



Recorder



Flow



Pressure



Temp



Analyzer



Level

Datasheet

Electromagnetic flow meter

FMC240

Supmea[®]



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Committed to process automation solutions

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 ($>5\mu\text{S}/\text{cm}$). 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

**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.
-

Electromagnetic flow meter

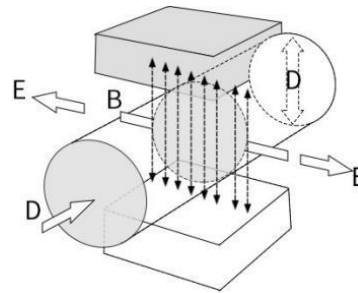
Principle

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

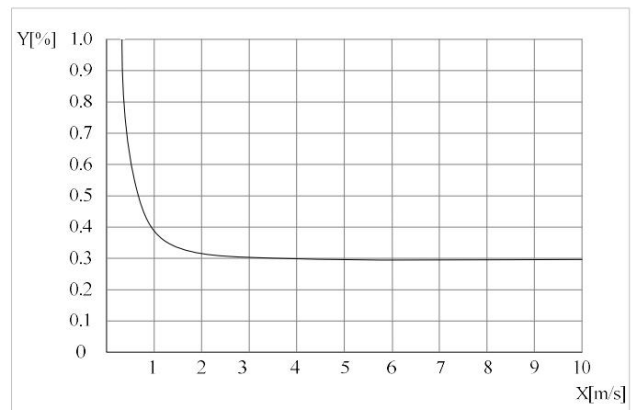


The induced voltage signal is detected by two electrodes and transmitted to the converter via a cable. After a series of analog and digital signal processing, the accumulated flow and real-time flow are displayed on the display of the converter.

Accuracy

Reference condition

- (1) Medium: water
- (2) Temperature: 20°C
- (3) Pressure: 0.1MPa
- (4) Front straight conduit: $\geq 10DN$, Rear straight conduit: $\geq 5DN$



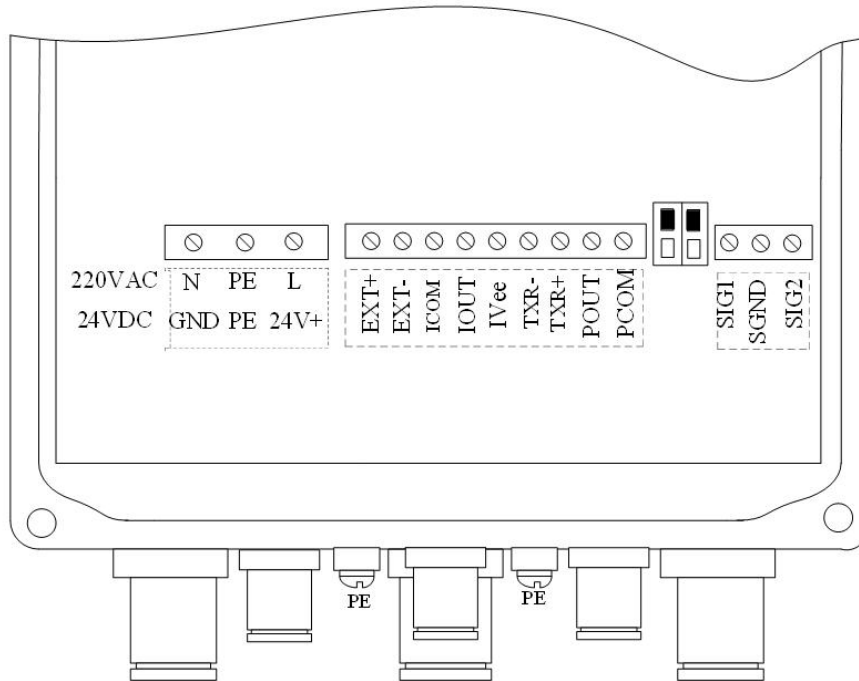
- ① X[m/s]: Flow rate
- ② Y[%]: Actual measured value deviation (mV)

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 $\pm 0.5\%$ (Flow speed > 0.5m/s) ; Measurement value $\pm 0.5\% \pm 2\text{mm/s}$ (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 I _{Vee} , IO _{UT} , 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	F _{max} ≤ 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 °C. Not applicable: alkali, hydrofluoric acid and smoke sulfuric acid.	
Pt	Various acids, bases and salts, excluding aqua regia.	

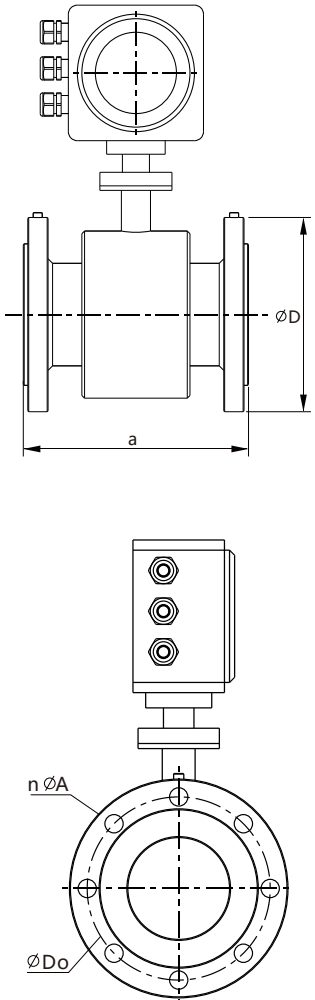
Wiring



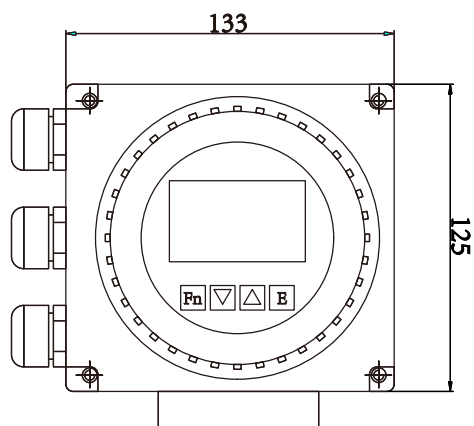
- Connect the sensor:
 - SIG 1: Signal 1
 - SGND: signal ground
 - SIG 2: Signal 2
 - EXT + : Excitation current +
 - EXT - : Excitation current-

- 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

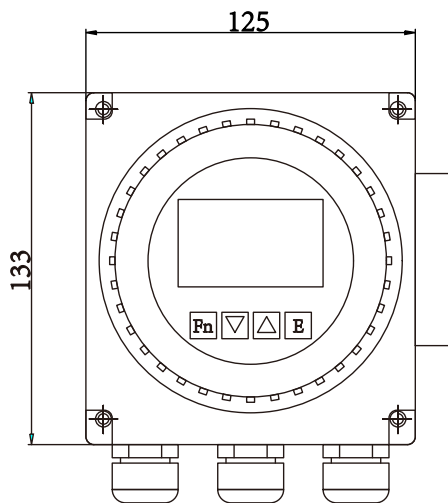
Dimension



DN	a	D	Do	n*A	Pressure resistance
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	



Compact type



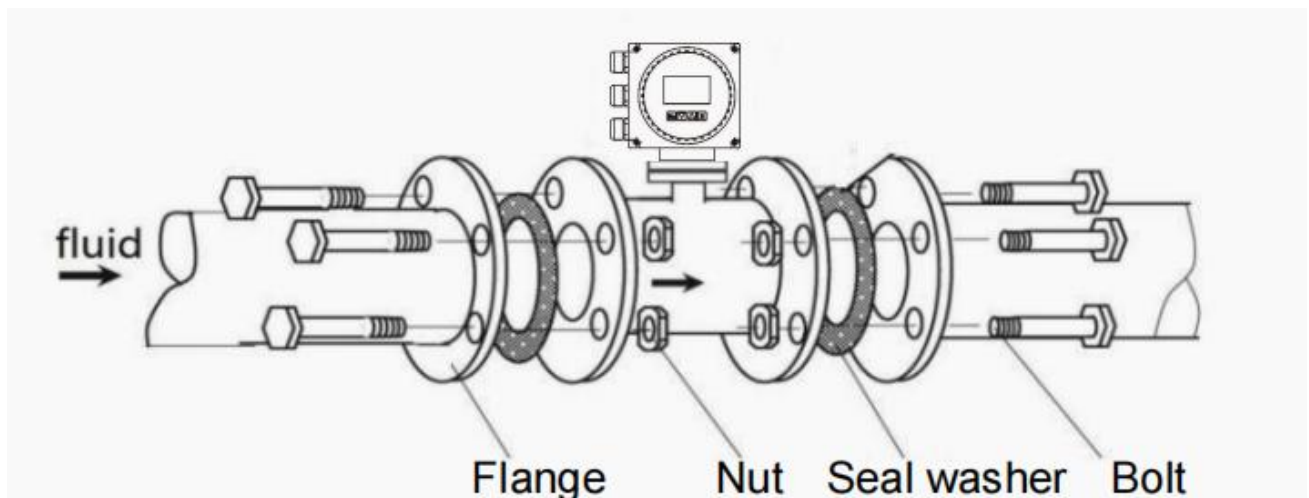
Remote type

Flow and Velocity Parallel Table for Electromagnetic Flowmeter

Flow (m ³ /h) DN (mm)	Flow rate (m/s)								
	0.1	0.2	0.4	0.5	1	10	12	15	
DN10	0.0283	0.0565	0.1131	0.1414	0.2827	2.8274	3.3929	4.2411	
DN15	0.0636	0.127	0.254	0.318	0.636	6.362	7.634	9.543	
DN20	0.113	0.226	0.452	0.565	1.131	11.310	13.572	16.965	
DN25	0.176	0.353	0.707	0.884	1.767	17.671	21.206	26.507	
DN32	0.290	0.579	1.158	1.448	2.895	28.953	34.744	43.429	
DN40	0.452	0.905	1.810	2.262	4.524	45.239	54.287	67.858	
DN50	0.707	1.414	2.827	3.534	7.069	70.690	84.823	106.03	
DN65	1.195	2.389	4.778	5.973	11.946	119.46	143.35	179.19	
DN80	1.810	3.619	7.238	9.048	18.100	181.00	217.15	271.43	
DN100	2.827	5.655	11.310	14.137	28.274	282.74	339.29	424.12	
DN125	4.418	8.836	17.671	22.090	44.179	441.79	530.14	662.68	
DN150	6.362	12.723	25.447	31.809	63.617	636.17	763.41	954.26	
DN200	11.310	22.619	45.239	56.549	113.10	1131.0	1357.2	1696.5	
DN250	17.671	35.343	70.686	88.357	176.71	1767.1	2110.6	2650.7	
DN300	25.447	50.893	101.79	127.23	254.47	2544.7	3053.6	3817.0	

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	-	-	-	-	-	-	-	-	-	-	-		
	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")
Nominal Diameter	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
			A										PN6
			B										PN10
			C										PN16
Nominal pressure			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	
					Integrated Type, M20×1.5 Cable Gland, Aluminum Alloy, IP65	
Electrical Interface, Housing Material, and Ingress Protection			WA		Split Type, M20×1.5 Cable Gland, Aluminum Alloy, IP68	
			WC			
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	