



BANNING MAGNETIC FLOW METER MF



BANNING

DESCRIPTION

MF series magnetic flowmeter is composed of a sensor and a converter. It works based on Faraday's law of magnetic induction. It is used to measure liquid or solid conductive media. The conductivity is generally greater than 20 μ S/cm. (The electrical conductivity of water is about 100-500 μ S/cm), which can be used to measure various media such as acid, alkali, salt solution, pulp, and mineral pulp, but the medium cannot contain more ferromagnetic substances or a lot of bubbles.

CHARACTERISTICS

- The instrument adopts dual-frequency excitation, which is not affected by the common frequency
- Low instrument power consumption
- After the pipe is empty, it will automatically detect and make the data zero and alarm to prevent misoperation of the flowmeter data caused by the jump of the empty pipe.
- High measurement accuracy, display value $\pm 0.2\%$
- Wide measuring range
- The EMC index of the flow meter meets the requirements of the IEC61000-1995 standard.

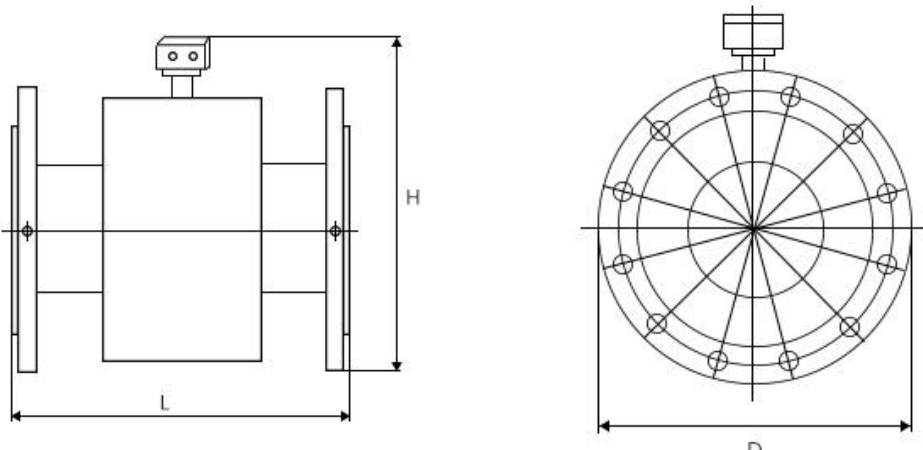
PREFORMANCE

Performance	MF series		
Nominal diameter	DN6mm-DN3000mm		
Nominal pressure	0.6-4.0MPa (special pressure can be customized)		
Accuracy	$\pm 0.5\%$ of indication; selectable indication of $\pm 0.3\%$ or $\pm 0.2\%$		
Lining material	Polytetrafluoroethylene (PTFE), PFA, polychloroprene rubber, polyurethane rubber, silicone fluorine rubber, F46		
Electrode form	Standard type, scraper type, replaceable type		
Electrode material	SUS316, Hastelloy B , Hastelloy C, Titanium, Tantalum, Platinum/I Alloy, Stainless Steel Coated with Tungsten Carbide		
Medium temperature	Integrated	-20 ~+80	
	Split type	Neoprene lining/polyurethane lining	-20 ~+80
		PFA lining/F46 lining/Silicone rubber lining	-40 ~+160
Ambient temperature	-25 ~+80		
Environment humidity	5~100%RH (relative humidity)		
Dielectric conductivity	20 μ s/cm		
Measuring range	1500:1 flow rate setting <15m/s		
Structure type	Integrated type, split type		
Protection class	IP65, IP67, IP68 optional		
Product Standards	JB/T9248-1999 magnetic flowmeter		

APPLICATION

- magnetic flowmeter is a kind of main flow meter for measuring conductive liquid. It is widely used in metallurgy, chemical industry, papermaking, environmental protection, petroleum, textile, food and other industries and municipal management, water conservancy construction and other fields.

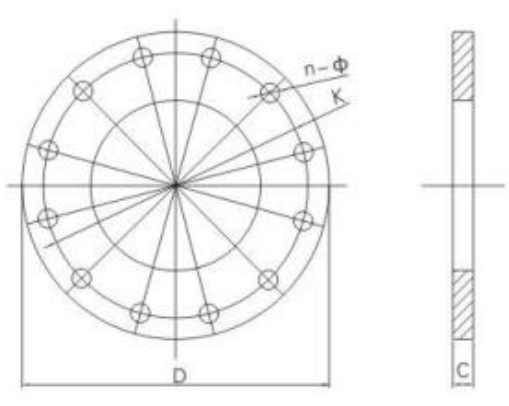
SENSOR SIZE

Type	MF
Dimensions Unit: mm	

Nominal diameter (mm)	Nominal pressure (MPa)	Dimensions (mm)			Reference weight (kg)
		L (With lining)	D	H	
6	4.0	200	90	220	6
10		200	90	220	6
15		200	95	220	8
20		200	105	220	10
25		200	115	223	12
32		200	140	240	13
40		200	150	250	14
50		200	165	263	15
65	1.6	250	185	283	18
80		250	200	290	20
100		250	235	318	25
125		250	270	350	28
150		300	300	380	30
200		350	340	430	50
250	450	405	495	70	
300	1.0	500	460	547	95
350		550	520	602	120
400		600	580	665	140
450		600	640	720	160
500		600	715	783	200
600		600	840	897	280
700		700	895	982	350
800		800	1015	1092	400
900		900	1115	1192	480
1000		1000	1230	1299	550
1200	0.6	1200	1405	1488	660

Nominal diameter (mm)	Nominal pressure (MPa)	Dimensions (mm)			Reference weight (kg)
		L (With lining)	D	H	
1400	0.6	1400	1630	1700	750
1600		1600	1830	1924	850
1800		1800	2045	2134	980
2000		2000	2265	2344	1200
2200		2200	2475	2549	1600
2400		2400	2685	2754	2000
2600		2600	2905	2964	2400
2800		2800	2905	3169	2700
3000		3000	3315	3369	2900

FLANGE SIZE

Type	MF
Dimensions Unit: mm	

- Implementation standard of connecting flange:

4.0MPa (DN6mm~DN50mm)	GB/T9119-2000
1.6MPa (DN65mm~DN250mm)	JB/T81-94
1.0MPa (DN300mm~DN1000mm)	JB/T81-94
0.6MPa (DN1200mm~DN3000mm)	JB/T81-94

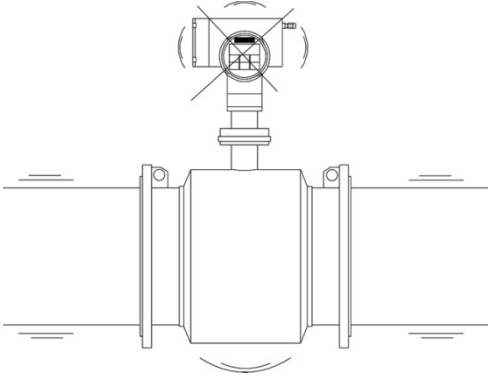
Nominal pressure (MPa)	Nominal diameter (mm)	D	K		n	C
4.0(MPa)	6	90	60	14	4	14
	10	90	60	14	4	14
	15	95	65	14	4	16
	20	105	75	14	4	16
	25	115	85	14	4	16
	32	135	100	18	4	18
	40	145	110	18	4	18
	50	160	125	18	4	20
1.6(MPa)	65	180	145	18	4	24
	80	195	160	18	8	24
	100	215	180	18	8	26
	125	245	210	18	8	28
	150	280	240	23	8	28
	200	335	295	23	12	30
	250	405	355	25	12	32
1.0(MPa)	300	440	400	23	12	28
	350	500	460	23	16	28
	400	565	515	25	16	30
	450	615	565	25	20	30
	500	670	620	25	20	32
	600	780	725	30	20	36
	700	895	840	30	24	36
	800	1010	950	34	24	38
	900	1110	1050	34	28	42
	1000	1220	1160	34	28	44
	0.6(MPa)	1200	1400	1340	33	32
1400		1630	1560	36	36	32
1600		1830	1760	36	40	34
1800		2045	1970	39	44	36
2000		2265	2180	42	48	38
2200		2475	2390	42	52	42
2400		2685	2600	42	56	44
2600		2905	2810	48	60	46
2800		3115	3020	48	64	48
3000		3315	3220	48	68	50

INSTALLATION

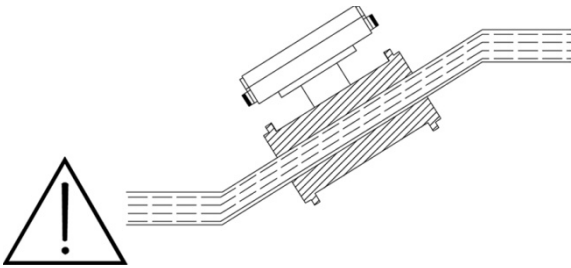
1. Vibration

Strong vibration should be avoided.

In applications with vibration, it is recommended to use a split structure to avoid damage to the transmitter.



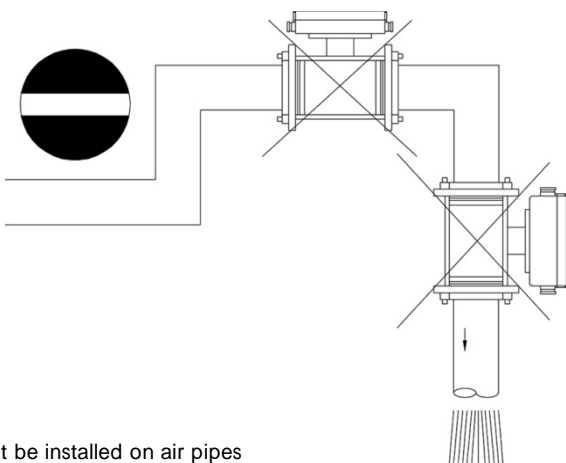
The sensor must always be filled with liquid



Installed on full pipe

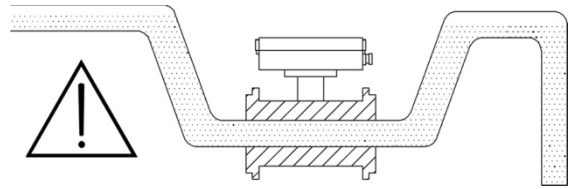
The sensor must always be filled with liquid. The following two points should be avoided:

- The flow meter is installed at the highest point of the pipeline
- The flowmeter is installed on a vertical pipe with a free outlet



Cannot be installed on air pipes

For partially filled pipes, or downward pipes with free outlets, the flow meter should be installed at the U-shaped pipe.

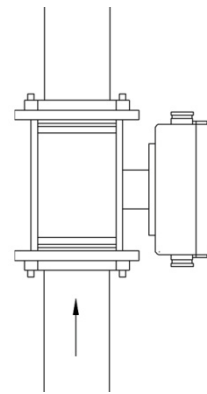


When the half full pipe, mounted on the U-tube

When measurable fluid containing small particles or dust, it is recommended mounted on vertical or inclined pipe to reduce wear and deposition of the sensor.

2. Installation on vertical pipelines

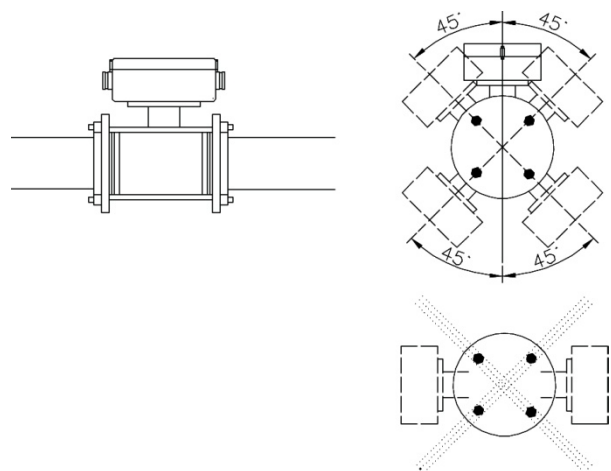
It is recommended that the fluid flow upwards to minimize the effect of air bubbles in the liquid on the measurement.



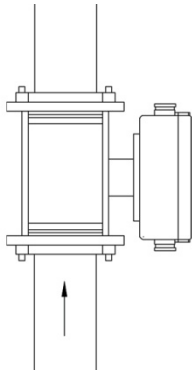
Installed on a vertical pipe with liquid flowing upward

3. Installation on horizontal pipes

The sensor must be installed as shown. It cannot be installed as shown in the bottom figure, which will make the measuring electrode either at the high point of the pipeline susceptible to air bubbles or at the possibility of sediment. Dirt and other low points in the pipeline.

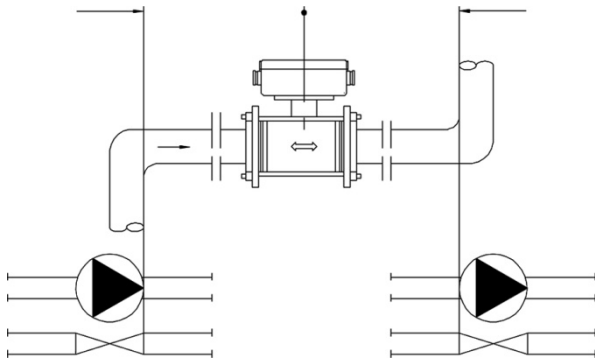


Using the empty pipe detection function, the sensor can be tilted at an angle of 45 °



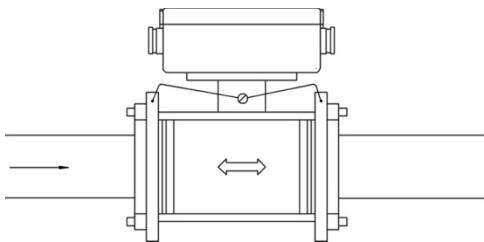
To measure fluids containing powder, install the flowmeter on a vertical pipe with the fluid flowing upward

4.Entry and exit conditions



Installed between elbow, pump and valve: For maximum measurement accuracy of standard inlet and outlet pipe sections, there is a certain distance between the flowmeter and the pump or valve when measuring flow. At the same time, try to align the flowmeter with the center of the pipe flange and gasket.

5.potential balance



Potential balance

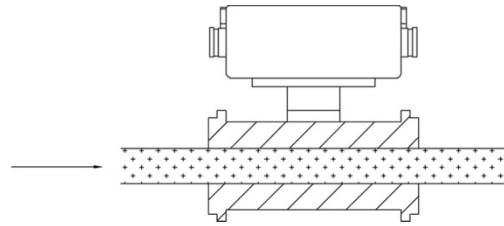
At any time, the potential of the liquid must be equal to the potential of the sensor.

Depending on the application, it can be implemented in different ways:

- Connect the sensor to the adjacent flange with a jumper
- Direct metal contact between sensor and accessory
- Built-in ground electrode
- Optional grounding / protective flange / grounding ring

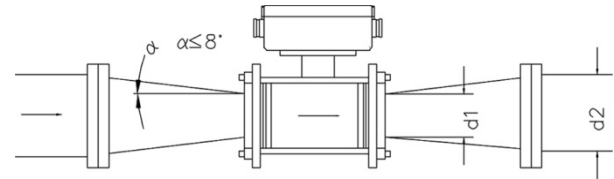
- Optional graphite gasket (specified when ordering high temperature)

6.Vacuum



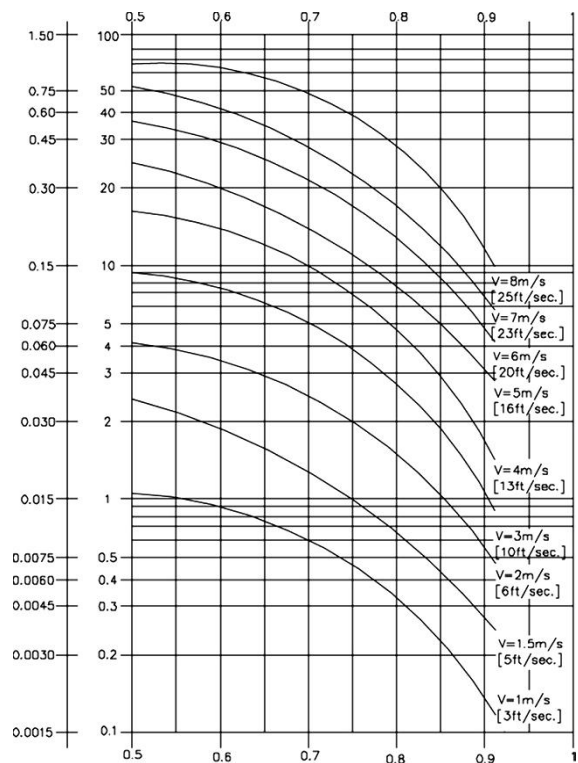
Avoid vacuum in the measuring pipe as this will cause damage to the lining

7.Installation of flowmeter on large diameter pipe



Reduce normal pipe diameter

The flow meter can be installed between two tapered tubes. The following figure shows the pressure reduction curve when the reduction angle is 8 °, which is suitable for the case where the medium is water.



Relation curve between reduction of tube diameter and pressure drop between reduced diameter tubes

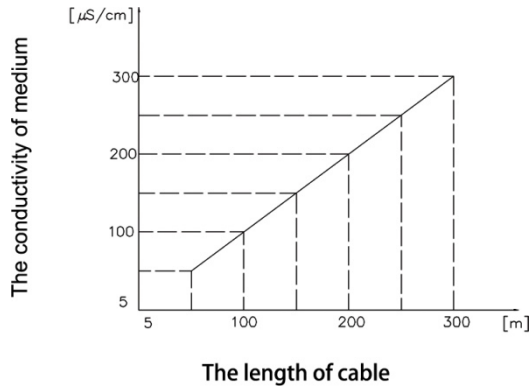
E.g:

The flow velocity (V) in the sensor is 3m / s, and the diameter of the pipeline is reduced from DN100 (4 ") to DN80 (3") (d1 / d2 = 0.8). The pressure drop from the figure is 2.9mbar.

8. Conductivity of sensor cable and medium

Integrated installation: liquid conductivity $5 \mu\text{S} / \text{cm}$.

Split installation



Conductivity of the medium (using special electrode cable)

Straight pipe requirements: front straight pipe section $5D$

Rear tube section $3D$

D = inside diameter of pipe

Dedicated electrode batteries cannot be used in remote installations in explosion-proof applications.

Lining material selection

It should be selected according to the corrosiveness, wear resistance and temperature of the medium. Chloroprene rubber can resist general weak acid and alkali corrosion, temperature 80°C , chloroprene rubber has abrasion resistance. Chlorotetrafluoroethylene can almost resist strong acid and alkali corrosion except hot phosphoric acid, medium temperature can reach 180°C , but not resistant to wear. Polyvinyl chloride rubber has good abrasion resistance, but it is not resistant to acid and alkali corrosion. The temperature resistance is also poor, and the medium temperature is less than 65°C .

Performance and scope of common lining materials (for reference only)

Lining material	Main performance	Scope of application
Neoprene	<ol style="list-style-type: none"> Excellent elasticity, high breaking force, and good wear resistance; Resistant to the corrosion of general low-concentration acid, alkali, salt media, not oxidized media; 	<ol style="list-style-type: none"> Water, sewage, weakly abrasive mud, ore slurry Temperature range: $-20 \sim +60$
Polyurethane rubber	<ol style="list-style-type: none"> Excellent wear resistance (equivalent to 10 times of natural rubber); Poor acid and alkali resistance; Cannot be used in water mixed with organic solvents; 	<ol style="list-style-type: none"> Medium-sized and strongly worn ore pulp, coal slurry, mud, etc.; Temperature range: $-20 \sim +60$
Silicone rubber	<ol style="list-style-type: none"> Has excellent elasticity, high breaking force, high temperature resistance; Not resistant to any concentration of acid, alkali, salt media; 	<ol style="list-style-type: none"> Water Temperature range: $-20 \sim +180$
Polytetrafluoroethylene (PTFE)	<ol style="list-style-type: none"> A material with the most stable chemical properties in plastics. It is resistant to boiling hydrochloric acid, sulfuric acid and aqua regia, as well as concentrated alkali and various organic solvents. It is not resistant to chlorine trifluoride, high flow rate liquid fluorine, liquid oxygen and ozone. corrosion; Poor wear resistance; 	<ol style="list-style-type: none"> Strong corrosive medium such as concentrated acid and alkali; Temperature range: $-40 \sim +120$
Polyperfluoroethylene propylene (F46)	<ol style="list-style-type: none"> Corrosion resistance is the same as PTFE; Can withstand low wear; Strong ability to resist negative pressure; 	<ol style="list-style-type: none"> Same as PTFE, can be used in low-abrasion media; Temperature range: $-40 \sim +160$
PFA	<ol style="list-style-type: none"> Corrosion resistance is the same as PTFE, strong ability to resist negative pressure; 	<ol style="list-style-type: none"> Can be used in negative pressure state; Temperature range: $-40 \sim +160$

Selection of electrode materials

It should be selected by the user based on the corrosivity of the medium being tested. For general media, check the relevant anti-corrosion manual and select the electrode material. For mixed media such as mixed acids, hanging experiments should be done.

Corrosion resistance of electrode materials (Reference)

Electrode material	Corrosion resistance
SUS316	It is used in industrial water, domestic water, sewage, and weakly corrosive media, and is widely used in petroleum, chemical industry, iron and steel and other industrial parts, municipal, environmental protection, etc.
Hastelloy B (HB)	It has good corrosion resistance to all concentrations of hydrochloric acid below the boiling point, as well as corrosion of non-oxidizing acids, alkalis and non-oxidizing salt solutions such as sulfuric acid, phosphoric acid, hydrofluoric acid and organic acids;
Hastelloy C (HC)	Resistant to corrosion by oxidizing alkalis, such as nitric acid, or a mixture of chromic acid and sulfuric acid, and also resistant to oxidizing hydrochloric acids, such as Fe ⁺⁺⁺ , Cu ⁺⁺ , or other oxidants, higher than normal temperature hypochlorite solution and seawater corrosion;
Titanium (Ti)	It is resistant to corrosion by salt water, various chlorides and hypochlorites, oxidizing acids (including fuming sulfuric acid), organic acids, alkalis, etc., and it is not resistant to more pure reducing acids (such as sulfuric acid, hydrochloric acid, but if the acid When it contains oxidants (such as nitric acid, Fe ⁺⁺⁺ , Cu ⁺⁺), the corrosion resistance is greatly reduced.
Tantalum (Ta)	It has excellent corrosion resistance and is very similar to glass. With the exception of hydrofluoric acid, fuming sulfuric acid, and alkali, it is resistant to corrosion by almost all chemical media, and alkali solutions such as sodium hydroxide are not suitable.
Platinum/iridium alloy	It is suitable for almost all chemical substances, but not for aqua regia and ammonium salts;
Stainless steel coated with tungsten carbide	Used for non-corrosive and strong abrasive media;

Selection of enclosure protection level

According to the international standard GB4208-84 International Electrotechnical Commission IEC standard (IEC529-76), the enclosure protection level is:

IP65 is a water-proof type, which allows the faucet to spray water to the instrument from any direction. The water spray pressure is 30KPa (0.3bar) and the water output is 12.5 liters / minute. The water spray distance from the instrument is 3 meters. IP67 is water-proof type, that is, the meter can be completely immersed in water for a short time. The highest point during the experiment should be at least 150cm and the duration is at least 30 minutes.

IP68 is submersible and should be able to work in water for a long time. The maximum immersion depth is negotiated by the manufacturer and the user. The selection principle of protection level should be selected according to the above requirements and the actual conditions of the instrument. If the instrument is below the ground and is often flooded, IP68 should be used; if the instrument is installed above the ground, IP65 can be used.

Selection of ground ring

If the pipeline connected to the instrument is insulating (relative to the measured medium), a grounding ring should be used. The general metal or non-metallic type can be used. The material of the grounding ring or grounding electrode (non-metallic type) should be compatible with the corrosiveness of the measured medium.

If the measured medium is abrasive, a grounding ring with a neck should be used to protect the lining at the inlet and outlet and extend the service life.

Ground ring of the sensor:

In order to make the meter work reliably, improve the measurement accuracy, and not be affected by the external potential, the

sensor should have a good separate grounding wire with a grounding resistance of $<10\ \Omega$. When the insulation pipe or non-metallic pipe is coated in the pipeline and connecting the sensor, A grounding ring should also be installed.

1. Ground ring form

General metal or non-metal protective ring

Material: optional

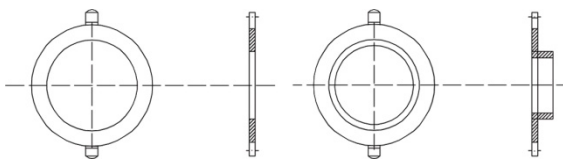
Thickness: 3mm ~ 12mm

Protective ring for PTFE-lined sensors, secured to the flange by screws to protect the PTFE flange from damage.

B. Grounding ring with neck

Material: optional

Thickness: 3mm



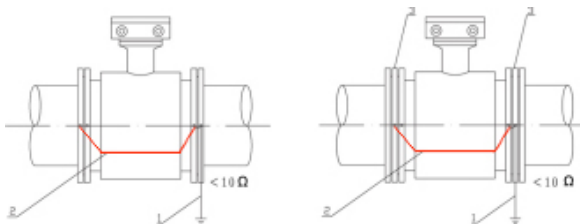
A. General or PVC ground ring

B. Grounding ring with neck

Grounded ring with neck is used for abrasive media, such as mud, coal water slurry, etc. Use it to protect the lining at the end of the measuring tube and extend the life of the sensor. This kind of grounding ring is ordered together with the meter, otherwise it will not be used in the original, and the precision of this kind of grounding ring will be affected.

2. Grounding method

A. Installation of sensor on metal pipe: The inner wall of metal pipe has no insulation coating, and is grounded as shown in the figure below.

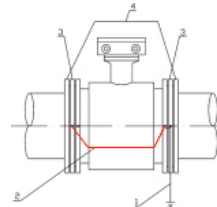


- A:
1. Grounding device line (installed when external interference is large)
 2. Instrument ground wire (included)

- B:
1. Grounding device line (installed when external interference is large)
 2. Instrument ground wire (included)
 3. Ground flange or ground ring

B. Installation of sensors on plastic pipes or pipes with insulating coatings and paint on the inner wall of the pipes: Both ends of the sensors should be installed with grounding medium and short-circuited to the ground, with zero potential. Otherwise, the magnetic flowmeter will not work properly.

C. The installation of the sensor on the cathode plate protection pipeline: there is a certain potential difference between the cathode protection pipeline and ground, so the measured medium has a high common-mode ground potential. Therefore, the sensor must use a ground ring.



1. Grounding device line (installed when external interference is large)
2. Instrument ground wire (included)
3. Ground flange or ground ring must be insulated from the flange of the connecting pipe
4. Connecting wire, copper cross-section area 16mm^2 , to isolate the cathodic protection potential from the sensor

3. Installation on the sensor cathodic protection pipeline

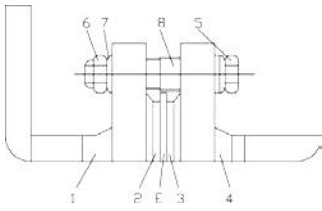
note:

- 1). The grounding rings are mounted on the two end faces of the sensor. They must be insulated from the flange of the connecting pipe and connected to the sensor and the grounding ring through the grounding wire
2. The material of the grounding ring should be resistant to the corrosion of the medium. Stainless steel ICrl8Ni9Ti
- 2). The flanges of the connecting pipes on both sides of the meter should be connected around the sensor with copper wires with a cross-sectional area of 16mm^2 to isolate the cathodic protection potential from the sensor. For the pipeline with cathodic corrosion protection, the sensor is insulated from the connecting pipeline on both sides. Pay attention to the following points during installation:

Grounding rings that insulate pipeline flanges must be installed at both ends of the flowmeter. The ground ring, flow meter and measurement ground must be interconnected.

The pipe flanges must be connected to each other with copper cables (L). Be careful not to connect to the sensors. The flange connection bolts must be insulated (as shown). The user must use bushings and washers made of insulating material.

- | | |
|-----------------|----------------------|
| 1 Sensor flange | 5 bolt |
| 2 lining | 6 Nut |
| 3 Sealing ring | 7 washer |
| 4 Pipe flange | 8 Insulation bushing |
| E Ground ring | |



Selection of the sensor (pipeline)

1. Instrument caliber selection

1.1. Selection of sensor caliber

Select the meter and connecting duct diameter is not necessarily the same diameter, the flow rate should be based on the pipe.

Generally speaking, when the pipeline velocity is 0.5 ~ 5m/s, it is the economic velocity, and the diameter of the sensor and the diameter of the pipeline can be the same. Unless the medium is low abrasive and use wear-resistant material, it is recommended that the long-term working flow rate does not exceed 7m/s.

For fluids containing substances that are easy to adhere, sediment, scale, etc., it is recommended to use a common flow rate of not less than 2m/s, and it is best to increase it to 3~4m / s or more, to perform self-cleaning, prevent adhesion, sedimentation, etc. function; used for abrasive fluids such as slurry, the common flow rate should be less than 3m / s to reduce the wear on the lining and the electrode: When measuring low-conductivity media with a conductivity of 5-10 $\mu\text{S} / \text{cm}$, choose as much as possible Low flow rate (0.5 ~ 1m / s), the flow noise will increase due to the increase of the flow rate, and the output will slosh.

1). Product accuracy

caliber (mm)	Demarcation velocity (m/s)	Standard accuracy (A)	High accuracy (B)	S
15-300	V ≥ 0.3	± 0.5%RS	± 0.2%RS	Special calibration
	V < 0.3	± 1.5mm/s	± 0.6 mm/s	
350-600	V ≥ 0.5	± 0.5%RS	± 0.2%RS	
	V < 0.5	± 2.5mm/s	± 1 mm/s	
700-1000	V ≥ 0.5	± 0.5%RS	Special order accuracy above DN700 can reach ± 0.3% (velocity 1m/s) or ± 3mm / s	
	V < 0.5	± 2.5mm/s		
1200	V ≥ 0.8	± 0.5%RS		
	V < 0.8	± 4mm/s		

Note: Optional correction technology can be used to make the product reduce the demarcation flow rate.

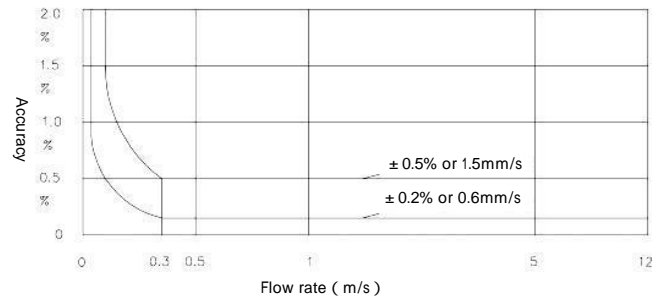


Table 1: Caliber 15-300

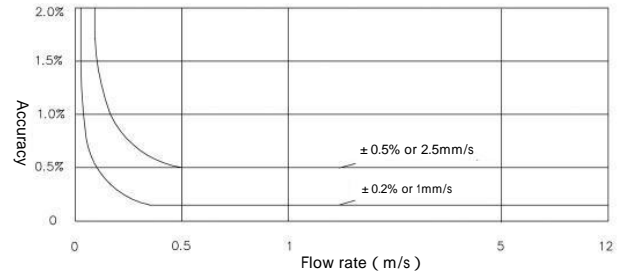


Table 1: Caliber 350-600

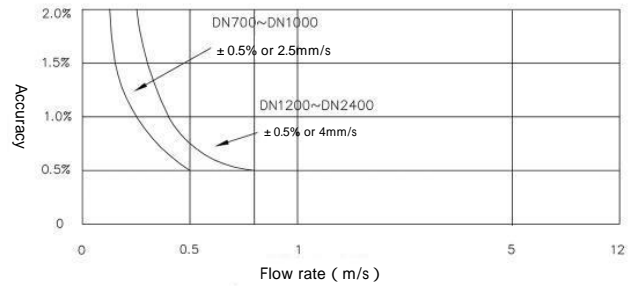


Table 1: Caliber 700-2400

1.2 Select the diameter of the sensor to be the same as the diameter of the connected process pipe, easy to install.

1.3 The sensor diameter is not the same as the process pipeline diameter
This choice applies to the following situations:

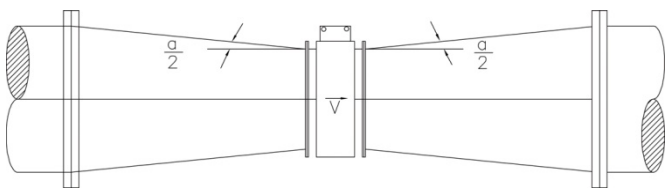
A. The flow velocity in the pipeline is relatively low and the process flow is stable. In order to meet the requirements of the flow rate range of the instrument, the flow rate is locally increased in the instrument part.

The diameter of the sensor is selected to be smaller than the diameter of the process pipeline, add reducers before and after the sensor.

B. In terms of price, for a large-diameter magnetic flowmeter, the larger the diameter, the higher the price. For the case where the flow velocity in the pipeline is relatively low and the process parameters are stable, a sensor with a smaller diameter can be selected, which can not only make the instrument run in a better working state, but also reduce the investment cost of the instrument.

1.4 Attentions when installing reducers

In order not to affect the distribution of the velocity field too much, and not to affect the measurement accuracy of the instrument, the central cone angle α of the reducer is not greater than 15, so that the reducer can be regarded as a part of a straight pipe section.



Other functions

1. Agreement measurement type (only for split type)

The protocol measurement type magnetic flowmeter signal conversion totalizer is a meter that integrates flow rate, accumulation, and display, and measures some special flow rates in accordance with the agreement method. When the actual flow is less than or higher than a preset value, the meter will automatically measure according to the agreement. If the actual flow is within the agreed normal range, the meter will measure according to the actual flow.

2. Time-sharing measurement type (only for split type)

Time-sharing measurement type magnetic flowmeter signal conversion totalizer, In some special cases, a meter that separately accumulates and measures flow according to the methods of "peak", "valley" and "flat".

3. Quantitative control type (only for split type)

Quantitative control type magnetic flowmeter is a meter that integrates flow measurement, accumulation, and display with a quantitative measurement control function. The meter can be used to manually preset the quantitative value of flow, the pre-alarm value of the remaining flow, and to manually open or close the linked valve in an emergency, to achieve the combination of total control and measurement and control functions.

4. Prepaid quantitative control type (only for split type)

The prepaid quantitative control type magnetic flowmeter is a meter that integrates flow (heat), accumulation, and display, with a prepaid quantitative measurement control function. The meter can facilitate manual quantitative recharge, manually set the unit price of flow, quantitative alarm, and can automatically open or close the linked electric valve, achieving the combination of total volume control and measurement and control functions.



NOMENCLATURE

Type	MF series –	
Meter type	S	Flange type sensor
	D	Clamping sensor
	C	Plug-in type
Pipe diameter	6	6mm
	20	20mm
	...	
	3000	3000mm
Output signal and communication	M	Pulse, 4~20mA+RS485-MODBUS protocol
	H	Pulse, 4~20mA+HART protocol
	Q	Other signal or communication method
Power supply	0	220V AC
	1	24V DC
	2	Battery powered
Electrode material	A	Stainless steel 316L (standard)
	B	Hastelloy Hb
	C	Tantalum Ta
	D	Titanium Ti
	E	Hastelloy Hc
	F	Tungsten carbide electrode
	G	other materials
Lining material	R	Neoprene
	P	Polytetrafluoroethylene
	O	Please specify
Measuring tube material	B	304 stainless steel (standard)
	C	316 stainless steel
Body housing material	A	20# Carbon steel+epoxy metal paint (standard)
	B	304 stainless steel
	C	316 stainless steel
Ground ring	0	Without grounding ring (standard)
	1	With grounding ring
preset pressure	10	1.0MPa
	16	1.6MPa
	40	4.0MPa
Medium temperature	E	80
	H	160 (split type)
Converter form	I	Integrated
	D	Split type

NOMENCLATURE

Type	MF series —	
Protection level	0	IP65
	1	IP67 (split)
	2	IP68 (split)

For example: MF-S50M0APBA140E10

It indicates that the series is MF flange type, pipe diameter is 50mm, output signal is pulse, 4~20mA+RS485-MODBUS protocol, power supply 220V, electrode material is stainless steel 316L, lining material is PTFE, and measuring tube material is 304 stainless steel , body housing material is 20# Carbon steel+epoxy metal paint, with grounding ring, rated pressure 4.0MPa, medium temperature 80 , integrated converter form, protection level is IP65;

APPENDIX

Pipe diameter / flow rate / flow comparison table

Flow m ³ /h		Flow rate-flow comparison table					
Flow velocity m/s							
Flow m ³ /h	0.5	1	2	3	4	5	10
Diameter mm							
10	0.1414	0.2827	0.5654	0.8482	1.1309	1.4137	2.8271
15	0.3181	0.6362	1.2723	1.9085	2.5447	3.1809	6.3625
20	0.5655	1.1310	2.2619	3.3929	4.5239	5.6549	11.3103
25	0.8836	1.7671	3.5343	5.3014	7.0686	8.8357	17.6714
32	1.4476	2.8953	5.7906	8.6859	11.5812	14.4765	28.9533
40	2.2619	4.5238	9.0478	13.5717	18.0956	22.6195	42.2384
50	3.5343	7.0686	14.1372	21.2058	28.2743	35.3429	70.6862
65	5.9730	11.9459	23.8918	35.8377	47.7836	59.7295	119.4591
80	9.0478	18.0956	36.1911	54.2826	72.3823	92.4779	180.9563
100	14.1372	28.2743	56.5487	84.8230	113.0973	141.3717	282.7432
125	22.0893	44.1786	88.3573	132.5359	176.7146	220.8932	441.7861
150	31.8086	63.6173	127.2345	190.8518	254.4690	318.0863	636.1733
200	56.5487	113.0973	226.1947	339.2920	452.3893	565.4867	1130.9735
250	88.3573	176.7146	353.4292	530.1438	706.8583	833.5729	1767.1464
300	127.2345	254.4690	508.9380	763.4070	1017.8760	1272.3450	2544.6901
350	173.1803	346.3606	692.7212	1039.0818	1385.4424	1731.8030	3463.6063
400	226.1947	452.3893	904.7787	1357.1680	1809.5574	2261.9467	4523.8932
450	286.2776	572.5553	1145.1105	1717.6658	2290.2210	2862.7763	5725.5533
500	353.4292	706.8583	1413.7167	2120.5750	2827.4334	3534.2917	7068.5835
600	508.9380	1017.8760	2035.7520	3053.6281	4071.5041	5089.3801	10178.7601
700	692.7212	1385.4424	2770.8847	4156.3271	5541.7694	6927.2118	13854.4242
800	904.7787	1809.5574	3619.1147	5428.6721	7238.2295	9047.7868	18095.5741
900	1145.1105	2290.2210	4580.4421	6870.6631	9047.7868	11451.1052	22902.2102
1000	1413.7167	2827.4334	5654.8668	8482.3002	11309.7336	14137.1669	28274.3344
1200	2035.7520	4071.5041	8143.0082	12214.5122	16286.0163	20357.5204	40715.0412
1400	2770.8847	5541.7694	11083.5389	16625.3083	22167.0778	27708.8472	55417.6941
1600	3619.1147	7238.2295	14476.4589	21714.6884	28952.9179	36191.1474	72382.2951
1800	4580.4420	9160.8842	18321.7684	27482.6526	36643.5367	45804.4209	91608.8423
2000	5654.8667	11309.7336	22619.4671	33929.2007	45238.9342	56548.6678	113097.3363
2200	6842.3887	13684.7776	27369.5552	41054.3328	54739.1104	68423.8880	136847.7763
2400	8143.0080	16286.0163	32572.0326	48858.0490	65144.0653	81430.0816	162860.1631
2600	9556.7247	19113.4268	38226.8536	57340.2804	76453.7072	95567.1340	191134.2683
2800	11083.5387	22167.0774	44334.1548	66501.2322	88668.3095	110835.3869	221670.7741
3000	12723.4500	25446.9001	50893.8001	76340.7002	101787.6002	127234.5003	254469.0011

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LIFE OR PROPERTY RISK

- Please ensure that this product has been designed as part of whole system and already considered related risks, make sure the product has the correct ratings and is designed based on the entire system. It must not be used when applications related to serious life or property damage risks.

Failure to follow this instruction can result in death or serious injury.

Warning

PERSONAL INJURY

- DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to follow this instruction can result in death or serious injury.

Warning

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Failure to follow this instruction can result in death or serious injury.

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