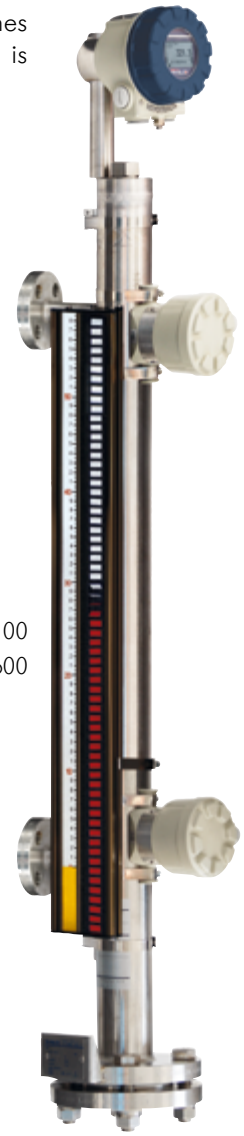
NIVOFLIP is a bypass level indicator for pressurized vessels with up to 5.5 m flange distance containing liquids. The device has the international PED *(Pressure Equipment Directive)* certificate, so it can be used for level indication of pressurized vessels up to 100 bar process pressure. The high-temperature versions are applicable up to +250 °C process temperature. **NIVOFLIP** can be equipped with optional limit switches or with **NIVELCO**'s **NIVOTRACK** high-precision magnetostrictive level transmitter if level transmission is needed.

FEATURES

- Clearly visible display
- Measuring range: 500…5500 mm
- ±10 mm accuracy
- Up to 100 bar process pressure
- High-temperature version
- Aluminum or stainless steel indicator housing
- Optional level switches
- Optional magnetostrictive level transmitter
- Explosion-proof
- 5 years warranty

APPLICATIONS

- Oil & Gas
- Chemical industry
- Power generation
- Boilers
- Pressurized vessels
- Tanks



NIVOFLIP ML□–100 + MAK–100
+ NIVOTRACK M□L–500/600

CERTIFICATES

- PED certificate
- ATEX (Ex d e m Gb): MAK–100 level switches
- ATEX (Ex h Ga/Gb): ML–100 bypass level indicator

OPERATION

The fluid level in the bypass chamber is the same as in the tank. The welded bypass chamber and the tank form one pressurized system, so the float containing a magnet rises and descends with the fluid level. The properly polarized magnet in the float topples the two-toned plates with the colored magnetic caps through the stainless steel tube's wall, indicating the fluid level. The plates with different color codes on the 100 mm under the lower stem provide a visual error message when fluid levels drop below the instrument's lower connecting point.

NIVOFLIP LEVEL INDICATING SYSTEM

NIVOFLIP bypass liquid level indicator can be equipped with positionable MAK–100/200 external level switches to provide level limit switching. For MAK–100 level switches, the minimal liquid density must exceed the default value specified in the datasheet by 0.1 kg/dm^3. For jobs requiring more accuracy than that of the magnetic flaps, high-precision **NIVOTRACK M–500** magnetostrictive level transmitters are recommended to use. Equipped with OIML R 85 certified **NIVOTRACK**, the measurement system is suitable for custody transfer measurements. The floatless rigid probe magnetostrictive transmitter can be mounted externally to the bypass chamber with clamps. All optional units are operated via magnetic coupling, there is no direct contact with the measured material.

PROPERTIES

NIVOFLIP	Standard version	High-temperature version
Titanium float	■	■
PED certificate	■	■
Maximum 100 bar process pressure	■	–
Maximum +250 °C process temperature	–	■
Optional level switch	■	■
Optional level transmitter	■	■

TECHNICAL DATA

		Standard version	High-temperature version
Display type		Two-toned magnetic flaps	
Display	scale	cm / inch	
	accuracy	±10 mm	
	resolution	5 mm	
	error indication	Lower 100 mm, inversely polarized flaps	
Tube diameter		Ø60.3 mm	
Flange distance (center to center)		500…5500 mm (as per order code)	
Process connection		DIN, ANSI flanges (as per order code)	
Vent connection		M20×1.5	
Process pressure		Max. 100 bar	Max. 88 bar
Process temperature		–60…+130 °C	–60…+250 °C
Ambient temperature		–60…+60 °C	
Min. medium density [1]		0.6 kg/dm³	
Level switch		Optional, freely adjustable MAK–100/200 level switches [2]	
PED (2014/68/EU) certificate		Category I–III, Module B + C2	
Level transmitter		Optional NIVOTRACK M□L–500 / 600 / 700 magnetostrictive level transmitter [2]	
Weight		About 25 kg for 1 m center to center distance	

[1] *In case of MAK–100 level switches, the minimal medium density must exceed the default value by 0.1 kg/dm³. The minimum media density is influenced by the type of float!*
[2] *For NIVOTRACK level transmitters and MAK level switches, the highest temperature values are shown in the diagram below.*

Ex INFORMATION

ATEX certificate	ML□–□□□–□ Ex, MH□–□□□–□ Ex	Ex marking: ⟨Ex⟩ II 1/2 G Ex h IIC T6…T2 Ga/Gb

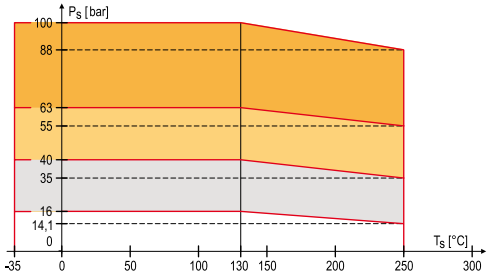
Temperature data for Ex certified models	Hazardous gas atmospheres			
	Standard [ML□–□□□–□ Ex]			High-temperature [MH□–□□□–□ Ex]
Highest process temperature	+80 °C	+95 °C	+130 °C	+250 °C
Highest ambient temperature	+60 °C			
Highest surface temperature	+80 °C	+95 °C	+130 °C	+250 °C
Temperature class	**T6**	**T5**	**T4**	**T2**

Lowest ambient and process temperature: –60 °C

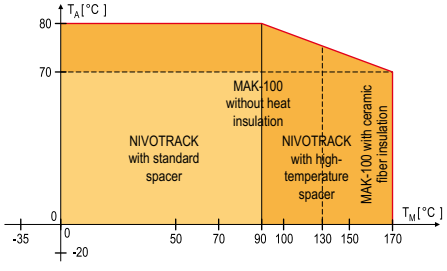
Highest process pressure		Highest process temperature	
Process connection	Bypass tube / Flange rating	T_{max} = 130 °C	T_{max} = 250 °C
		Standard version	High-temperature version
		Maximum process pressure	
DIN flanges DN15 – DN50	Ø60 mm / PN16	16 bar	14.1 bar
	Ø60 mm / PN40	40 bar	35 bar
	Ø60 mm / PN63	63 bar	55 bar
	Ø60 mm / PN100	100 bar	88 bar
ANSI flanges ½" – 1"	Ø2.35" / 150 Class	232 psi	204 psi
	Ø2.35" / 400 Class	580 psi	500 psi
	Ø2.35" / 600 Class	930 psi	800 psi
	Ø2.35" / 900 Class	1440 psi	1275 psi

TEMPERATURE DIAGRAM

Temperature (T_S) – Pressure (P_S) diagram



Process temperature (T_M) – Ambient temperature (T_A) diagram when NIVOTRACK level transmitter or MAK–100/MAK–200 level switch is mounted on NIVOFLIP



MAK–100/200 MAGNETIC LEVEL SWITCHES

The **MAK** magnetic level switches are optional accessories for **NIVOFLIP** bypass level indicators. The float in the stainless steel bypass tube follows the level of the measured liquid. The float *(permanent magnet)* operates the positionable MAK–100/200 level switch via magnetic coupling and provides a non-contact signal transfer to the switch. There must be at least 100 mm distance for MAK–100 and 60 mm distance for MAK–200 between two switching points.

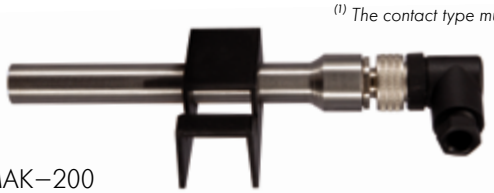
TECHNICAL DATA

	MAK–100–0	MAK–100–7 Ex	MAK–100–6 Ex	NEW MAK–2□0–□
Process temperature	up to +130 °C	See temperature classes table		up to +130 °C
Ambient temperature	–20…+80 °C			–25…+90 °C
Material of the switch-housing	Painted aluminum			Stainless steel (DIN 1.4571)
Bracket material	–			Aluminum
Switch	1 microswitch, with NO, NC contacts			1 bistable reed switch, with NO, NC contacts[1]
Switching data	250 V 2.5 A AC12, 220 V 0.3 A DC13		Only Ex ia certified and approved contact isolator should be used for supply	120 W / VA, 250 V AC/DC, 3 A
Switching hysteresis	up to Δ 35 mm			up to Δ 20 mm
Electrical connection	M20×1.5 cable gland, terminal for max. 2.5 mm² wire cross section			M12 cable gland: cable diameter: Ø4…6 mm, max 0.75 mm² wire cross section
Ingress protection	IP65			
Electrical protection	Class I			Class II
Overvoltage protection	–			Class II (degree of pollution: 2)
Ex marking	–	Ex II 2 G Ex db eb mb IIC T6…T4	Ex II 1 G	–
Weight	1.5 kg			~0.15 kg

[1] *The contact type must be specified in the order code.*

MAK–100

MAK–200

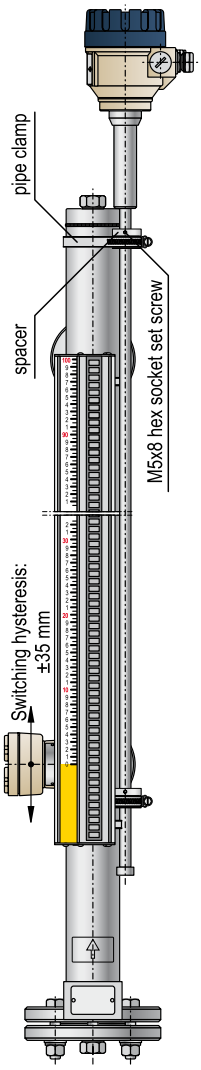


TEMPERATURE DATA FOR Ex CERTIFIED MODELS

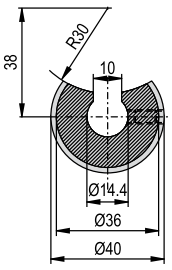
Temperature classes		
Classes	Max. process temperature	Ambient temperature
T6	+70 °C	–20…+60 °C
T5	+85 °C	–20…+70 °C
T4	+120 °C	–20…+80 °C

NIVOTRACK MOUNTED ON NIVOFLIP

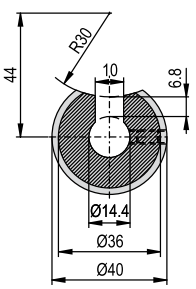
The length of the magnetostrictive level transmitter's probe must be 400 mm longer than the center to center distance of the bypass tube, depending on float version. The level transmitter is placed onto the bypass tube so that the top of the magnetostrictive probe is at the same height as the bypass tube's top. The end of the probe must extend 20 mm / 40 mm farter than the error indication flaps.
The aluminum spacers that come with the level transmitter are held to the probe stem by grub screws, and the assembly is clamped onto the bypass tube. High-temperature versions have ceramic fiber insulator fabric between the bypass tube and the probe of the level transmitter.

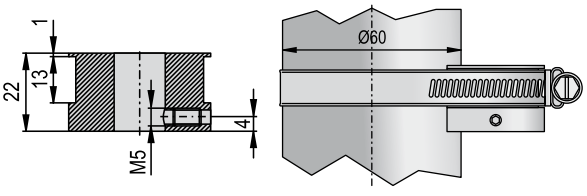


Standard version



High-temperature version,
heat-resistant design, 1.4301 (304) stainless steel plate housing





NIVOFLIP ML — 5 years

Bypass level indicator with optical display and magnetic float for liquids with titanium float and for max. 16 or 40 bar process pressure

Version

M □■ – ■■■ – ■

L	Standard version, max. +130 °C
H	High-temperature version, max. +250 °C, as per pressure diagram

Process connection

M ■□ – ■■■ – ■

A	DN15 (B form)
B	DN20 (B form)
C	DN25 (B form)
D	DN40 (B form)
E	DN50 (B form)
F	ANSI ½" RF
G	ANSI ¾" RF
H	ANSI 1" RF
J	ANSI 1½" RF
K	ANSI 2" RF
X	¾" BSPT
Y	¾" NPT
1	1" BSPT
2	1" NPT

Bypass tube / Pressure / Lamella housing material

M ■■ – □■■ – ■

5	60.3 mm tube diameter / PN16; 150 Class / Aluminum
1	60.3 mm tube diameter / PN40; 400 Class / Aluminum
9	60.3 mm tube diameter / PN16; 150 Class / Stainless steel
6	60.3 mm tube diameter / PN40; 400 Class / Stainless steel

Measuring range (center to center)

M ■■ – ■□□ – ■

For aluminum housing	
0 5	0.5 m
n n	0.6…5.5 m; sold by the 0.1 m
For stainless steel housing	
0 5	0.5 m
n n	0.6…5.5 m; sold by the 0.1 m
nn = 06…55 : 0.6…5.5 m	

Float material / Scale

M ■■ – ■■■ – □

1	Titanium / mm scale
3	Titanium / Feet/inch scale

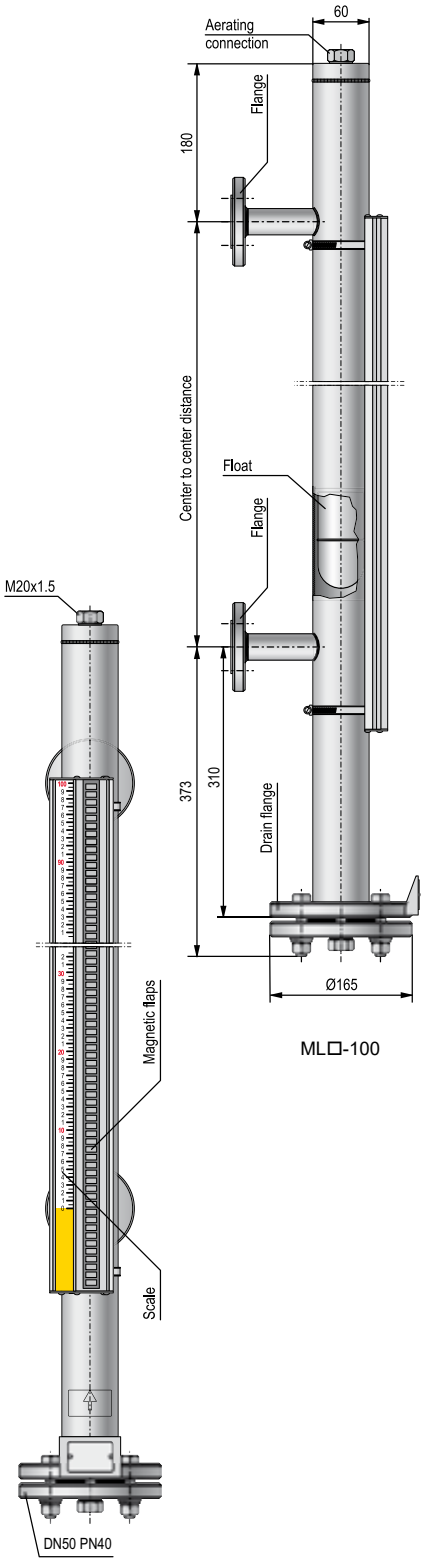
The instrument can be equipped with high-resolution NIVOTRACK M_L-500 and M_T-500 magnetostrictive level transmitter up to +90 °C / +200 °C process temperature! (Center to center distance +400 mm).

Available on request (must be specified in the text of the order)

Drain/vent plug M20x1.5 / ½" BSP inner thread
Drain/vent plug M20x1.5 / ½" NPT inner thread
Drain/vent plug M20x1.5 / ¾" BSP inner thread
Drain/vent plug M20x1.5 / ¾" NPT inner thread
Drain/vent plug M20x1.5 / ½" BSP inner thread, high temperature version
Drain/vent plug M20x1.5 / ½" NPT inner thread, high temperature version
Drain/vent plug M20x1.5 / ¾" BSP inner thread, high temperature version
Drain/vent plug M20x1.5 / ¾" NPT inner thread, high temperature version

Accessories sold separately

MLD-105-0M-611-00	Drain/vent plug M20x1.5 / ½" BSP inner thread
MLD-105-0M-621-00	Drain/vent plug M20x1.5 / ½" NPT inner thread
MLD-105-0M-631-00	Drain/vent plug M20x1.5 / ¾" BSP inner thread
MLD-105-0M-641-00	Drain/vent plug M20x1.5 / ¾" NPT inner thread
MHD-105-0M-611-00	Drain/vent plug M20x1.5 / ½" BSP inner thread, high temp. version
MHD-105-0M-621-00	Drain/vent plug M20x1.5 / ½" NPT inner thread, high temp. version
MHD-105-0M-631-00	Drain/vent plug M20x1.5 / ¾" BSP inner thread, high temp. version
MHD-105-0M-641-00	Drain/vent plug M20x1.5 / ¾" NPT inner thread, high temp. version
MLD-105-0M-711-00	Ball valve ½" BSP MF 63 bar / 914 psi (max. +180 °C)
MLD-105-0M-721-00	Ball valve ½" NPT MF 63 bar / 914 psi (max. +180 °C)



ML□-100

NIVOFLIP ML — 5 years

Bypass level indicator with optical display and magnetic float for liquids
with titanium float and for max. 63 or 100 bar process pressure

Version

M □■ – ■■■ – ■

L	Standard version, max. +130 °C
H	High-temperature version, max. +250 °C, as per pressure diagram

Process connection

M ■□ – ■■■ – ■

A	DN15 (B form)
B	DN20 (B form)
C	DN25 (B form)
D	DN40 (B form)
E	DN50 (B form)
F	ANSI ½" RF
G	ANSI ¾" RF
H	ANSI 1" RF
J	ANSI 1½" RF
K	ANSI 2" RF

Bypass tube / Pressure / Lamella housing material

M ■■ – □■■ – ■

3	60.3 mm tube diameter / PN63; 600 Class / Aluminum
4	60.3 mm tube diameter / PN100; 900 Class / Aluminum
7	60.3 mm tube diameter / PN63; 600 Class / Stainless steel
8	60.3 mm tube diameter / PN100; 900 Class / Stainless steel

Measuring range (center to center)

M ■■ – ■□□ – ■

For aluminum housing	
0 5	0.5 m
n n	0.6…5.5 m; sold by the 0.1 m
For stainless steel housing	
0 5	0.5 m
n n	0.6…5.5 m; sold by the 0.1 m
nn = 06…55 : 0.6…5.5 m	

Float material / Scale

M ■■ – ■■■ – □

1	Titanium / mm scale
3	Titanium / Feet/inch scale

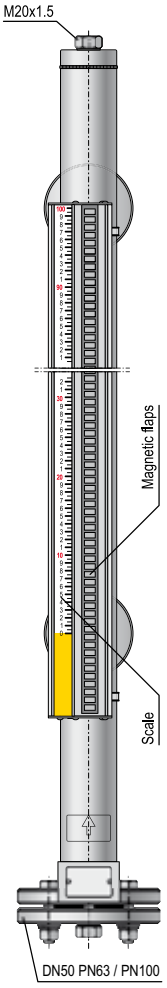
The instrument can be equipped with high resolution NIVOTRACK M_L-500 and M_T-500 magnetostrictive level transmitter up to +90 °C / +200 °C process temperature! (Center to center distance +400 mm).

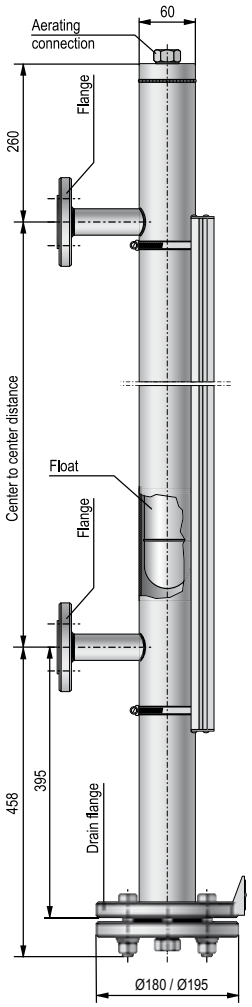
Available on request (must be specified in the text of the order)

Drain/vent plug M20x1.5 / ½" BSP inner thread
Drain/vent plug M20x1.5 / ½" NPT inner thread
Drain/vent plug M20x1.5 / ¾" BSP inner thread
Drain/vent plug M20x1.5 / ¾" NPT inner thread
Drain/vent plug M20x1.5 / ½" BSP inner thread, high temperature version
Drain/vent plug M20x1.5 / ½" NPT inner thread, high temperature version
Drain/vent plug M20x1.5 / ¾" BSP inner thread, high temperature version
Drain/vent plug M20x1.5 / ¾" NPT inner thread, high temperature version

Accessories sold separately

MLD-105-0M-611-00	Drain/vent plug M20x1.5 / ½" BSP inner thread
MLD-105-0M-621-00	Drain/vent plug M20x1.5 / ½" NPT inner thread
MLD-105-0M-631-00	Drain/vent plug M20x1.5 / ¾" BSP inner thread
MLD-105-0M-641-00	Drain/vent plug M20x1.5 / ¾" NPT inner thread
MHD-105-0M-611-00	Drain/vent plug M20x1.5 / ½" BSP inner thread, high temp. version
MHD-105-0M-621-00	Drain/vent plug M20x1.5 / ½" NPT inner thread, high temp. version
MHD-105-0M-631-00	Drain/vent plug M20x1.5 / ¾" BSP inner thread, high temp. version
MHD-105-0M-641-00	Drain/vent plug M20x1.5 / ¾" NPT inner thread, high temp. version
MLD-105-0M-711-00	Ball valve ½" BSP MF 63 bar / 914 psi (max. +180 °C)
MLD-105-0M-721-00	Ball valve ½" NPT MF 63 bar / 914 psi (max. +180 °C)





MLD-300 / 400

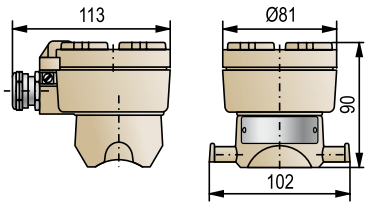
NIVOFLIP MAK-100 — 5 years

Magnetic coupling limit switch for NIVOFLIP ML bypass level indicator
with contact output, factory positioned at intervals specified in the order

Ex certificate

M A K – 1 0 0 – □

0		None
6		Ex ia
7		Ex d e m Gb



MAK–100

NIVOFLIP MAK-200 — 5 years

Magnetic coupling limit switch for NIVOFLIP ML bypass level indicator
with contact output, factory positioned at intervals specified in the order

Output%%TAB

M A K – 2 □ 0 – ■

0		1 bistable reed, NO
1		1 bistable reed, NC

Electrical connection%%TAB

M A K – 2 ■ □ – ■

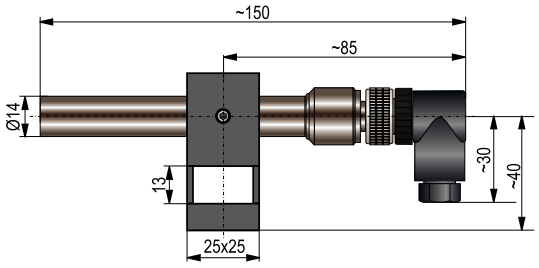
0		M12x1 connector

Ex certificate%%TAB

M A K – 2 ■ 0 – □

0		None
6	*	Ex ia

* Under development



MAK–200

NIVOFLIP ML — 5 years

Bypass measuring chamber for liquid level measurement or level switching, stainless steel, 16 or 40 bar

Prices on request

Version

M ☐■ – ■■■ – ■

L	Standard version, max. +130 °C
H	High-temperature version, max. +250 °C, as per pressure diagram

Process connection

M ■☐ – ■■■ – ■

A	DN15 (B form)
B	DN20 (B form)
C	DN25 (B form)
D	DN40 (B form)
E	DN50 (B form)
F	ANSI ½" RF
G	ANSI ¾" RF
H	ANSI 1" RF
J	ANSI 1½" RF
K	ANSI 2" RF
X	¾" BSPT
Y	¾" NPT
1	1" BSPT
2	1" NPT

Bypass tube / Pressure

M ■■ – ☐■■ – ■

5	60.3 mm tube diameter / PN16; 150 Class
1	60.3 mm tube diameter / PN40; 400 Class

Measuring range (center to center)

M ■■ – ■☐☐ – ■

0 5	0.5 m
n n	0.6…5.5 m; sold by the 0.1 m

nn = 06…55 : 0.6…5.5 m

Instrument connection

M ■■ – ■■■ – ☐

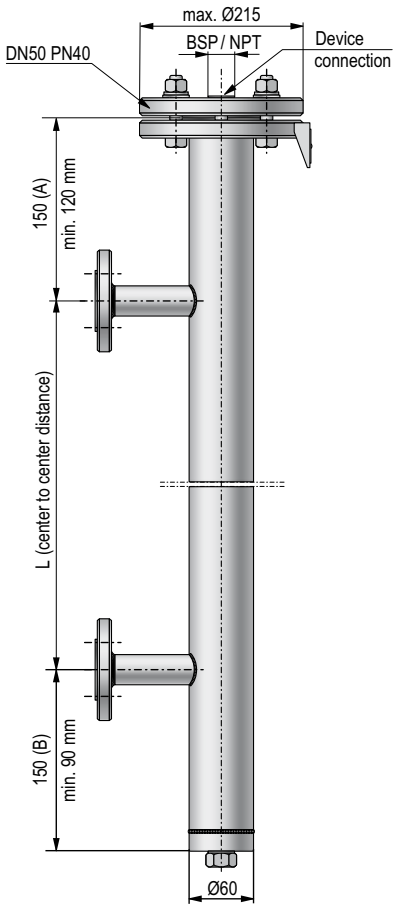
A	¾" BSP
B	¾" NPT
C	1" BSP
D	1" NPT
E	1½" BSP
F	1½" NPT
G	2" BSP
H	2" NPT

Available on request (must be specified in the text of the order)

Drain/vent plug M20x1.5 / ½" BSP inner thread
Drain/vent plug M20x1.5 / ½" NPT inner thread
Drain/vent plug M20x1.5 / ¾" BSP inner thread
Drain/vent plug M20x1.5 / ¾" NPT inner thread
Drain/vent plug M20x1.5 / ½" BSP inner thread, high temperature version
Drain/vent plug M20x1.5 / ½" NPT inner thread, high temperature version
Drain/vent plug M20x1.5 / ¾" BSP inner thread, high temperature version
Drain/vent plug M20x1.5 / ¾" NPT inner thread, high temperature version

Accessories sold separately

MLD-105-0M-611-00	Drain/vent plug M20x1.5 / ½" BSP inner thread
MLD-105-0M-621-00	Drain/vent plug M20x1.5 / ½" NPT inner thread
MLD-105-0M-631-00	Drain/vent plug M20x1.5 / ¾" BSP inner thread
MLD-105-0M-641-00	Drain/vent plug M20x1.5 / ¾" NPT inner thread
MHD-105-0M-611-00	Drain/vent plug M20x1.5 / ½" BSP inner thread, high temp. version
MHD-105-0M-621-00	Drain/vent plug M20x1.5 / ½" NPT inner thread, high temp. version
MHD-105-0M-631-00	Drain/vent plug M20x1.5 / ¾" BSP inner thread, high temp. version
MHD-105-0M-641-00	Drain/vent plug M20x1.5 / ¾" NPT inner thread, high temp. version
MLD-105-0M-711-00	Ball valve ½" BSP MF 63 bar / 914 psi (max. +180 °C)
MLD-105-0M-721-00	Ball valve ½" NPT MF 63 bar / 914 psi (max. +180 °C)



ML☐–100 / 500,
MH☐–100 / 500

NIVOFLIP ML — 5 years

Bypass measuring chamber for liquid level measurement or level switching, stainless steel, 63 or 100 bar

Prices on request

Version

M □■ – ■■■ – ■

L	Standard version, max. +130 °C
H	High-temperature version, max. +250 °C, as per pressure diagram

Process connection

M ■□ – ■■■ – ■

A	DN15 (B form)
B	DN20 (B form)
C	DN25 (B form)
D	DN40 (B form)
E	DN50 (B form)
F	ANSI ½" RF
G	ANSI ¾" RF
H	ANSI 1" RF
J	ANSI 1½" RF
K	ANSI 2" RF

Bypass tube / Pressure

M ■■ – □■■ – ■

3	60.3 mm tube diameter / PN63; 600 Class
4	60.3 mm tube diameter / PN100; 900 Class

Measuring range (center to center)

M ■■ – ■□□ – ■

0 5	0.5 m
n n	0.6…5.5 m; sold by the 0.1 m

nn = 06…55 : 0.6…5.5 m

Instrument connection

M ■■ – ■■■ – □

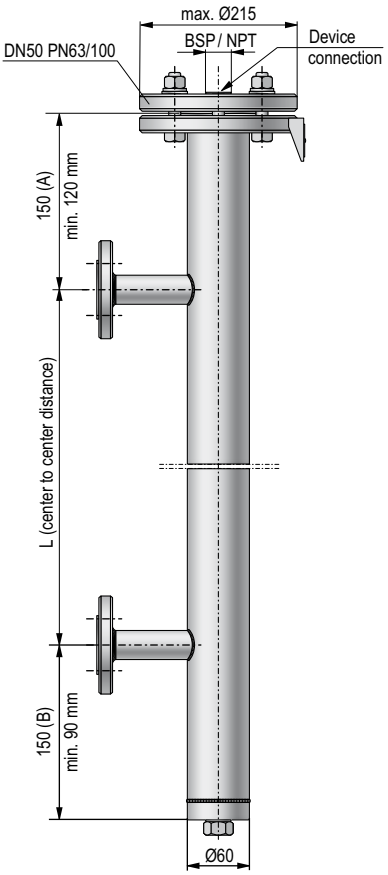
A	¾" BSP
B	¾" NPT
C	1" BSP
D	1" NPT
E	1½" BSP
F	1½" NPT
G	2" BSP
H	2" NPT

Available on request (must be specified in the text of the order)

Drain/vent plug M20x1.5 / ½" BSP inner thread
Drain/vent plug M20x1.5 / ½" NPT inner thread
Drain/vent plug M20x1.5 / ¾" BSP inner thread
Drain/vent plug M20x1.5 / ¾" NPT inner thread
Drain/vent plug M20x1.5 / ½" BSP inner thread, high temperature version
Drain/vent plug M20x1.5 / ½" NPT inner thread, high temperature version
Drain/vent plug M20x1.5 / ¾" BSP inner thread, high temperature version
Drain/vent plug M20x1.5 / ¾" NPT inner thread, high temperature version

Accessories sold separately

MLD-105-0M-611-00	Drain/vent plug M20x1.5 / ½" BSP inner thread
MLD-105-0M-621-00	Drain/vent plug M20x1.5 / ½" NPT inner thread
MLD-105-0M-631-00	Drain/vent plug M20x1.5 / ¾" BSP inner thread
MLD-105-0M-641-00	Drain/vent plug M20x1.5 / ¾" NPT inner thread
MHD-105-0M-611-00	Drain/vent plug M20x1.5 / ½" BSP inner thread, high temp. version
MHD-105-0M-621-00	Drain/vent plug M20x1.5 / ½" NPT inner thread, high temp. version
MHD-105-0M-631-00	Drain/vent plug M20x1.5 / ¾" BSP inner thread, high temp. version
MHD-105-0M-641-00	Drain/vent plug M20x1.5 / ¾" NPT inner thread, high temp. version
MLD-105-0M-711-00	Ball valve ½" BSP MF 63 bar / 914 psi (max. +180 °C)
MLD-105-0M-721-00	Ball valve ½" NPT MF 63 bar / 914 psi (max. +180 °C)



ML□–300 / 400,
MH□–300 / 400