ELECTROMAGNETIC FLOWMETER SERIES SpiraMAG®

1. IDENTIFICATION

Manufacturer Bopp & Reuther Messtechnik
Am Neuen Rheinhafen 4
67346 Speyer / Germany
Phone: +49 6232 657-0
www.bopp-reuther.com

Product type Electromagnetic flowmeter
Product name SpiraMAG® with transmitters

2. RANGE OF APPLICATION

The series SpiraMAG® are best suited for bi-directional flow measurement of fluids with a minimum conductivity of 5 µS/cm. The meters are highly accurate (better than ± 0.25% of actual flow), and measurement is independent of density, temperature and pressure of the medium.
Series SpiraMAG® is a preferable solution for measurement in a variety of applications from water and waste water industry to chemical / pharmaceutical and food/beverage industries.

Available sizes are DN 15 to DN 1000 with a number of different connections (DIN, ANSI, JIS, etc.) with nominal pressures up to PN 100. Tri-clamp and thread connections are also available. Liner materials are hard and soft rubber or PTFE/PFA.
For applications without a power supply, we offer our battery powered version (SPM xxxx - B) with a battery life time of 10 years with standard sampling rate.

3. MEASURING PRINCIPLE

Based on Faraday's law of magnetic induction, when a conductor moves in right angles through a magnetic field, a voltage is being induced across it, proportional to the velocity of the conductor and the magnetic flux density.
In an electromagnetic flow meter, when fluid moves as the conductor, the voltage induced within the fluid is measured by two diametrically apposed electrodes. This allows the magnetic-inductive flowmeter to detect flow velocity of fluid inside a closed conduit. Electromagnetic flowmeters are able to measure a wide range of fluid velocities, however, meter sizes shall be selected properly based on the application and flow conditions to reach the best possible accuracy.

4. FEATURES

- DN15 – DN1000 (up to DN2000 on request)
- Accuracy up to±0.25 % of reading ±0.1 full scale
- Flow velocity from 0.03 to 10 m/s (recommended 2 - 3 m/s)
- Protection Class IP67, IP68 (for remote variant on request)
- Compact / remote converter
- Power supply: 85-265 VAC / 9-36 VDC / battery
- up to PN40 (up to PN100 on request)
- analogue output 4-20 mA
- frequency output / Pulse
- Interface: Modbus RS485

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5. TECHNICAL DATA

Sensor

Size	DN15 - DN1000, larger sizes on request
Connections	Flange: DIN, ANSI, JIS, (Tri-Clamp on request) Customized connections on request
Protection class	IP67, optional IP68, only with converter remote mounted
Nominal pressure	up to PN40 (up to PN100 on request)
Process temperature	0 to +70°C (compact mounted , rubber liner) 0 to +90°C (remote mounted , rubber liner) -40 to +100°C (compact mounted, with PTFE liner) -40 to +160°C (remote mounted, with PTFE liner)
Electrode material	Hastelloy C (2.4610), stainless steel platinum plated, Titanium , others on request
Liner material	hard-, soft rubber, PTFE / PFA
Measuring tube material	stainless steel 316
Housing	Carbon Steel / Optional Stainless Steel
Length	standard acc. to ISO 13359, others on request
Conductivity	≥ 5 µS/cm
Flow range	0.03 - 10 m/s (recommended: 2 - 3 m/s)

Converter

Type / model	variant SPM xxxx - A	85 - 265 V AC (50 / 60 Hz), P_{max} = 12 W
	variant SPM xxxx - D	9 - 36 V DC, P_{max} = 12 W
	variant SPM xxxx - B	battery powered
Flow direction	bi - directional	
Accuracy	powered devices: ± 0.25 % of reading ± 0.1 % full scale battery devices: ± 0.5 % of reading ± 0.1 % full scale	
Inlet / outlet sections	5 × D / 3 × D recommended	
Ambient temperature	-25 to + 60°C (powered), -10°C to 60°C (battery)	
Relative humidity	90 %	
Power supply	85 - 265 VAC (50 / 60 Hz), 9 - 36 VDC, battery powered	
Analogue output	4 - 20 mA	
Digital output	frequency output / pulse (active)	
Empty pipe detection	standard	
Communication	Modbus RS 485 or HART® protocol	
Display	7 digits flow rate / 8 digits totalizer / LCD	
Housing	Aluminum	
Protection class	IP67	
Remote version	Standard 10 m, up to 100 m with standard junction box	

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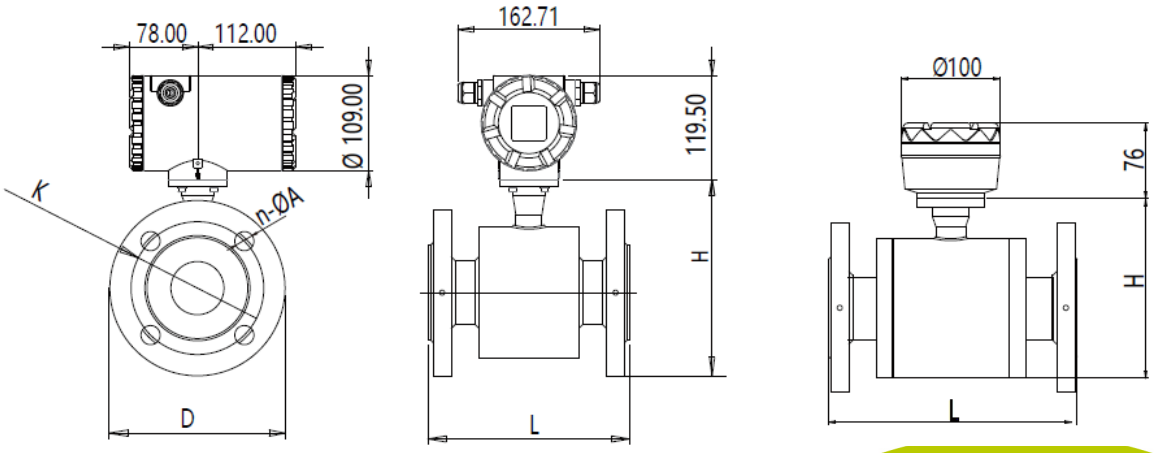
6. SENSOR DIMENSIONS and MEASRURING RANGE

DN		Maximum operating pressure [bar]	Flow range [m³/h] (for flow velocity* ~ 0.3 – 10 m/s)		L [mm]	D [mm]	K [mm]	n-ØA	Weight compact version** [kg]
[mm]	[Inch]		Min	Max					
15	½	40	0.2	6	150	95	65	4-Ø14	6
25	1		0.5	18	150	115	85	4-Ø14	7
32	1 1/4		0.9	29	150	140	100	4-Ø18	9
40	1½		1.5	45	200	150	110	4-Ø18	11
50	2		2.1	71	200	165	125	4-Ø18	12
65	2½		3.6	119	200	185	145	8-Ø18	17
80	3		5.4	181	200	200	160	8-Ø18	17
100	4	16	8.5	283	250	220	180	8-Ø18	22
125	5		13	442	250	250	210	8-Ø18	24
150	6		19	636	300	285	240	8-Ø22	35
200	8		34	1131	350	340	295	8-Ø22	45
250	10		53	1767	400	395	350	12-Ø22	84
300	12		76	2545	500	445	400	12-Ø22	102
350	14		104	3464	500	505	460	16-Ø22	123
400	16	10	136	4524	600	565	515	16-Ø26	147
450	18		172	5725	600	615	565	20-Ø26	212
500	20		212	7068	600	670	620	20-Ø26	229
600	24		305	10178	600	780	725	20-Ø30	252
700	28		416	13854	700	895	840	24-Ø30	352
800	32		543	18095	800	1015	950	24-Ø33	462
900	36		687	22902	900	1115	1050	28-Ø33	558
1000	40	6	848	28274	1000	1235	1120	28-Ø36	690

* Recommended flow velocity is 2-3 m/s.
** Remote versions are 2 kg lighter.



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7. ORDERING MATRIX (DN 15 - DN1000)

ORDERING MATRIX SPIRAMAG®

SPM									
TYPE / SENSOR DIAMETER									
DN 15 (½")	0015								
:	:								
:	:								
DN 1000 (40")	1000								
POWER SUPPLY									
85 – 265 VAC		A							
18 – 36 VDC		D							
Battery powered		B							
TRANSMITTER DESIGN									
Compact Design			C						
Remote Design (IP 67), cable length 10 m (Standard)			W						
Remote Design (IP 68), cable length 10 m (Standard)			R						
CABLE GLANDS									
Cable gland CM20 (M20 × 1,5)				M					
Adapter CM 20 to ½"-NPT				N					
FLANGE MATERIAL									
Carbon Steel, epoxy-coated					CS				
Stainless Steel SS 304					04				
Stainless Steel SS 316									
ELECTRODE MATERIAL									
Hastelloy C (2.4610)						10			
Titanium						TI			
Stainless Steel, platinum-plated						PT			
(others on request)						16			
LINER MATERIAL									
Soft rubber							S		
Hard rubber							H		
PTFE (Teflon)							T		
(others on request)									
HYDRAULIC CONNECTION									
DIN PN 6	(Standard for DN 1000 / NPS 40)							Y	
DIN PN 10	(Standard for DN 200 – DN 900 / NPS 8" – NPS 36", optional for DN 1000)							A	
DIN PN 16	(Standard for DN 100 – DN 350 / NPS 4" – NPS 14", optional for DN 400 – DN 900)							B	
DIN PN 25	(optional for DN 100 – DN 350 / NPS 4" – NPS 14")							C	
DIN PN 40	(Standard for DN 15 – DN 80 / NPS ½" – NPS 3")							D	
ANSI 150								E	
JIS B2220 10 K								J	
Tri-Clamp	(for DN15 – DN 100 / NPS ½" – NPS 4")							Z	
OUTPUTS									
Pulse / RS485 (for Battery version "B" only)									P
4-20 mA / Pulse / RS485									4
4-20 mA / Pulse / HART									H

EXAMPLE: SPM 0050 A C M-CS-10-S-B-4

- Customized cable length / Connections / Flange material shall be ordered separately.
- Grounding method is grounding electrode as standard. Grounding rings shall be ordered separately, if required.
- Protection class is IP67 as standard. IP68 available on request only.