MEASURE **TODAY.** ENSURE **TOMORROW.**

SpireMag Series MAG888-DC
Battery-Powered Magnetic Flow Meter

Standalone No Wiring Plug & Play Telemetry Ready

Integral type

Integral type with GPRS Wireless

Remote Type

The SpireMag series MAG888-DC flowmeter is a battery-powered high-performance magnetic water meter designed for the water and wastewater industry to accurately measure the water flow in closed conduits.

MAG888-DC is ideal for remote locations in municipal, irrigation, wastewater treatment and industrial liquid processes industries where no power connection is available.

- Stand alone water meter with battery lifetime for more than 4 years. Simple and easy battery replacement
- Billing grade with class 0.5 accuracy
- Plug and play. No need for programming, no need for wiring
- Compact and rugged design. IP68 submersible
- Large measurement range, Bi-directional
- No moving parts to wear and tear, maintenance free
- Short straight-pipe run requirement, suitable for any desired installation location
- Optional GPRS wireless and turnkey data service.
- Battery powered for more than 3 years

DS888DC-QT-1502-Rev.13

SPIRE METERING TECHNOLOGY

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SpireMag Series MAG888-DC

Battery-Powered Magnetic Flow Meter

Applications

- Accurate water metering for water consumption and revenue generation
- Water metering in remote locations
- Potable water metering
- Irrigation water metering
- Wastewater and raw water metering
- Water distribution network monitoring
- Leakage detection
- Pump performance monitoring

Specifications

Nominal Size	DN15 (½")~DN800 (32")
Accuracy	±0.5%
Measurement Range	0 ~±15m/s (±49ft/s)
Nominal Pressure	• DN15~DN100 (0.5"~4"): 2.5MPa (362psig) • DN125~DN250 (5"~10"): 1.6MPa (232psig) • DN300~DN800 (12"~32"): 1.0MPa (145psig) • Higher pressure rating is available upon request
Medium Electrical Conductivity	≥ 20us/cm
Medium Temperature	-10°C ~ +100°C (14°F ~ 212°F)
Display	Large LCD for displaying instantaneous flow, forward flow total, reverse flow total and alarm
Recordable Parameters	Accumulative total of flow, 32 events
Alarms	• Fluid empty-tube alarm • Excitation current alarm • Battery capacity low alarm
Totalizer	Built-in forward flow totalizer and reverse flow totalizer

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Output Signals	Pulse output (optional for integral type or for remote type with battery power supply only) Pulse/Frequency output (for remote type with dual power supply only) Dry Contact interface for pulse output. 0.001L ~ 1m^3 per pulse.
Communication (optional)	• RS-485/Modbus (for remote type) • GPRS Wireless **Note:** with GPRS, a server with Static IP address is needed or you can use our data service • CDMA wireless
Lining Material	Rubber, PTFE, Polyurethane
Electrode Material	316L SS, Hastelloy B, Hastelloy C, Titanium, Tantalum
Sensor Body Material	• Measuring tube: stainless steel • Housing: carbon steel as standard offer. Stainless steel available upon request • Flange: carbon steel as standard offer. Stainless steel available upon request
Excitation Frequency	• 1/30Hz (default): longer battery life but slower response • 1/15Hz: shorter battery life but faster response
Pipe Connection	• DIN flange as standard offer • ASME ANSI flange
Ambient Condition	-10°C ~ +60°C (14°F ~ 140°F), Humidity <95%
Power Supply*	• For battery-only flowmeter (integral type, Model# MAG888-DC-1/2): 3.6V built-in Li batteries. Lifetime: more than 4 years • For GPRS (integral type): up to 3 years. Easy to replace • For flowmeter with dual-power supply (remote type, Model# MAG888-DC-3): 3.6V built-in Li batteries, plus interface for external DC power supply – 24VDC/1A.
Protection Class	• For integral type: IP68 submersible • For remote type: **a.** IP68 for Flow sensor, IP65 for converter **b.** IP68 for Flow sensor, IP68 for converter *(The cable length between converter and flow sensor is 15m, up to 25m)*
Structure Type*	• Integral type • Remote type: º Remote type with battery-only power supply º Remote type with dual power supply (external 24VDC power source is required)

***Note:** *Battery-only powered flowmeter is good for flow which does not change fast. It measures the flow once every 15s to save battery. You may program the measurement to a shorter interval, but the battery will be consumed faster. For a fast changing flow, you may consider the dual power model.*

SpireMag Series MAG888-DC

Battery-Powered Magnetic Flow Meter

Dimensions and Pressure Rating of Flow Sensor (full bore only)

Nominal Size	Nominal Pressure*	Dimension						Weight**	
		L		H		D**			
		mm	in	mm	in	mm	in	kg	lbs
15 (½″)	2.5 MPa (362psig)	200	7.9	220	8.7	80	3.1	8	0.3
20 (¾″)		200	7.9	220	8.7	90	3.5	10	0.4
25 (1″)		200	7.9	223	8.8	100	3.9	12	0.5
32 (1 ¼″)		200	7.9	240	9.4	120	4.7	13	0.5
40 (1 ½″)		200	7.9	250	9.8	130	5.1	14	0.6
50 (2″)		200	7.9	263	10.4	140	5.5	15	0.6
65 (2 ½″)	1.6 MPa (232psig)	200	7.9	283	11.1	180	7.1	18	0.7
80 (3″)		200	7.9	290	11.4	195	7.7	20	0.8
100 (4″)		250	9.8	318	12.5	215	8.5	25	1.0
125 (5″)		250	9.8	350	13.8	245	9.6	28	1.1
150 (6″)		300	11.8	380	15.0	280	11.0	30	1.2
200 (8″)		350	13.8	430	16.9	335	13.2	50	2.0
250 (10″)		450	17.7	495	19.5	405	15.9	70	2.8
300 (12″)	1.0 MPa (145 psig)	500	19.7	547	21.5	440	17.3	95	3.7
350 (14″)		550	21.7	602	23.7	500	19.7	120	4.7
400 (16″)		600	23.6	665	26.2	565	22.2	140	5.5
450 (18″)		600	23.6	720	28.3	615	24.2	160	6.3
500 (20″)		600	23.6	783	30.8	670	26.4	200	7.9
600 (24″)		600	23.6	897	35.3	780	30.7	280	11.0
700 (28″)		700	27.6	982	38.7	895	35.2	350	13.8
800 (32″)		800	31.5	1092	43.0	1010	39.8	400	15.7

Dimensions and Pressure Rating of Flanges (full bore flow sensor only)

Nominal Size	DIN Flange (mm)					ANSI RF150# Flange (in)			
	Nominal Pressure*	Diameter of Flange	Diameter of Bolts	No. of Bolts	Bolt Circle	Diameter of Flange	Diameter of Bolts	No. of Bolts	Bolt Circle
15 (½″)	2.5 MPa (362psig)	80	12	4	55	3 ½	½	4	2 ⅜
20 (¾″)		90	12	4	60	3 ⅞	½	4	2 ¾
25 (1″)		100	12	4	75	4 ¼	½	4	3 ⅛
32 (1 ¼″)		120	14	4	80	4 ⅝	½	4	3 ½
40 (1 ½″)		130	14	4	100	5	½	4	3 ⅞
50 (2″)		140	14	4	110	6	⅝	4	4 ¾
65 (2 ½″)	1.6 MPa (232psig)	180	18	4	145	7	⅝	4	5 ½
80 (3″)		195	18	8	160	7 ½	⅝	4	6
100 (4″)		215	18	8	180	9	⅝	8	7 ½
125 (5″)		245	18	8	210	10	¾	8	8 ½
150 (6″)		280	23	8	240	11	¾	8	9 ½
200 (8″)		335	23	12	295	13 ½	¾	8	11 ¾
250 (10″)		405	25	12	355	16	⅞	12	14 ¼
300 (12″)	1.0 MPa (145psig)	440	23	12	400	19	⅞	12	17
350 (14″)		500	23	16	460	21	1	12	18 ¾
400 (16″)		565	25	16	515	23 ½	1	16	21 ¼
450 (18″)		615	25	20	565	25	1 ⅛	16	22 ¾
500 (20″)		670	25	20	620	27 ½	1 ⅛	20	25
600 (24″)		780	30	20	725	32	1 ¼	20	29 ½
700 (28″)		895	30	24	840				
800 (32″)		1010	34	24	950				

Notes:

** For metric flange only. If ANSI RF150# flange is chosen, the pressure should exceed that allowed by the ANSI flange spec.*

***May vary with ANSI flange*

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Flow Sensor Selection

Selection of Liner Material

Liner Material	Main Performance	Applications
Polytetrafluoroethylene (PTFE)	1. A plastic material with the most stable chemical properties, able to resist the corrosion of boiling hydrochloric acid, sulfuric acid, nitric acid, aqua regia, concentrated alkali and many kinds of organic solvents. 2. Unable to resist the corrosion of chlorine trifluoride, high temperature vanadyltrifluoride, high flow-rate liquid fluorine, liquid oxygen and ozone. 3. Poor abrasion resistance. 4. Poor ability of anti-negative pressure.	1. 100°C (212°F) 2. Strong corrosive mediums like concentrated acid, alkali, and more.
Chloroprene rubber (Neoprene rubber)	1. Excellent elasticity, retractility and abrasion resistance. High degree of tensile strength, good wear resistance. 2. Able to resist the corrosion of low concentration acid, alkali and salt, but unable to resist that of that oxidative medium.	1. <80°C (176°F) 2. Water, sewage, slurry, polluted water, with very low abrasive quality.
Polyurethane rubber	1. Excellent wear resistance (ten times higher than that of the natural rubber). 2. Not suitable for acid and alkaline applications. 3. Unable to work with water mixed with organic solvents.	1.<80°C (176°F) 2. Medium and strong wearability for ore pulp, coal pulp, mud, and more. 3. Highly abrasive liquids such as mineral rich liquids, slurry.
PFA Liner	1. Outstanding chemical and solvent resistance. 2. High temperature stability.	1. <204°C (400°F) 2. Often used in various grades of purity and cleanliness.

Electrode Material Selection

Electrode Material	Applications
Mo-containing stainless steel (0Cr18Ni12Mo2Ti)	Liquids with weak corrosivity, such as industrial water, sewage, wastewater, polluted water, are widely used in industries such as oil, chemical, petrochemical,urea, vinylon, carbamide, etc.
Hastelloy B (HB)	Good corrosion resistance of different concentration of hydrochloric acid under boiling point, resist the corrosion of non-oxidizing acid, alkali, non-oxidizing salt solution, such as sulfuric acid, phosphoric acid, organic acid, etc.
Hastelloy C (HC)	Able to resist the corrosion of oxidizing acid, such as nitric acid, mixed acid,the mixture of chromic acid and sulfuric acid, oxidizing salt like Fe+++,Cu++ or other oxidants such as hypochlorite solution above ordinary temperature and seawater
Titanium (Ti)	Seawater, chloride, hypochlorite salt, oxidable acid, organic acid, alkali, etc. Unable to resist the corrosion of purer reducing acid like sulfuric acid and hydrochloric acid. The corrosivity of alpha hydroxy acids will be substantially decreased if there are oxidants such as nitric acid, Fe+++, Cu++, etc. in it.
Tantalum (Ta)	The corrosion resistance of tantalum is as good as glass. Except hydrofluoric acid, fuming nitric acid and alkali, it is able to resist the corrosion of almost any other chemical media.

As there are a great variety of mediums and the corrosiveness of each medium could significantly depending upon temperature, concentration, flow rate, the above two tables can only be used as a reference. Users should choose the liner and electrode materials according to the specific nature of their application. If necessary, corrosion resistance experiments using similar materials should be performed prior to selecting the electrode material.

Grounding

In general, an extra grounding accessory is not needed for water flow in metal pipes which have been connected to ground. However, if the pipe is plastic or the pipe is not grounded, you may consider the following accessories.

Type	Applications
Tri-electrode	Economical. Recommended. This is not a separate part. It is part of the electrode. Therefore, it cannot be ordered separately. Applicable to non-conductive pipelines such as plastic.
Ground Ring	Economical. Applicable to non-conductive pipelines such as plastic. However, it is not required for sensors with polytetrafluoroethylene (PTFE) liner.
Ground Flange	Premium price but best grounding solution. Applicable to non-conductive pipelines such as plastic. However, it is not required for sensors with polytetrafluoroethylene (PTFE) liner.

Nominal Diameter Selection

1. The MAG888-DC electromagnetic flowmeter has a high turndown ratio of 1200:1. For best results, Spire Metering recommends selecting the nominal diameter of the flow sensor to be the same as that of the process pipe.

2. If there are solid particles in the medium, a flow velocity range of 1~3m/s (3~10ft/s) is recommended.

- If the actual velocity is over 10ft/s and it is inconvenient or difficult to reduce the flow velocity, Spire Metering recommends selecting a nominal diameter one size larger than that of the process pipe. This will cause the flow velocity to decrease and the abrasion of the electrode and liner caused by particles will be alleviated.

- If the actual flow velocity is below 3ft/s and it is inconvenient or difficult to increase, Spire Metering recommends selecting a nominal diameter one size smaller than that of the process pipe. This will increase the flow velocity and will avoid particle deposition and accuracy degradation.

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When you select a flow sensor which nominal diameter is different from the process pipe, a size adaptation pipe should be jointed to both the upstream and downstream of the flow sensor. The center taper angle should be no more than 150° and there should be a straight pipe at least 5 times of the process pipe diameter jointed to the adaptation pipe.

To help sensor size selection, please consult the following table which shows the flow rate of each size at different flow velocity.

Comparison Table of Flow Velocity and Flowrate

Velocity m/s(ft/s) / Flowrate m^3/h (gpm) / Diameter mm (inch)	0.01(0.03) (Min)	1 (3.28)	2 (6.56)	3 (9.84)	4 (13.12)	5 (16.4)	15 (49.2) (Max)
15 (½")	0.006 (0.026)	0.64(2.82)	1.27(5.60)	1.9(8.40)	2.5(11.20)	3.2(14.00)	9.5(41.99)
20 (¾")	0.011 (0.048)	1.13(4.97)	2.26(9.95)	3.4(14.93)	4.5(19.91)	5.6(24.88)	16.9(74.64)
25 (1")	0.018 (0.079)	1.77(7.79)	3.53(15.55)	5.3(23.33)	7.1(31.10)	8.8(38.88)	26.5(116.63)
40 (1 ½")	0.45 (1.98)	4.52(19.89)	9.04(39.81)	13.5(59.72)	18.1(79.62)	22.6(99.53)	67.8(298.58)
50 (2")	0.07 (0.31)	7.07(31.11)	14.13(62.20)	21.2(93.31)	28.2(124.41)	35.3(155.51)	106.0(466.53)
65 (2 ½")	0.12 (0.53)	11.95(52.58)	23.89(105.12)	35.8(157.69)	47.7(210.25)	59.7(262.81)	179.2(788.43)
80 (3")	0.18(0.79)	18.1(79.64)	36.19(159.24)	54.3(238.86)	72.3(318.48)	90.4(398.10)	271.4(1194.31)
100 (4")	0.28(1.23)	28.27(124.41)	56.5(248.81)	84.8(373.22)	113.1(497.63)	141.3(622.04)	424.1(1866.11)
150 (6")	0.63(2.80)	63.61(279.92)	127.2(559.83)	190.8(839.75)	254.4(1119.66)	318.1(1399.58)	954.2(4198.74)
200 (8")	1.13(4.98)	113.1(497.63)	226.1(995.26)	339.3(1492.88)	452.3(1990.51)	565.4(2488.14)	1696.4(7464.42)
250 (10")	1.76(7.78)	176.7(777.54)	353.4(1555.09)	530.1(2332.63)	706.8(3110.18)	883.5(3887.72)	2650.7(11663.16)
300 (12")	2.54(11.2)	254.4(1119.66)	508.9(2239.33)	763.4(3358.99)	1017.8(4478.65)	1272.3(5598.32)	3817.0(16794.95)
350 (14")	3.46(15.2)	346.3(1990.51)	692.7(3047.97)	1039.1(4571.96)	1385.4(6095.95)	1731.8(7619.93)	5195.4(22859.80)
400 (16")	4.52(19.91)	452.3(4478.65)	904.7(3981.03)	1357.1(5971.54)	1809.5(7962.05)	2261.9(9952.57)	6785.8(29857.70)
450 (18")	5.72(25.19)	572.5(2519.24)	1145.1(5038.49)	1717.6(7557.73)	2290.2(10076.97)	2962.7(13036.22)	8588.3(37788.65)
500 (20")	7.06(31.10)	706.8(3110.18)	1413.7(6220.35)	2120.5(9330.53)	2827.4(12440.71)	3534.3(15550.88)	10602.8(46652.65)
600 (24")	10.17(44.79)	1017.8(4478.65)	2035.7(8957.31)	3053.6(13435.96)	4071.5(17914.62)	5089.3(22393.27)	15268.1(67179.82)

SpireMag Series MAG888-DC

Battery-Powered Magnetic Flow Meter

How to Order

Please select one option (ID) from each category.

MAG888-DC-□-□-□□□□□□-□-□-□-□-□-□

Type*	ID
Integral Type (Default)	1
Remote Type	2
Remote Type with Dual Power Supply	3

Wireless**	ID
None	0
With GPRS Wireless (Output must be A-None)	1

Unit System	ID
Metric System	DN
English System	IN

Calibre	ID
DN15 (½")	0015 (0050)
DN20 (¾")	0020 (0075)
DN25 (1")	0025 (0100)
DN32 (1 ¼")	0032 (0125)
DN40 (1 ½")	0040 (0150)
DN50 (2")	0050 (0200)
DN65 (2 ½")	0065 (0250)
DN80 (3")	0080 (0300)
DN100 (4")	0100 (0400)
DN125 (5")	0125 (0500)
DN150 (6")	0150 (0600)
DN200 (8")	0200 (0800)
DN250 (10")	0250 (1000)
DN300 (12")	0300 (1200)
.....	.....
DN800 (32")	0800 (3200)

ID	Cable Length
A	15m
B	25m
C	None for Integral Type

ID	Grounding
A	None (Default)
B	Tri-electrode
C	Ground Ring
D	Ground Flange

ID	Flange
1	DIN flange (ask for pressure rating)
2	ANSI RF150# @ 2.0MPa (290psig) (up to 24")
3	ANSI RF125# @1.2MPa (175psig) (24" to 80")
4	Other, please specify

ID	Output
A	None (Default)
B	Pulse (not available if wireless option is selected)
C	RS485/Modbus and Pulse (for remote type with dual power supply. Not available if wireless option is selected)
D	Other, please specify

ID	Electrode Material
1	316LSS (OCr18N112M02Ti) (default)
2	HC (Hastelloy C)
3	Ti (Titanium)
4	Other, please specify

ID	Liner Material
A	PTFE
B	Chloroprene Rubber (for DN50/2" or above only)
C	Other, please specify

**Note:* *battery-only integral type or remote type meters are recommended for applications with relatively constant flow rates. For applications with moderate to high fluctuations in flow rate, please consider the dual-power type Model# MAG888-DC-3) which requires a 24VDC external power supply.*

***Note:* *Telemetry Software is required if Wireless GPRS option is selected. Please contact Sales@SpireMT.com for pricing.*

Example

Model# MAG888-DC-1-0-IN0100-A-1-A-1-A-A

Stands for integral type, no wireless, battery powered magnetic flowmeter, size 1", no output, no ground ring, 15m(45ft) cable, PTFE liner, 316L SS electrode, DIN flange.