



# MAGNETIC FLOWMETER (ZH-PMF-G)



Incorporate type



Separate body-type

## PMF series electromagnetic flow meter

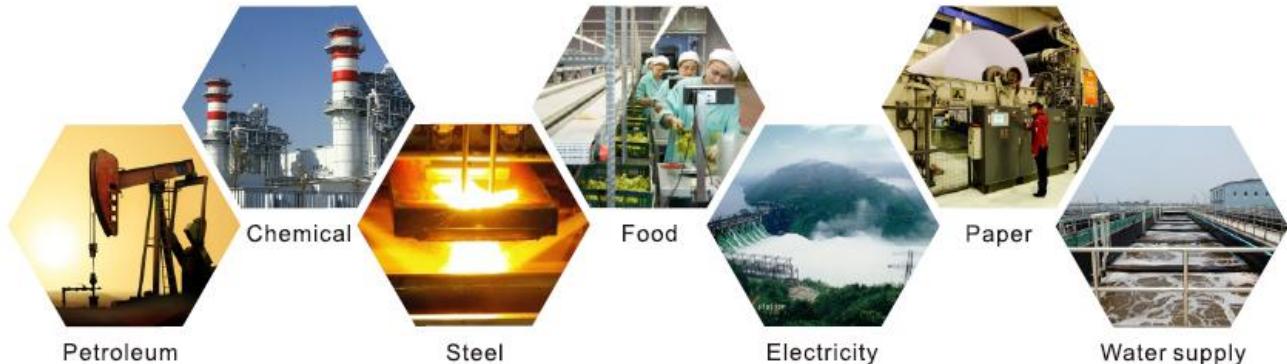
It is suitable for the conductive medium whose conductivity is more than 5us/cm, and it not only has a wide nominal diameter range, but also adapts to various actual environmental conditions. In addition, it possesses a variety of power supply methods and signal output using the standard RS-485 serial communication interface, as well as supports the international standard MODBUS-RTU protocol and GPRS and other wireless or wired communication network methods, and also has the accumulative pulse equivalent output. It provides the wireless meter reading system that can access the network in a long-distance (computer management software and databases).

### Functional characteristics

- Excellent measurement repeatability and linearity
- Good reliability and anti-interference performance
- Good pressure resistance sealing ability
- Low pressure loss measurement tube
- High intelligentization
- Maintenance-free

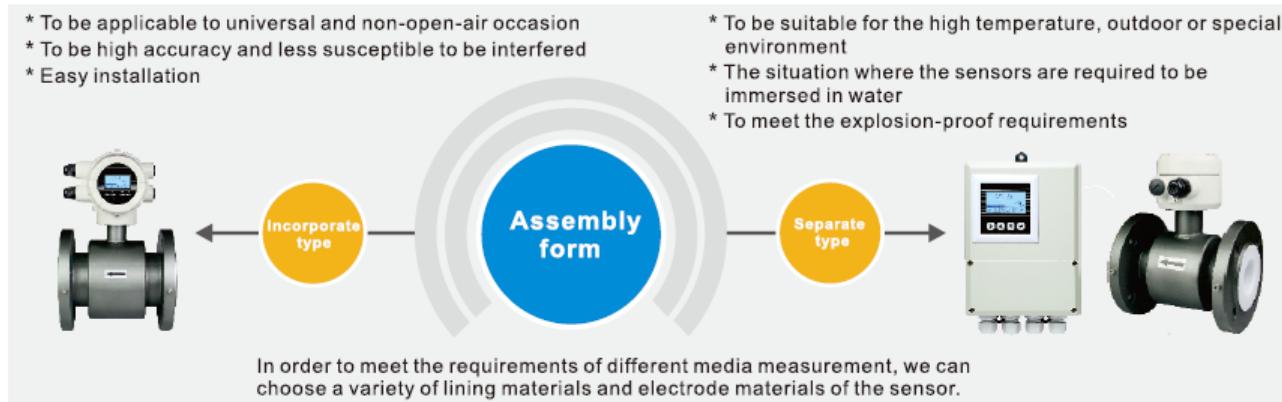
## Industry application

Electromagnetic flow meter is a kind of speed meter which has a high accuracy and reliability and is widely used in petroleum, chemical engineering, steel, food, electricity, paper, water treatment, water supply, heat supply, environmental protection and other industries.



## Product description

Electromagnetic flowmeter is composed of the sensor and convertor, and the sensor consists of measuring tube, electrodes, excitation coils, iron core and shell and other components. After the traffic signal is amplified, processed and operated by convertor, you can see the instantaneous flow, cumulative flow, output pulse, analog current and other signals for the measurement and control of fluid flow. PMF series electromagnetic flowmeter adopts the smart converter so that it not only has the measurement, display and other functions, but also supports the remote data transmission, wireless remote control, alarm and other functions.



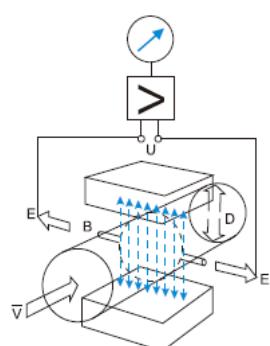
## Working principle

The working principle of electromagnetic flowmeter is based on Faraday's law of electromagnetic induction. The two electromagnetic coils of upper and lower ends in the right figure generate a constant or alternating magnetic field, and the induced electromotive force can be detected by the space of flowmeter wall between two electrodes on the left and right when the conductive medium flows through the electromagnetic flowmeter. The induced electromotive force is proportional to the conductive medium velocity, the magnetic flux density of the magnetic field and the conductor width (flowmeter tube diameter), then the medium flow can be achieved through operation.

The induced electromotive force process parameters equation:

$$E = K B V D$$

Where: E—induced electromotive force; D—measuring tube diameter;  
B—magnetic induction intensity; V— average velocity;



K—it is a coefficient that relates to the field distribution and axial length;

## Performance parameter

Executive standard	JB/T 9248-1999					
Nominal diameter	15-2000mm					
velocity range	0-10m/s					
Degree of accuracy	$\pm 0.5\%R$ , $\pm 1\%R$ ( $< DN20$ )					
Medium conductivity	$\geq 5 \mu S/cm$ , Actual conductivity $\geq 30 \mu S/cm$					
Nominal pressure	1.0MPa	1.6MPa	2.5MPa	4.0MPa		
	DN15-DN800	DN15-DN800	DN15-DN600	DN15-DN50		
Environment temperature	Sensor		$0^{\circ}C - +80^{\circ}C$ or $-25^{\circ}C - +120^{\circ}C$ or $+70^{\circ}C - +250^{\circ}C$			
	Incorporate type		$-10^{\circ}C - +55^{\circ}C$			
Highest medium temperature	Separate body-type	CR chloroprene rubber liner (CR)		+80°C		
		Polytetrafluoroethylene lining (F4)		+120°C		
		Polite lining (F46)		+120°C		
		Teflon (PFA)		+180°C		
		Fluorosilicone rubber (FVMQ)		+250°C		
Output signal	4-20mA, Pulse/Frequency 2kHz(Default), 5KHz(Max)					
Cable entry size	M20*1.5 (Standard nylon waterproof connector, optional explosion-proof metal connector)					
Supply voltage	110/220VAC (100-240VAC), 50Hz/60Hz; 24VDC $\pm 10\%$					
Power dissipation	$\leq 15VA$					
Digital communication	RS-485, support standard Mudbugs-RTU protocol; GPRS					
Signal electrode and the ground electrode material	Stainless steel 316L, Hastelloy C, Hastelloy B, titanium, tantalum, platinum					
Form of electric pole	Interpolating, extrapolating electrode need to customize					
Number of electrodes	Standard configuration 3-4 electrodes(two measuring electrodes plus a grounding electrode),according to the caliber configuration					
Flange standard	Conform to the international GB9119(customize according to customer's demand)					
Connecting flange material	Standard carbon steel and stainless steel are needed to be customized					
Grounding ring material	Stainless steel, and stainless steel that contains molybdenum, etc.					
	DN12-DN450	Stainless steel 1 Cr18Ni9Ti(Ordinary austenitic stainless steel SUS321)				
Housing material	Standard carbon steel and stainless steel are needed to be customized					
Level of protection	Separate body-type			IP68, IP65		
	Incorporate type			IP65		
Interval/wire length (separate body-style)	10m standard configuration connecting line, optional 15m, 20m, 25m, 30m					

## PMF-G Series Magnetic Flowmeter Option Table

Type	Suffix Code										Introduction
PMF-G	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>							
Pressure Level	1.0										Sensor Pressure Level * 1 (0.6,1.0,1.6,2.5,4.0MPa etc.)
Installing form	A1										LGB1 flange installation *2
Caliber		50									Sensor caliber (See caliber option table) * 3
Electrode material	K1										Stainless steel 316L
	K2										Hastalloy C(HC)
	K3										Hastalloy B(HB)
	K4										Titanium (Ti)
	K5										Tantalum(Ta)
	K6										Platinum(Pt)
Lining material	F1										Chloroprene rubber(CR)
	F11										Fluorosilicone rubber(FVMQ)
	F2										FEP F46
	F21										FEP F46 Steel mesh
	F3										Teflon(PFA)
	F4										Ptfe ethylene propylene(PTFE)
The highest using temperature	A1										$\leq 80^{\circ}\text{C}$ *4
	A2										$\leq 120^{\circ}\text{C}$ *5
	A3										$\leq 250^{\circ}\text{C}$ *6
Flowmeter structure	C3										Incorporate type*7
	S										Separate body-type *8
Power	P0										AC 110/220V power supply *9
	P1										DC24V power supply *10
Optional features	/T										1 Channel 4-20 mA output
											Hart (4-20mA output)
	/C3										RS-485 Communication
											/TF1 1Channel frequency / pulse output
	/KB1										Infrared touch button*11
<p>*1 Sensor optional pressure level is 1.0MPa, 1.6MPa, 2.5MPa, 4.0MPa.          The selection reference of maximum pressure level of each diameter range (high voltage can be customized):          DN15 - DN50, PN≤4.0MPa ; DN65 - DN150, PN≤1.6MPa ; DN200 – DN450, PN≤1.0MPa.</p> <p>*2 Flange: 9119-2000 GB/T standard carbon steel, other standard flange needs to be customized.</p> <p>*3 Please selects caliber on the caliber option table, we should consider that the medium measuring flow rate should be kept in the appropriate range when choosing caliber.</p> <p>*4 When selects A1 as the highest using temperature (mainly refers to measurement medium temperature, the same below), the flowmeter working temperature range is <math>0^{\circ}\text{C} \sim + 80^{\circ}\text{C}</math> which can use CR lining or PTFE F4 lining.          The maximum operating temperature is higher than <math>80^{\circ}\text{C}</math> and the minimum temperature is less than <math>0^{\circ}\text{C}</math>, which needs to use the separate body-type, you can use PTFE F4 lining.</p> <p>*5 The maximum operating temperature is less than or equals to <math>120^{\circ}\text{C}</math>, you can choose PTFE F4 lining, FEP F46 lining or soluble PFA.</p> <p>*6 The maximum use temperature of <math>250^{\circ}\text{C}</math>, can be selected silicone rubber (FVMQ).</p> <p>*7 When installing the C3 type, the QX5100 converter or QX5300 converter can be used.</p> <p>*8 When installing the S split type, the QX3100 converter or QX5300 converter can be used, the standard configuration length of the converter and the sensor signal cable is 10m; the optional 15m, 20m, 25m, 30m.</p> <p>*9 110/220VAC power supply voltage range : 100-240VAC, 50/60Hz.</p> <p>*10 24VDC power supply voltage range : 22-26VDC.</p> <p>*11 Only when the flow meter can be used when the structure of the C3. The default button functions as mechanical buttons.          Remark: when selecting the ground ring, please put forward in order, then the price of the ground ring is calculated.          If some parameters of the electromagnetic flowmeter are not listed in the selection table, they need to be customized.</p>											

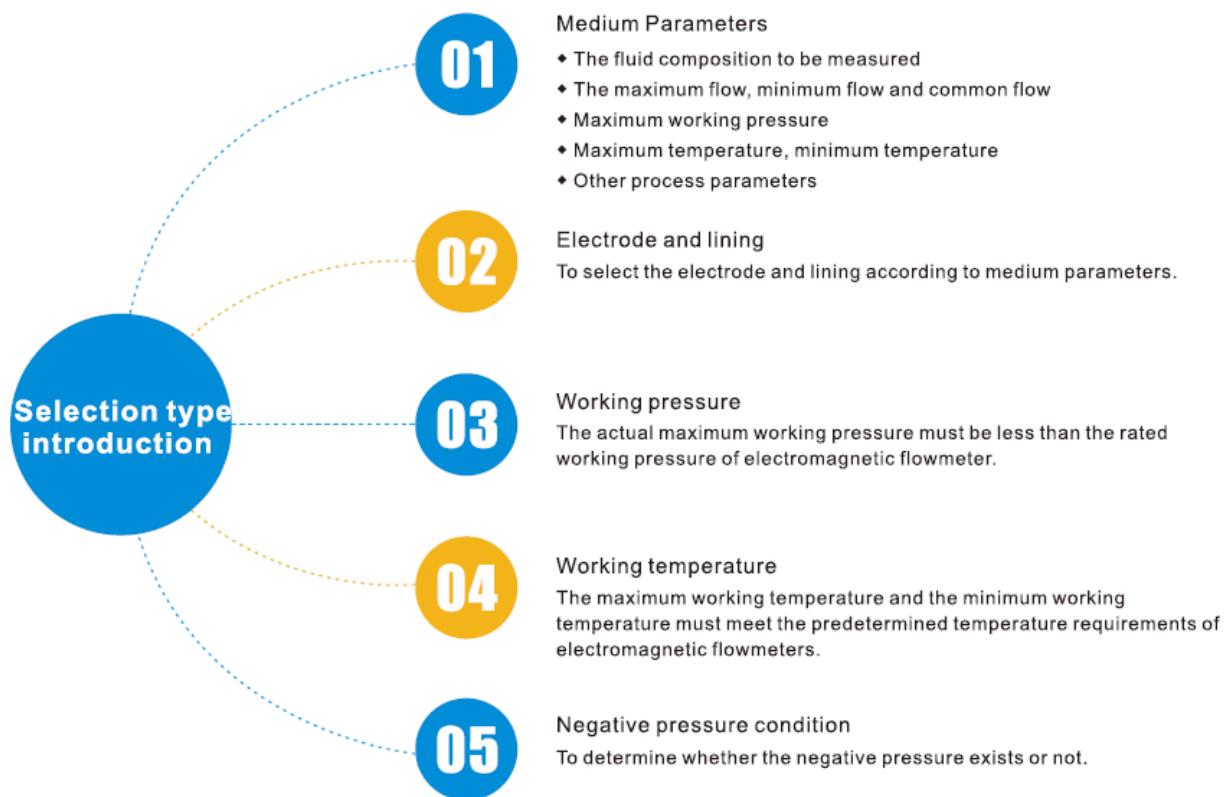
## Ordering instruction

The following questions should be clear when selects the electromagnetic flowmeter:

- 1) The medium to be measured must be conductive fluid. And it isn't available to the gas, oil, organic solvents and the non-conductive medium.
- 2) When selects the model and specification, we should provide the measurement range of the electromagnetic flowmeter for the manufacturer, then the factory should make a demarcation within the scope of this measure in order to ensure accuracy of the instrument.
- 3) The users should provide manufacturers with the medium's process parameters, flow rate and temperature, pressure and other parameters of the selection table, then based on these parameters, flow rate and temperature, pressure and other parameters of the selection table, then based on these parameters, select the appropriate meter.
- 4) When selects the separate body-type electromagnetic flowmeter, the users should propose wiring length requirements to the factory according to the sensor distance away from installation location of converter.
- 5) If users need to install accessories, such as supporting flange, metal ring gasket, bolts, nuts, washers and other additional requirements, they can put them forward when ordering.

## Selection type introduction

The selection type of instrumentation is very an important work in instrument application, the relevant data shows that two-thirds of the fault is the instrument wrong selection type in actual application or is caused by incorrect installation, please pay special attention.



## Examples

Electromagnetic flowmeter type PMF-G1.0A1-80K1F1A1C3P0/T1 means that the instruments function as the working pressure 1.0Mpa, LGB1 flange mounting, caliber 80mm, stainless steel 316L electrode, CR lining, and the maximum temperature is less than or equals to 80°C, the incorporate complete machine structure (meter head and sensors are installed together, which can refer to "body-type" electromagnetic flowmeter picture "in the form of product assembling" on page 3), 1st path 4-20mA signal output, the working power supply AC 110/220V.

## **Engineering application case**

Clean water flow measurement--the main points of option type

- Pressure: We should be clear of the working pressure of the medium to be measured.
- To usually select flange mounting, CR lining and stainless steel 316L electrode.
- Maximum using temperature of medium to be measured at still condition is 75 °C, and the flow rate of is 3m/s, suggesting that the users choose the highest using temperature option A2 which is less than or equals to 120°C.
- Grounding Rings: PMF Series flowmeters have 1-2 ground electrodes, and usually needs no grounding rings. Small caliber DN15 and DN20 have no grounding level, and should select the grounding ring in accordance with site caliber DN15 and DN20 have no grounding level, and should select the grounding ring in accordance with site conditions.
- The default protection level of body-type electromagnetic flowmeter is IP65, /T1 (1 Channel 4-20mA) or /TF1 (1 Channel frequency/pulse) signal output, and the working power supply AC is 220V.
- Typically, 1-3m/s is the economic velocity, the measurement range is generally set based on economy velocity.

## **Optional type table details**

### **Pressure level**

- Pressure level means that the default pressure rating of sensor that can withstand is 1.0Mpa, this is adaptable to most electromagnetic flowmeters occasions. typically, pressure that loaded by sensors is determined by the applying pressure of medium inside the flow pipe through a device(such as a pump, etc.), the excess of the sensors rated pressure can cause a leak of electromagnetic flowmeter so that it cannot work properly and even damage the electromagnetic flowmeter.
- Other pressure ratings that may be used are 0.6Mpa, 1.6Mpa, 2.5Mpa, 4.0Mpa, ultra-high pressure levels and so on.
- In the selection of pressure rating, it should leave a margin. for example, the working pressure of medium inside the pipe is 0.8Mpa, then 1.6Mpa at least is selected as the electromagnetic flowmeters pressure rating.

### **Installation form**

- LGB1 flange mounting.
- It needs to cooperate with the mounting way of flow pipe. Flange mounting need to install a flange interface on the flow pipe that is measured.
- The tube pipe that can be installed with electromagnetic flowmeters has a stainless steel, cast iron pipes and PE pipes, and different pipes need to select electromagnetic flowmeters that have different installation forms, and they need to be grounded when installation. PE pipe and other non-metallic pipes should pay a special attention during installation.

### **Caliber**

Caliber of electromagnetic flowmeter should generally match the caliber of flow pipe that is measured, and selection of caliber should match flow rate of the medium, which can be seen the caliber selection table, and try to make the usual flow of the measured medium lies in the yellow font area of the table.

## Caliber optional table

Caliber DN(mm)	Volume flowq <sub>v</sub> ( m <sup>3</sup> /h )													
v(m/s)	0.57	0.7	0.9	1.1	1.4	1.7	2.3	2.8	3.4	4.5	5.7	6.8	9.1	
25	1.0	1.2	1.6	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10	12	16	
32	1.6	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10	12	16	20	25	
40	2.5	3.0	4.0	5.0	6.0	8.0	10	12	16	20	25	30	40	
50	4.0	5.0	6.0	8.0	10	12	16	20	25	30	40	50	60	
65	6.0	8.0	10	12	16	20	25	30	40	50	60	80	100	120
80	10	12	16	20	25	30	40	50	60	80	100	120	160	
100	16	20	25	30	40	50	60	80	100	120	160	200	250	
125	25	30	40	50	60	80	100	120	160	200	250	300	400	
150	40	50	60	80	100	120	160	200	250	300	400	500	600	
200	60	80	100	120	160	200	250	300	400	500	600	800	1000	
250	100	120	160	200	250	300	400	500	600	800	1000	1200		
300	160	200	250	300	400	500	600	800	1000	1200	1600	2000		
350	200	250	300	400	500	600	800	1000	1200	1600	2000	2500		
400	250	300	400	500	600	800	1000	1200	1600	2000	2500	3000		
450	300	400	500	600	800	1000	1200	1600	2000	2500	3000			

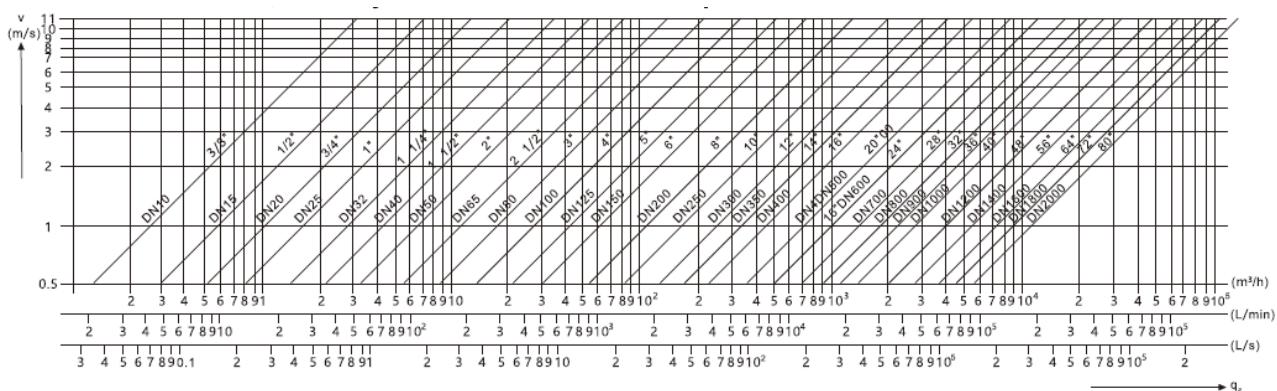
## Note:

1. The flow/velocity data in table is the approximate value, the yellow area is the recommended flowmeter flow/velocity rate.
  2. Other calibers can be customized. The velocity and flow conversion formula: velocity  $V=354 \times \text{flow} \times \frac{g}{D^2}$

Where:  $qv$ -m<sup>3</sup>/h,  $v$ -m/s,  $D$  (DN)-mm;

Velocity range: 0.3-10m/s

### Flowmeter diameter, velocity and flow rate relationship curve



**The situation where caliber of option sensor is same with the connected technology pipe caliber**

- Usually, the option flowmeter caliber is the same with caliber of process piping, which not only meets the project needs, but also easily installs, as well as has no pressure loss, and the recommendation flow rate is within the range of 0.5-5m/s.
  - The new design project not only considers the current work but also consider the full load operation of the equipment in the future when choose the flow rate. when the new equipment is running, the flow rate is at a low state, the inner tube keeps a high flow rate state when normally generated.
  - In the premise of the correct selection, simply changing the settings of the instrument range can be adapted to different flow rates.

## **Electrode material**

- Electrode is used to obtain traffic signals, which will directly contact with the measured medium, so when chooses the electrode material, the suitability between the electrode material and measured medium is needed to be considered, namely that the corrosion resistance of the electrode material, passivation, water, and other factors are needed to be considered.
- You can choose a variety of electrode materials(including stainless steel 316L,Hastelloy B(HB),HastelloyC(HC), titanium(Ti), tantalum(Ta), platinum (Pt), etc.) to accommodate different measurement medium.
- The selection of electrode materials should be determined according to the corrosive property of medium, and the corrosion resistance of the electrode material should be determined according to the corrosive property of medium, and the corrosion resistance of the electrode material can be seen in the table of electrode material corrosion resistance and use range, more detailed information can be found in the preservation manual.

## **The corrosion resistance and the use range table of the electrode material**

Material	Corrosion Resistance
Stainless steel 316L	Application: 1. Domestic water, industrial water, raw water wells, urban pollution. 2. Weak corrosive acid, alkali, salt solution.
Hastelloy B (HB)	Application: 1. Non-oxidizing acid, such as hydrochloric acid (concentration is less than 10 percent); 2. The alkali (part), for example, sodium hydroxide (concentration is less than 50%), all concentrations of ammonium hydroxide solution; 3. Acid (part), such as phosphoric acid, and organic acid. NA: nitric acid.
Hastelloy C (HC)	Application: 1. mixed acid, for example, a mixed solution of chromic acid and sulfuric acid. 2. oxidizing salts, such as $\text{Fe}^{3+}$ , $\text{Cu}^{2+}$ , sea water. NA: hydrochloric acid.
Titanium (Ti)	Application: 1. salt (part), for example, (1) hydrogen chloride (chloride/magnesium/aluminum/ calcium / ammonia / iron, etc.); (2) the sodium, potassium, ammonium, hypochlorite, sea water. 2. The alkali (part), such as the potassium hydroxide, ammonium hydroxide, barium hydroxide alkaline solution which have a less than 50% concentration. NA: hydrochloric acid, phosphoric acid, sulfuric acid, hydrofluoric acid and other reducing acids.
Tantalum (Ta)	Application: 1 strong acid, such as hydrochloric acid (concentration is less than 40%), sulfuric acid and concentrated sulfuric acid (not including oleum). 2. chlorine dioxide, ferric chloride, hypochlorous acid, sodium cyanide and lead acetate. 3. oxidizing acids such as nitric acid (including fuming nitric acid) and the aqua regia whose temperature is below 80°C. NA: alkali, hydrofluoric acid.
Platinum (Pt)	Application: 1 almost all acids, alkalis, salt solutions (including fuming sulfuric acid, fuming nitric acid) NA: aqua regia, ammonium salt

## **Lining material**

- Lining material is selected according to the corrosion, abrasion resistance and temperature of the measured medium, and the adaptability of lining material which is commonly used can be seen in the performance table for common lining material suitable.
- Rubber has the wear-resisting feature and is widely used for the measurement water, industrial water, waste water, sewage, pulp, mud fiber pulp and other mediums.
- PTFE lining has excellent resistance to acid and strong alkali, it also a reliable heat resistance and won't deform under a high temperature and reduce the performance of the insulation resistance. It also has a non-stick property, which isn't bonded with other material because of a smooth surface. therefore, a high measurement of viscosity (e.g.syrup) or readily studding medium (such as alumina), or corrosive medium (such as sulfuric acid, nitric acid, hydrochloric acid, phosphoric acid, etc.), or the situation where high temperature medium or regularly flushing medium pipe using steam and the food which has the

hygiene requirements (such as beer, milk, malt extract) can select the PTFE lining.

### Common lining materials application performance table

Inner lining material	Name	Symbol	Performance	Maximum working temperature	application caliber
Rubber	CR	CR	1. Resistance to oil, solvent, oxidation and general acid and alkali salt and other corrosive mediums. 2. It has excellent flexibility, abrasion resistance, but a poor resistance to cold.	1. 0°C - + 80°C non-strong acid, alkali, oxidizing mediums. 2. Measurable sewage and mud.	DN6-DN2200
Fluoro-plastics	PTFE	PTFE或F4	1. It is the material which has the most stable chemical properties among plastics and can bear the boiling hydrochloric acid, sulfuric acid, nitric acid and aqua regia. In addition, it can be also resistant to concentrated alkali and various organic solvents, but not to chlorine trifluoride, high temperature trifluoride itch, high velocity fluid fluorine, oxygen and ozone corrosion. 2. Poor wear resistance 3. Poor ability to resist negative pressure	1. -25°C - +120°C. 2. Concentrated acid, alkali and other strong corrosive mediums. 3. Health category medium.	DN10-DN600
	Poly FEP	FEP或F46	1. Hydrophobic and non-adhesive property. 2. the ability to resist corrosion is only after PTFE. 3. If have a higher requirement to negative resistance, we can add metal net to improve the ability to resist negative pressure. 4. Poor wear resistance.	1. -25°C - +120°C Non-strong grinding medium. 2. Health category medium.	DN6-DN200
	Teflon	PFA	Performance is close to polytetrafluoroethylene	1. -10°C - +180°C Non-strong grinding medium. 2. Health category medium.	Need to customize

### Highest Temperature

- Highest temperature is mainly determined by the temperature of the measured medium, the flow field conditions (velocity) and other conditions, and sometimes there also needs to consider the influence of the ambient temperature.
- The temperature of the medium in the pipe flow is usually higher than the standstill condition. if the still temperature of measured medium is close to a certain selection range(for example, the maximum temperature A1 level 80°C), then select a higher level using temperature option. for example when the still temperature of the measured medium is 70°C so that it recommended that users choose the highest temperature option A2 is less than or equals to 120°C.
- To obtain accurate measured medium temperature, it recommends that users install the temperature measurement instrument in the measured medium pipe.

### Flowmeter structure

#### Incorporate type

Under good environmental conditions of the site, generally choose the incorporate type, that is the combination of sensor and converter which can be seen the overview of product on third page, incorporate type electromagnetic flowmeter Figure.

- Sensors and intelligent are assembled together, prices and installation costs are more economical, and the visual display is more intuitional.
- When installed in an inaccessible place, the maintenance is inconvenient.
- Prevent the electronic component of smart converter from being influenced by pipe fluid temperature.
- Avoid directly installing outdoor or using in harsh environment.
- Default protection class of incorporate type is IP65.

#### Separate type

Select the separate body-type when use in the following cases:

- Ambient temperature or converter surface temperature is greater than 55°C.
- Piping vibration is larger.
- The aluminum case of converters will be seriously corroded.

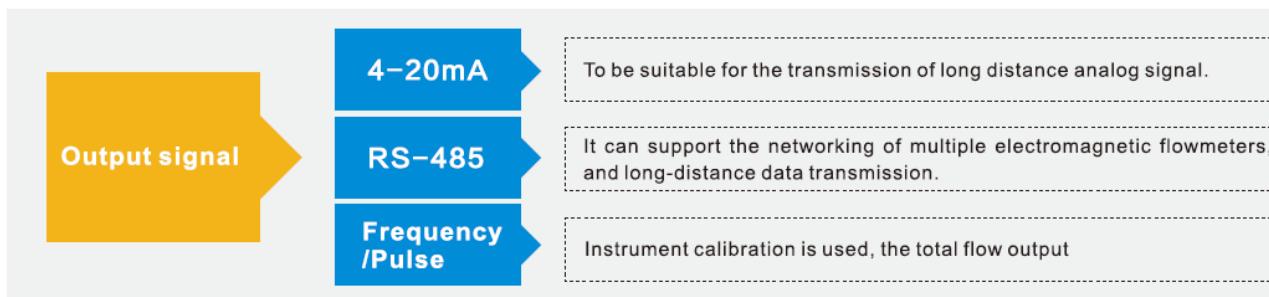
- High humidity or corrosive gas.
- Flowmeter is installed at high altitude or underground debugging and other inconvenient occasions.
- The default protection class of underground debugging and other inconvenient occasions.
- The default protection class of separate body-type is IP68. When there is no need to immerse into water or other special conditions, we can choose the separate body-type electromagnetic flowmeter of IP65 protection class, which should put forward specially when ordering.

### **Explanation:**

- Separate body-type electromagnetic flowmeter sensors are mounted on the process piping, but also can be long-buried underground water spaces (IP68 type), and smart converter installed in the control room or sensor attachment.
- When using separate body-type electromagnetic flowmeter, intelligent converter can be away from the scene in harsh environments, and the personnel can inspect, adjust, set the instrument working conditions.
- Should consider the impact and installation of transmission distance of cable, which is usually less than 20m.
- Connection cable between sensor and transducer needed to be protected by the cloth wiring pipe at on-site installation.

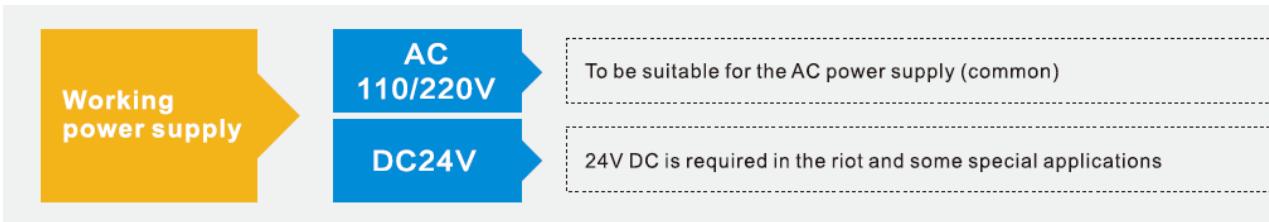
### **Output signal**

PMF series electromagnetic flowmeter output signals are 4-20mA, RS-485, Frequency/Pulse. Users need to select the output signal according to the actual situation and ancillary equipment.



### **Working power supply**

The power supply of PMF series electromagnetic flowmeter has AC 110/220V (100-240V), and DC24V.



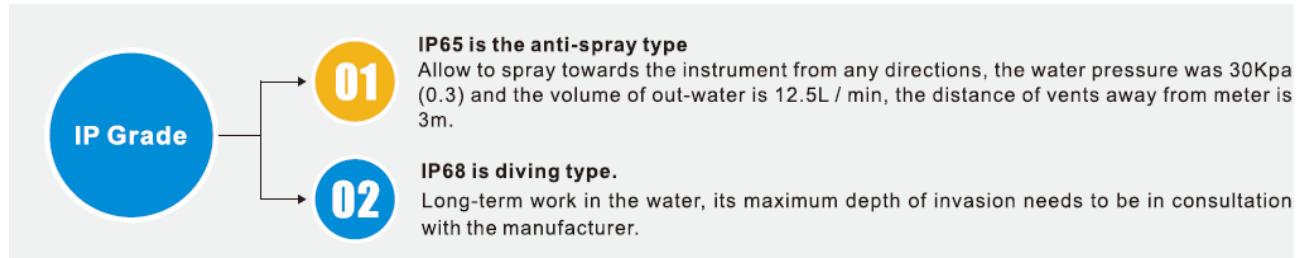
### **Grounding ring option**

- Grounding ring is used to ground the process fluid measured so as to improve the stability of electromagnetic flowmeter. There is a possibility of erosion and abrasion since the grounding ring need to touch the process fluid measured. Generally the grounding ring should be changed after being used for a while.
- Instead of using grounding ring, PMF series electromagnetic flowmeter has adopted grounding electrode to increase the convenience and reliability of using, which is already enough for achieving a good result for grounding.

- Some small-bore electromagnetic flowmeters have only got two electrodes. user can choose double grounding ring according to the field needs.
- When installing the grounding ring, it should be put on the right position of the pipe to avoid the influence of fluency of the process fluid measured.

## IP Grade

In accordance with the national standard GB 4208-48 or the IEC standards (IEC529-76) on shell protection grade:

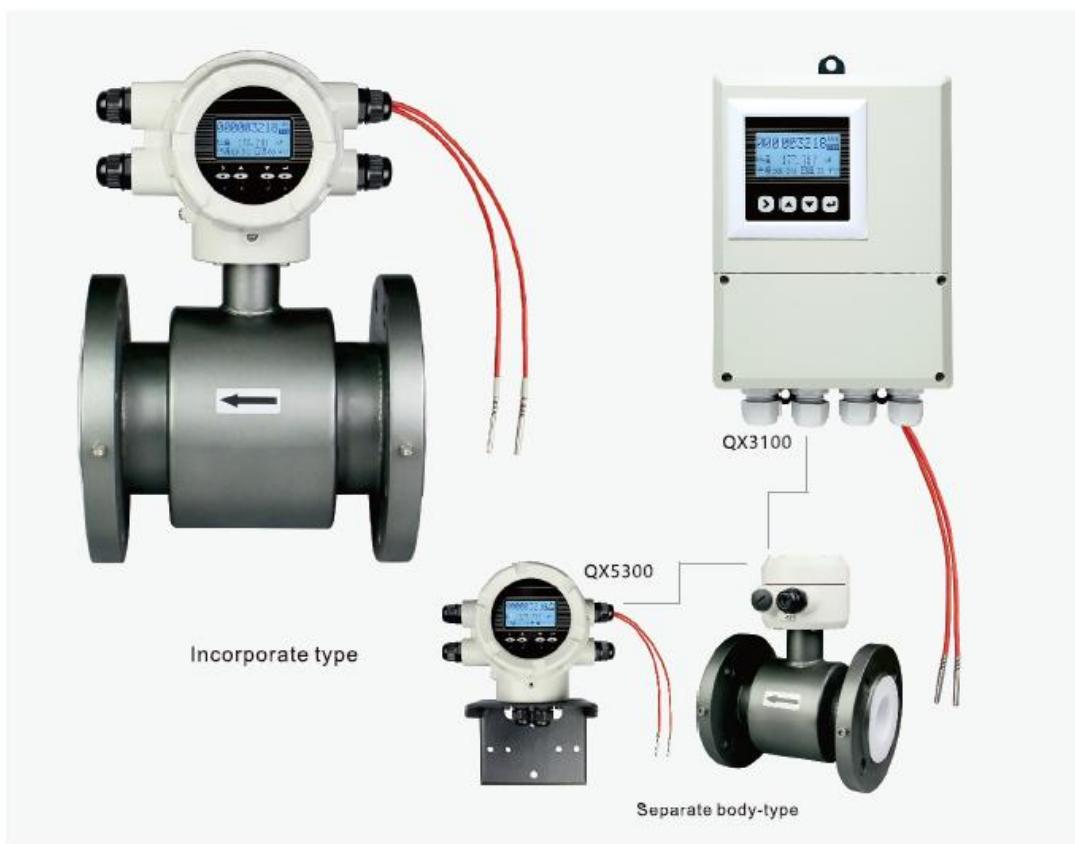


Protection class selection principles should be selected based on the actual conditions of instrumentation and the above requirements, if the meter is below ground and is often affected by flooding, so we should select IP68; if the meter is installed above ground and non-exposed environment, the choice is IP65.

## Notification of electromagnetic flowmeters

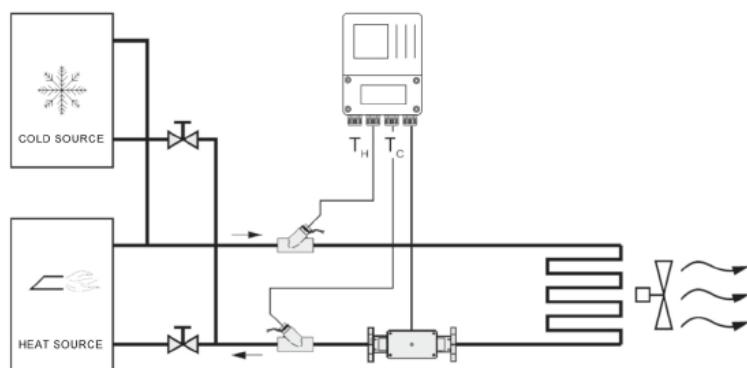
- Reducing pipe installation should refer to Electromagnetic flowmeter installation reducing pipe technical description or Electromagnetic Flowmeter Maunal Instruction.
- Installation of electromagnetic flowmeters has the appropriate technical requirements which can be seen "Electromagnetic Flowmeter Installation Manual Instruction or Electromagnetic Flowmeter Manual Instruction".
- The wiring way of electromagnetic flowmeter can be seen Electromagnetic Flowmeter Wiring Instructions or Electromagnetic Flowmeter Manual Instruction.
- Other matters may consult the supplier.

# Magnetic heat meter



## Industry Application

Magnetic heat meter is mainly used in heating, refrigeration and other energy metering system.



## PMF-H Series Magnetic heat meter Option Table

Type	Suffix Code					Introduction		
PMF-H	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Caliber	50					Sensor caliber (See caliber option table) * 3		
Flowmeter structure		C3				Incorporate type		
		S				Separate body-type *2		
Power			P0			220VAC		
			P1			24VDC		
Optional features			/T1	1 Channel 4-20 mA output				
				/C3				
			/TF1	RS-485 Communication				
				/KB1				
				Infrared touch button*3				
<p>*1 Please selects caliber on the caliber option table, we should consider that the medium measuring flow rate should be kept in the appropriate range when choosing caliber.</p> <p>*2 When installing the S split type, the QX3100 converter or QX5300 converter can be used, the standard configuration length of the converter and the sensor signal cable is 10m; the optional 15m, 20m, 25m, 30m.</p> <p>*3 Only when the flow meter can be used when the structure of the C3. The default button functions as mechanical buttons.</p>								

### Performance parameter

Power	220VAC/24VDC
Communication	RS-485
Communication protocol	Modbus-RTU、BACnet
Maximum communication distance	400m
Accuracy grade	level 2
Temperature sensor	PT1000
Temperature measuring accuracy	±0.1°C
Medium temperature	2-180°C
Range of temperature difference	2K~80K
Storing data	18 months of historical data
Installation location	Inlet and return water pipe optional
Ambient temperature	-10°C~55°C
Protection level	IP65

## Comparision of mechanical, ultrasonic and electromagnetic heat meter

	Mechanical	Ultrasonic	Magnetic type
Advantage	<ul style="list-style-type: none"> <li>The structure is simple, production process is low price;</li> <li>Low power consumption.</li> </ul>	<ul style="list-style-type: none"> <li>No moving parts inside the measuring tube, Congestion problem is not serious;</li> <li>Can meet the corrosion of the heat carrying fluid on the measurement requirements;</li> <li>No special requirements for the installation.</li> </ul>	<ul style="list-style-type: none"> <li>Without obstruction, little pressure loss, high accuracy. Energy saving effect is remarkable, without mechanical inertia, the reaction is very sensitive.</li> <li>Wide measuring range. Liquid flow rate is available at 0.3~10m/s. Diameter from small to large, a series of complete.</li> <li>Excellent repeatability and linearity. Measurement of fluid has nothing to do with the physical properties of the medium, such as temperature, pressure, viscosity, density, etc..</li> <li>Strong adaptability to the pipeline and environment vibration; can meet the requirements of the measurement of the corrosion of the heat carrying fluid.</li> <li>Good reliability and anti-interference.</li> </ul>
Shortcoming	<ul style="list-style-type: none"> <li>Wearing parts more, easy scaling, low reliability and stability;</li> <li>Impeller shaft core is easy to wear, poor durability and short service life;</li> <li>Pressure loss, lower heating network transmission efficiency, difficult to transform the old pipe network;</li> <li>Flow measurement accuracy is not high, the fluid speed is low can not be effective measurement.</li> </ul>	<ul style="list-style-type: none"> <li>Point - speed sampling, detection accuracy is not high;</li> <li>Required for descaling treatment on heat carrying fluid;</li> <li>Water quality has great influence on the measuring instrument;</li> <li>Measured fluid temperature changes have significant effect on the accuracy;</li> <li>Caused greater pressure loss;</li> <li>Accuracy and reliability of vibration impact measurement.</li> </ul>	<ul style="list-style-type: none"> <li>Cannot measure the conductivity is low (&lt; 30us/cm) liquid, such as petroleum products and organic solvents etc.;</li> <li>Can not measure the gas, steam and liquid containing more larger bubbles;</li> <li>Relatively high power consumption.</li> </ul>

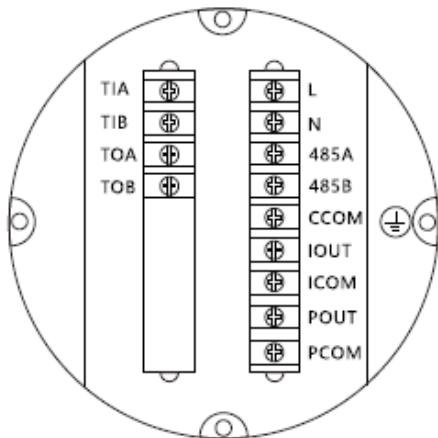
## Parts

The main parts of the temperature sensor for electromagnetic calorimeter include:

PT1000 Temperature sensor, sheath, welding base.

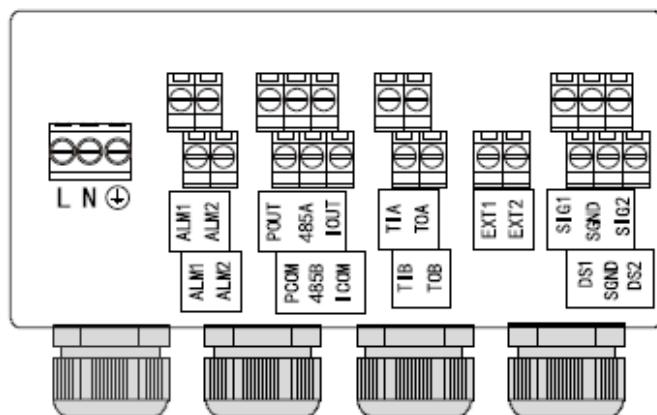


## Terminal wiring diagram



### Incorporate type

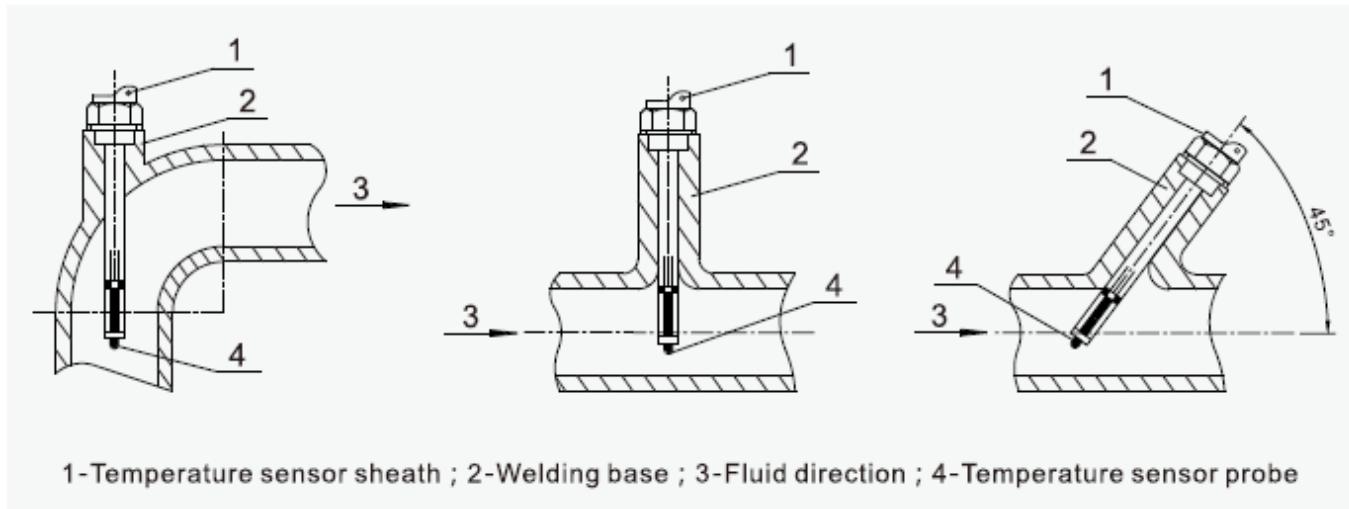
- L , N : Power
- 485A , 485B : 485 serial communication
- POUT , PCOM : Pulse / Frequency / Alarm output
- IOUT , ICOM : 4-20mA output
- TIA , TIB : Temperature of water supply
- TOA , TOB : Return water temperature



### Separate body-type

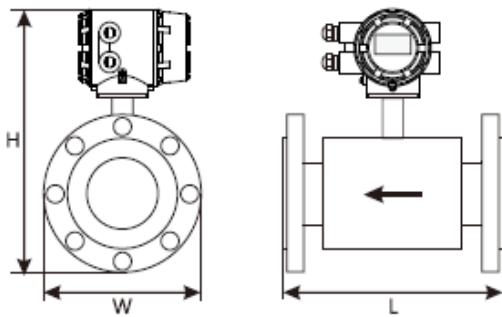
- L , N : Power
- ALM1 , ALM2 : Alarm output
- POUT , PCOM : Pulse / Frequency output
- IOUT , ICOM : 4-20mA output
- 485A , 485B : 485 serial communication
- TIA , TIB : Temperature of water supply
- TOA , TOB : Return water temperature
- EXT1 , EXT2 : Excitation signal
- SIG1 , SIG2 : Electrode signal
- DS1 , DS2 : Electrode shield

## Recommended installation location of temperature sensor

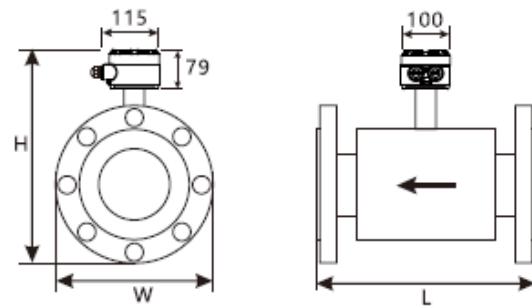


## The overall and mounting dimension of PMF series flowmeters

**Flange type (incorporate type)**



**Flange (separate type)**



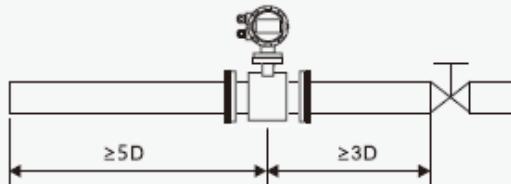
Caliber (mm)	Size			Weight (kg)
	L	W	H	
10	200	90	290	6
15	200	95	315	6
20	200	105	315	6.5
25	200	115	315	6.8
32	200	140	315	7.1
40	200	150	315	7.6
50	200	165	320	9.9
65	200	185	350	10.6
80	200	200	365	12.3
100	250	220	380	14.7
125	250	250	410	17.9
150	300	285	440	24.6
200	350	340	495	32.7
250	450	395	560	43.5
300	500	445	600	58
350	550	505	670	78
400	600	565	720	97
450	600	615	765	110
500	600	670	820	122
600	600	780	930	161
700	700	860	1010	241
800	800	975	1110	420
900	900	1075	1210	541
1000	1000	1175	1310	668
1200	1200	1405	1540	858

Caliber (mm)	Size			Weight (kg)
	L	W	H	
10	200	90	195	5.5
15	200	95	220	5.5
20	200	105	220	6
25	200	115	220	6.3
32	200	140	220	6.6
40	200	150	220	7.1
50	200	165	225	9.4
65	200	185	255	10.1
80	200	200	275	11.8
100	250	220	285	14.2
125	250	250	315	17.4
150	300	285	345	24.1
200	350	340	400	32.2
250	450	395	465	43
300	500	445	505	58
350	550	505	575	78
400	600	565	625	97
450	450	615	670	112
500	500	670	725	122
600	600	780	835	161
700	700	860	915	241
800	800	975	1015	420
900	900	1075	1115	541
1000	1000	1175	1215	668
1200	1200	1405	1445	858

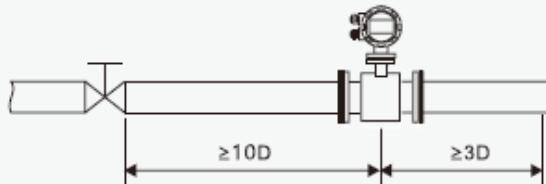
Note: Here the size and weight of electromagnetic flowmeter may differ from the product and it can be standardized according to actual object.

## Installation

### Straight pipe length requirements



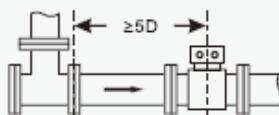
Installation whose valve is the downstream of sensor



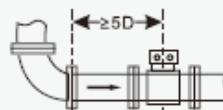
Installation whose valve is the upstream of sensor



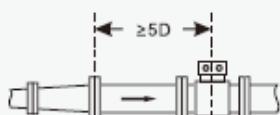
Tapered tube can be seen as a straight pipe



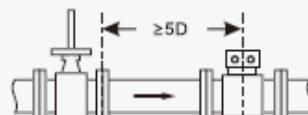
T type junction



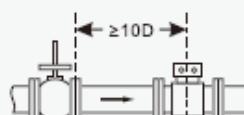
90°C elbow



Expansion tube



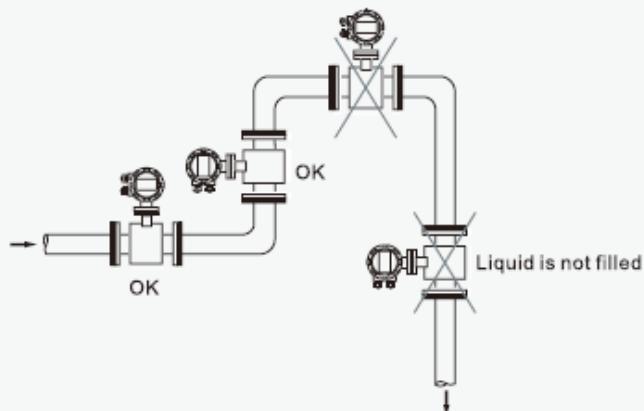
Fully open valve



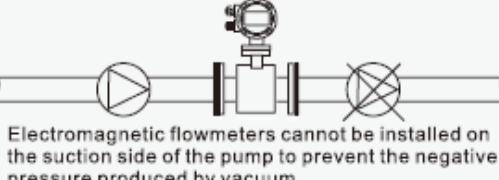
Various types of valves

### Recommended mounting position

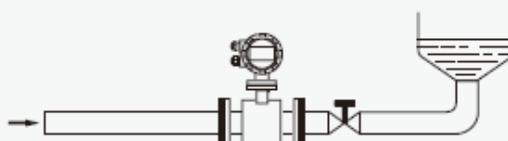
Easy to accumulate air



Installation that the sensor is below the pipes

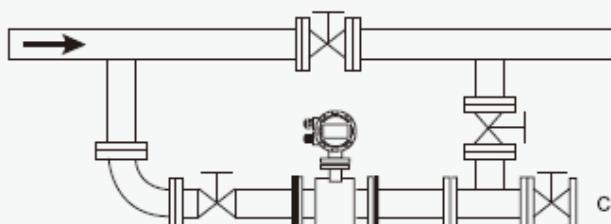


Electromagnetic flowmeters cannot be installed on the suction side of the pump to prevent the negative pressure produced by vacuum



Installation that downstream of the sensor has the back pressure

### The connection which is easy to clean pipe



Cleaning port

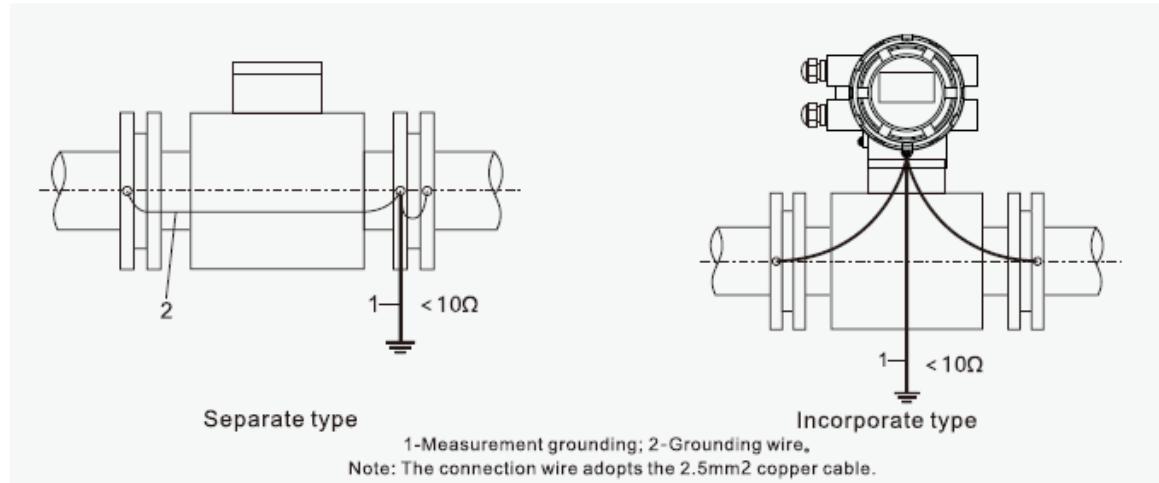
Situation where the pipe needs to be cleaned and the fluid conduit cannot stop, you must install a bypass pipe to be able to continue running during cleaning system.

## Grounding

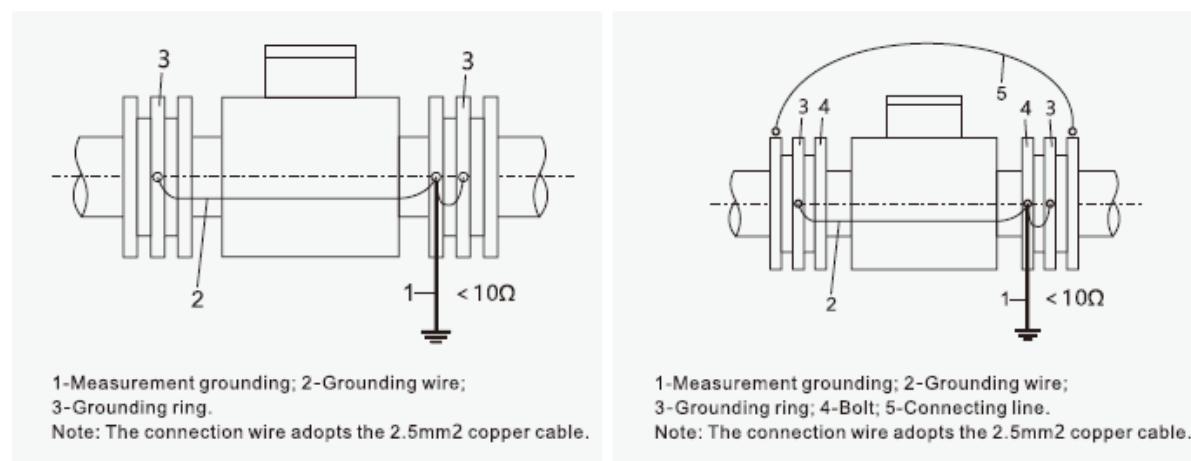
Electromagnetic Flowmeter sensor should be well grounded, the measuring accuracy of flowmeter depends on the grounding effect in a considerable extent.

Sensor grounding at different installation situation

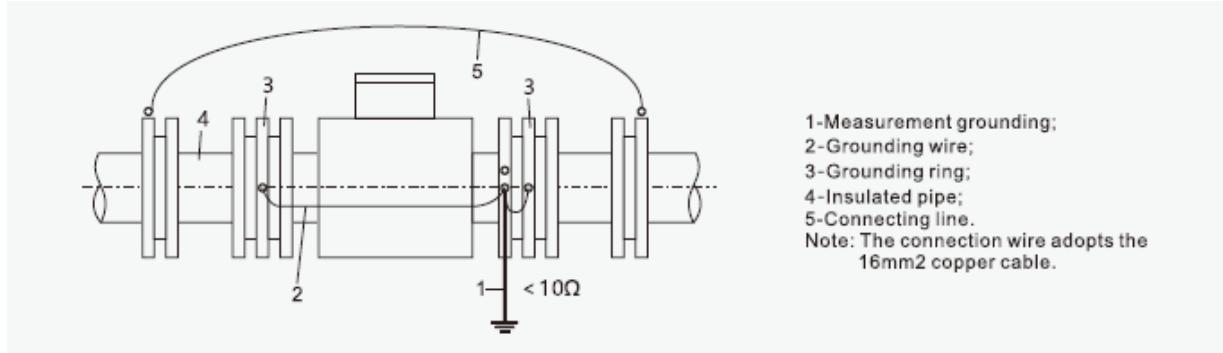
1, Grounding that sensor mounted on metal pipe.



1. Grounding that the sensor mounted on the insulating pipes.



4. The sensor is installed in the pipeline stray strong current place



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