

# Electromagnetic flowmeter type PEM-1000

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

## Application

Electromagnetic flowmeter for bidirectional measurement of liquids with a minimum conductivity of  $\geq 5 \mu\text{S/cm}$ :

- 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

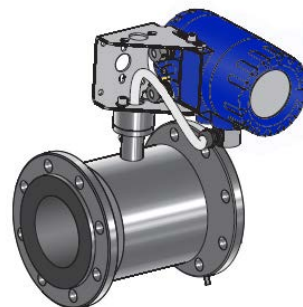
The measuring system consists of a transmitter and a sensor.

Two versions are available:

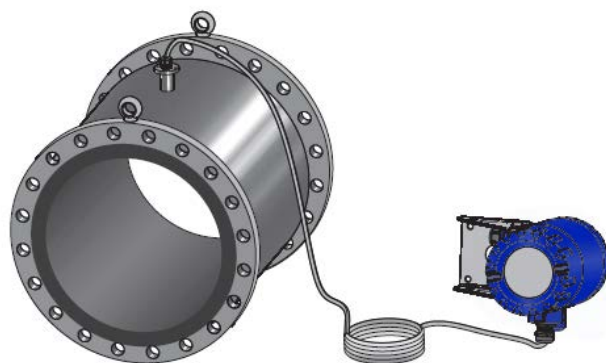
- Compact version: Transmitter and sensor form a mechanical unit PEM-1000ALW
- Remote version: Sensor is mounted separate from the transmitter PEM-1000NW

## 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 [m <sup>3</sup> /h]							
DN acc. DIN	Recommended flow values		Factory settings				Cut-off level for small flows (v~0,1 [m/s])
	~Q <sub>(min)</sub>	~Q <sub>(max)</sub>	Current output 4...20mA		Pulse output		
			Measuring range	Flow speed (for URV)	Volume / pulse	Number of pulses / m <sup>3</sup>	
	[m <sup>3</sup> /h]	[m <sup>3</sup> /h]	[m <sup>3</sup> /h]	[m/s]	[m <sup>3</sup> /pulse]		[m <sup>3</sup> /h]
10	0,08	2,8	0÷1	3,54	0,000025	400000	0,03
15	0,19	6,4	0÷2	3,14	0,000005	200000	0,06
20	0,34	11	0÷4	3,54	0,00001	100000	0,12
25	0,5	18	0÷5	2,83	0,0000125	80000	0,15
32	0,9	29	0÷10	3,45	0,000025	40000	0,3
40	1,4	45	0÷15	3,32	0,00004	25000	0,45
50	2,1	71	0÷20	2,83	0,00005	20000	0,6
65	3,6	119	0÷30	2,51	0,0001	10000	0,9
80	5	181	0÷50	2,76	0,000125	8000	1,5
100	8	283	0÷100	3,54	0,00025	4000	3
125	13	442	0÷150	3,40	0,0004	2500	4,5
150	19	636	0÷200	3,14	0,0005	2000	6
200	34	1131	0÷360	3,18	0,001	1000	10,8
250	53	1767	0÷500	2,83	0,00125	800	15
300	76	2545	0÷760	2,99	0,002	500	22,8
350	104	3464	0÷1000	2,89	0,0025	400	30
400	136	4524	0÷1300	2,87	0,004	250	39
500	212	7069	0÷2000	2,83	0,005	200	60
600	305	10179	0÷3000	2,95	0,008	125	90
800	416	13854	0÷5000	2,76	0,0125	80	120
1000	848	28274	0÷8000	2,83	0,025	40	240

## Technical data

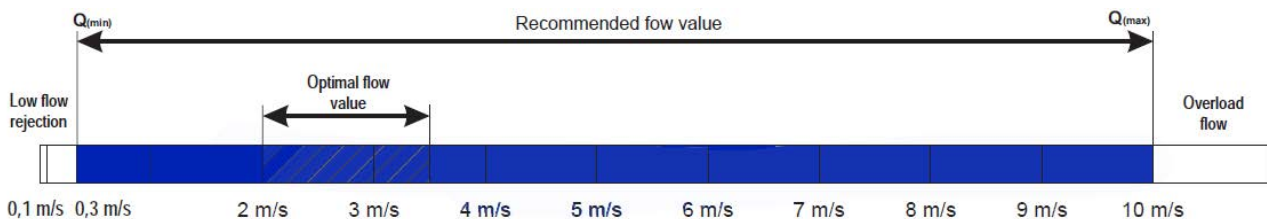
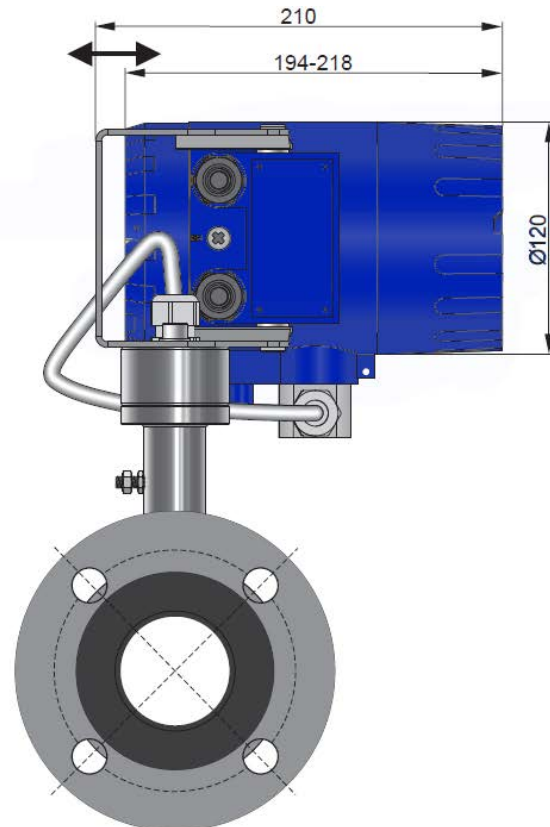
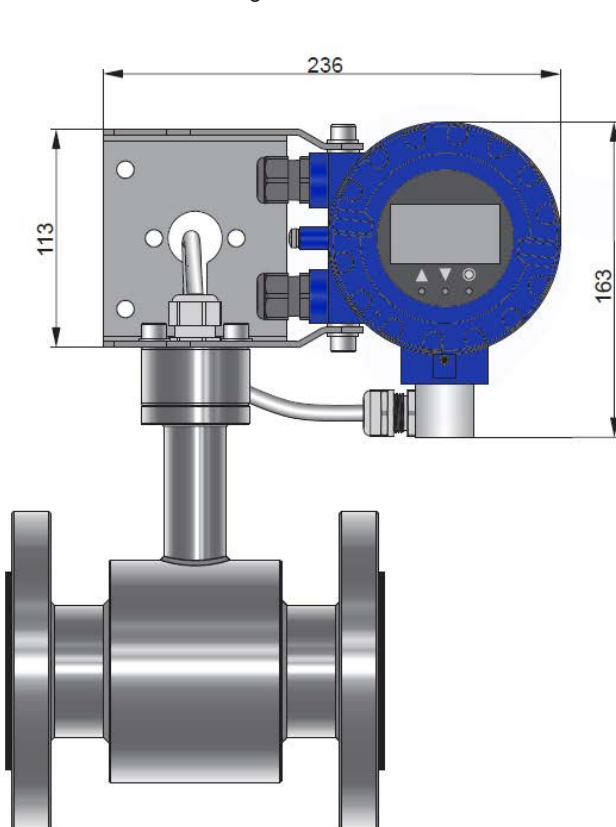
### Specification for PEM-1000 control unit

<b>Electrical conductivity of the medium</b>	≥ 5µS/cm
<b>Input resistance</b>	≥ 10 <sup>10</sup> Ω
<b>Accuracy</b>	±0,5% of reading at 20÷100% Q <sub>10m/s</sub> special version: ±0,2% of reading at 20÷100% Q <sub>10m/s</sub> (for reference conditions)*
<b>Low flow rejection</b>	adjustable, any value
<b>Actual flow</b>	both directions (l/s, m <sup>3</sup> /h, m <sup>3</sup> /s, other)
<b>Totalizer</b>	3 counters: total, positive, negative (m <sup>3</sup> , other)
<b>Configuration</b>	LCD display/buttons or Modbus RTU via RS485
<b>Empty pipe detection</b>	cyclic, configurable
<b>Analog output</b>	4÷20mA/500Ω active output (passive output – on request)
<b>Pulse/frequency output</b>	max. 24V/10mA DC 0,1...2000Hz in frequency mode up to 500Hz in pulse mode
<b>2-state output OC</b>	2, open collector, max. 35V DC for each galvanic insulation, reverse polarity protection
<b>Communication output</b>	Modbus RTU/RS 485 galvanic insulation
<b>2-state 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

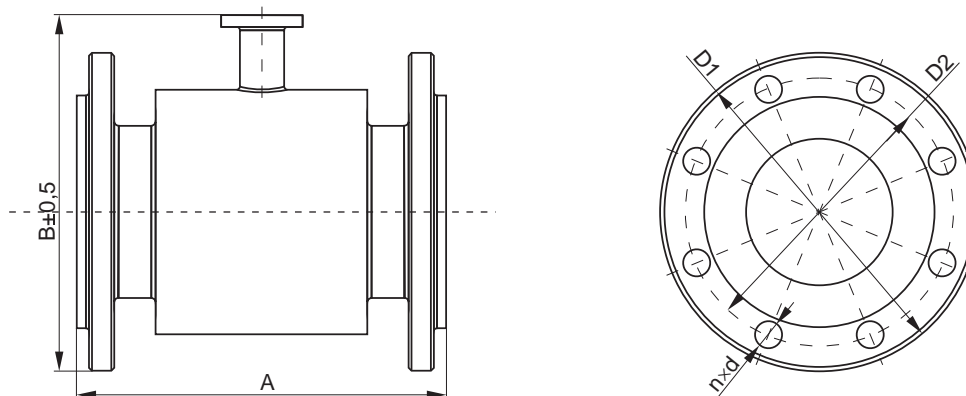
\* Reference conditions according to PN-EN 29104:2003

### 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
<b>Ambient temperature</b>	-20÷60°C
<b>Liner temperature range</b>	Rubber: -5÷90°C Neoprene: 0÷80°C Teflon PTFE: -25÷90°C PFA: -10÷90°C
<b>Connection cable</b>	standard: 8m (other on request)
<b>Electrodes material</b>	316L (Hastelloy/Tantalum)
<b>Liner</b>	Hard rubber DN40÷1000 Neoprene DN40÷1000 Teflon PTFE DN15÷500 PFA DN10
<b>Casing and flange material</b>	standard : carbon steel
<b>Rustproofing</b>	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



### Dimensions of sensor

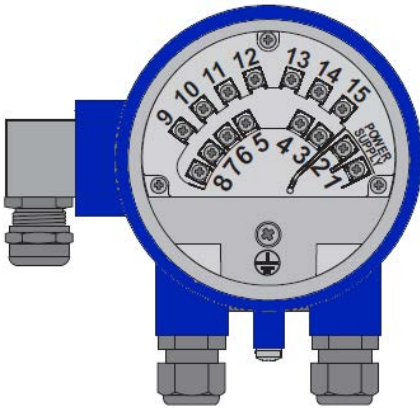


DN 10 – DN 150 A ± 5 mm  
 DN 200 – DN 1000 A ± 10 mm

DN	PN	Dimensions [mm]						Weight kg	
		A	B	D1	D2	d	n		
10	16	200	153	90	60	14	4	5	
15			155	95	65	14	4	5	
20			160	105	75	14	4	6	
25			167	115	85	14	4	7	
32			180	140	100	18	4	8	
40			185	150	110	18	4	8	
50			191	165	125	18	4	9	
65			209	185	145	18	4	11	
80			224	200	160	18	8	13	
100			250	245	220	180	18	8	16
125				276	250	210	18	8	21
150			300	305	285	240	22	8	26
200			350	375	340	295	22	12	36
250			430	405	355	26	12	60	
300		500	487	460	410	26	12	80	
350			542	520	470	26	16	90	
400		600	615	580	525	30	16	120	
450			657	640	585	30	20	130	
500			750	715	650	33	20	150	
600			870	840	770	36	20	240	
700	700	927	910	840	36	24	340		
800	800	1050	1025	950	39	24	400		
900	900	1145	1125	1050	39	28	480		
1000	1000	1285	1255	1170	42	28	600		

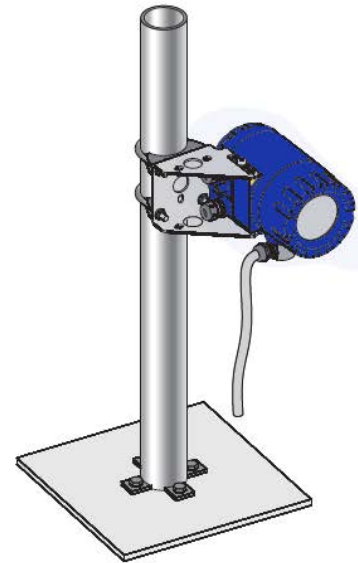
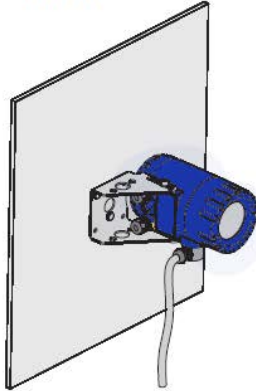
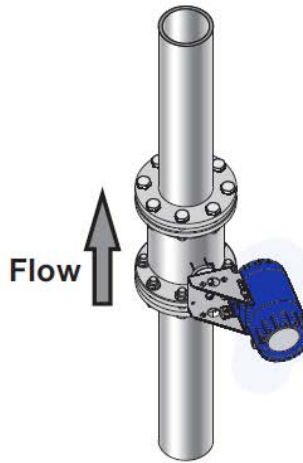
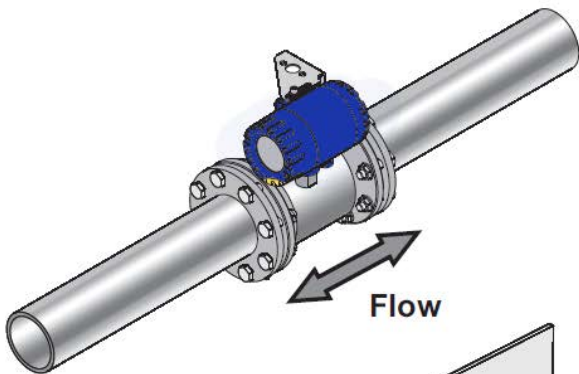
ANSI	lbs	Dimensions [mm]						Weight kg	
		A	B	D1	D2	d	n		
1/2"	150	200	155	88,9	60,45	15,7	4	5	
3/4"			160	98,6	69,85	15,7	4	6	
1"			167	108	79,25	15,7	4	7	
1 1/4"			180	117,3	88,9	15,7	4	8	
1 1/2"			185	127	98,6	15,7	4	8	
2"			191	152,4	120,7	19,1	4	9	
2 1/2"			209	177,8	139,7	19,1	4	11	
3"			224	190,5	152,4	19,1	4	13	
4"			250	245	228,6	190,5	19,1	8	16
5"				276	254	215,9	22,4	8	21
6"		300		305	279,4	241,3	22,4	8	26
8"		350		375	342,9	298,5	22,4	8	36
10"		450	430	406,4	362	25,4	12	60	
12"		500	487	482,6	431,8	25,4	12	80	
14"	550	542	533,4	476,3	28,4	12	90		
16"	600	615	596,9	539,8	28,4	16	120		
18"		657	635	577,9	31,75	16	130		
20"		750	698,5	635	31,75	20	150		
24"		870	812,8	749,3	35,1	20	240		

### Electrical diagrams



	Terminal	Description		
Power supply	1	90...260V AC	(-)	10...36V DC (on request)
	2		(+)	
2-state 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		
2-state input (passive)	12	reverse polarity protection, galvanic insulation		
	13			
2-state output 2	14	reverse polarity protection, galvanic insulation, passive		
	15			

### Examples of installation



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

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

Nominal diameter: **DN10...1000**  
**0,5"...40"**

Pressure rating: **PN16, ANSI150**

Electrodes material: **316L, Hastelloy, Tantalum**

Liner material: **hard rubber, Teflon**

Cable length (standard L=8m)

Special version: **IP68, IP67, 0,2%, 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

**0,2%** – accuracy 0,2%

**Q<sub>max</sub>** – non-standard value of Q<sub>max</sub>.

**PZH** – approval for contact with potable water