Datasheet

Water meter

SUP-FMC240

Supmea®

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Electronic water meter

SUP-FMC240-DNxx

Supmea's electronic water 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 electronic water meter, these components can be fabricated from a variety of materials to make the meter compatible with different conditions of water.

The only limitation of the electronic water meter is that the measured fluid media must be electrically conductive (>20μS/cm).

Application industries

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

Features

- Class 2 accuracy
- RS485 Modbus 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 very little pressure loss.
- Readings that are unaffected by changes in density or viscosity.

Electronic water meter

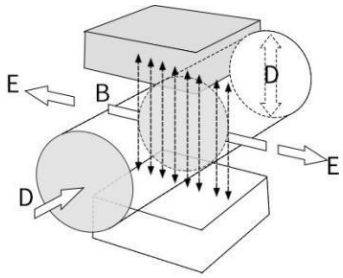
Principle

The measurement principle of electronic water meter 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.

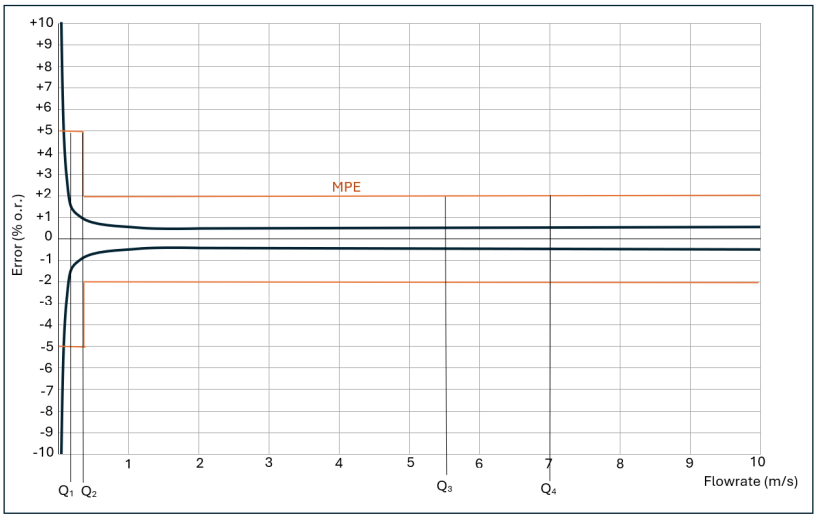
Accuracy

Meeting standards of Class 2

≤ ±2% for upper zone: (Q2 ≤ Q ≤ Q4) at T ~ 0.1 - 30°C
≤ ±3% for upper zone: (Q2 ≤ Q ≤ Q4) at T>30°C
≤ ±5% for lower zone: (Q1 ≤ Q ≤ Q2))

Reference condition

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



Typical accuracy curve with Class 2 at reference condition

① X[m/s]: Flowrate
② Y[%]: Error (o.r. = of reading)
MPE = Maximum permissible error

Temperature class

Meeting requirements of temperature class T50

Minimum temperature (mAT): 0.1°C (32.18°F)

Maximum temperature (MAT): 50°C (122°F)

Pressure loss

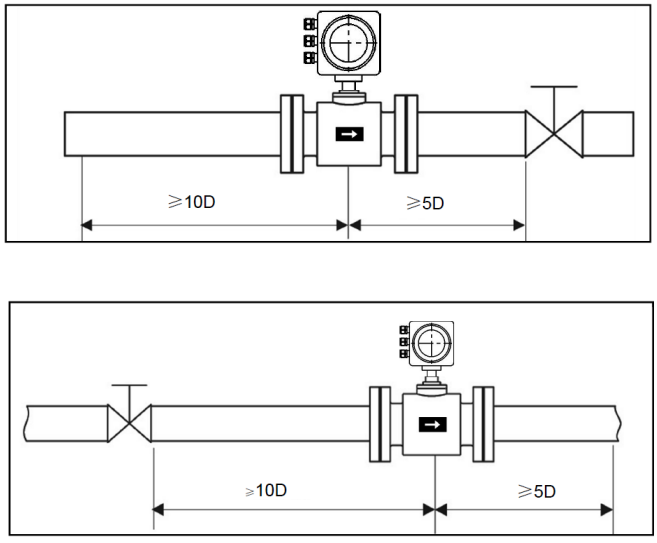
Very low pressure loss due to no obstruction component in sensor tube

Pressure loss: < 0.3 bar at Q3

Inlet/Outlet straight run and orientations

The watermeter's accuracy can be affected by hydraulic disturbing pipe components as reducers, tees, elbows, control valves, partially opened valves, etc... if installed not far enough.

In order to ensure the measurement accuracy of watermeter, it is recommended to ensure that the length of the straight pipe on the upstream of the sensor shall be at least 10 times of pipe diameters (10D), and the length of straight pipe on the downstream be at least 5 times of pipe diameters (5D).



The water meter can be installed at any orientations

Environmental classification

Class O

The water meter can be fixed and installed outdoor

Electromagnetic environment

Class E1

The water meter can be installed in locations where electromagnetic disturbances correspond to those likely to be found in a residential and light industrial environment.

Password protection and meter simulation

The meter is designed with a 3-level password. Level 1 password can modify the password value of this level; Level 2 password can modify the password of this level, you can view the password value of Level 1; Level 3 password can modify the password of this level, you can view the password value of Level 1 and Level 2. The factory values of Level 1 and Level 2 are "10000" and "40000" respectively. After entering the menu with the password, you can operate the corresponding password level, and the exit key can return to the main screen, and you can directly enter the menu without a password within 5 minutes (enter any password on the password input screen, press the exit key, and then press the function key to directly enter the menu.).

The passwords can set as desired by users thought the path: System settings/ Password Setting.

SIMULATION

The water meter has simulation modes as below:

Flow simulation mode (Password Level 3)
4-20mA output simulation mode (Password Level 2)
Pulse output simulation mode (Password Level 2)
Frequency output simulation mode (Password Level 2)

With password level 3, flow simulation mode can be activated. Flow simulation mode can be accessed by the path: Diagnotics test/ Speed test, then enter the desired flow speed. Flow speed will be simulated to test the performance of positive totalizer, negative totalizer, net totalizer, display and all outputs.

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~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	Meeting requirements of temperature class T50 Minimum temperature (mAT): 0.1°C (32.18°F) Maximum temperature (MAT): 50°C (122°F)	
Serial communications	Modbus RS-485 RTU	
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	
Measurement accuracy	Class 2	
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	

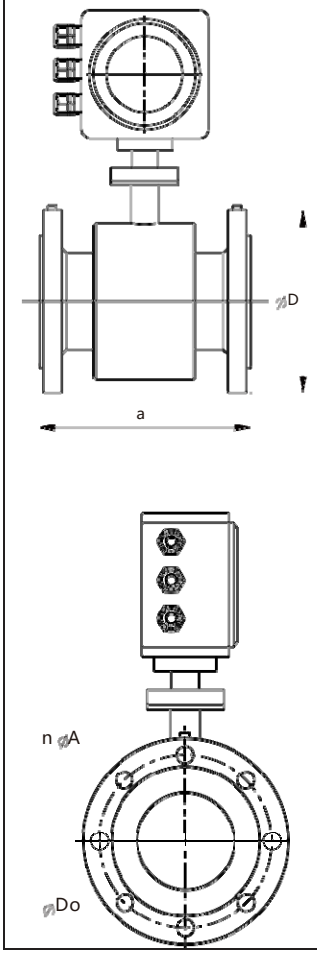
Current output		
Function	Measurement of volume and quality (in the case of constant density)	
Setting	Scope	4-20mA
	Max	20mA
	Min	4mA
Passive	Corresponding terminal IVee, IOUT, support 5-24VDC external power supply	
Load	250Ω，Max 1000Ω	
Pulse and frequency output		
Function	Set up Pulse and frequency 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	

Parameter

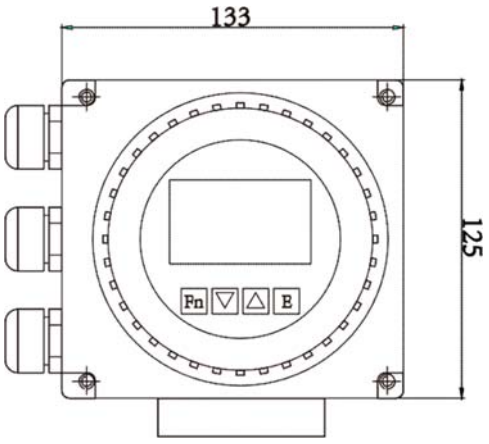
Electrode selection

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 ℃. Not applicable: alkali, hydrofluoric acid and smoke sulfuric acid.
Pt	Various acids, bases and salts, excluding aqua regia.

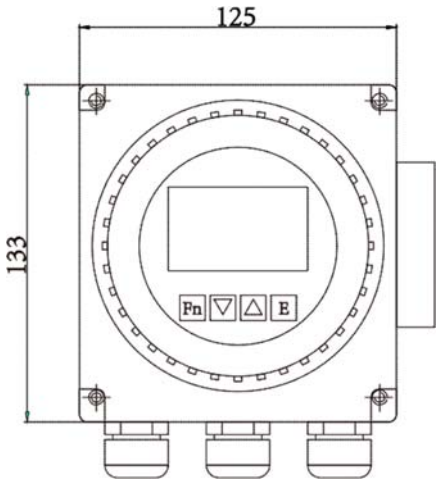
Dimensions



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



Compact type

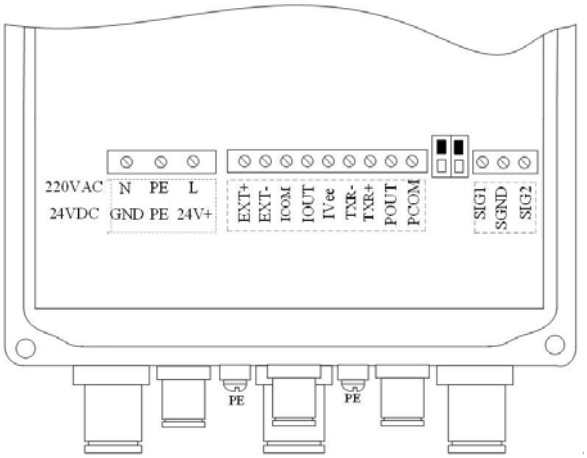


Remote type

Flowrate for Class 2 accuracy

Norminal diameter	Q1 m3/h	Q2 m3/h	Q3 m3/h	Q4 m3/h	Ratio Q3/Q1	Maximum permissible error
DN10	0.06	0.10	2.50	3.13	40	± (2; 5) %
DN15	0.10	0.16	4.00	5.00	40	± (2; 5) %
DN20	0.16	0.25	6.30	7.88	40	± (2; 5) %
DN25	0.25	0.40	10.00	12.50	40	± (2; 5) %
DN32	0.40	0.64	16.00	20.00	40	± (2; 5) %
DN40	0.63	1.00	25.00	31.25	40	± (2; 5) %
DN50	1.00	1.60	40.00	50.00	40	± (2; 5) %
DN65	1.58	2.52	63.00	78.75	40	± (2; 5) %
DN80	2.50	4.00	100.00	125.00	40	± (2; 5) %
DN100	4.00	6.40	160.00	200.00	40	± (2; 5) %
DN125	6.25	10.00	250.00	312.50	40	± (2; 5) %
DN150	10.00	16.00	400.00	500.00	40	± (2; 5) %
DN200	15.75	25.20	630.00	787.50	40	± (2; 5) %
DN250	25.00	40.00	1000.00	1250.00	40	± (2; 5) %
DN300	40.00	64.00	1600.00	2000.00	40	± (2; 5) %

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-)