



**EUROMAG**  
INTERNATIONAL

*Measure > Sense > Innovate*

# SENSOR MUT2200EL

Electromagnetic flowmeter



*The electromagnetic flowmeter for all applications*



DS100-7-ENG



## Sensor MUT2200EL

MUT2200EL sensors represent the state of the art of Euromag International production for water cycle and process applications. The new structure for the generation of the magnetic field and the innovative route of the signal generated by the electrodes, provide a sensor with an extremely wide measurement range:

EL= Extended Linearity

This new sensors series follows the successful tradition of the MUT2200EL, introducing a measurement range of more than 1:1000 without linearization software. These kinds of performances allow very accurate measures on a wide flowrate range and to count lower flow rates that, before, would have been reset because of the effect of the converters cut off.

This flanged sensors series bases its operation on the Faraday Principle, by which a conductor crossing a magnetic field generates a potential perpendicularly orientated to the same field.

In this case the flow tube made in stainless steel AISI 304 is equipped with carbon steel or stainless steel flanges, two coils are installed on the top and inferior part; the magnetic field, generated by the electric current crossing the coil, induces in the electrodes a difference in the potential proportional to the flow rate.

With the aim of measuring such potential of very low values, the interior of the flow tube is electrically insulated, thus the process liquid is no longer in contact neither with the material of the flow tube nor with that of the flange.

The converter used generates the current supplying the coil, acquires the electrodes difference of potential, process the signal to calculate the flowrate and administers the communication with the exterior.

The entire sensor, when installed in the separate version, has a degree of protection IP68 suitable for a permanent immersion in water up to a depth of 1.5m thanks to a welded plate structure containing the coil and the electrodes.



## Body and flanges

The flange and the sensor external surface are acrylic painted. This treatment gives the sensor an excellent resistance to water, even in permanent immersion. When special ambient conditions require it, the MUT2200EL may be supplied in stainless steel, flange included or special painting for C4 class environments.

## Internal lining

The standard internal insulating lining is in PTFE for diameters from DN15 to DN100, in hard rubber (Ebonite) for diameters equal or bigger than DN125. On request, sensors may be supplied coated with PTFE with diameters bigger than DN100. The suitable temperature is limited by the type of internal lining used.

## Electrodes

Standard electrodes in Hastelloy C guarantee a wide compatibility with different kind of liquids; if required, they may be supplied in Hastelloy B, Titanium, Tantalum or Platinum.

## Coupling and sensor connection

MUT2200EL sensors may be coupled with any Euromag converters. In the separate version the sensor is connected to the converter by means of cables whose length depends on the liquid conductivity; the maximum length shall not exceed 100 metres (30 meters in combination with battery operated electronics).

When installed in plastic or coated pipe lines, sensors may require the use of two grounding rings, which are inserted between the flange and the counter flange. On sensors greater or equal than DN50 an empty pipe electrode is supplied as a standard (empty pipe alarm).

## Reference standards

The Euromag magnetic meters are marked CE and are manufactured according to the following standards:

- 2014/35/EU - EN 61010-1:2013 (LVD)
- 2014/30/EU - EN 61326-1:2013 (EMC)
- OIML R49-1:2013
- European directive 2014/32/EU (MID)
- 2014/34/UE - IEC 60079 - 0, IEC 60079 - 18 (ATEX - IECEx) Separate version
- EN ISO 15609-1 and EN ISO 15614-1
- UNI EN ISO 12944-2, painting for C4 class environments (on request)
- PTFE conform to the norms WRAS, FDA, DPR 777/82 e DM 21/09/773
- Ebonite conform to the norms WRAS, FDA e DM174



MUT2200EL - MC608A



Integrated pressure sensor



MUT2200EL - MC608B - GSM - Pressure

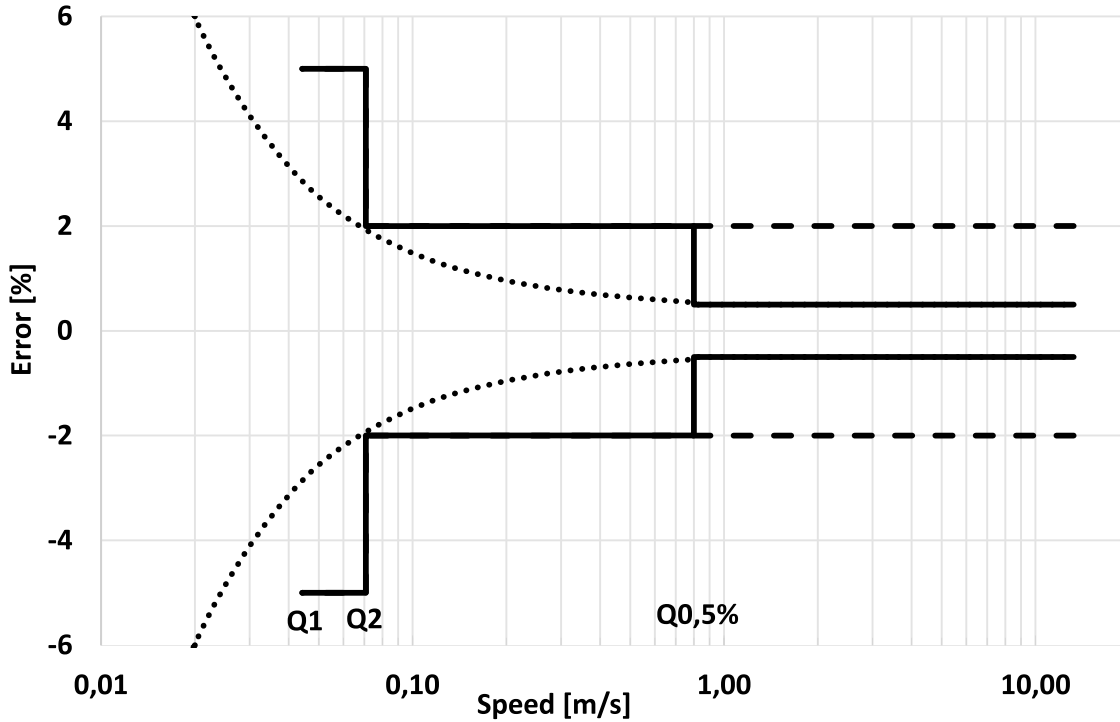


MUT2200EL - PTFE liner

# Calibration and maximum error

Each sensor is calibrated on an hydraulic test rig equipped with a ISO17025 traceable weighing system. The accuracy is equal to 0,2% ± 2mm/s. The repeatability of the measure is about 0,1%. Bi-directional measure. On request the sensors can be supplied certified MID OIML R49 (if coupled to MC406M converters) for custody transfer or OIML R49 with MC608A.

Maximum Permissible Error is within the limits indicated in the following graph:



# Flow rates chart

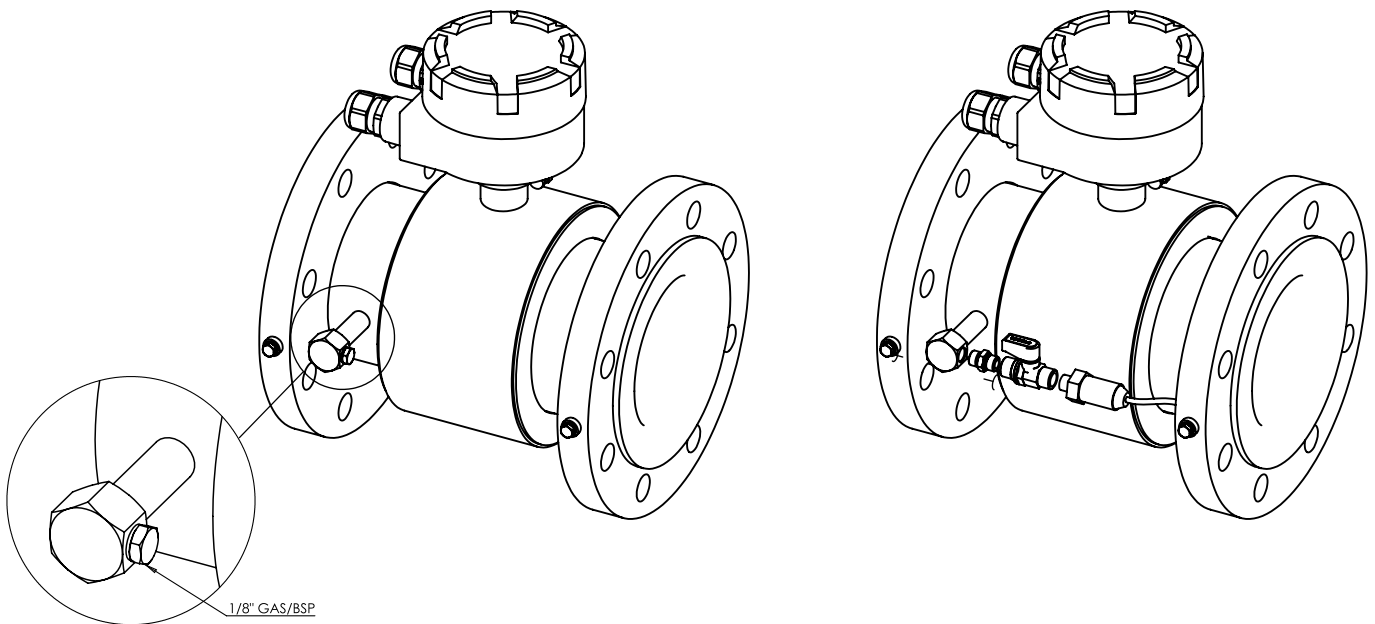
Sensor diameter	Flow rate [m³/h]					Ratio Q3/Q1
	Min. Q1	Trans. Q2	Q0,5%	Perm. Q3	Overl. Q4	
DN25 - 1"	0,080	0,128	1,40	10,00	12,50	125
DN32 - 1 1/4"	0,080	0,128	2,30	10,00	12,50	125
DN40 - 1 1/2"	0,128	0,205	3,60	16,00	20,00	125
DN 50 - 2"	0,200	0,320	5,65	25,00	31,25	125
DN 65 - 2 1/2"	0,320	0,512	9,55	40,00	50,00	125
DN 80 - 3"	0,504	0,806	14,50	63,00	78,75	125
DN 100 - 4"	0,800	1,280	22,60	100,00	125,00	125
DN 125 - 5"	1,280	2,048	35,30	160,00	200,00	125
DN 150 - 6"	2,000	3,200	51,00	250,00	312,50	125
DN 200 - 8"	3,200	5,120	90,50	400,00	500,00	125
DN 250 - 10"	5,040	8,064	140,00	630,00	787,50	125
DN 300 - 12"	8,000	12,800	200,00	1.000,00	1.250,00	125
DN 350 - 14"	12,800	20,480	280,00	1.600,00	2.000,00	125
DN 400 - 16"	12,800	20,480	360,00	1.600,00	2.000,00	125

Sensor diameter	Flow rate [m³/h]					Ratio Q3/Q1
	Min. Q1	Trans. Q2	Q0,5%	Perm. Q3	Overl. Q4	
DN450 - 18"	25	40	460	2.500	3.125	100
DN500 - 20"	25	40	570	2.500	3.125	100
DN600 - 24"	50	80	820	4.000	5.000	80
DN700 - 28"	50	80	1.100	4.000	5.000	80
DN800 - 32"	100	160	1.450	6.300	7.875	63
DN900 - 36"	100	160	1.840	6.300	7.875	63
DN1000 - 40"	200	320	2.270	10.000	12.500	50
DN1200 - 48"	320	512	3.270	16.000	20.000	50
DN1400 - 56"	500	800	4.440	25.000	31.250	50
DN1500 - 60"	800	1.280	5.100	40.000	50.000	50
DN1600 - 64"	1.260	2.016	5.800	63.000	78.750	50
DN1800 - 72"	2.000	3.200	7.350	100.000	125.000	50
DN2000 - 80"	3.200	5.120	9.100	160.000	200.000	50

# MUT2200EL general features

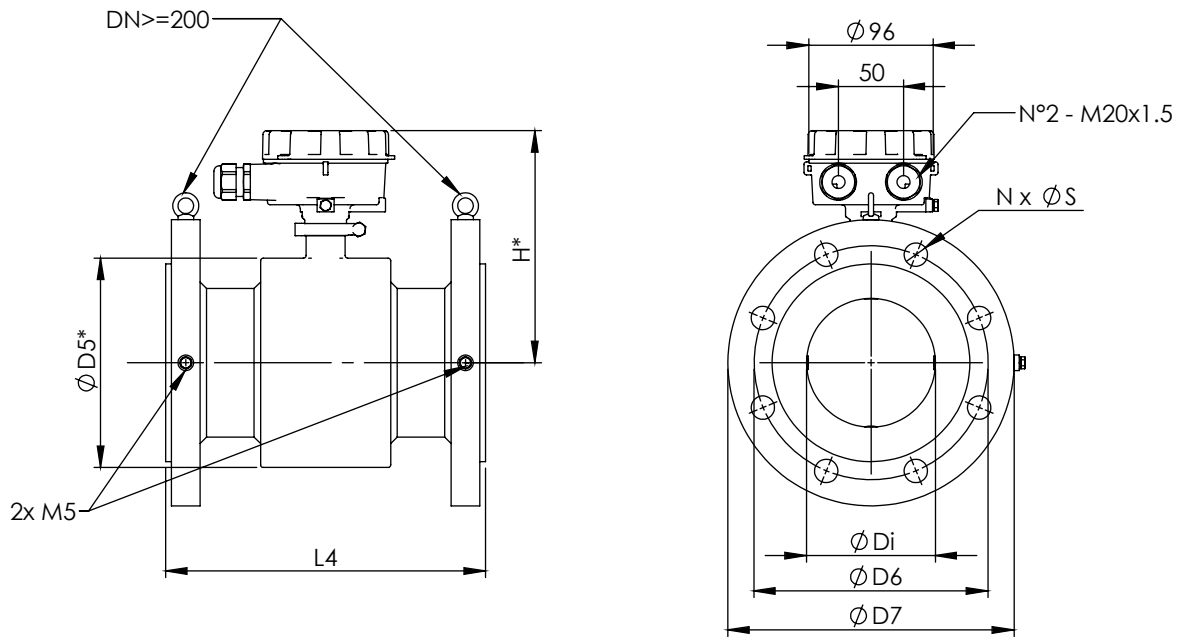
<b>Flow tube material</b>		AISI 304 (std), AISI 316																
<b>Flanges material</b>		Carbon steel painted (std), AISI 304, AISI 316																
<b>Electrodes material</b>		Hastelloy C (std), Hastelloy B, Titanium, Tantalio, Platinum																
<b>Internal lining and liquid temperature</b>		<b>Internal lining</b>								<b>Liquid temperature</b>								
		PTFE								Standard -40 /+130°C (up to +180° on request)								
		Ebonite								-40°C / +80°C								
<b>Available sizes</b>		mm	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400
		pollici	1/2"	3/4"	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"
		mm	450	500	600	700	800	900	1000	1200	1300	1400	1500	1600	1700	1800	2000	
		pollici	18"	20"	24"	28"	32"	36"	40"	48"	52"	56"	60"	64"	68"	72"	80"	
<b>Flange standards available</b>		EN1092-1, ANSI 150, ANSI 300, ANSI 600, ANSI 900, DIN 2501, BS 4504, AS 2129 (TABLE D - E - F), AS 4087, ISO 7005-1, KS 10K																
<b>Protection Degree</b>		IP68 1,5 m continuous immersion (EN 60529)																
<b>Compatible converters</b>		MC608 A/B/R/P/I, MC406																
<b>Electrical connections</b>		Cable glands M20 x 1.5 + terminal block + sealing resin																

## Pressure port integrated



## Applications

MUT2200EL sensors are suitable for any on-line application. These sensors are typically used in the measure of potable or not potable water, industrial waste water, industrial process liquids, muds and concretes.



MUT2200EL PN 10 EN 1092-1

DN	L4	D5	Di	D6	D7	N	S	H	H1	H2	H3
15	200(+0/-3)	84	11	65	95	4	14	156	195	190	236
20	200(+0/-3)	84	17	75	105	4	14	156	195	190	236
25	200(+0/-3)	74	24	85	115	4	14	151	190	185	231
32	200(+0/-3)	83	31	100	140	4	18	155	195	190	236
40	200(+0/-3)	88	37	110	150	4	18	158	197	192	238
50	200(+0/-3)	102	47	125	165	4	18	165	204	199	245
65	200(+0/-3)	114	63	145	185	8	18	171	210	205	251
80	200(+0/-3)	127	75	160	200	8	18	177	217	212	258
100	250(+0/-3)	161	99	180	220	8	18	194	234	229	275
125	250(+0/-3)	187	124	210	250	8	18	207	247	242	288
150	300(+0/-3)	210	152	240	285	8	22	219	258	253	299
200	350(+0/-3)	261	201	295	340	8	22	244	284	279	325
250	450(+0/-5)	319	255	350	395	12	22	273	313	308	354
300	500(+0/-5)	371	308	400	445	12	22	299	339	334	380
350	550(+0/-5)	404	340	460	505	16	22	316	355	350	396
400	600(+0/-5)	455	390	515	565	16	26	341	381	376	422
450	450(+0/-7)	519	441	565	615	20	26	373	413	408	454
500	500(+0/-9)	570	492	620	670	20	26	399	438	433	479
600	600(+0/-9)	684	592	725	780	20	30	456	495	490	536
700	700(+0/-9)	783	695	840	895	24	30	505	545	540	586
800	800(+0/-9)	885	795	950	1015	24	33	556	596	591	637
900	900(+0/-15)	996	896	1050	1115	28	33	612	651	646	692
1000	1000(+0/-15)	1098	996	1160	1230	28	36	663	702	697	743
1200	1200(+0/-15)	1312	1199	1380	1445	32	39	770	809	804	850
1400	1400(+0/-15)	1512	1402	1590	1675	36	42	870	909	904	950
1500	1500(+0/-15)	1612	1500	1700	1785	36	44	920	959	954	1000
1600	1600(+0/-15)	1712	1602	1820	1915	40	48	970	1009	1004	1050
1800	1800(+0/-15)	1922	1803	2020	2115	44	48	1075	1114	1109	1155
2000	2000(+0/-15)	2122	2004	2230	2325	48	48	1175	1214	1209	1255

MUT2200EL PN 16 EN 1092-1

<b>DN</b>	<b>L4</b>	<b>D5</b>	<b>Di</b>	<b>D6</b>	<b>D7</b>	<b>N</b>	<b>S</b>	<b>H</b>	<b>H1</b>	<b>H2</b>	<b>H3</b>
15	200(+0/-3)	84	11	65	95	4	14	156	195	190	236
20	200(+0/-3)	84	17	75	105	4	14	156	195	190	236
25	200(+0/-3)	74	24	85	115	4	14	151	190	185	231
32	200(+0/-3)	83	31	100	140	4	18	155	195	190	236
40	200(+0/-3)	88	37	110	150	4	18	158	197	192	238
50	200(+0/-3)	102	47	125	165	4	18	165	204	199	245
65	200(+0/-3)	114	63	145	185	8	18	171	210	205	251
80	200(+0/-3)	127	75	160	200	8	18	177	217	212	258
100	250(+0/-3)	161	99	180	220	8	18	194	234	229	275
125	250(+0/-3)	187	124	210	250	8	18	207	247	242	288
150	300(+0/-3)	210	152	240	285	8	22	219	258	253	299
200	350(+0/-3)	261	201	295	340	12	22	244	284	279	325
250	450(+0/-5)	319	255	355	405	12	26	273	313	308	354
300	500(+0/-5)	371	308	410	460	12	26	299	339	334	380
350	550(+0/-5)	404	340	470	520	16	26	316	355	350	396
400	600(+0/-5)	455	390	525	580	16	30	341	381	376	422
450	450(+0/-7)	519	439	585	640	20	30	373	413	408	454
500	500(+0/-9)	570	490	650	715	20	33	399	438	433	479
600	600(+0/-9)	684	592	770	840	20	36	456	495	490	536
700	700(+0/-9)	783	691	840	910	24	36	505	545	540	586
800	800(+0/-9)	885	791	950	1025	24	39	556	596	591	637
900	900(+0/-15)	996	890	1050	1125	28	39	612	651	646	692
1000	1000(+0/-15)	1098	992	1170	1255	28	42	663	702	697	743
1200	1200(+0/-15)	1312	1191	1390	1485	32	48	770	809	804	850
1400	1400(+0/-15)	1512	1392	1590	1685	36	48	870	909	904	950
1500	1500(+0/-15)	1612	1492	1710	1820	36	57	920	959	954	1000
1600	1600(+0/-15)	1712	1594	1820	1930	40	56	970	1009	1004	1050
1800	1800(+0/-15)	1922	1795	2020	2130	44	56	1075	1114	1109	1155
2000	2000(+0/-15)	2122	1994	2230	2345	48	62	1175	1214	1209	1255

## MUT2200EL PN 25 EN 1092-1

<b>DN</b>	<b>L4</b>	<b>D5</b>	<b>Di</b>	<b>D6</b>	<b>D7</b>	<b>N</b>	<b>S</b>	<b>H</b>	<b>H1</b>	<b>H2</b>	<b>H3</b>
15	200(+0/-3)	84	11	65	95	4	14	156	195	190	236
20	200(+0/-3)	84	17	75	105	4	14	156	195	190	236
25	200(+0/-3)	74	24	85	115	4	14	151	190	185	231
32	200(+0/-3)	83	31	100	140	4	18	155	195	190	236
40	200(+0/-3)	88	37	110	150	4	18	158	197	192	238
50	200(+0/-3)	102	47	125	165	4	18	165	204	199	245
65	200(+0/-3)	114	63	145	185	8	18	171	210	205	251
80	200(+0/-3)	127	75	160	200	8	18	177	217	212	258
100	250(+0/-3)	161	99	190	235	8	22	194	234	229	275
125	250(+0/-3)	187	124	220	270	8	26	207	247	242	288
150	300(+0/-3)	210	152	250	300	8	26	219	258	253	299
200	350(+0/-3)	261	201	310	360	12	26	244	284	279	325
250	450(+0/-5)	319	255	370	425	12	30	273	313	308	354
300	500(+0/-5)	371	306	430	485	16	30	299	339	334	380
350	550(+0/-5)	404	338	490	555	16	33	316	355	350	396
400	600(+0/-5)	455	386	550	620	16	36	341	381	376	422
450	450(+0/-7)	519	437	600	670	20	36	373	413	408	454
500	500(+0/-9)	570	488	660	730	20	36	399	438	433	479
600	600(+0/-9)	684	588	770	845	20	39	456	495	490	536
700	700(+0/-9)	783	685	875	960	24	42	505	545	540	586
800	800(+0/-9)	885	787	990	1085	24	48	556	596	591	637
900	900(+0/-15)	996	884	1090	1185	28	48	612	651	646	692
1000	1000(+0/-15)	1098	984	1210	1320	28	56	663	702	697	743
1200	1200(+0/-15)	1312	1181	-	-	-	-	770	809	804	850
1400	1400(+0/-15)	1512	1382	-	-	-	-	870	909	904	950
1500	1500(+0/-15)	1612	1482	-	-	-	-	920	959	954	1000
1600	1600(+0/-15)	1712	1580	-	-	-	-	970	1009	1004	1050
1800	1800(+0/-15)	1922	1783	-	-	-	-	1075	1114	1109	1155
2000	2000(+0/-15)	2122	1978	-	-	-	-	1175	1214	1209	1255

MUT2200EL PN 40 EN 1092-1

DN	L4	D5	Di	D6	D7	N	S	H	H1	H2	H3
15	200(+0/-3)	84	11	65	95	4	14	156	195	190	236
20	200(+0/-3)	84	17	75	105	4	14	156	195	190	236
25	200(+0/-3)	74	24	85	115	4	14	151	190	185	231
32	200(+0/-3)	83	31	100	140	4	18	155	195	190	236
40	200(+0/-3)	88	37	110	150	4	18	158	197	192	238
50	200(+0/-3)	102	47	125	165	4	18	165	204	199	245
65	200(+0/-3)	114	63	145	185	8	18	171	210	205	251
80	200(+0/-3)	127	75	160	200	8	18	177	217	212	258
100	250(+0/-3)	161	99	190	235	8	22	194	234	229	275
125	250(+0/-3)	187	124	220	270	8	26	207	247	242	288
150	300(+0/-3)	210	152	250	300	8	26	219	258	253	299
200	350(+0/-3)	261	195	320	375	12	30	244	284	279	325
250	450(+0/-5)	319	249	385	450	12	33	273	313	308	354
300	500(+0/-5)	371	302	450	515	16	33	299	339	334	380
350	550(+0/-5)	404	334	510	580	16	36	316	355	350	396
400	600(+0/-5)	455	382	585	660	16	39	341	381	376	422
450	450(+0/-7)	519	431	610	685	20	39	373	413	408	454
500	500(+0/-9)	570	480	670	755	20	42	399	438	433	479
600	600(+0/-9)	684	578	795	890	20	48	456	495	490	536
700	700(+0/-9)	783	677	-	-	-	-	505	545	540	586
800	800(+0/-9)	885	775	-	-	-	-	556	596	591	637
900	900(+0/-15)	996	872	-	-	-	-	612	651	646	692
1000	1000(+0/-15)	1098	970	-	-	-	-	663	702	697	743
1200	1200(+0/-15)	1312	1165	-	-	-	-	770	809	804	850
1400	1400(+0/-15)	1512	1364	-	-	-	-	870	909	904	950
1500	1500(+0/-15)	1612	1462	-	-	-	-	920	959	954	1000
1600	1600(+0/-15)	1712	1560	-	-	-	-	970	1009	1004	1050
1800	1800(+0/-15)	1922	1759	-	-	-	-	1075	1114	1109	1155
2000	2000(+0/-15)	2122	1954	-	-	-	-	1175	1214	1209	1255

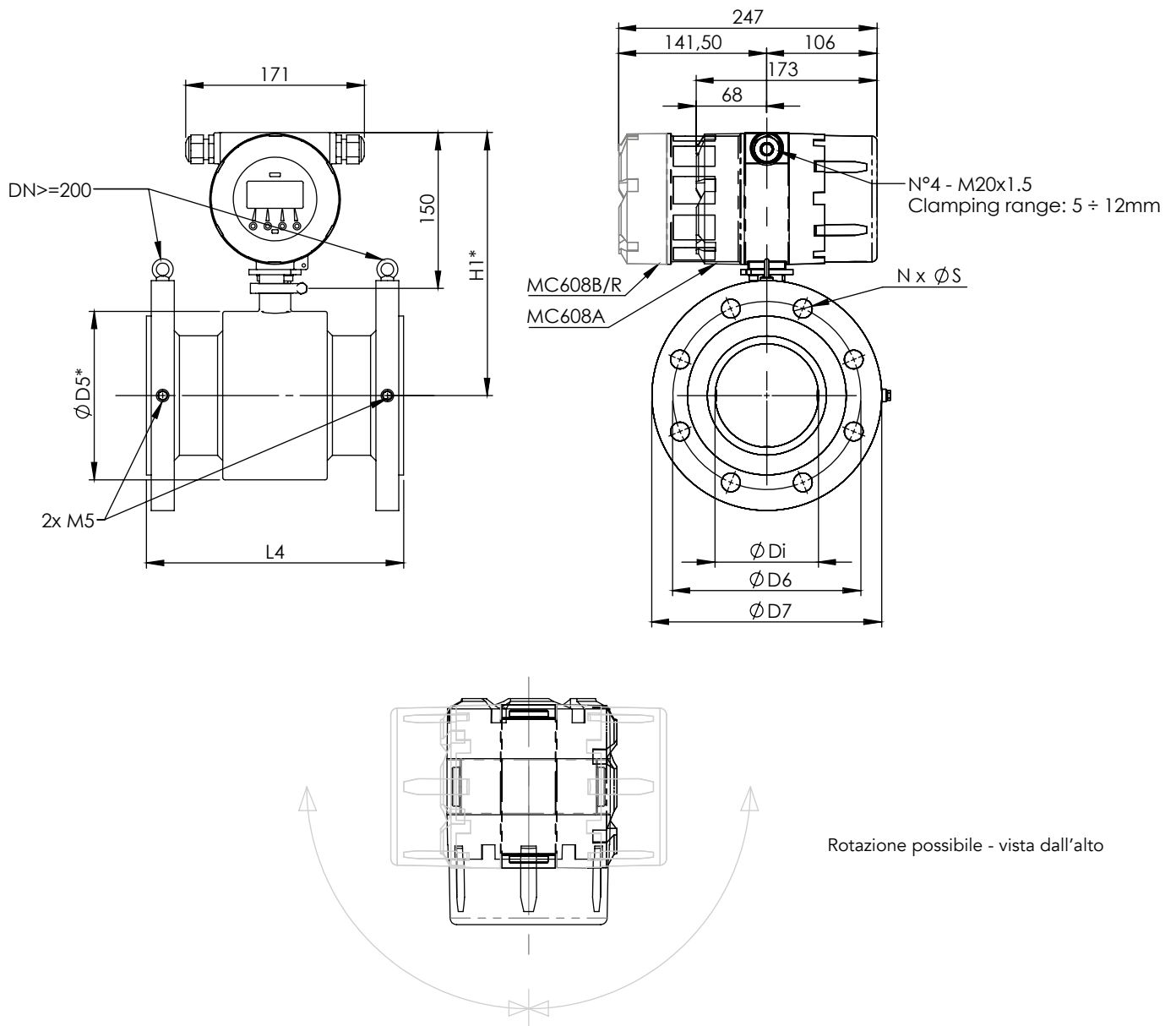
MUT2200EL ANSI 150

DN	L4	D5	Di	D6	D7	N	S	H	H1	H2	H3
1/2"	200(+0/-3)	84	11,3	60,3	90	4	15,88	156	195	190	236
3/4"	200(+0/-3)	84	16,9	69,9	100	4	15,88	156	195	190	236
1"	200(+0/-3)	74	23,7	79,4	110	4	15,88	151	190	185	231
1" 1/4	200(+0/-3)	83	31,4	88,9	115	4	15,88	155	195	190	236
1" 1/2	200(+0/-3)	88	37,3	98,4	125	4	15,88	158	197	192	238
2"	200(+0/-3)	102	47,3	120,7	150	4	19,05	165	204	199	245
2" 1/2	200(+0/-3)	114	63,1	139,7	180	4	19,05	171	210	205	251
3"	200(+0/-3)	127	74,9	152,4	190	4	19,05	177	217	212	258
4"	250(+0/-3)	161	97,3	190,5	230	8	19,05	194	234	229	275
5"	250(+0/-3)	187	121,7	215,9	255	8	22,23	207	247	242	288
6"	300(+0/-3)	210	148,3	241,3	280	8	22,23	219	258	253	299
8"	350(+0/-3)	261	195,1	298,5	345	8	22,23	244	284	279	325
10"	450(+0/-5)	319	245	362	405	12	25,4	273	313	308	354
12"	500(+0/-5)	371	307,9	431,8	485	12	25,4	299	339	334	380
14"	550(+0/-5)	404	337,6	476,3	535	12	28,58	316	355	350	396
16"	600(+0/-5)	455	386,4	539,8	595	16	28,58	341	381	376	422
18"	450(+0/-7)	519	437,2	577,9	635	16	31,75	373	413	408	454
20"	500(+0/-9)	570	488	635	700	20	31,75	399	438	433	479
24"	600(+0/-9)	684	587,6	749,3	815	20	34,93	456	495	490	536
28"	700(+0/-9)	783	687,2	863,6	927,1	28	34,93	505	545	540	586
32"	800(+0/-9)	885	786,8	977,9	1060,4	28	41,28	556	596	591	637
36"	900(+0/-15)	996	888,4	1085,9	1168,4	32	41,28	612	651	646	692
40"	1000(+0/-15)	1098	988	1200	1290	36	41,28	663	702	697	743
48"	1200(+0/-15)	1312	1187,2	1422,4	1511,1	44	41,28	770	809	804	850
56"	1400(+0/-15)	1512	1386,4	-	-	-	-	870	909	904	950
60"	1500(+0/-15)	1612	1484	-	-	-	-	920	959	954	1000
64"	1600(+0/-15)	1712	1585,6	-	-	-	-	970	1009	1004	1050
72"	1800(+0/-15)	1922	1786,8	-	-	-	-	1075	1114	1109	1155
80"	2000(+0/-15)	2122	1986	-	-	-	-	1175	1214	1209	1255

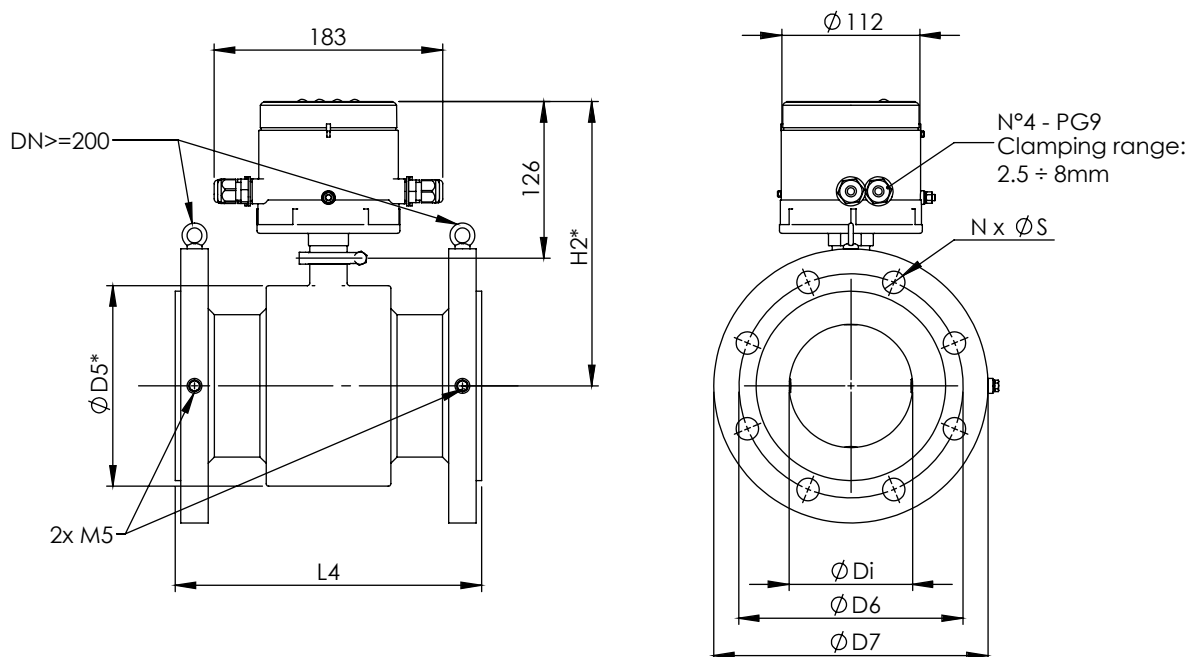
MUT2200EL ANSI 300

DN	L4	D5	Di	D6	D7	N	S	H	H1	H2	H3
1/2"	200(+0/-3)	84	11,3	66,7	95	4	15,88	156	195	190	236
3/4"	200(+0/-3)	84	16,9	82,6	115	4	19,05	156	195	190	236
1"	200(+0/-3)	74	23,7	88,9	125	4	19,05	151	190	185	231
1" 1/4	200(+0/-3)	83	31,4	98,4	135	4	19,05	155	195	190	236
1" 1/2	200(+0/-3)	88	37,3	114,3	155	4	22,23	158	197	192	238
2"	200(+0/-3)	102	47,3	127	165	8	19,05	165	204	199	245
2" 1/2	200(+0/-3)	114	63,1	149,2	190	8	22,23	171	210	205	251
3"	200(+0/-3)	127	74,9	168,3	210	8	22,23	177	217	212	258
4"	250(+0/-3)	161	99,3	200	255	8	22,23	194	234	229	275
5"	250(+0/-3)	187	121,7	235	280	8	22,23	207	247	242	288
6"	300(+0/-3)	210	150,3	269,9	320	12	22,23	219	258	253	299
8"	350(+0/-3)	261	195,1	330,2	380	12	25,4	244	284	279	325
10"	450(+0/-5)	319	249	387,4	445	16	28,58	273	313	308	354
12"	500(+0/-5)	371	299,9	450,8	520	16	28,58	299	339	334	380
14"	550(+0/-5)	404	329,6	514,4	585	20	28,58	316	355	350	396
16"	600(+0/-5)	455	378,4	571,5	650	20	34,93	341	381	376	422
18"	450(+0/-7)	519	427,2	628,6	710	24	34,93	373	413	408	454
20"	500(+0/-9)	570	476	685,8	775	24	34,93	399	438	433	479
24"	600(+0/-9)	684	571,6	812,8	915	24	34,93	456	495	490	536
28"	700(+0/-9)	783	671,2	-	-	-	-	505	545	540	586
32"	800(+0/-9)	885	766,8	-	-	-	-	556	596	591	637
36"	900(+0/-15)	996	864,4	-	-	-	-	612	651	646	692
40"	1000(+0/-15)	1098	962	-	-	-	-	663	702	697	743
48"	1200(+0/-15)	1312	1159,2	-	-	-	-	770	809	804	850
56"	1400(+0/-15)	1512	1352,4	-	-	-	-	870	909	904	950
60"	1500(+0/-15)	1612	1450	-	-	-	-	920	959	954	1000
64"	1600(+0/-15)	1712	1547,6	-	-	-	-	970	1009	1004	1050
72"	1800(+0/-15)	1922	1746,8	-	-	-	-	1075	1114	1109	1155
80"	2000(+0/-15)	2122	1938	-	-	-	-	1175	1214	1209	1255

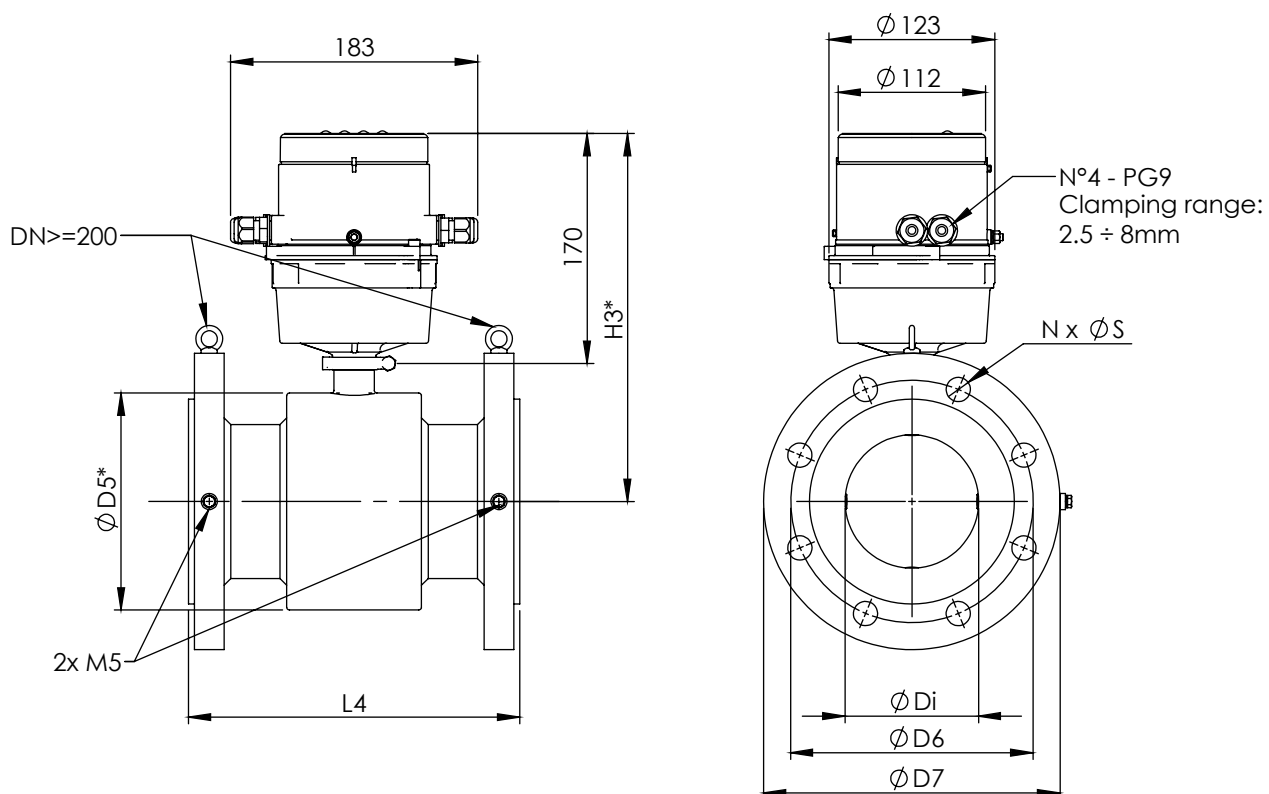
# MUT2200EL - MC608 A/B/R\*



## MUT2200EL - MC406 - max DN 600



## MUT2200EL - MC406 GSM - max DN 600



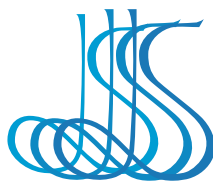


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