

SIC Flow meter Products guide

电磁流量计 选型样本



SIC *by customer's side*

Seeking for truth, Struggling
Innovating, Developing

Customer *in SIC's heart*

ENTERPRISE SURVEY

Chongqing Sichuan Instrument Complex Co., Ltd. Flowmeter Branch (hereafter referred to as SICFB), as the affiliate of Chongqing Sichuan Instrument Complex Co., Ltd. (hereafter referred to as SIC) of China Silian Instrument Group which is the biggest instrument enterprises in China, is a professional high-tech enterprise integrating in flowmeter developing, manufacturing and selling, who has passed ISO9001/2000 International Quality System Certifications and is the skeleton enterprise in China's flowmeter industry.

All products of SICFB are based on professional technologies, standard manufacturing system, calibration equipments that reach $\pm 0.1\%$ of accuracy and integrated flowmeter production line of SIC, thus quality of our products are well assured. Main products include FlowMaster series electromagnetic flowmeter, VFC series Vortex Flowmeter, etc, whose technical performances reach world-class standards such as stabilization, responding speed, self-compatibility, self-diagnostics, etc. We can supply services to our customers with product selections and inquiries, product supply, operation maintenance, technical supports, user training, after-sale service, etc, that's to say, the overall services.

SICFB insists on the service philosophy of "SIC by customer's Side, Customer in SIC's heart!", and the enterprise spirits of "Seeking for truth, struggling, innovating and developing", and the operational philosophy of "Emphasizing particularly on technologies and qualities, with very good services", continuously optimizing our structure, improving efficiency, accelerating development, supply customers with more superior products and services, cooperating with partners in good faith to promote mutual development.

And here we thank you for your close attention of our products, looking forward to your inquiries.





VFC Vortex Flowmeter



FlowMaster Electromagnetic Flowmeter
MFC Series



FlowMaster Electromagnetic Flowmeter
MFE-S Series



FlowMaster High Protective
Electromagnetic Flowmeter



AMG-208 Programmer



FMS-1 Flow velocity simulator

PRODUCT INTRODUCTION

产品介绍



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1. Product Summarize

1.1 Product applied field

Electromagnetic flowmeter is composed of sensor and transmitter and operate basing on Faraday electromagnetic induction rule. The subject could be electric liquid or liquid and solid medium, and the conductance not lower than $5\mu\text{ s/cm}$ which equal to the soften water (conductance of the general tap water and the natural water is about $100\text{--}500\mu\text{ s/cm}$). Therefore, the acid, soda and salt liquid, the paper slurry, the mineral slurry, etc can all adapt electromagnetic flowmeter for measurement. Note that the subject can't contain too many Fe-magnetic substances and too many bubbles.

Electromagnetic flowmeter is a main flow meter to measure electric liquid. It is widely applied in the municipal management, water building and many other fields such as metallurgy, chemical industry, paper making, petroleum, light & textile industries, foods and so on.

1.2 Measuring principal

The measuring principal below is based on Faraday electromagnetic induction rule. A pair of measuring electrodes are installed on the tube and are vertical with the axes of pipeline and magnetic field direction. When travelling vertically in the electric-liquid magnetic fields, the conductor generates inductive voltage, whose value is calculated through such formula as:

$$Q=KB\bar{V}D$$

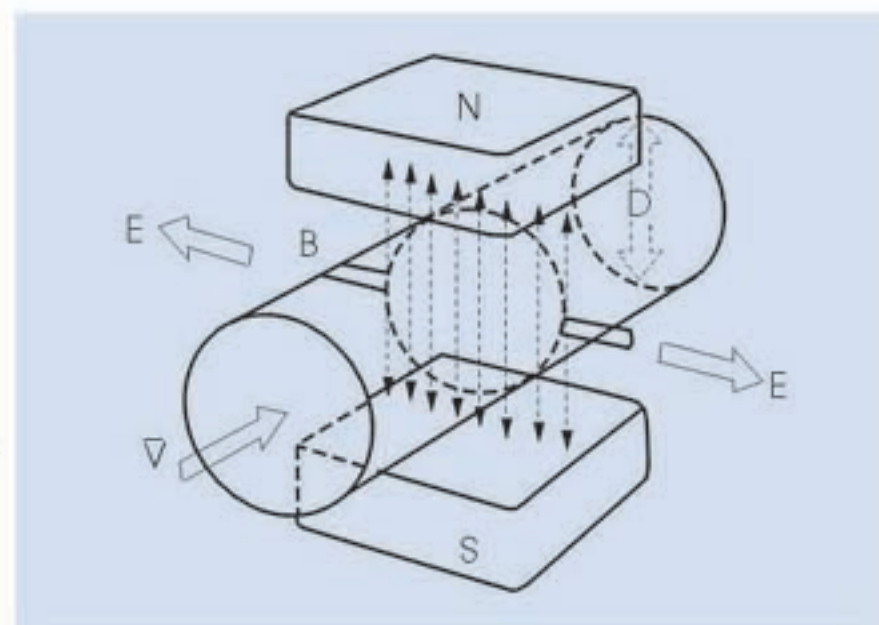
Thereinto: Q--flow

K--nstrument invariable

B--magnetic induction intensity

\bar{V} -- average flow velocity across the section of the measuring pipe

D--inner diameter of the measuring pipe



When measuring the flow value, the liquid is flowing through the magnetic field vertical to the flowing direction, and the flowing electric liquid generates a voltage directly proportional to the average flow velocity (also called volume velocity), therefore the measured flowing liquid is demanded to have a minimum conductivity. The inductive voltage signal is conveyed through two electrodes directly contacting the flow liquid and is sent to the transmitter by cable, and exchange to an integrated output signal. Then accumulated flow and current flow could be displayed on the screen of transmitter after signal treatment and relative calculation.



1.3 Meter features

- 1.As there are no blocking flow and active parts in the measuring pipe, no additional energy will be caused lost and no blocks will be formed. It's very effective in energy-saving, especially applied well in the two-phased flow measuring such as the wastewater, the slop, the mineral slurry, water-coal slurry, the paper slurry, etc.
- 2.As only the lining and the electrode contact the measuring medium, if their materials are properly chosen, good erosion-resistance and abrasion-resistance will be achieved. So the flowmeter can be used to measure various chemical liquids such as thick acid, alkali, and so on.
- 3.Mount quite easy, there needs 5D for the front straight pipe and 2D for the back straight pipe.
- 4.High measuring accuracy. The FlowMaster series could reach an accuracy of $\pm 0.2\%$, capable of measuring forward and reverse flow rates, which provides a good tool for accurate measuring of the flow.
- 5.Consists of dual frequency excitation wave, not violated from the working frequency and all other electromagnetic fields, stable in performance.
- 6.Only consumes a very little power ($< 20VA$).
- 7.The sensor and the transmitter are exchangeable with each other, not necessary to re-set the practical flow value and it can meet the requirements of the accuracy.
- 8.Operable flow range is wide, it could reach 1500:1.
- 9.Automatically detect empty pipeline, then reset data to zero and send alarm to prevent making mistaken operation caused by the jam of pipe empty.
- 10.The sealing of electrode is applied with double sealing methods, cone-shaped surface sealing and line sealing, to assure the leaking wouldn't be happened.
- 11.The input impedance of transmitter is more than $10^{12} \Omega$, which effectively prevent the effect on sensor from accumulative dirt and is suitable for measuring the medium with low conductance.
- 12.Electromagnetic compatibility (EMC) index of flowmeter satisfies IEC61000-1995 Standard.


As the electromagnetic flowmeter has the advantages of all the above, it became more and more popular in various industries, being the No.1 instrument in measuring flow of the liquid.

1.4 Ordering information

Please read this sample guide to learn the product type and code regulations before you put an order of our products, and then confirm the specification you need. Attach information below if necessary:

- 1.Asking for the original setting parameters of the product not leaving our production factory.
- 2.Whether require providing the matching flanges for installation.
- 3.Whether require submersible application.
- 4.Other special requirements.


2. Capability introduction

FlowMaster Electromagnetic Flowmeter MFC series		
	Integral version	Separation version
Accuracy	$\pm 0.2\%$ or $\pm 0.5\%$ of displayed value	
Nominal size (mm)	DN3~DN2400	DN3~DN2400
Flange	GB9119, carbon (SUS is available)	
Pressure rating	DN3~DN300 1.0, 1.6, 2.5, 4.0MPa DN350~DN600 1.0, 1.6, 2.5, 4.0MPa DN700~DN2400 0.6MPa (Special pressure consult with our company)	
Lining material	PTFE, Elastomer, Polyurethane, Neoprene, PFA, FEP, Nature Rubber	
Medium Conductance	$\geq 5 \mu S/cm$ (low $5 \mu S/cm$, consult with our company)	
Electrode	SUS316L, Hastelloy C, Ti, Ta, Pt-Ir Alloy	
Protection rating	IP65/IP67	IP65/IP67 (IP67/IP68 is available for sensor)
Medium temperature	-25℃~80℃ Refer to selection of lining material	-25℃~140℃ Refer to selection of lining material
Ambient temperature	-25℃~60℃	
Ambient temperature effect	$< \pm 0.1\%/10^\circ C$ or $< \pm 0.25\%/10^\circ C$	
Repeatability and Reproductivity	$\leq \pm 0.1\%$ or $\pm 0.25\%$	
Analog output deviation	$\leq \pm 0.02mA$	
Measuring range velocity	$\leq 20m/s$	
Buriable	—————	$\leq 5m$ (Only for IP68)
Electric connector	M20*1.5 sealing sleeve, G1/2, NPT1/2	
Sensor cable	—————	$< 100m$ (When cable exceed 100m, please consult with us)

Note: nominal size is more than DN300, separation version flowmeter is recommended.



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FlowMaster Electromagnetic Flowmeter MFE-S series		
	Integral version	Separation version
Accuracy	$\pm 0.2\%$ or $\pm 0.5\%$ of displayed value	
Nominal size (mm)	DN3~DN2400	DN3~DN2400
Flange	GB9119, carbon (SUS is available)	
Pressure rating	DN3~DN300 1.0, 1.6, 2.5, 4.0MPa DN350~DN600 1.0, 1.6, 2.5, 4.0MPa DN700~DN2400 0.6MPa (Special pressure consult with our company)	
Lining material	PTFE, Elastomer, Polyurethane, Neoprene, PFA, FEP, Nature Rubber	
Medium Conductance	$\geq 5 \mu S/cm$ (low $5 \mu S/cm$, consult with our company)	
Electrode	SUS316L, Hastelloy C, Ti, Ta, Pt-Ir Alloy	
Protection rating	IP65/IP67	IP65/IP67 (IP67/IP68 is available for sensor)
Medium temperature	-25℃~80℃ Refer to selection of lining material	-25℃~140℃ Refer to selection of lining material
Ambient temperature	-25℃~60℃	
Ambient temperature effect	$< \pm 0.1\%/10^\circ C$ or $< \pm 0.25\%/10^\circ C$	
Repeatability and Reproductivity	$\leq \pm 0.1\%$ or $\pm 0.25\%$	
Analog output deviation	$\leq \pm 0.02mA$	
Measuring range velocity	$\leq 20m/s$	
Buriable	_____	$\leq 5m$ (Only for IP68)
Electric connector	M20*1.5 sealing sleeve, G1/2, NPT1/2	
Sensor cable	_____	$< 100m$ (When cable exceed 100m, please consult with us)
Output interface	Standard output, Dual current output, RS485, HART, Profibus-PA	

Note: nominal size is more than DN300, separation version flowmeter is recommended.

FlowMaster High Protective Electromagnetic Flowmeter		
	Integral version	Separation version
Accuracy	$\pm 0.2\%$ or $\pm 0.5\%$ of displayed value	
Nominal size (mm)	DN3~DN2400	DN3~DN2400
Explosion-proof rate		Exdmib II CT4
Flange	GB9119, carbon (SUS is available)	
Pressure rating	DN3~DN300 1.0, 1.6, 2.5, 4.0MPa	DN3~DN300 1.0, 1.6, 2.5, 4.0MPa
	DN350~DN600 1.0, 1.6, 2.5, 4.0MPa	DN350~DN600 1.0, 1.6, 2.5, 4.0MPa
	DN700~DN2400 0.6MPa	
	(Special pressure consult with our company)	
Lining material	PTFE, Elastomer, Polyurethane, Neoprene, PFA, FEP, Nature Rubber	
Medium Conductance	$\geq 5 \mu S/cm$ (low $5 \mu S/cm$, consult with our company)	
Electrode	SUS316L, Hastelloy C, Ti, Ta, Pt-Ir Alloy	
Protection rating	IP67	IP67
Medium temperature	-25℃~80℃ Refer to selection of lining material	-25℃~80℃ Refer to selection of lining material
Ambient temperature	-25℃~60℃	
Ambient temperature effect	$< \pm 0.1\%/10^\circ C$ or $< \pm 0.25\%/10^\circ C$	
Repeatability and Reproductivity	$\leq \pm 0.1\%$ or $\pm 0.25\%$	
Analog output deviation	$\leq \pm 0.02mA$	
Measuring range velocity	$\leq 20m/s$	
Buriable		$\leq 5m$ (Only for IP68)
Electric connector	M20*1.5 sealing sleeve, G1/2, NPT1/2	

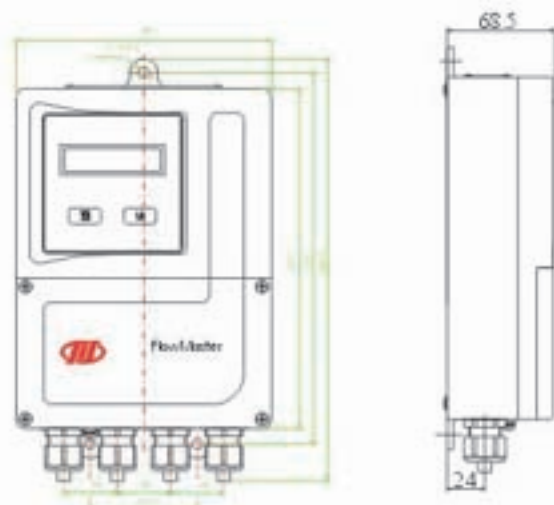


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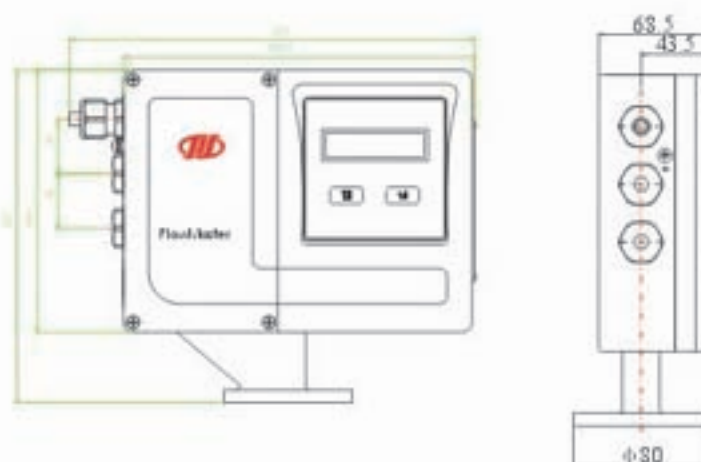
3. Dimensions

3.1 Transmitter dimensions

MFC transmitter

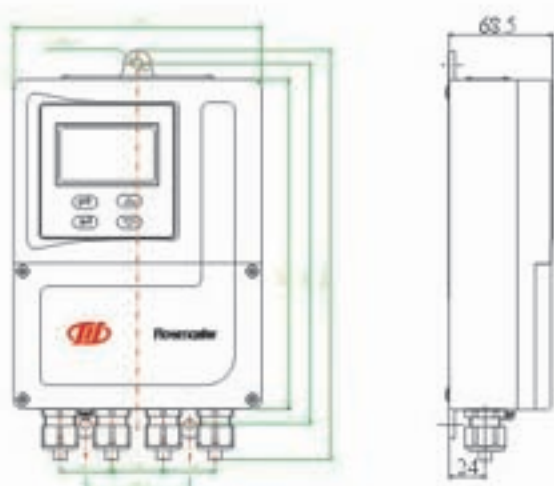


Separation version transmitter
(mounted on sensor)



Integral version transmitter

MFE-S transmitter

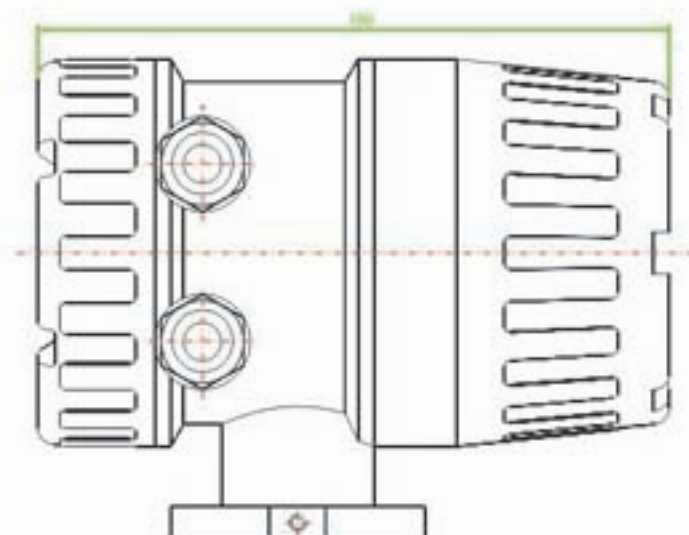
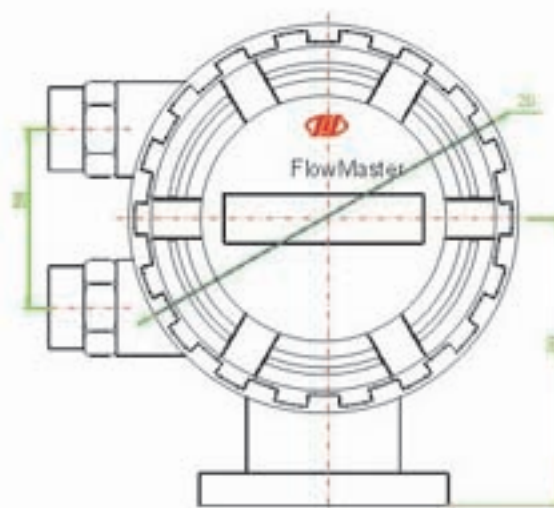


Separation version transmitter
(mounted on sensor)

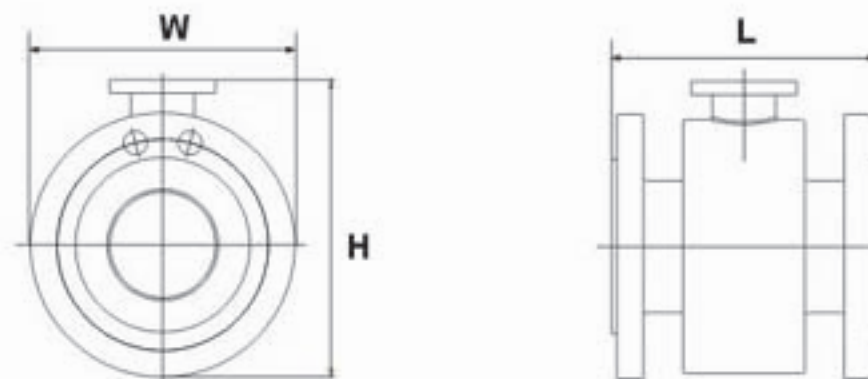


Integral version transmitter

High protective transmitter



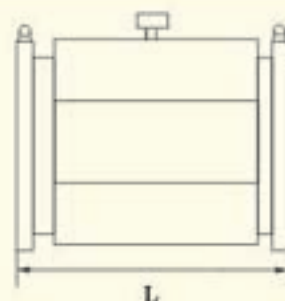
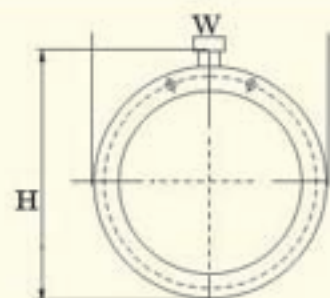
3.2 Sensor dimensions



Nominal Size (mm)	Dimension (mm)			Weigh (kg)			
	L	W	H	1.0MPa	1.6MPa	2.5MPa	4.0MPa
3~15	200	128	127	3.5	3.5	3.5	4.0
20	200	128	137	4	4	4	4.5
25	200	128	147	5	5	5	5.5
32	200	128	155	7	7	7	8
40	200	128	165	7.5	7.5	8	8.5
50	200	165	187	9	9	9.5	10
65	200	185	202	11	11	12	14
80	200	200	223	14	14	15	19
100	250	220	249	19	19	20	24
125	250	250	278	24	24	25	30
150	300	285	303	32	32	35	42
200	350	340	358	41	41	46	56.5
250	450	405	418	68	68	73	85
300	500	460	468	89	89	97	113
350	550	562	560	97	97	124	—
400	600	596	614	122	122	157	—
450	600	640	656	161	161	200	—
500	600	706	710	180	180	243	—
600	600	810	810	241	241	285	—



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Nominal Size (mm)	L	W	H	Weigh (kg) 0.6MPa
700	700	895	995	420
800	800	1015	1115	541
900	900	1115	1215	668
1000	1000	1230	1350	858
1200	1200	1405	1505	990
1400	1400	1630	1730	1362
1600	1600	1830	1930	1754
1800	1800	2045	2145	1890
2000	2000	2266	2365	2105
2200	2200	2475	2364	3210
2400	2400	2685	2564	3910

4. Selecting sensor

4.1 Selecting flowmeter diameter

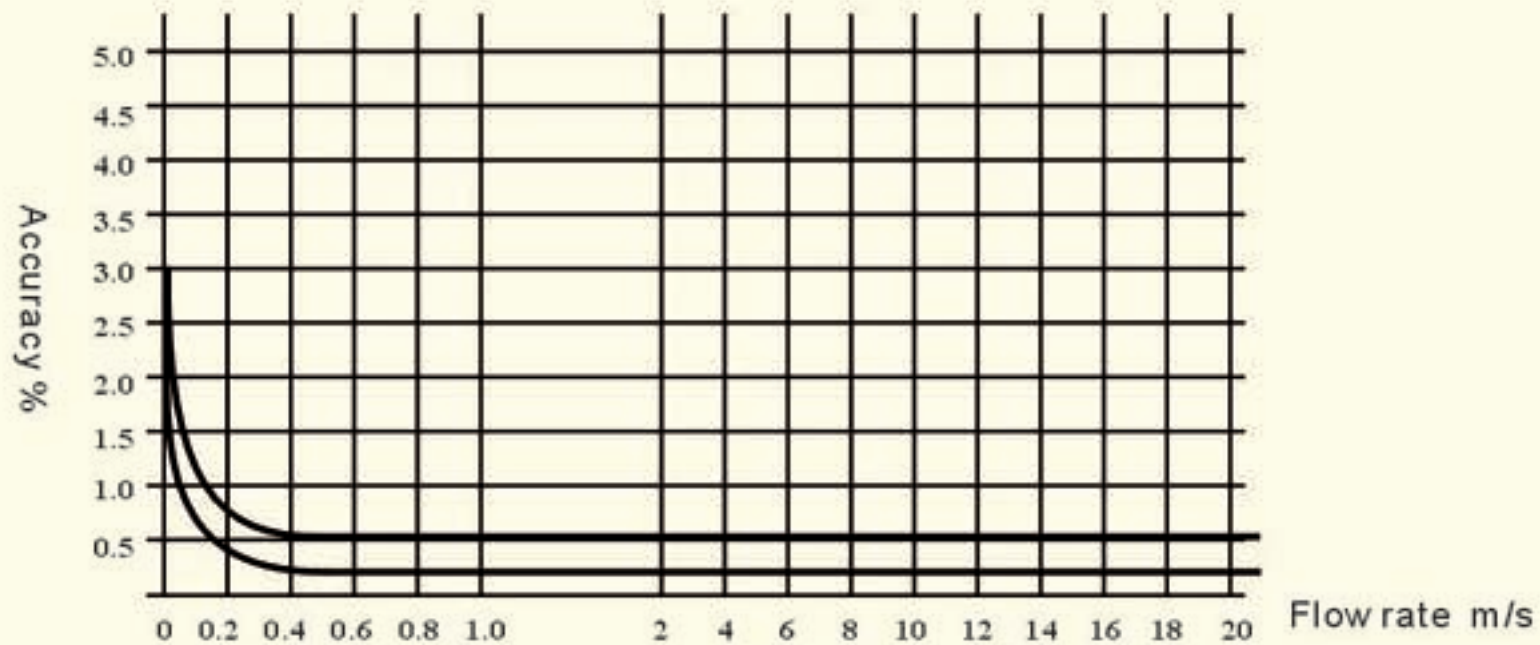
4.1.1 Selecting sensor diameter

Flowmeter diameter couldn't always equal to the connecting process pipe. It is determined by the flow inside the pipe.

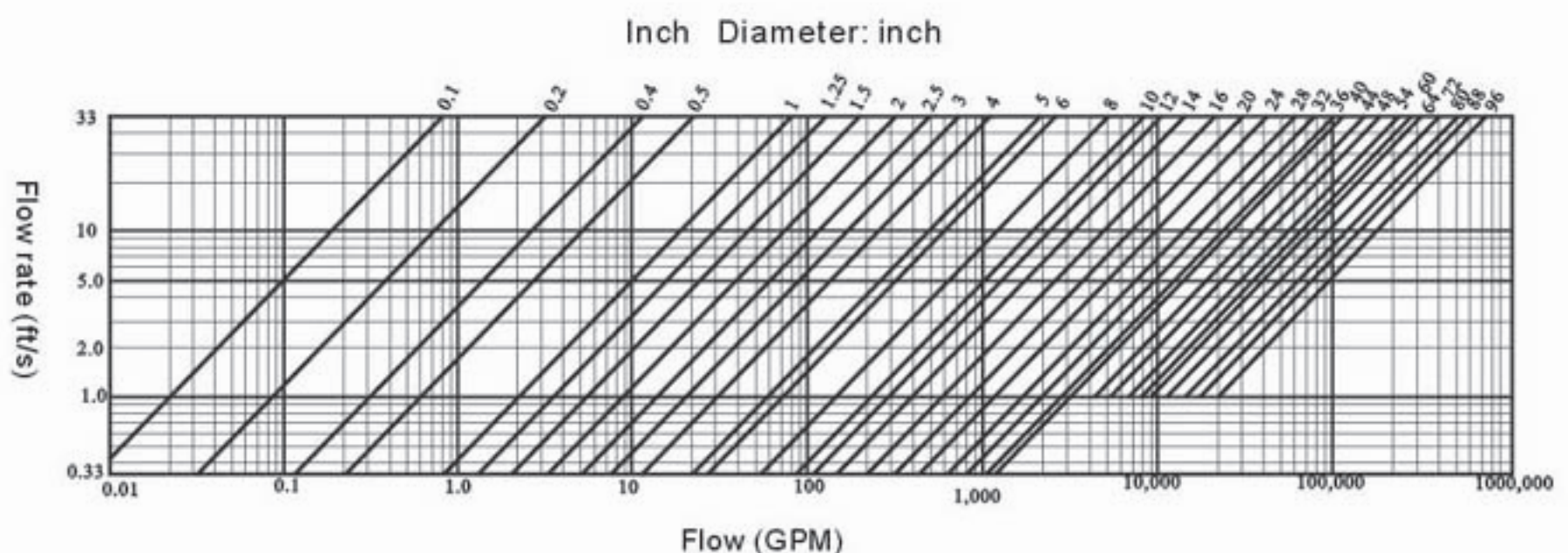
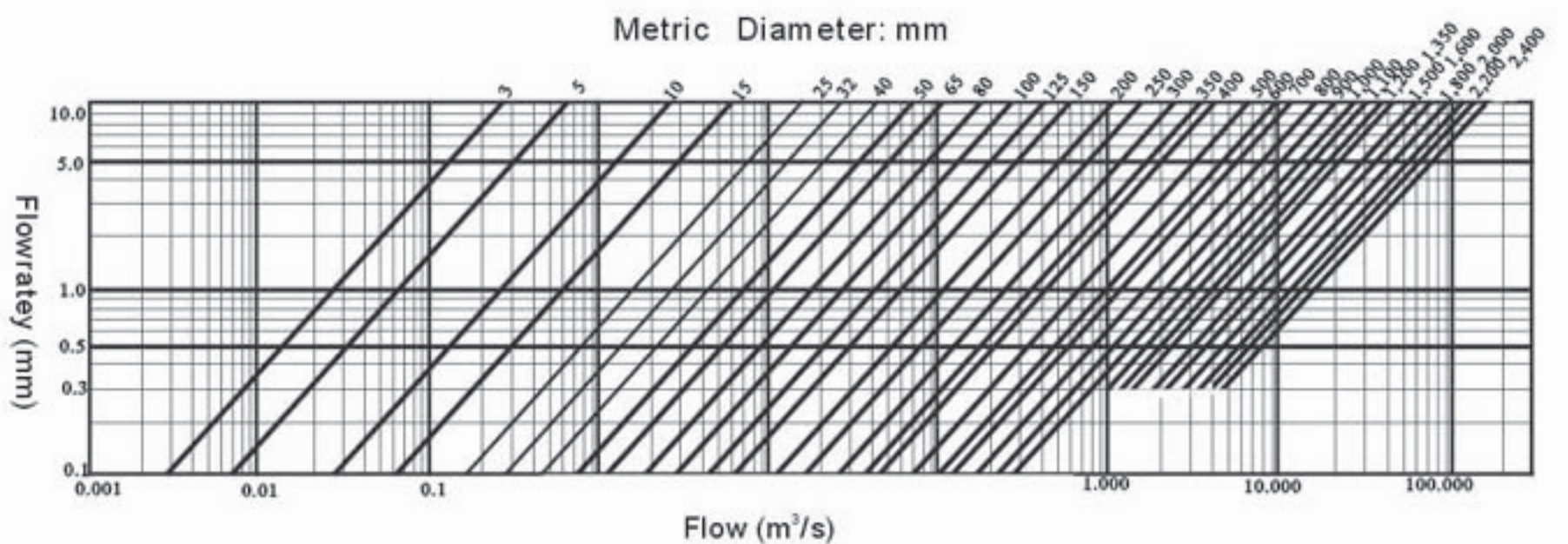
Generally, 0.5~ 5m/s is the economical flow rate. The sensor diameter could equal to the connecting process pipe. The long-term working flow rate is suggested to not excess 7m/s, except the medium is small abrasion and abrasion resistant material is applied.

For the medium which contains easily adherent, sedimentary and dirt precipitated material, we suggest that the usual flow rate is not small than 2m/s. It's best to increase the flow rate to 3~4m/s or above to self-clean the pipe and prevent the phenomena of adhesion or sediment. For the medium which is strong abrasion such as mineral slurry, the usual flow rate should be small than 3m/s to decrease the abrasion to lining and electrode. When the conductance of measured medium is 5~10 μ S/cm, it is best to select low flow rate (0.5~1m/s). Because the flow rate increasing could increase the noise and then the phenomenon of output waving will occur..

- (1) Flowmeter diameter $\leq 300\text{mm}$, the accuracy could reach $\pm 0.2\%$;
 Flowmeter diameter $> 300\text{mm}$, the accuracy is $\pm 0.5\%$. ($< \pm 0.5\%$, consult with our company)



- (2) When select flowmeter diameter, refer to the Flow Range Table below and Comparison table of meter size, flow rate and flow in the appendix.





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4.1.2 Sensor diameter equal to the connecting process pipe

This selection is easy and convenient for the installing and mounting.

4.1.3 Sensor diameter not equal to the connecting process pipe

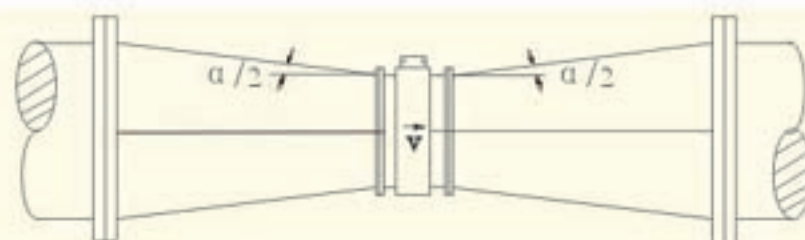
This selection suits the conditions below:

A.The flow inside the pipe is rather slow and the process flow is quite stable. To satisfy the requirements of the instrument upon the flow ranges, locally improving the flow rate is done upon the instruments, selecting that the sensor diameter is less than process pipe diameter and adding curl pipes to connect the

B.Considering by the price, for the big diameter electromagnetic flowmeter, the bigger the diameter, the higher the price; For the slow flow inside the pipe and the stable process parameters, smaller diameter sensor is preferable which can not only keep the instrument in the very good working conditions but also reduce the investment costs upon the instruments.

4.1.4 Question that should be noted regarding adding curling pipes

Curling pipes can be regarded as part of the linear pipe, in order not to violate too much the flow rate field, the gradual shrinking sharp angle should not be above 15° , and the less this angle, the better.



4.1.5 Selecting the diameter size

The FlowMaster series represents their diameters in 3-digit figures, the former 2 represents 1st and 2nd figure of the diameter, and the 3rd digit represents the quantity of zeros after the former 2-digit figure. Unit is mm.

For examples:

Size 150 presents 15mm diameter; Size 151 presents 150mm diameter; Size 152 presents 1500mm diameter.

4.2 Selecting lining material

Lining material is selected according to the erosion capability, abrasion capacity and temperature of the measured mediums. Usual lining material capabilities are listed in the following diagram.

Code	Lining materials	Main capabilities	Application range
8	Neoprene	1. Resistant to normal acid, alkali and salt erosion, resistant to oil, solvents and oxidative medium erosion 2. Have good elasticity and good abrasion capability. Weak in enduring cold resistance.	1. $0^\circ\text{C} \sim 80^\circ\text{C}$, normal acid, alkali and salt medium 2. Usual water, waste-water, mineral slurry
3	Nature rubber	1. Have good abrasion capability, erosion resistance, insulation capability, cold resistance. 2. Have low oil resistance, aging resistance, oxidative medium resistance.	1. $-10^\circ\text{C} \sim 70^\circ\text{C}$, normal acid, alkali and salt medium. Available for water supply.

Code	Lining materials	Main capabilities	Application range
6	Polyurethane	1. Have good abrasion resistance capability and elasticity. 2. Weak in acid and alkali resistance	1. -25℃~60℃ 2. Neutral high abrasion mineral slurry, coal slurry and slop
A	PFA	1. Have good hydrophoby and inviscidy capability, resistant to high temperature 2. Resistant to thick acid, thick alkali, organic solvents and various salt erosion. 3. Strong in negative voltage resistance, if negative voltage is high, wire netting would be applied to improve the negative voltage resistance. 4. Have low abrasion resistance capability	1. -25℃~140℃ available for non-high abrasion medium 2. Hygienetype medium
7	PTFE	1. The best stable chemical plastic material, resistance to boiled hydrochloric acid, vitriol, nitric acid, aqua regia, thick alkali, various organic solvents, not resistant to C ₂ F ₆ , high temperature OF ₂ , high flow velocity liquid state fluorin, Iox, ozone, etc. 2. Weak in abrasion resistance capability and negative voltage resistance.	1. -25℃~140℃ 2. Mediums such as thick acid, thick alkali, etc. 3. Hygienetype mediums
9	FEP	1. Have good hydrophoby and inviscidy capability 2. After PFA as referred to erosion resistance 3. Strong in negative voltage resistance, if negative voltage is high, wire netting would be applied to improve the negative voltage resistance. 4. Have low abrasion resistance capability.	1. -25℃~100℃ non-high abrasion mediums 2. Hygienetype mediums
4	Elastomer	1. Resistant to heat, normal acid. The capability of heat and abrasion resistance is better than polyurethane and nature rubber. Perfect oil resistance capability. 2. Weak in ozone, cold resistance. Have not good elasticity.	1. 0℃~80℃, normal acid, alkali and salt medium. Perfect for oil medium. 3. Do not used on cold medium.

Manufacturing standard		Environment temperature (℃)	Process flow liquid temperature (℃)						
			Neoprene	Nature rubber	Polyurethane	PFA	PTFE	FEP	Elastomer
Standard struction Separation type	Non- hazardous area of the standard structure	60	80	70	60	120	120	100	80
	High temperature of the non-hazardous area	60	80	70	60	140	140	100	80
	Special temperature of the non-hazardous area (Sensor/transmitter)	120/60	80	70	60	140	140	100	80
	The approved standard temperature of the hazardous area	60	60	60	60	120	120	80	60
	High temperature of the approved hazardous area	60	80	70	60	130	130	100	80
Standard struction Integral type	Integral type of standard structure	60	80	70	60	80	80	80	80
	The approved standard temperature of the hazardous area	60	80	70	60	80	80	80	80

Note: Special requirement, please consult with our company.



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4.3 Selecting electrode

The electrode material should accord with the erosion performance of the tested medium and determined by user. More details can be looked up in the related erosion resistance manual.

Material	Erosion-resistant performance
316 stainless steel	Used for the measurement of water, wastewater, slight erosion-resistant mediums.
Hastelloy 'C'	Resistant to nitric acid, mixed acid, mixed mediums (chromate and vitriol), Fe^{+++} , Cu^{++} and other oxidants (hypochlorite above normal temperature, seawater, etc.)
Ti	Resistant to seawater, every chloride and hypochlorite, organic acid and alkali, not resistant to vitriol and hydrochloric acid. If oxidants (nitric acid, Fe^{+++} , Cu^{++} , etc.) included in the acid and the erosion will be greatly reduced.
Ta	Excellent erosion-resistant performance like the glass, resistant to almost all chemical mediums (including boiled hydrochloric acid, nitric acid and vitriol below $175^{\circ}C$) except for hydrofluoric acid, fuming nitric acid, and alkali; not resistant in the salt liquid.
Pt	Good erosion-resistant performance to acid, alkali and salt, not resistant to aqua regia.

4.4 Selecting protection rating

The protection rating of flowmeter's outer shell is classified by national standard GB4208 as shown below.

IP65: sprinkling water proof type

Allow the water to be sprinkled to the flowmeter through water faucet from any direction. The hydraulic pressure is 30kPa, flow rate is 12.5L/Min and distance between water faucet and flowmeter is 3m.

IP67: inundating type

Flowmeter can be inundated in water (underwater < 1m) and last for 30 minutes.

IP68: submersible type

Flowmeter can operate underwater (< 5m) for a long term. The maximum deepness consult with our company.

The protection rating is selected according to the requirement above and factual condition of flowmeter. **If the flowmeter is installed underground and frequently inundated with water, or is installed over ground and the atmosphere humidity is heavy, the separate version flowmeter is recommended with IP68 type sensor which is placed in the protecting box or inside the house.**

4.5 Selecting cable

The connecting cable between the sensor and the transmitter is for special purposes, and the cable length in the specifications means this cable. The maximum length of cable is 5 times as large as the minimum conductance of medium, not exceed 100m. (Exceeding 100m, please consult with our company). Generally, the iron pipe should be applied to protect the cable between transmitter and sensor at jobsite.

4.6 Selecting flange

Select metric flanges (exception not included), and the matching flange should be made in accordance with the metric standard. The flange standard is according to China GB9119 flange standard. Refer to Appendix 1 for the common specifications of flange pressure.

Regarding special flange standard or high pressure-resistance rating, please especially order. If matching flange should be matched, it is best to inform us the diameter of connecting pipe.

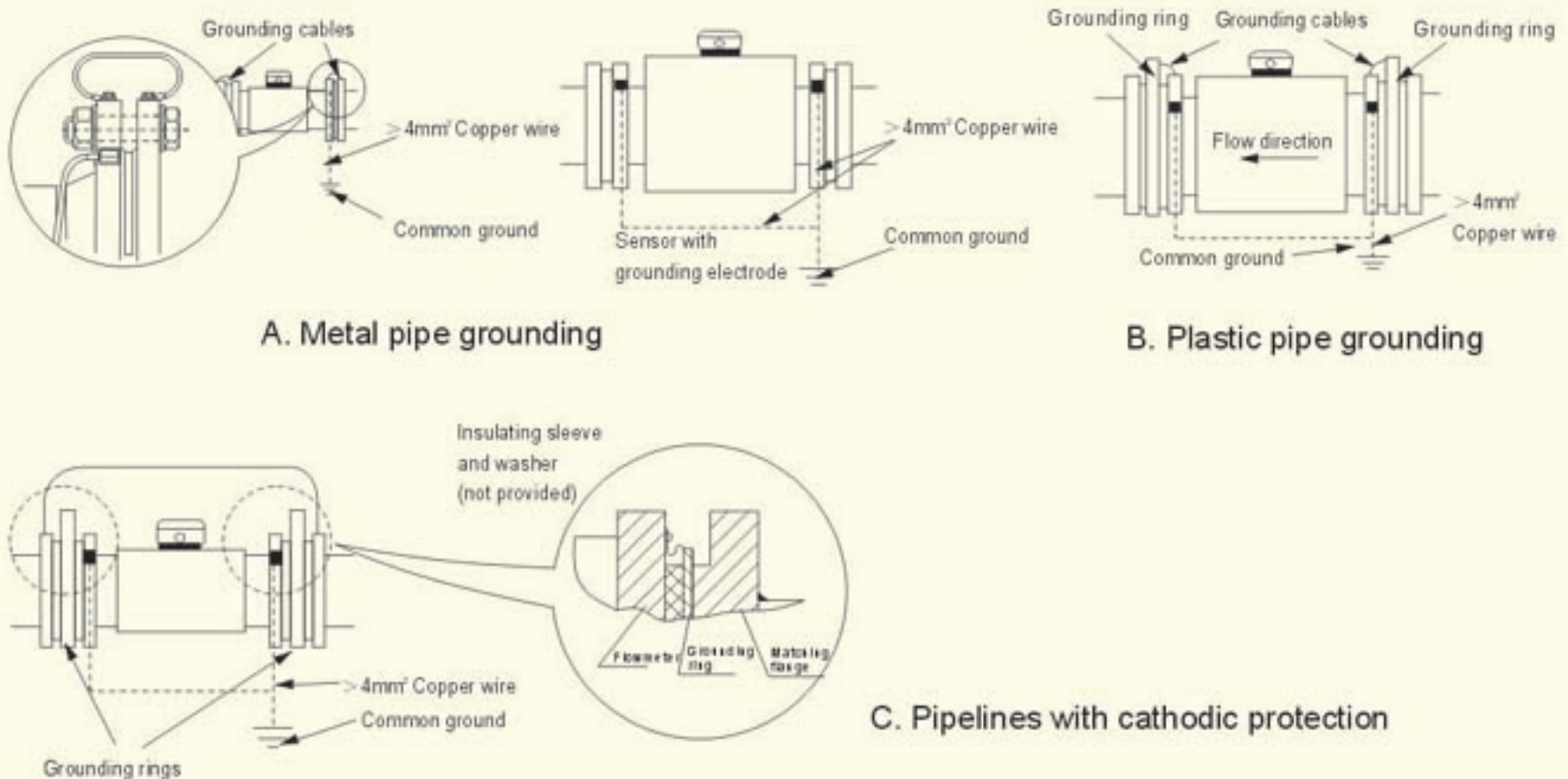
4.7 Selecting cable glands

Cable glands is M20*1.5 plastic seal.

M20*1.5 plastic seals are universal, among which code 1 and code 5 is the same, the difference is that code 1 requires the cable accomplish connection and sealant is gelatinized before leaving the factory, while code 5 requires users to finish these tasks, therefore if not exceptions please select code 5.

4.8 Selecting grounding ring

As the inductive signal related to medium flow is very faint in the electromagnetic flowmeter sensor, avoiding disturbing signal is of great importance, of which the most important is to have a good grounded connection. When the diameter of electromagnetic flowmeter is small than 15mm, grounding is matched. (For the nonmetal pipe, grounding ring must be applied. (User could directly purchase from our company or indicate when making order). The installing methods of different conditions are as shown below.



Grounding ring make the outer shell of flowmeter being connected to the ground. So a space could be formed to shield the interference from outside, the measuring accuracy could be increase.

4.9 Confirming working environment

Working environment is the environment around the flowmeter. Generally, it include normal working area, and hazardous working area.

The **normal working area** is the safe area where the flammable gas, explosive substance, etc. don't exist. The working environment temperature is below 60℃. The maximum medium temperature is two types, 80℃ and 140℃. Integral version or separate version flowmeter are available.

The **hazardous working area** is the area where the flammable gas, explosive substance, etc. exist. The working environment temperature is below 60℃ and medium temperature is below 80℃. **The working temperature of transmitter is below 60℃ and medium temperature is below 80℃.**



5 MFC serial transmitter selection

5.1 MFC serial transmitter performance

▲Display

32-character LCD, using magnetic switch to enable the rolling and return to original condition.

▲Internal totalizer

Enables 9-digit totalisation for forward flow total value, reverse flow total value and net flow total value.

▲Programming

Supply data before users put an order, as the internal transmitter programs have already been set before leaving our factory. Local hand-held terminals can be used to easily enable the reprogramming of the transmitter if necessary, not effecting the technical performance of the transmitter. Optional units can be selected to flexibly execute programming of the transmitter. Samples as using different units to display flow value and flow total value.

Programming options: Personal Computer, SIC hand-held configurator.

▲Power Supply

Voltage: 95~265V a.c., 47~440Hz, Maximum power 20 VA

▲Output

1. Analog outputs (standard output)

Max. loaded resistance 750 Ω in which the cable resistance is included.

2. Dual-analog outputs (optional)

The same with 1, but the forward flow and reverse flow both have a separate output, or output could be programmed to two forward flows/everse flows..

3. Dual-pulse outputs (standard output)

Max. loaded resistance 750 Ω in which the cable resistance is included. Output forward and reverse flow which is 0~1000Hz square wave or fixed width pulse signal; Parameters such as pulse repeat frequency, cut-off frequency and pulse width, etc. are safely programmable. Frequency ranges can be set between 1Hz and 1000Hz, 1Hz for 1 rating. When the insulating-protected output transistor switch is electrified, the current should below 150mA, contact voltage below 35V.

4. Double-Alarm (standard output)

When the insulating-protected output transistor switch is electrified, the current should below 150mA, so as to generate 0V. Contact voltage below 35V. (Note: not insulated from frequency output)

All parameters below programmable:

High/low flow, fluid measurement; error condition; forward/reverse flow; polarity (always on/always off); analog value within the limited measuring ranges; pulse (frequency within the limited measuring ranges); pulse cut-off frequency, and so on.

5. RS232

Data inserting hole(plug)/9-pin D type inserting hole(plug) connecting to the hand-held configurator

▲Input

Contact input: CLS of insulated juncture totalizer (not insulated from pulse and alarm)

▲Insulation

Between simulation value and pulse/alarm signal and earth, D.C 500V for the insulated voltage

▲External environmental protection

IP65/IP67 separate terminal box and electric part; IP65/IP67 already insulated

▲Environmental temperature

Working temperature: $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$ Storage temperature: $-25^{\circ}\text{C} \sim +85^{\circ}\text{C}$

▲Configuration

Configuration is registered in a register difficult to loose data (usually 10 years for remaining);

Pre-set value users set is changeable.

▲Self-diagnostics

The transmitter can configure whether the hardware is working well and can execute error analog such as wire driving error.

▲Flowrate setting

Almost equal to the flow measurement range of maximum velocity ($\leq 20\text{m/s}$), this range can be changed according user's requirement.

▲Interchangeability

Transmitter completely changeable with various diameter FlowMaster sensor.

▲Gland sealing

M20*1.5 plastic sealing sleeve as a standard type. Special demand, please indicated.

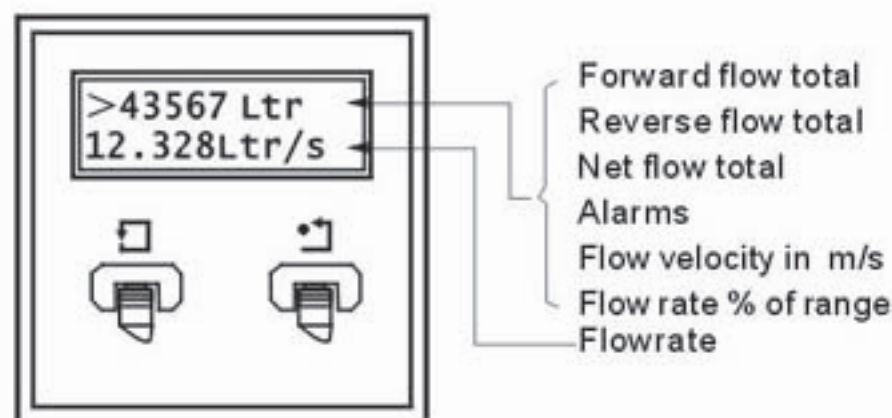
▲Time invariable

1~120 seconds all programmable

▲Display direction

When selecting integral version flowmeter, the pipe position makes the display direction of the transmitter not easy to watch, in this case, you can select display direction to suit (horizontal or vertical).

▲Display method



▲Functions

Fully configurable	A choice of engineering parameters in engineering units, e.g. flowrate, flowunits, all outputs, etc.
Liquid sensing	Ensures units read zero on empty pipe.
Interchangeability	Transmitter/sensor can be changed without affecting performance
Self-diagnostics	Ensures transmitter and sensor integrity.
Test mode	Powerful commissioning aid. Exercises all outputs and displays, even without a connected sensor.



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5.2 MFC serial transmitter selection

MFC serial transmitter selection is composed with sensor and transmitter.

Sensor										Transmitter									
MFC	XXX	X	X	X	X	0	X	XX	X	XX	X	X	X	X	X	X	X		
Main Title																			
Size DN3~DN2400 Represented with 3-digit figure, the former 2 represents 1st and 2nd figure of the Diameter, the 3rd digit figure. Unit: mm																			
Standard Pressure 1: 1.6MPa DN3~DN600 (flange) 2: 4.0MPa DN3~DN600 (flange) 4: 2.5MPa DN3~DN600 (flange) 5: 1.0MPa DN3~DN600 (flange) 6: 0.6MPa DN700~DN2400 (flange) 7: 1.6MPa DN100~DN200 (wafer) 8: 1.0MPa DN200~DN300 (wafer) 9: 4.0MPa DN25~DN80 (wafer) S: Special																			
Lining Material 3: Nature rubber 4: Elastomer 6: Polyurethane 7: PTFE 8: Neoprene 9: FEP DN<300 A: PFA DN<300																			
Electrode Material 1: SUS 316L 2: Hastelloy C 3: Ti 4: Ta 5: Pt-Ir alloy																			
Working environment 1: Normal area: Environment temperature≤60℃ Medium temperature≤80℃ 4: Normal area: Environment temperature≤60℃ Medium temperature≤140℃(Separation type)																			
Calibration A: Standard 3 point test without pressure ± 0.5% B: Standard 3 point test without pressure ± 0.2% (DN≤300)																			
Cable length Separation type≤100m, Integral is 00, Special demand remarked when ordering																			
Gland sealing 1: M20*1.5 plastic sealing (cable fitted) 2: G1/2 3: NPT1/2 5: M20*1.5 plastic sealing (user to fit cable or integral type)																			
Type EH: Integral ER: Separation																			
Power supply 1: 95-265V AC 47-440Hz																			
Display 0: No display 3: High protected two line display																			
Drive Connection 0: Standard output 1: Dual current output																			
Working environment 1: Normal working area (not used on slurry medium) 2: Normal working area (used on slurry medium)																			
Display direction 1: Standard direction 2: +90° 3: +180° 4: +270°																			
Language 1: English																			
Nameplate 1: Factory matched																			

6. MFE-S serial electromagnetic flowmeter transmitter selection

6.1 Features and application range

MFE-S serial electromagnetic flowmeter transmitter uses particular signal processing technology and high performance microprocessor which makes whole system operating more stable and credible.

MFE-S serial electromagnetic flowmeter transmitter has two versions, process versions which is applied to liquid in process controlling and slurry version which is applied to measure slurry.

The slurry version of MFE-S serial electromagnetic flowmeter can be applied to measure various slurry, such as paper slurry, paste. The transmitter of this version flowmeter has particular sensor excitation method and signal processing system which could eliminate interfering signal (such as noise) and assure the accuracy and stability of measuring.

6.2. MFE-S serial electromagnetic flowmeter transmitter performance

▲Display (optional)

2 line display: 32-character high temperature super twisted LCD, displays flow value, total value, alarm terms, etc. in letters and digits, using magnetic switch to enable the rolling and return to original condition.

3 line display: 32-character and 80-segment LCD, displays not only flow value, total value, alarm terms, etc. in letters and digits, but also bar chart of percentage flow and alarm prompt, using magnetic switch to enable the rolling and return to original condition.

▲Internal totalizer

Enables 9-digit totalisation for forward flow total value, reverse flow total value and net flow total value.

▲Programming

Supply data before users put an order, as the internal transmitter programs have already been set before leaving our factory. Local hand-held terminals or keypad on transmitter (3 line display) can be used to easily enable the reprogramming of the transmitter if necessary, not effecting the technical performance of the transmitter. Optional units can be selected to flexibly execute programming of the transmitter. Samples as using different units to display flow value and flow total value. Programming options:

RS232 communication (short distance communication); RS485 communication; HART communication; Profibus-PA communication.

▲Power Supply (two types are available)

Alternating Current: 95~265V AC, 47~440Hz as standard. Maximum power 20 VA.

Direct Current: 11~40V DC. Maximum power 20 VA.

▲Output

1. Analog outputs:

For the zero scale, the full scale actively programmable, minimum output 4mA, maximum output 20mA, flow direction optional, outputs completely separated. Output power is more than 15V. Loaded resistance 750Ω.

2. Dual-analog outputs (optional)

The same with 1, two analog signal output forward flow and reverse flow separately.

3. Dual-pulse

Forward and reverse flow, 0~1000Hz square wave and fixed width pulse signal; Parameters such as pulse repeat frequency, cut-off frequency and pulse width, etc. are safely programmable. Frequency ranges can be set between 1Hz and 1000Hz, 1Hz for 1 rating; When the insulating-protected output transistor switch is electrified, the current should below 150mA, contact voltage below 35V.

4. Double-Alarm

When the insulating-protected output transistor switch is electrified, the current should below 150mA, so as to generate 0V; contact voltage below 35V. (Note: not insulated from frequency output)

All parameters below programmable: High/low flow, empty pipe measurement; error condition; forward/reverse flow, polarity (always on/always off), analog value within the limited measuring ranges, pulse (frequency within the limited measuring ranges), pulse cut-off frequency and so on.



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5. RS232C

Data inserting hole(plug)/9-pin D type inserting hole(plug) connecting to the hand-held configurator or Personal Computer.

6. RS485 Series communication preface. (optional)

7. HART communication preface. (optional)

8. Profibus-PA communication preface. (Optional)

▲Input: CLS of insulated juncture totalizer (not insulated from pulse and alarm).

▲Insulation: Between simulation value and pulse/alarm signal and earth, D.C 500V for the insulated voltage.

▲Environmental temperature: Working temperature: -20°C ~+60°C;
Storage temperature: -25°C ~+85°C

▲External environmental protection: IP65/IP67 separate terminal box and electric part;
IP65/IP67 already insulated

▲Configuration: Configuration is registered in a register difficult to loose data (usually 10 years for remaining); Pre-set value users set changeable.

▲Self-diagnostics: The transmitter can configure whether the hardware is working well and can execute error analog such as wire driving error.

▲Flowrate setting: Almost equal to the flow measurement range of maximum velocity ($\leq 20\text{m/s}$), this range can be changed.

▲Interchangeability: Transmitter completely changeable with various diameter MFE-S sensor, configurable in the working field; Transmitter exchange not effecting system performance.

▲Gland sealing: M20*1.5 plastic sealing sleeve as a standard type. Special demand, please indicated.

▲Time invariable: 1~120 seconds all programmable

▲Explosion-proof performance (details of explosion-proof parameters refer to GB3836.1)

Explosion-proof
rating:

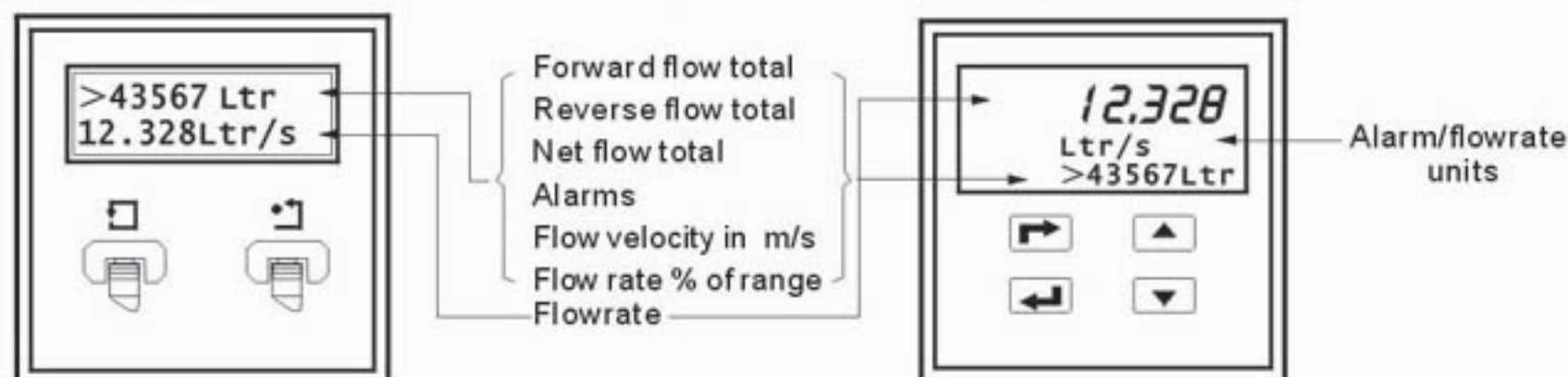
Exdmib II CT4

Temperature rating
Electrical apparatus of explosive gas atmospheres (except colliery)
Intrinsically safe type b
Encapsulated type
Flameproof type
Means electrical apparatus meet the prescript of explosion-proof type

▲Functions

Fully configurable	A choice of engineering parameters in engineering units, e.g. flowrate, flowunits, all outputs, etc.
Liquid sensing	Ensures units read zero on empty pipe.
Interchangeability	Transmitter/sensor can be changed without affecting performance
Self-diagnostics	Ensures transmitter and sensor integrity.
Test mode	Powerful commissioning aid. Exercises all outputs and displays, even without a connected sensor.

▲Three display modes optional (see below): none, two line display, three line display



6.3 MFE-S serial electromagnetic flowmeter selection

MFE-S serial transmitter selection is composed with sensor and transmitter.

	Sensor										Transmitter									
Main Title	MFE	XXX	X	X	X	X	0	X	XX	X	XX	X	X	X	X	X	X	X	S	
Size DN3~DN2400 Represented with 3-digit figure, the former 2 represents 1st and 2nd figure of the Diameter, the 3rd digit figure, Unit: mm																				
Standard Pressure 1: 1.6MPa DN3~DN600 (flange) 2: 4.0MPa DN3~DN600 (flange) 4: 2.5MPa DN3~DN600 (flange) 5: 1.0MPa DN3~DN600 (flange) 6: 0.6MPa DN700~DN2400 (flange) 7: 1.6MPa DN100~DN200 (wafer) 8: 1.0MPa DN200~DN300 (wafer) 9: 4.0MPa DN25~DN80 (wafer) S: Special																				
Lining Material 3: Nature rubber 4: Elastomer 6: Polyurethane 7: PTFE 8: Neoprene 9: FEP A: PFA																				
Electrode Material 1: SUS 316L 2: Hastelloy C 3: Ti 4: Ta 5: Pt-Ir alloy																				
Working environment 1: Normal area: Environment temperature≤60℃ Medium temperature≤80℃ 4: Normal area: Environment temperature≤60℃ Medium temperature≤140℃(Separation type) 6: Hazardous area: Environment temperature≤60℃ Medium temperature≤80℃																				
Calibration A: Standard 3 point test with out pressure ± 0.5% B: Standard 3 point test without pressure ±0.2% (DN≤300)																				
Cable length Separation type≤100m, Integral is 00, Special demand remarked when ordering																				
Gland sealing 1: M20*1.5 plastic sealing (cable fitted) 2: G1/2 3: NPT1/2 5: M20*1.5 plastic sealing (user to fit cable or integral type)																				
Type	EH: Integral										ER: Separation									
Power supply	1: 95-265V A.C. 47-440Hz										2: 11-40V D.C.									
Display	0: No display 3: High protected two line display 4: Three line keypad display																			
Drive Connection	0: Standard output 1: Dual current output 2: RS485 3: HART 4: Profibus-PA																			
Working environment	1: Normal working area (not used on slurry medium) 2: Normal working area (used on slurry medium) 5: Hazardous working area (not used on slurry medium) 6: Hazardous working area (used on slurry medium)																			
Display direction	1: Standard direction 2: +90° 3: +180° 4: +270°																			
Language	1: English																			
Nameplate	1: Factory matched																			

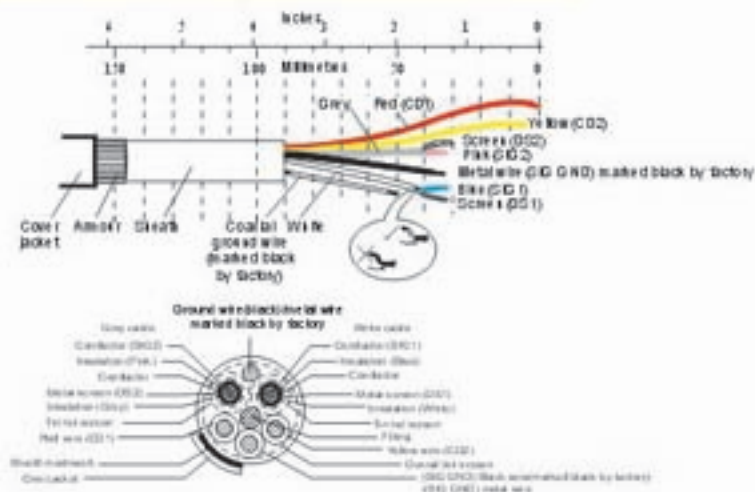


SIC FLOW METER

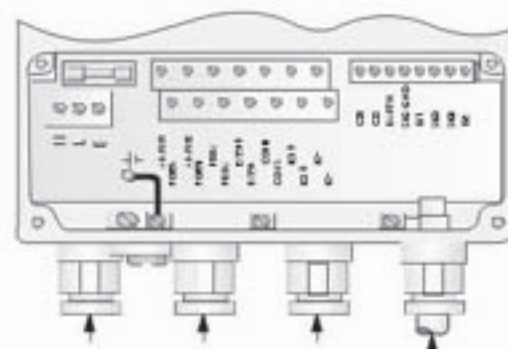
7. Transmitter electric connection

7.1. Transmitter cable

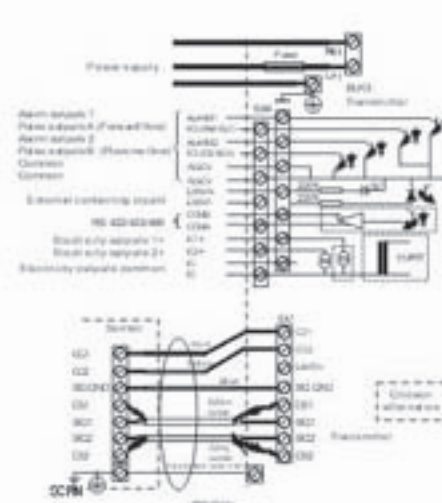
A. Working temperature of cable: $-25^{\circ}\text{C} \sim 70^{\circ}\text{C}$



The diameter of cable is $11.5 \pm 0.5\text{mm}$



B. Connecting terminals



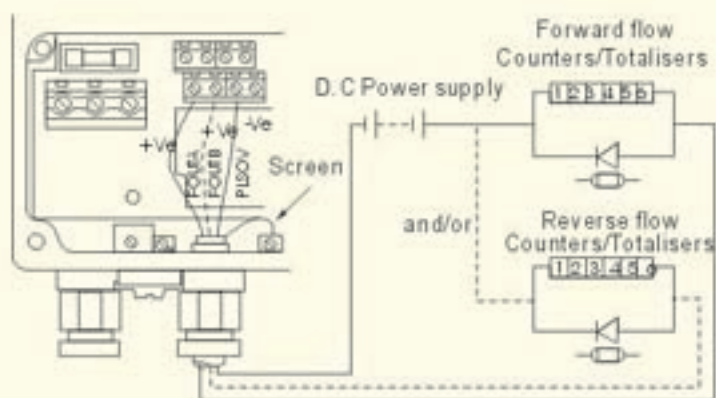
Notice

Notice the following issues when connect wires:

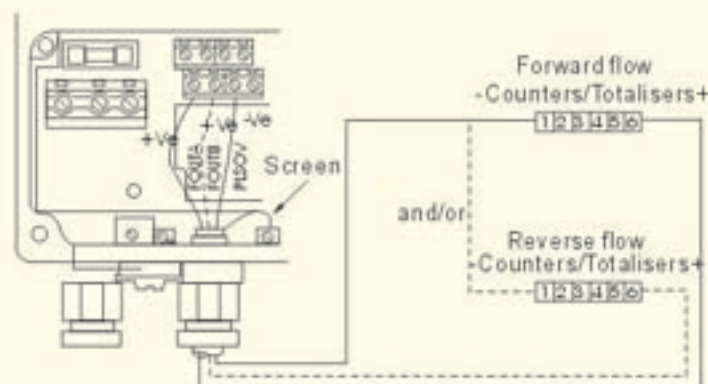
- (1) Connections between sensor and transmitter should be correct, and contact well, free from short circuit and open circuit.
- (2) Do not connect wires outdoor in the rain day for avoiding moisture.
- (3) Fix the cable linker to the wire connection box after finishing connecting wires for separation type flowmeter.
- (4) Do not add other power supply to the 4~20mA output.

7.2. Common transmitter connections (IP67/Explosion-proof refer to 7.3)

A. Frequency outputs

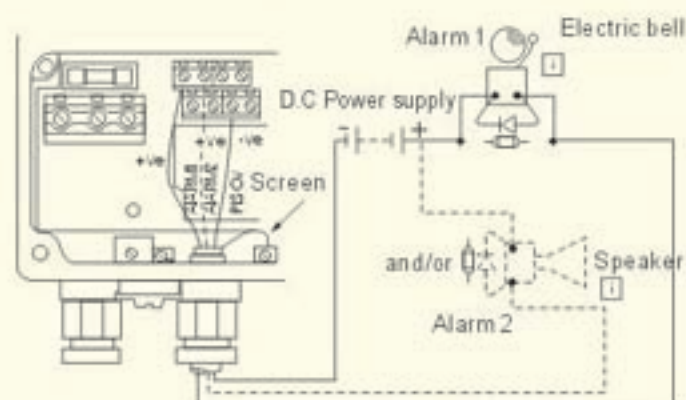


Electromagnetic counter connection

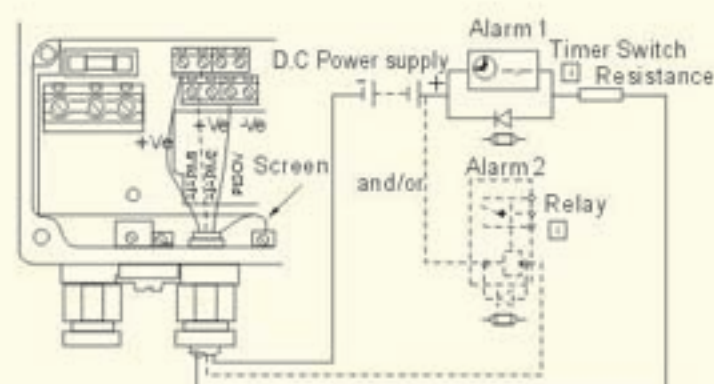


Telemetry, electronic counters etc.

B. Alarm output connections

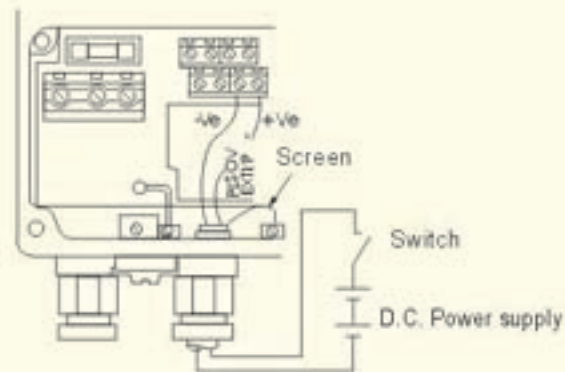


Alarms (1)

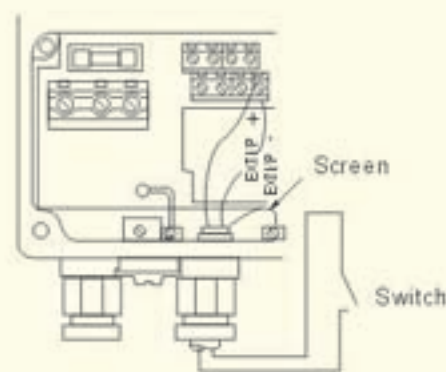


Alarms (2)

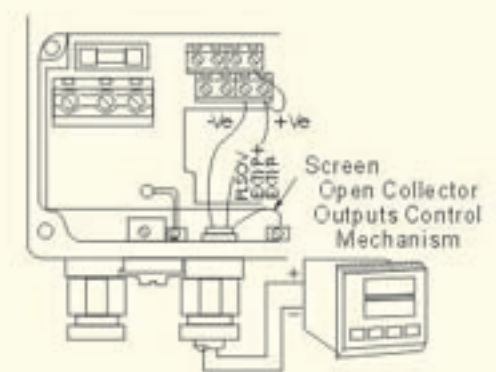
C. Contact input connections



Volt-free contact

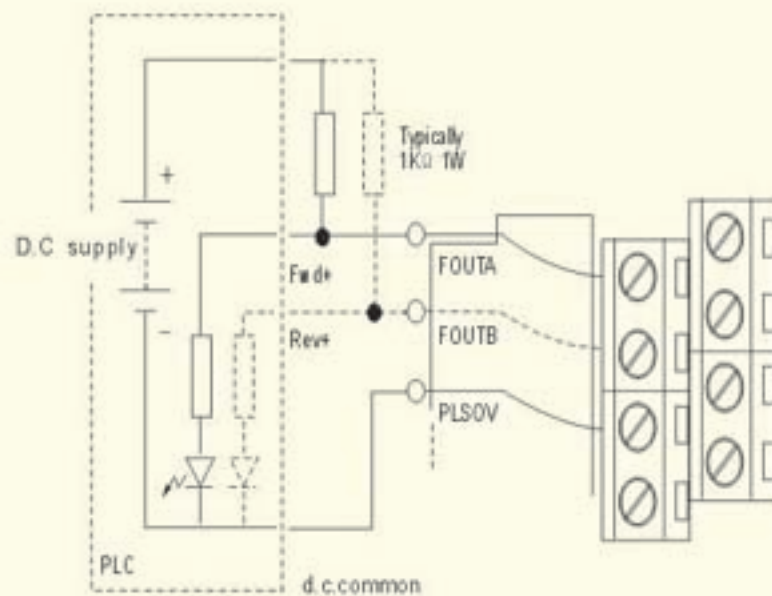


Voltage Signal or Logic Signal

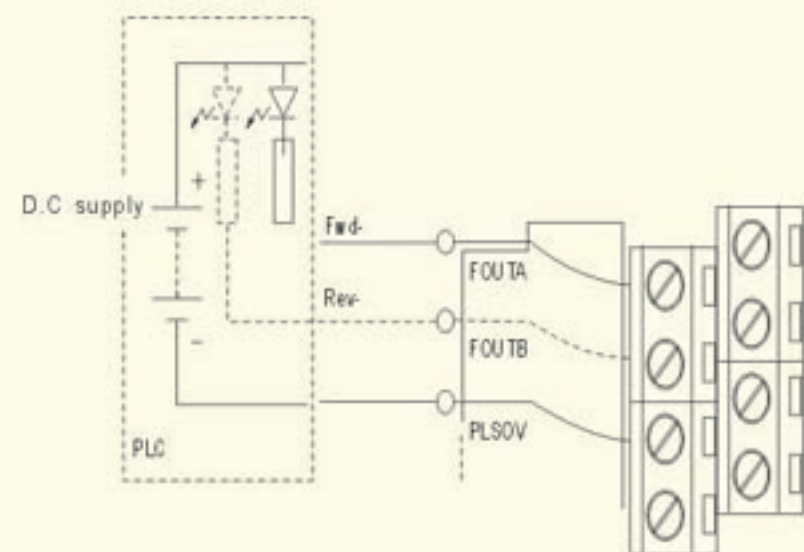


Open Collector (or Grounded Contact)

D. PLC Interface

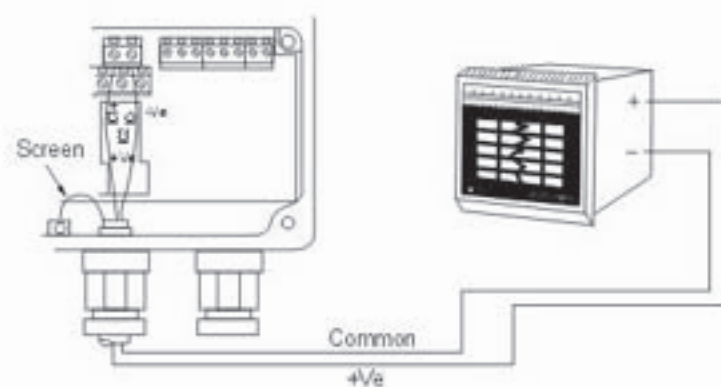


PLC Common -Ve

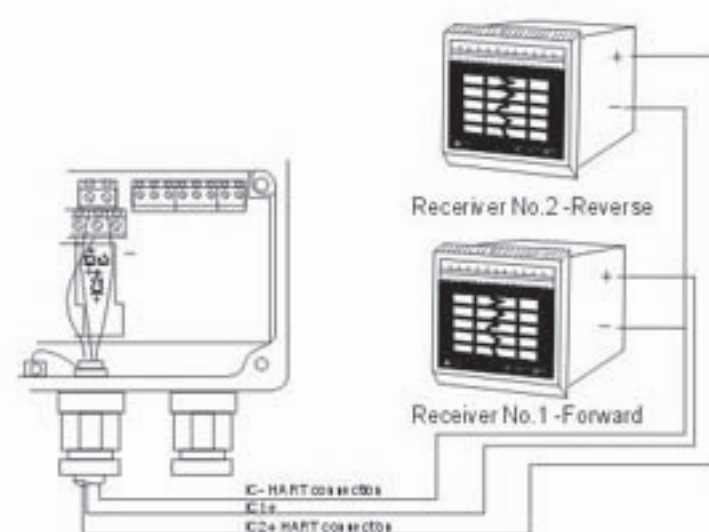


PLC Common +Ve

E. Current Output Connections



Current Output Connections: Standard

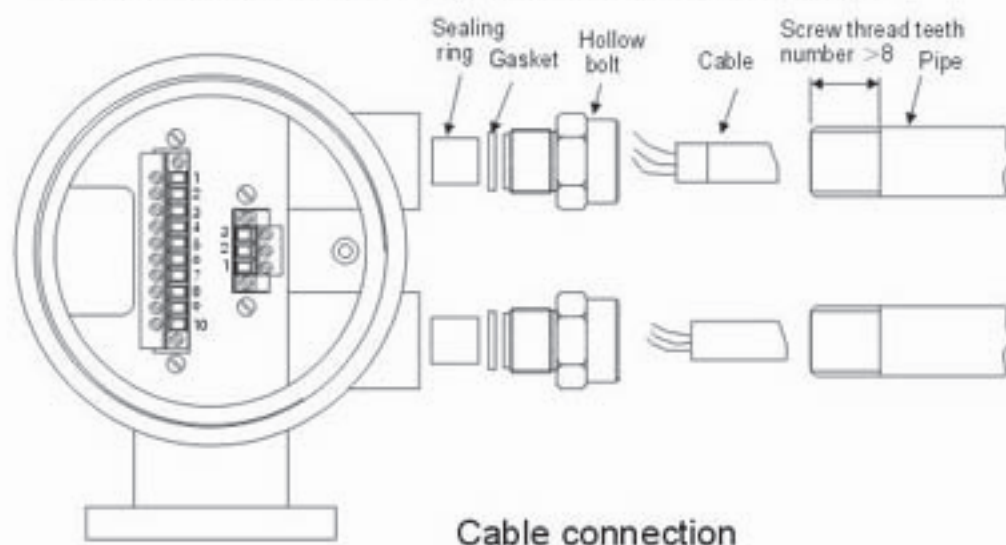


Current Output Connections: Dual Current Option



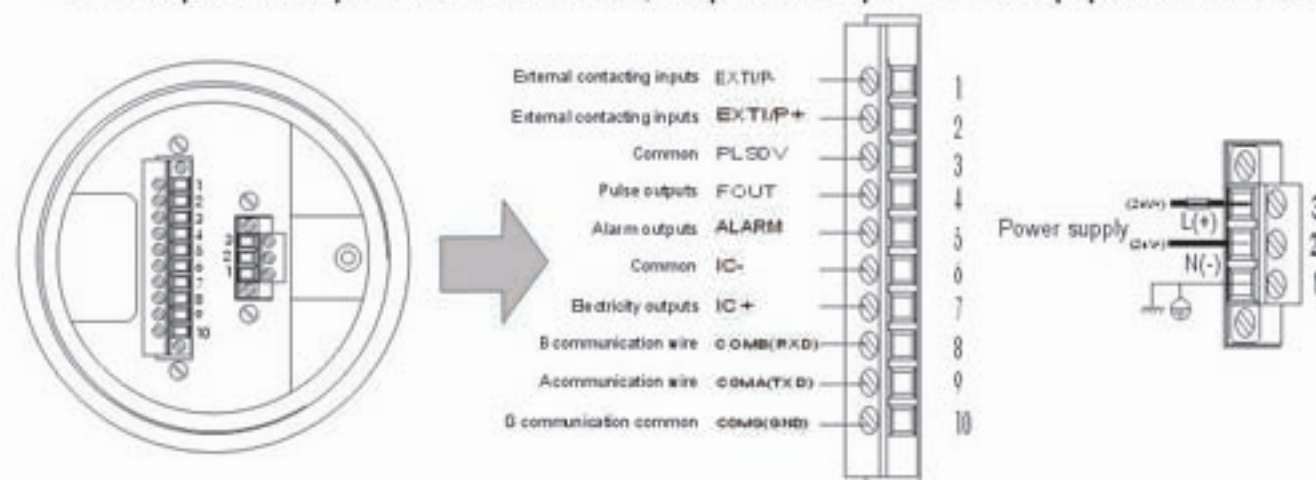
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7.3. High protective transmitter connection



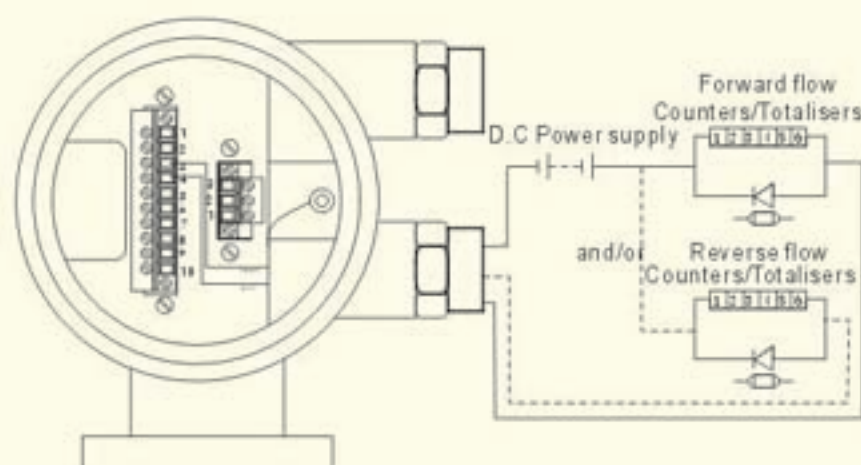
Note:

- (1) For the integral version, connections between sensor and transmitter are completed by the manufacturer.
- (2) Please use the cable (outer diameter is $\phi 10 \pm 0.5\text{mm}$) for power supply cable and other output signal cables (prepared by user).
- (3) Lead hollow bolt, gasket, sealing ring to cable. Keep the cable with enough length to connect wires. Then enclose the hollow bolt after sealing ring and gasket being into cable leading hole. For explosion-proof transmitter, explosion-proof wire pipe should be installed to the cable.

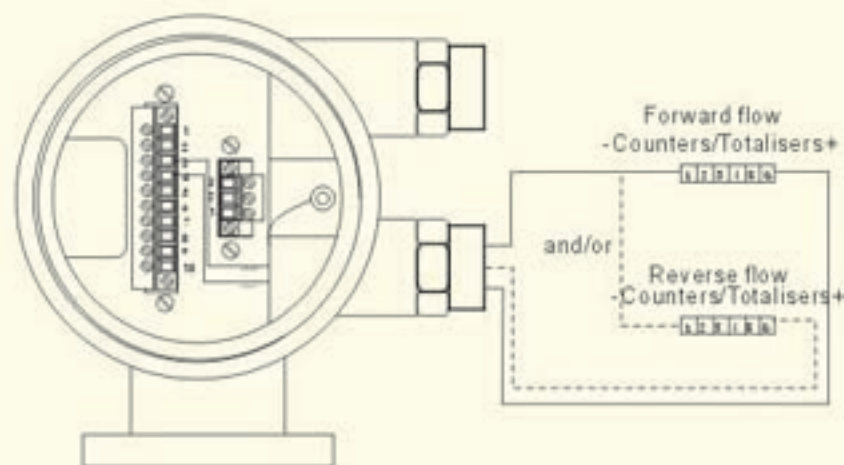


Notice: Please cut off the power supply to avoid the explosion occur when connect wires in the volatile gas circumstance.

A. Frequency outputs

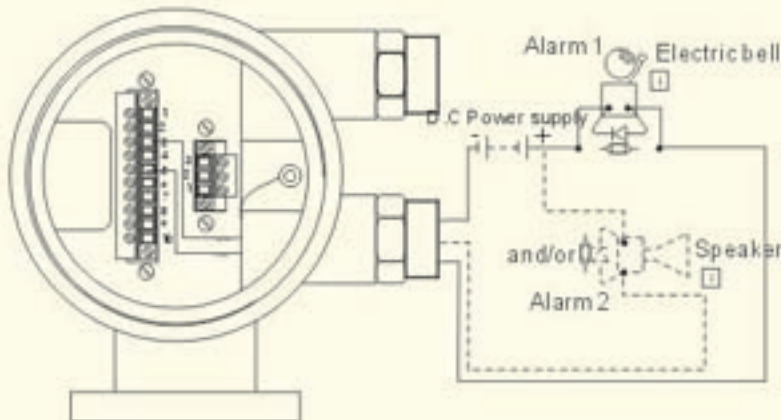


Electromagnetic counter connection

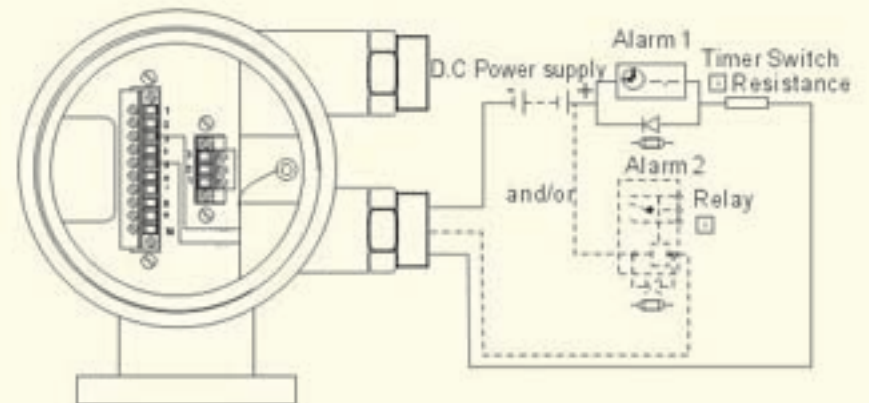


Telemetry, electronic counters etc.

B. Alarm output connections

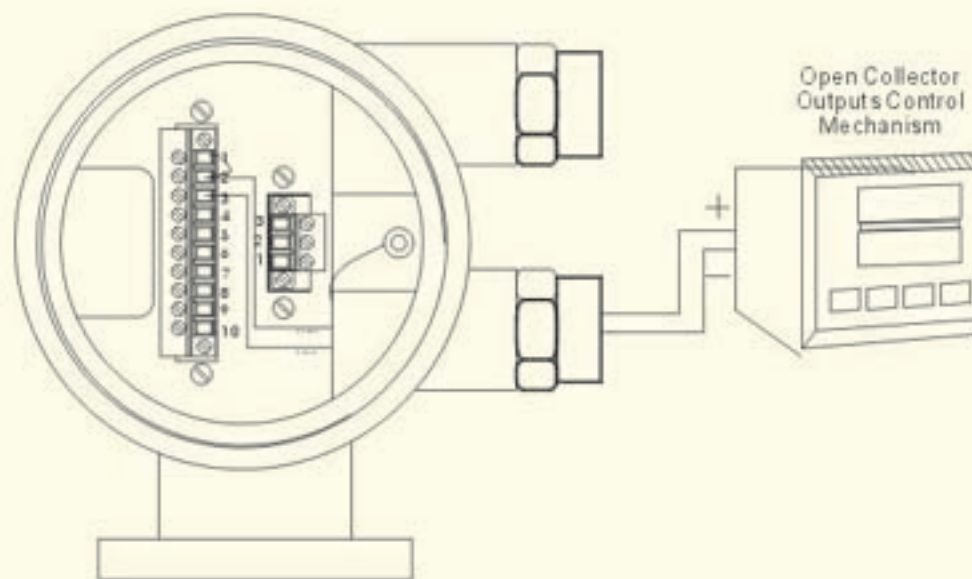


Alarms (1)

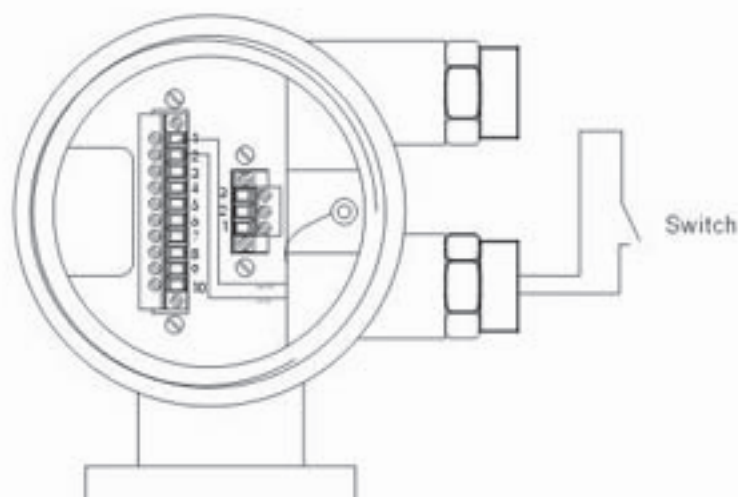


Alarms (2)

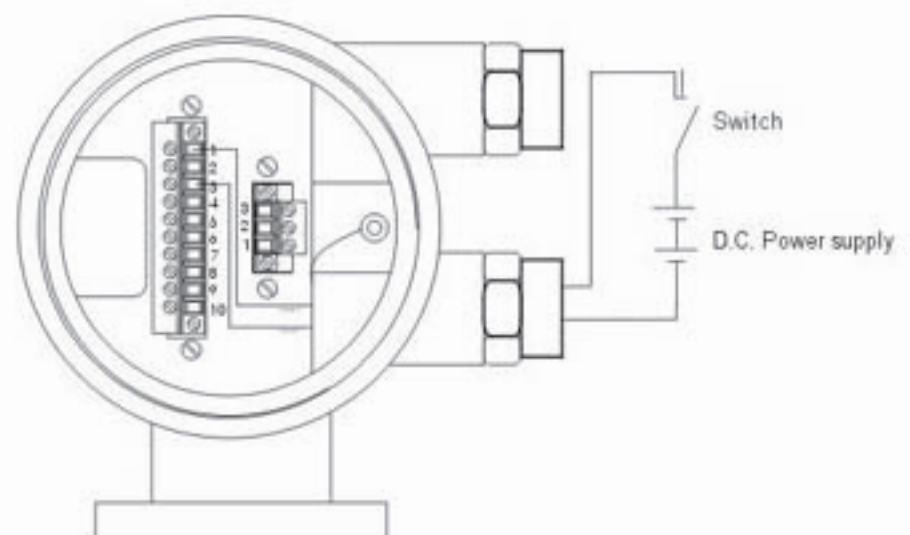
C. Contact input connections



Open Collector
(or Grounded Contact)



Volt-free contact

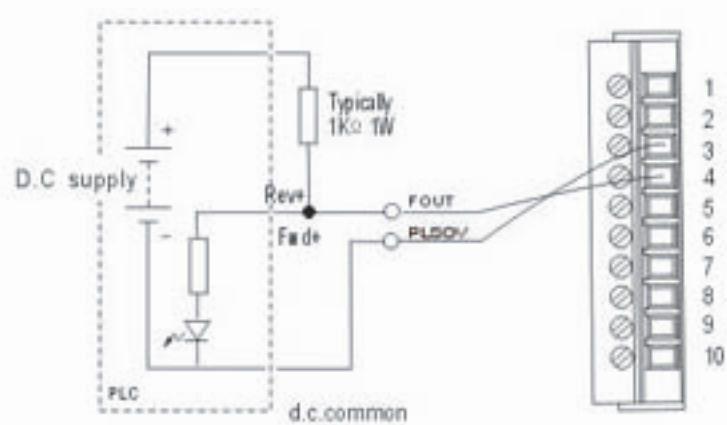


Voltage Signal or
Logic Signal

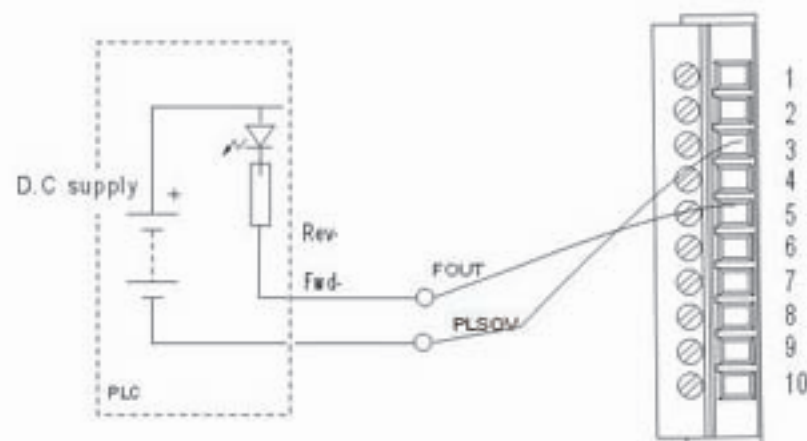


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D. PLC Interface

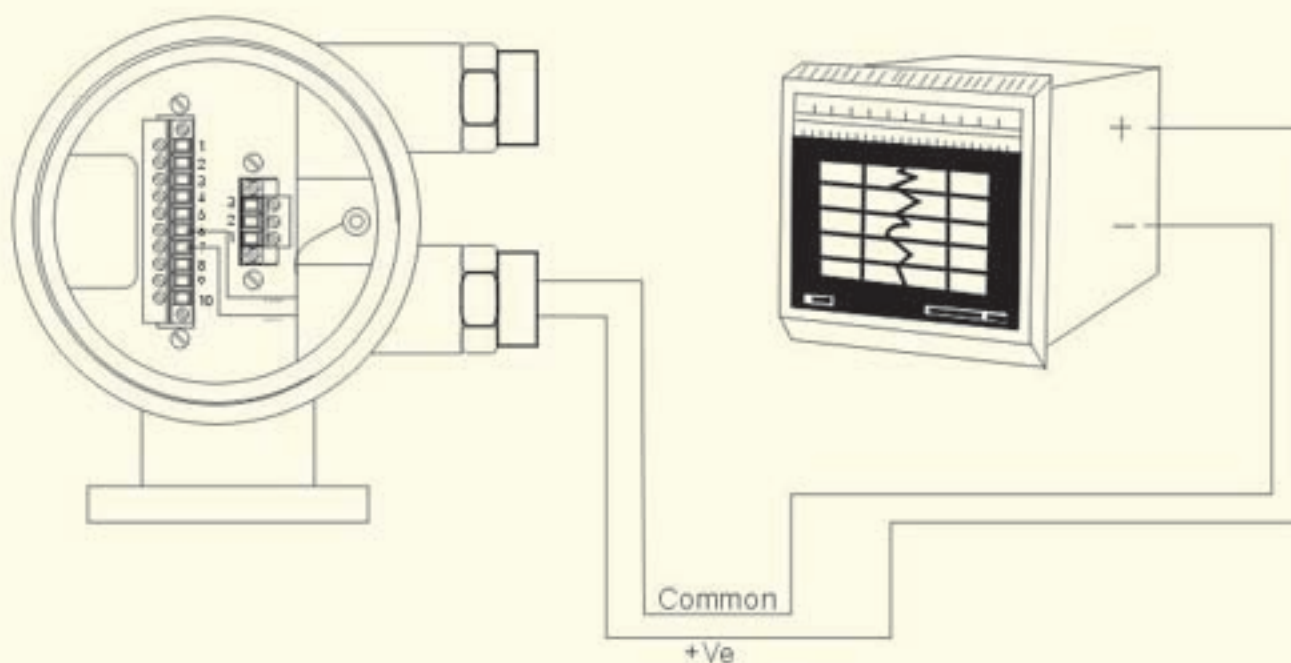


PLC Common -Ve



PLC Common +Ve

E. Current Output Connections



Current Output Connections:
Standard

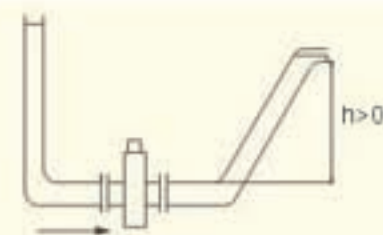
8. Meter installation on pipeline

(1) Flow direction

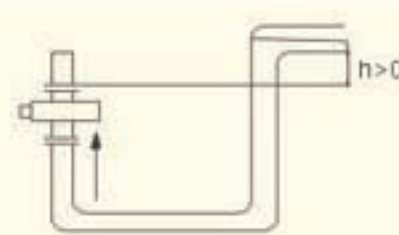
The flowmeter can self-check forward/reverse flow, and the flow arrow on the sensor is stipulated by the producer as forward flow direction. Users should make the flow arrow consistent with the process flow when installing the instrument.

(2) Installation direction

The sensor could be horizontal or vertical installation.



Horizontal direction

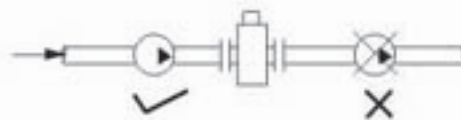


Vertical direction

(3) Process medium fully filled in the pipe

The measuring pipe must be fully filled with process medium, assuring that the electrode completely immerse into the measured flow liquid to make the measurement reliable.

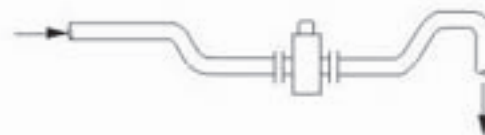
(4) The flowmeter could not be installed at the pumping side.



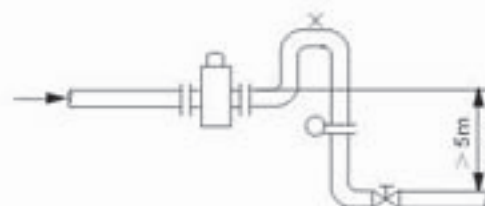
(5) For the long pipeline, control valve is usually installed at downstream flowmeter.



(6) For the opening emission pipe, the flowmeter should be installed at the low pipeline part.



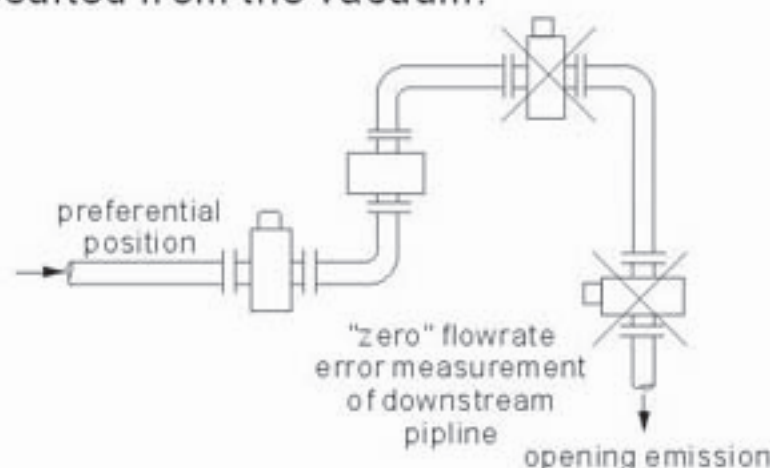
(7) For pipe fall exceeding 5m, air valve (vacuum) should be installed at downstream flowmeter.





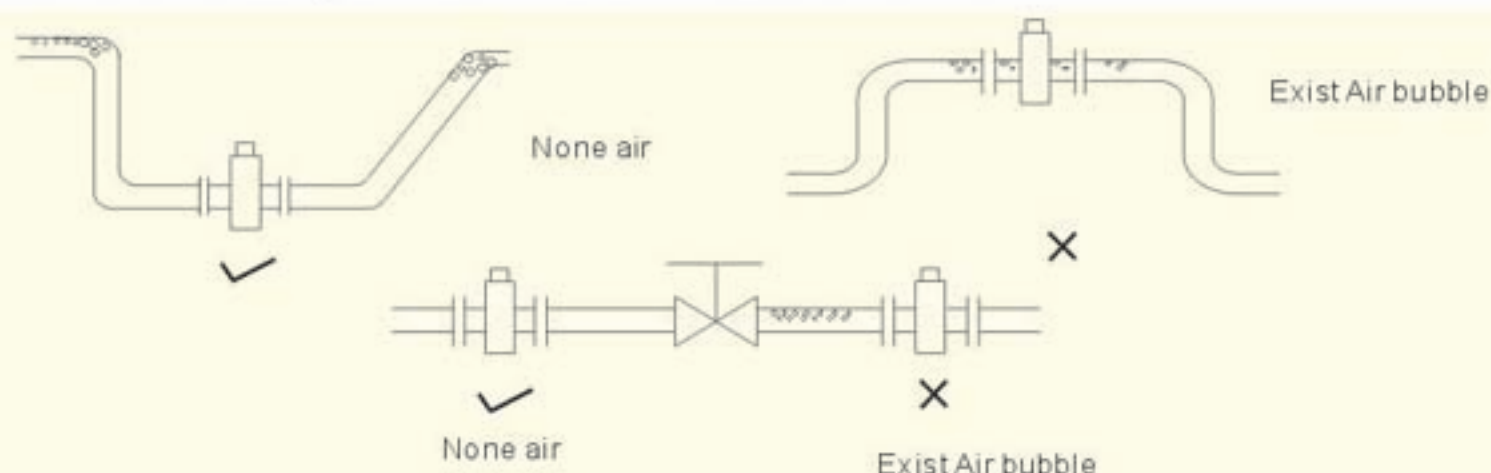
SIC FLOW METER

- (8) Avoiding measure deviation resulted from the additional gases and the damages against the lining resulted from the vacuum.



- (9) None air bubble in pipeline

Ensure air bubble could not be separated from liquid when design the pipeline. Flowmeter should be installed at upstream before the valve. Due to the action of valve, the pressure inside the pipeline will decrease to cause the air bubble appear. Simultaneity, flowmeter should be installed at the low pipeline part to decrease the effect from liquid which is mixed with air bubble.



- (10) Liquid conductance

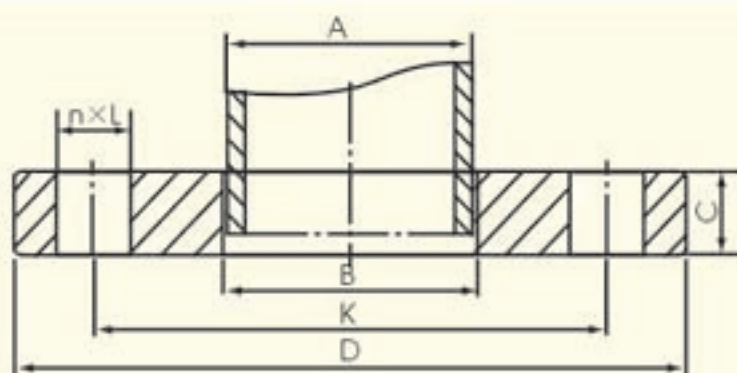
Don't install flowmeter at the place where conductance is unequable. Fill chemical liquid at the upstream of pipeline will easily cause liquid's conductance unequable. And it will bring serious disturbance to the reading value of flowmeter. In this situation, we suggest filling chemical liquid at the downstream. If it's necessary to fill chemical liquid at the upstream, please ensure that the straight pipe of flowmeter is more than 5D of the upstream part. In this way, liquids could adequately mix at the upstream.

- (11) Earth connection

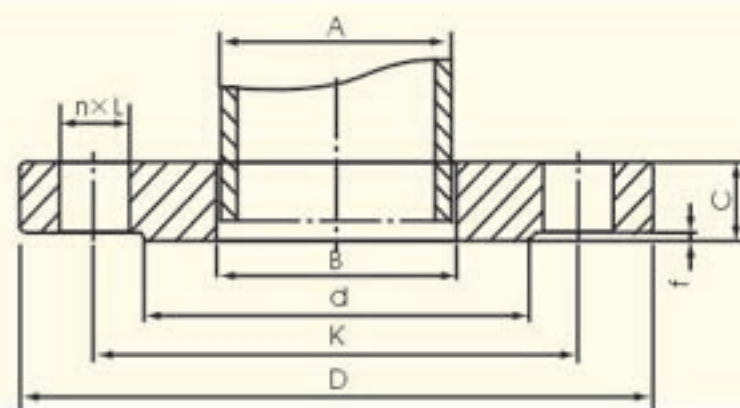
The inductive voltage of electromagnetic flowmeter is very faint and is easily affected by the noise or other electromagnetic signal from outside. So the electromagnetic flowmeter \leq DN15 is matched with earth ring; DN20~DN150 is matched with earth electrode; \geq DN200 is matched with earth ring when the pipeline is not metal pipe. With them, the outer case of flowmeter have a good earth connect and a shield space comes to being. And the accuracy of measurement increase.

1. Connection Dimension of Flange

The following flange dimensions satisfy GB/T9119-2000.



Slip-on welding plate steel pipe flanges with flat face (FF)



Slip-on welding plate steel pipe flanges with raised face (RF)

Unit: mm

Class	Meter Size DN	Connection dimension						Sealing surface		C	B
		A	D	K	L	Bolting		d	f		
						Number of holes n	Screw thread specification				
PN1.0MPa	10	17.2	90	60	14	4	M12	41	2	14	18
	15	21.3	95	65	14	4	M12	46	2	14	22
	20	26.9	105	75	14	4	M12	56	2	16	27.5
	25	33.7	115	85	14	4	M12	65	2	16	34.5
	32	42.4	140	100	18	4	M16	76	2	18	43.5
	40	48.3	150	110	18	4	M16	84	2	18	49.5
	50	60.3	165	125	18	4	M16	99	2	20	61.5
	65	76.1	185	145	18	4	M16	118	2	20	77.5
	80	88.9	200	160	18	8	M16	132	2	20	90.5
	100	114.3	220	180	18	8	M16	156	2	22	116
	125	139.7	250	210	18	8	M16	184	2	22	141.5
	150	168.3	285	240	22	8	M20	211	2	24	170.5
	200	219.1	340	295	22	8	M20	266	2	24	221.5
	250	273	395	350	22	12	M20	319	2	26	276.5
	300	323.9	455	400	22	12	M20	370	2	28	327.5
	350	355.6	505	460	22	16	M20	429	2	30	359.5
	400	406.4	565	515	26	16	M24	480	2	32	411
	450	457	615	565	26	20	M24	530	2	35	462
	500	508	670	620	26	20	M24	582	2	38	513.5
	600	610	780	725	30	20	M27	682	2	42	616.5

A: Steel pipe outer diameter

D: Flange outer diameter

K: Diameter of circle composed by centre of bolt hole

L: Bolt hole diameter

C: Flange thickness

B: Flange inner diameter

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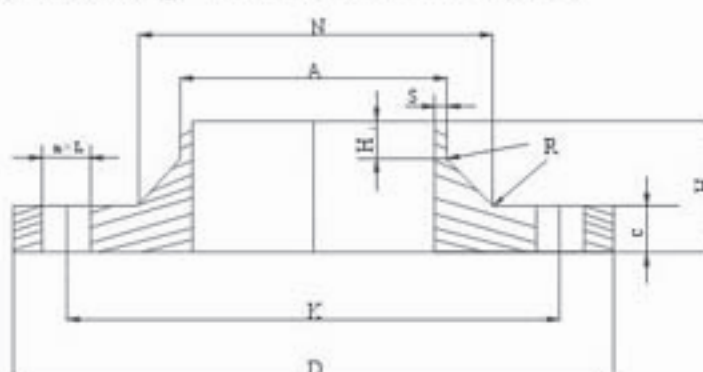
Unit: mm

Class	Meter Size DN	Connection dimension						Sealing surface		C	B
		A	D	K	L	Bloting		d	f		
						Number of holes n	Screw thread specification				
PN1.6MPa	10	17.2	90	60	14	4	M12	41	2	14	18
	15	21.3	95	65	14	4	M12	46	2	14	22
	20	26.9	105	75	14	4	M12	56	2	16	27.5
	25	33.7	115	85	14	4	M12	65	2	16	34.5
	32	42.4	140	100	18	4	M16	76	2	18	43.5
	40	48.3	150	110	18	4	M16	84	2	18	49.5
	50	60.3	165	125	18	4	M16	99	2	20	61.5
	65	76.1	185	145	18	4	M16	118	2	20	77.5
	80	88.9	200	160	18	8	M16	132	2	20	90.5
	100	114.3	220	180	18	8	M16	156	2	22	116
	125	139.7	250	210	18	8	M16	184	2	22	141.5
	150	168.3	285	240	22	8	M20	211	2	24	170.5
	200	219.1	340	295	22	12	M20	266	2	26	221.5
	250	273	405	355	26	12	M24	319	2	28	276.5
	300	323.9	460	410	26	12	M24	370	2	32	327.5
	350	355.6	520	470	26	16	M24	429	2	35	359.5
	400	406.4	580	525	30	16	M27	480	2	38	411
	450	457	640	585	30	20	M27	548	2	42	462
	500	508	715	650	33	20	M30	609	2	46	513.5
	600	610	840	770	36	20	M33	720	2	52	616.5
PN2.5MPa	10	17.2	90	60	14	4	M12	41	2	14	18
	15	21.3	95	65	14	4	M12	46	2	14	22
	20	26.9	105	75	14	4	M12	56	2	16	27.5
	25	33.7	115	85	14	4	M12	65	2	16	34.5
	32	42.4	140	100	18	4	M16	76	2	18	43.5
	40	48.3	150	110	18	4	M16	84	2	18	49.5
	50	60.3	165	125	18	4	M16	99	2	20	61.5
	65	76.1	185	145	18	8	M16	118	2	22	77.5
	80	88.9	200	160	18	8	M16	132	2	24	90.5
	100	114.3	235	190	22	8	M20	156	2	26	116
	125	139.7	270	220	26	8	M24	184	2	28	141.5
	150	168.3	300	250	26	8	M24	211	2	30	170.5
	200	219.1	360	310	26	12	M24	274	2	32	221.5
	250	273	425	370	30	12	M27	330	2	35	276.5
	300	323.9	485	430	30	16	M27	389	2	38	327.5
	350	355.6	555	490	33	16	M30	448	2	42	359.5
	400	406.4	620	550	36	16	M33	503	2	46	411
	450	457	670	600	36	20	M33	548	2	50	462
	500	508	730	660	36	20	M33	609	2	56	513.5
	600	610	845	770	39	20	M36	720	2	68	616.5

Unit: mm

Class	Meter Size DN	Connection dimension						Sealing surface		C	B
		A	D	K	L	Blotting		d	f		
						Number of holes (n)	Screw thread specification				
PN4.0MPa	10	17.2	90	60	14	4	M12	41	2	14	18
	15	21.3	95	65	14	4	M12	46	2	14	22
	20	26.9	105	75	14	4	M12	56	2	16	27.5
	25	33.7	115	85	14	4	M12	65	2	16	34.5
	32	42.4	140	100	18	4	M16	76	2	18	43.5
	40	48.3	150	110	18	4	M16	84	2	18	49.5
	50	60.3	165	125	18	4	M16	99	2	20	61.5
	65	76.1	185	145	18	8	M16	118	2	22	77.5
	80	88.9	200	160	18	8	M16	132	2	24	90.5
	100	114.3	235	190	22	8	M20	156	2	26	116
	125	139.7	270	220	26	8	M24	184	2	28	141.5
	150	168.3	300	250	26	8	M24	211	2	30	170.5
	200	219.1	375	320	30	12	M27	284	2	36	221.5
	250	273	450	385	33	12	M30	345	2	42	276.5
	300	323.9	515	450	33	16	M30	409	2	48	327.5
	350	355.6	580	510	36	16	M33	465	2	55	359.5
	400	406.4	660	585	39	16	M36	535	2	60	411
	450	457	685	610	39	20	M36	560	2	66	462
	500	508	755	670	42	20	M39	615	2	72	513.5
	600	610	890	795	48	20	M45	735	2	84	616.5

The following flange dimensions satisfy GB/T9115.1V1-2000.



Butt welding steel pipe flanges with flat face (FF)

Unit: mm

Class	Meter Size DN	A	Connection dimension					Sealing surface		C	H	Flange neck			
			D	K	L	Blotting		d	f			N	S	H ₁	R
						Number of holes (n)	Screw thread specification								
PN0.6MPa	700	711	860	810	26	24	M24	772	5	26	70	740	Indicated by customer	16	12
	800	813	975	920	30	24	M27	878	5	26	70	842		16	12
	900	914	1075	1020	30	24	M27	978	5	26	70	942		16	12
	1000	1016	1175	1120	30	28	M27	1078	5	26	70	1045		16	12
	1200	1220	1405	1340	33	32	M30	1295	5	28	90	1248		20	12
	1400	1420	1630	1560	36	36	M33	1510	5	32	90	1452		20	12
	1600	1620	1830	1760	36	40	M36	1710	5	34	90	1655		20	12
	1800	1820	2045	1970	39	44	M39	1918	5	36	100	1855		20	15
	2000	2020	2265	2180	42	48	M39	2125	5	38	110	2058		25	15
	2200	2220	2475	2390	42	52	M39	2335	6	42	115	2260		25	15
	2400	2420	2685	2600	42	56	M45	2545	6	44	125	2462		25	15

H: Thickness between two surfaces of flange

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SIC FLOW METER

2. Comparison table of meter size, flow rate and flow

(It is the comparison table when flow rate is 1~20m/s. When flow rate is below 0.2m/s, please specially indicate)

Flow rate m/s		Meter size mm	3	6	8	9	10	12	15	20	25	32	40	50
Flow range (m ³ /h)	1		0.025	0.102	0.181	0.229	0.283	0.407	0.636	1.131	1.767	2.895	4.524	7.069
	2		0.051	0.204	0.362	0.458	0.565	0.814	1.272	2.262	3.534	5.791	9.048	14.137
	3		0.076	0.305	0.543	0.687	0.848	1.221	1.909	3.393	5.301	8.686	13.572	21.206
	4		0.102	0.407	0.724	0.916	1.131	1.629	2.545	4.524	7.069	11.581	18.096	28.274
	5		0.127	0.509	0.905	1.145	1.414	2.036	3.181	5.655	8.836	14.476	22.619	35.343
	6		0.153	0.611	1.086	1.374	1.696	2.443	3.817	6.786	10.603	17.372	27.143	42.412
	7		0.178	0.713	1.267	1.603	1.979	2.850	4.453	7.917	12.370	20.267	31.667	49.480
	8		0.204	0.814	1.448	1.832	2.262	3.257	5.089	9.048	14.137	23.162	36.191	56.549
	9		0.229	0.916	1.629	2.061	2.545	3.664	5.726	10.179	15.904	26.058	40.715	63.617
	10		0.254	1.018	1.810	2.290	2.827	4.072	6.362	11.310	17.671	28.953	45.239	70.686
	11		0.280	1.120	1.991	2.519	3.110	4.479	6.998	12.441	19.439	31.848	49.763	77.754
	12		0.305	1.221	2.171	2.748	3.393	4.886	7.634	13.572	21.206	34.744	54.287	84.823
	13		0.331	1.323	2.352	2.977	3.676	5.293	8.270	14.703	22.973	37.639	58.811	91.892
	14		0.356	1.425	2.533	3.206	3.958	5.700	8.906	15.834	24.740	40.534	63.335	98.960
	15		0.382	1.527	2.714	3.435	4.241	6.107	9.543	16.965	26.507	43.429	67.858	106.029
	16		0.407	1.629	2.895	3.664	4.524	6.514	10.179	18.096	28.274	46.325	72.382	113.097
	17		0.433	1.730	3.076	3.893	4.807	6.922	10.815	19.227	30.041	49.220	76.906	120.166
	18		0.458	1.832	3.257	4.122	5.089	7.329	11.451	20.358	31.809	52.115	81.430	127.235
	19		0.483	1.934	3.438	4.351	5.372	7.736	12.087	21.488	33.576	55.011	85.954	134.303
	20		0.509	2.036	3.619	4.580	5.655	8.143	12.723	22.619	35.343	57.906	90.478	141.372

Flow rate m³/h m³/s		Meter size mm	65	80	100	125	150	200	250	300	350
Flow range (m³/h)	1		11.946	18.096	28.274	44.179	63.617	113.097	176.715	254.469	346.361
	2		23.892	36.191	56.549	88.357	127.235	226.195	353.429	508.938	692.721
	3		35.838	54.287	84.823	132.536	190.852	339.292	530.144	763.407	1039.082
	4		47.784	72.382	113.097	176.715	254.469	452.389	706.858	1017.876	1385.442
	5		59.730	90.478	141.372	220.893	318.086	565.487	883.573	1272.345	1731.803
	6		71.675	108.573	169.646	265.072	381.704	678.584	1060.288	1526.814	2078.164
	7		83.621	126.669	197.920	309.251	445.321	791.681	1237.002	1781.283	2424.524
	8		95.567	144.765	226.195	353.429	508.938	904.779	1413.717	2035.752	2770.885
	9		107.513	162.860	254.469	397.608	572.555	1017.876	1590.431	2290.221	3117.245
	10		119.459	180.956	282.743	441.786	636.173	1130.973	1767.146	2544.690	3463.606
	11		131.405	199.051	311.018	485.965	699.790	1244.071	1943.860	2799.159	3809.966
	12		143.351	217.147	339.292	530.144	763.407	1357.168	2120.575	3053.628	4156.327
	13		155.297	235.242	367.566	574.322	827.024	1470.265	2297.290	3308.097	4502.688
	14		167.243	253.338	395.841	618.501	890.642	1583.363	2474.004	3562.566	4849.048
	15		179.189	271.434	424.115	662.680	954.259	1696.460	2650.719	3817.035	5195.409
	16		191.134	289.529	452.389	706.858	1017.876	1809.557	2827.433	4071.504	5541.769
	17		203.080	307.625	480.664	751.037	1081.493	1922.655	3004.148	4325.973	5888.130
	18		215.026	325.720	508.938	795.216	1145.111	2035.752	3180.863	4580.442	6234.491
	19		226.972	343.816	537.212	839.394	1208.728	2148.849	3357.577	4834.911	6580.851
	20		238.918	361.911	565.487	883.573	1272.345	2261.947	3534.292	5089.380	6927.212



SIC FLOW METER

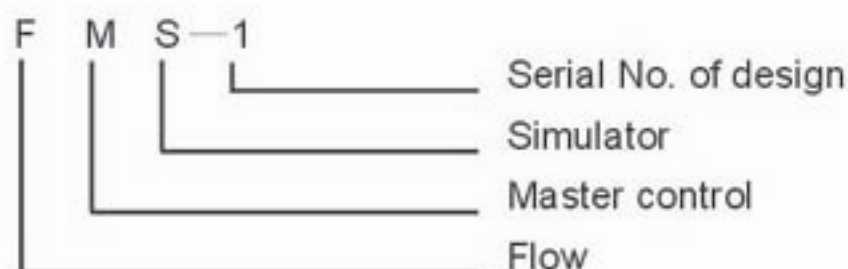
Flow rate	Meter size mm	400	450	500	600	700	750	800	900
		m³/h	m³/h	m³/h	m³/h	m³/h	m³/h	m³/h	m³/h
Flow range (m³/h)	1	452.389	572.555	706.858	1017.876	1385.442	1590.431	1809.557	2290.221
	2	904.779	1145.111	1413.717	2035.752	2770.885	3180.863	3619.115	4580.442
	3	1357.168	1717.666	2120.575	3053.628	4156.327	4771.294	5428.672	6870.663
	4	1809.557	2290.221	2827.433	4071.504	5541.769	6361.725	7238.229	9160.884
	5	2261.947	2862.776	3534.292	5089.380	6927.212	7952.156	9047.787	11451.105
	6	2714.336	3435.332	4241.150	6107.256	8312.654	9542.588	10857.344	13741.326
	7	3166.725	4007.887	4948.008	7125.132	9698.096	11133.019	12666.901	16031.547
	8	3619.115	4580.442	5654.867	8143.008	11083.539	12723.450	14476.459	18321.768
	9	4071.504	5152.997	6361.725	9160.884	12468.981	14313.881	16286.016	20611.989
	10	4523.893	5725.553	7068.583	10178.760	13854.423	15904.313	18095.573	22902.210
	11	4976.283	6298.108	7775.442	11196.636	15239.866	17494.744	19905.131	25192.431
	12	5428.672	6870.663	8482.300	12214.512	16625.308	19085.175	21714.688	27482.652
	13	5881.061	7443.218	9189.158	13232.388	18010.750	20675.606	23524.245	29772.873
	14	6333.451	8015.774	9896.017	14250.264	19396.193	22266.038	25333.803	32063.094
	15	6785.840	8588.329	10602.875	15268.140	20781.635	23859.469	27143.360	34353.315
	16	7238.229	9160.884	11309.733	16286.016	22167.077	25446.900	28952.917	36643.536
	17	7690.619	9733.439	12016.592	17303.892	23552.520	27037.331	30762.475	38933.757
	18	8143.008	10305.995	12723.450	18321.768	24937.962	28627.763	32572.032	41223.978
	19	8595.397	10878.550	13430.308	19339.644	26323.404	30218.194	34381.589	43514.199
	20	9047.787	11451.105	14137.167	20357.520	27708.847	31808.625	36191.147	45804.420

Flow rate m³/h m³/s		Meter size mm	1000	1200	1400	1500	1600	1800	2000	2200	2400
Flow range (m³/h)	1		2827.433	4071.504	5541.769	6361.725	7238.229	9160.884	11309.733	13684.777	16286.016
	2		5654.867	8143.008	11083.539	12723.450	14476.459	18321.768	22619.467	27369.555	32572.032
	3		8482.300	12214.512	16625.308	19085.175	21714.688	27482.652	33929.200	41054.332	48858.048
	4		11309.733	16286.016	22167.077	25446.900	28952.917	36643.536	45238.933	54739.109	65144.064
	5		14137.167	20357.520	27708.847	31808.625	36191.147	45804.420	56548.667	68423.887	81430.080
	6		16964.600	24429.024	33250.616	38170.350	43429.376	54965.304	67858.400	82108.664	97716.096
	7		19792.033	28500.528	38792.385	44532.075	50667.605	64126.188	79168.134	95793.442	114002.112
	8		22619.467	32572.032	44334.155	50893.800	57905.835	73287.072	90477.867	109478.219	130288.128
	9		25446.900	36643.536	49875.924	57255.525	65144.064	82447.956	101787.600	123162.996	146574.144
	10		28274.333	40715.040	55417.693	63617.250	72382.294	91608.840	113097.334	136847.774	162860.160
	11		31101.767	44786.544	60959.463	69978.975	79620.523	100769.724	124407.067	150532.551	1791463176
	12		33929.200	48858.048	66501.232	76340.700	86858.752	109930.608	135716.800	164217.328	195432.192
	13		36756.633	52929.552	72043.002	82702.425	94096.982	119091.492	147026.534	177902.106	211718.208
	14		39584.067	57001.056	77584.771	89064.150	101335.211	128252.376	158336.267	191586.883	228004.225
	15		42411.500	61072.560	83126.540	95425.875	108573.440	137413.260	169646.000	205271.660	244290.241
	16		45238.933	65144.064	88668.310	101787.600	115811.670	146574.144	180955.734	218956.438	260576.257
	17		48066.367	69215.568	94210.079	108149.325	123049.899	155735.028	192265.467	232641.215	276862.273
	18		50893.800	73287.072	99751.848	114511.050	130288.128	164895.912	203575.200	246325.993	293148.289
	19		53721.233	77358.576	105293.618	120872.775	137526.358	174056.796	214884.934	260010.770	309434.305
	20		56548.667	81430.080	110835.387	127234.500	144764.587	183217.680	226194.667	273695.547	325720.321



3. FMS—1 flow velocity simulator

3.1. Model and specification



3.2. Purpose and applied range

FMS-1 is a simulated signal generating machines of flow velocity (hereafter referred to as simulator) which can match with our transmitter. In the process of transmitter inspection and initialization, the simulator can simulate the flow velocity exactly and stably, inspect the transmitter and modify the parameter of transmitter. The main component of simulator is applied with CMOS integrate circuit and exact resistance. The simulator has many excellences, such as low power, accuracy, large flow velocity range, convenient operation, etc.

3.3. Main technical parameter

1. Working conditions of simulator

- a) Ambient temperature: 0℃~40℃
- b) Atmosphere relative humidity: 5%~85%
- c) Atmosphere pressure: 86kPa~108kPa
- d) External magnetic field intensity not more than: 400A/M
- e) Mechanical vibration frequency not more than: 25Hz
- f) Mechanical vibration amplitude not more than: 0.075mm
- g) Working voltage range: 6V~9V DC
- h) The ambient air doesn't include flammable or explosive substance and corrosive mediums which could erode the Nobelium or Nickel plating layer, nonferrous metal and its alloy.

2. The basic tolerance range of simulator is $\pm 0.5\%$

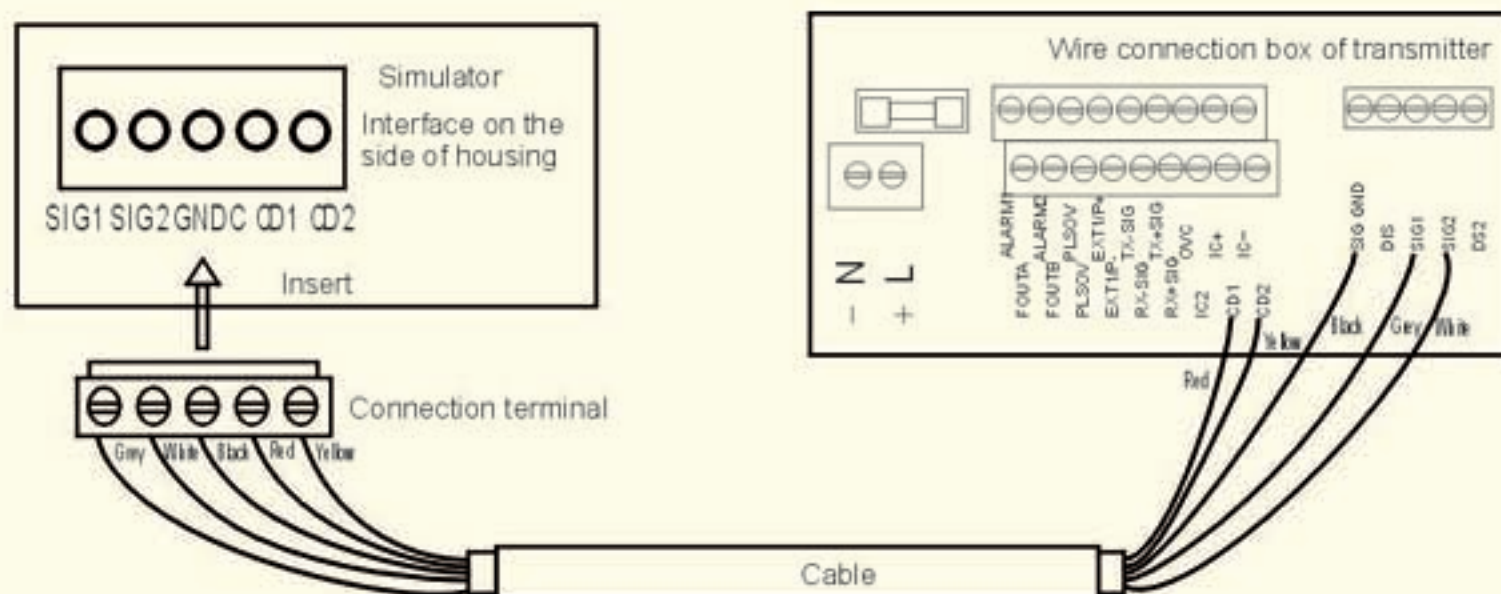
3. Flow direction: Forward (FWD), Reverse (REV)

4. Flow velocity range: 0.05~20.00m/s

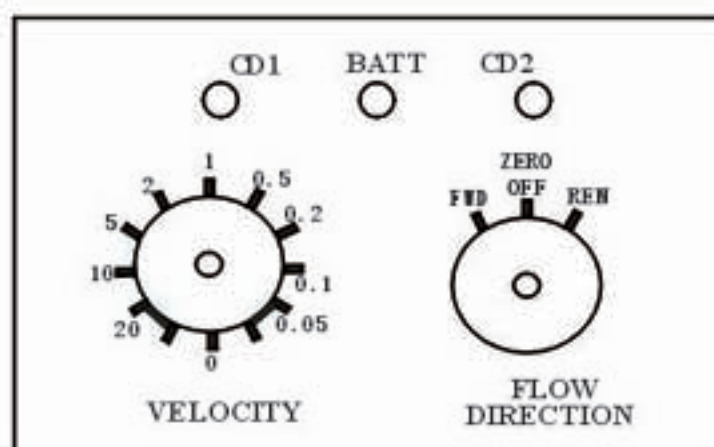
5. Working voltage: 9V DC

3.4. Operation and fault diagnoses

- a) Correctly connect the cable between simulator and transmitter



- b) Advance to the Hyper Terminal of PC and connect transmitter to PC.
- c) Opening the simulator, 'FWD' corresponds the forward flow velocity and 'REV' corresponds the reverse flow velocity. After the flow velocity of each point stabilizing, read and record the velocity data.



- d) Opening the simulator, check whether the wire connecting is correct and stable (specially check the excitation wires of transmitter) if CD1 and CD2 don't flash. If the connection is correct after checking, there must be some problem inside the transmitter.
- e) After recording the velocity data, user can validate parameter D1 of transmitter by running LINEST function, then input the value of D1 to transmitter to finish the parameter configuration of transmitter.
- f) BATT will stop flashing every 20 minutes which is the normal time function. Open the simulator again by running the knob to ZERO OFF and then running it to FWD/REV if user want to continue the using of simulator. If BATT stop flashing within 10 minutes, it is demanded to exchange the battery because the voltage of battery is not enough.



4. Electromagnetic flowmeter hand-by programmer



4.2. Main technical parameter

CPU: Intel® PXA255 Applications Processor 300MHz

Operation system: Windows® CE.NET 4.2

Display: 3.5 inch TFT display screen, 65K colour, LED with back-light

External facility: PC connecting wire, CF-I card (optional)

Figure dimension: 122mm(L)×77mm(W)×15.5mm(T)

Weight: 139g

Battery: 1100mA/h Li-Polymer battery inside

Communication: USB1.1, IrDA1.2, serial-port RS232

Input rule: Chinese full screen manuscript input, English soft keyboard input

Input methods: full screen manuscript input, small keyboard on screen

EMS memory: 32MB SDRAM 32MB FLASH ROM

Scalable equipment/synchronous equipment: CF memory card, CF GPRS/Modem/network card/

WLAN wireless network card, CF GPS positioning card

4.2. Main function

Connecting this hand-by programmer and electromagnetic flowmeter transmitter reliably, user can watch the data of transmitter and program it. The operation of the hand-by programmer is easy.

User can advance to 'SIC Flow' module and program the transmitter after the power on.

For the details of hand-by programmer operation, please refer to the 'Help file' of this equipment.

The background of the advertisement is a circular inset showing a close-up of water. At the top, a single water droplet is suspended in mid-air, just above a calm surface with concentric ripples. Below this, the water is in a state of dynamic motion, with splashing, bubbles, and intricate patterns of light and shadow, suggesting a high-speed flow measurement. The entire circular image is set against a light gray background.

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