

ISOMAG ™

The friendly magmeter

MS 1000

WAFER TYPE SENSOR



"WAFER" TYPE SENSOR SUITABLE FOR SEVERAL FLANGE TYPES

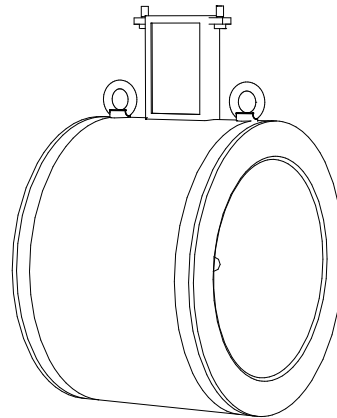
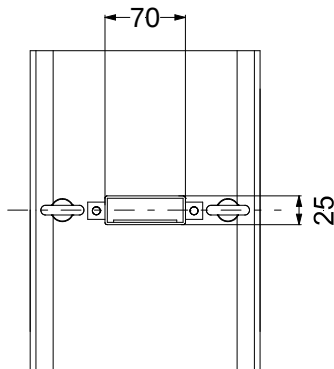
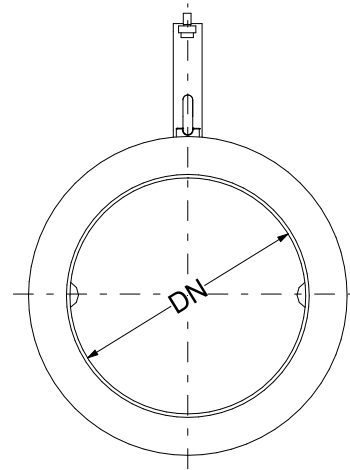
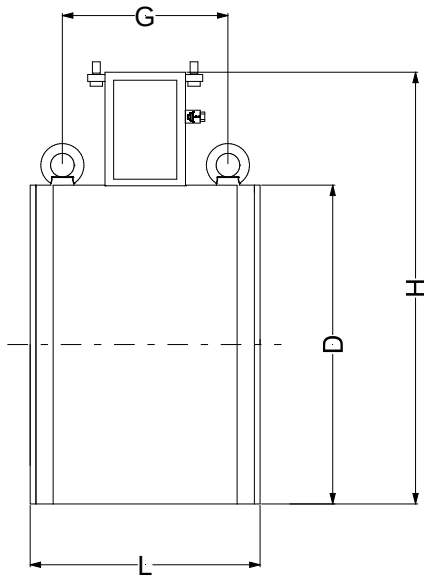
Warranty conditions are available on this website:
www.isomag.eu only in English version

ISOIL 
INDUSTRIA
The solutions that count

TECHNICAL DATA

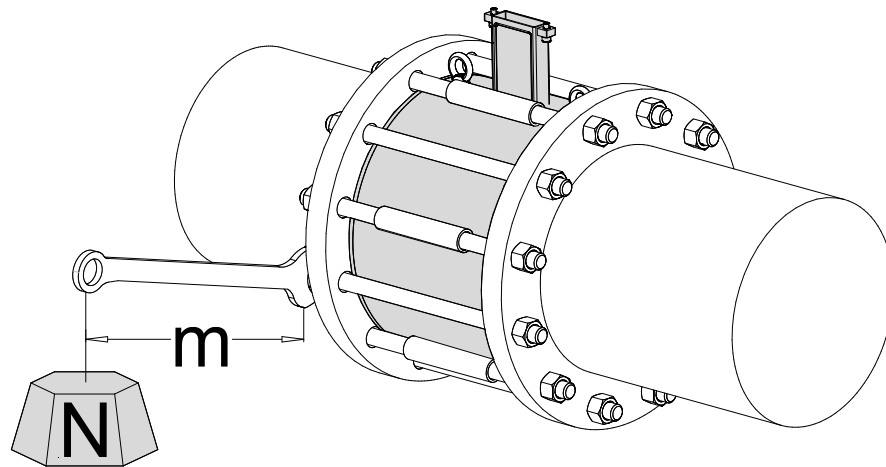
Body material	☐ Carbon steel painted ☐ Stainless steel AISI 304/316 (optional)
Nominal diameter	☐ DN 25 ÷ 400
Nominal pressure	☐ 1600 kPa : all with PP and Ebonite lining ☐ 4000 kPa : PTFE lining up to DN 150
Process connection	☐ Wafer Type
Liquid temperature	☐ 0 °C ÷ 60 °C with PP lining ☐ 0 °C ÷ 80 °C with Ebonite lining ☐ -20 ÷ 100 °C with PTFE lining in compact version ☐ -20°C ÷ 130°C with PTFE lining in separate version* *Contact the factory for higher temperature
Vacuum resistance	☐ 20 Kpa at 100 °C
Lining material	☐ Polypropylene (max PN 16 for DN 25÷150) ☐ Ebonite (DN 200 – 400) ☐ PTFE (DN 25 – 150) ☐ Other on request
Gasket material	☐ No gasket with PTFE-EBONITE lining ☐ FPM or EPDM with Polypropylene lining
Electrode material	☐ Stainless steel AISI 316L ☐ Hastelloy C 276 ☐ Platinum-rhodium 90-10 ☐ Titanium ☐ Tantalum ☐ Others on request
Version – protection rating	☐ Compact version – IP 67 ☐ Separate version (max 20m) – IP 68 ☐ Separate version (max 500 m), with preamplifier – IP 67 (OPT. IP 68)
Accuracy	☐ See table below

OVERALL DIMENSIONS



DIMENSIONS mm (inches)	ND													
	25 (1")	32 (1" 1/4)	40 (1" 1/2)	50 (2")	65 (2" 1/2)	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")	350 (14")	400 (16")
L	+0 -3 (-0.12)	+0 -3 (-0.12)	+0 -3 (-0.12)	+0 -3 (-0.12)	+0 -3 (-0.12)	+0 -3 (-0.12)	+0 -3 (-0.12)	+0 -3 (-0.12)	+0 -3 (-0.12)	+0 -3 (-0.12)	+0 -5 (-0.20)	+0 -5 (-0.20)	+0 -5 (-0.20)	+0 -5 (-0.20)
	100 (3.94)	100 (3.94)	100 (3.94)	100 (3.94)	150 (5.90)	150 (5.90)	150 (5.90)	180 (7.09)	180 (7.09)	200 (7.87)	250 (9.84)	300 (11.81)	350 (13.78)	400 (15.75)
	147 (5.79)	153 (6.02)	161 (6.34)	177 (6.97)	199 (7.83)	209 (8.23)	235 (9.25)	263 (10.35)	291 (11.46)	362 (14.25)	417 (16.42)	467 (18.39)	527 (20.75)	579 (22.80)
H	147 (5.79)	153 (6.02)	161 (6.34)	177 (6.97)	199 (7.83)	209 (8.23)	235 (9.25)	263 (10.35)	291 (11.46)	362 (14.25)	417 (16.42)	467 (18.39)	527 (20.75)	579 (22.80)
D	56 (2.20)	62 (2.44)	70 (2.76)	86 (3.39)	108 (4.25)	118 (4.65)	144 (5.67)	172 (6.77)	200 (7.87)	271 (10.67)	326 (12.83)	376 (14.80)	436 (17.17)	488 (19.21)
G	-	-	-	-	-	-	-	-	-	144 (5.67)	194 (7.64)	244 (9.60)	294 (11.57)	344 (13.54)
Weight kg (lbs)	1.2 (2.64)	1.6 (3.52)	1.8 (3.96)	2 (4.4)	3.6 (7.92)	3.8 (8.36)	5 (11)	7.8 (17.16)	8.2 (18)	18.2 (40)	24 (53)	27 (59)	32 (70)	39 (86)
Usable flanges	PN10, PN16, PN25, PN40, ANSI150, ANSI300										PN10, PN16, ANSI150			

TORQUES (Nm)

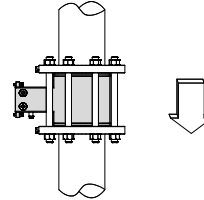
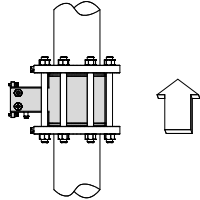


		OPERATING PRESSURE								
Kpa	1000	1600			2500		4000		6400	
psi	140	260			350		600		1000	
DN	PTFE	EBON.	PTFE	EBON.	PP	PTFE	EBON.	PTFE	EBON.	EBON.
25			25		19	25		25		39
32			43		28	43		43		53
40			53		36	53		53		72
50			68		52	68		68		81
65			90		75	45		45		58
80			53		41	53		53		62
100			59		56	83		83		87
125			77		71	112		112		148
150			108		106	135		135		217
200	148	123		82			112		149	233
250	123	103		117			170		223	321
300	142	119		146			168		232	317
350	172	143		171			270		352	481
400	217	181		235			355		516	623

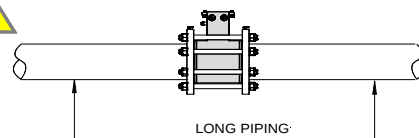
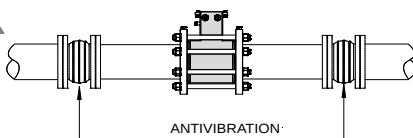
- o Tighten uniformly in diagonally opposite sequence
- o The torque listed in the tab is applicable to the following flanges types:
EN1092-1, DIN 2501, BS 4504, ANSI B16.5 , JIS
- o The use of gaskets DIN 2690 is recommended

INSTALLATION RECOMMENDATIONS

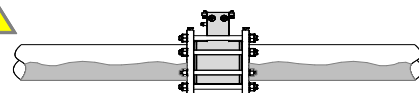
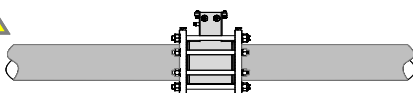
In vertical installations an ascending flow is preferable. For vertical installations with descending flow direction contact the manufacturer



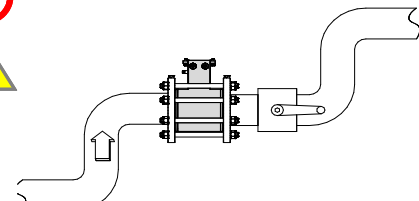
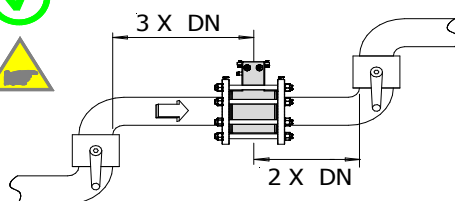
For installations in long pipe lines, please use anti vibration joints



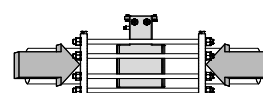
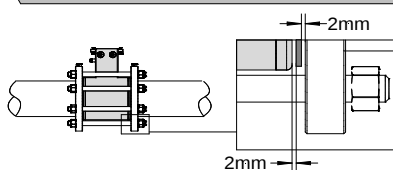
Avoid a partially empty pipe, during operation the pipe must be either completely full of liquid or completely empty



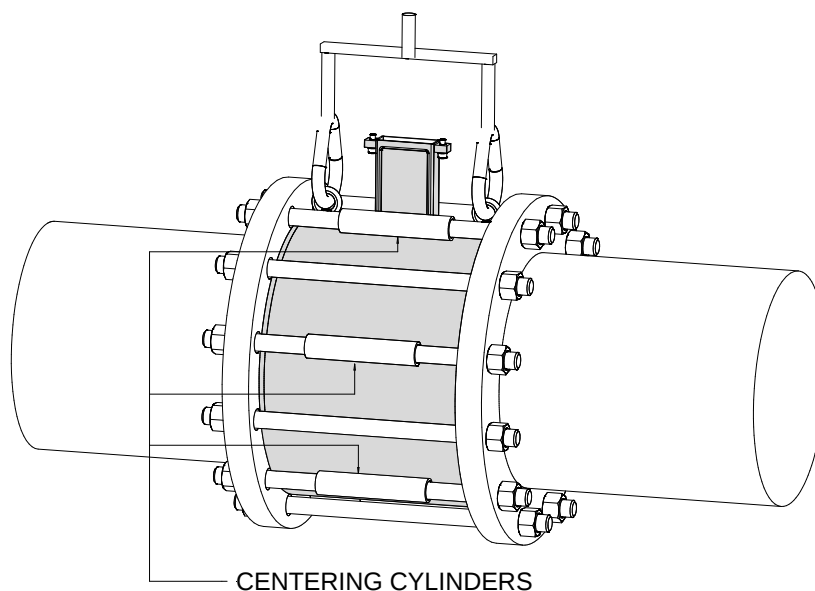
Install the sensor away from bends and hydraulic accessories



Avoid positioning flange and counter flanges by tightening the nuts.



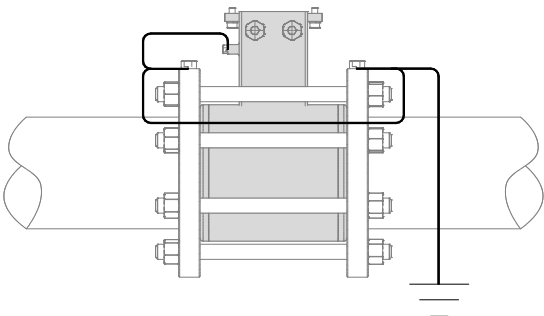
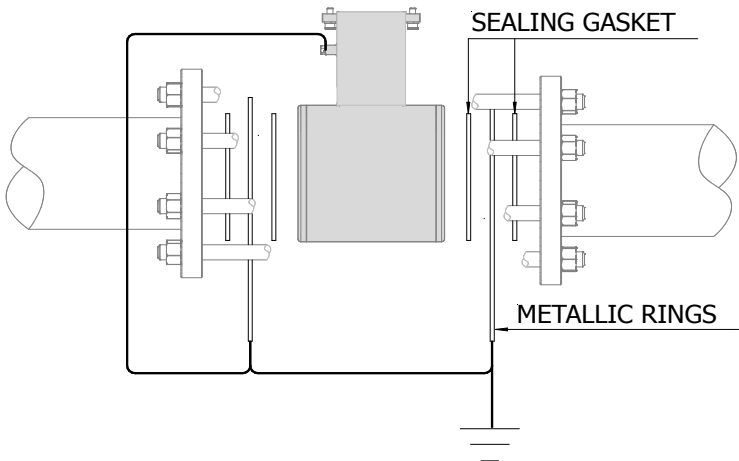
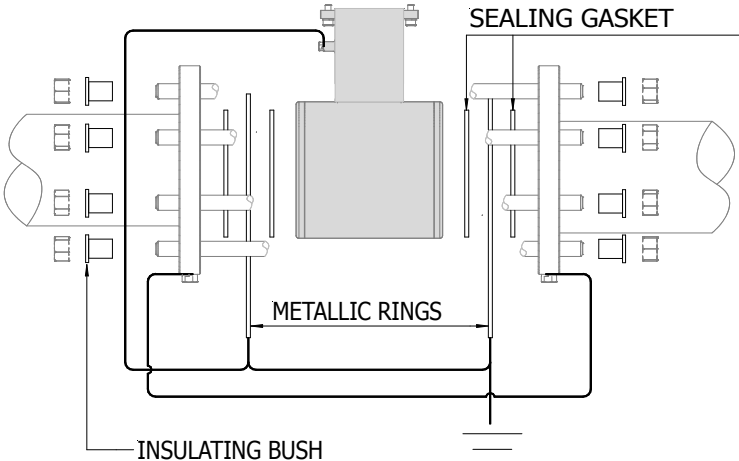
RECOMMENDED INSTALLATION METHOD



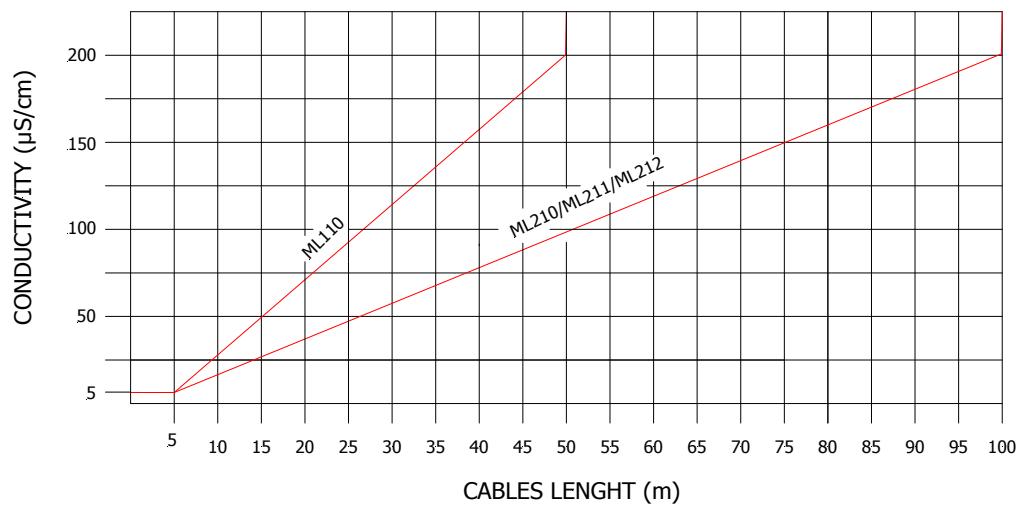
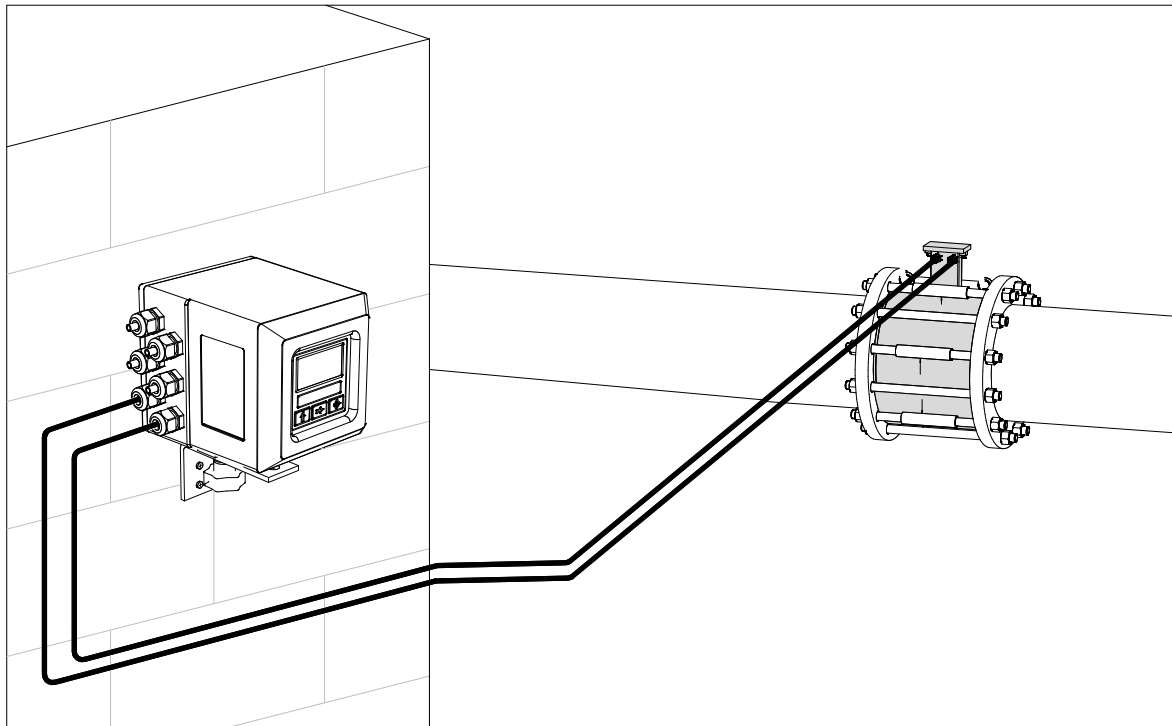
In order to help the installation the DN > 150 they are equipped with appropriate eyebolts to lift the sensor according to the above illustrated method

- The eyebolts support the only weight of the meter
- For sensor MS 1000 we recommend the use of centring cylinders

SENSOR GROUNDING

METALLIC PIPE	
	
INSULATED PIPE	
	SEALING GASKET METALLIC RINGS -If the sensor has to be installed in a pipe made of an insulating material, the following are necessary: - Inserting two metallic rings between the sensor flanges and the pipe line counter flanges or - Using a sensor with the additional grounding electrode
PIPE WITH CATHODIC PROTECTION	
	SEALING GASKET METALLIC RINGS INSULATING BUSH If the sensor has to be installed in the pipe with a cathodic protection, the following are necessary: - using insulating bushes to isolate the bolts - Metallic grounding rings should be provided to ground the liquid using insulating gasket between the rings

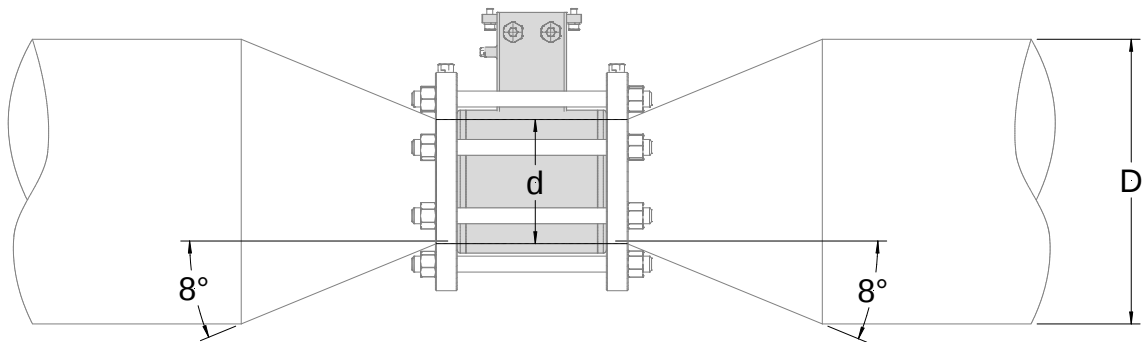
SEPARATE VERSION



Notes:

- It is recommended to install the connection cables away from, or protect against sources of electromagnetic noise.
- The minimum conductivity of the liquid medium to ensure correct functionality of the empty pipe detection is 20 $\mu\text{S/cm}$

PRESSURE LOSS CALCULATION (CONES 8° ANGLES)



$$\Delta p = \left[0.10 + 0.20 \left(\left(\frac{d}{D} \right)^{-2} - 1 \right) \left(\frac{d}{D} \right)^4 \right] \left(\rho \frac{u^2}{2} \right)$$

Where:

Δp = Pressure loss in [Pa]

ρ = Fluid density [kg/m^3] typical value $\rho = 1000[\text{kg} / \text{m}^3]$

d = sensor diameter [m]

D = pipe diameter (greater than sensor diameter) [m]

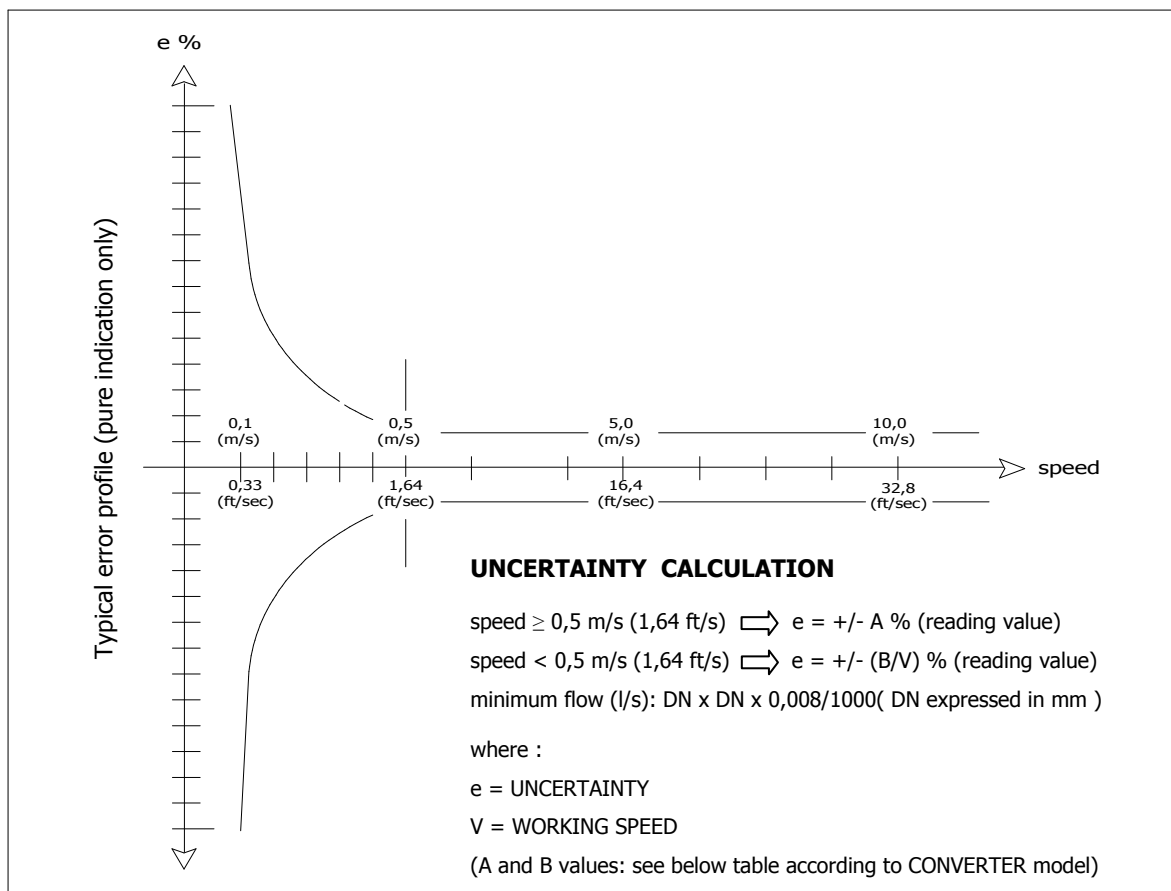
u = Mean flow velocity in sensor diameter [m/s]

Calculation examples Δp [mbar]								
$\frac{d}{D} \backslash u$	1 [m/s]	2 [m/s]	3 [m/s]	4 [m/s]	5 [m/s]	6 [m/s]	7 [m/s]	8 [m/s]
0.5	1.1	4.3	9.6	17.0	26.6	38.3	52.1	68.0
0.6	0.9	3.6	8.2	14.6	22.7	32.7	44.6	58.2
0.7	0.8	3.0	6.8	12.2	19.0	27.4	37.2	48.6
0.8	0.6	2.5	5.7	10.1	15.7	22.7	30.9	40.3
0.9	0.5	2.1	4.8	8.6	13.4	19.3	26.3	34.3

Note :

- $\rho = 1000[\text{kg} / \text{m}^3]$ as goodness approximation of water density in common use.
- Inner diameter of sensor is used for d , express in meters.
- Indeed pressure loss equation is dimensionally correct in [Pa]. The equation results in table are show in [mbar].

ACCURACY TABLE



AC/DC POWERED CONVERTERS

ML 51			ML 110 – STD			ML 110 – SA*			ML210/211/212			ML4F1		
A	B (m/s)	B (ft/s)	A	B (m/s)	B (ft/s)	A	B (m/s)	B (ft/s)	A	B (m/s)	B (ft/s)	A	B (m/s)	B (ft/s)
0,5	0,25	0,82	0,8	0,4	1,31	0,4	0,2	0,66	0,2	0,1	0,33	0,2	0,1	0,33

* SPECIAL ACCURACY

FLOWIZ™ BATTERY POWERED CONVERTERS

ML 250			ML 252		
A	B (m/s)	B (ft/s)	A	B (m/s)	B (ft/s)
0,5	0,25	0,82	0,5	0,25	0,82

Reference conditions:

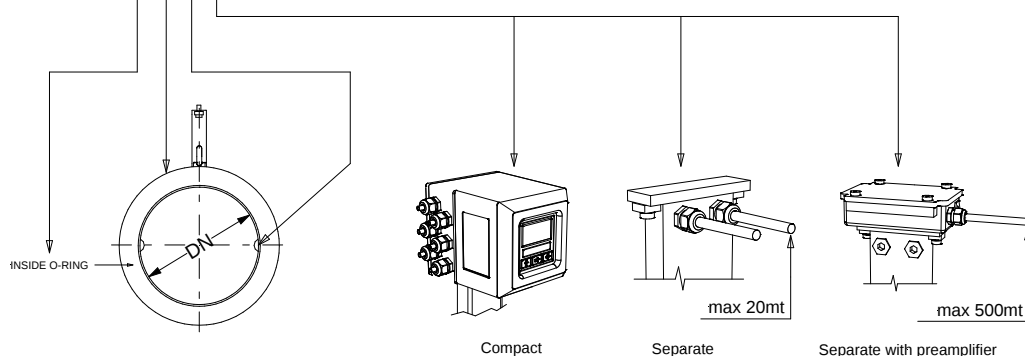
- ☐ Constant flow rate during the test
- ☐ Pressure: >30 Kpa
- ☐ Flow condition : fully developed flow profile
- ☐ Zero stability +/- 0,005 %

HOW TO ORDER

MS 1000	Nominal Diameter - Lining - Maximum temperature - Measuring range
T25 ÷ T150	From DN 25 (1") up to DN 150 (6"), PTFE lining, liquid maximum temperature 150 °C, Measuring range 0...0,72/0...648 m ³ /h
P25 ÷ P150	From DN 25 (1") up to DN 150 (6"), Polypropylene lining, liquid maximum temperature 60 °C, Measuring range 0...0,72/0...640 m ³ /h
E200 ÷ E400	From DN 200 (8") up to DN 400 (16"), Ebonite lining, liquid maximum temperature 80 °C, Measuring range 0...45,2/0...4500 m ³ /h
Gasket material (internal tightness, only for polypropylene lining)	
0	No O-Ring (ONLY FOR PTFE/EBONITE LINING)
1	O-Ring : FPM
2	O-Ring : Epdm
9	Other
Body material	
A	Body in carbon steel ,RAL6028 painted
B	Body in AISI304 (only with PTFE lining)
C	Body in AISI316 (only with PTFE lining)
Z	Other
Number and electrodes material	
1	n. 2 measure electrodes in AISI316
2	n. 3 (2 measure + 1 for ground) electrodes in AISI316
4	n. 3 (2 measure + 1 for ground) electrodes in Hastelloy C
5	n. 3 (2 measure + 1 for ground) electrodes in Titanium
6	n. 3 (2 measure + 1 for ground) electrodes in Tantalum; not available with Polypropilene
7	n. 3 (2 measure + 1 for ground) electrodes in Platinum; not available with Polypropilene
0	Other
Version - Protection rate	
A	Compact version, IP67 protection rate, liquid maximum temperature 100 °C
B	Separate version "C", maximum length see table, liquid maximum temperature 130 °C, protection rate IP68
C	Separate version "L" (in Carbon Steel), with preamplifier (maximum length 500 m), liquid maximum temperature 100 °C, protection rate IP67
D	Separate version "L" (in AISI304), with preamplifier (maximum length 500 m.), liquid maximum temperature 100 °C, protection rate IP67
E	Version with length and position of the neck of the Sensor to define according draw. G006 (valid for A-B-C-D versions, add the relative COST)
F	Separate version with N° 2 connectors IP 68 suitable for C015/16 for fast cable connections (max 20 m-ADD THE COST)
G	Separate version with N° 1 connectors IP 68 suitable for C018 for fast cable connections (max 20 m-ADD THE COST)
H	Separate version with N° 1 connectors IP 68 suitable for C014 for fast cable connections TO PREAMPLIFIER IN CAR. STEEL(DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST)
I	Separate version with N° 1 connectors IP 68 suitable for C014 for fast cable connections TO PREAMPLIFIER IN SS 304(DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST)
M	Compact Version, IP67 protection rate , with the possibility to turn the converter 90°

MS 1000 T25 0 A 1 A

EXAMPLE OF ORDER CODE



The manufacturer reserves the right to make design improvements without notice.