



Datasheet

Water meter

SUP-FMC240

Supmea[®]

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Datasheet**Electronic water meter for flow measurement
SUP-FMC240-DNxx water meter**

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

Application

- 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 no pressure loss.
- Readings that are unaffected by changes in density or viscosity.

**Electronic water meter**

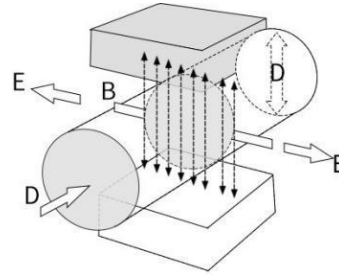
Principle

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

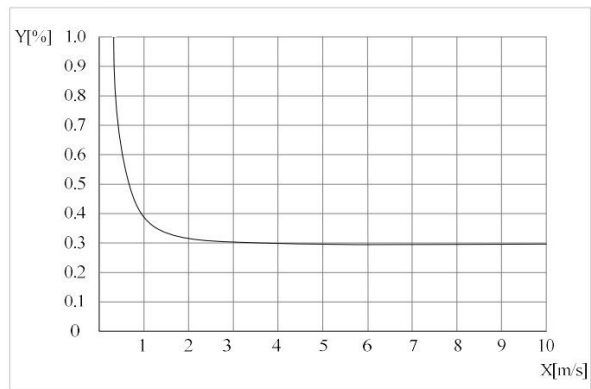


The induced voltage signal is detected by two electrodes and transmitted to the converter via a cable. After a series of analog and digital signal processing, the accumulated flow and real-time flow are displayed on the display of the converter.

Accuracy

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~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 | |
| 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 | |

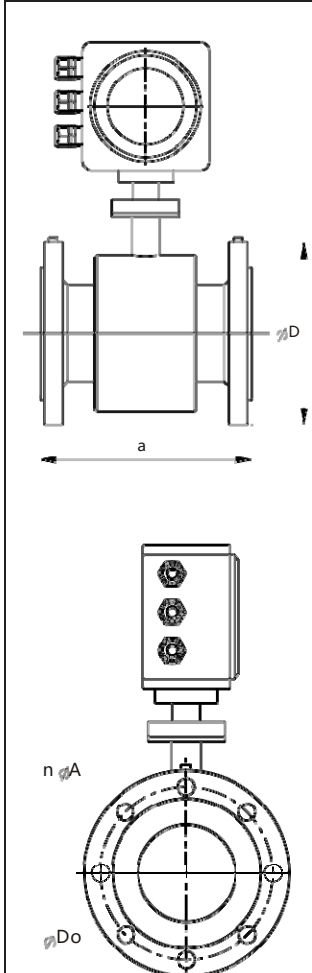
| Current output | |
|----------------------------|--|
| Function | Measurement of volume and quality (in the case of constant density) |
| Setting | Scope 4-20mA |
| | Max 20mA |
| | Min 4mA |
| Passive | Corresponding terminal IVee, IOUT, support 5-24VDC external power supply |
| Load | 250Ω. Max 1000Ω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

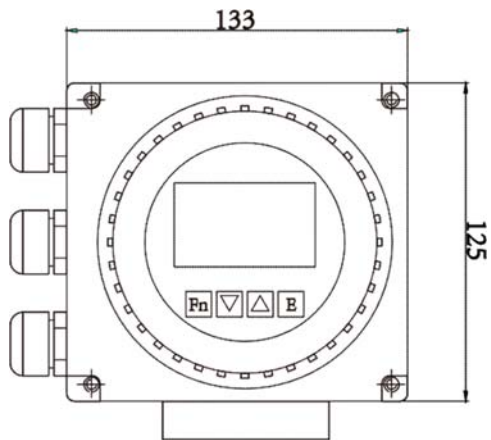
Electrode selection

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

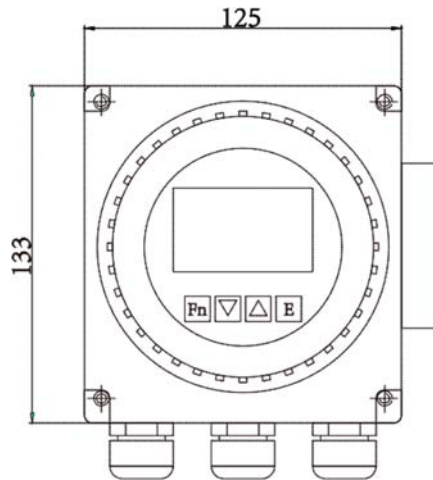
Dimensions



| 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 | 1Mpa |
| 300 | 500 | 440 | 400 | 12*23 | |



Compact type



Remote type

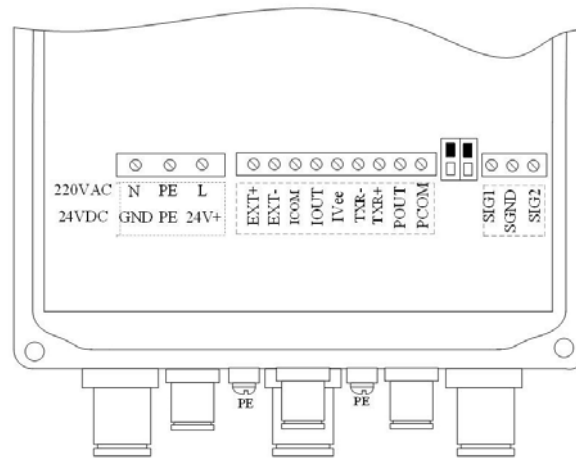
Flow and Velocity Parallel Table for Electromagnetic Flowmeter

| Flow rate (m/s) | Flow (m ³ /h) | | | | | | | |
|--------------------|--------------------------|--------|--------|--------|--------|--------|--------|--------|
| | 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 |

Flowrate for Class 2 accuracy

| Norminal diameter | Q1 (min flowrate) m3/h 0.12 m/s | Q2 (Transition flowrate) m3/h 0.24 m/s | Q3 (Norminal flowrate) m3/h 5.4 m/s | Q4 (max flowrate) m3/h 7 m/s | Ratio Q3/Q1 | Maximum permissible error |
|-------------------|------------------------------------|---|--|---------------------------------|-------------|---------------------------|
| DN10 | 0.03 | 0.07 | 1.53 | 1.98 | 45 | ± (2; 5) % |
| DN15 | 0.08 | 0.15 | 3.44 | 4.45 | 45 | ± (2; 5) % |
| DN20 | 0.14 | 0.27 | 6.11 | 7.92 | 45 | ± (2; 5) % |
| DN25 | 0.21 | 0.42 | 9.54 | 12.37 | 45 | ± (2; 5) % |
| DN32 | 0.35 | 0.69 | 15.63 | 20.27 | 45 | ± (2; 5) % |
| DN40 | 0.54 | 1.09 | 24.43 | 31.67 | 45 | ± (2; 5) % |
| DN50 | 0.85 | 1.7 | 38.17 | 49.48 | 45 | ± (2; 5) % |
| DN65 | 1.43 | 2.87 | 64.51 | 83.62 | 45 | ± (2; 5) % |
| DN80 | 2.17 | 4.34 | 97.74 | 126.7 | 45 | ± (2; 5) % |
| DN100 | 3.39 | 6.79 | 152.68 | 197.92 | 45 | ± (2; 5) % |
| DN125 | 5.3 | 10.6 | 238.57 | 309.25 | 45 | ± (2; 5) % |
| DN150 | 7.63 | 15.27 | 343.53 | 445.32 | 45 | ± (2; 5) % |
| DN200 | 13.57 | 27.14 | 610.74 | 791.70 | 45 | ± (2; 5) % |
| DN250 | 21.21 | 42.41 | 954.23 | 1236.97 | 45 | ± (2; 5) % |
| DN300 | 30.54 | 60.07 | 1374.14 | 1781.29 | 45 | ± (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-)