

### Mag-11 Series Electromagnetic Heat (Cooling) Meter

#### Product Description

MAG-11 Series electromagnetic heat meter is a product integrating the measurement of air conditioning water flow, heat and temperature difference, which is suitable for cold / hot water air conditioning billing system. It is usually called electromagnetic energy meter or electromagnetic BTU meter. The converter, electromagnetic flow sensor and supply / return water temperature sensor form a heat meter. The converter can be installed independently or assembled on the electromagnetic flow sensor.



#### Product Features

- ◆ No moving part and no pressure loss.
- ◆ High accuracy of  $\pm 0.5\%$  value of reading.
- ◆ Suitable for Water and Water/Glycol Solutions, heat capacity can be programmed.
- ◆ Measure forward and reverse direction flows.
- ◆ 4-20mA, Pulse, RS485, Bluetooth and BACnet output can be optional.
- ◆ DN10-DN300 pipes are available.
- ◆ Paired PT1000 temperature sensors.
- ◆ Built-In Interval Data Logger.

#### Flange connection version (DN10-300)

Flange type sensor use the way of connecting the flange with pipe, has various types of electrode material and lining material. The sensor and converter can be combined into the integrated or split electromagnetic flow meter.



**Integrated type**



**Remote type**

## Technical data

### Converter:

Display	4-line English LCD display,display the data of instantaneous flow,cumulative flow, heat (cold), the temperature of inlet and outlet water.
Current Output	4-20mA (can set flow or energy)
Pulse Output	Can choose full frequency or pulse equivalent output, the maximum frequency value of output is 5kHz.
Communication	RS485(MODBUS or BACNET), Data logger, Bluetooth
Power Supply	220VAC, 24VDC, 100-240VAC
Temperature	-20 ℃ ~ 60 ℃
Humidity	5% ~ 95%
Protection	IP65 (converter); IP67, IP68 (sensor)
Structure	Compact or Remote

### Sensor:

Application	All conductive liquid including water,beverage,various of corrosive media and liquid-solid two-phase fluid (mud,paper pulp).
Diameter	DN10-DN300
Pressure	0.6 ~ 4.0 Mpa
Electrode Material	SS316L, Hc, Hb, Ti, Ta, W, Pt
Lining Material	Ne, PTFE, PU, FEP, PFA
Temperature	-40 ℃ ~ 80℃
Shell Material	Carbon Steel (Stainless Steel can be customized)
Protection Level	IP65, IP67, IP68
Connection	GB9119 (Can connect with HG20593-2009 flange directly),JIS,ANSI or customized.)
Temperature sensor	PT1000

### Flange Type Sensor Dimension and Diameter,Pressure,Lining Material

Pipe Diameter	Pressure (Mpa)	Lining Material					Dimension (mm)			Connection size		Weight (kg)	
		FEP	Ne	PU	PTFE	PFA	L	D	H	K	N x φ		
DN10	4.0	O				O	150	95	142	60	4 x 14	3.5	
DN15		O		O	O	O				65			
DN20		O		O	O	O				75			
DN25		O		O	O	O		85					
DN32		O		O	O	O		140	172	100		4 x 18	6.5
DN40		O		O	O	O		150	177	110			7.0
DN50		O	O	O	O	O	200	165	205	125	8 x 18	9.5	
DN65		O	O	O	O	O						185	216

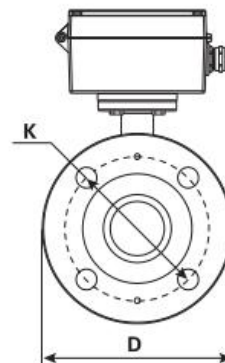
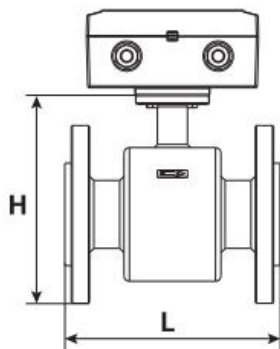
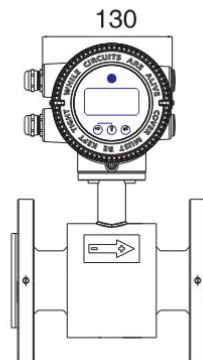
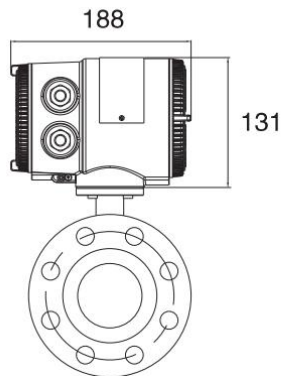
DN80		O	O	O	O	O		200	228	160		15
DN100	1.6	O	O	O	O	O	250	220	258	180	8 x 22	17
DN125		O	O	O	O	O		250	284	210		21
DN150		O	O	O	O	O		300	285	315		240
DN200	1.0	O	O	O	O	O	350	340	366	295	12 x 22	36
DN250		O	O	O	O	O	400	395	420	350		49
DN300		O	O	O	O	O	450	445	470	400		61

Note: "O" in the sheet means that different types of flow meters can choose different lining material.

When the working pressure of measured pipe is higher than pressure of sensor, the flow meter can be customized from our company.

The connection size in the sheet is designed according to GB/T9119-2010 standard, if you want the other connection size (such as ANSI/JIS), can be customized from our company.

### Schematic diagram



### Measure range

Pipe size	Connection	Measure range		
		Qp (m3/h)	Qi (m3/h)	
			FEP/PU	PTFE
DN10	Flange	2.5	0.06	
DN15		6	0.15	0.3
DN20		10	0.25	0.5
DN25		16	0.4	0.8
DN32		25	0.6	1.2
DN40		40	1	2
DN50		64	1.6	3.2
DN65		100	2.5	5
DN80		160	4	8
DN100		250	6	12
DN125		400	10	20
DN150		600	15	30
DN200		1000	25	50
DN250		1600	40	80

### Thread version connection (DN10-40)

Thread-type sensor breaks through the conventional design of electromagnetic flow-meter, it makes up the fatal flaw of some flow meters in the field of small flow measurement, it has the advantage of light and handy appearance, convenient installation, widely measuring range and hard to clogged, etc.



### Technical data:

#### Converter:

Display	4-line English LCD display, display the data of instantaneous flow, cumulative flow, heat (cold), the temperature of inlet and outlet water.
Current Output	4-20mA (can set flow or energy)
Pulse Output	Can choose full frequency or pulse equivalent output, the maximum frequency value of output is 5kHz.
Communication	RS485(MODBUS or BACNET), Data logger, Bluetooth
Power Supply	220VAC, 24VDC, 100-240VAC
Temperature	-20 °C ~ 60 °C
Humidity	5% ~ 95%
Protection	IP65 (converter); IP67, IP68 (sensor)
Structure	Compact

### Sensor:

Diameter	DN10 - DN40
Electrode Material	SS316L, Hastelloy Alloy C
Lining Material	FEP, PFA
Temperature	0 ~ 180°C
Protection Level	IP65, IP67, IP68
Connection	Thread-type
Pressure	1.0Mpa
Temperature sensor	PT1000

### Dimension

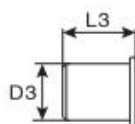
Diameter	D	L	L1	L2	D1	L3	D3
DN10	G 3/4 B	110	50	15	R 1/4	28	13.5
DN15					R 1/2	30	20.4
DN20	G 1 B	123	58		R 3/4	33	26.2
DN25	G 1 1/4 B	128	60	18	R 1	35	33.2
DN32	G 1 3/4 B	133	68	20	R 1 1/4	38	41.7
DN40							

### Measure range

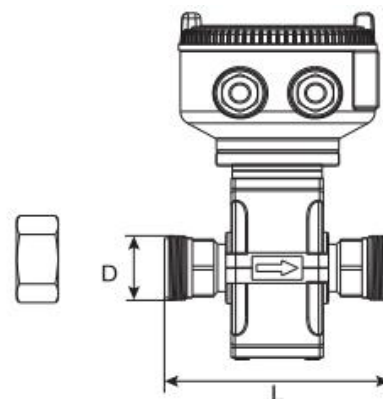
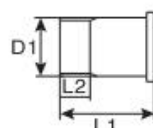
Pipe size	Connection	Measure range		
		Qp (m3/h)	Qi (m3/h)	
			FEP/PU	PTFE
DN10	Thread	2.5	0.06	
DN15		6	0.15	0.3
DN20		10	0.25	0.5
DN25		16	0.4/0.8	0.8
DN32		25	0.6	1.2
DN40		40	1	2

### Schematic diagram

Short Welded Pipe



Short Threaded Pipe



## Electrode Material Selection

Material	Code	Performance of Corrosion Resistance
316L	V	Used in industrial water, domestic water, sewage, neutral solution and the weak acid such as carbonic acid and acetic acid.
Hastelloy Alloy C	Hc	Oxidation resistance acid, such as nitric acid, mixed acid, complex acid mixed with sulfuric acid. Have good corrosion resistance to seawater, alkali solution and chloride solution. Inapplicable to: hydrochloric acid and Hydrofluoric acid.
Hastelloy Alloy B	Hb	Has good corrosion resistance to non-oxidative acid, alkali, salt. Inapplicable to: nitric acid.
Ti	Ti	Have good corrosion resistance to sea water, chloride, hypochlorite and various hydroxides. Inapplicable to: reducing acids like hydrochloric acid, sulfuric acid, hydrofluoric acid.
Ta	Ta	Almost have the corrosion resistance to all chemical media, generally used for hydrochloric acid and sulfuric acid. Inapplicable to: hydrofluoric acid, alkali and fuming sulfuric acid.
Tungsten Carbide	W	Have good wear resistance, used for the wearing media such as mud and paper pulp, but with poor corrosion resistance.
Platinum-iridium Alloy	Pt	Besides aqua acid and ammonium salt, almost have the corrosion resistance to all acid, alkali and salt solution.

## Lining Material Selection

- 1) For high-temperature media ( $\geq 140^{\circ}\text{C}$ ), preference for PFA lining
- 2) For the media with sanitation requirement should select FEP (or PTFE) lining
- 3) For the wearing media such as slurry and pulp should select PU or FEP lining.
- 4) For easy scaling media such as paper pulp, preference for FEP or PFA lining.
- 5) In the case of negative-pressure, should select FEP.

## Performance Table of Lining Material

Material	Performance of Corrosion Resistance	Working Temperature	Applicable Range	Diameter (mm)
PTFE	Almost have the corrosion resistance to all chemical media.	$-40 \sim 150^{\circ}\text{C}$	All media besides the fluid in negative-pressure pipe and also the fluid has the good wear resistance.	DN15 ~ 1200
Ne	Have the corrosion resistance to low consistence acid, alkali and salt, besides oil.	$-30 \sim 80^{\circ}\text{C}$	Industrial water, sewage, low consistence acid, alkali and salt solutions.	DN50 ~ 2000
GFNE	Have the corrosion resistance to low consistence acid, alkali and salt; have the resistance to high temperature and negative pressure.	$-25 \sim 160^{\circ}\text{C}$	Industrial water, sewage, hot water, low consistence acid, alkali and salt solutions.	DN50 ~ 2000
PU	Have good wear resistance, used for the wearing slurry, but with poor corrosion resistance.	$-30 \sim 80^{\circ}\text{C}$	Liquid containing solid grains (grout, slurry)	DN15 ~ 400
FEP	The corrosion resistance is equal to PTFE.	$-40 \sim 150^{\circ}\text{C}$	All fluid besides the wearing media such as mortar.	DN3 ~ 400
PFA	Have the corrosion resistance to all chemical media. The temperature resistance is better than FEP.	$-40 \sim 180^{\circ}\text{C}$	Same as PTFE, preference for sustained high temperature.	DN3 ~ 400


## Measuring Range Selection

Each of our electromagnetic flow meter has to be tested by strict actual calibration before leaving the factory. So when you select the measuring range, generally do not violate the precondition of "range must be larger than the measured flow", and it's better for the range close to the common measured flow. Generally make the common measured flow in the range of 50% to 80%.

The measuring range of Mag series electromagnetic flow-meter can be modified according to the actual situation. The highest velocity can reach 12m/s.

## Scale Flow Selection

Diameter(mm)(DN)					Scale Flow (m <sup>3</sup> /h)										
10	0.1	0.16	0.2	0.25	0.3	0.4	0.5	0.6	0.8	1.0	1.2	1.6	2.0	2.5	2.8
15	0.2	0.4	0.5	0.6	0.8	1.0	1.2	1.6	2.0	2.5	3.0	4.0	5.0	6.0	6.3
20	0.4	0.6	0.8	1.0	1.2	1.6	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10	11.3
25	0.6	1.0	1.2	1.6	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10	12	16	17.7
32	0.9	1.6	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10	12	16	20	25	28
40	1.4	2.5	3.0	4.0	5.0	6.0	8.0	10	12	16	20	25	30	40	45
50	2.1	4.0	5.0	6.0	8.0	10	12	16	20	25	30	40	50	60	70
65	4	6.0	8.0	10	12	16	20	25	30	40	50	60	80	100	120
80	6	10	12	16	20	25	30	40	50	60	80	100	120	160	180
100	8	16	20	25	30	40	50	60	80	100	120	160	200	250	280
125	13	25	30	40	50	60	80	100	120	160	200	250	300	400	440
150	19	40	50	60	80	100	120	160	200	250	300	400	500	600	630
200	34	60	80	100	120	160	200	250	300	400	500	600	800	1000	1100
250	53	100	120	160	200	250	300	400	500	600	800	1000	1200	1400	1600
300	76	160	200	250	300	400	500	600	800	1000	1200	1600	1800	2000	2500

Note 1 :  The red area is the flow we recommended.

Note 2 : The formula for the flow and velocity :

$$V = \frac{354 \times F}{D^2}$$

V: Velocity, m/s

F: Flow, m<sup>3</sup>/h

D: Diameter, mm

## Configuration Code

<b>Mag-11</b>	<b>Mag-11 Series Electromagnetic Heat Meter</b>											
	<b>Structure Of Converter</b>											
	A	Compact type										
	B	Remote type										
	<b>Sensor Type</b>											
	1	Flange type										
	2	Thread type										
	<b>Pipe Diameter</b>											
	010	DN10										
	020	DN20										
	100	DN100										
	150	DN150										
	...	...										
	<b>Electrode Material</b>											
	1	SS316L ( Standard )										
	2	HC276										
	3	Ta										
	4	Ti										
	5	Pt										
	<b>Lining Material</b>											
	P	PTFE										
	F	FEP										
	U	PU										
	<b>Measuring Pipe Material</b>											
	S	Carbon steel ( Standard )										
	<b>Output Option</b>											
	A	4-20mA + Modbus										
	B	4-20mA + Bacnet										
	O	Others										
	<b>Built-In Ground Electrode</b>											
	1	None										
	2	HC276										
	3	Ta										
	4	Ti										
	5	Pt										
	<b>Explosion-Proof</b>											
	0	No										
	1	Yes										
	<b>Protection Class</b>											
	0	IP65 ( Standard )										
	1	IP67										
	2	IP68										
	<b>Cable Length</b>											
	10m	10m ( Standard )										
	Xm	Customized Length										
<b>Mag-11</b>	<b>-A</b>	<b>-1</b>	<b>-010</b>	<b>-1</b>	<b>-P</b>	<b>-S</b>	<b>-A</b>	<b>-1</b>	<b>-0</b>	<b>-0</b>	<b>-10m</b>	<b>(example configuration)</b>



