



Electromagnetic flowmeter

Committed to process automation solutions

Datasheet





Introduction

Our electromagnetic flowmeter was developed on long-cultivated technology for flow measure. MP family has extended its application range with such model as integrated and remote. Through constant development and improvements, MP series electromagnetic flow meter has become more accurate and reliable and widely used in the industrial instrumental field. We provides wide range of electromagnetic flow meters, all fulfilling the highest demands in terms of accuracy and reliability in industries such as water and waste water, food and beverage, mining, pulp and paper.

Please note: Electromagnetic flow meter is only applicable to measure the flow of conductive liquid. The fresh supply of equipment is in factory setting condition, and only when manufacturers set the appropriate parameters, can it work well.

Principle

The measurement principle of magnetic flowmeters can be described as follows: when the liquid goes through the pipe at the flow rate of v with a diameter D , within which a magnetic flux density of B is created by an exciting coil, the following electromotive E is generated in proportion to flow speed v :

$$E = KBVD$$

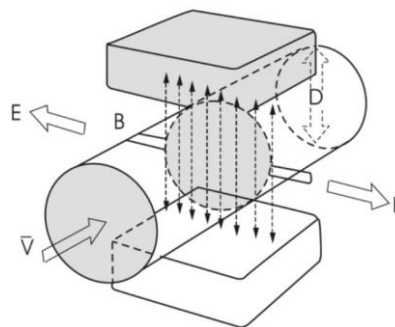
E —Induced voltage; K —

Constant;

B —Magnetic induction (magnetic field); V —

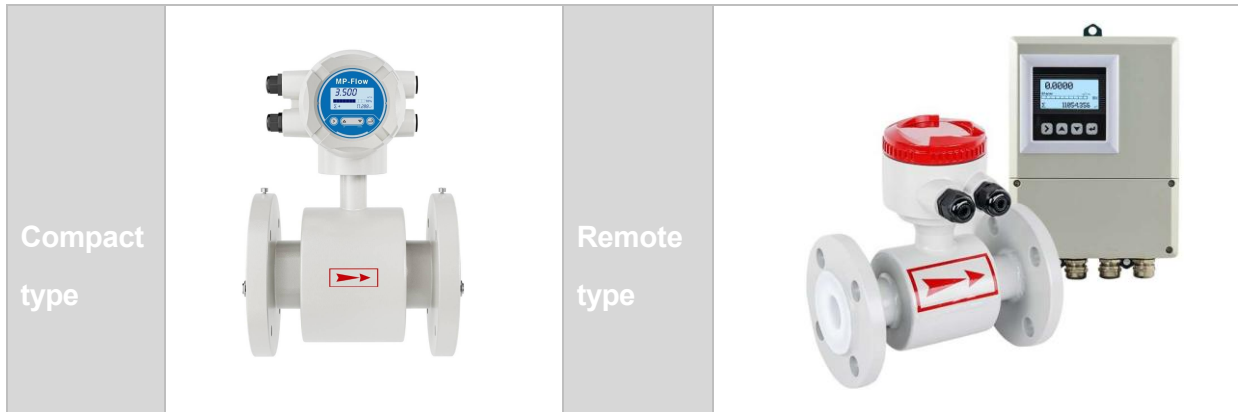
Flow velocity;

D —Pipe Size





Type overview



Characteristics

Compact type

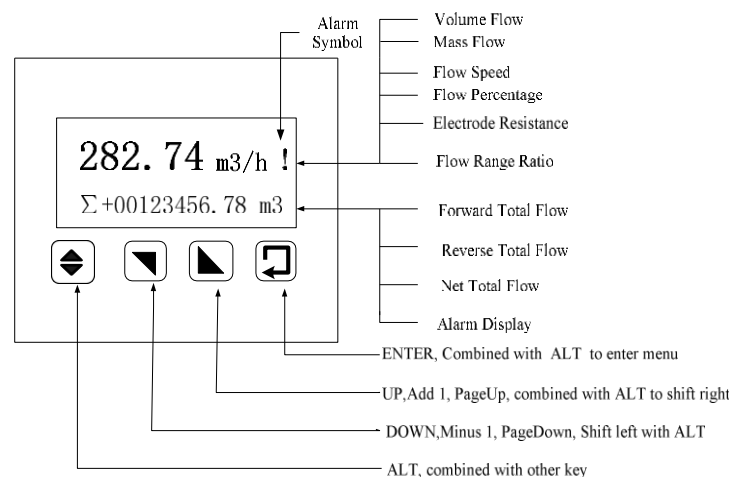
- Excellent measurement repeatability and linearity
- Good reliability and anti-interference performance
- Good pressure resistance sealing ability
- Self diagnosis for empty pipe Detection
- Low pressure loss measurement tube
- Extremely simple operation
- High degree of accuracy
- High intelligentization



Remote type

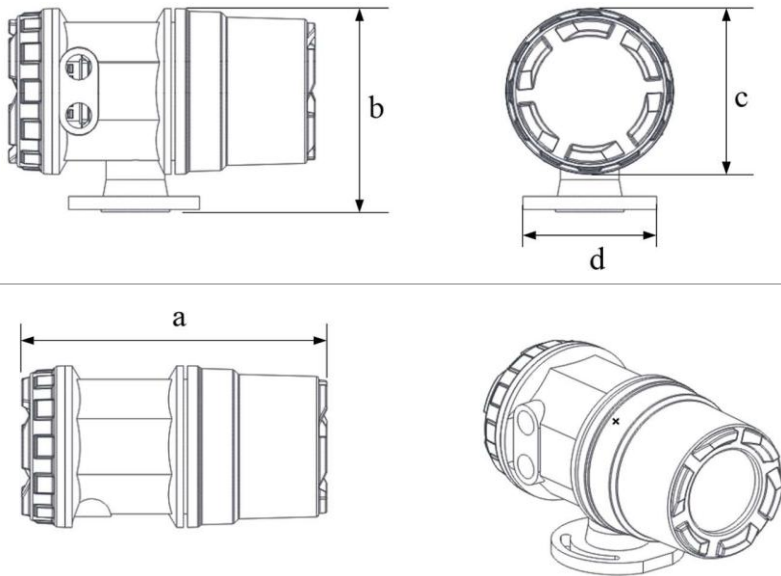
- Measurement is not affected by the variation of flow density, viscosity, temperature, pressure and conductivity. High accuracy measurement is guaranteed according to the linear measurement principle.
- No obstacle in the pipe, no pressure-loss and lower requirement for straight pipeline.
- DN 6 to DN2000 covers a wide range of pipe size. A variety of liners and electrodes are available to satisfy different flow characteristic.
- Programmable low frequency square wave field excitation, improving measurement stability and reducing power consumption.
- Implementing 16 bits MCU, providing high integration and accuracy; Full-digital processing, high noise resistance and reliable measurement; Flow measurement range up to 1500:1.
- High definition LCD display with backlight.
- RS485 or RS232 interface supports digital communication.
- Intelligent empty pipe detection and electrodes resistance measurement diagnosing empty pipe and electrodes contamination accurately.
- SMD component and surface mount technology (SMT) are implemented to improve the reliability.

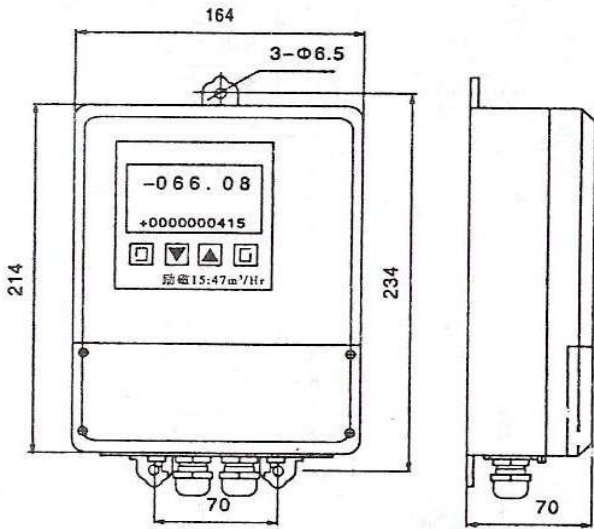
Navigation keys





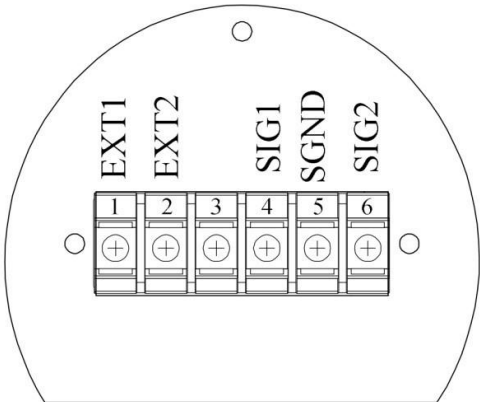
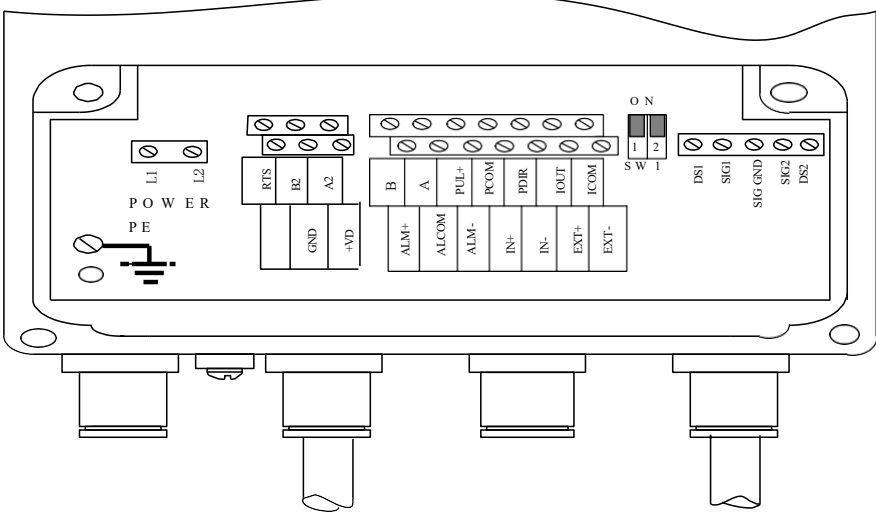
Dimension

Compact converter				
				
[mm]				[Kg]
a	b	c	d	
219	147	120	90	0.6

Remote converter	
	

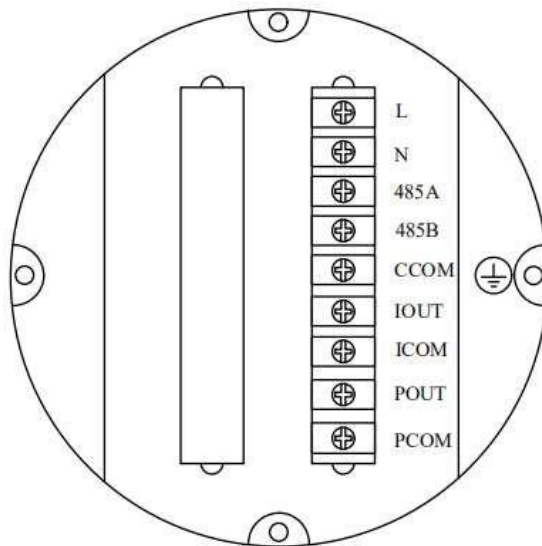


Wiring

Remote type	
	
SIG1, SIG2	Positive signal, negative signal
SGND:	Signal ground
EXT1, EXT2:	Excitation positive, Excitation negative
Excitation signal and sensor signals are connected to the converter via the signal line.	
	
The definition of terminals and their marks for remote type converter is given as below:	
DS1	Shield drive 1
SIG1	Signal input 1



SIG GND	Signal Ground
SIG2	Signal input 2
DS2	Shield drive 2
EXT+	Coil excitation +
EXT-	Coil excitation -
IOUT	Current output +
ICOM	Current output -
PUL+	Frequency/pulse output +
PCOM	Frequency/pulse output -
PDIR	Flow direction indicator +
ALM-	Low alarm output +
ALM+	High alarm output +
ALCOM	Alarm output -
A	RS485 communication A
B	RS485 communication B
IN+	Input contact +
IN-	Input contact -
L1(+)	220V(24V +) input
L2(-)	220V(24V -) input
Compact type	



L, N	220VAC power supply
IOU, ICOM	4-20mA output connection
POUT, PCOM	Pulse/Frequency/Relay out
485A, 485B	RS485 communication
CCOM	RS485 communication ground
	Converter instrument grounding protection



Parameter

Maximum flow speed	15m/s
Accuracy	0.5%
Reliability	0.2%
Nominal width range	DN 10 to 1200 (3/8 to 48")
Housing material	Carbon steel
Process connection	Flange
Nominal pressure	DN6-DN50,PN<4.0MPA
	DN65-DN150,PN<1.6MPA
	DN200-DN600,PN<1.0MPA
	DN700-DN2000,PN<0.6MPA
Response time	0.02s
Lining Material	Rubber, F46,PTFE,PU,PFA
Electrode material	stainless steel containing Mo
	stainless steel coated with carbonized tungsten,
	Hastelloy B
	Hastelloy C
	Titanium
	Tantalum
	Platinum-iridium alloy.
Material	stainless steel
Protection type	IP65(compact version), IP68(remote version)
Display	Graphical display
Unit	L、m3、Kg、 t/s、 min、 h
Medium temperature	Rubber (80℃)



	F46 (150℃)
	PTFE (120℃)
	PU (60℃)
	PFA (180℃)
Cable gland	10meters(standard)
Power supply	100-240VAC 24VDC
Transmitter	4-20mA, pulse, RS485, Hart protocol
Conductivity	> 5 μS/cm, (20 μS/cm for demineralized water)
ATEX	NO
Power supply	100-240VAC 24VDC
Transmitter	4-20mA, pulse, RS485, Hart protocol
Conductivity	> 5 μS/cm, (20 μS/cm for demineralized water)
ATEX	NO



Flow rate

Diameter (mm)	Flow range (m ³ /h)		
10	0.02827-0.25	0.3-1.6	2.0-3.3924
15	0.0636-0.6	0.8-3.0	4.0-7.632
20	0.131-1.0	1.2-5.0	6.0-13.6
25	0.176-1.6	2.0-8.0	10-21
32	0.2895-2.5	3.0-12	16-35
40	0.4524-4.0	5.0-20	25-45
50	0.707-6.0	8.0-40	50-85
65	1.195-10	12-60	80-143
80	1.81-16	20-120	160-217
100	2.83-25	30-160	200-339
125	4.42-40	50-250	300-530
150	6.36-60	80-400	500-763
200	11.3-100	120-600	800-1357
250	17.7-160	200-800	1000-2120
300	25.45-250	300-1200	1600-3054
350	34.6-300	400-1600	2000-4157
400	45.2-400	500-2000	2500-5429
450	57.3-500	600-2500	3000-6871
500	70.7-600	800-3000	4000-8482
600	102-800	1000-4000	5000-12216
700	139-1200	1600-5000	6000-16620
800	181-1600	2000-6000	8000-21720



900	229-1600	2000-8000	10000-27480
1000	283-2000	2500-10000	12000-33924
1200	407-2500	3000-12000	16000-48833
1400	554-3000	4000-16000	20000-66468
1600	723-4000	5000-20000	27000-86815

Instrument Selection

- **Select lining**

Lining material	Main Performance	Applications
Teflon	1. The most steady material in plastics which is irresistible to boiling hydroelectric acid, vitriol aqua fortis as well as strong alkali and organic impregnates. 2. Not be perfect in abrasion resistance.	Strong corrosive mediums such as strong acid and alkali
PFA	1. Having the same abrasion resistance with PTFE. 2. Having strong ability of load pressure resistance.	Applicable in state of load pressure
F46	1. Have the same abrasion resistance with PTFE. 2. Resistible for low abrasion. 3. Having strong resistance to load pressure.	1. The same as PTFE. 2. Applicable in mediums of low abrasion.
Neoprene	1. Be of good elasticity, retractility and abrasion resistance. 2. Be resistant to low acid, alkali and salt but not for oxidation mediums.	Water, sewage and slurry, mineral serosity of low abrasion.
Polyurethane	1. be of good abrasion resistance. 2. Not be perfect in acid/alkali resistance. 3. Can't be used for water mixed with organic impregnate.	Applicable in mineral serosity, slurry and coal slurry of high abrasion.



- Select electrode

Electrode material	Applications
Stainless steel SUS316	Applicable in water, sewage and corrosive mediums. Widely used in industries of petrol, chemistry, carbamide, etc
Stainless steel covered with tungsten carbide	Applicable in mediums of no corrosive and low abrasion.
Hastelloy B (HB)	Having strong resistance to hydrochloric acid of any concentration which is below boiling point. Also resistant against vitriol, phosphate, hydrofluoric acid, organic acid etc which are oxidizable acid, alkali and non-oxidizable salt.
Hastelloy C (HC)	Be resistant to oxidizable acid such as nitric acid, mixed acid as well as oxidizable salt such as Fe^{+++} , Cu^{++} and sea water
Titanium	Applicable in seawater, and kinds of chloride, hypochlorite salt, oxidizable acid (including fuming nitric acid), organic acid, alkali etc. Not resistant to a pure reducing acid (such as sulphuric acid, hydrochloric acid) corrosion. But if acid contains antioxidant (such as Fe^{3+} , Cu^{2+}) is greatly reduce corrosion.
Tantalum	In addition to hydrofluoric acid, fuming sulfuric acid, alkali remaining outside chemicals, including boiling hydrochloric acid
Platinum-iridium	Almost be applicable in all chemical mediums except for aqua fortis, ammonium salt.

Installation

- The measuring pipe must always be full.
- The flow direction must match the identification marking
- Install the devices without any mechanical tension (torsion, bending).
- Use a flange seal made from a material that is compatible with the medium and the medium temperature.

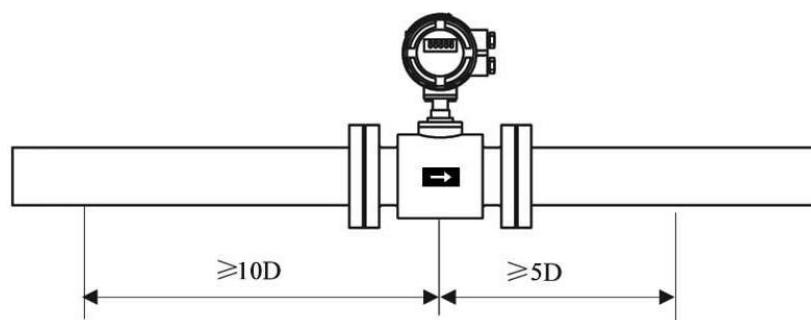


- Seals should not extend into the flow area, since any turbulence affects the device accuracy.
- The pipeline must not exert any inadmissible forces or torque on the device.
- Install remote mount transmitters at a location that is largely free of vibration.
- Do not expose the transmitter to direct sunlight; provide sun protection if necessary.

Inlet and outlet runs

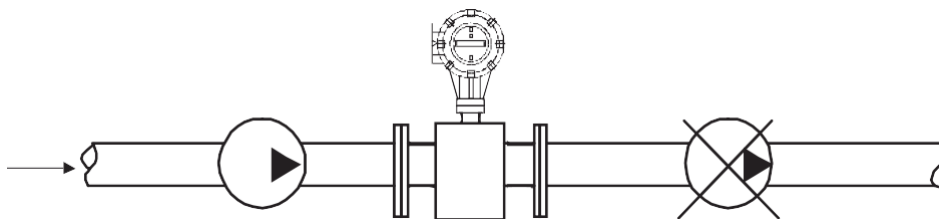
The following inlet and outlet runs must be observed in order to meet accuracy specifications:

- Inlet run $\geq 10 \times DN$
- Outlet run $\geq 5 \times DN$



Installation with pumps

The sensor should only be installed behind the pump.



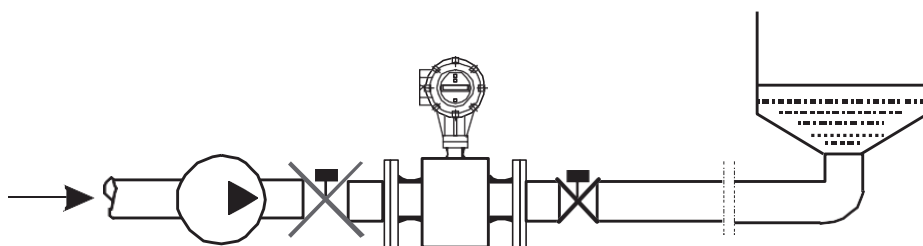


Note!

- The sensor should never be installed in front of the pump in order to avoid the risk of low pressure.
- and thus damage to the measuring tube.

Installation with pumps

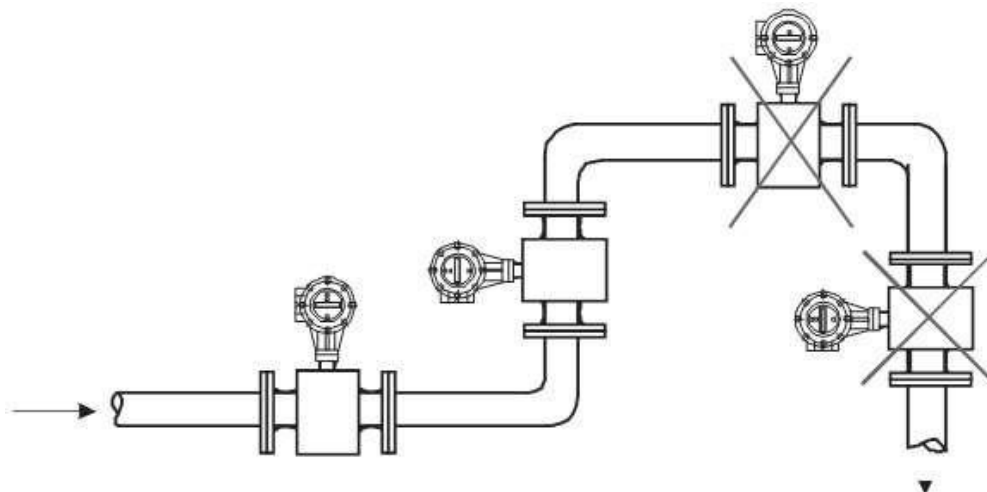
The sensor should only be installed in front of a control valve



Note!

- The sensor should never be installed behind the valve in order to avoid the risk of low pressure, and thus damage to the measuring tube.

Bend



Note!

En-trained air bubble formation in the measuring tube can result in an increase in measuring errors. For this reason, the following mounting locations should be avoided:

- Highest point of a pipeline. Risk of air accumulating!
- Directly upstream from a free pipe outlet in a vertical pipeline. Risk of pipe not filling correctly!



Ordering Code

Electromagnetic flowmeter															
Model														Description	
MP	-	-	-	-	-	-	-	-	-	-	-	-	-		
Type	M1													Compact type	
	M2													Remote type	
Pipe size		DNXX												DN10 - DN2000	
Accuracy			J1											1.00%	
			J2											0.50%	
Output			O0											No output	
			O1											Pulse output	
			O2											4-20mA output	
Communication			D0											No	
			D1											RS232	
			D2											RS485	
			D3											HART	
Installation			I1											Thread installation	
			I2											Flange installation	



	I3								Clamp mounting
	I4								Clamp installation
Power supply	V1								220VAC
	V2								24VDC
	V3								Battery powered
Pressure rating	P1								0.6MPa
	P2								1.0MPa
	P3								1.6MPa
	P4								2.5MPa
	P5								4.0MPa
	PZ								Others
Temperature rating	T1								≤60°C(CR/PU)
	T2								≤120°C(F4/F46)
	T3								≤150°C (PFA)
Electrode material	E1								316L stainless steel
	E2								Titanium
	E3								Tantalum
	E4								Hastelloy B
	E5								Hastelloy C
	E6								Platinum
	E7								Tungsten carbide
Lining material	L1								Neoprene (CR)
	L2								Polyurethane (PU)
	L3								F4/PTFE
	L4								Teflon (F46/FEP)
	L5								Tetrafluoroethylene (PFA)



Grounding	G0		No grounding
	G1		Grounding ring
	G2		Grounding electrode
	G3		Grounding screw
Body material	B1		Carbon steel
	B2		304 stainless steel
	B3		316 stainless steel
Ingress protection	IP1	IP65	
	IP2	IP67	
	IP3	IP68	