

# Electromagnetic flowmeter type PEM-1000

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- **Nominal size:** DN10...1000 (ANSI 0,5...40")
- **Maximum static pressure** 1,6MPa, 2,5MPa or 4MPa
- **Accuracy:** +/-0,5%
- **Analog outputs:** 4...20mA,
- **Communication protocol:** Modbus RTU / RS 485

## Application

Electromagnetic flowmeter for bidirectional measurement of liquids with a minimum conductivity of 5 µS/cm:

- Acid, alkalis
- Paints
- Pastes
- Water, wastewater, etc.

## Measuring principle:

Following Faraday's law of magnetic induction, a voltage is induced in a conductor moving through a magnetic field. In the electromagnetic measuring principle, the flowing medium is the moving conductor. The voltage induced is proportional to the flow velocity and is supplied to the amplifier by means of two measuring electrodes. The flow volume is calculated by means of the pipe cross-sectional area. The DC magnetic field is created through a switched direct current of alternating polarity.

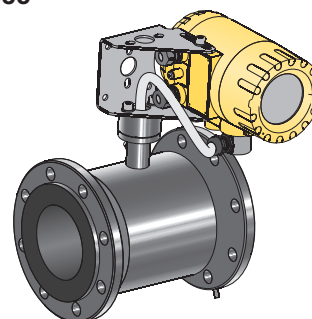
## Measuring system

The measuring system consists of a transmitter and a sensor. Two versions are available:

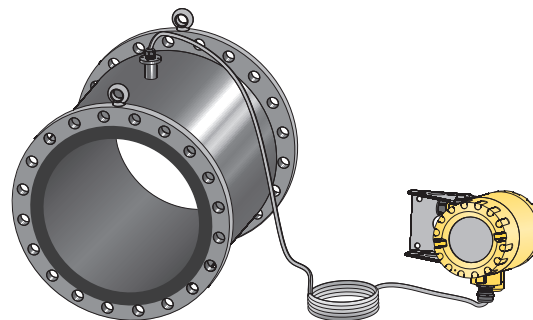
- Compact version: Transmitter and sensor form a mechanical unit PEM-1000ALW
- Remote version: Sensor is mounted separate from the transmitter PEM-1000NW

## Advantages

- Flexible and clever assembling system
- Easy and fast-moving change from compact to remote version
- Innovative and high-power transmitter for every application
- Robust and resistant cover of sensor and transmitter



**PEM-1000ALW**



**PEM-1000NW**

Flow value table in [ m <sup>3</sup> /h ]						
DN	V = 0,3 m/s	V = 1 m/s	V = 3 m/s	V = 5 m/s	V = 8 m/s	V = 10 m/s
10	0,085	0,283	0,848	1,414	2,262	2,827
15	0,191	0,636	1,909	2,545	3,181	3,817
20	0,339	1,131	3,393	5,655	9,048	11,310
25	0,530	1,767	5,301	8,836	14,137	17,671
32	0,869	2,895	8,686	14,476	23,162	28,953
40	1,357	4,524	13,572	22,619	36,191	45,239
50	2,121	7,069	21,206	35,343	56,549	70,686
65	3,584	11,946	35,838	59,729	95,567	119,46
80	5,429	18,096	54,287	90,478	144,76	180,96
100	8,482	28,274	84,823	141,37	226,19	282,74
125	13,254	44,179	132,54	220,89	353,43	441,787
150	19,085	63,617	190,85	318,087	508,94	636,17
200	33,929	113,10	339,30	565,49	904,78	1130,0
250	53,014	176,71	530,14	883,57	1413,7	1767,1
300	76,341	254,47	763,41	1272,3	2035,7	2544,7
350	103,90	346,36	1039,1	1731,8	2770,9	3463,6
400	135,72	452,39	1357,2	2261,9	3619,1	4523,9
500	212,06	706,86	2120,6	3534,3	5654,9	7068,6
600	305,36	1017,9	3053,6	5089,4	8143,0	10178,7
800	542,87	1809,6	5428,7	9047,8	14476,4	18095,5
1000	848,23	2827,4	8482,3	14137,1	22619,4	28274,3

Optimal flow speed – to 5m/s

Standard set value Qmax	
DN	Flow [m3/h]
10	1
15	2
20	4
25	5
32	10
40	15
50	20
65	30
80	50
100	100
125	150
150	200
200	360
250	500
300	760
350	1000
400	1300
500	2000
600	3000
800	5000
1000	8000

## Technical data

### Specification for PEM-1000 control unit

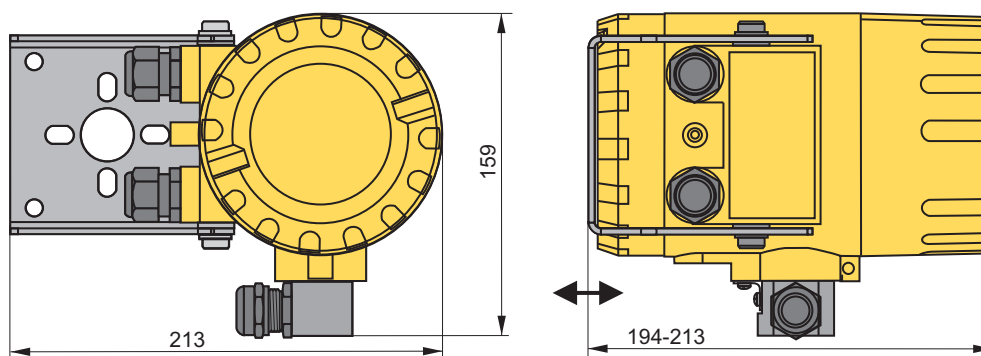
<b>Medium electrical conductivity</b>	≥ 5μS/cm
<b>Input resistance</b>	≥ 10 <sup>10</sup> Ω
<b>Accuracy</b>	±0,5% of reading while flow in 20÷100% Q <sub>max</sub> ±1,0% of reading while flow in 10÷20% Q <sub>max</sub> (for reference conditions)*
<b>Low flow rejection</b>	adjustable in steps of 0,1%
<b>Actual flow</b>	2-side (l/s, m <sup>3</sup> /h, m <sup>3</sup> /s, other)
<b>Totalizer</b>	2-side (m <sup>3</sup> , other)
<b>Low flow</b>	automatic zeroing
<b>Configuration</b>	buttons or RS485 and Modbus RTU
<b>Empty pipe detection</b>	cyclic, programmable
<b>Analog output</b>	4÷20mA/500Ω active output (passive output – on request)
<b>Pulse/frequency output</b>	max. 24V/10mA DC 0,1...500Hz in frequency mode; up to 500Hz in pulse mode passive output, galvanic insulation, reverse polarity protection
<b>Communication output</b>	Modbus RTU/RS 485 galvanic insulation
<b>Binary input</b>	5...35V DC/2mA passive input, galvanic insulation, reverse polarity protection
<b>Power supply</b>	90...260V AC/50Hz/15VA 10...36V DC/15W (reverse polarity protection)
<b>Protection class</b>	IP66 (IP67 on request)
<b>Ambient temperature</b>	-20...60°C
<b>Weight</b>	3,5kg

### Specification for PEM-1000 sensor

<b>Nominal size</b>	DN10÷1000 (ANSI 0,5"...40")
<b>Max. static pressure</b>	standard: 1,6MPa (2,5MPa, 4MPa on request)
<b>Process connection</b>	flange DIN (ANSI, BS)
<b>Ambient temperature</b>	-20÷60°C
<b>Liner temperature range</b>	Rubber: -5÷90°C Teflon: -25÷130°C
<b>Connection cable</b>	standard: 8m (other on request)
<b>Electrodes material</b>	316L (316Ti/Hastelloy/Tantalum/Titanium/Platinum)
<b>Flowtube material</b>	321
<b>Liner</b>	Hard (or soft rubber) DN20÷1000 Teflon PTFE DN10÷500 Halar ECTFE DN350÷600
<b>Casing and flange material</b>	standard : carbon steel (304, 321 on request)
<b>Rustproofing</b>	acrymetal paint
<b>Excitation coils supply</b>	from the transmitter
<b>Excitation of coils isolation class</b>	E
<b>Protection class</b>	standard: IP67, (IP68 on request)
<b>Measuring principle</b>	electromagnetic
<b>Accessories</b>	grounding rings

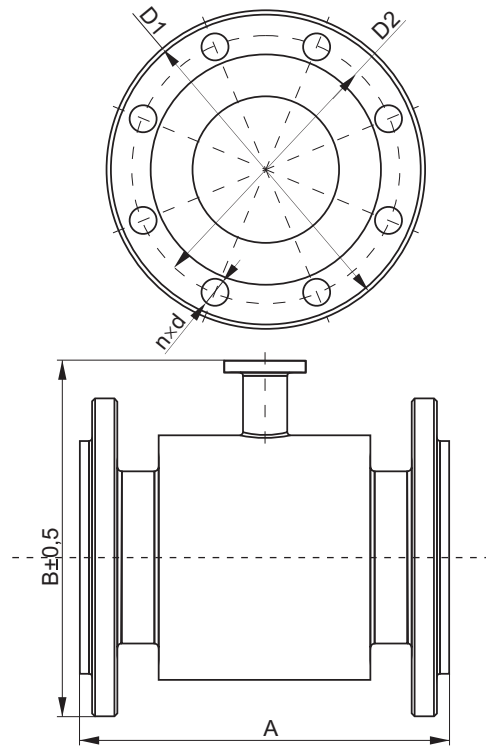
\* Reference conditions according to PN-EN 29104:2003

### Dimensions of control unit



### Dimensions of sensor

DN	PN	Dimensions [mm]						Weight kg	
		A	B	D1	D2	d	n		
10	16	150 or 200	153	90	60	14	4	2,5	
15			155	95	65	14	4	2,5	
20			160	105	75	14	4	3	
25			167	115	85	14	4	3,5	
32			180	140	100	18	4	5	
40			185	150	110	18	4	6	
50		200	191	165	125	18	4	7	
65			209	185	145	18	4	8	
80			224	200	160	18	8	9,5	
100		250	245	220	180	18	8	12	
125			276	250	210	18	8	15	
150		300	305	285	240	22	8	20	
200			350	375	340	295	22	12	36
250			400	430	405	355	26	12	58
300			500	487	460	410	26	12	70
350				542	520	470	26	16	85
400	600		615	580	525	30	16	100	
450			657	640	585	30	20	120	
500			750	715	650	33	20	160	
600			870	840	770	36	20	190	
700	700		927	910	840	36	24	260	
800	800	1050	1025	950	39	24	350		
900	900	1145	1125	1050	39	28	450		
1000	1000	1285	1255	1170	42	28	550		

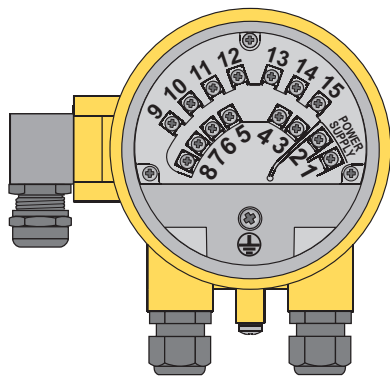


DN 10 – DN 150 A ± 5 mm  
DN 200 – DN 1000 A ± 10 mm

DN	PN	Dimensions [mm]						Weight kg	
		A	B	D1	D2	d	n		
10	25	150 or 200	153	90	60	14	4	2,5	
15			155	95	65	14	4	2,5	
20			160	105	75	14	4	3	
25			167	115	85	14	4	3,5	
32			180	140	100	18	4	5	
40			185	150	110	18	4	6	
50		200	191	165	125	18	4	7	
65			209	185	145	18	4	8	
80			224	200	160	18	8	9,5	
100		250	245	235	190	22	8	12	
125			276	270	220	26	8	15	
150		300	305	300	250	26	8	20	
200			350	375	360	310	26	12	36
250			400	430	425	370	30	12	58
300			500	487	485	430	30	16	70
350				542	555	490	33	16	85
400	600		615	620	550	36	16	100	
450			657	670	600	36	20	120	
500			750	730	660	36	20	160	
600			870	845	770	39	20	190	
700	700		927	960	875	42	24	260	
800	800	1050	1085	990	48	24	350		
900	900	1145	1185	1090	48	28	450		
1000	1000	1285	1320	1210	56	28	550		

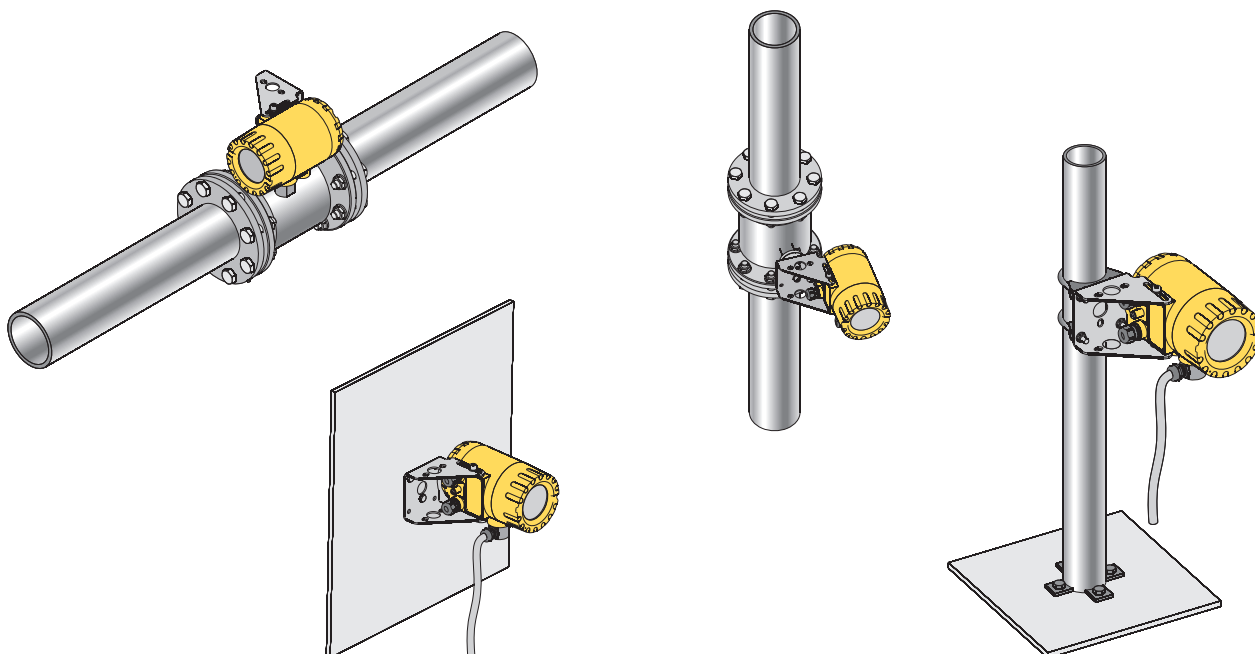
DN	PN	Dimensions [mm]						Weight kg	
		A	B	D1	D2	d	n		
10	40	150 or 200	153	90	60	14	4	2,5	
15			155	95	65	14	4	2,5	
20			160	105	75	14	4	3	
25			167	115	85	14	4	3,5	
32			180	140	100	18	4	5	
40			185	150	110	18	4	6	
50		200	191	165	125	18	4	7	
65			209	185	145	18	4	8	
80			224	200	160	18	8	9,5	
100		250	245	235	190	22	8	12	
125			276	270	220	26	8	15	
150		300	305	300	250	26	8	20	
200			350	375	375	320	30	12	36
250			400	430	450	385	33	12	58
300			500	487	515	450	33	16	70
350				542	580	510	36	16	85
400	600		615	660	585	39	16	100	
450			657	685	610	39	20	120	
500			750	755	670	42	20	160	
600			870	890	790	42	20	190	

### Electrical diagrams



	Terminal	Description	
Power supply	1	90...260V AC	(-)
	2		(+)
Binary output 1	3	reverse polarity protection, galvanic insulation, passive	
	4		
Pulse/frequency output	5	reverse polarity protection, galvanic insulation, passive	
	6		
Current output 4÷20 mA	7	(+)	active (passive on request)
	8	(-)	
Communication	9	RS 485 A	
	10	RS 485 B	
	11	RS 485 GND / shield	
Binary input (passive)	12	reverse polarity protection, galvanic insulation	
	13		
Binary output 2	14	reverse polarity protection, galvanic insulation, passive	
	15		

### Examples of installation



### Ordering procedure

PEM-1000ALW / - / / / / / / /

PEM-1000NW / - / / / / / / / / L = m

Nominal diameter: DN10...1000

Pressure rating: PN16, PN25, PN40

Electrodes material: 316L, 316Ti, Hastelloy, Tantalum, Titanium, Platinum

Liner material: hard rubber, soft rubber, Teflon, ECTFE

Cable length (standard L=8m)

Special version: IP68, IP67, SS, Q<sub>max</sub>, PZH

Power supply: 90...260 V AC, 10...36 V DC

Communication: Modbus RTU/RS 485

### Special versions

- IP68 – sensor protection class IP68
- IP67 – transmitter protection class IP67
- SS – stainless steel sensor casing

- Q<sub>max</sub> – non-standard value of Q<sub>max</sub>.
- PZH – approval for contact with potable water