HD-MF Electromagnetic Flowmeter

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

Normal Operating Conditions

Environment temperature:-25 °C~ + 60 °C

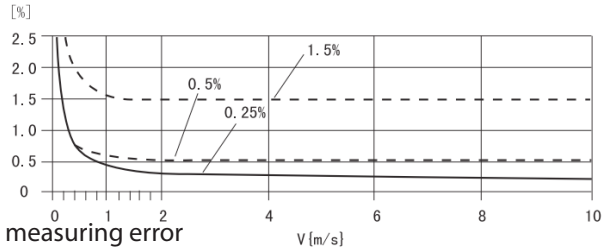
Relative Humility: 5% ~90%

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

Consumed power: less than 20W

Measuring Accuracy

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



measuring error

Output

- Analog Current Output

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

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

Intrinsic Error: o.1&% ± 10μA

- 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 Equivlent: 0.001 m^3/cp~1.000 m^3/cp; 0.001 LTR/cp ~1.000 LRT/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

Pictures - Integral, Remote and Insertion type				
Model	Standard	High Accuracy	Sanitary	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 ≥20 μs/cm)			
Size	10mm ~2000 mm	10mm ~2000 mm	10mm ~125 mm	200mm ~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/Platinoiridita/others			

Liner Material	Rubber /PTFE/PFA	PFA	PTFE
Electrodes Type	Standard		
Qty of Electrodes	2 pairs (one pair for measuring, one pair for grounding)		1 pair (measuring)
Tube Material	304 Stainless Steel		
Flange Material	Carbon steel/304 Stainless steel	304 Stainless steel	304 Stainless steel
Installation Type	Wafer/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	Exdemib II BT3~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(Mpa)	Min flow range velocity(0-0.5)m/s	Max Flow range velocity(0-10)m/s
10	4.0	(0-2.25)L/min	(0-45)L/min
15	4.0	(0-5)L/min	(0-100)L/min
20	4.0	(0-7.5)L/min	(0-150)L/min
25	4.0	(0-10L)/min	(0-200)L/min
32	4.0	(0-20L)/min	(0-400)L/min
40	4.0	(0-30L)/min	(0-600)L/min
50	4.0	(0-3)m^3/h	(0-60)m^3/h
65	4.0	(0-6)m^3/h	(0-120)m^3/h
80	4.0	(0-9)m^3/h	(0-180)m^3/h
100	1.6	(0-12)m^3/h	(0-240)m^3/h
125	1.6	(0-21)m^3/h	(0-420)m^3/h
150	1.6	(0-30)m^3/h	(0-600)m^3/h
200	1.6	(0-54)m^3/h	(0-1080)m^3/h
250	1.6	(0-90)m^3/h	(0-1800)m^3/h

300	1.0	(0-120)m^3/h	(0-2400)m^3/h
350	1.0	(0-165)m^3/h	(0-3300)m^3/h
400	1.0	(0-225)m^3/h	(0-4500)m^3/h
500	1.0	(0-330)m^3/h	(0-6600)m^3/h
600	1.0	(0-480)m^3/h	(0-9600)m^3/h
700	1.0	(0-660)m^3/h	(0-13200)m^3/h
800	1.0	(0-900)m^3/h	(0-18000)m^3/h
900	1.0	(0-1200)m^3/h	(0-24000)m^3/h
1000	1.0	(0-1350)m^3/h	(0-27000)m^3/h
1200	0.6	(0-2100)m^3/h	(0-42000)m^3/h
1400	0.6	(0-2700)m^3/h	(0-54000)m^3/h
1600	0.6	(0-3600)m^3/h	(0-72000)m^3/h
1800	0.6	(0-4500)m^3/h	(0-90000)m^3/h
2000	0.6	(0-5700)m^3/h	(0-114000)m^3/h
2200	0.6	(0-6900)m3/h	(0-140000)m^3/h

2) Model Selection

Table 3

Item	Code	Description
Factory Mark		
Meter Type	SE11	Standad (0.5% accuracy ,DN10~DN2000)
	SE12	High Accuracy (0.25% accuracy,DN10~DN2000)
	SE13	Sanitary type (0.5% accuracy,DN10~DN125)
	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	Polychlorobutadiene rubber
	L5	Polyurethane rubber

Rated Pressure(MPa)	4	DN10~80
	1.6	DN100~150
	1	DN200~1000
	0.6	DN1100~2000
	0.25	DN2200~DN3200
Working Temperature	E	<60℃
	H	<160℃
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 10meters)
Output Signal Communication	S0	4~20mA
	S1	RS-485
	S2	Hart
	S3	Profibus-DP*1
	S4	Pulse Output
Housing Material	H0	CS
	H1	304 SS
	H2	Special Demand
Material of Body Flange	F0	CS
	F1	304 SS
	F2	Speical Demand
Companion Flange	0	No
	1	With
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 IIBT3~BT6

3) Selection of Liner

Table 4

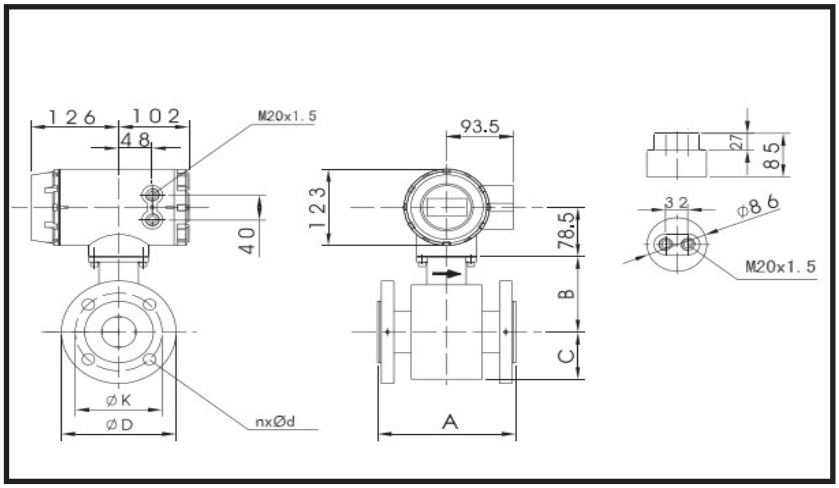
Material of Liner	Main Functions	Max Fluid Temperature		Application
		Integral	Remote	
Teflon (PTFE)	1. Most steady plastic of chemical living energy; resist boiling hydrochloric acid, sulfuric acid, nitric acid, nitro- hydrochloric acid, thick alkali and all kinds of organic solvent; not resist chlorine trifluoride, chlorine trifluoride of high temperature, liquid fluorine of high rate, liquid fluorine, corrosion of ozone 1. Performance of resisting abrasion not as good as polyurethane rubber 2. Capability of resisting sub atmospheric pressure not as good as polychlorobutadiene rubber	120 ℃	100℃ 150℃	1. Thick acid, alkali, etc. with strong corrosion 2. Sanitary mediums
F46			Same above	
Fs	Upper limit of suitable temperature lower than teflon, as well as cost	70 ℃	80℃	
Polychlorobutadiene rubber	1.Excellent elasticity, high strength of pulling apart, good performance of resisting abrasion 2.Resist corrosion of generally low- density acid, alkali and salt; not resist corrosion of oxidized matters		80℃ 120℃	Water, sewage, mud and pulp with weak abrasion
Polyurethane rubber	1.Strong performance of resisting abrasion 2. Poor performance of resisting corrosion		80℃	Neutral pulp, coal and mud with strong abrasion

4) Selection of Materials of Electrodes

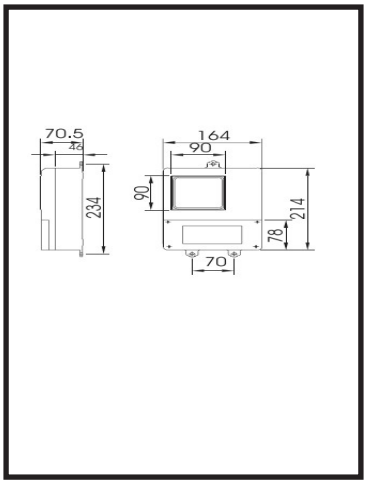
Table 5

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 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	

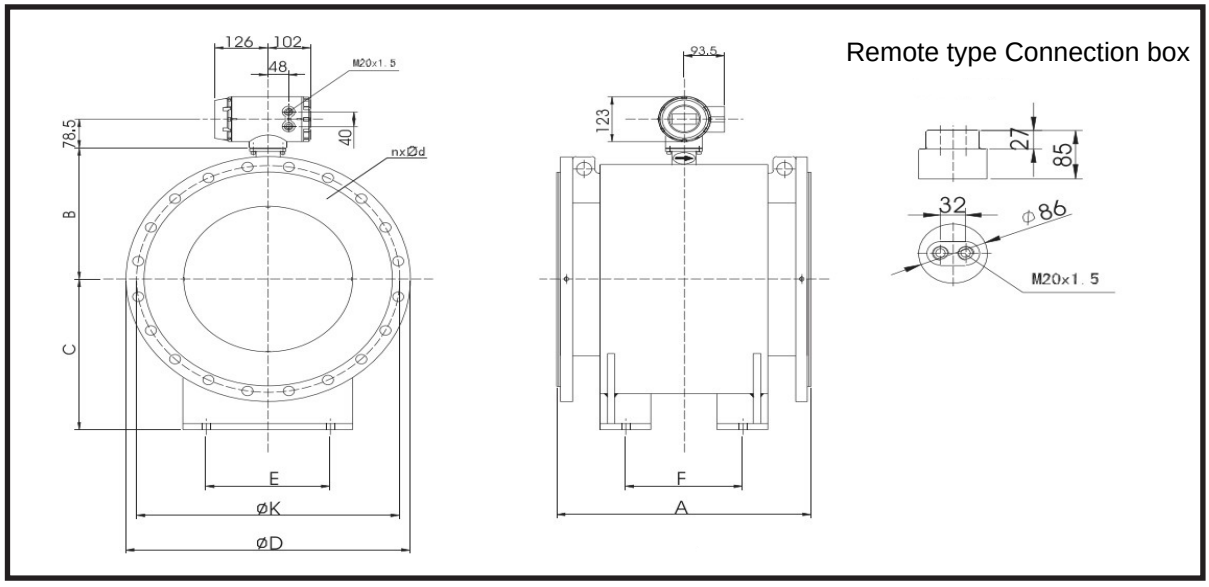
6. Dimensions



DN10~DN450 Electromagnetic Flow meter



Remote Version Converter



Above DN500 Electromagnetic Flow meter

Table 6

DN	Pressure	Dimensions (unit:mm) PFFE & Rubber Liner							
	MPa	A	B	C	E	F	θ D	θ K	nxθ d
10	4.0	150	95	50			90	60	4xθ 14
15							95	65	4xθ 14
20							105	75	4xθ 14
25			100	55			115	85	4xθ 14
32			105	60			140	100	4xθ 18
40			110	65			150	110	4xθ 18
50		197/202	121	76			165	125	4xθ 18
65			130	85			185	145	8xθ 18
80			135	90			200	160	8xθ 18
100	1.6	247/252	145	100			220	180	8xθ 18
125		247/252	161	116			245	210	8xθ 18
150		297/302	171	126			280	240	8xθ 22
200		348/352	199	154			335	295	12xθ 22
250		398/402	224	179			405	355	12xθ 26
300	1.0	498/502	249	204			440	400	12xθ 22
350			274	229			500	460	16xθ 22
400		598/602	305	260			565	515	16xθ 26
450			330	285			615	565	20 xθ26
500		/600	360	403	300	240	670	620	20 xθ26
600		/600	410	453		270	780	725	20 xθ30
700		/700	467	560	400	350	895	840	24 xθ30
800		/800	517	610		400	1010	950	24 xθ33
900		/900	567	660		470	1110	1050	28 xθ33
1000		/1000	617	712		570	1225	1160	28 xθ36
1200	0.6	/1200	719	814	600	710	1400	1340	32 xθ33
1400		/1400	819	914		900	1625	1560	36 xθ36
1600		/1600	919	1036	800	1040	1825	1760	40 xθ36
1800		/1800	1021	1138		1180	2045	1970	44 xθ39
2000		/2000	1121	1238		1350	2265	2180	48 xθ42
2200	1.0	/2200	1280	1380	900	1500	2550	2440	52 xθ56