



Datasheet

Electromagnetic flow meter

FMC240

**Supmea<sup>®</sup>**

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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 ( $>5\mu\text{S/cm}$ ). Non-conductive fluids, such as oil and other petroleum-based fluids, cannot be measured with mag meter technology.

#### Application

- 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**

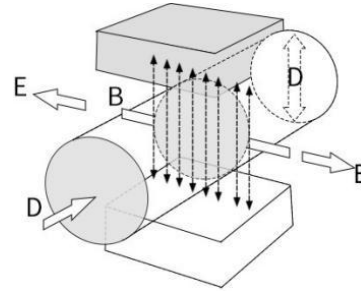
## Principle

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

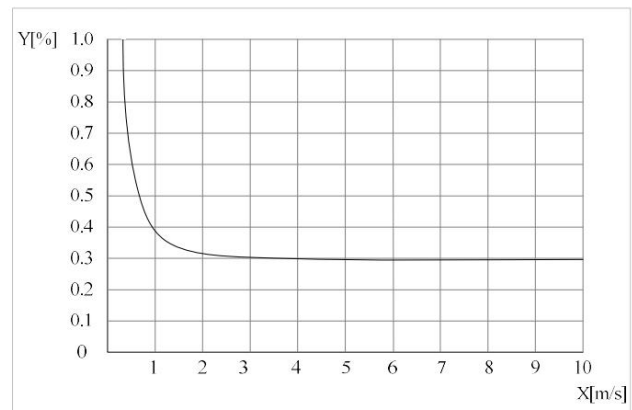


The induced voltage signal is detected by two electrodes and transmitted to the converter via a cable. After a series of analog and digital signal processing, the accumulated flow and real-time flow are displayed on the display of the converter.

## 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	
Module configuration	Measurement system is made up of signal converter and measurement sensor	
Converter		
Compact Type	IP65	
Remote Type	IP65 for transmitter (IP65/IP68 for sensor)	
Measurement sensor		
Nominal Diameter	DN10~DN1000	
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~DN1000, PN<1.0MPa (can customize PN16)	
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	

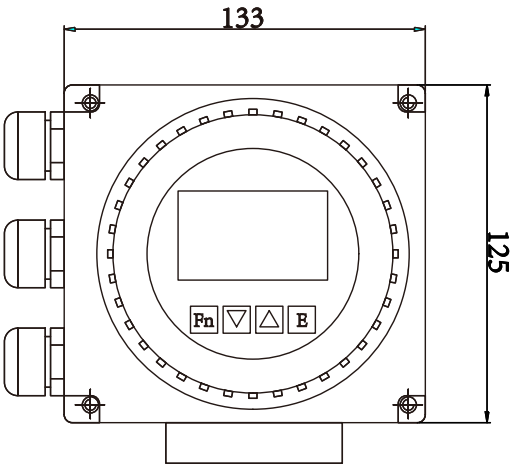
Current output		
Function	Measurement of volume and quality (in the case of constant density)	
Setting	Scope	4-20mA
	Max	20mA
	Min	4mA
Passive	Corresponding terminal I <sub>vee</sub> , I <sub>OUT</sub> , support 5-24VDC external power supply	
Load	250Ω, Max 1000Ω	
Pulse and frequency output		
Function	Set up Pulse and frequency output	
Pulse output	Basis	Output pulse width: 0.1ms~100ms
	Setting	0.001L~10000.000L
Frequency	Max	F <sub>max</sub> ≤ 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	

## Parameter

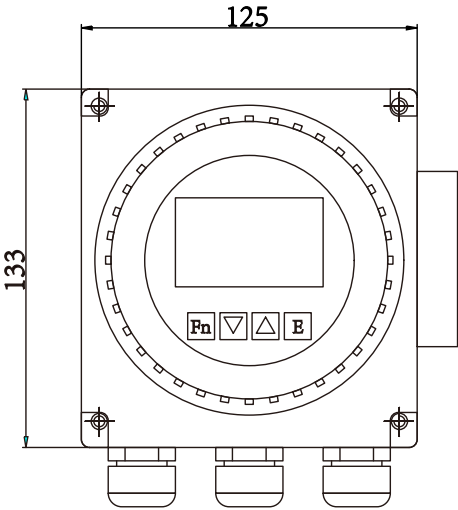
Electrode selection	
Material	Corrosion Resistance
Molybdenum-containing stainless steel (0Cr18N12Mo2Ti)	Applicable: Domestic/industrial water, sewage, weak acid and alkali saline as well as concentrated nitric acid at room temperature. Not Applicable : Hydrofluoric acid, hydrochloric acid, chlorine, 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.

Dimensions

	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	1Mpa
	350	550	500	460	12*23	
	400	600	565	515	12*25	
	450	600	615	565	20*25	
	500	600	780	620	20*25	
	600	600	780	725	20*30	



Compact type



Remote type

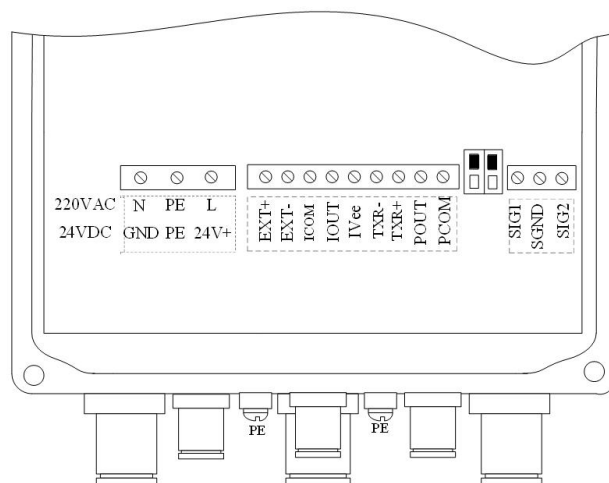
Flow and Velocity Parallel Table for Electromagnetic Flowmeter

Flow rate (m/s)	0.1	0.2	0.4	0.5	1	10	12	15
DN (mm)								
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
DN350	34.636	69.272	138.54	173.18	356.36	356.36	3463.6	5195.4
DN400	45.239	90.478	180.96	226.19	452.39	4523.9	5428.7	6785
DN450	57.256	114.51	229.02	286.28	572.56	5725.6	6870.7	8588.3
DN500	70.686	141.37	282.74	353.43	706.86	7060.6	8482.3	10603
DN600	101.79	203.58	407.15	508.94	1017.9	10179	12215	15268



## 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 (485-)

## Ordering code

FMC240-M1-DN50-J5-O1-PWM1-D2-I2-V1-P2-E1-L1-CS10-B0-IP1														Description
FMC240	-	-	-	-	-	-	-	-	-	-	-	-	-	
Type	M1													Compact type(IP65)
	M2													Remote type(IP68)
Pipe size	DNXX													DN15 - DN1000
Accuracy		J5												0.5%
Transmit output		O1												4-20mA output
Frequency output		PWM1												Pulse output
Communication		D2												RS485
Installation		I2												Flange
Power supply		V1												24VDC
		V2												220VAC
Nominal pressure		P2												1.0MPa
		P3												1.6MPa
Electrode material		E1												316L stainless steel
		E2												Titanium
		E3												Tantalum
		E4												Hastelloy B
		E5												Hastelloy C
		E6												Platinum
Lining material		L1												Neoprene(CR)
		L2												Polyurethane(PU)
		L3												F4/PTFE
		L4												Teflon(F46/FEP)
Cable length		CS10												10m
		CSXX												XXm
Body material		B0												Carbon steel
Ingress protection		IP1												IP65
		IP2												IP68