FM10
Electromagnetic Flowmeter

The electromagnetic flow meter is composed of two parts, the sensor and the converter. It is based on the work of Faraday's law of electromagnetic induction. It is used to measure the volume flow of a conductive liquid. It is a speed instrument. Besides measuring the volume flow rate of general conductive liquids, it can also be used to measure the volumetric flow rate of strong liquid and strong corrosive liquids such as strong acid and strong alkali, and even liquid solid two phase suspension liquid such as slurry, pulp and pulp. It is widely used in the fields of petroleum, chemical, metallurgical, textile, papermaking, environmental protection, food and other industrial departments and municipal administration, water conservancy construction, river dredging and so on.

The electromagnetic flow meter is specially designed and designed for the measurement of the two network flow in the thermal industry. According to the special requirements of the thermal industry, it is tailored to be customized. It is highly targeted and cost-effective. Widely used in the heating industry exchange station two net water supply, backwater flow measurement.

Product Series

Measuring principle

FM10 Series Electromagnetic Flow Meter consists of sensor & convertor. Typical structure of sensor is shown as following, measuring tube is equipped magnet exciting coil. The convertor provide current to magnet exciting coil and generate magnetic field which filled measuring tube, one or more pairs of electrode which are fixed in inner-wall of the measuring tube(verticale to field direction) detect and lead to induced electromotive force after contact liquid, then delivery to convertor through cable and do signal processing. Insulation lining is fixed in inner-wall of the measuring tube, and make the measuring tube high resistant and nonmagnetic. Lining contacts with the measuring fluid, different causticity, abrasiveness and temperature of fluid choose different types of lining.

Electromagnetic Flow Meter features

• Specially designed for the thermal industry, the target is strong, and the price ratio is high;
• Without any flow resistance component, it will not cause loss of net;
• The precision is high, the data is stable and the reaction is sensitive;
• In accordance with the long-term application of the design below 150 ℃ ;
• Strong corrosion resistance;
• Strong anti fouling ability;
• The range of measurement is strong and the resolution of the signal is high;
• Simple installation, no special tools, field connection debugging is easy to understand;
• It can output 4 ~ 20mA current, pulse, and integrate 485 communication, and can realize centralized control of data remote transmission.

## Electromagnetic Flow Meter Technical Parameter

Standard of execution	Electromagnetic flow meter (JB/T9248-1999)
Nominal path (mm) (Customizable)	Pipe type PTFE lining
	Tubular chloroprene rubber lining
Flow direction	Positive, negative, net flow
Range ratio	20 : 1
Repeatability	±0.1%
Accuracy	±0.5% ±1.0%
Temperature	Conventional rubber lining:-20~+60℃
	High-temp rubber lining:-20~+90℃
	PTFE lining:-30~+120℃
	High-temp PTFE lining:-20~+160℃
Working pressure	DN4 ~ DN50 ≤ 4.0MPa
	DN65 ~ DN300 ≤ 1.6MPa
	DN300 ~ DN600 ≤ 1.0MPa
	DN700 ~ DN2000 ≤ 0.6MPa
Velocity range	0.5 ~ 10m/s
Signal output	4 ~ 20mA(Load resistance 0~750Ω), Pulse / frequency, Control electrical level

| Communication output	RS485, MODBUS, HART, Profibus-DP
Power supply	220VAC ±15%, 24VDC, Battery
Length of straight pipe	Upper reaches ≥ 5DN, Lower reaches ≥ 2DN
Connection method	Flanges are used between the flow meter and the pipe, and the flange is in line with the international: GB/T9113.1-2000
Ex-proof grade	Exd[ib]q Ⅱ CT6Gb
IP grade	IP65 - IP68
Ambient temperature	-25 ~ 60℃
Relative humidity	5% ~ 95%
Total power consumption	≤ 20W

Installation size
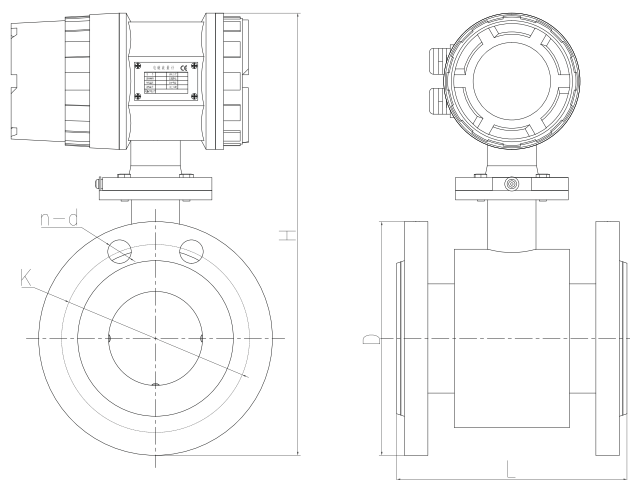
Integral type
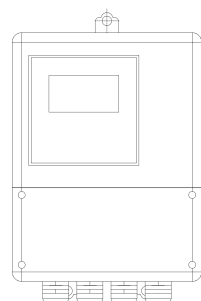
Size:165×215×70
（wide, high, and thick）
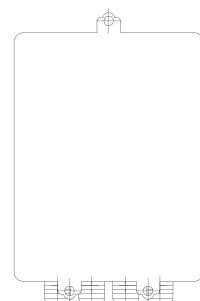
Converter installation size
(wall hanging)
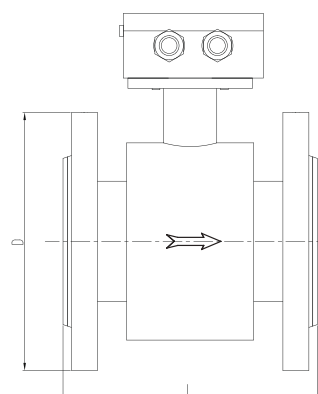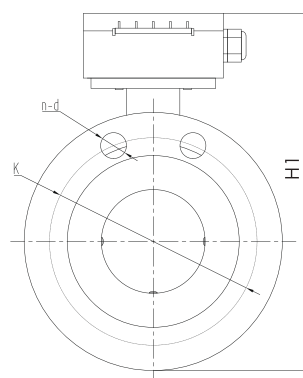
Split type

Type size and pressure

Nominal path (mm)	L (mm)	D (mm)	K (mm)	H (mm)	H_1 (mm)	n×d (mm)	Pressure grade	Special pressure grade
4	200	86	56	198	195	4×Φ14	≤ 4MPa	≤ 16MPa
6	200	90	58	210	207	4×Φ14		
10	200	90	60	299	242	4×Φ14		
15	200	95	65	299	242	4×Φ14		
20	200	105	75	304	247	4×Φ14		
25	200	115	85	312	255	4×Φ14		
32	200	140	100	321	264	4×Φ18	≤ 1.6MPa	
40	200	150	110	340	283	4×Φ18		
50	200	165	125	353	296	4×Φ18		
65	200	185	145	369	312	4×Φ18		
80	200	200	160	375	328	8×Φ18		
100	250	220	180	404	347	8×Φ18		
125	250	250	210	432	375	8×Φ18		
150	300	285	240	461	404	8×Φ22		
200	350	340	295	517	460	12×Φ22		≤ 2.5MPa
250	400	395	355	585	528	12×Φ24		
300	500	445	410	627	570	12×Φ24		
350	500	505	470	681	624	16×Φ24	≤ 1.0MPa	
400	500	565	525	741	684	16×Φ27		
450	550	615	565	779	722	20×Φ26		
500	550	670	620	834	777	20×Φ26		
600	600	780	725	988	898	20×Φ30		
700	700	860	810	1095	1005	24×Φ30		
800	800	975	920	1208	1118	24×Φ34		
900	900	1075	1020	1310	1220	28×Φ34	≤ 0.6MPa	≤ 1.0MPa
1000	1000	1175	1120	1413	1323	28×Φ36		
1200	1200	1450	1340	1525	1435	32×Φ33		
1400	1400	1630	1560	1735	1645	36×Φ36		
1600	1600	1830	1760	1965	1875	40×Φ36		
1800	1800	2045	1970	2155	2065	44×Φ39		
2000	2000	2265	2180	2365	2275	48×Φ42		

Electromagnetic Flow Meter Structure

FM10 Intelligent Electromagnetic Flow Meter working principle is based on Faraday's law of electromagnetic induction law: When conducting liquid do the movement of cutting magnetic line in the magnetic field, conductor generate induced electromotive force. The induced electromotive force E is:

E=KBVD
K-- Instrument constant
B-- magnetic induction
V-- the average flow rate of cross-section in measuring tube
D -- the inner diameter of tube cross-section in measuring tube

When measuring the flow rate, conducting liquid flows through the magnetic field which is vertical to the flow direction with speed V, the flow of the conducting liquid on measuring electrode induct the voltage which is direct proportion to the average flow rate, thus we can get the flow rate of the volume that through the tube as belowed formula:
Q=0.785DE / KB
In the formula:
Q-- volume flow rate   E-- inductive voltage

coil
convertor
D
electrode
electromotiv
voltage (V)
magnetic induction (B)
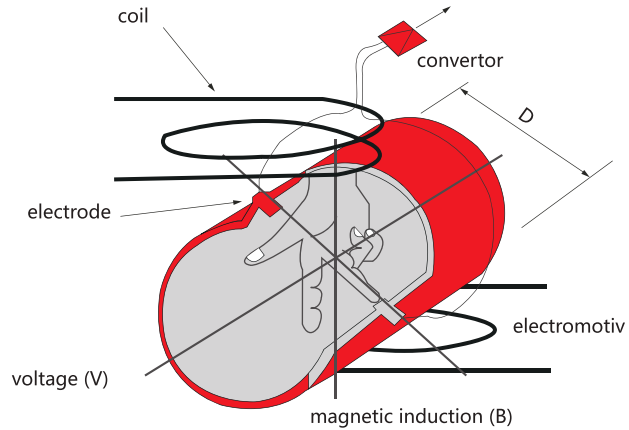
From this formula we can get, when measuring tube's structure, magnetic induction of the magnetic field is certained, volume flow rate and induced electromotive force are in direct proportion. We can get volume flow rate through the tube by measuring inductive voltage. The inductive voltage signal is checked out through one or more pairs of electrodes which contacts direcly with the liquid, and delivery to convertor through cable and process intelligently. then LCD display can show or transfer to standard signal 4-20mA, frequency signal or Hart Agreement output.

Selection Table

Electromagnetic Flowmeter

A: Clamping Type; **B**: Flanged Type

*** E.g. : 80 means DN80

A: SUS316L; **B**: Hastelloy Hb; **C**: Tantalum; **D**: Titanium; **E**: Hastelloy Hc

A: Neoprene; **B**: Polytetrafluoroethylene; **C**: Polyurethane; **D**: F46

A: Stainless steel; **B**: Carbon steel

A: Grounding Electrode (above DN50);
B: SS316L Grounding Loop (below DN40)
C: Grounding Electrode (non SS316L material for below DN50)

A: 4.0 MPa; **B**: 1.0 MPa; **C**: 0.6 MPa; **D**: 2.5 MPa

A: ≤60℃; **B**: ≤180℃

A: Integrate Type; **B**: Split Type

A: Pulse Output; **B**: 4-20mA; **C**: Hart

A: 220VAC; **B**: 24VDC

A: IP65; **B**: IP68

A: Non;
E: Explosion-proof

Product Series	Installation Form	Nominal Diameter	Electrode Type	Inner-lining Material	External Flange&Housing Material	Grounding Loop or Grounding Electrode	Rating Pressure Level	Working Temperature	Convertor	Output Signal	Power	Protection Grade	Explosion-proof
FM10	-□	□□	□	□	□	□	□	□	□	□	□	□	□

Sizes-Flow-Current Speed

Speed (m/s) Flow(m³/h) / Size(mm)	0.3	0.4	0.5	1	2	3	4	5	6	7	8	9	10
4	0.014	0.018	0.022	0.045	0.09	0.14	0.18	0.23	0.27	0.32	0.36	0.41	0.45
6	0.03	0.04	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
10	0.09	0.11	0.14	0.28	0.57	0.85	1.1	1.4	1.7	2	2.3	2.5	3
15	0.2	0.3	0.4	0.6	1.3	1.9	2.5	3.2	3.8	4.5	5.1	5.7	6
20	0.4	0.5	0.6	1.1	2.3	3.4	4.5	5.7	6.8	7.9	9	10	15
25	0.6	0.7	0.9	1.8	3.5	5.3	7.1	8.8	11	12	14	16	20
32	0.9	1.2	1.4	2.9	5.8	8.7	12	14	17	20	23	26	30
40	1.4	1.8	2.3	4.5	9	14	18	23	27	32	36	41	45
50	2.2	2.8	3.5	7.1	14	21	28	35	42	49	57	64	70
65	3.6	4.8	6	12	24	36	48	60	72	84	96	100	110
80	5.4	7.2	9	18	36	54	72	90	100	120	140	160	180
100	8.4	11	14	28	57	85	110	140	170	190	220	250	280
125	14	17	22	44	80	130	170	220	260	300	350	390	440
150	20	25	32	64	120	190	250	310	380	440	500	570	630
200	34	45	57	110	220	340	450	560	670	790	900	1000	1100
250	54	71	88	180	350	530	700	880	1000	1200	1400	1500	1700
300	77	100	130	250	500	760	1000	1200	1500	1700	2000	2200	2500
350	110	140	180	350	690	1000	1300	1700	2000	2400	2700	3100	3400
400	140	180	230	450	900	1300	1800	2200	2700	3100	3600	4000	4500
450	180	230	290	570	1100	1700	2300	2800	3400	4000	4500	5100	5700
500	220	280	360	710	1400	2100	2800	3500	4200	4900	5600	6300	7000
600	310	410	510	1000	2000	3000	4000	5100	6100	7100	8100	9100	10000
700	420	550	700	1400	2700	4100	5500	7000	8300	9600	11000	12000	13000
800	550	720	910	1800	3100	5400	7200	9000	10000	12000	14000	16000	18000
900	690	920	1200	2300	4500	6800	9100	11000	13000	16000	18000	20000	22000
1000	850	1100	1500	2800	5600	8500	11000	14000	16000	19000	22000	25000	28000
1200	1300	1600	2100	4100	8100	12000	16000	20000	24000	28000	30000	32000	40000
1400	1700	2200	2800	5500	11000	16000	22000	27000	33000	38000	44000	50000	55000
1600	2200	2900	3700	7200	14000	21000	29000	36000	43000	50000	57000	65000	72000
1800	2800	3700	4600	9200	18000	27000	36000	45000	54000	64000	73000	82000	91000
2000	3400	4500	5700	11000	22000	34000	45000	56000	67000	79000	90000	100000	110000
2200	4200	5500	6900	14000	27000	41000	54000	68000	82000	95000	110000	120000	130000
2400	4900	6500	8200	16000	32000	48000	65000	81000	97000	110000	130000	140000	160000
2600	5800	7600	9600	19000	38000	57000	76000	95000	110000	130000	150000	170000	190000
2800	6700	8900	12000	22000	440000	66000	88000	110000	130000	150000	170000	190000	220000
3000	7700	10000	13000	25000	50000	76000	100000	120000	150000	170000	200000	220000	250000