EUROMAG INTERNATIONAL

Electromagnetic flowmeters

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NEW

Sensor MUT 2200 EL

DS100-2-ENG

Sensor MUT 2200 EL

MUT 2200 EL 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, 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 MUT 2200, introducing a measurement range of more than 1:1000 without linearization software. These kinds of performances allow very accurate measures on a wide flow rate 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 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 IP 68 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.

1. Body and flange

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 MUT 2200 EL may be supplied in stainless steel, flange included (see Table 4). The available flanges are shown in Table 2.

2. Internal lining

The standard internal insulating lining is in PTFE for diameters from ND 25 to ND 150, in hard rubber (ebonite for food) for diameters of more than ND 150. On request, the sensors may be supplied coated with PTFE with diameters of more than ND 150. The temperature of the liquid to be measured is limited by the kind of internal lining used. (see Table 3).

3. Electrodes

The standard electrodes are in nickel alloys C 22 and, therefore, guarantee a wide compatibility with the process liquids, if required, they may be supplied in the materials shown in Table 5.

4. Coupling and connecting to sensor

MUT 2200 EL sensors may be coupled with any EUROMAG converters (see Table 6). In the separate version the sensor is connected to the converter by means of a cable whose length depends on the liquid conductivity; the maximum length not exceeding 100 metres as shown in Figure 1. If these sensors are inserted in a plastic or lined pipe line, they require the use of two grounding rings of the liquid, which are inserted between the flange and the counter flange or the installation of the grounding electrode. An empty pipe device is also available

5. Choice of diameter

When choosing the diameter we advice keeping at the full scale flow rate, a liquid velocity of at least 2÷3 m/s. The maximum acceptable velocity is of 10 m/s. Figure 3 provides the flow rate for each ND (nominal diameter) according to the liquid velocity.

6. Maximum temperature of the liquid

In the separate version the maximum liquid temperature allowed is shown in Table 3. In the compact version instead, the maximum temperature allowed depends on the ambient temperature. This is due to the required cooling of the electronics. The maximum liquid temperature allowed for the compact version should be 80°C.

7. Calibration and maximum error

MUT 2200 EL sensors belong to the reference Group B1 (ISO 11631). Each sensor is calibrated by a hydraulic bench equipped with a reference weighting system and SIT certified. The uncertainty of the measure is equal to 0.2% of the read flowrate value when the velocity of the liquid is more than 0.2 m/s. The repeatability of the measure is in the order of 0.1%

8. Reference standards

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

* CEI EN 61010-1
* UNI EN ISO 6817
* EN 1434
* EN 50081 - 1
* EN 50082 - 1

Maximum length of cables according to the liquid conductivity

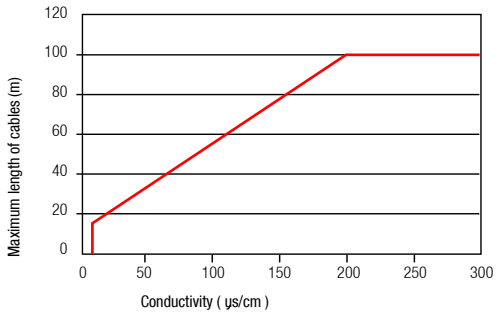


figure 1

Standard diameters

millimeters (mm)	25	32	40	50	65	80	100
inches (")	1"	1.1/4"	1.1/2"	2"	2.1/2"	3"	4"
millimeters (mm)	125	150	200	250	300	350	400
inches (")	5"	6"	8"	10"	12"	14"	16"

table 1

Available flanges

PN	Max. Diameter [mm I inches]	STANDARD				
6	400 mm	UNI2223	DIN2501	BS45404	ISO7005	Others on request
10	400 mm					
16	400 mm					
25	400 mm					
40	400 mm					
64	400 mm			-	-	
20	16"	ANSI 150	-	-	-	-
50	16"	ANSI 300	-	-	-	-
100	16"	ANSI 600	-	-	-	-
150	16"	ANSI 900	-	-	-	-

table 2

Internal lining - Liquid temperature

Internal lining	Liquid temperature
PTFE	-40°C ÷ +180°C
EBANITE FOR FOOD	-40°C ÷ +80°C
EPDM [1]	-20°C ÷ +90°C
ABRAL [1]	-20°C ÷ +90°C

[1] On request

table 3

Flow tube materials

AISI 304 (Inox)

Flanges materials

Acc. Carb. painted (std)

AISI 304 (Inox)

AISI 316 (Inox)

table 4

Available electrodes

Hastelloy C (std)

Hastelloy B

Titanium

Tantalum

Platinum

table 5

Converters coupling

MUT 2200 EL Version	MC 106 A	MC 106 B	MC 106 C	MC 306	MC 308	MC 308 C	MC 108	MC 108/ET
	[1]	[1]	[3]	[1]	[1] [2]	[2]	[2]	[2]
SEPARATE	●	●		●	●	●	●	●
COMPACT	●		●	●	●	●	●	●

[1] Case in abs [2] Case in aluminium [3] Case in stainless steel

table 6

General characteristics of Sensor MUT2200 EL

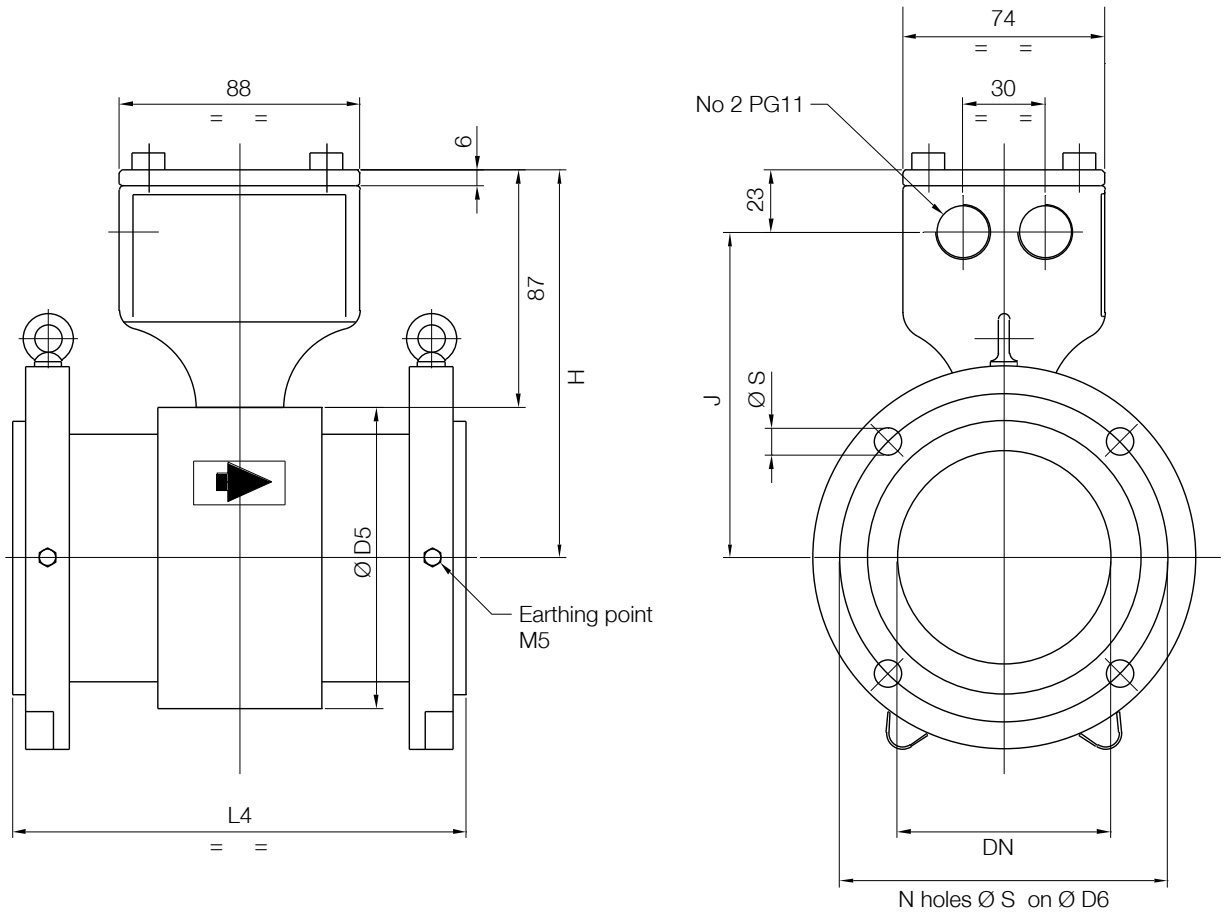
Available diameters	25 1"	32 1.1/4"	40 1.1/2"	50 2"	65 2.1/2"	80 3"	100 4"	125 5"	150 6"	200 8"	250 10"	300 12"	350 14"	400 16"
Standard flanged connections	UNI2223				ANSI 150			ANSI 300				DIN2501		
Flanged connections on request	BS45404				AWWA			ISO7005				KS		
Standard operation pressure [1]	16 bar													
Degree of protection	IP68 continuous immersion at 1,5 m (IEC 529)													
Converters compatibility	MC 106 A	MC 106 B	MC 106 C	MC 306	MC 308	MC 308 C	MC 108	MC 108/ET						
Dimensions	See figure 2													
Parts in contact with the liquid [2]	PTFE							Ebanite for food stuff						
Electrical connections	Cableglands PG 11 + terminal box + sealing resin													

[1] On request up to 150 bar

[2] Others on request.

table 7

Fig. 2 - Overall dimensions.



MUT 2200 EL Separate PN10

Ø DN	Ø D5	L4	J	Ø D6	N	Ø S	H
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25	64	200 $^{0}_{-3}$	96	85	4	14	119
32	77	200 $^{0}_{-3}$	102.5	100	4	18	125.5
40	82	200 $^{0}_{-3}$	105	110	4	18	128
50	98	200 $^{0}_{-3}$	113	125	4	18	136
65	114	200 $^{0}_{-3}$	121	145	4	18	144
80	127	200 $^{0}_{-3}$	127.5	160	4	18	150.5
100	152	250 $^{0}_{-3}$	140	180	8	18	163
125	178	250 $^{0}_{-3}$	153	210	8	18	176
150	206	300 $^{0}_{-3}$	167	240	8	22	190
200	257	350 $^{0}_{-3}$	192.5	295	8	22	215.5
250	311	450 $^{0}_{-5}$	219.5	350	12	22	242.5
300	362	500 $^{0}_{-5}$	245	400	12	22	268
350	394	550 $^{0}_{-5}$	260	460	16	22	283
400	444	600 $^{0}_{-5}$	286	515	16	25	309

table 8

MUT 2200 EL Separate PN16

Ø DN	Ø D5	L4	J	Ø D6	N	Ø S	H
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25	64	200 $^{0}_{-3}$	96	85	4	14	119
32	77	200 $^{0}_{-3}$	102.5	100	4	18	125.5
40	82	200 $^{0}_{-3}$	105	110	4	18	128
50	98	200 $^{0}_{-3}$	113	125	4	18	136
65	114	200 $^{0}_{-3}$	121	145	4	18	144
80	127	200 $^{0}_{-3}$	127.5	160	8	18	150.5
100	152	250 $^{0}_{-3}$	140	180	8	18	163
125	178	250 $^{0}_{-3}$	153	210	8	18	176
150	206	300 $^{0}_{-3}$	167	240	8	22	190
200	257	350 $^{0}_{-3}$	192.5	295	12	22	215.5
250	311	450 $^{0}_{-5}$	219.5	355	12	25	242.5
300	362	500 $^{0}_{-5}$	245	410	12	25	268
350	394	550 $^{0}_{-5}$	260	470	16	25	283
400	444	600 $^{0}_{-5}$	286	525	16	30	309

table 9

MUT 2200 EL Separate PN25

Ø DN	Ø D5	L4	J	Ø D6	N	Ø S	H
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25	64	200 $^{0}_{-3}$	96	85	4	14	119
32	77	200 $^{0}_{-3}$	102.5	100	4	18	125.5
40	82	200 $^{0}_{-3}$	105	110	4	18	128
50	98	200 $^{0}_{-3}$	113	125	4	18	136
65	114	200 $^{0}_{-3}$	121	145	8	18	144
80	127	200 $^{0}_{-3}$	127.5	160	8	18	150.5
100	152	250 $^{0}_{-3}$	140	190	8	22	163
125	178	250 $^{0}_{-3}$	153	220	8	25	176
150	206	300 $^{0}_{-3}$	167	250	8	25	190
200	257	350 $^{0}_{-3}$	192.5	310	12	25	215.5
250	311	450 $^{0}_{-5}$	219.5	370	12	30	242.5
300	362	500 $^{0}_{-5}$	245	430	16	30	268
350	394	550 $^{0}_{-5}$	260	490	16	33	283
400	444	600 $^{0}_{-5}$	286	550	16	36	309

table 10

MUT 2200 EL Separate PN40

Ø DN	Ø D5	L4	J	Ø D6	N	Ø S	H
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25	64	200 $^{0}_{-3}$	96	85	4	14	119
32	77	200 $^{0}_{-3}$	102.5	100	4	18	125.5
40	82	200 $^{0}_{-3}$	105	110	4	18	128
50	98	200 $^{0}_{-3}$	113	125	4	18	136
65	114	200 $^{0}_{-3}$	121	145	8	18	144
80	127	200 $^{0}_{-3}$	127.5	160	8	18	150.5
100	152	250 $^{0}_{-3}$	140	190	8	22	163
125	178	250 $^{0}_{-3}$	153	220	8	25	176
150	206	300 $^{0}_{-3}$	167	250	8	25	190
200	257	350 $^{0}_{-3}$	192.5	320	12	30	215.5
250	311	450 $^{0}_{-5}$	219.5	385	12	33	242.5
300	362	500 $^{0}_{-5}$	245	450	16	33	268
350	394	550 $^{0}_{-5}$	260	510	16	36	283
400	444	600 $^{0}_{-5}$	286	585	16	39	309

table 11

MUT 2200 EL Separate ANSI 150

Ø DN	Ø D5	L4	J	Ø D6	N	Ø S	H
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25	64	200 $^{0}_{-3}$	96	79.4	4	15.9	119
32	77	200 $^{0}_{-3}$	102.5	88.9	4	15.9	125.5
40	82	200 $^{0}_{-3}$	105	98.4	4	15.9	128
50	98	200 $^{0}_{-3}$	113	120.6	4	19	136
65	114	200 $^{0}_{-3}$	121	139.7	4	19	144
80	127	200 $^{0}_{-3}$	127.5	152.4	4	19	150.5
100	152	250 $^{0}_{-3}$	140	190.5	8	19	163
125	178	250 $^{0}_{-3}$	153	215.9	8	22.2	176
150	206	300 $^{0}_{-3}$	167	241.3	8	22.2	190
200	257	350 $^{0}_{-3}$	192.5	298.4	8	22.2	215.5
250	311	450 $^{0}_{-5}$	219.5	361.9	12	25.4	242.5
300	362	500 $^{0}_{-5}$	245	431.8	12	25.5	268
350	394	550 $^{0}_{-5}$	260	476.2	12	28.6	283
400	444	600 $^{0}_{-5}$	286	539.7	16	28.6	309

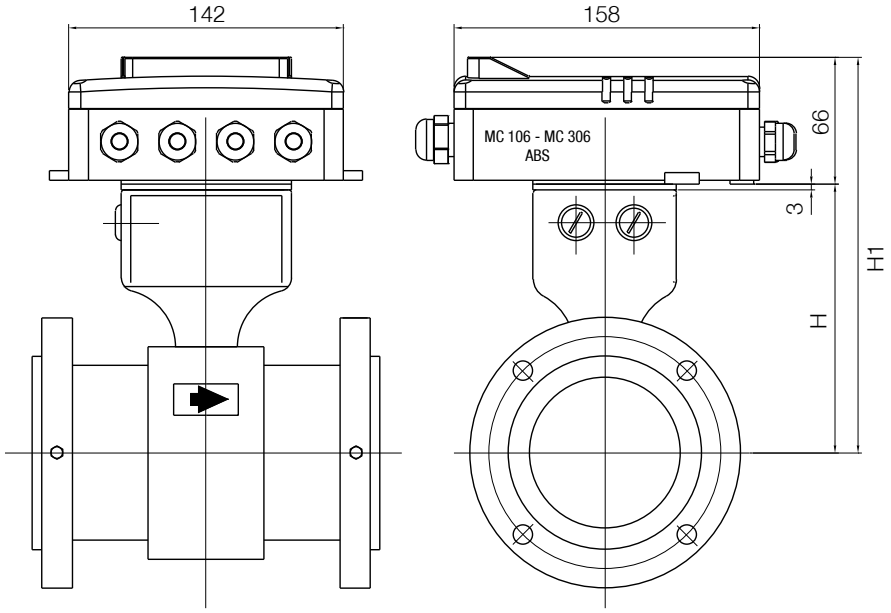
table 12

MUT 2200 EL Separate ANSI 300

Ø DN	Ø D5	L4	J	Ø D6	N	Ø S	H
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25	64	200 $^{0}_{-3}$	96	88.9	4	19	119
32	77	200 $^{0}_{-3}$	102.5	98.4	4	19	125.5
40	82	200 $^{0}_{-3}$	105	114.3	4	22.2	128
50	98	200 $^{0}_{-3}$	113	127	8	19	136
65	114	200 $^{0}_{-3}$	121	149.2	8	22.2	144
80	127	200 $^{0}_{-3}$	127.5	168.3	8	22.2	150.5
100	152	250 $^{0}_{-3}$	140	200	8	22.2	163
125	178	250 $^{0}_{-3}$	153	234.9	8	22.2	176
150	206	300 $^{0}_{-3}$	167	269.9	12	22.2	190
200	257	350 $^{0}_{-3}$	192.5	330.2	12	25.4	215.5
250	311	450 $^{0}_{-5}$	219.5	387.3	16	28.6	242.5
300	362	500 $^{0}_{-5}$	245	450.8	16	31.7	268
350	394	550 $^{0}_{-5}$	260	514.3	20	31.7	283
400	444	600 $^{0}_{-5}$	286	571.5	20	34.9	309

table 13

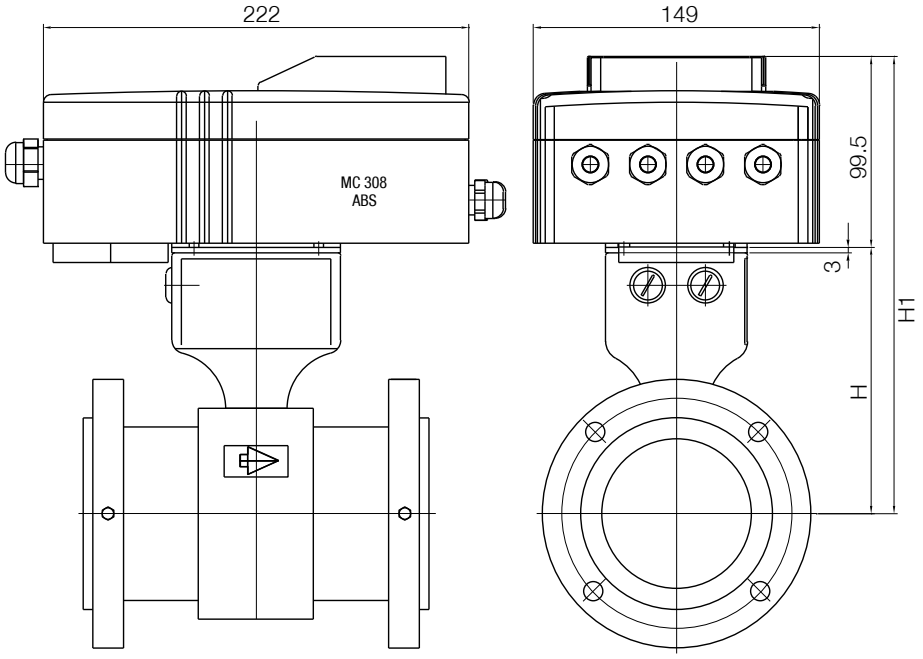
Fig. 3 - MUT 2200 EL Compact - MC 106 / 306 Converter Horizontal ABS Case



Ø DN	H	H1
[mm]	[mm]	[mm]
25	116	182
32	122.5	168.5
40	125	191
50	133	199
65	141	207
80	147.5	213.5
100	160	226
125	173	239
150	187	253
200	212.5	278.5
250	239.5	305.5
300	265	331
350	280	346
400	306	372

table 14

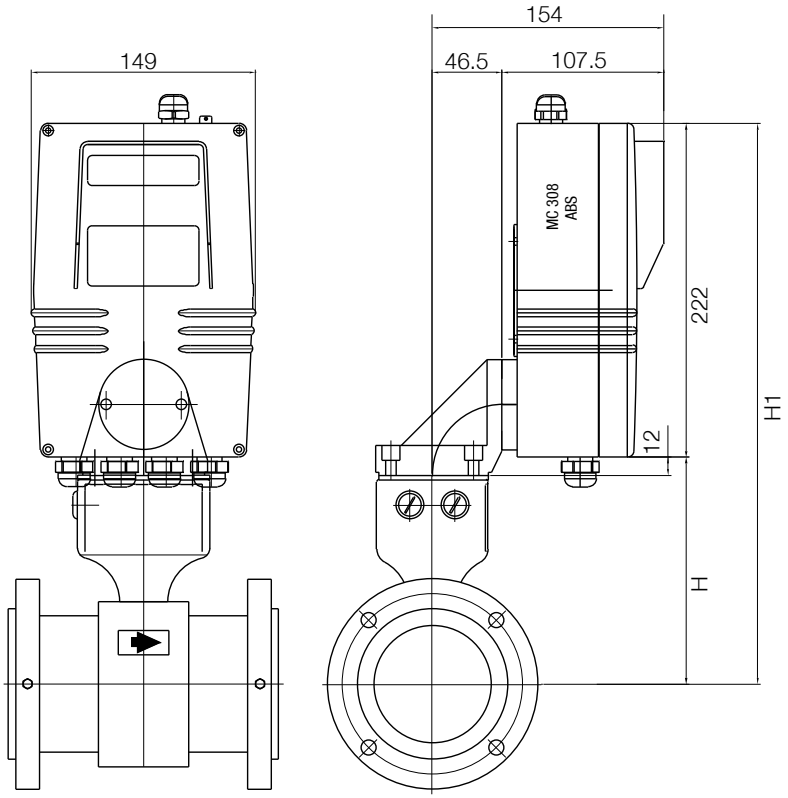
Fig. 4 - MUT 2200 EL Compact - MC 308 Converter Horizontal ABS Case



Ø DN	H	H1
[mm]	[mm]	[mm]
25	116	215.5
32	122.5	222
40	125	224.5
50	133	232.5
65	141	240.5
80	147.5	247
100	160	259.5
125	173	272.5
150	187	286.5
200	212.5	312
250	239.5	339
300	265	364.5
350	280	379.5
400	306	405.5

table 15

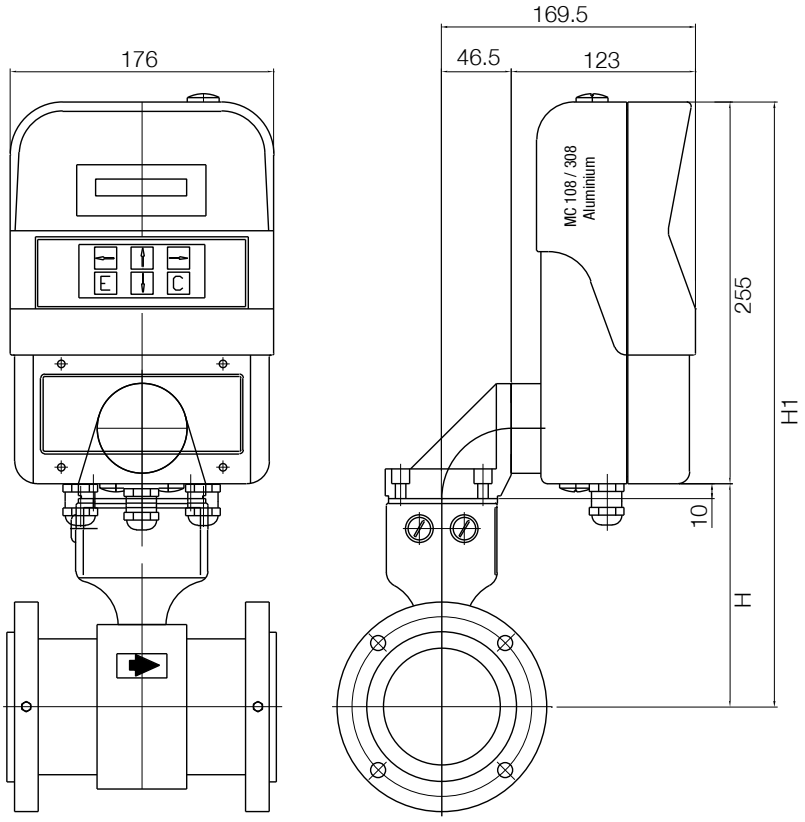
Fig. 5 - MUT 2200 EL Compact - MC 308 Converter Vertical ABS Case



Ø DN	H	H1
[mm]	[mm]	[mm]
25	128	350
32	134.5	356.5
40	137	359
50	145	367
65	153	375
80	159.5	381.5
100	172	394
125	185	407
150	199	421
200	224.5	446.5
250	251.5	473.5
300	277	499
350	291	513
400	318	540

table 16

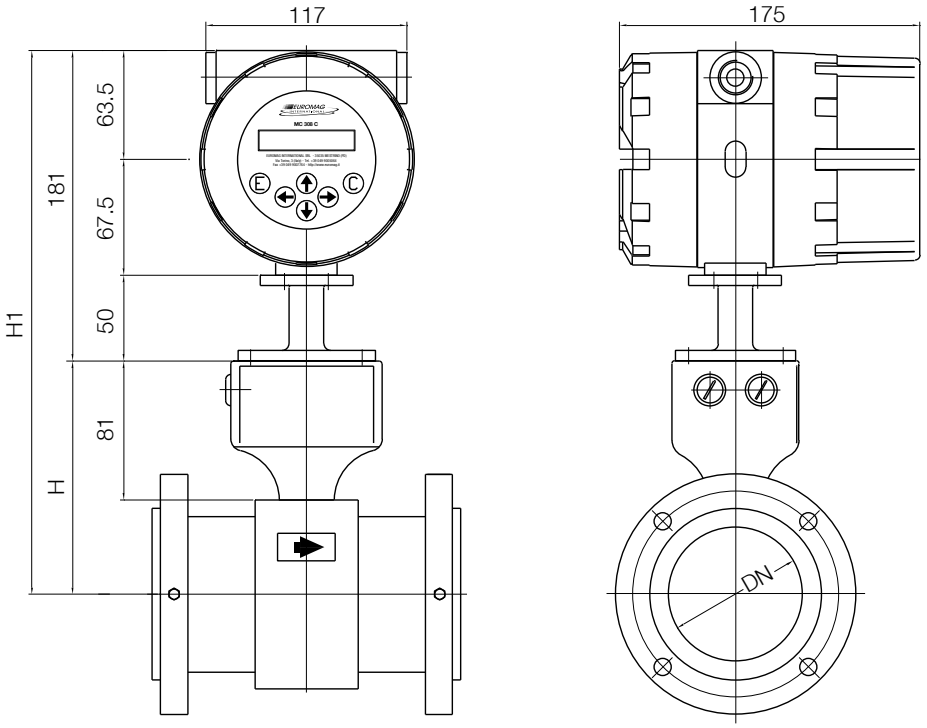
Fig. 6 - MUT 2200 EL Compact - MC 108 / 308 Converter Vertical Aluminium Case



Ø DN	H	H1
[mm]	[mm]	[mm]
25	126	381
32	132.5	387
40	135	390
50	143	398
65	151	406
80	157.5	412.5
100	170	425
125	183	438
150	197	452
200	222.5	477.5
250	249.5	504.5
300	275	530
350	290	545
400	316	571

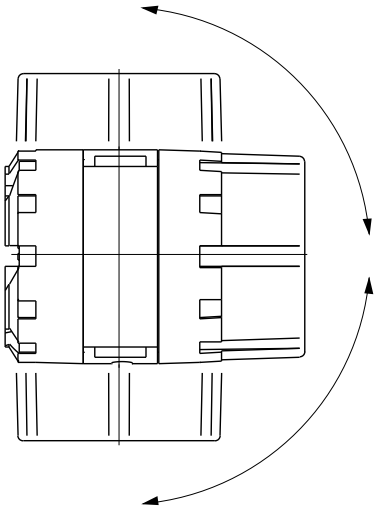
table 17

Fig. 7 - MUT 2200 EL Compact - Converter MC 308 C



Ø DN	H	H1
[mm]	[mm]	[mm]
25	113	294
32	119.5	300.5
40	122	303
50	130	311
65	138	319
80	144.5	325.5
100	157	338
125	170	351
150	184	365
200	209.5	390.5
250	236.5	417.5
300	262	443
350	280	461
400	303	484

table 18



POSSIBLE ROTATION
SUPERIOR VIEW

Weight of sensor in the separate version without packing

DN	PN10	PN16	PN25	PN40	ANSI 150	ANSI 300
[mm]	[kg]	[kg]	[kg]	[kg]	[kg]	[kg]
25	7	7	7	7	7	8
32	10	10	10	10	9	10
40	11	11	11	11	10	13
50	11	11	12	12	10	13
65	14	14	16	16	15	17
80	17	17	19	19	16	22
100	19	19	22	25	21	30
125	27	27	32	32	29	40
150	29	29	35	35	32	56
200	46	50	59	52	70	80
250	64	67	77	97	72	109
300	75	84	102	129	101	145
350	85	100	129	166	113	181
400	128	145	188	210	140	252

table 17

Fig. 7 - Flowrate expressed in m3/h, for all diameters of MUT2200EL sensors

MUT 2200 EL DN 25 - 100 Flowrate

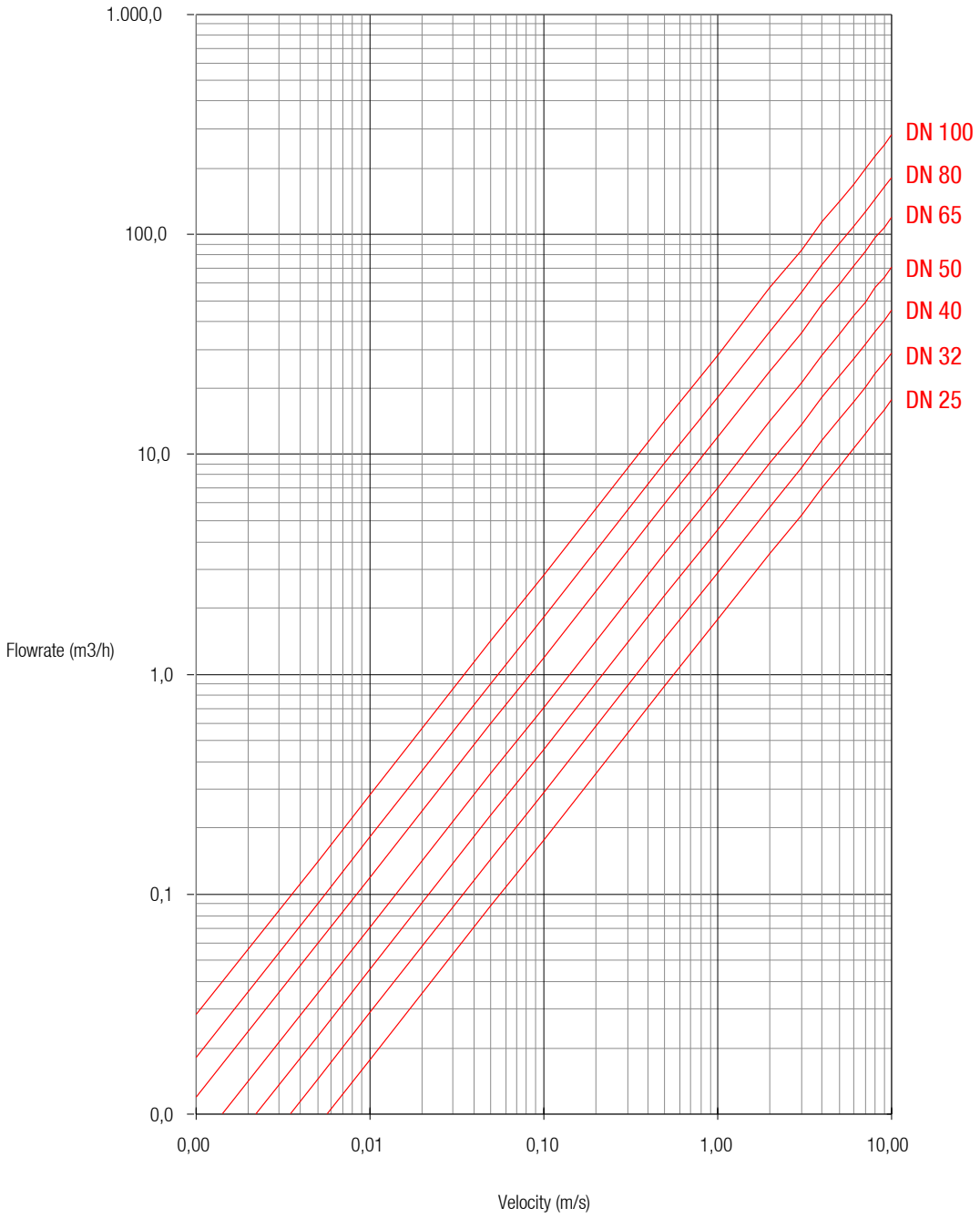
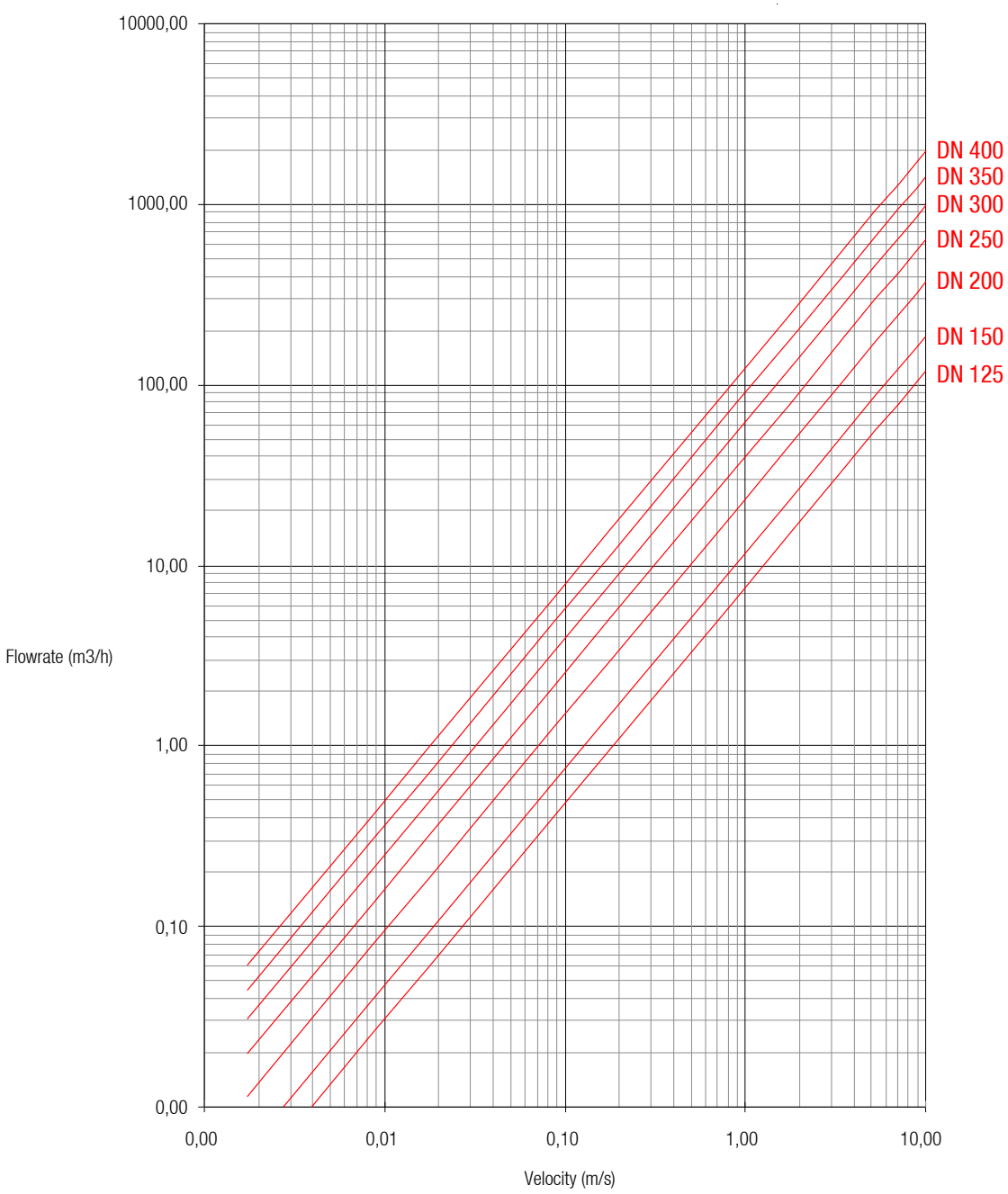


Fig. 8 - Flowrate expressed in m3/h, for all diameters of MUT2200EL sensors

MUT 2200 EL DN 125 - 400 Flowrate



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