



Product Specification

EFM Series - Electromagnetic Flow Meter



ABACO HYDRONICS



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Applications

The EFM Series can be applied to a variety of conductive liquid measurement such as water, sewage, mud, pulp, beverages, chemicals, viscous liquids and suspensions. EFM has Compact Type and Remote Type. If you choose compact type, means the calculator and flowsensor will be mounted in same place; while the remote type means calculator mounted in different place, the largest distance between calculator and flow sensor is 100m. Default is compact type.

Features

- No moving parts inside the tubes, unimpeded flow components, measuring almost no additional pressure loss.
- Measurement results is irrelevant with the velocity distribution, fluid pressure, temperature, density, viscosity and other physical parameters.
- Measurement results is irrelevant with the velocity distribution, fluid
- High-resolution backlit LCD display, the entire Chinese menu operation, ease of use, simple operation, easy to understand.
- SMD devices and the use of surface-mount (SMT) technology, high reliability circuit.
- A 16-bit embedded microprocessors, the computing speed, high precision, low-frequency programmable frequency rectangular wave excitation, improved flow measurement stability, low power consumption.
- All digital processing, anti-jamming capability is strong, reliable measurement, high precision flow measurement range up to 150:1 ultra-low EMI switching power supply, changes in the scope of application of the supply voltage, anti-EMI good performance.
- Three Totalizer with internal device can be displayed in reverse positive cumulative total volume and margin Totalizer volume, with no power off internal clock can record 16 power off time.
- With RS485, RS232, Hart Modbus and other digital communications and signal output.
- A self-inspection and self-diagnosis function.

Principle of Measurement

According to Faraday Law, the flowmeter is used to measure volumetric flowrate for inductive liquids and pulps.

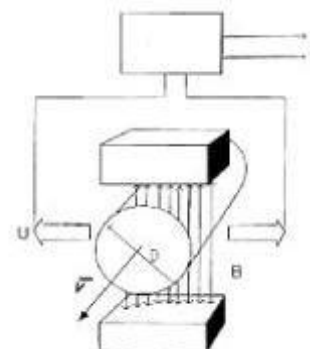
K — Sensor corrected factor.

B – Magnetic flux density (Induction), its direction is right angle to flow direction.

V – Velocity of fluid.

d – Inner diameter of the measuring tube.

$$E = KBdV$$



Technical data

DN (mm):

PTFE: 10,15,20,25,32,40,50,65,80,100,125,
150,200,250,300,350,400,450,500,600
Soft Rubber: 40,50, 65,80,100,125,150,200,250,300,
350,400,450,500,600,800,1000

Other sizes can be customized **FLOW:**

Positive and negative flow respectively

Repeatability: $\pm 0.1\%$

Accuracy: 0.5, 1.0

Operating temperature:

Rubber lining: $-20\sim+60^{\circ}\text{C}$

High-temperature rubber: $-20\sim+90^{\circ}\text{C}$

PTFE: $-30\sim+100^{\circ}\text{C}$

High-temperature PTFE: $-30\sim+180^{\circ}\text{C}$

Pressure:

DN10 ~ DN65: ≤ 2.5 Mpa

DN80 ~ DN150: ≤ 1.6 Mpa

DN200 ~ DN1000: ≤ 1.0 Mpa

Velocity rang: 0.3~15m/s

Conductivity of fluid: $\geq 5\mu\text{S/cm}$

Current out put: 4-20mA with electric isolation

Load Resistance: $<750\ \Omega$

Pulse output: 0-1KHZ

External Power Supply: $\leq 35\text{V}$

Photoelectric isolation: OCT

Material of electrode:

Stainlesssteel, HastelloyB, HastelloyC, Titanium, Tantalum

Housing protection:

IP68(only for remote version), IP65(others)

Power supply:

85~265V, 45~63HZ

Requirement for straight pipes:

Upstream $\geq 5\text{DN}$, Downstream $\geq 2\text{DN}$

The dimension of the connecting flanges should accord to GB9119-88 standards.

EX: md II BT4

Temperature Limits: $-25^{\circ}\text{C}\sim+60^{\circ}\text{C}$

Ambient Humidity: 5%~95%

Power: $<20\text{W}$

Type Selection

DN（mm）	10	15	20	25	32	40	50	65
Qmin(m³/h)	0.0283	0.0636	0.12	0.176	0.29	0.452	0.7	1.19
Qmax(m³/h)	4.24	9.54	16.96	26.5	43.42	67.85	106.0	179.0
DN（mm）	80	100	125	150	200	250	300	350
Qmin(m³/h)	1.8	2.82	4.04	6.36	11.3	17.6	25.4	34.6
Qmax(m³/h)	271.0	424.0	662.0	954.0	1690	2650	3810	5190
DN（mm）	400	450	500	550	600	700	800	900
Qmin(m³/h)	45.2	57.2	77.6	85.5	101.0	138.0	180.0	229.0
Qmax(m³/h)	6780	8570	10600	12800	15200	20700	27100	34300
DN（mm）	1000	Type Selection Example: EFM-010 (Qmin=0.0283 m³/h, Qmax=4.24m³/h) EFM-500 (Qmin=77.6 m³/h, Qmax=10600m³/h)						
Qmin(m³/h)	282.0							
Qmax(m³/h)	42400							

Conductivity of fluid

Liquid	Conductivity of fluid ($\mu\text{S/cm}$)	Liquid	Conductivity of fluid ($\mu\text{S/cm}$)
Acid	$10\times 10^4\sim 80\times 10^4$	Beer	600~800
Lye	$8\times 10^4\sim 30\times 10^4$	Malt juice	500~1000
Distilled water	0.01-5	Milk	200~300
Water and beverages	200-800	Water Jam	400~1000

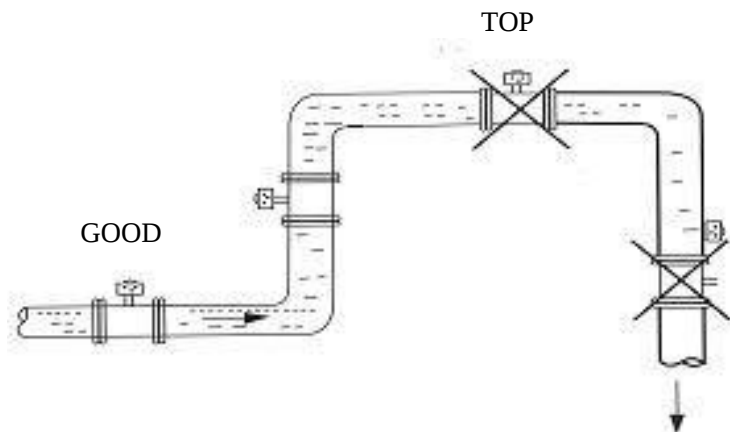
Installation

Location of installation:

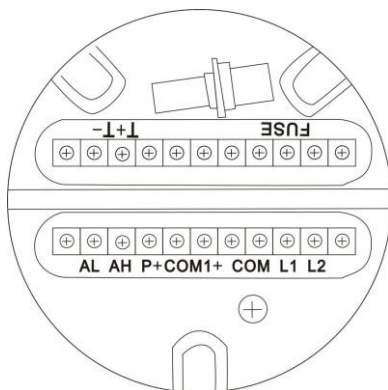
- 1) Avoid a strong electromagnetic field equipment (such as big motor, large transformers, etc.), against the magnetic field sensor impact.
- 2) It should be installed in the ventilation in the dry, avoid moist and stagnant water.
- 3) The all-weather cover should be used to prevent the housing from the direct sunlight or rain when the device in the open. The flowmeter should avoid the excessive vibration, high changing ambient temperature and long-time shower.
- 4) The electromagnetic flowmeter must be installed in the pipe fully filled with medium.

Requirement of installation:

- 1) Installation may be horizontal or vertical, but make sure no deposit on the electrodes when horizontal installation.
- 2) The electromagnetic flowmeter should not be installed in the pipe section with a free pipe outlet that could run empty. When installation in a downstream pipe, please make sure the pipe is always fully filled with medium.
- 3) The electromagnetic flowmeter should not be installed at the highest point of the pipe because of the accumulation of gas.
- 4) Requirement for straight pipes : $\geq 5DN$, Downstream $\geq 2DN$



Links and labels of connectors



Compact Type

Up: T-T+ RS485

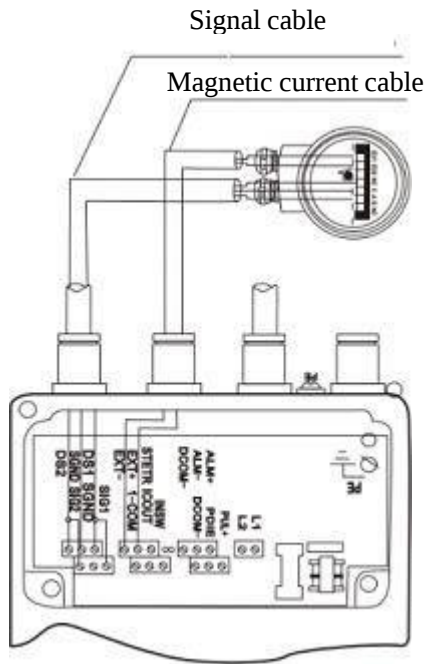
FUSE Fuse for Power Supply

Down: AL, AH... Alarm Output for Low/Upper Limit

P+, COM Frequency (Pulse), COM

1+, COM 4~20mA

L1, L2 Power 220V (other 24VDC)



Remote Type

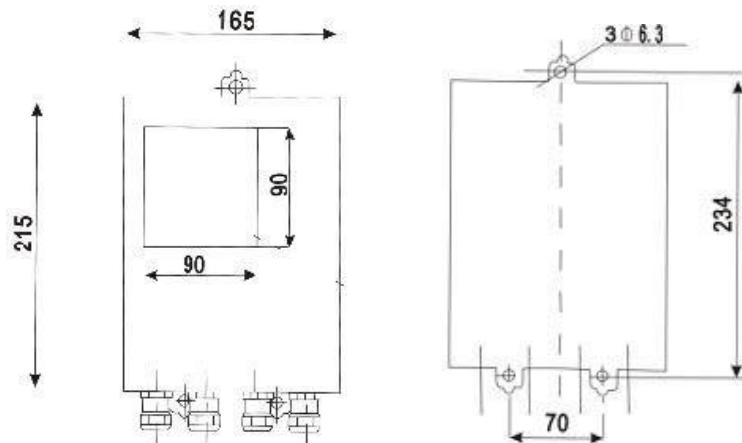
UP: DS2, SGND, DSSignal shielding (steel mesh)
 EXT-, EXT+ Excitation coil
 TR, TR+ RS485
 COM, ALM+, ALM-...Alarm Output for Low/Upper Limit
 L1, L2 Power 220V (other 24VDC)

Down: SIG2, SGND, SIG1Signal electrode
 1-COM, ICOUT, INSW...For forward/reverse direction
 INSW is empty
 PCOM, PUL-, PUL+ For forward/reverse Pulse
Sensor: SIG1, SIG2, SGNDSignal electrode
 DS1, DS2Signal shielding (copper mesh)
 EXT+, EXTExcitation coil

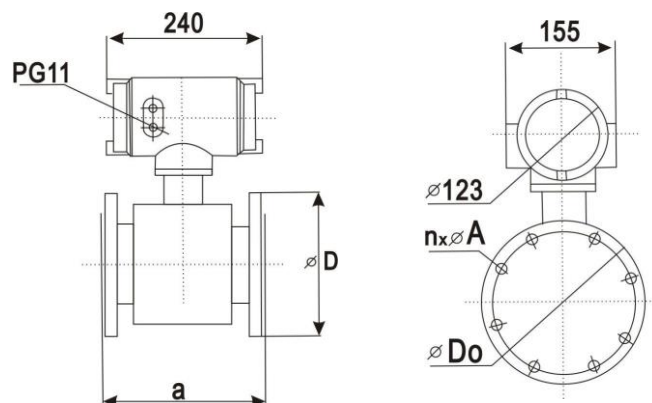
Dimension

Calculator Dimension for Remote Type Meter

Note: the meter body dimension is same with Compact Type.



Dimension for Compact Type



DN	a	D	Do	n×A
10	230	90	60	4×14
15	230	95	65	4×14
20	230	105	75	4×14
25	230	115	85	4×14
32	230	140	100	4×18
40	230	150	110	4×18
50	230	165	125	4×18
65	230	185	145	8×18
80	230	200	160	8×18
100	230	220	180	8×18
125	280	250	210	8×18
150	280	285	240	8×22
200	310	340	295	8×22
250	360	395	350	12×22
300	460	445	400	12×22
350	460	505	460	16×22
400	460	565	515	16×26
450	460	615	565	20×26
500	600	670	620	20×26
600	600	780	725	20×30
700	700	895	840	24×30
800	800	1015	950	24×33
900	900	1115	1050	28×33
1000	1000	1230	1160	28×36