

ISOMAG

The friendly magmeter

MS 501

THE MICROFLOW SENSOR



**MICROFLOW SENSOR WITH A WIDE RANGE OF APPLICATIONS
THANKS TO THE AVAILABILITY OF DIFFERENT CONNECTION
TYPES**

The manufacturer guarantees only English text.
Available on our web site: www.isomag.eu

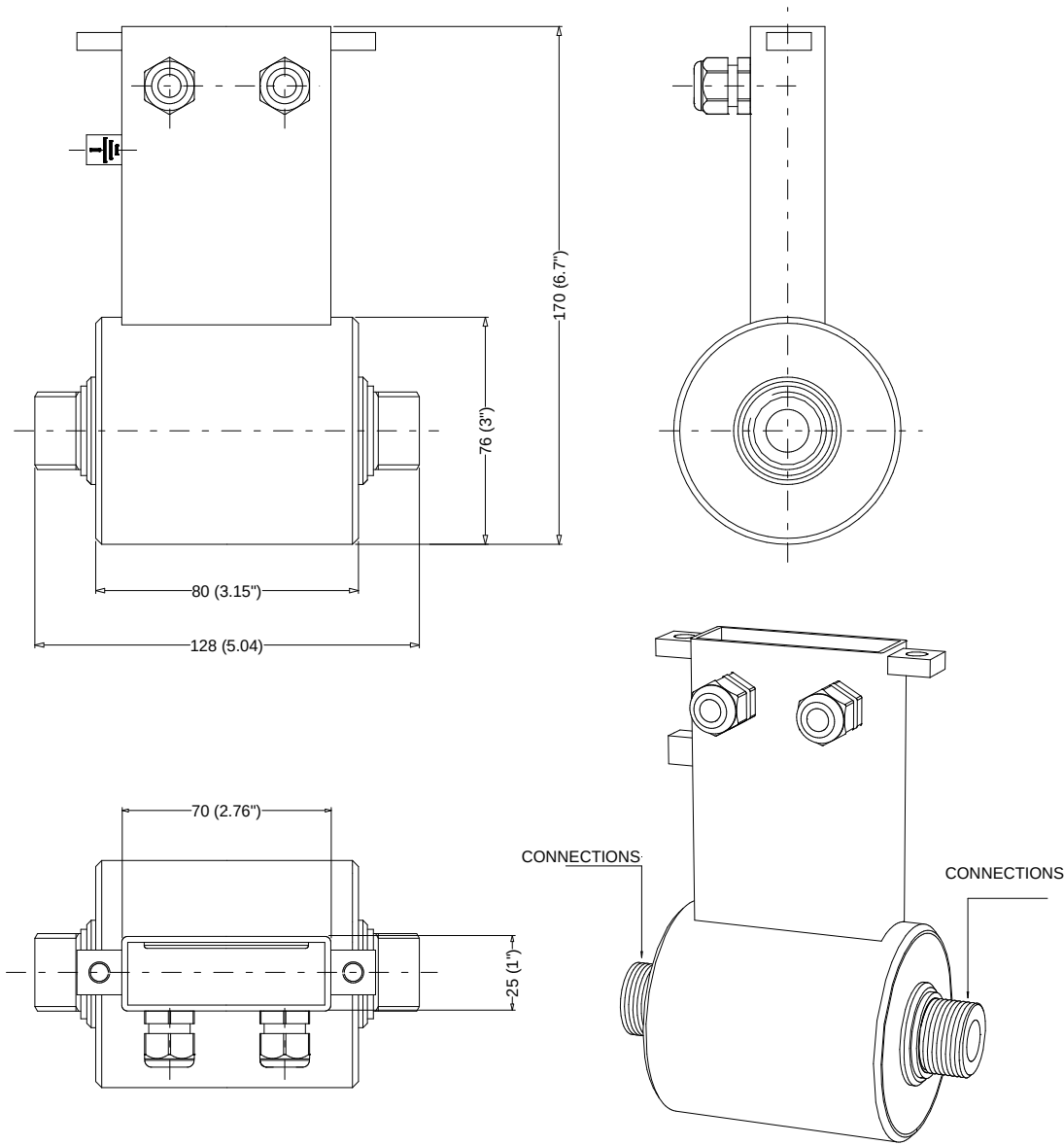
ISOIL 
INDUSTRIA
The solutions that count

TECHNICAL DATA

Body material	☐ AISI 304 ☐ AISI 316 (opt.)
Nominal Diameter	☐ DN 3 ÷ 20
Nominal Pressure	☐ 1600 kPa / 4000 (optional)
Process connections	☐ Threaded UNI 338 ☐ Threaded NTP ☐ Flanged UNI 2278 ☐ Flanged ANSI 150 ☐ Sanitary DIN 11851 ☐ Clamp ISO 2852 ☐ Clamp BS 4825 ☐ SMS ☐ Other on request
Vacuum resistance	☐ 20 Kpa absolute at 100 °C
Connections material	☐ AISI 316 ☐ AISI 304 with lining in PTFE ☐ Other on request
Liquid temperature	☐ -20°C ÷ 100°C comp. (130°C only with ML4F-1) ☐ -20°C ÷ 130°C separate
Lining material	☐ PTFE
Gasket material	☐ FPM ☐ EPDM
Electrodes material	☐ AISI 316L ☐ Hastelloy C ☐ Platinum – rhodium ☐ Titanium ☐ Tantalum ☐ Others on request
Version/ protection rating	☐ Compact – IP 67 ☐ Separate (max 20m) – IP 68 ☐ Separate (max 500m) with pre-amp IP 67 (IP 68 optional)
Accuracy	☐ See table below

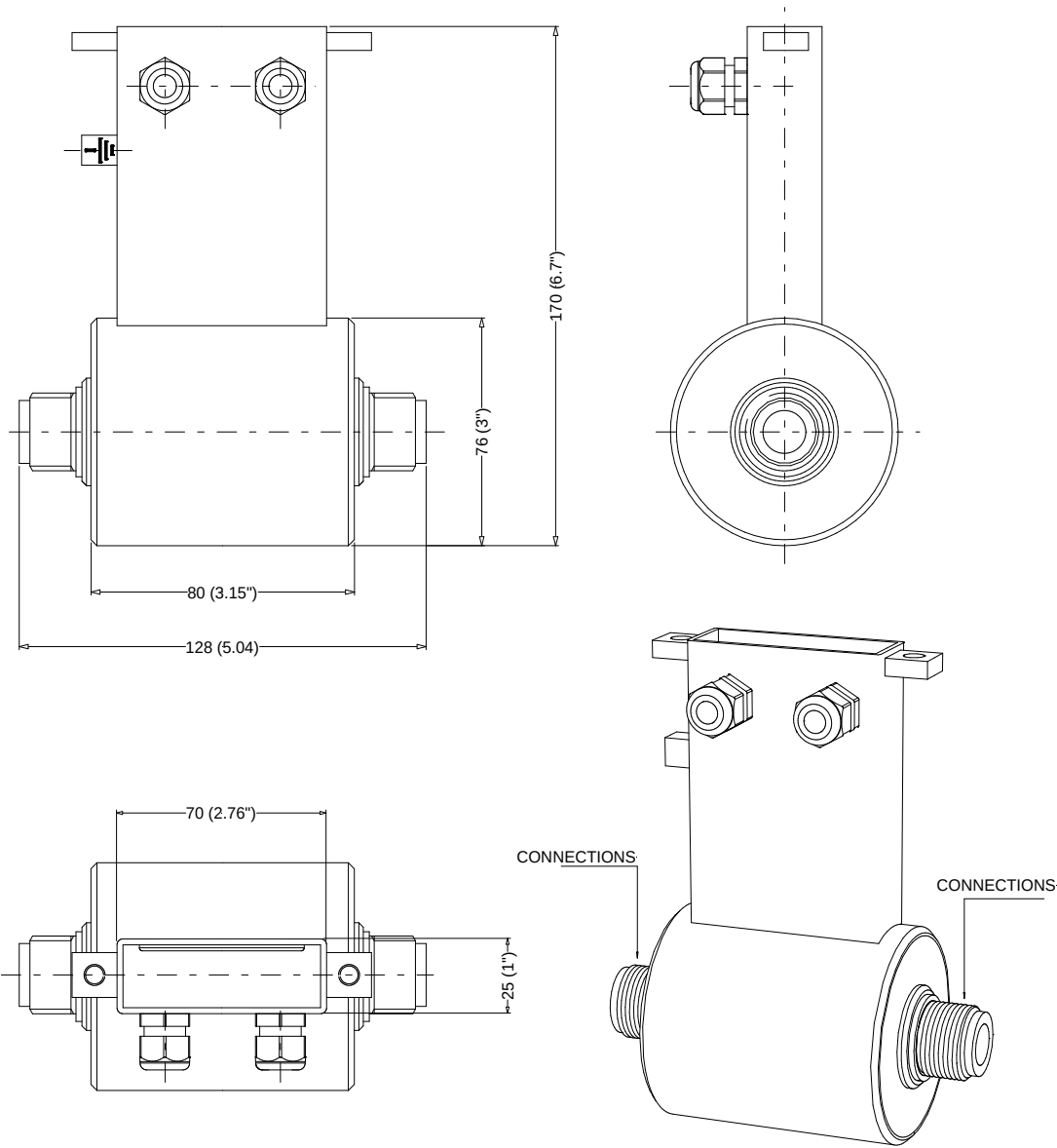
OVERALL DIMENSIONS

GAS/NPT WITHOUT LINING



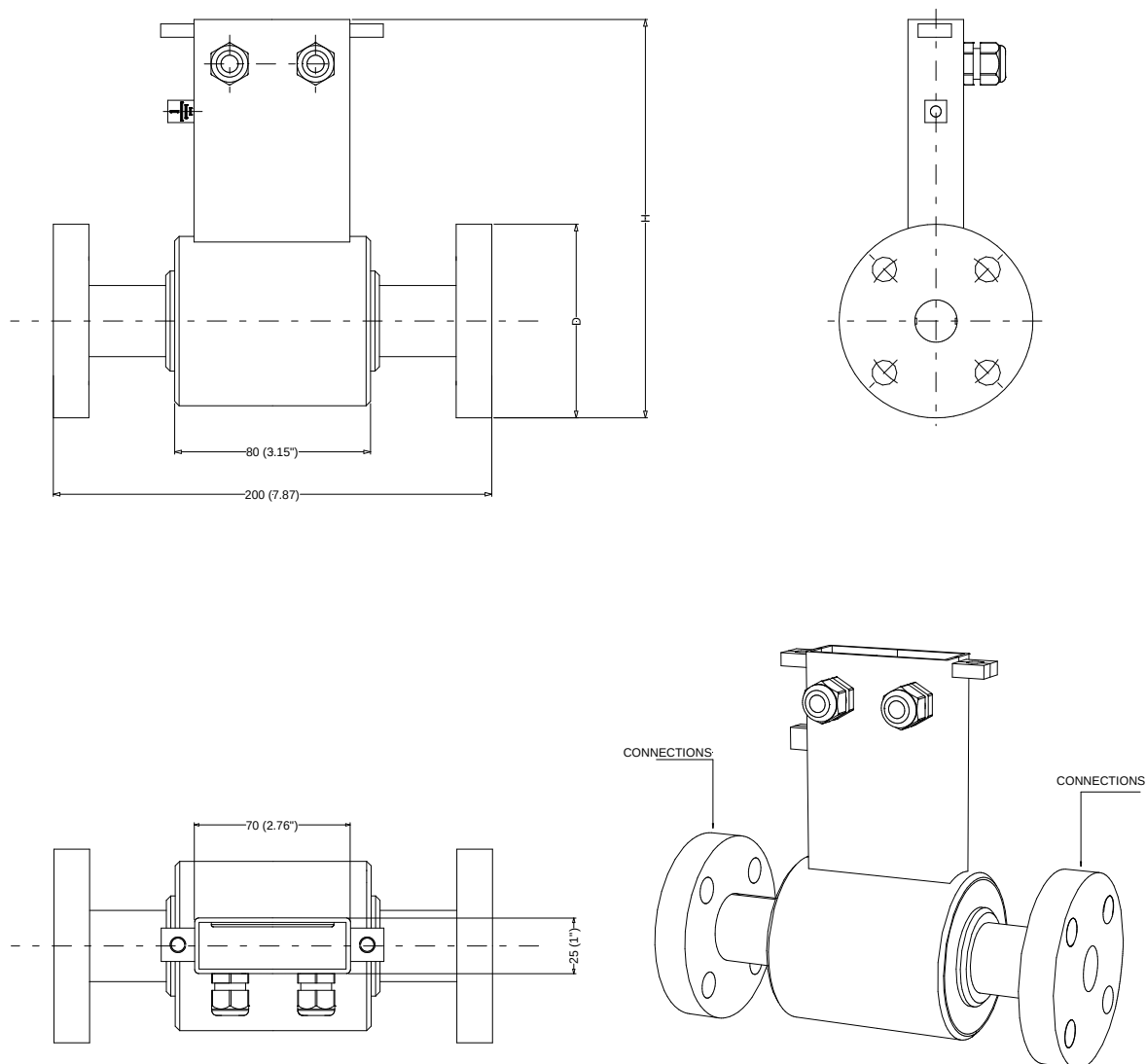
CONNECTIONS GAS/NPT (STAINLESS STEEL WITHOUT LINING)					
DIMENSIONS mm (inches)	DN				
	3 (1/8")	6 (1/4)	10 (3/8)	15 (1/2")	20 (3/4")
FITTINGS	1/4"	3/8"	1/2"	3/4"	1"

GAS/NPT WITH LINING



CONNECTIONS GAS/NPT (STAINLESS STEEL LINING)					
DIMENSIONS mm (inches)	DN				
	3 (1/8")	6 (1/4)	10 (3/8)	15 (1/2")	20 (3/4")
FITTINGS	1/2"	1/2"	3/4"	1"	1"1/4

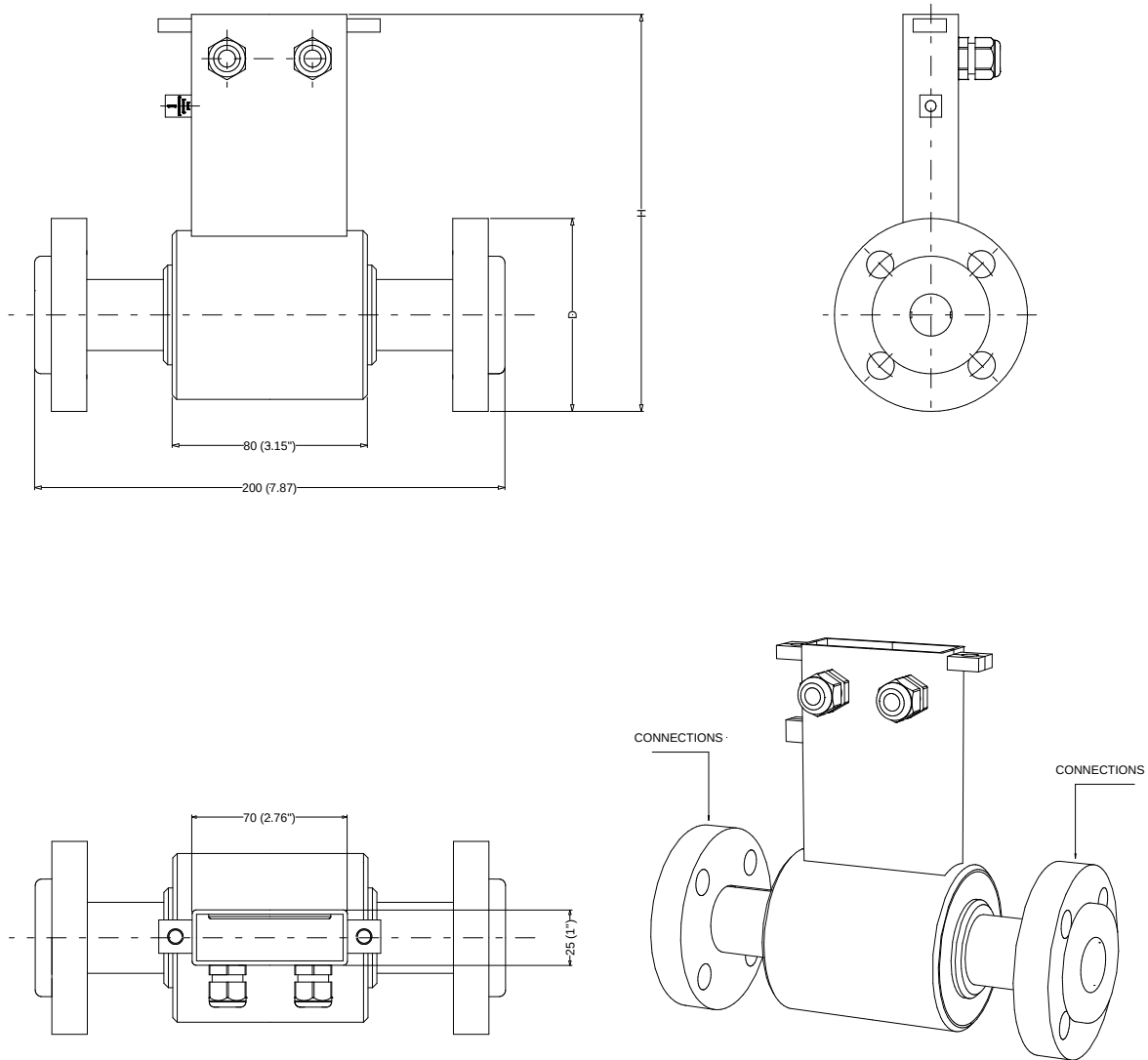
FLANGED WITHOUT LINING



FLANGE CONNECTIONS UNI (STAINLESS STEEL WITHOUT LINING)					
DIMENSIONS mm (inches)	DN				
	3 (1/8")	6 (1/4)	10 (3/8)	15 (1/2")	20 (3/4")
D	90 (3.54)	90 (3.54)	90 (3.54)	95 (3.74)	105 (4.13)
H	183 (7.20)	183 (7.20)	183 (7.20)	186 (7.30)	191 (7.5)
FITTINGS	DN 10	DN 10	DN 10	DN 15	DN 20

FLANGE CONNECTIONS ANSI (STAINLESS STEEL WITHOUT LINING)					
DIMENSIONS mm (inches)	DN				
	3 (1/8")	6 (1/4)	10 (3/8)	15 (1/2")	20 (3/4")
D	88.9 (3.5)	88.9 (3.5)	88.9 (3.5)	88.9 (3.5)	98.4 (3.87)
H	183 (7.20)	183 (7.20)	183 (7.20)	183 (7.20)	188 (7.37)
FITTINGS	1/2"	1/2"	1/2"	1/2"	3/4"

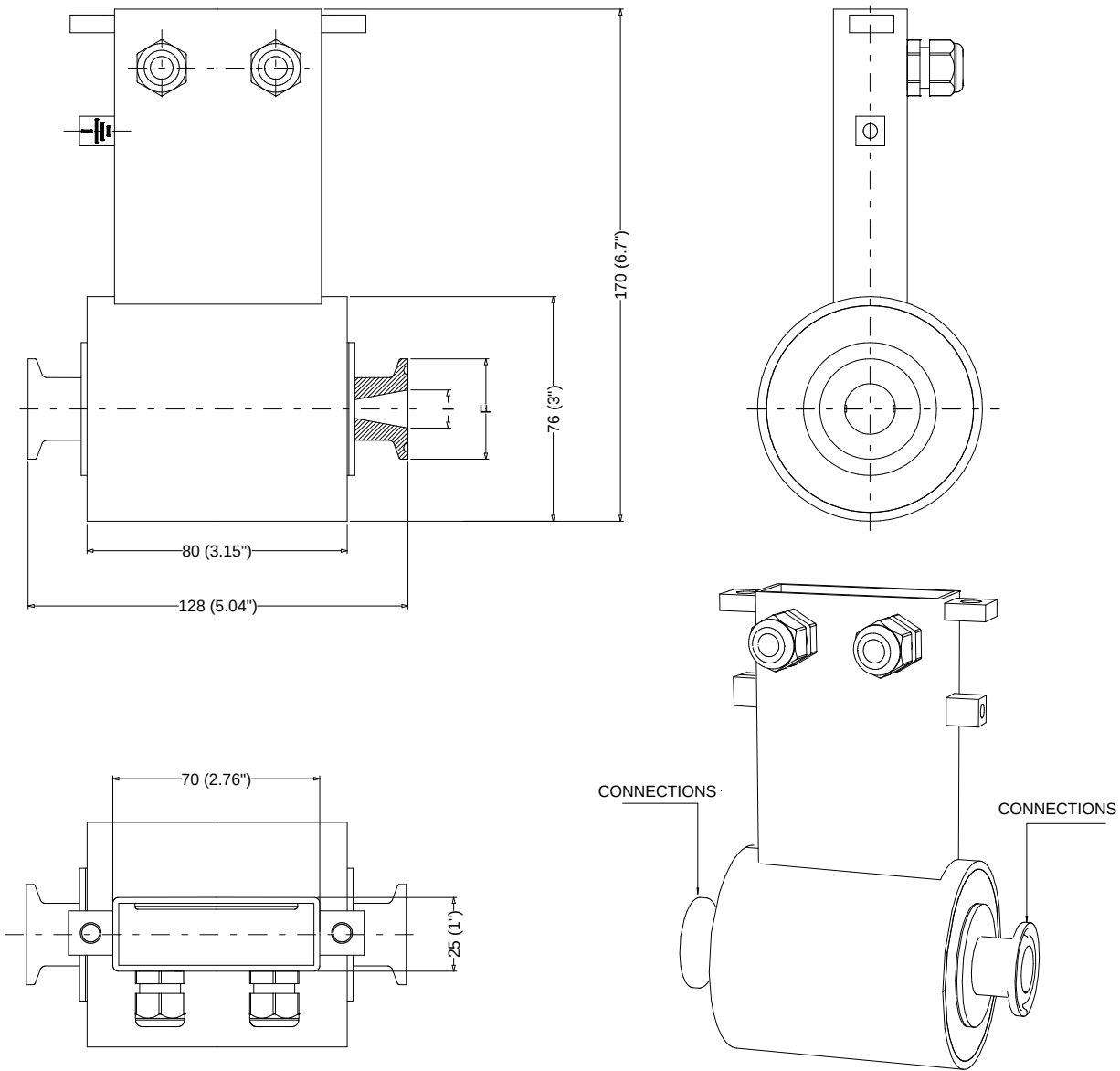
FLANGED WITH PTFE LINING



UNI FLANGE CONNECTIONS (PTFE LINING)					
DIMENSIONS mm (inches)	DN				
	3 (1/8")	6 (1/4)	10 (3/8)	15 (1/2")	20 (3/4")
D	90 (3.54)	90 (3.54)	90 (3.54)	95 (3.74)	105 (4.13)
H	183 (7.20)	183 (7.20)	183 (7.20)	186 (7.30)	191 (7.5)
FITTINGS	DN 10	DN 10	DN 10	DN 15	DN 20

ANSI FLANGE CONNECTIONS (PTFE LINING)					
DIMENSIONS mm (inches)	DN				
	3 (1/8")	6 (1/4)	10 (3/8)	15 (1/2")	20 (3/4")
D	88.9 (3.5)	88.9 (3.5)	88.9 (3.5)	88.9 (3.5)	98.4 (3.87)
H	183 (7.20)	183 (7.20)	183 (7.20)	183 (7.20)	188 (7.37)
FITTINGS	1/2"	1/2"	1/2"	1/2"	3/4"

SANITARY CLAMP CONNECTIONS

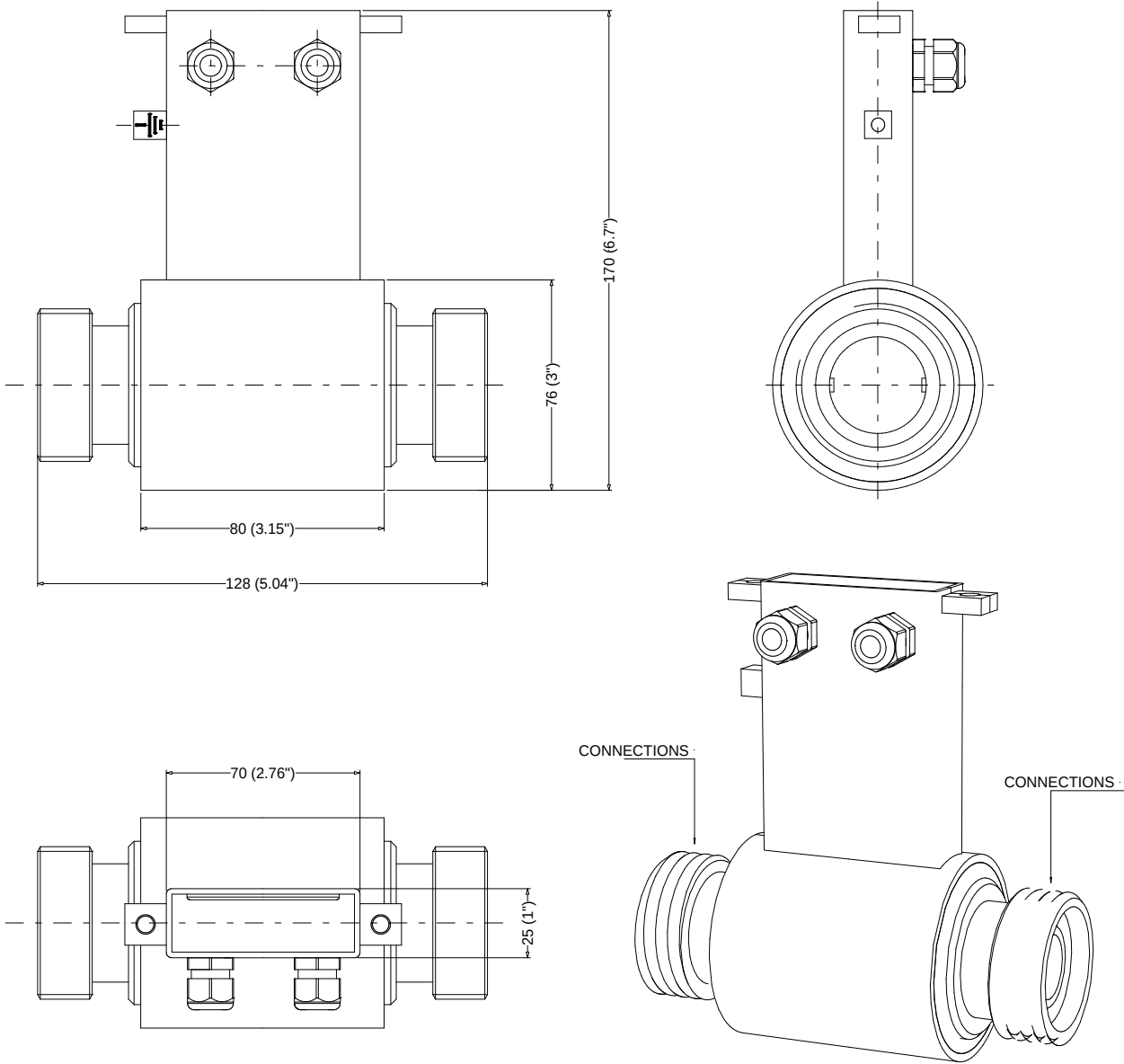


CLAMP ISO 2852					
DIMENSIONS mm (inches)	DN				
	3 (1/8")	6 (1/4)	10 (3/8)	15 (1/2")	20 (3/4")
I	12.7(0.5)	12.7(0.5)	12.7(0.5)	17.2(0.68)	21.3 (0.84)
F	34 (1.34)	34 (1.34)	34 (1.34)	34 (1.34)	34 (1.34)

CLAMP BS 4825					
DIMENSIONS mm (inches)	DN				
	3 (1/8")	6 (1/4)	10 (3/8)	15 (1/2")	20 (3/4")
I	9.5 (0.37)	9.5 (0.37)	9.5 (0.37)	15.85 (0.62)	22.2 (0.87)
F	25.4 (1)	25.4 (1)	25.4 (1)	25.4 (1)	50.5 (1.99)

SANITARY DIN/SMS

SANITARY CONNECTIONS

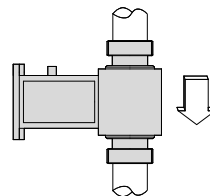
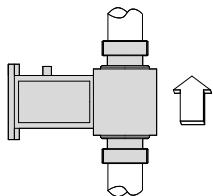


DIN 11851					
DIMENSIONS	DN				
	3 (1/8")	6 (1/4)	10 (3/8)	15 (1/2")	20 (3/4")
FITTINGS	DN 10	DN 10	DN 10	DN 15	DN 20

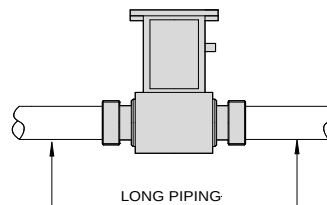
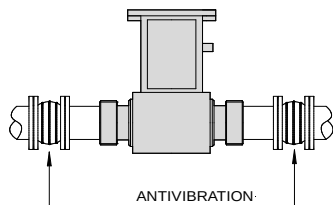
SMS			
DIMENSIONS			
	10 (3/8)	15 (1/2")	20 (3/4")
FITTINGS	DN 25	DN 25	DN 25

INSTALLATION RECOMMENDATIONS

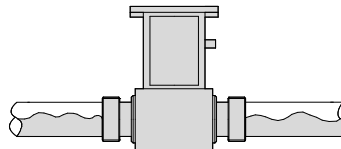
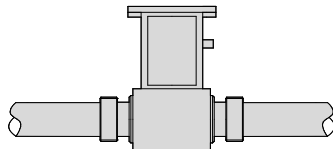
In vertical installations an ascending flow is preferable. For vertical installations with descending flow direction contact the manufacturer



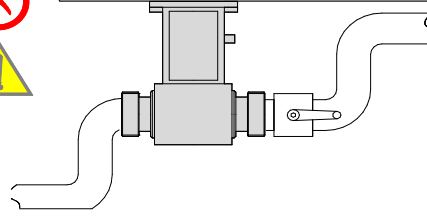
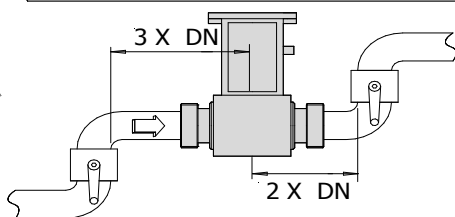
For installations in long pipe lines, please use anti vibration joints



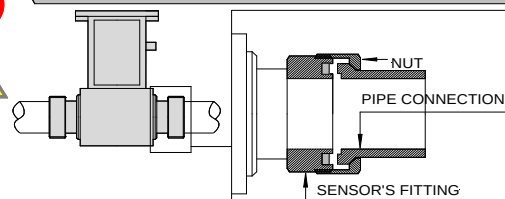
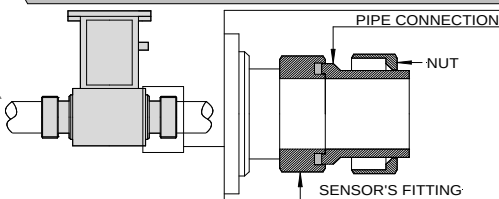
Avoid a partially empty pipe, during operation the pipe must be either completely full of liquid or completely empty



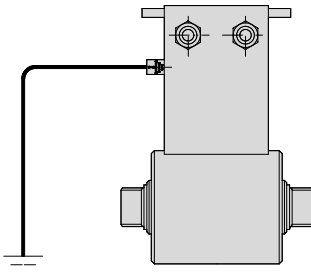
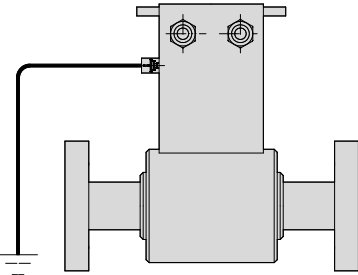
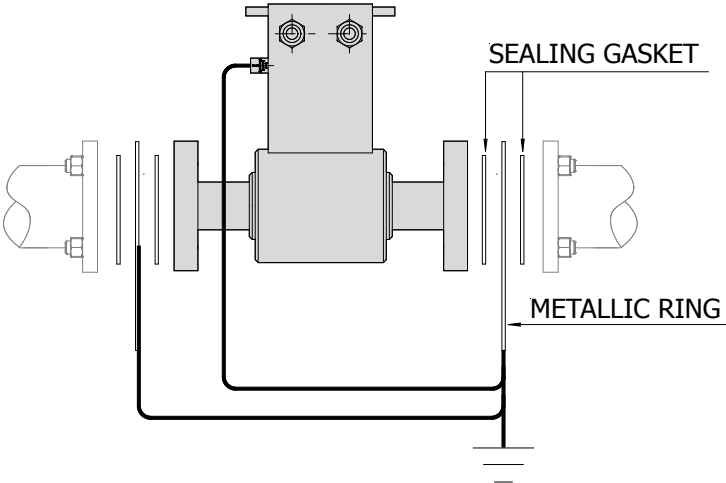
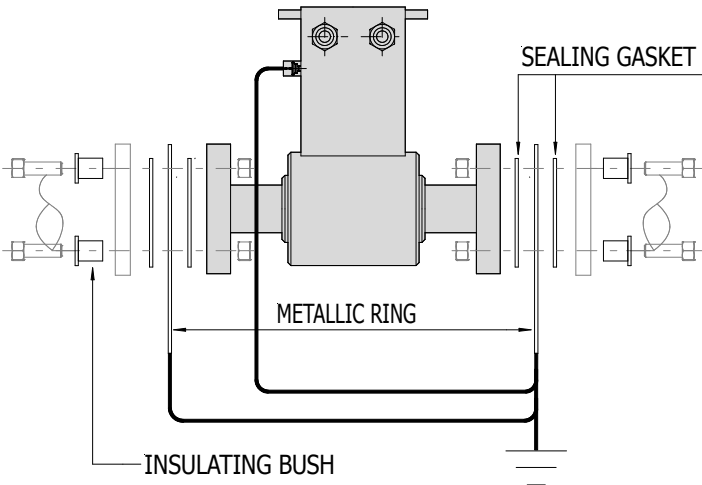
Install the sensor away from bends and hydraulic accessories and hydraulic accessories



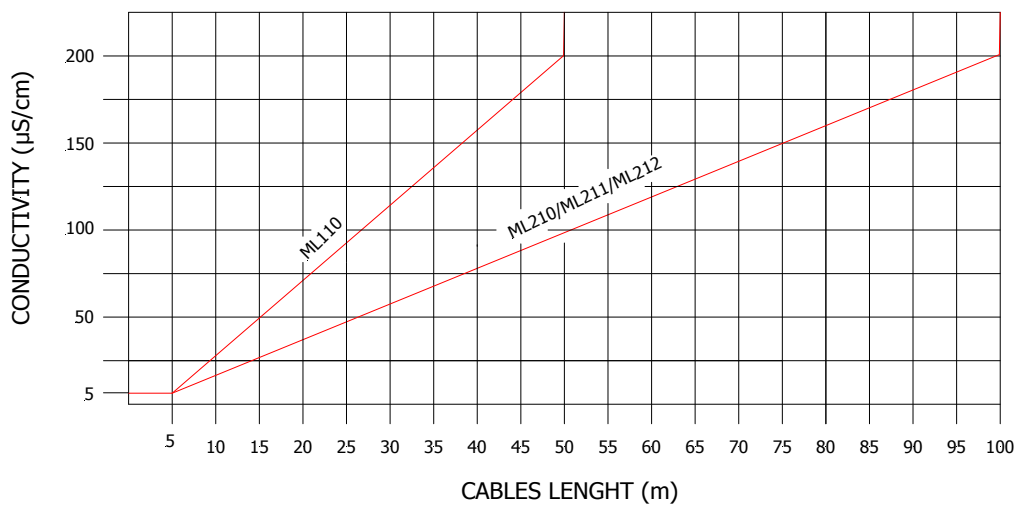
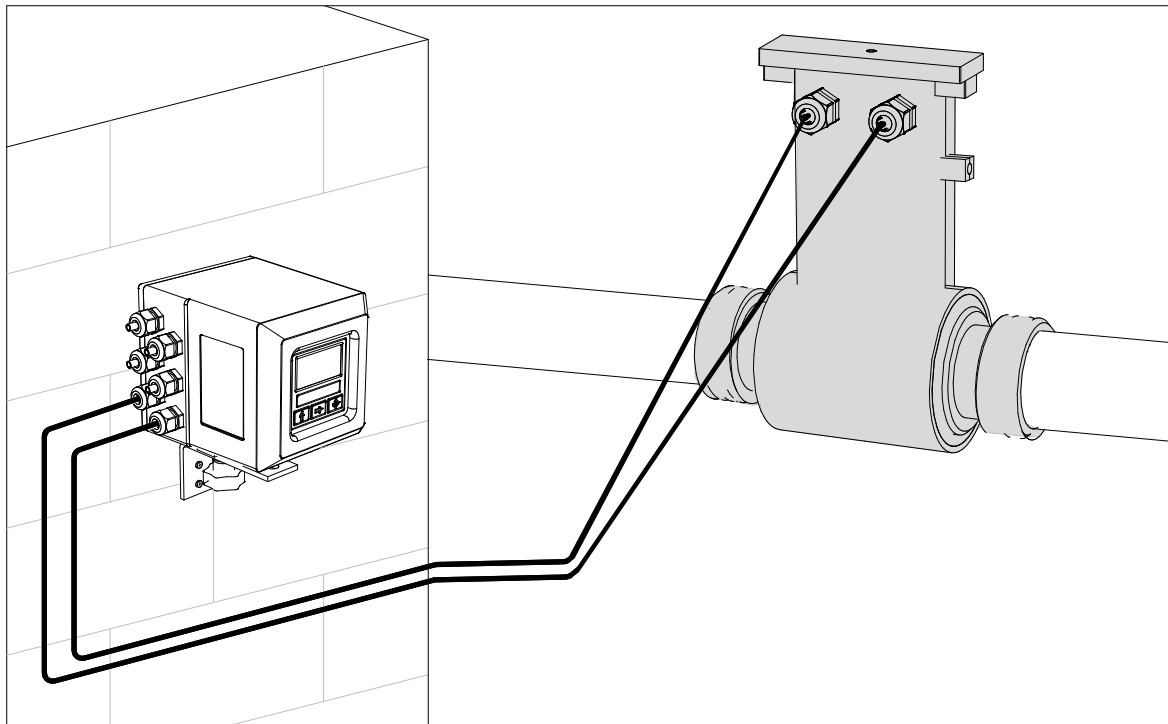
Avoid positioning flange and counter flanges by tightening the nuts.



SENSOR GROUNDING

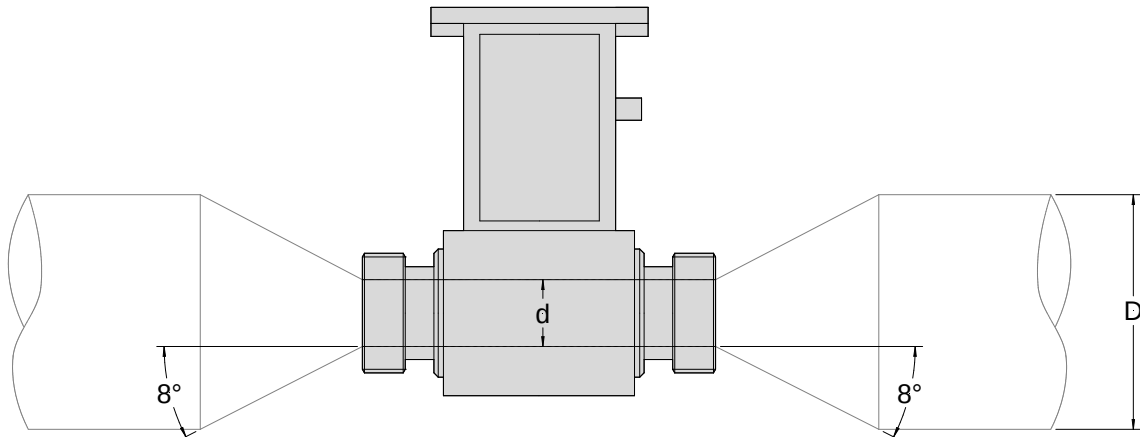
METALLIC PIPE	
THREADED SENSOR 	FLANGED SENSOR 
INSULATED PIPE	
	If the sensor has to be installed in a pipe made of an insulating material, the following are necessary: - Inserting two metallic rings between the sensor flanges and the pipe line counter flanges or: - Using a sensor with the additional grounding electrode
PIPE WITH CATHODIC PROTECTION	
	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 gaskets 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 $\mu\text{S}/\text{cm}$

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]

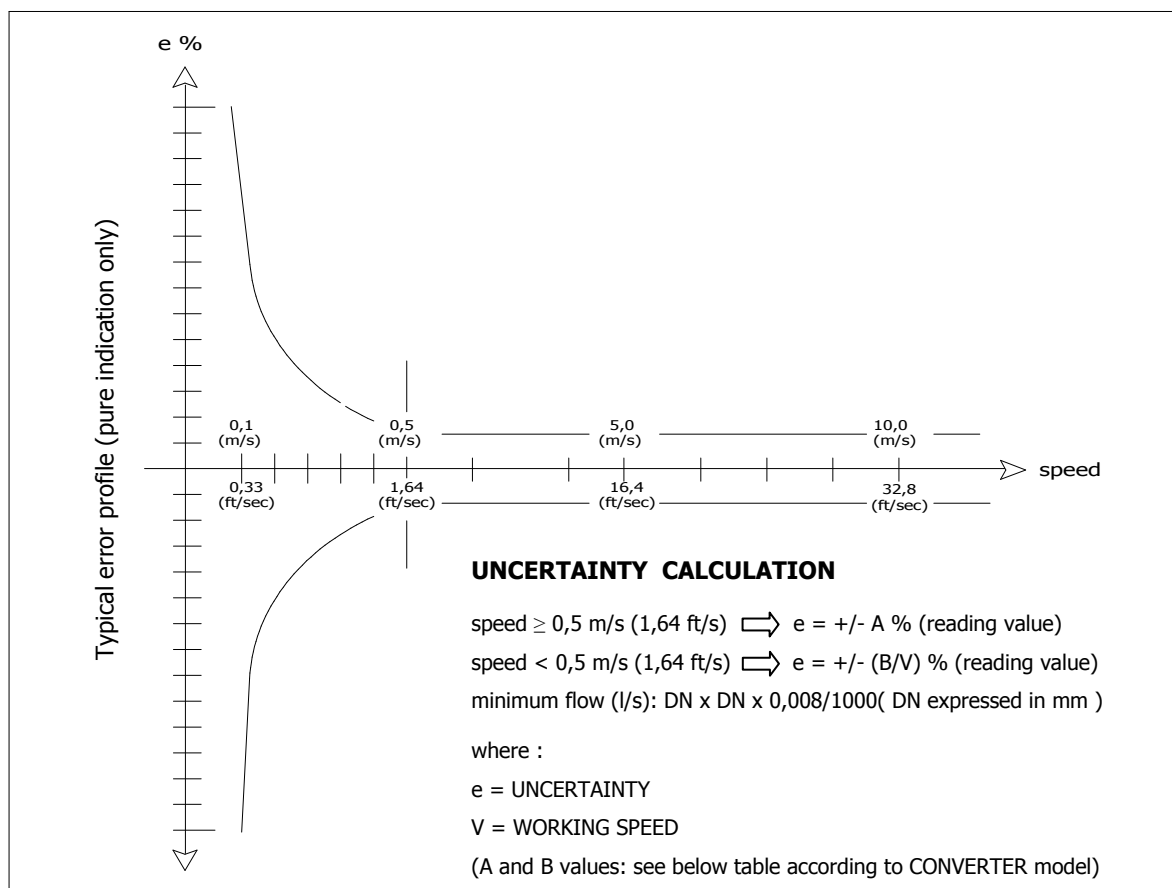
u = Mean flow velocity in sensor diameter [m/s]

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

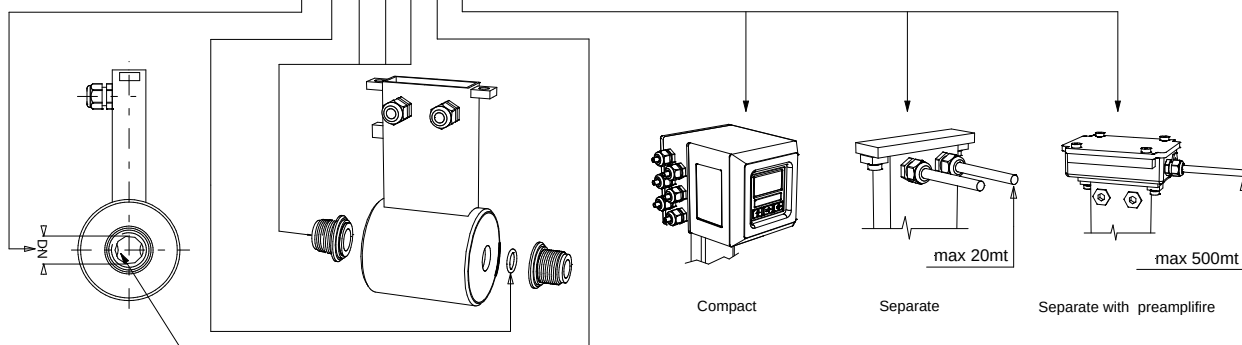
Reference conditions :

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

HOW TO ORDER

MS 501	Nominal diameter / Lining / Range of measure
T03	DN3 (1/8 "), lining PTFE, range 0.. 10 / 0...250 l/h
T06	DN6 (1/4 "), lining PTFE, range 0...40/0...1000 l/h
T10	DN10 (3/8 "), lining PTFE, range 0...120/0...3000 l/h
T15	DN15 (1/2 "), lining PTFE, range 0.. 240/0...6000 l/h
T20	DN20 (3/4 "), lining PTFE, range 0.. 500/0...12500 l/h
Gasket material	
1	O-Ring : FPM
2	O-Ring : Epdm
4	O-Ring : FFKM
9	O-Ring : other
Nomimal pressure	
A	PN 16
B	PN 40
Z	PN other
Connections type	
1	GAS UNI338
2	NPT
3	Clamp ISO2852
4	DIN11851
5	SMS (solo per/only for DN10, 15 ,20)
6	UNI2223
7	ANSI 150
8	Clamp connection, BS 4825
9	JIS flanges (5-7.5-10 k)
0	Other fittings
Connections material	
A	AISI 316
C	AISI304, with PTFE lining (only for connections1-2-6-7)
9	Other
Number and electrodes material	
1	n. 2 electrodes in AISI316 L
4	n. 4 electrodes in Hastelloy C 276 (2 measure + 2 ground)
5	n. 4 electrodes in Titanium (2 measure + 2 ground)
6	n. 4 electrodes in Tantalum (2 measure + 2 ground)
7	n. 4 electrodes in Platinum-Rhodium 90/10 (2 measure + 2 ground)
0	other
Version - Protection degree	
A	Versione compact, IP67, max liquid temp. 100 °C
B	Version separate (see table) m., max liquid temp. 130 °C, IP68
C	Version separate (in carbon steel.), with preamplifire (max distance 500 m), max liquid temp 100 °C
D	Version separate (in SS.), with preamplifire (max distance 500 m), max liquid temp 100 °C
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	Version separate with N° 2 connectors IP 68 suitable for C015/16 for fast cable connections (max 20 m-ADD THE COST)
G	Version separate with N° 1 connectors IP 68 suitable for C018 for fast cable connections (max 20 m-ADD THE COST)
H	Version separate with N° 1 connectors IP 68 suitable for C014 for fast cable connections TO PRAMPLIFIRE IN CARBON STEEL VERSION (DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST)
I	Version separate with N° 1 connectors IP 68 suitable for C014 for fast cable connections TO PRAMPLIFIRE IN AISI 304 VERSION (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 501 T03 1 A 1 A 1 A EXAMPLE OF ORDER CODE



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