

SHD Electromagnetic Flow meter

1. Description of Products

Electromagnetic flowmeter is a kind of inductional instrument designed by Faraday's law of electromagnetic induction to measure flow of conductive media in the tube. It adopts the technology of insertion of single chip to realize digital excitation and employs CAN local fieldbus.

Electromagnetic flow meter can realize local indication and output electrical current signal of 4-20mA which can be used to record, adjust and control. Electromagnetic flow meters are widely used in industrial sectors such as chemical industry, environmental protection, metallurgy, pharmaceutical, paper making, water supply and removal etc.

Besides measuring flow of general conductive liquid electromagnetic flowmeter can measure flow of liquid-solid mixed fluid, high-viscosity fluid and salt, strong acid and strong alkali.



2. Features

- Simple structures, firm, no movable parts and long operation life
- No intercepting fluid parts, no pressure loss and fluid clogging
- No mechanical inertia, quick response and good stability, application in automatic examination, adjustment and controlling
- Measuring accuracy not influenced by physical parameters such as style, temperature, viscosity, density and pressure.
- Employ Teflon or rubber liner and different combination of electrode material such as Hastelloy C, Hastelloy B, 316L, Titanium and adapt the need of different mediums.
- Supply many styles of flowmeters such as inline type and insertion type, etc.
- Adopt EEPROM memory to measure operation data, safe and reliable protection of memory.
- Integral type flowmeters and remote type flowmeters.
- LCD back light display with high clearness

3. Technical Specifications and Technical Parameters

① Normal Operating Conditions

Environment temperature: $-25^{\circ}\text{C} \sim +60^{\circ}\text{C}$

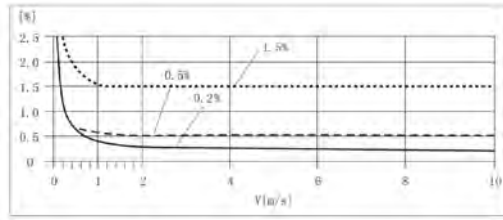
Relative Humidity: 5% ~90%

Power supply: 85VAC~250VAC; 16VDC~36VDC

Consumed power: less than 20W

② Measuring Accuracy

Standard SE11/ Sanitary SE13: $\pm 0.5\%$; High Accuracy SE12: $\pm 0.25\%$; Inserted type SE 14 : $\pm 1.5\%$



Basic Error

③ Output

Analog Current Output

Load Resistance: 0 mA~10 mA ,0 ~1.5 K Ω ,

Load Resistance : 4 mA~20mA ,0 ~750 Ω ,

Intrinsic Error: 0.1% \pm 10 μ A

Digital Frequency Output

Frequency Output Range: 1 Hz ~ 5000 Hz

Output Electrical Isolation: Optoelectronic Isolation, Isolation Voltage: > 1000VDC

Frequency Output Driver: Field-Effect Tube Output, Max bearing Voltage 36VDC, Max load Current 250mA

Digital Pulse Output

Output Pulse Range: 0 pulse/second ~ 100 pulses /second. (Higher than 100 pulses/second, pulse can be lost)

Output Pulse Equivalent: 0.001~1.000 m³/cp;
0.001~1.000 LRT/cp;
0.001~1.000 USG/cp
0.001~1.000 UKG/cp

Output Electrical Isolation: Optoelectronic Isolation, Isolation Voltage: > 1000VDC

Frequency Output Driver: Field-Effect Tube Output, Max bearing Voltage 36VDC, Max load Current 250mA

Alarm Output

Alarm Output Point: ALH –Upper limit Alarm, ALML—lower limit Alarm

Output Electrical Isolation: Optoelectronic Isolation, Isolation Voltage: > 1000VDC

Frequency Output Driver: Field-Effect Tube Output, Max bearing Voltage 36VDC, Max load Current 250mA

Digital Communication

MODBUS Interface: RTU Format, Physical Interface RS-485, Electrical Isolation 1000VH

Hart Interface : Standard Hart Protocol, configure HART Communicator, can display the measuring valve on line and modify the instruments parameters.

4. Main Technical Parameters

Main Technical Parameters of Electromagnetic Flow meter

Table 1

Model	SE 11 Standard	SE12 High Accuracy	SE13 Sanitary	SE14 Insertion type
Medium	Conductivity Fluids			
Accuracy	±0.5%	±0.25%	±0.5%	±1.5%
Repeatability	±0.25%	±0.125%	±0.25%	±0.75%
Fluid Temperature	-25°C ~ 130 °C	-25°C ~ 130 °C	-25°C ~ 130 °C	-25°C ~ 130 °C
Conductivity	≥ 5μs/cm (soft water should be ≥ 20μs/cm)			
Size	10~2000 mm	10~2000 mm	10~125 mm	200~3000 mm
Operation Pressure	0.6Mpa/1.0Mpa/1.6Mpa/2.5Mpa/4.0Mpa/Others			
Velocity	0.5 m/s ~ 10 m/s			
Flow Direction	Forward / Reversed			
Electrodes Material	316L / Hastelloy C2,B4/Tantalum/Titanium/Platinoidita/others			
Liner Material	Rubber /PTFE/PFA		PFA	PTFE
Electrodes Type	Standard			
Qty of Electrodes	2 pairs (one pair for measuring, one pair for grounding)			1pair (measuring)
Tube Material	304 Stainless Steel			
Flange Material	Carbon steel/304 Stainless steel		304 Stainless steel	304 Stainless steel
Installation Type	Flange		Tri-clamp/screw	Flange/plug-in
Protection level	IP65/P68 (Remote Version)			
Power	220VAC ±20% 60HZ / 24 VDC			
Signal Output	4~20mA			
Communication	Hart / Modbus/ Profibus			
Electrical connection	2* M20 * 1.5			
Explosive-Proof	Exd eia II C T3~T6			
Construction Type	Compact / Remote			
Operation Environment	Environment temperature:-25 °C~ + 60 °C; Relative Humility: 5% ~90%			

5. Product Selection

① Nominal Diameter, Pressure & Flow Range

Table 2

Size(DN)	Pressure	Min flow range velocity(0-0.5)m/s	Max Flow range velocity(0-10)m/s
10	4.0 Mpa	(0-2.25)L/min	(0-45)L/min
15	4.0 Mpa	(0-5)L/min	(0-100)L/min
20	4.0 Mpa	(0-7.5)L/min	(0-150)L/min
25	4.0 Mpa	(0-10L)/min	(0-200)L/min
32	4.0 Mpa	(0-20L)/min	(0-400)L/min
40	4.0 Mpa	(0-30L)/min	(0-600)L/min
50	4.0 Mpa	(0-3)m³/h	(0-60)m³/h
65	4.0 Mpa	(0-6)m³/h	(0-120)m³/h
80	4.0 Mpa	(0-9)m³/h	(0-180)m³/h
100	1.6 Mpa	(0-12)m³/h	(0-240)m³/h
125	1.6 Mpa	(0-21)m³/h	(0-420)m³/h
150	1.6 Mpa	(0-30)m³/h	(0-600)m³/h
200	1.6 Mpa	(0-54)m³/h	(0-1080)m³/h
250	1.6 Mpa	(0-90)m³/h	(0-1800)m³/h
300	1.0 Mpa	(0-120)m³/h	(0-2400)m³/h
350	1.0 Mpa	(0-165)m³/h	(0-3300)m³/h
400	1.0 Mpa	(0-225)m³/h	(0-4500)m³/h
500	1.0 Mpa	(0-330)m³/h	(0-6600)m³/h
600	1.0 Mpa	(0-480)m³/h	(0-9600)m³/h
700	1.0 Mpa	(0-660)m³/h	(0-13200)m³/h
800	1.0 Mpa	(0-900)m³/h	(0-18000)m³/h
900	1.0 Mpa	(0-1200)m³/h	(0-24000)m³/h
1000	1.0 Mpa	(0-1350)m³/h	(0-27000)m³/h
1200	0.6 Mpa	(0-2100)m³/h	(0-42000)m³/h
1400	0.6 Mpa	(0-2700)m³/h	(0-54000)m³/h
1600	0.6 Mpa	(0-3600)m³/h	(0-72000)m³/h
1800	0.6 Mpa	(0-4500)m³/h	(0-90000)m³/h
2000	0.6 Mpa	(0-5700)m³/h	(0-114000)m³/h

② Model Selection

Table 3

② Model Selection

Table 3

Item	Code	Description				
Factory Mark	SHD	Silver Automation Instruments				
Meter Type	SE11	Standard (0.5% accuracy ,DN10~DN2000)				
	SE12	High Accuracy (0.25% accuracy,DN10~DN2000)				
	SE13	Sanitary type (0.5% accuracy,DN10~DN125,Tri-clamp)				
	SE14	Insertion type (1.5% accuracy,DN200~3000)				
Meter Size	-XXX	Example:100=DN100,refer to Table 2 Nominal diameter, pressure and flow range				
Electrode Material	E0	316L SS				
	E1	Hastelloy B				
	E2	Hastelloy C				
	E3	Titanium				
	E4	Tantalum				
	E5	Pt/Iridium Alloy				
Liner Material	L1	Teflon (PTFE)				
	L2	F46 (FEP)				
	L3	PFA				
	L4	Hard rubber				
Rated Pressure	1G	GB1.6Mpa	1D	DIN PN16	1A	ANSI 150#
	2G	GB2.5Mpa	2D	DIN PN25	2A	ANSI 300#
	3G	GB4.0Mpa	3D	DIN PN40	3A	ANSI 600#
	S	Special				
Working Temperature	E	<60 °C				
	H	60~160 °C				
Protection Grade	P0	IP65				
	P1	IP 67				
	P2	IP68 (only for remote version, sensor IP68,converter IP65)				
Converter Type	0	Compact				
	1	Remote (standard cable 5 meters)				
Output Signal Communication	S0	4~20mA				
	S1	RS-485				
	S2	Hart				
	S3	Profibus-DP*1				
	S4	Pulse Output				
Housing Material	H0	Carbon steel				

Material of Body Flange	F0	Carbon steel
	F1	304 SS
	F2	Special Demand
Power Supply	G0	220V AC (85~265V,45~63 Hz)
	G1	24V DC (18~36V)
	G2	Battery supply (without 4~20mA output)
Explosion Proof	0	Non(0 could be omitted)
	Ex	Exd eia II C T3~T6

③ Selection of Liner

Table 4

Liner Material	Main Function	Application
Hard Rubber	Resistant to Hydrochloric acid, acetic acid ,oxalic acid, ammonia water, phosphoric acid and 50% Sulfuric acid, sodium hydroxide and potassium hydroxide in normal temperature avoid enhancer	1. Temp. less than 65 °C 2. Common acid, alkali, salt solution
PTFE F46 PFA	Most steady plastic of chemical living energy; resist boiling hydrochloric acid, sulfuric acid, nitric acid, nitro-hydrochloric acid, thick alkali and all kinds of organic solvent; Poor abrasion and adhesion performance	1. -40°C ~130°C(PTFE) -40°C ~180°C(F46) -40°C ~180°C(PFA) 2. Strong corrosive fluids such as acid and alkali 3. For sanitary purpose

④ Selection of Materials of Electrodes

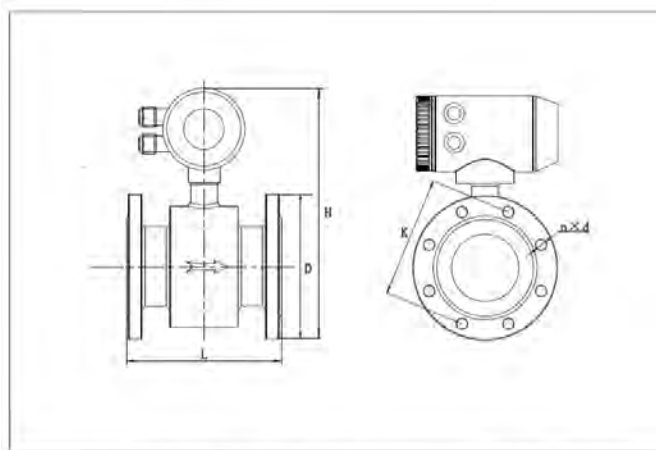
Table 5

Electrodes	Performance of resisting erosion and abrasion
Stainless steel 0Cr18Ni12Mo2Ti	Apply to industrial water, domestic water, polluted water, etc. with weak erosion, applied in petroleum chemical industry, steel and iron,etc. and fields in government and environmental protection
Hastelloy B	Good performance of resisting erosion to hydrochloric acid of all degrees of density below the boiling point; resisting sulfuric acid, phosphoric acid, hydrofluoric acid, organic acid, etc. non- chlorine acid, alkali, erosion of non-oxidized salty fluid
Hastelloy C	Resisting non-oxidized acid, such as nitric acid, nitration mixture, or the erosion of the mixture of chromic acid and sulfuric acid; resisting oxidized salt such as Fe ⁺⁺⁺ , Cu ⁺⁺ or the erosion of other oxidizers, such as the erosion of higher than normal temperature hypochlorite liquor and the sea water
Titanium	Resisting erosion of sea water, all kinds of chloride and hypochlorite, oxidized acids (including Fuming sulfuric acid), organic acid, alkali; not resisting the erosion of purer reducing acids(such as sulfuric acid, hydrochloric acid); if oxidizer exists in acids (such as nitric acid, Fe ⁺⁺⁺ . Cu ⁺⁺) the erosion will reduce greatly.
Tantalum	Good performance of resisting erosion, similar to glass; Besides hydrofluoric acid, fuming nitric acid, alkali, nearly can resist erosion of all chemical mediums(including boiling hydrochloric acid, nitric acid and below 150;æ sulfuric acid). Not resisting erosion in alkali.

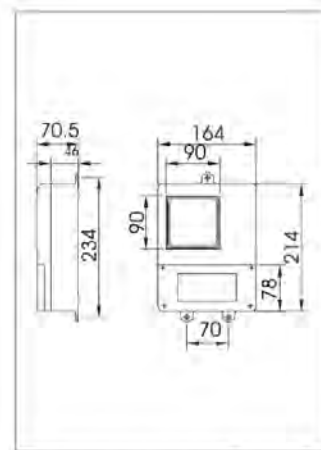
Pt/ Iridium Alloy	Can nearly resist all chemical matters, not fit for aqua regia and ammonium salt
Stainless Steel Painting Tungsten Carbide	Fit for mediums without erosion and strong attrition

Remarks: Due to multiple types the erosion is subject to complex factors such as temperature, density, flow rate etc., this sheet is only for reference. Users should make decision according to practical conditions, if necessary make experiment of resisting erosion of to-be-chosen materials, such as the experiment of hanging pieces

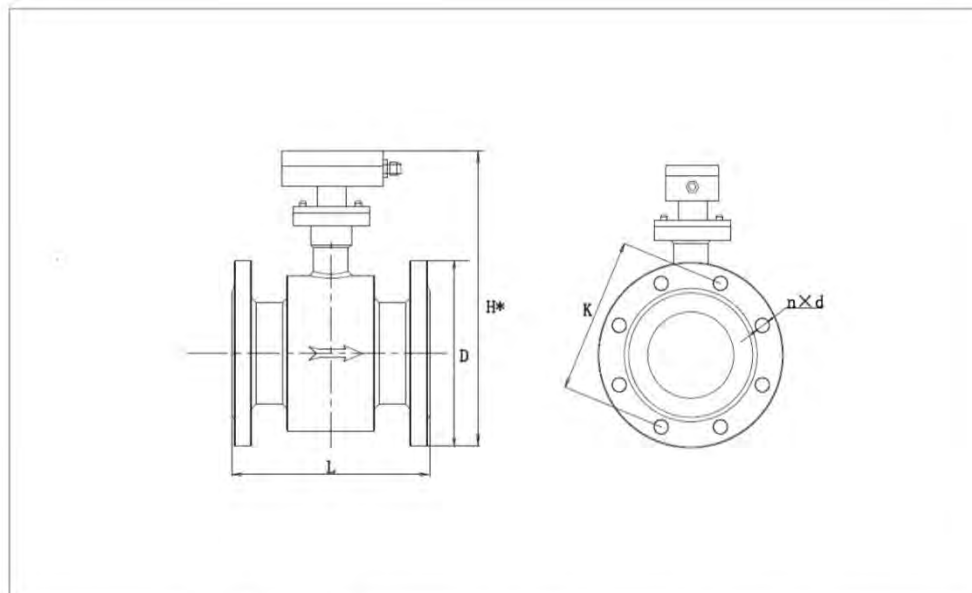
6. Dimensions



DN10~DN2000 Electromagnetic Flow meter



Remote Version Converter



DN10~DN2000 Remote Version Electromagnetic Flow meter

Size (mm)	L (mm)	D (mm)	K (mm)	H (mm)	H* (mm)	n × d (mm)	Pressure
10	200	90	60	310	220	4 × 14	4MPa
15	200	95	65	310	220	4 × 14	
20	200	105	75	315	225	4 × 14	
25	200	115	85	325	235	4 × 14	
32	200	140	100	325	235	4 × 18	1.6MPa
40	200	150	110	340	250	4 × 18	
50	200	165	125	355	265	4 × 18	
65	200	185	145	375	285	4 × 18	
80	250	200	160	385	295	8 × 18	
100	250	220	180	415	325	8 × 18	
125	250	250	210	445	355	8 × 18	
150	300	285	240	475	385	8 × 22	
200	350	340	295	505	415	12 × 22	
250	450	395	350	590	500	12 × 22	
300	500	445	400	645	555	12 × 22	1.0MPa
350	500	505	460	695	605	16 × 22	
400	500	565	515	745	655	16 × 26	
450	550	615	565	825	735	20 × 26	
500	550	670	620	878	788	20 × 26	
600	600	780	725	988	898	20 × 30	
700	700	860	810	1095	1005	24 × 30	
800	800	975	920	1208	1118	24 × 34	0.6MPa
900	900	1075	1020	1310	1220	28 × 34	
1000	1000	1175	1120	1413	1323	28 × 36	
1200	1200	1450	1340	1525	1435	32 × 33	
1400	1400	1630	1560	1735	1645	36 × 36	
1600	1600	1830	1760	1965	1875	40 × 36	
1800	1800	2045	1970	2155	2065	44 × 39	
2000	2000	2265	2180	2365	2275	48 × 42	