Datasheet

Electromagnetic flow meter

FMC240

Supmea®

Committed to process automation solutions

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Datasheet

Electromagnetic flow meter for flow measurement
FMC240 flow meter

Supmea's electromagnetic flow meter does not contain any moving parts, rotating gears or turbines, or bearings. Instead, it relies on two electrodes to measure the density of the induced magnetic field that results from an electrically conductive fluid, such as water, flowing through a pipe. So there is no susceptibility to bearing wear or other mechanical wear-and-tear issues.

As for the electrodes and the liner used in electromagnetic flow meter, these components can be fabricated from a variety of materials to make the mag meter compatible with virtually various electrically conductive fluid, including aggressive acids.

The only limitation of the electromagnetic flow meter is that the measured fluid media must be electrically conductive (>5μS/cm). Non-conductive fluids, such as oil and other petroleum-based fluids, cannot be measured with mag meter technology.

Applications

- Sewage treatment
- printing and dyeing
- Chemical industry
- Environmental protection
- Metallurgy
- Medicine
- Papermaking
- Tap water supply

Electromagnetic flow meter

Features

- 0.5%F.S measuring accuracy
- RS485 mod-bus communication 4-20mA output
- It can measure the flow of fluid in the forward and reverse directions.
- Unaffected by the temperature, pressure, density of the liquid.
- There is no pressure loss.
- Readings that are unaffected by changes in density or viscosity.
-

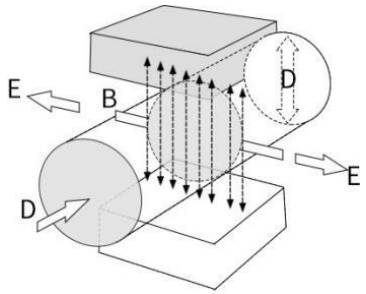
Principle

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:

$$E=K\times B\times V\times D$$

Where:

E—Induced electromotive force
K—Meter constant
B—Magnetic induction density
V—Average flow speed in cross-section of measuring tube
D—Inner diameter of measuring tube

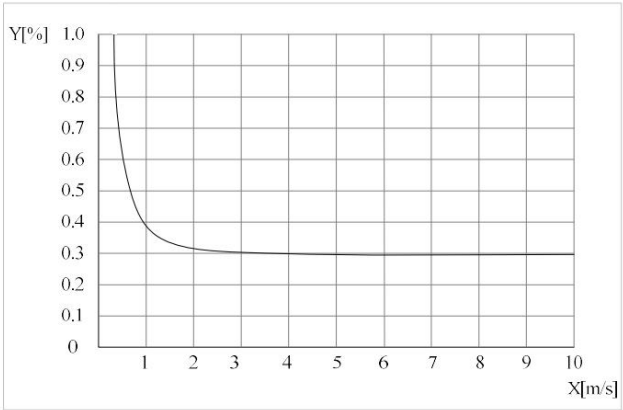


The induced voltage signal is detected by two electrodes and transmitted to the converter via a cable. After a series of analog and digital signal processing, the accumulated flow and real-time flow are displayed on the display of the converter.

Accuracy

Reference condition

(1) Medium: water
(2) Temperature: 20℃
(3) Pressure: 0.1MPa
(4) Front straight conduit:
≥10DN, Rear straight conduit: ≥5DN



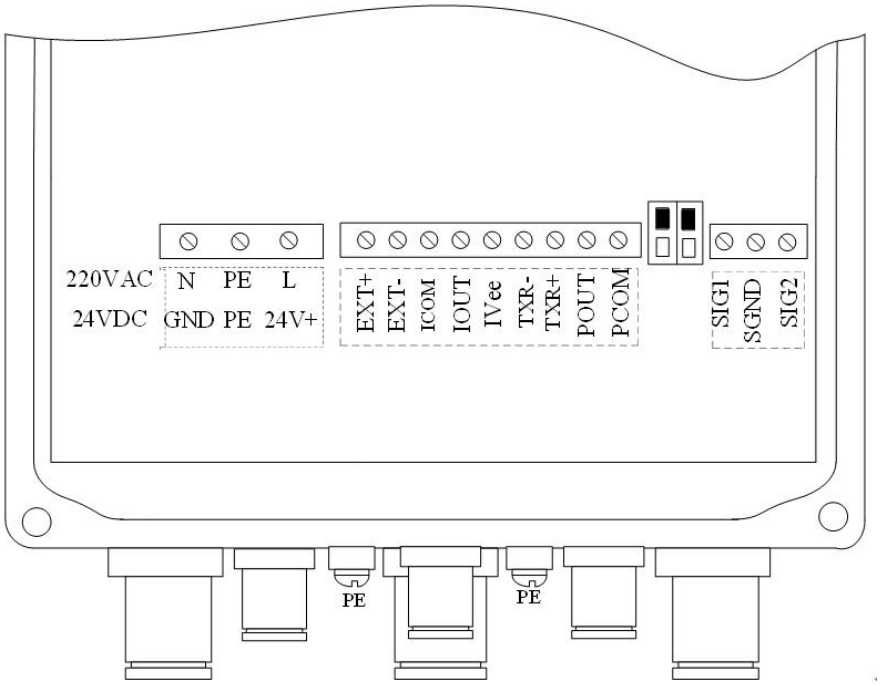
① X[m/s]: Flow rate
② Y[%]: Actual measured value deviation （mV）

Parameters

Execution Standard	JB/T9248-2015	
Measuring principle	Faraday's law of electromagnetic induction	
Function	Real-time flow rate, flow velocity, mass flow (when the density is constant), real-time measurement and flow accumulation	
Converter		
Compact Type	IP65	
Remote Type	IP65 for transmitter (IP65/IP68 for sensor)	
Measurement sensor		
Nominal Diameter	DN10~DN300	
Flange	In line with JB/T9248-2015 standard carbon steel (Optional stainless steel flanges), other standard flange can be customized	
Pressure rating (High pressure can be customized)	DN15 - DN250, PN≤1.6MPa DN300, PN≤1.0MPa	
Lining Material	Neoprene (CR), Polyurethane (PU), PTFE (F4), PFEP (F46), PFA	
Electrode Material	316L Stainless Steel, Hastelloy C, Hastelloy B, Ti, Ta, Pt	
	Remote type	Compact type
Ingress protection	IP65 for converter, IP68 for sensor	IP65
Medium temperature	Neoprene:-10℃ ~ 70℃ Polyurethane:-10℃~ 60℃ PTFE/FEP:-10℃~ 120℃ PFA:-10℃~ 180℃	Neoprene:-10℃~ 70℃ Polyurethane:-10℃~ 60℃ PTFE/FEP:-10℃ ~ 120℃ PFA:-10℃ ~ 120℃
Serial communications	Modbus RS-485	
Output	Current (4~20 mA) , pulse , frequency	
Function	Empty pipe recognition, electrode contamination,upper limit alarm, lower limit alarm	
Graphic display	Monochrome LCD display with white backlight	
Display function	2 measurement value pictures (measurements, condition, etc)	
Language	English/Chinese	
Unit	You can configure the menu to select the unit Refer to User manual “6.4”	
Operating unit	4 Mechanical keys	
Max measuring error	Measurement value ±0.5%（Flow speed > 0.5m/s）; Measurement value ±0.5% ±2mm/s（Flow speed <0.5m/s）	
Repetitiveness	≤0.16%	
Temperature		
Environment	-20℃ - 60℃	
Storage	-40℃ - 65℃	
Sensor housing	Carbon steel,stainless steel 304, stainless steel 316L	
Converter	Standard painted die cast aluminum	
Power supply	220VAC,24VDC,12VDC (Low power consumption)	

Power consumption	Max 15W, minimum 3W (12VDC power supply, suitable for solar power supply occasions)
Signal cable	Apply only to remote type
	Current output
Function	Measurement of volume and quality (in the case of constant density)
Setting	Scope 4-20mA Max 20mA Min 4mA
Passive	Corresponding terminal IVee, IOUT, support 5-24VDC external power supply
Load	250Ω，Max 1000Ω
	Pulse and frequency output
Function	Set up Pulse and frequency output
Pulse output	Basis Output pulse width: 0.1ms~100ms Setting 0.001L~10000.000L
Frequency	Max Fmax ≤ 10000Hz Setting 0~10000Hz
Active	Turn the two red DIP switch to the ON position
Passive	Turn the two red DIP switch to the ON position
Material	Corrosion Resistance
Molybdenum-containing stainless steel (0Cr18N12Mo2Ti)	Applicable: Domestic/industrial water, sewage, weak acid and alkali saline as well as concentrated nitric acid at room temperature. Not Applicable：Hydrofluoric acid, hydrochloric acid, chlorine, bromine, iodine and other media.
Parameters	
Material	Corrosion Resistance
Molybdenum-containing stainless steel (0Cr18N12Mo2Ti)	Applicable: Domestic/industrial water, sewage, weak acid and alkali saline as well as concentrated nitric acid at room temperature. Not Applicable：Hydrofluoric acid, hydrochloric acid, chlorine, bromine, iodine and other media.
Hastelloy B	Applicable: Non-oxidizing acid, such as hydrochloric acid and hydrofluoric acid of certain concentration and other alkali liquor with a concentration of no less than 70% sodium hydroxide Not Applicable: Nitric acid and other oxidizing acids
Hastelloy C	Applicable: corrosion by oxidizing acids such as Nitric acid, acid mixtures and sulfuric acid and environmental corrosion by oxidation resistant salt or that contains other oxidants. For example, Hypochlorite solution higher than room temperature is strongly corrosion resistant to sea water. Not Applicable: Reducing acid and chloride such as hydrochloric acid
Ti	Applicable: chloride, hypochlorite, sea water, oxidizing acid. Not applicable: reducing acid such as hydrochloric acid, sulphuric acid
Ta	Applicable: most acids like concentrated hydrochloric acid, nitric acid and sulfuric acid including hydrochloric acid and nitric acid at the boiling point as well as sulfuric acid under 175 ℃. Not applicable: alkali, hydrofluoric acid and smoke sulfuric acid.
Pt	Various acids, bases and salts, excluding aqua regia.

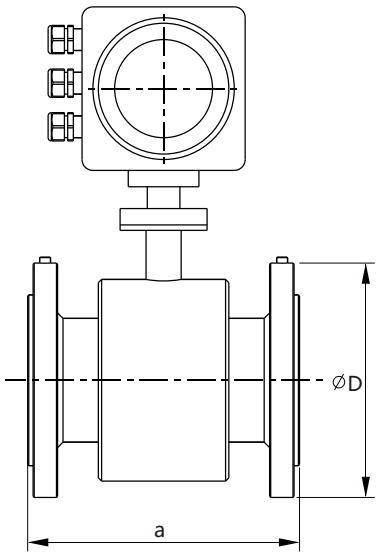
Wiring

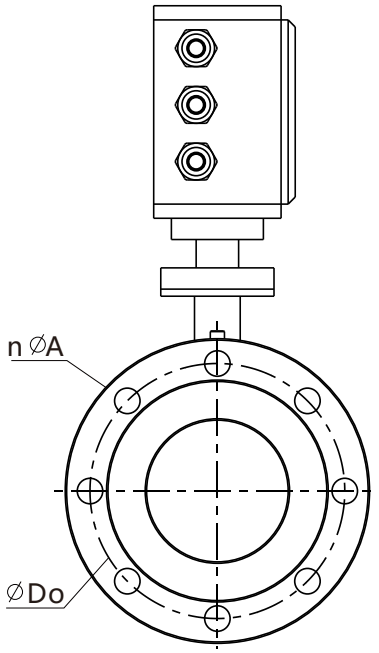


- Connect the sensor:
  SIG 1: Signal 1
  SGND: signal ground
  SIG 2: Signal 2
  EXT + : Excitation current +
  EXT - : Excitation current-

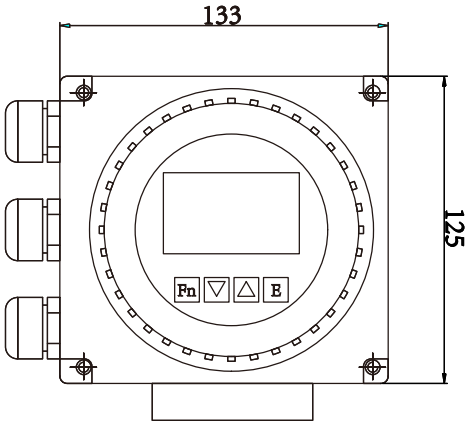
- Current output
  IVee: Current output power supply
  IOUT: Current output
  ICOM: Current output ground
  Frequency or pulse output:
  POUT: Frequency (pulse) output
  PCOM: frequency (pulse) output ground
  Communication output:
  TXR+: Communication input (485+)
  TXR -: Communication input (48

Dimension

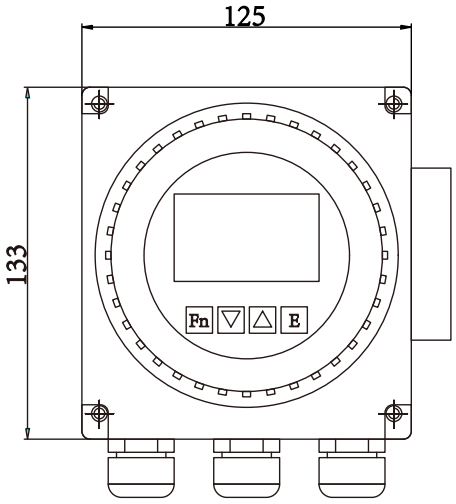




DN	a	D	Do	n*A	pressure rating
10	200	90	60	4*14	1.6Mpa
15	200	95	65	4*14	
20	200	105	75	4*14	
25	200	115	85	4*14	
32	200	135	100	4*18	
40	200	145	110	4*18	
50	200	160	125	4*18	
65	200	180	145	4*18	
80	200	195	160	8*18	
100	250	215	180	8*18	
125	250	245	210	8*18	
150	300	280	240	8*23	
200	350	335	295	12*23	
250	450	405	355	12*25	
300	500	440	400	12*23	1Mpa
350	550	500	460	16*23	
400	600	565	515	16*25	
450	600	615	565	20*25	
500	600	670	620	20*25	
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	
1200	1200	1405	1340	32*33	0.6Mpa
1400	1400	1630	1560	36*36	
1600	1600	1830	1760	40*36	
1800	1800	2045	1970	44*39	
2000	2000	2265	2180	48*42	



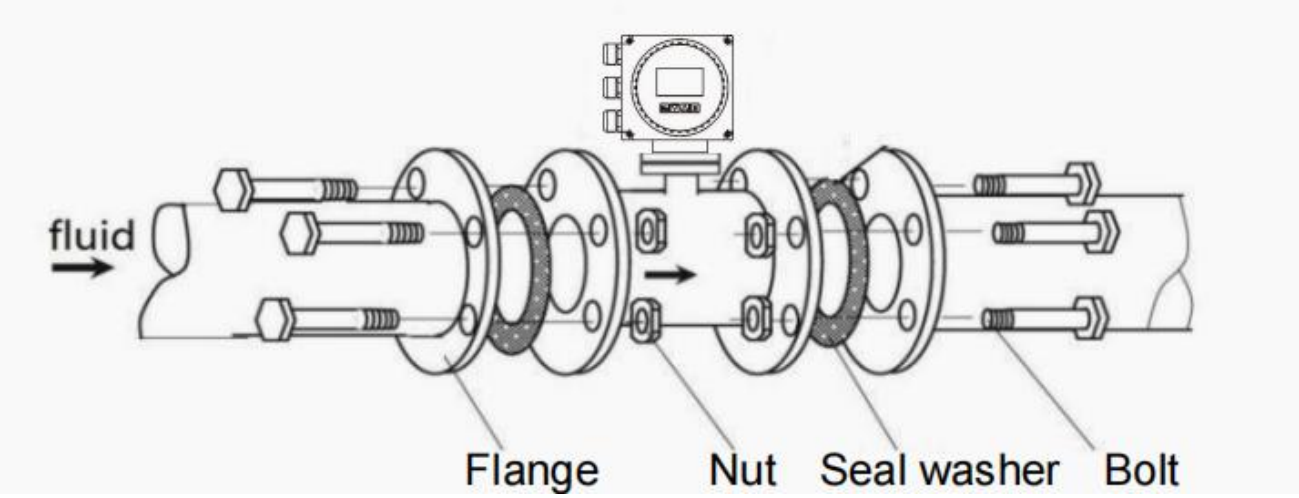
Compact type



Remote type

Installation

- 1. Installation direction: Measured fluid flow must match the flowmeter's mark.
- 2. Flange gaskets need corrosion resistance and no protrusion into the pipe.
- 3. Near sensor pipe welding/cutting, isolate to avoid lining heat deformation.
- 4. For well or underwater installation, seal sensor terminal box post-installation & debugging (if IP68, already waterproof).
- 5. On-site flowmeter installation: Connect sensor and pipe flanges with bolts. Bolts, nuts & threads should be intact, undamaged, lubricated, used with proper washers. Tighten with torque wrench per flange spec. Regularly retighten in daily use.



Ordering code

FMC240-10-J-A-MC-K-AA-M3-N6-WA-00-1-PB													Description
FMC240	-	-	-	-	-	-	-	-	-	-	-	-	
Nominal Diameter	10												DN10(3/8")
	15												DN15(1/2")
	20												DN20(3/4")
	25												DN25(1")
	32												DN32(1.25")
	40												DN40(1.5")
	50												DN50(2")
	65												DN65(2.5")
	80												DN80(3")
	1C												DN100(4")
	1E												DN125(5")
	1G												DN150(6")
	2C												DN200(8")
	2G												DN250(10")
	3C												DN300(12")
	3G												DN350(14")
	4C												DN400(16")
	4G												DN450(18")
	5C												DN500(20")
	6C												DN600(24")
	7C												DN700(28")
	8C												DN800(32")
	9C												DN900(36")
	A0												DN1000(40")
Thread Type Standard		J											JB/T 81 flange
		I											ISO2852 Clamp
		X											Other
Nominal pressure			A										PN6
			B										PN10
			C										PN16
			D										PN25
			E										PN40
			F										PN63
			X										Others
Thread Type Material and Body Material				MC									Carbon steel
				M1									304SS
				XX									Other
Accuracy					K								0.5 Class

Output and Power Supply	AA					4-20mA+pulse+RS485, 220VAC
	AM					4-20mA+pulse+RS485, 24VDC
	XX					Other
Electrode Material		M3				316LSS
		MF				Hastelloy B
		MG				Hastelloy C
		T1				Titanium
		T2				Tantalum
		MH				Platinum Iridium Alloy
		MJ				Tungsten carbide
Lining material			N6			Polytetrafluoroethylene/PTFE
			N1			Chloroprene Rubber
			N2			Polyurethane
			N7			Teflon F46/FEP
Electrical Interface, Housing Material, and Ingress Protection				WA		Integrated Type, M20×1.5 Cable Gland, Aluminum Alloy, IP65
				WC		Split Type, M20×1.5 Cable Gland, Aluminum Alloy, IP68
Split cable length					00	0m
					10	10m
					15	15m
					20	20m
					25	25m
					30	30m
					40	40m
					50	50m
					XX	Others
language						1 Chinese
						2 English
						3 Russian
						4 Spanish (Brazil)
						5 Portuguese (Brazil)
						X Other
Accessories						PB Paired with Carbon Steel Flange
						PC Paired with 304SS Flange
						PE Paired with SS316L Grounding Ring
						PF Paired with Titanium Grounding Ring