



MagMeters

magnetic flowmeters



Basic principles

The measurement principle of electromagnetic flowmeters (EMF) is based on Faraday's law of induction. The MagMeters can accurately measure the flow of any electrically conductive liquid, even those with low conductivities (starting from 5 $\mu\text{S}/\text{cm}$).

Typical applications include:

- Water cycle
- Water industry: revenue metering, district metering, water extraction, leakage detection
- Irrigation
- Wastewater industry: transport networks, sewage treatment plants, sludges
- Food & beverage industry: mixing, dosing and filling of drinks under hygienic conditions
- Chemical industry: acids, alkalis, dosing applications, abrasive or corrosive media
- Pulp & paper industry: pulp, pastes, sludges and other caustic media, liquor, additives, bleaches, colourants
- Metal & mining industry: media with a high solid content, like ore or excavator mud, tailing slurry.

Highlights

- Minimal or no inlets/outlets
- All Euromisure flowmeters are wet-calibrated
- Liner materials suitable for potable water, wastewater, chemicals, and solids
- Maintenance free
- Suitable custody transfer applications
- Measurement is independent from the flow profile and solid contents
- Zero-point stability regardless of changes in medium properties
- Nominal sizes DN 15 to DN 2.000
- Field verification with minimized cost for the installation.

Overview





FLC-2200EL Sensor

Applications:

- Water & waste water
- Industrial process liquid
- Muds and concretes



Size: ½”– 80” (DN 15 - 2000)

Connections: M20 x 1,5

Protection degree: IP 68 (-1.5 m H₂O)

Standard materials:

- Flanges: CS
- Body: SS304
- Electrodes: Hastelloy C

Lining:

- PTFE (standard DN 15 - DN 100)
- Ebonite (standard > DN 125)

Accuracy: +/- 0,2% m.v.

Repeatability: +/- 0,1%

Rating: up to PN63 (EN1092-1) or ASME 900#. Other flanges available on request.

ATEX: On request II 2 GD Eex mb IIC T4 U (separated version)

Options: Integrated pressure port



FLC-2300 Sensor

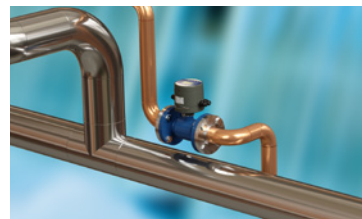
Applications:

- Water & waste water
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Protection degree: IP 68 (-1.5 m H₂O)

Optimized flow tube profile, zero straight pipe runs!



Standard materials:

- Flanges: CS
- Body: SS304
- Electrodes: Hastelloy C

ATEX: On request II 2 GD Eex mb IIC T4 U (separated version).

Rating: up to PN16 (EN1092-1) or ASME 150#. Other flanges available on request.

Size: 2”– 12” (DN 50 - 300)

Connections: M20 x 1,5

Lining: Ebonite

Accuracy: +/- 0,2% m.v.

Repeatability: +/- 0,1%



FLC-1000EL Wafer Sensor

Applications:

- Drinking water
- Food processing industry



Size: 1”– 12” (DN 25 - 300)

Connections: M20 x 1,5

Protection degree: IP 68 (-1.5 m H₂O)

Standard materials:

- Body: SS304
- Electrodes: Hastelloy C

Lining:

- PTFE (standard DN 25 - DN 100)
- Ebonite (standard > DN 125)

Accuracy: +/- 0,2% m.v.

Repeatability: +/- 0,1%

Rating: for installation between flanges up to PN40 or ASME 300#

ATEX: On request II 2 GD Eex mb IIC T4 U (separated version)





FLC-1100J Wafer Sensor



Applications:

- Agricultural
- Irrigation
- Refrigerating systems

Size: 1 ½" – 12" (DN 40 - 300)

Connections: M20 x 1,5

Protection degree: IP 67

Standard materials:

- Body: Noryl™ + Fiberglass
- Electrodes: SS316L

Accuracy: +/- 0,2% m.v.

Repeatability: +/- 0,1%

Rating: for installation between flanges up to PN40 or ASME 300#



FLC-2400EL Sensor



Applications:

- Food & Beverage
- Chemical and pharmaceutical industry
- Breweries & wineries
- Dosing and batching

Size: 1" – 4" (DN 25 - 100)

Process connections: Triclamp up to 16 bar or DIN11851F/SMS1146F up to 25 bar

Connections: M20 x 1,5

Protection degree: IP 68 (-1.5 m H₂O)

Standard materials:

- Body and connections: SS304
- Electrodes: Hastelloy C

Lining: Hygienic PTFE

Accuracy: +/- 0,2 % m.v.

Repeatability: +/- 0,1 %

ATEX: On request II 2 GD Eex mb IIC T4 U (separated version)



FLC-2100F Speciality Flowmeter



Applications:

- Anti-seismic and fire protection systems
- Buildings & construction
- Naval maritime

Size: 2" – 6" (DN 50 - 150)

Rating: up to PN25 with universal Victaulic® connection

Connections: M20 x 1,5

Protection degree: IP 67 (IP68 on request)

Standard Materials:

- Body: SS304
- Electrodes: Hastelloy C

Lining: Rilsan® coating ≥ 250 µm





FLC-2770 Insertion Sensor

Applications:

- Water network management
- Flow profiling and survey
- District metering

Size: DN 80 up to DN4 000

Maximum pressure: 25 bar

Protection degree: IP 68 (-1.5 m H₂O)

Standard Materials:

- Body: SS304
- Electrodes: SS316L



Head of the unit: PTFE

Process connections: Flanged 1 1/2" or EN 1092-1 or DN40

Supplied with 2" flanged nozzle

Accuracy: +/- 3%



FLC-2660 Insertion Sensor

Applications:

- Water network management
- Flow profiling and survey
- Leakage control

Size: DN 80 up to DN 500

Maximum pressure: 10 bar

Protection degree: IP 68 (-1.5 m H₂O)

Standard Materials:

- Body: SS304
- Electrodes: SS316L



Head of the unit: PTFE

Connections: 1 1/4" threaded brass muff for pipe welding

Accuracy: +/- 3%



FLC-1222 Insertion Sensor

Applications:

- Water network management
- Flow surveys & profiling, district metering
- Checking on-site flowmeters
- Data capture reporting and analysis
- Leakage control

Size: DN 50 up to DN 2000

Maximum pressure: 20 bar

Protection degree: IP 68 (-1.5 m H₂O)



Standard Materials:

- Body: SS304
- Electrodes: SS316L

Head of the unit: POM

Connections:

- Input connection for pressure gauge
- Hot tap installation Input connection for pressure gauge

Accuracy: +/- 3%





FLC-608 Converter



Power supply: mains, battery, both, solar panel

Installation: compact or separate (up to 30 m or 100 m depending on power supply)

Outputs: 4-20 mA, pulse, digital output (1 programmable + 1 active frequency)

Comm. Protocol: RS 485 Modbus RTU; IrCOM Interface

Display: backlit, graphic LCD 50 x 25 mm with programming pushbuttons

Totalizers: 5

Diagnostic: empty pipe, overtemperature, pulse overlapping, power failure (alarm logged in the data logger, displayed status icon)

Verification: by field verifier, for calibration and electronics status check

Options: Hart protocol, pressure and temperature reading modules

FLC-406 Converter



Power supply: battery, 10 years pack life

Installation: compact or separate (up to 30 m)

Outputs: 2 x pulse, passive, galvanically insulated

Comm. Protocol: IrCOM Interface

Display: backlit, graphic LCD with programming pushbuttons

Totalizers: 4

Diagnostic: empty pipe, overtemperature, pulse overlapping, power failure, overvoltage, wet board (alarm logged in the data logger, displayed status icon)

Verification: by field verifier, for calibration and electronics status check

Type approvals: OIML R49-1, MID Cert. n. T10713 with automatic firmware check

Options: pressure and temperature reading modules

Tips on MagMeters

When a conductor moves through a magnetic field, it generates a voltage. The higher the velocity of the conductor (with the magnetic field strength held constant), the higher the voltage generated. In this case, the fluid is the conductor, and it flows through a non-conductive line sized tube that has a magnetic field passing from top to bottom. The meter has a pair of small electrodes (one on either side of the tube), which detect the resulting voltage and calculate fluid velocity. The velocity times the cross sectional area of the meter provides a volumetric flow rate.

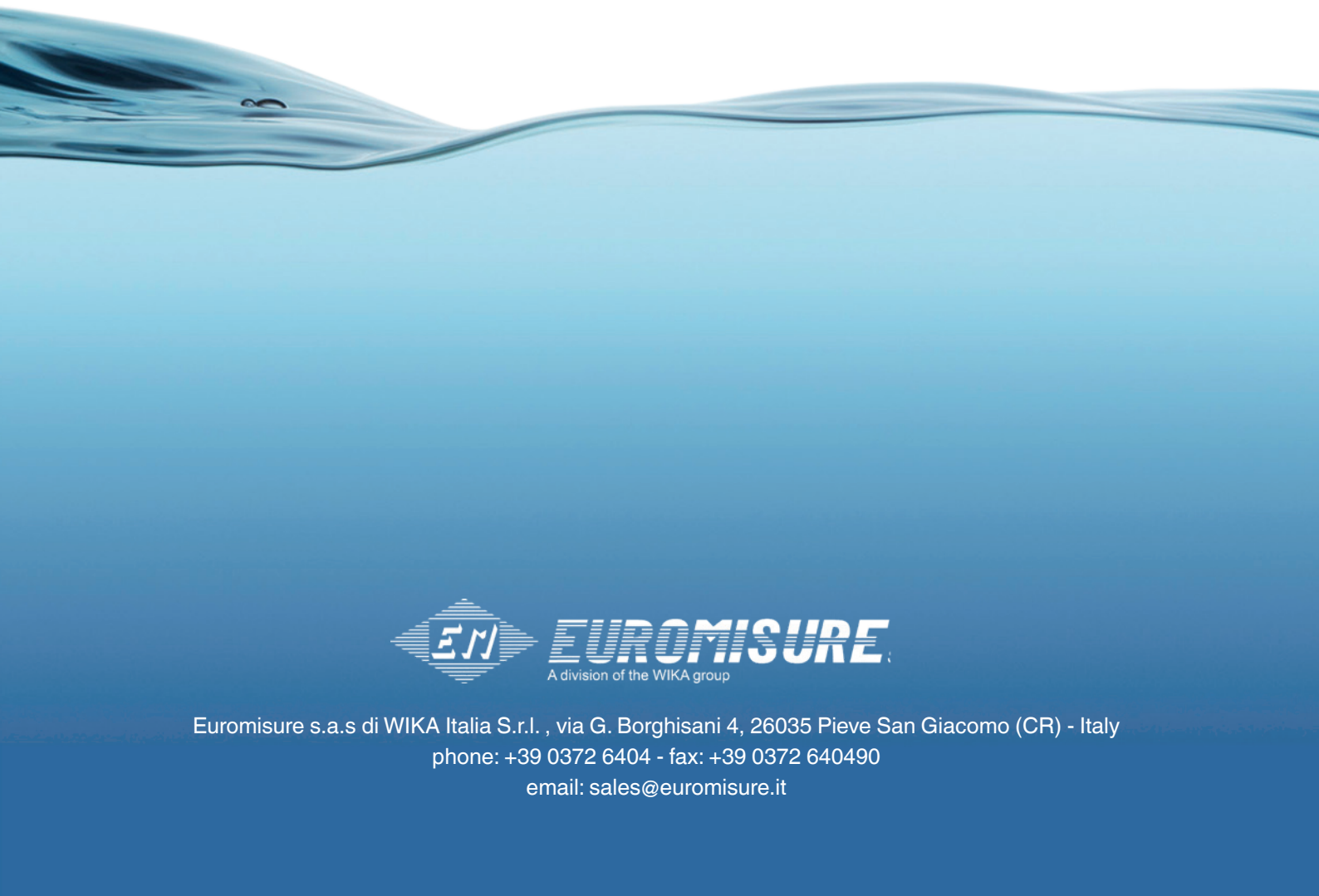
Some meters include an additional electrode at the top and bottom of the tube to detect whether or not the pipe is full. (A half full pipe will read high because the calculation assumes that the pipe is full). Here is a quick list of tips and hints to operate MagMeters at their best.

Rule of Thumb

1. The meter is a full bore device and has practically no pressure drop.
2. The only metal contacting the fluid is the electrodes, which are very small. Therefore, the meter can be used to measure strong acids and caustics. Even if the electrodes must be made of an exotic metal (platinum, tantalum, etc.) the additional cost is not great.
3. The meter has no problems measuring acids, caustics, or conductive liquids with entrained solids. It can also work well for viscous fluids.
4. The meter effectively averages the flow profile of the pipe so it does not require the long, straight upstream and downstream meter runs that other technologies require. Two to three diameters upstream and downstream are usually all that is necessary.
5. Recent improvements in electronics have made 2-wire MagMeters available. The 2-wire devices reduce installation time and cost.
6. MagMeters do not have low flow cutoff problem and will generally read as low as 0.3 m/s.
7. If separate transmitter is used, MagMeters can handle very high temperatures and pressures.

Watch-Outs

1. The meter only works on conductive fluids and will read zero if the fluid has no or very low conductivity. Most require at least 5 microSiemens, though some units can measure below that.
2. Cheaper MagMeters use liner with no additional reinforcement. When these meters are "steamed out," the tube can soften and if the pipe is then blocked in, the resulting vacuum in the line can collapse the liner and ruin the meter. A high quality meter uses a liner that has been reinforced to prevent this problem.
3. A MagMeter will not work on a lined pipe unless grounding rings are added between the flanges of the meter and the lined pipe. (These rings complete the circuit that allows the voltage to be generated). Recognize that these rings will also touch the fluid and should utilize the proper material of construction.
4. Beware of tantalum electrodes (which are often used for strong acids). If these electrodes are exposed to air they will generate a non-conductive oxide coating which will keep the meter from operating immediately. Once they are again exposed to the acid, it will burn the coating off but this can take some time and the meter may not function at all during this time.
5. A MagMeter measures volumetric flow—not mass flow. It can calculate a mass flow based on an assumed density but if the fluid density changes, the reading will be in error.
6. Beware of gravity flow measurements when using a MagMeter. Unless the meter is properly located, partially empty pipe conditions will occur, and the meter may be inaccurate.



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