium paint coated		

** Maximum medium pressure for ball float 1.6 MPa (16 bar)*

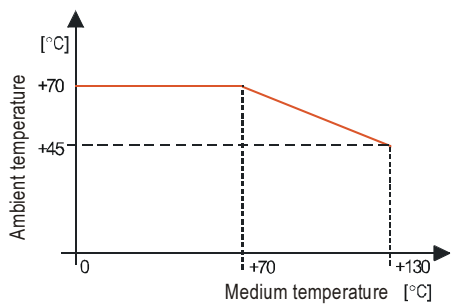
TEMPERATURE CLASS

HIGH TEMPERATURE LIMIT:

TYPE	TEMPERATURE CLASS	MAX AMBIENT EMPERATURE	MAX MEDIUM-HŐMÉRSÉKLET
M□A -..., M□C – M□D -..., M□G -...	T6	+70 °C	+80 °C
M□K -..., M□N -...			+70 °C
MEU -..., MGU -...			+80 °C
M□A -..., M□C -... M□D -..., M□G -...	T5	+59 °C	+95 °C
MEU -..., MGU -...			+95 °C
M□A -..., M□C -... M□D -..., M□G -...	T4	+45 °C	+130 °C
MEU -..., MGU -...			+130 °C

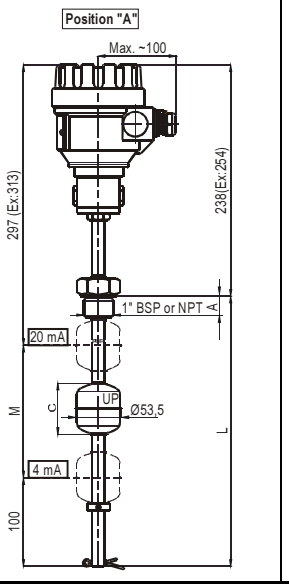
LOW TEMPERATURE LIMIT:

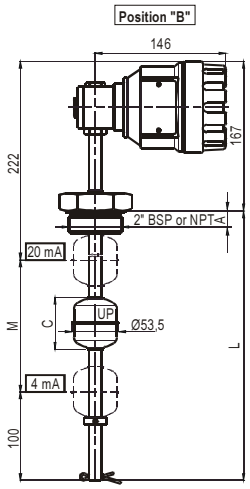
TYPE	EX MARKING		
	ia	d	d+ia
MT□ -..., ME□ -...	- 40 °C	- 40 °C	- 40 °C
MB□ -..., MG□ -...	- 25 °C	- 20 °C	- 20 °C



DIMENSIONS

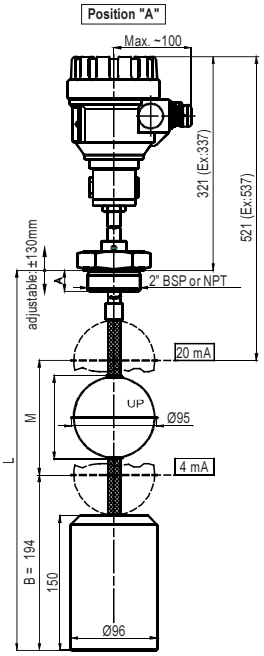
RIGID TUBE TRANSMITTER PROBE AND THREADED PROCESS CONNECTION
M□A ... M□C M□D ... M□G

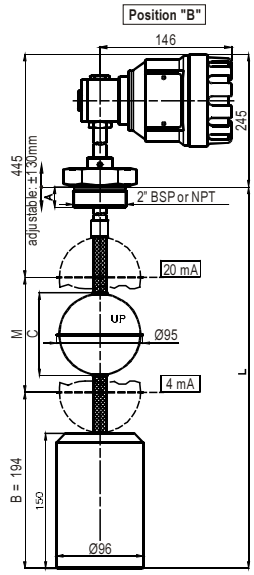




$M_{max} = L - 100 - A - C/2$

FLEXIBLE TUBE TRANSMITTER PROBE WITH SLIDING SLEEVE
M□K... M□N... (FLANGE AVAILABLE)

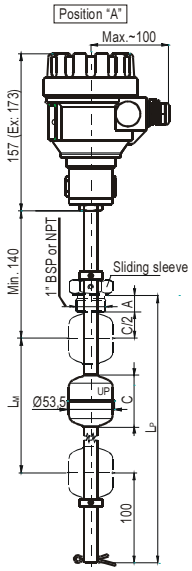


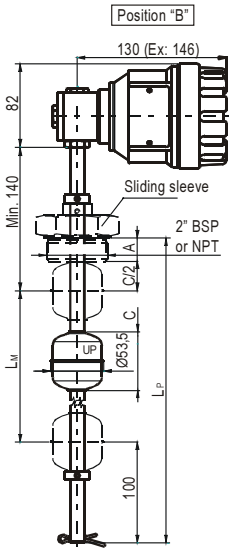


$M_{max} = L - 342 - A - C/2$

L = nominal length *M = Measurement range* *C = Float height* ***A – C/2** = Upper dead zone* ** See float size in the Technical Data*

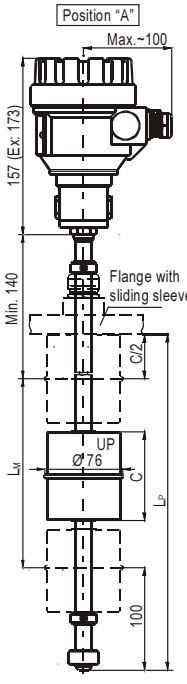
RIGID TUBE TRANSMITTER PROBE WITHOUT PROCESS CONNECTION
MTU... MBU... (SLIDING SLEEVE AVAILABLE)

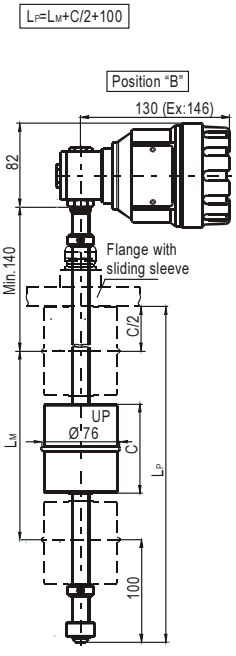




$L_{Max} = L_p - 100 - A - C/2$

RIGID TUBE PLASTIC VERSION WITHOUT PROCESS CONECTION
MEU... MGU... (FLANGE AVAILABLE)





$L_{Max} = L_p - 100 - C/2$

FLOAT SIZE

TYPE	Ø 53,5 FLOAT	Ø 95 BALL FLOAT	Ø 76 PLASTIC FLOAT
„C" float height	59 mm	88 mm	87 mm

TRANSMITTER LENGTH

TYPE	RIGID PROBE		RIGID PROBE PFA COATED	FLEXIBLE PROBE
	WITH CONNECTION	W/O CONNECTION		
Length to order	$L_R = L$	$L_R = L_P - 100 - A - C/2$	$L_R = L_P - 100 - C/2$	$L_R = L$

mba3s06a0603a

INSTALLATION

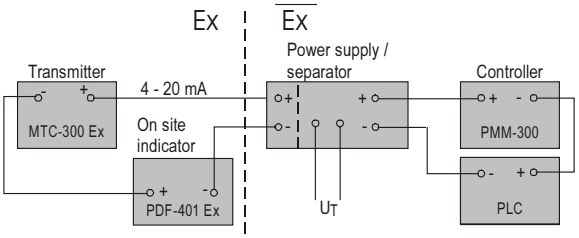
The ∅ 53,5 mm float can be inserted through the free hole of the 2" BSP process connection. Devices with bigger floats (∅ 95 mm ball or ∅ 72 mm cylinder) require flange with a minimum dimension of DN 100, PN 16.

To achieve the greatest possible range the nominal length of the unit should preferably be as long as possible but the probe must not reach the bottom.

WIRING

The 2-wire transmitters are powered with 12 ... 36 V AC. The maximum load of the unit is depending on the operating voltage of the power supply. (R_{max} = 600 Ohm in the case of 24 V DC).

The unit should be grounded effectively with the maximum resistance of 1 Ohm. The grounding of the unit should preferably separated from the grounding system of the plant.



TYPICAL ARRANGEMENT

PROGRAMMING

The transmitter can be programmed in three different ways.

- On site programming without plug-in display module SAP-201, changing level in the tank and measuring the output current.
- On site programming with plug-in display module SAP-201, changing level in the tank not necessary
- Remote programming of the transmitter with HART using PC or universal controller MULTICONT PRW-100

EX PROTECTION

Ex marking:

ATEX II 1G EExia IIB T6...T4
ATEX II 1G EExia IIA T6...T4
ATEX II 2G EExd IIB T6...T4
ATEX II 1/2 G EExdia IIB T6...T4
ATEX II 1/2 G EExdia IIA T6...T4

For temperatures see Technical Data.

CONDITIONS OF EX APPLICATION

– Intrinsically safe units can only be powered by duly certified EEx ia current loop in accordance with values as per Technical data.
– Plastic probe units tend to statical charging thus:
- they can only be used to conductive mediums with a specific resistance not exceeding 10^4 Ωm even at the most unfavourable place and under the most unfavourable conditions
- filling and emptying rate should be selected in accordance with the relevant feature of the material..

ORDER CODES (NOT ALL COMBINATIONS AVAILABLE)

NIVOTRACK M ☐☐ – ☐☐☐ – ☐

FUNCTION	CODE
Transmitter	T
Tx + display	B
Tx plastic coated	E
Tx plastic coated + display	G

PROBE / PROCESS CONNECTION	CODE
Rigid 1" BSP	A
Rigid 2" BSP	C
Rigid 1" NPT	D
Rigid 2" NPT	G
W/O process conn.	U **
Flexible 2" BSP	K
Flexible 2" NPT	N

HOUSING MATERIAL	CODE
Aluminium	3
Plastic	4

CODE	INSERTION LENGTH		CODE
0	0 m	0 m	0
1	1 m	0,1 m	1
2	2 m	0,2 m	2
3	3 m	0,3 m	3
4	4 m	0,1 m	4
5	5 m	0,5 m	5
6	6 m	0,6 m	6
7	7 m	0,7 m	7
8	8 m	0,8 m	8
9	9 m	0,9 m	9
A	10 m		

OUTPUT / FLOAT / RESOLUTION / APPROVAL	CODE
4...20 mA / 1x float	2
4...20 mA, HART / 1x float	4
4...20 mA / 1x float / Eex ia	6
4...20 mA, HART / 1x float / Eex ia	8
4...20 mA / 1x float / Eex d	A
4...20 mA, HART / 1x float / Eex d	B
4...20 mA / 1x float / Eex d + Eex ia	C
4...20 mA, HART / 1x float / Eex d + Eex ia	D
4...20 mA, HART / 1x float / 5 mm resolut.	N

* Head position of A or B is to define with ordering
** Process connection is to be ordered separately

ACCESSORIES TO ORDER

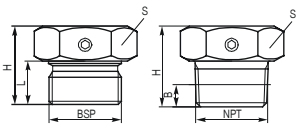
FLANGES M F T – ☐☐☐–☐

STANDARD / MATERIAL	CODE
DIN / 1.4571	2
DIN / PP	3
DIN / steel + PTFE	4
ANSI / 1.4571	6
ANSI / PP	7
ANSI / A38 + PTFE	8

DIMENSION DIN ANSI	CODE
DN 65 2½"	1
DN 80 3"	2
DN 100 4"	3
DN 125 5"	4
DN 150 6"	5
DN 200 8"	6

PRESSURE	CODE
PN 16 / 150 psi	1
PN 25 / 300 psi	2

MIDDLE FACILITY	CODE
1" BSP	2
2" BSP	3
1" NPT	5
2" NPT	6



STAINLESS STEEL SLIDING SLEEVES

TYPE	THREAD	S (mm)	H (mm)	L (m)	B (mm)
MBH-105-2M-300-00	1" BSP	41	36	20	
MBK-105-2M-300-00	2" BSP	70	43	24	
MBL-105-2M-300-00	1" NPT	41	38		~10
MBN-105-2M-300-00	2" NPT	70	43		~11

PLASTIC SLIDING SLEEVES

TYPE	THREAD	S (mm)	H (mm)	L (m)	B (mm)
MGH-105-2M-300-00	1" BSP	46	42	22	
MGK-105-2M-300-00	2" BSP	75	59	22	
MGL-105-2M-300-00	1" NPT	46	45		~10
MGN-105-2M-300-00	2" NPT	75	61		~11

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