

Description

The M5000 is a battery-powered electromagnetic flow meter with a very high accuracy even at very low flows. The excellent repeatability as well as the above-average battery life makes this innovative water meter indispensable for the water market. Typical applications are leak detection in water networks, water consumption measurements and irrigation plants.

The meter is best suited for applications without a power supply where exact consumption or flow rates are required. Of course, the M5000 can also be used with an available power supply. The meter can be powered with main voltage and in case of a main failure, it is powered by an internal battery. Important data are consequently saved.

The M5000 has been designed for very harsh environmental measurement conditions. The meter has no moving parts and can be used to measure water containing particles like sand or gravel. The M5000 is encased in an IP67 housing (optional IP68), which makes it a reliable meter even when submerged.

The standard meter is equipped with an internal datalogger which can read-out via an IrDA or RS232 interface with ModBus® RTU protocol. The collected data can also be retrieved via radio frequency or GSM/GPRS. The data can thus be centrally compiled and evaluated.

M5000 can be checked without process interruption with the Verification Device.



Measuring principle

The operating principle of the electromagnetic flow meter is based on Faraday's law of magnetic induction: The voltage induced across any conductor, as it moves at right angles through a magnetic field, is proportional to the velocity of that conductor. The voltage induced within the fluid is measured by two diametrically opposed internally mounted electrodes. The induced signal voltage is proportional to the product of the magnetic flux density, the distance between the electrodes and the average flow velocity of the fluid.

Features

- Up to 12 years battery life span,
- Accuracy better than $\pm 0,4\%$,
- Measuring range of 0,03 to 12 m/s,
- Sizes from DN 15 to DN 600,
- ACS, OIMLR49-1 and MID MI-001 approved,
- LCD display,
- IP 67 / IP 68 protection class,
- RS232, IrDA, Modbus® interfaces,
- Integrated Datalogger function,
- Verification Device.



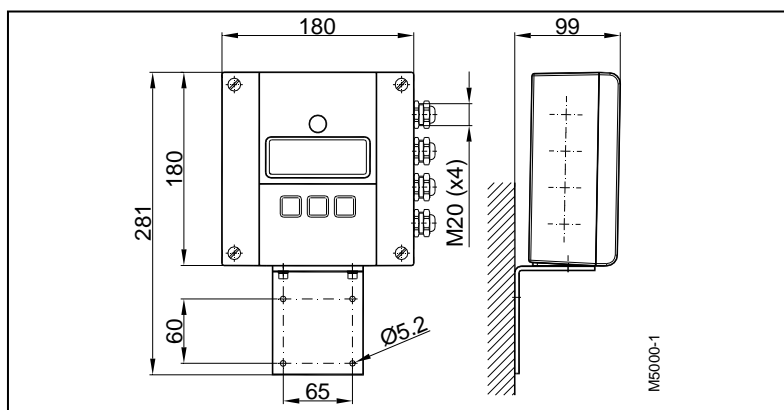
Verification device

All important parameters of the flow meter are measured, protocolled and evaluated. The accuracy of the amplifier and of the in-/outputs as well as the functionality of the detector are measured without process interruption more easily, more precisely and better secured.

The verification device enables to check the perfect and exact functionality of the electromagnetic flow meters types M2000 and M5000 on site in regular time intervals at a low cost and without interruption of the process. The device is verifying that the MAG meter's calibration is still ranging between $\pm 1\%$ of the primary factory calibration.



Dimensions of converter



Technical data

| | |
|----------------------------|---|
| Power supply | Internal Lithium batteries 3,6 V Optional battery back-up model (AC) |
| Sizes | DN 15 to DN 600 (PTFE / hard rubber) |
| Battery life span | 6 years, optional 12 years |
| Display | LCD, 2 lines |
| Programming | 3 keys |
| Measuring range | 0,03 – 12 m/s |
| Accuracy | $\geq 0,5$ m/s better than $\pm 0.4\%$ accuracy of rate $< 0,5$ m/s $\pm 2,5$ mm/s of rate |
| Repeatability | 0.1% |
| Minimum fluid conductivity | ≥ 20 $\mu\text{s/cm}$ |
| Flow direction | Bidirectional |
| Low-flow detection | Separate electrode |
| Digital outputs | 4 x open collector, passive 30 VDC/20 mA, max. 100 Hz |
| Status outputs | Min./max. alarm, flow direction, failure report |
| Serial communication | RS232, ModBus® RTU, IRDA External AMR or GSM/GPRS module (optional) |
| Datalogger | Integrated |
| Low-flow cut off | 0-10% |
| Pulse width | Programmable up to 500 ms. |
| Housing | Powder coated cast aluminium |
| Protection class | IP67 (IP68 optional) |
| Cable entry | Signal cable (outputs) M20 |
| Signal cable | From detector M20 |
| Remote version | Max. 30 m |
| Ambient temperature | -20°C to 60°C |

Wireless data recording

Fuji Electric offers the possibility to record wireless the measuring data you are getting from our flow meters. Those data are transmitted to and filed on a central server via a GPRS module. The information can be retrieved, visualised, evaluated and downloaded via a password protected access; the password is set by the customer.

Advantages

- Low investment costs,
- Cost saving as against classical data recording,
- Wireless measuring sites,
- Access via internet independently from location,
- Optimization of global applications,
- Ideal for measuring sites in difficult areas,
- High flexibility thanks to the extremely small space requirement and quick installation of the GPRS module,
- Makes service, maintenance and putting into operation easier.

Applications

- Consumption monitoring and leakage reduction in water supply systems,
- Precise flow metering in large channels and rivers for the monitoring of navigability and issue of flooding forecasts,
- Monitoring and alarm of overflow basins for rainwater, sewage plants, storm water overflow plants,
- Control of irrigation plants,
- Level monitoring, alarm for automatical filling and connection to the supplying system.



Detector type VI

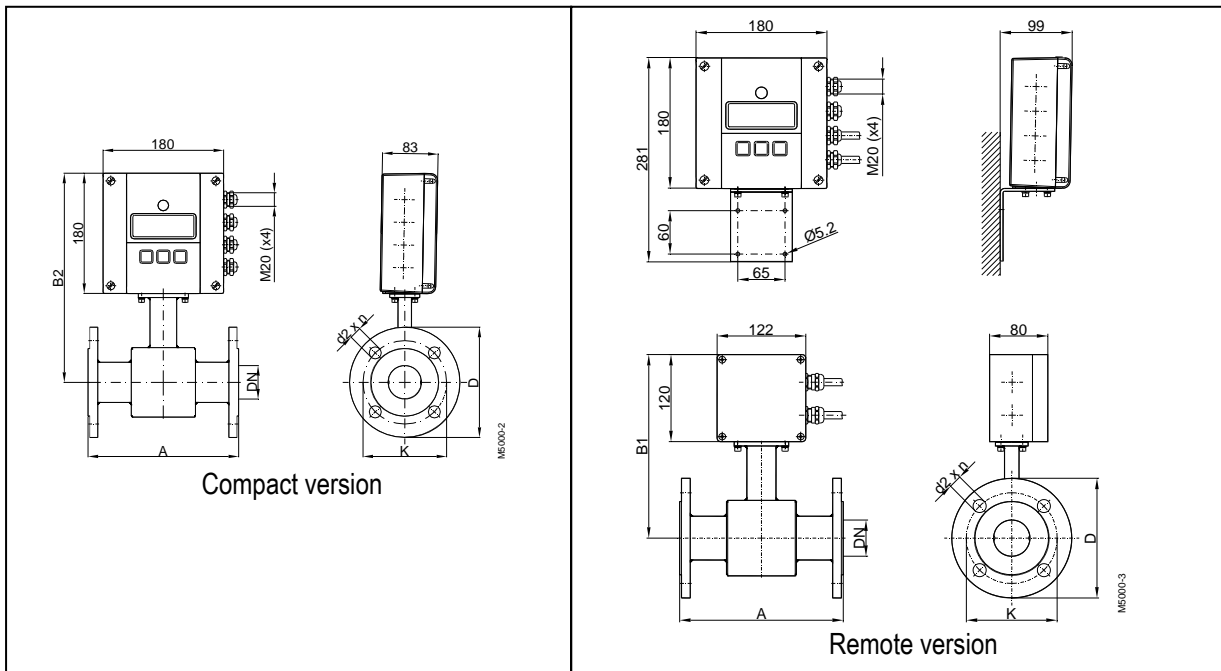
Flange process connection



The electromagnetic detector type VI is available with different flange process connections (DIN, ANSI, JIS, AWWA, etc.) and liners like hard rubber or PTFE. Available in sizes from DN 15 to DN 600 and nominal pressures up to PN 100, the detector type VI is best suited for a variety of flow counting applications in the water industry.

| | | | |
|----------------------|--|------------|--------------------|
| Size | DN 15 – 600 (1/2" ... 24") | | |
| Process connections | Flange: DIN, ANSI, JIS, AWWA, etc | | |
| Nominal pressure | up to PN 100 | | |
| Protection class | IP67, optional IP68 | | |
| Min. conductivity | ≥ 20 µS/cm | | |
| Liner materials | Hard rubber | from DN 25 | 0°C up to +80°C |
| | PTFE | DN 6 – 600 | -40°C up to +150°C |
| Electrodes materials | Hastelloy C (standard), Tantal Platinum / Gold plated, Platinum / Rhodium | | |
| Housing | Steel / Optional stainless steel | | |
| Approval | WRAS, KTW, NSF-61, DVGW-W270 and ACS for drinking water (Hard rubber only) OIMLR49-1 and MID MI-001 | | |

Dimensions (mm)



| DN | | A* | B1 | B2 | with ANSI-flanges | | | with DIN-flanges | | |
|---------------------------------|--------|-------------------|-----|-----|-------------------|-------|-----------|------------------|-----|---------|
| | | | | | ∅ D | ∅ K | ∅ d2xn | ∅ D | ∅ K | ∅ d2xn |
| 15 | 1/2" | 200 | 238 | 298 | 88,9 | 60,3 | 15,9 x 4 | 95 | 65 | 14 x 4 |
| 20 | 3/4" | 200 | 238 | 298 | 98,4 | 69,8 | 15,9 x 4 | 105 | 75 | 14 x 4 |
| 25 | 1" | 200 | 238 | 298 | 107,9 | 79,4 | 15,9 x 4 | 115 | 85 | 14 x 4 |
| 32 | 1 1/4" | 200 | 253 | 313 | 117,5 | 88,9 | 15,9 x 4 | 140 | 100 | 18 x 4 |
| 40 | 1 1/2" | 200 | 253 | 313 | 127 | 98,4 | 15,9 x 4 | 150 | 110 | 18 x 4 |
| 50 | 2" | 200 | 253 | 313 | 152,4 | 120,6 | 19 x 4 | 165 | 125 | 18 x 4 |
| 65 | 2 1/2" | 200 | 271 | 331 | 177,8 | 139,7 | 19 x 4 | 185 | 145 | 18 x 4 |
| 80 | 3" | 200 | 271 | 331 | 190,5 | 152,4 | 19 x 4 | 200 | 160 | 18 x 8 |
| 100 | 4" | 250 | 278 | 338 | 228,6 | 190,5 | 19 x 8 | 220 | 180 | 18 x 8 |
| 125 | 5" | 250 | 298 | 358 | 254 | 215,9 | 22,2 x 8 | 250 | 210 | 18 x 8 |
| 150 | 6" | 300 | 310 | 370 | 279,4 | 241,3 | 22,2 x 8 | 285 | 240 | 22 x 8 |
| 200 | 8" | 350 | 338 | 398 | 342,9 | 298,4 | 22,2 x 8 | 340 | 295 | 22 x 12 |
| 250 | 10" | 450 | 362 | 422 | 406,4 | 361,9 | 25,4 x 12 | 395 | 350 | 22 x 12 |
| 300 | 12" | 500 | 425 | 485 | 482,6 | 431,8 | 25,4 x 12 | 445 | 400 | 22 x 12 |
| 350 | 14" | 550 | 450 | 510 | 533,4 | 476,2 | 28,6 x 12 | 505 | 460 | 22 x 16 |
| 400 | 16" | 600 | 475 | 535 | 596,9 | 539,7 | 28,6 x 16 | 565 | 515 | 26 x 16 |
| 450 | 18" | 600 | 500 | 560 | 635,0 | 577,8 | 31,7 x 16 | 615 | 565 | 26 x 20 |
| 500 | 20" | 600 | 525 | 585 | 698,5 | 635,0 | 31,7 x 20 | 670 | 620 | 26 x 20 |
| 550 | 22" | 600 | 550 | 610 | 749,3 | 692,1 | 34,9 x 20 | --- | --- | --- |
| 600 | 24" | 600 | 588 | 648 | 812,8 | 749,3 | 34,9 x 20 | 780 | 725 | 30 x 20 |
| Standard | | | | | | | | | | |
| with ANSI-flanges | | from 1/2" – 24" | | | 150 lbs | | | | | |
| with DIN flanges | | from DN 15 – 200 | | | PN 16 | | | | | |
| | | from DN 250 – 600 | | | PN 10 | | | | | |
| * ISO 13359 from DN 15 to DN400 | | | | | | | | | | |

Fuji Electric France S.A.S.

46, Rue Georges Besse – ZI du Brézet
 63039 Clermont-Ferrand cedex 2 – France
 France : Tél. 04 73 98 26 98 – Fax : 04 73 98 26 99
 International : Tél. (33) 4 73 98 26 98 – Fax : (33) 4 73 98 26 99
 Email : sales.dpt@fujielectric.fr – Web : www.fujielectric.fr

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