

# ISOMAG ™

*The friendly magmeter*

## MS 2500

**FLANGED SENSOR**



**FLANGED SENSOR WITH A WIDE RANGE OF FLANGE SIZES**

Warranty conditions are available on this website:  
[www.isomag.eu](http://www.isomag.eu) only in English version

**ISOIL**   
INDUSTRIA  
*The solutions that count*

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## TECHNICAL DATA

<i>OVERALL FEATURES</i>	
Nominal diameter	<input type="checkbox"/> DN 25 ÷ 2000
Minimum conductivity	<input type="checkbox"/> 5 µS/cm
Humidity Range	<input type="checkbox"/> 0÷100% (IP 67)
Accuracy	<input type="checkbox"/> See relevant converter data sheet
CE Certification	<input type="checkbox"/> Yes
PED	<input type="checkbox"/> Yes

<i>STANDARD FEATURES</i>	
Body material	<input type="checkbox"/> Carbon steel painted
Nominal pressure	<input type="checkbox"/> 1600 kPa ( 4000 kPa up to DN 50 )
Process connection	<input type="checkbox"/> Flanges std : UNI PN 16
<i>Version – protection rating</i>	<input type="checkbox"/> Compact IP67
Flanges material	<input type="checkbox"/> Carbon steel
Lining material	<input type="checkbox"/> Polypropylene (max. PN 16) <input type="checkbox"/> PTFE <input type="checkbox"/> Ebonite <input type="checkbox"/> Rilsan
Gasket material (ONLY for lining in Polypropylene )	<input type="checkbox"/> FPM
Liquid temperature	<input type="checkbox"/> 0°C ÷ 70°C with Rilsan lining <input type="checkbox"/> 0°C ÷ 60°C with PP lining <input type="checkbox"/> -5°C ÷ 80°C with ebonite lining <input type="checkbox"/> -20°C ÷ 100°C with PTFE lining in compact version
Vacuum resistance	<input type="checkbox"/> 20 Kpa (absolute) at 100 °C (60/80°C for PP/Ebonite)
Electrodes material	<input type="checkbox"/> Stainless steel AISI 316

<i>OPTIONAL FEATURES (CHECK FOR MORE DETAILS 'HOW TO ORDER' ON LAST PAGE)</i>	
Body material	<input type="checkbox"/> Stainless steel AISI 304 or 316
Gaskets material (ONLY for lining in Polypropylene )	<input type="checkbox"/> EPDM
Nominal pressure	<input type="checkbox"/> Higher pressure rates available on request
Process connection	<input type="checkbox"/> Flanges: UNI, ANSI, DIN, JIS Others on request
Flanges material	<input type="checkbox"/> Stainless steel AISI 304 - AISI316
Liquid temperature	<input type="checkbox"/> -20°C ÷ 180°C* with PTFE lining in separate version: * sensors with working temperature higher than 110 ° C are classified according to PED guidelines (details on table in the next page).
Lining material	<input type="checkbox"/> On request
Electrodes material	<input type="checkbox"/> On request
Version – protection rating	<input type="checkbox"/> Separate version (max 20m) – IP 68 <input type="checkbox"/> Separate version (max 500 m), with preamplifier – IP 67 <input type="checkbox"/> Separate version (max 500 m), with preamplifier – IP 68
Certifications	<input type="checkbox"/> MI-001 (check table below) <input type="checkbox"/> MI-004 (check table below)

## 97 / 23 / CE PED DIRECTIVE \*

The Pressure Equipment Directive (97/23/EC) was adopted by the European Parliament and the European Council in May 1997. It has initially come into force on 29 November 1999. From that date until 29 May 2002 manufacturers had a choice between applying the pressure equipment directive or continuing with the application of the existing national legislation. From 30 May 2002 the pressure equipment directive is obligatory throughout the EU.

The directive provides, together with the directives related to simple pressure vessels (2009/105/EC), transportable pressure equipment (99/36/EC) and Aerosol Dispensers (75/324/EEC), for an adequate legislative framework on European level for equipment subject to a pressure hazard.

Here below the list of diameters which falls within PED directive, when the **medium temperature is above 110°C** (ONLY for PTFE lining)

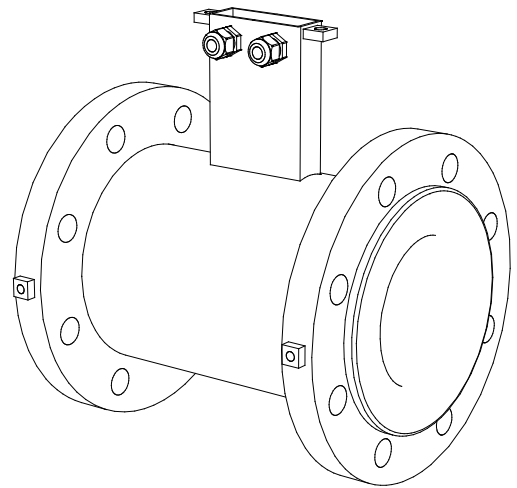
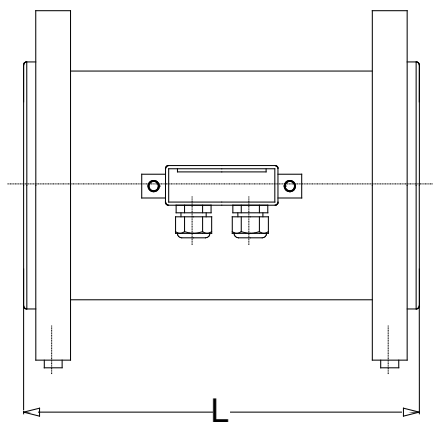
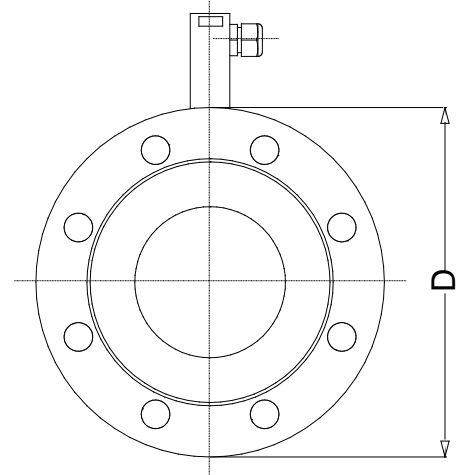
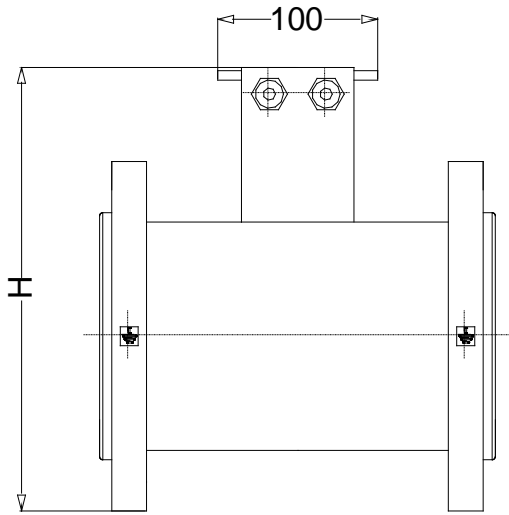
ND	PRESSURE RATE (kPa)			
25	N.A.		N.A.	4000
32	N.A.		N.A.	4000
40	N.A.		N.A.	4000
50	N.A.	1600	N.A.	4000
65				
80				
100				
125	1000	1600	2500	4000
150				
200		1600	2500	
250				
300	1000	1600	2500	4000
350				
400				
450	1000	1600	2500	4000
500				

	= EXCLUDED FROM PED
	= CAT. I
	= CAT. II
	= CAT. III
	= NOT MADE

**Rif. Tab. 056**

\*Only for EU country

# OVERALL DIMENSIONS

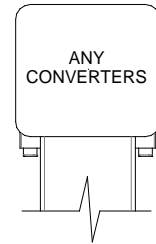
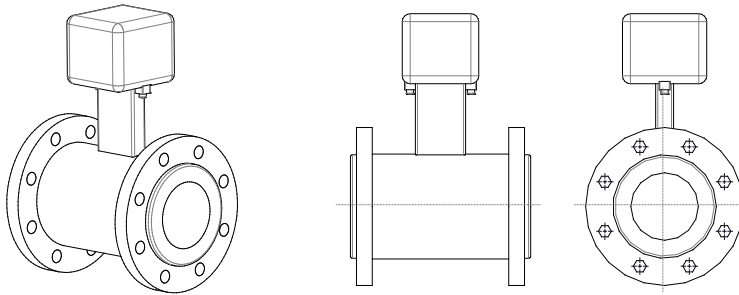


<b>MS 2500 PN 10/64 - ANSI 150/300 OVERALL DIMENSIONS</b>									
<b>DIMENSIONS mm (inches)</b>		<b>PN</b>							
		<b>PN 10</b>	<b>PN 16</b>	<b>PN 25</b>	<b>PN 40</b>	<b>PN 64</b>	<b>ANSI 150</b>	<b>ANSI 300</b>	
<b>DN</b>	<b>25 (1")</b>	<b>L</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>
		<b>H</b>	185 (7.28)	185 (7.28)	185 (7.28)	185 (7.28)	198 (7.80)	181 (7.13)	190 (7.48)
		<b>D</b>	<b>115 (4.53)</b>	<b>115 (4.53)</b>	<b>115 (4.53)</b>	<b>115 (4.53)</b>	<b>140 (5.51)</b>	<b>108 (4.25)</b>	<b>124 (4.88)</b>
	<b>32 (1"1/4)</b>	<b>L</b>	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)
		<b>H</b>	<b>203 (8)</b>	<b>203 (8)</b>	<b>203 (8)</b>	<b>203 (8)</b>	<b>209 (8.23)</b>	<b>192 (7.56)</b>	<b>199 (7.83)</b>
		<b>D</b>	140 (5.51)	140 (5.51)	140 (5.51)	140 (5.51)	155 (6.10)	118 (4.65)	133 (5.24)
	<b>40 (1"1/2)</b>	<b>L</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>
		<b>H</b>	213 (8.39)	213 (8.39)	213 (8.39)	213 (8.39)	220 (8.66)	207 (8.15)	221 (8.7)
		<b>D</b>	<b>150 (5.90)</b>	<b>150 (5.90)</b>	<b>150 (5.90)</b>	<b>150 (5.90)</b>	<b>170 (6.69)</b>	<b>127 (5)</b>	<b>156 (6.14)</b>
	<b>50 (2")</b>	<b>L</b>	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)
		<b>H</b>	<b>228 (8.98)</b>	<b>228 (8.98)</b>	<b>228 (8.98)</b>	<b>228 (8.98)</b>	<b>233 (9.17)</b>	<b>222 (8.74)</b>	<b>228 (8.98)</b>
		<b>D</b>	165 (6.50)	165 (6.50)	165 (6.50)	165 (6.50)	180 (7.09)	152 (5.98)	165 (6.5)
	<b>65 (2"1/2)</b>	<b>L</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>	<b>200 (7.87)</b>
		<b>H</b>	248 (9.76)	248 (9.76)	248 (9.76)	248 (9.76)	257 (10.12)	245 (9.65)	251 (9.88)
		<b>D</b>	<b>185 (7.28)</b>	<b>185 (7.28)</b>	<b>185 (7.28)</b>	<b>185 (7.28)</b>	<b>205 (8.07)</b>	<b>178 (7.01)</b>	<b>191 (7.52)</b>
	<b>80 (3")</b>	<b>L</b>	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)
		<b>H</b>	<b>263 (10.35)</b>	<b>263 (10.35)</b>	<b>263 (10.35)</b>	<b>263 (10.35)</b>	<b>267 (10.51)</b>	<b>259 (10.2)</b>	<b>268 (10.55)</b>
		<b>D</b>	200 (7.87)	200 (7.87)	200 (7.87)	200 (7.87)	215 (8.46)	191 (7.52)	210 (8.27)
	<b>100 (4")</b>	<b>L</b>	<b>250 (9.84)</b>	<b>250 (9.84)</b>	<b>250 (9.84)</b>	<b>250 (9.84)</b>	<b>250 (9.84)</b>	<b>250 (9.84)</b>	<b>250 (9.84)</b>
		<b>H</b>	283 (11.14)	283 (11.14)	294 (11.57)	294 (11.57)	297 (11.69)	288 (11.34)	300 (11.81)
		<b>D</b>	<b>220 (8.66)</b>	<b>220 (8.66)</b>	<b>235 (9.25)</b>	<b>235 (9.25)</b>	<b>250 (9.84)</b>	<b>229 (9.02)</b>	<b>254 (10)</b>
	<b>125 (5")</b>	<b>L</b>	250 (9.84)	250 (9.84)	250 (9.84)	250 (9.84)	250 (9.84)	250 (9.84)	250 (9.84)
		<b>H</b>	<b>313 (12.32)</b>	<b>313 (12.32)</b>	<b>325 (12.80)</b>	<b>325 (12.80)</b>	<b>330 (13)</b>	<b>315 (12.4)</b>	<b>328 (12.91)</b>
		<b>D</b>	250 (9.84)	250 (9.84)	270 (10.63)	270 (10.63)	295 (11.61)	254 (10)	279 (10.98)
	<b>150 (6")</b>	<b>L</b>	<b>300 (11.81)</b>	<b>300 (11.81)</b>	<b>300 (11.81)</b>	<b>300 (11.81)</b>	<b>300 (11.81)</b>	<b>300 (11.81)</b>	<b>300 (11.81)</b>
		<b>H</b>	344 (13.54)	344 (13.54)	355 (13.98)	355 (13.98)	377 (14.84)	341 (13.43)	360 (14.17)
		<b>D</b>	<b>285 (11.22)</b>	<b>285 (11.22)</b>	<b>300 (11.81)</b>	<b>300 (11.81)</b>	<b>345 (13.58)</b>	<b>279 (10.98)</b>	<b>318 (12.52)</b>
	<b>200 (8")</b>	<b>L</b>	350 (13.78)	350 (13.78)	350 (13.78)	350 (13.78)	350 (13.78)	350 (13.78)	350 (13.78)
<b>H</b>		<b>399 (15.71)</b>	<b>399 (15.71)</b>	<b>415 (16.34)</b>	<b>425 (16.73)</b>	<b>435 (17.13)</b>	<b>401 (15.79)</b>	<b>420 (16.54)</b>	
<b>D</b>		340 (13.39)	340 (13.39)	360 (14.17)	375 (14.76)	415 (16.34)	343 (13.5)	381 (15)	
<b>250 (10)</b>	<b>L</b>	<b>450 (17.72)</b>	<b>450 (17.72)</b>	<b>450 (17.72)</b>	<b>450 (17.72)</b>	<b>450 (17.72)</b>	<b>450 (17.72)</b>	<b>450 (17.72)</b>	
	<b>H</b>	454 (17.87)	460 (18.11)	475 (18.7)	493 (19.41)	491 (19.33)	461 (18.15)	480 (18.9)	
	<b>D</b>	<b>395 (15.55)</b>	<b>405 (15.94)</b>	<b>425 (16.73)</b>	<b>450 (17.72)</b>	<b>470 (18.5)</b>	<b>406 (15.98)</b>	<b>445 (17.52)</b>	
<b>300 (12")</b>	<b>L</b>	500 (19.69)	500 (19.69)	500 (19.69)	500 (19.69)	500 (19.69)	500 (19.69)	500 (19.69)	
	<b>H</b>	<b>504 (19.84)</b>	<b>515 (20.28)</b>	<b>535 (21.06)</b>	<b>558 (21.97)</b>	<b>545 (21.46)</b>	<b>527 (20.75)</b>	<b>546 (21.5)</b>	
	<b>D</b>	445 (17.52)	460 (18.11)	485 (19.09)	515 (20.28)	530 (20.87)	483 (19.02)	521 (20.51)	
<b>350 (14")</b>	<b>L</b>	<b>550 (21.65)</b>	<b>550 (21.65)</b>	<b>550 (21.65)</b>	<b>550 (21.65)</b>	<b>550 (21.65)</b>	<b>550 (21.65)</b>	<b>550 (21.65)</b>	
	<b>H</b>	564 (22.2)	575 (22.64)	598 (23.54)	619 (24.37)	603 (23.74)	582 (22.91)	607 (23.9)	
	<b>D</b>	<b>505 (19.88)</b>	<b>520 (20.47)</b>	<b>555 (21.85)</b>	<b>580 (22.83)</b>	<b>600 (23.62)</b>	<b>533 (20.98)</b>	<b>584 (22.99)</b>	
<b>400 (16")</b>	<b>L</b>	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	
	<b>H</b>	<b>620 (24.41)</b>	<b>630 (24.8)</b>	<b>659 (25.94)</b>	<b>695 (27.36)</b>	<b>670 (26.38)</b>	<b>639 (25.16)</b>	<b>664 (26.14)</b>	
	<b>D</b>	565 (22.24)	580 (22.83)	62 (2.44)	660 (25.98)	670 (26.38)	597 (23.5)	648 (25.51)	
<b>450 (18")</b>	<b>L</b>	<b>600 (23.62)</b>	<b>600 (23.62)</b>	<b>600 (23.62)</b>	<b>600 (23.62)</b>		<b>600 (23.62)</b>	<b>600 (23.62)</b>	
	<b>H</b>	670 (26.38)	690 (27.17)	709 (27.91)	720 (28.35)		688 (27.09)	726 (28.58)	
	<b>D</b>	<b>615 (24.21)</b>	<b>640 (25.2)</b>	<b>670 (26.38)</b>	<b>685 (26.97)</b>		<b>635 (25)</b>	<b>711 (27.99)</b>	
<b>500 (20")</b>	<b>L</b>	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)		600 (23.62)	600 (23.62)	
	<b>H</b>	<b>725 (28.54)</b>	<b>758 (29.84)</b>	<b>769 (30.28)</b>	<b>784 (30.87)</b>		<b>751 (29.57)</b>	<b>770 (30.31)</b>	
	<b>D</b>	670 (26.38)	715 (28.15)	730 (28.74)	755 (29.72)		699 (27.52)	775 (30.51)	

<b>MS 2500 PN 10/64 - ANSI 150/300 OVERALL DIMENSIONS</b>									
Dimensions mm(inches)		PN							
		PN 10	PN 16	PN 25	PN 40	PN 64	ANSI 150	ANSI 300	
DN	600 (24")	L	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)		600 (23.62)	600 (23.62)
		H	830 (32.68)	879 (34.61)	880 (34.65)	911 (35.87)		866 (34.09)	916 (36.06)
		D	780 (30.71)	840 (33.07)	845 (33.27)	890 (35.04)		813 (32.01)	914 (35.98)
	650 (26")	L						650 (25.59)	650 (25.59)
		H						921 (36.26)	1002 (39.45)
		D						870 (34.25)	972 (38.27)
	700 (28")	L	700 (27.56)	700 (27.56)	700 (27.56)	700 (27.56)		700 (27.56)	
		H	895 (35.24)	949 (37.36)	989 (38.94)	1016 (40)		1016 (40)	
		D	800 (31.5)	910 (35.83)	960 (37.8)	995 (39.17)		927,1 (36,5)	
	750 (30")	L						750 (29.53)	750 (29.53)
		H						1032 (40.63)	1121 (44.13)
		D						984 (38.74)	1092 (42.99)
	800 (32")	L	800 (31.5)	800 (31.5)	800 (31.5)	800 (31.5)		800 (31.5)	
		H	1058 (41.65)	1060 (41.73)	1106 (43.54)	1149 (45.24)		1149 (45.24)	
		D	1015 (39.96)	1025 (40.35)	1085 (42.72)	1114 (43.86)		1060,5 (47,15)	
	850 (34")	L						850 (33.46)	850 (33.46)
		H						1149 (45.24)	1230 (48.43)
		D						1111 (43.74)	1207 (47.52)
	900 (36")	L	900 (35.43)	900 (35.43)	900 (35.43)	900 (35.43)		900 (35.43)	900 (35.43)
		H	1158 (45.59)	1160 (45.67)	1206 (47.48)	1259 (49.57)		1206 (47.48)	1292 (50.87)
		D	1115 (43.9)	1125 (44.29)	1185 (46.65)	1250 (49.21)		1168 (45.98)	1270 (50)
	1000 (40")	L	1000 (39.37)	1000 (39.37)	1000 (39.37)	1000 (39.37)		1000 (39.37)	1000 (39.37)
		H	1269 (49.96)	1284 (50.55)	1329 (52.32)	1369 (53.9)		1381 (54.37)	1467 (57.76)
		D	1230 (48.43)	1255 (49.41)	1320 (51.97)	1360 (53.54)		1346 (52.99)	1448 (57.01)
	1050 (42")	L						1050 (41.3)	
		H						1355.0 (54.00)	
		D						1346.2 (53.00)	
	1100 (44")	L						1100 (43.3)	
H							1428 (56.25)		
D							1403.4 (55.25)		
1200 (48")	L	1200 (47.24)	1200 (47.24)				1200 (47.24)		
	H	1498 (59.92)	1518 (59.76)				1530 (60.50)		
	D	1455 (57.28)	1485 (58.46)				1511.3 (59.50)		
1400 (56")	L	1400 (55.18)	1400 (55.18)						
	H	1711 (67.36)	1714 (67.46)						
	D	1675 (65.94)	1685 (66.34)						
1600 (56")	L	1600 (62.99)	1600 (62.99)						
	H	1944 (76.52)	1947 (76.65)						
	D	1915 (75.39)	1930 (75.98)						
1800 (72")	L	1800 (70.87)	1800 (70.87)				1800 (72.00)		
	H	2144 (84.39)	2147 (84.53)				2190 (54.37)		
	D	2115 (83.27)	2130 (75.98)				2197 (86.50)		
2000 (80")	L	2000 (78.74)	2000 (78.74)						
	H	2352 (92.66)	2356 (92.77)						
	D	2325 (91.53)	2345 (92.32)						

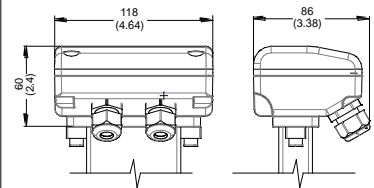
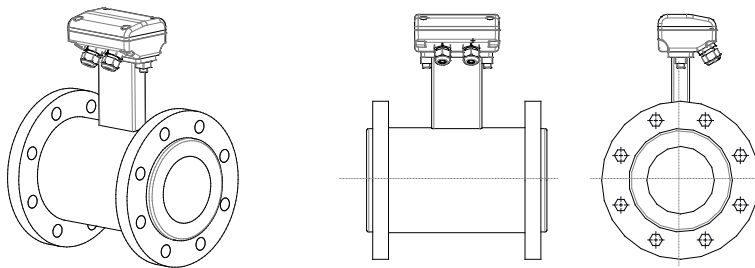
# VERSIONS

## COMPACT VERSION



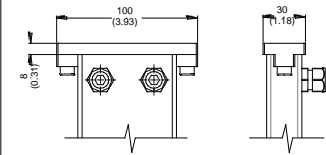
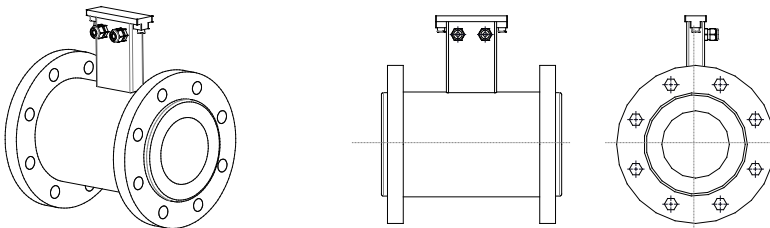
Converter's overall dimensions are defined in the relevant manual

## SEPARATE VERSION FOR PAINTED SENSORS WITH OR WITHOUT PREAMPLIFIER



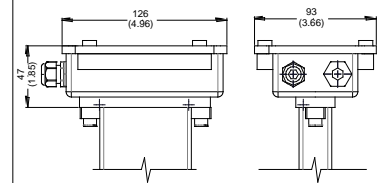
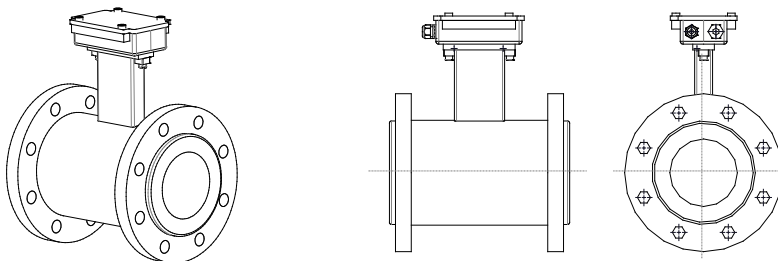
Sensors with Junction box

## SEPARATE VERSION FOR STAINLESS STEEL SENSORS



Sensors with cover

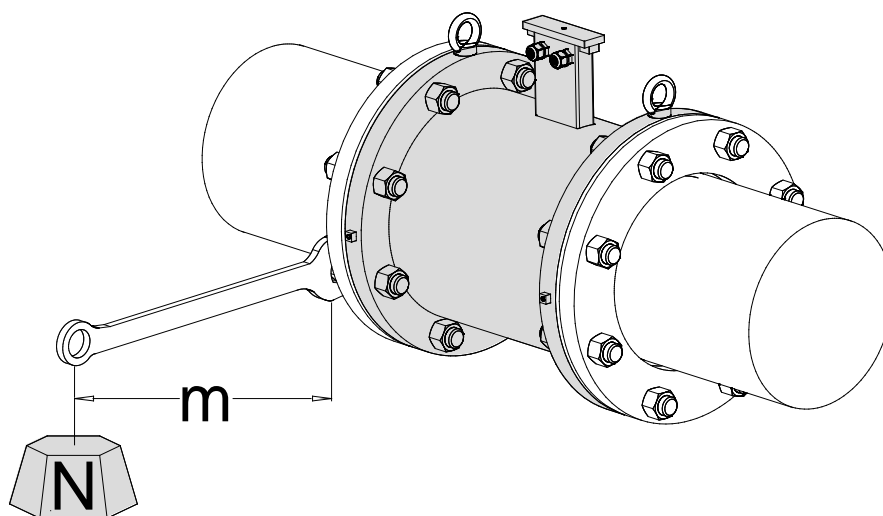
## SEPARATE VERSION FOR STAINLESS STEEL SENSOR WITH PREAMPLIFIER



Sensors with preamplifier



## TORQUES (Nm)

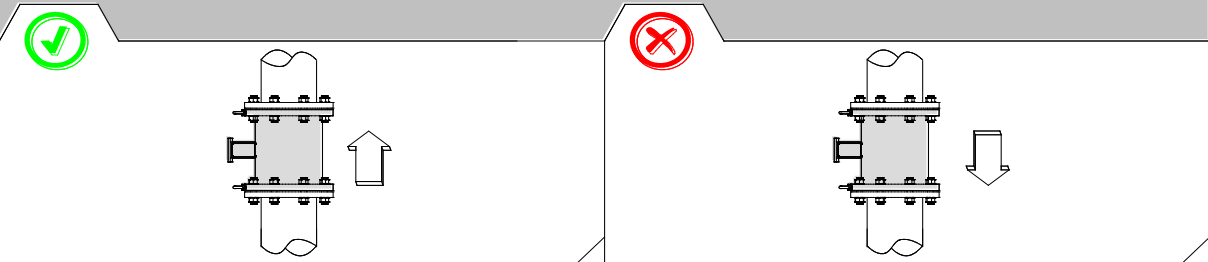


OPERATIVE PRESSURE										
Kpa	1000		1600		2500		4000		6400	
psi	140		260		350		600		1000	
DN	PTFE	EBON.	PTFE	EBON.	PP	PTFE	EBON.	PTFE	EBON.	EBON.
25			25 (21)		19	25		25 [32]		39 [32]
32			43 (26)		28	43		43 [40]		53 [40]
40			53 (32)		36	53		53 [63]		72 [63]
50			68 (60)		52	68		68 [35]		81 [35]
65			90 (78)		75	45		45 [53]		58 [53]
80			53 (89)		41	53		53 [68]		62 [68]
100			59 (70)		56	83		83 [94]		87 [94]
125			77 (94)		71	112		112 [130]		148 [130]
150			108 (106)		106	135		135 [113]		217 [113]
200	148	123	99 (148)	82 (124)		134	112	178 [178]	149 [148]	233 [178]
250	123	103	140 (156)	117 (130)		204	170	267 [185]	223 [154]	321 [185]
300	142	119	175 (234)	146 (195)		201	168	278 [275]	232 [229]	317 [275]
350	172	143	205 (325)	171 (271)		324	270	422 [318]	352 [265]	481 [318]
400	217	181	282 (312)	235 (260)		426	355	619 [411]	516 [342]	623 [411]
450	194	161	281 (336)	234 (280)				[398]	[332]	
500	224	186	382 (317)	318 (264)				[465]	[387]	
550			(379)	(316)				[608]	[506]	
600	323	269	568 (463)	474 (386)				[774]	[645]	
650			(429)	(357)				[753]	[627]	
700	356	297	421 (503)	351 (420)				[947]	[789]	
750			(451)	(376)				[1105]	[920]	
800	476	400	549	446						
850			(563)	(469)				[1373]	[1144]	
900	450	380	519 (618)	395 (515)				[1408]	[1173]	
1000	582	485	721 (736)	546 (613)				[1598]	[1332]	

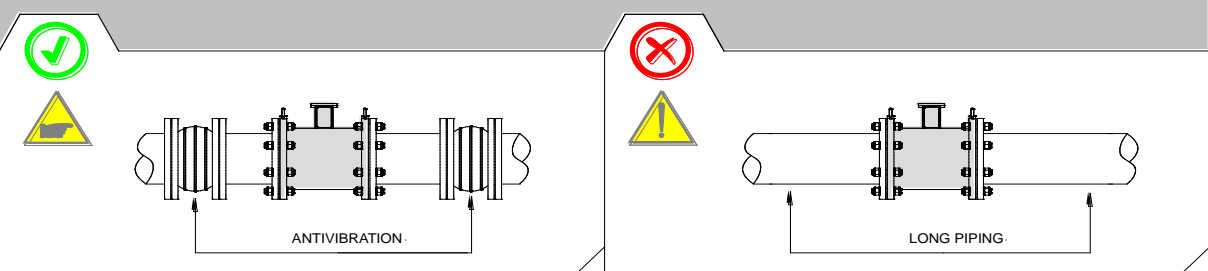
- Tighten uniformly in diagonally opposite sequence
- Above torques values are suitable for flanges:  
EN1092-1, DIN 2501, BS 4504, ANSI B16.5 , JIS
- The use of DIN 2690 gaskets is recommended
- For DN > 1000 contact the manufacturer
- Value within round brackets (xxxx)= ANSI 150
- Value within squared brackets [xxxx]= ANSI 300

## INSTALLATION RECCOMENDATIONS

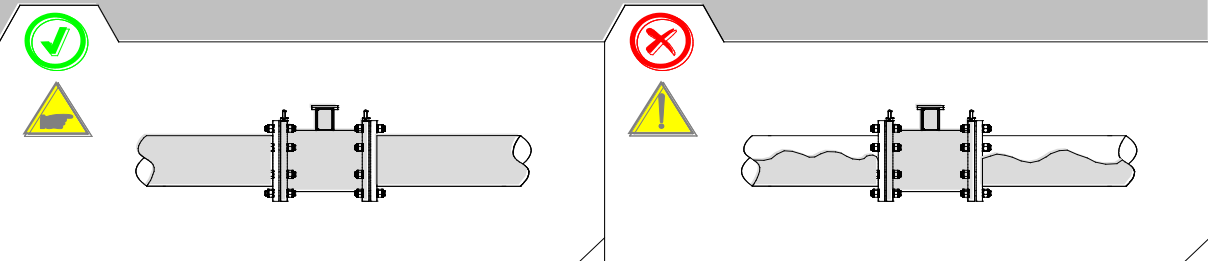
In vertical installations an ascending flow is preferable. For vertical installations with descending flow direction contact the manufacturer



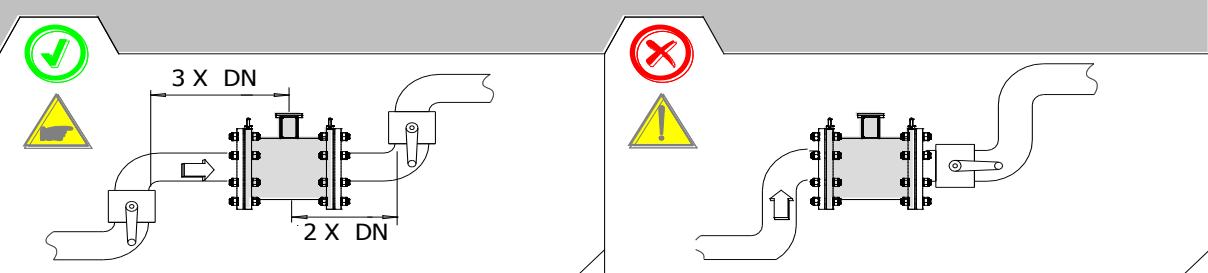
For installations in long pipe lines, please use anti vibration joints



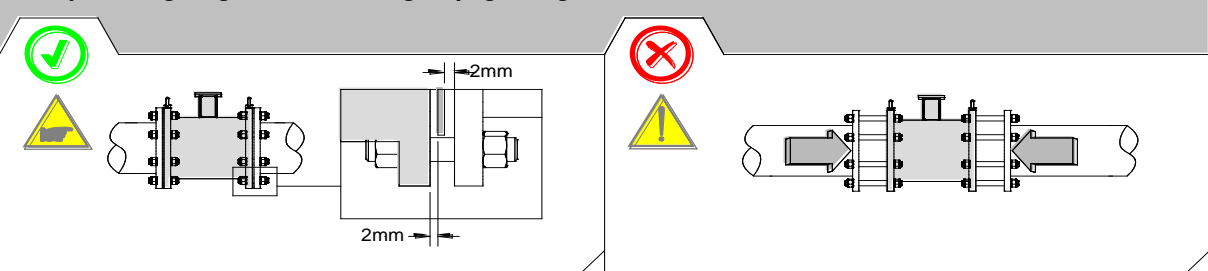
Avoid a partially empty pipe, during operation the pipe must be either completely full of liquid or completely empty



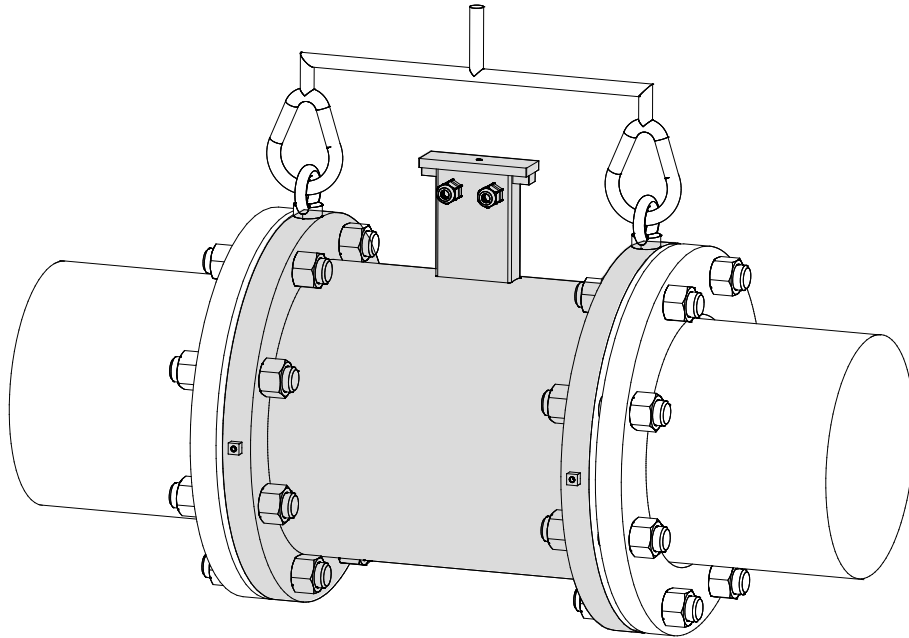
Install the sensor away from bends and hydraulic accessories



Avoid positioning flange and counter flanges by tightening the nuts.



## RECCOMENDED INSTALLATION PROCEDURE

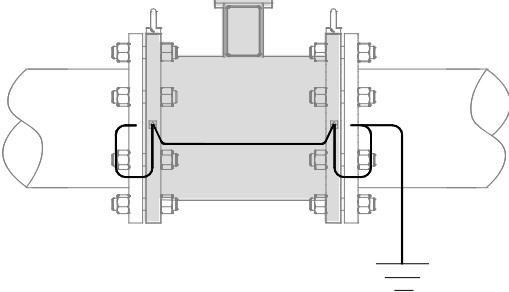
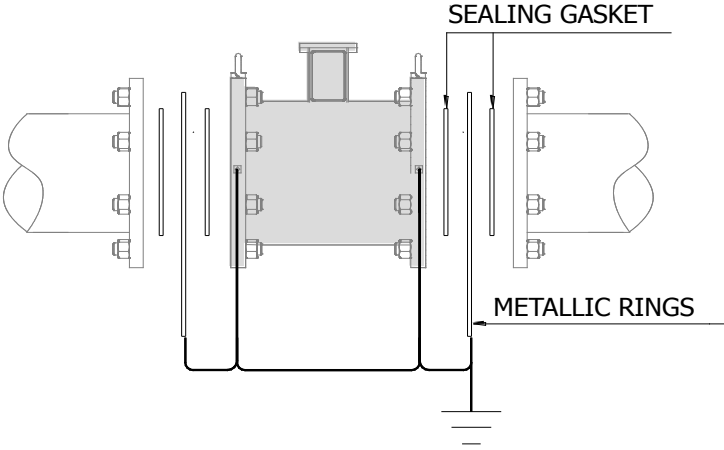
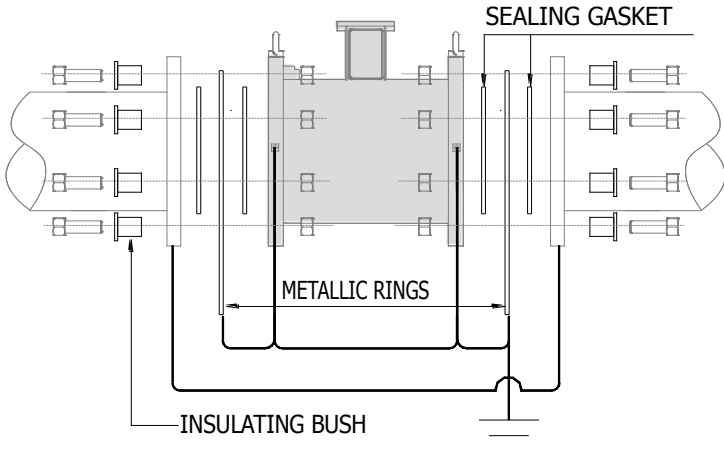


Sensors weighing more than 20Kg are equipped of appropriate eyebolts to lift the sensor according to the drawing above.

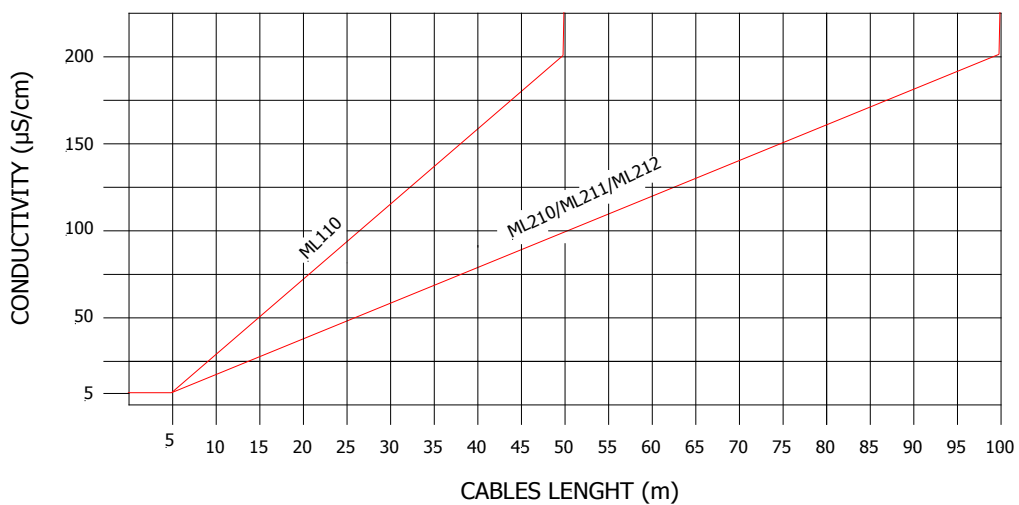
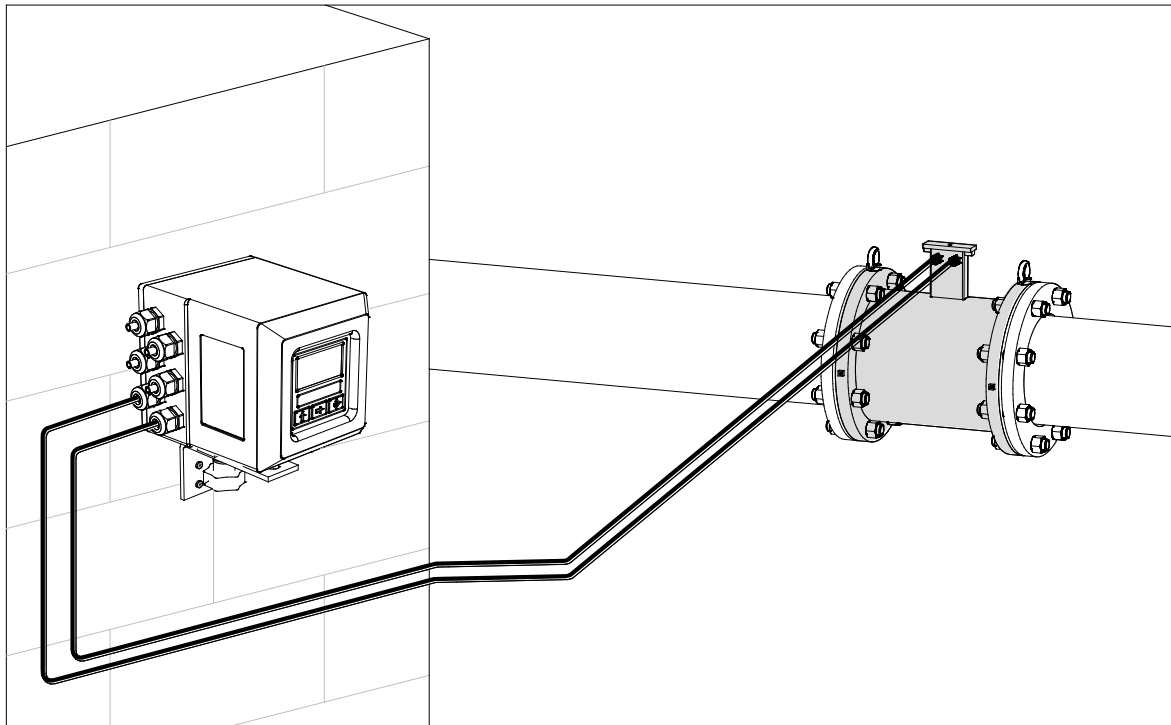
NOTE :

**The eyebolts support ONLY the weight of the meter.**

## SENSOR GROUNDING

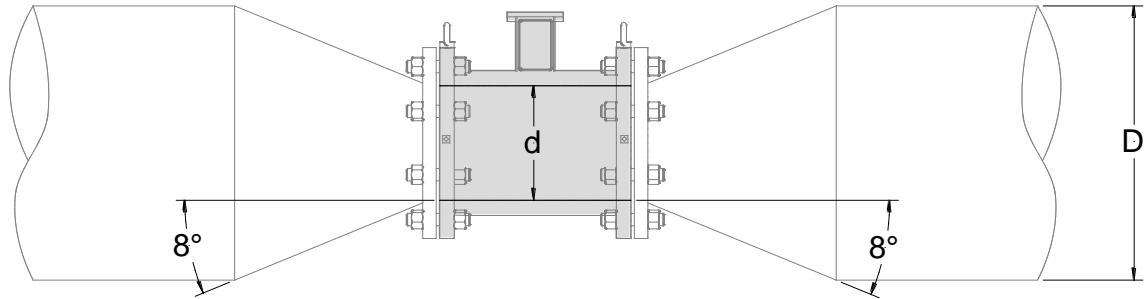
<b>METALLIC PIPE</b>	
	
<b>INSULATED PIPE</b>	
	<p>-If the sensor has to be installed in a pipe made of an insulating material, the following are necessary:</p> <ul style="list-style-type: none"> <li>- Inserting two metallic rings between the sensor flanges and the pipe line counter flanges</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>- Using a sensor with the additional grounding electrode</li> </ul>
<b>PIPE WITH CATHODIC PROTECTION</b>	
	<p>If the sensor has to be installed in the pipe with a cathodic protection, the following are necessary:</p> <ul style="list-style-type: none"> <li>- using insulating bushes to isolate the bolts</li> <li>- Metallic grounding rings should be provided to ground the liquid using insulating gasket between the rings</li> </ul>

## 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 µS/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:

$\Delta p$  = Pressure loss in [Pa]

$\rho$  = Fluid density [kg/m<sup>3</sup>] typical value  $\rho = 1000$ [kg/m<sup>3</sup>]

$d$  = sensor diameter [m]

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

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

Calculation examples $\Delta p$ [mbar]								
$d/D \backslash u$	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 :

- $\rho = 1000$ [kg/m<sup>3</sup>] 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].

## MS2500: MI-001 DETAILS

The sensor's diameters listed below, coupled with ML210 and ML110 , are certified according to European Directive 2004/22CE category MI-001 (OIML R49)

Sensor Size	mm	25	32	40	50	65	80	100	125	150	200
	inch	1	1 ¼	1 ½	2	2 ½	3	4	5	6	8
Q1	m <sup>3</sup> /h	0.1	0.156	0.25	0.394	0.625	1	1.563	2.5	3.938	6.25
Q2	m <sup>3</sup> /h	0.16	0.25	0.4	0.63	1	1.6	2.5	4	6.3	10
Q3	m <sup>3</sup> /h	<b>16.0</b>	<b>25.0</b>	<b>40.0</b>	<b>63.0</b>	<b>100.0</b>	<b>160.0</b>	<b>250.0</b>	<b>400.0</b>	<b>630.0</b>	<b>1000</b>
Q4	m <sup>3</sup> /h	20	31.3	50	78.8	125	200	312.5	500	787.5	1250

### MI-001 ALLOWABLE RANGE

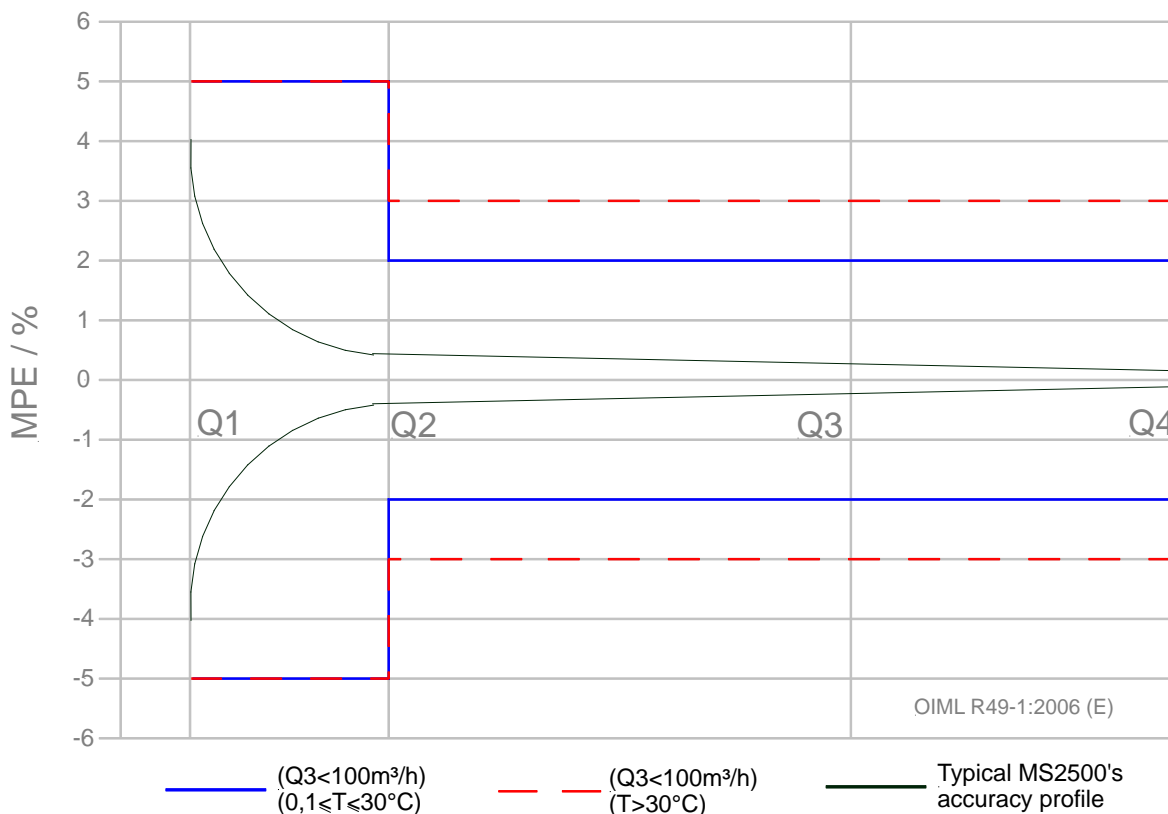
- Q3 allowed range :

/m <sup>3</sup> h <sup>-1</sup>	/dm <sup>3</sup> s <sup>-1</sup>	/m <sup>3</sup> h <sup>-1</sup>	/dm <sup>3</sup> s <sup>-1</sup>	/m <sup>3</sup> h <sup>-1</sup>	/dm <sup>3</sup> s <sup>-1</sup>	/m <sup>3</sup> h <sup>-1</sup>	/dm <sup>3</sup> s <sup>-1</sup>	/m <sup>3</sup> h <sup>-1</sup>	/dm <sup>3</sup> s <sup>-1</sup>
1	0,278	1,6	0,444	2,5	0,694	4	1,111	6,3	1,750
10	2,778	16	4,444	25	6,944	40	11,11	63	17,50
100	27,78	160	44,44	250	69,44	400	111,1	630	175,0
1000	277,8	1600	444,4	2500	694,4	4000	1111	6300	1750

- Q2 /Q1=1,6
- Q4 /Q3=1,25
- R (= Q3/Q1) allowed range :

10	12,5	16	20	25	31,5	40	50	63	80
100	125	160	200	250	315	400	500	630	800

### OIML R49 ACCURACY CLASS 2 (Maximum Permissible Error)



## MS2500: MI-004

The sensor's diameters listed below, coupled with ML210 and ML110, are certified according to European Directive 2004/22CE category MI-004

DN sensore	mm	25	32	40	50	65	80	100	125	150	200
	inch	1	1 ¼	1 ½	2	2 ½	3	4	5	6	8
q <sub>i</sub>	m <sup>3</sup> /h	0.16	0.25	0.4	0.63	1	1.6	2.5	4	6.3	10
0,1 q <sub>p</sub>	m <sup>3</sup> /h	1.6	2.5	4	6.3	10	16	25	40	63	100
q <sub>p (10m/s)</sub>	m <sup>3</sup> /h	16	25	40	63	100	160	250	400	630	1000
<b>q<sub>p</sub>/q<sub>i</sub></b>		<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

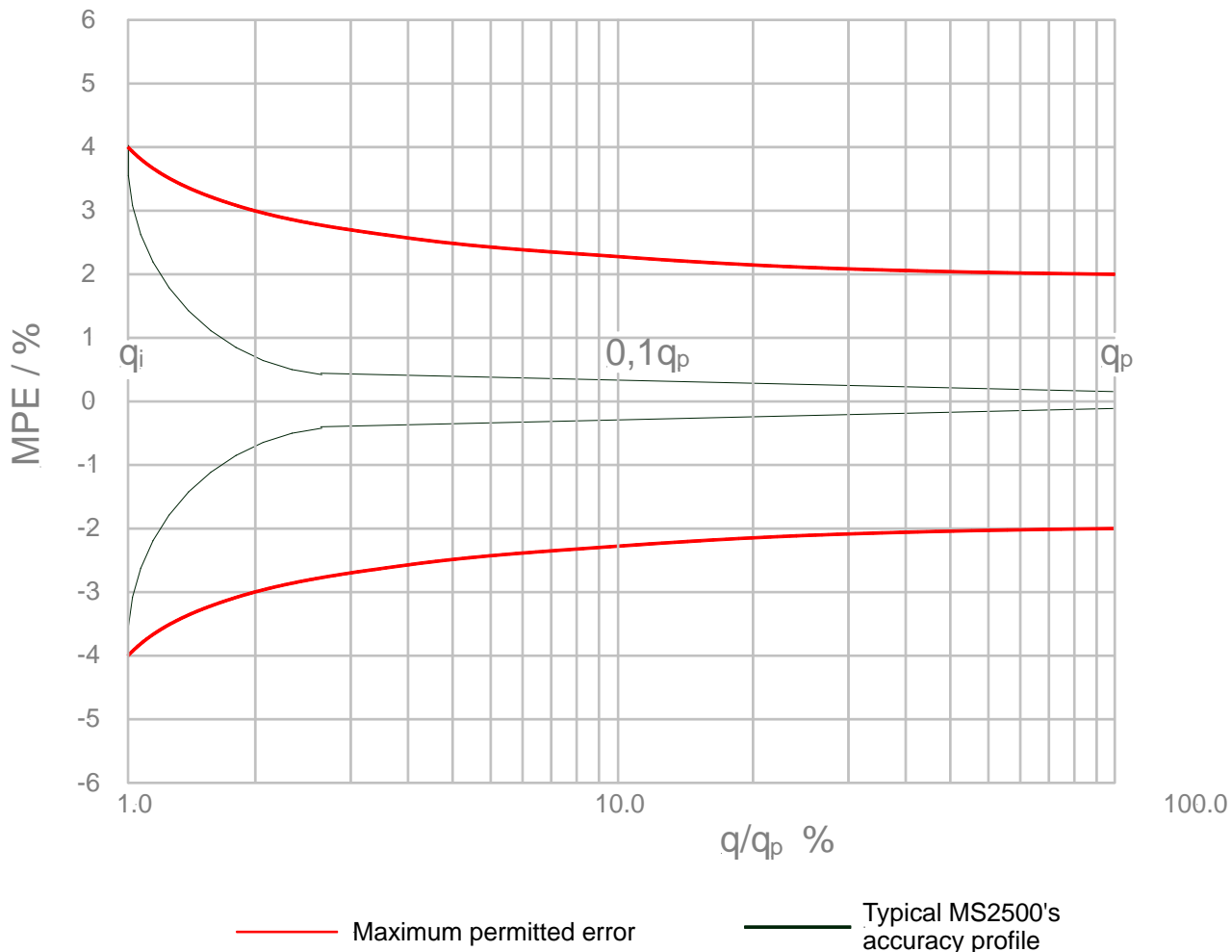
DN sensore	mm	25	32	40	50	65	80	100	125	150	200
	inch	1	1 ¼	1 ½	2	2 ½	3	4	5	6	8
q <sub>i</sub>	m <sup>3</sup> /h	0.2	0.32	0.5	0.8	1.26	2	3.2	5	8	12.6
0,1 q <sub>p</sub>	m <sup>3</sup> /h	1	1.6	2.5	4	6.3	10	16	25	40	63
q <sub>p (5m/s)</sub>	m <sup>3</sup> /h	10	16	25	40	63	100	160	250	400	630
<b>q<sub>p</sub>/q<sub>i</sub></b>			<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>

DN sensore	mm	25	32	40	50	65	80	100	125	150	200
	inch	1	1 ¼	1 ½	2	2 ½	3	4	5	6	8
q <sub>i</sub>	m <sup>3</sup> /h	0.16	0.252	0.4	0.64	1	1.6	2.52	4	6.4	10
0,1 q <sub>p</sub>	m <sup>3</sup> /h	0.4	0.63	1	1.6	2.5	4	6.3	10	16	25
q <sub>p (2;5m/s)</sub>	m <sup>3</sup> /h	4	6.3	10	16	25	40	63	100	160	250
<b>q<sub>p</sub>/q<sub>i</sub></b>			<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>

DN sensore	mm	25	32	40	50	65	80	100	125	150	200
	inch	1	1 ¼	1 ½	2	2 ½	3	4	5	6	8
q <sub>i</sub>	m <sup>3</sup> /h	0.16	0.25	0.4	0.63	1	1.6	2.5	4	6.3	10
0,1 q <sub>p</sub>	m <sup>3</sup> /h	0.16	0.25	0.4	0.63	1	1.6	2.5	4	6.3	10
q <sub>p (1,0m/s)</sub>	m <sup>3</sup> /h	1.6	2.5	4	6.3	10	16	25	40	63	100
<b>q<sub>p</sub>/q<sub>i</sub></b>		<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>



MID 004 - MPE CLASS 2  
(Maximum permitted error)



## HOW TO ORDER

MS 2500	
code	Nominal Diameter / Lining / Liquid temperature / Measuring range
<b>P25</b>	DN25 (1"), P.P. lining, liquid maximum temp. 60 °C measuring range 0...0,72/0...18 m3/h
<b>T25</b>	DN25 (1"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...0,72/0...18 m3/h
<b>HT25</b>	DN25 (1"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...0,72/0...18 m3/h
<b>P32</b>	DN32 (1 1/4"), P.P. lining, liquid maximum temp. 60 °C measuring range 0...1,16/0...29 m3/h
<b>T32</b>	DN32 (1 1/4"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...1,16/0...29 m3/h
<b>P40</b>	DN32 (1 1/4"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...1,16/0...29 m3/h
<b>T40</b>	DN40 (1 1/2"), P.P. lining, liquid maximum temp. 60 °C measuring range 0...1,8/0...45 m3/h
<b>HT40</b>	DN40 (1 1/2"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...1,8/0...45 m3/h
<b>P50</b>	DN50 (2"), P.P. lining, liquid maximum temp. 60 °C measuring range 0...2,88/0...72 m3/h
<b>T50</b>	DN50 (2"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...2,88/0...72 m3/h
<b>HT50</b>	DN50 (2"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...2,88/0...72 m3/h
<b>R50</b>	DN50 (2"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...2,88/0...72 m3/h
<b>P65</b>	DN65 (2 1/2"), P.P. lining, liquid maximum temp. 60 °C measuring range 0...4,8/0...120 m3/h
<b>T65</b>	DN65 (2 1/2"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...4,8/0...120 m3/h
<b>HT65</b>	DN65 (2 1/2"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...4,8/0...120 m3/h
<b>R65</b>	DN65 (2 1/2"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...4,8/0...120 m3/h
<b>P80</b>	DN80 (3"), P.P. lining, liquid maximum temp. 60 °C measuring range 0...7,2/0...180 m3/h
<b>T80</b>	DN80 (3"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...7,2/0...180 m3/h
<b>HT80</b>	DN80 (3"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...7,2/0...180 m3/h
<b>R80</b>	DN80 (3"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...7,2/0...180 m3/h
<b>P100</b>	DN100 (4"), P.P. lining, liquid maximum temp. 60 °C measuring range 0...11,2/0...280 m3/h
<b>T100</b>	DN100 (4"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...11,2/0...280 m3/h
<b>HT100</b>	DN100 (4"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...11,2/0...280 m3/h
<b>R100</b>	DN100 (4"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...11,2/0...280 m3/h
<b>P125</b>	DN125 (5"), P.P. lining, liquid maximum temp. 60 °C measuring range 0...18/0...450 m3/h
<b>T125</b>	DN125 (5"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...18/0...450 m3/h
<b>HT125</b>	DN125 (5"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...18/0...450 m3/h
<b>R125</b>	DN125 (5"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...18/0...450 m3/h
<b>P150</b>	DN150 (6"), P.P. lining, liquid maximum temp. 60 °C measuring range 0...25,6/0...640 m3/h
<b>T150</b>	DN150 (6"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...25,6/0...640 m3/h
<b>HT150</b>	DN150 (6"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...25,6/0...640 m3/h
<b>R150</b>	DN150 (6"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...25,6/0...640 m3/h
<b>E200</b>	DN200 (8"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...45,2/0...1130 m3/h
<b>T200</b>	DN200 (8"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...45,2/0...1130 m3/h
<b>HT200</b>	DN200 (8"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...45,2/0...1130 m3/h
<b>R200</b>	DN200 (8"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...45,2/0...1130 m3/h
<b>E250</b>	DN250 (10"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...70,8/0...1770 m3/h
<b>T250</b>	DN250 (10"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...70,8/0...1770 m3/h
<b>HT250</b>	DN250 (10"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...70,8/0...1770 m3/h
<b>R250</b>	DN250 (10"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...70,8/0...1770 m3/h
<b>E300</b>	DN300 (12"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...100,8/0...2520 m3/h
<b>T300</b>	DN300 (12"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...100,8/0...2520 m3/h
<b>HT300</b>	DN300 (12"), PTFE lining, liquid maximum temp. 180 °C measuring range 0...100,8/0...2520 m3/h
<b>R300</b>	DN300 (12"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...100,8/0...2520 m3/h
<b>E350</b>	DN350 (14"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...138/0...3450 m3/h
<b>T350</b>	DN350 (14"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...138/0...3450 m3/h
<b>R350</b>	DN350 (14"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...138/0...3450 m3/h

<b>E400</b>	DN400 (16"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...180/0...4500 m3/h
<b>T400</b>	DN400 (16"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...180/0...4500 m3/h
<b>R400</b>	DN400 (16"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...180/0...4500 m3/h
<b>E450</b>	DN450 (18"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...228,8/0...5720 m3/h
<b>T450</b>	DN450 (18"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...228,8/0...5720 m3/h
<b>E500</b>	DN500 (20"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...284/0...7100 m3/h
<b>T500</b>	DN500 (20"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...284/0...7100 m3/h
<b>E550</b>	DN500 (20"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...348/0...8712m3/h
<b>E600</b>	DN600 (24"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...408/0...10200 m3/h
<b>T600</b>	DN600 (24"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...408/0...10200 m3/h
<b>E650</b>	(26"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...480/0...12000 m3/h
<b>T650</b>	(26"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...480/0...12000 m3/h
<b>E700</b>	DN700, Ebonite lining, liquid maximum temp. 80 °C measuring range 0...560/0...14000 m3/h
<b>T700</b>	DN700, PTFE lining, liquid maximum temp. 110 °C measuring range 0...560/0...14000 m3/h
<b>E750</b>	(30"), rEbonite lining, liquid maximum temp. 80 °C measuring range 0...640/0...16000 m3/h
<b>T750</b>	(30"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...640/0...16000 m3/h
<b>E800</b>	DN800, Ebonite lining, liquid maximum temp. 80 °C measuring range 0...720/0...18000 m3/h
<b>T800</b>	DN800, PTFE lining, liquid maximum temp. 110 °C measuring range 0...720/0...18000 m3/h
<b>E850</b>	(34"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...820/0...20500 m3/h
<b>T850</b>	(34"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...820/0...20500 m3/h
<b>E900</b>	DN900 (36"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...920/0...23000 m3/h
<b>T900</b>	DN900 (36"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...920/0...23000 m3/h
<b>E1000</b>	DN1000 (40"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...1140/0...28500 m3/h
<b>T1000</b>	DN1000 (40"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...1140/0...28500 m3/h
<b>E1200</b>	DN1050 (42"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...1270/0...31752 m3/h
<b>E1400</b>	DN400 (16"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...180/0...4500 m3/h
<b>E1600</b>	DN400 (16"), PTFE lining, liquid maximum temp. 110 °C measuring range 0...180/0...4500 m3/h
<b>E1800</b>	DN400 (16"), RILSAN lining, liquid maximum temp. 70 °C measuring range 0...180/0...4500 m3/h
<b>E2000</b>	DN450 (18"), Ebonite lining, liquid maximum temp. 80 °C measuring range 0...228,8/0...5720 m3/h

<b>Gasket material ( internal tightness - only PP lining)</b>		
<b>A</b>	<b>A</b>	No O-Ring (ONLY FOR PTFE/EBANITE/RILSAN LINING)
	<b>B</b>	O-Ring : FKM
	<b>C</b>	O-Ring : Epdm
	<b>Z</b>	O-Ring : to be specified
<b>Flange type</b>		
<b>1</b>	<b>1</b>	Flange EN1092 PN16 (standard with Polypropilene/Rilsan lining)
	<b>2</b>	Flange EN1092 PN10
	<b>3</b>	Flange EN1092 PN25
	<b>4</b>	Flange EN1092 PN40
	<b>5</b>	Flange EN1092 PN64
	<b>6</b>	Flange ANSI 150RF
	<b>7</b>	Flange ANSI 300RF
	<b>8</b>	Flange EN1092 PN6
	<b>9</b>	Flange JIS 10K
	<b>0</b>	Flange: to be specified
<b>Body and Flanges material</b>		
<b>A</b>	<b>A</b>	Body and flange in Carbon Steel, RAL6028 painted
	<b>B</b>	Body and flange in Stainless Steel (AISI304)
	<b>C</b>	Body and flange in Stainless Steel (AISI316)
	<b>Z</b>	Body and flange material: other
<b>Number and electrodes material</b>		
<b>1</b>	<b>1</b>	n. 2 measure electrodes in AISI316
	<b>2</b>	n. 3 (2 measure + 1 for ground) electrodes in AISI316
	<b>4</b>	n. 3 (2 measure + 1 for ground) electrodes in Hastelloy C
	<b>5</b>	n. 3 (2 measure + 1 for ground) electrodes in Titanium
	<b>6</b>	n. 3 (2 measure + 1 for ground) electrodes in Tantalum; <b>not available with PP</b>
	<b>7</b>	n. 3 (2 measure + 1 for ground) electrodes in Platinum; <b>not available with PP</b>
	<b>0</b>	Electrode material: to be specified
<b>Version / Protection Rate</b>		
<b>A</b>	<b>A</b>	Compact version , IP67 protection rate
	<b>B</b>	Separate version , remember to add the cables, protection rate IP68 (standing immersion with 1,5 m of head water)
	<b>E</b>	Separate 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)
	<b>F</b>	Separate version with N° 2 connectors IP 68 suitable for fast cable connections
	<b>G</b>	Separate version with N° 1 connectors IP 68 suitable for fast cable connections
	<b>M</b>	Compact version , IP67 protection rate , with the possibility to turn the converter of 90°
	<b>N</b>	Separate version in Aluminum , with JB PREAMPLIFIRE* (maximum length 500 m.), remember to add the cables ,protection rate IP67
	<b>P</b>	Separate version in AISI 304, with JB PREAMPLIFIRE* (maximum length 500 m.), remember to add the cables ,protection rate IP67
	<b>Q</b>	Separate version with N° 1 connectors IP 68 suitable for fast cable connection to JB PREAMPLIFIRE* in Aluminum (DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST )
	<b>R</b>	Separate version with N° 1 connectors IP 68 suitable for fast cable connections to JB PRAMPLIFIRE* IN AISI 304 (DEFINE THE CABLE LENGHT MAX 500 m-ADD THE
	<b>X</b>	Separate version with JUNCTION BOX in AISI 304 (Rif. Dis R038)



### MS2500-T150-A1A1A (Example of Complete code for order)

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