# EU-type examination certificate

Number **T10713** revision 6
Project number: 2463352


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| Issued by | NMi Certin B.V.,<br>designated and notified by the Netherlands to perform tasks with respect to conformity assessment procedures mentioned in article 17 of Directive 2014/32/EU, after having established that the Measuring instrument meets the applicable requirements of Directive 2014/32/EU, to: |
| Manufacturer | Euromag International S.r.l.<br>Via della Tecnica 20<br>35035 Mestrino (PD)<br>Italy |
| Measuring instrument | An electromagnetic **water meter**<br>Type : MUT1000EL, MUT2200EL and MUT2300<br>with electronic converter MC406M and MC406AM |
| | Further properties are described in the annexes:<br>– Description T10713 revision 6;<br>– Documentation folder T10713-6. |
| Valid until | 31 March 2026 |
| Remark | – This revision replaces the previous revisions;<br>– The documentation folder replaces the previous documentation folder. |

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# 1 General information on the water meter

Properties of this water meter, whether mentioned or not, shall not conflict with the legislation.

## 1.1 Essential parts

The measurement sensor can have the following cylindrical measuring tube:
- Full bore for type MUT1000EL (without flanges) or MUT2200EL (with flanges); or
- Reduced bore for type MUT2300.

| Description | Documents | Remarks |
|---|---|---|
| **Measurement sensor** | | |
| MUT1000EL<br>MUT2200EL<br>MUT2300 | 10713/6-01,<br>10713/6-02,<br>10713/1-01,<br>10713/4-03 | The inside of the cylindrical measuring tube is covered with an insulating liner. Through the liner, the 3 or 4 electrodes are in contact with the liquid. The flow sensor is equipped with a magnetic circuit containing 2 electromagnetic coils. |
| **Calculator and indicating device** | | |
| Electronic signal converter and meter reading. Used to drive the magnetic spools and convert the electrode voltage to a flow rate. See documentation number:<br>- 10713/1-03 for the compact version MC406M;<br>- 10713/3-03 for the remote version MC406M;<br>- 10713/4-04 for the compact version MC406AM;<br>- 10713/4-05 for the remote version MC406AM. | | |
| MC406M<br>(compact version only) | 10713/0-03,<br>10713/0-04 | The electromagnetic environmental classification is E2. |
| MC406M<br>(compact and remote version) | 10713/3-04,<br>10713/3-05,<br>10713/3-06,<br>10713/6-03,<br>10713/4-06,<br>10713/4-07 | The electromagnetic environmental classification is E2 for the compact version and E1 for the remote version.<br>Inluding optional GSM board. |
| MC406AM<br>(compact and remote version) | 10713/4-08,<br>10713/4-09 | The MC406AM is on basis of MC406M version 2.2.4 with additional power supply board and optional GSM board.<br><br>The electromagnetic environmental classification is E2. |

## 1.2 Essential characteristics

1.2.1 Flow characteristics of full bore type MUT1000EL or MUT2200EL

| Meter size | Ø in- and outlet [mm] | Flow rates [m³/h] | | | | Ratio Q3/Q1 |
|---|---|---|---|---|---|---|
| | | Minimum Q1 | Transitional Q2 | Permanent Q3 | Overload Q4 | |
| DN32 | 32 | 0,125 | 0,2 | 25 | 31,25 | 200 |
| DN40 | 40 | 0,2 | 0,32 | 40 | 50 | 200 |
| DN50 | 50 | 0,315 | 0,504 | 63 | 78,75 | 200 |
| DN65 | 65 | 0,5 | 0,8 | 100 | 125 | 200 |
| DN80 | 80 | 0,8 | 1,28 | 160 | 200 | 200 |
| DN100 | 100 | 1,25 | 2 | 250 | 312,5 | 200 |
| DN125 | 125 | 2 | 3,2 | 400 | 500 | 200 |
| DN150 | 150 | 3,15 | 5,04 | 630 | 787,5 | 200 |
| DN200 | 200 | 5 | 8 | 1000 | 1250 | 200 |
| DN250 | 250 | 8 | 12,8 | 1600 | 2000 | 200 |
| DN300 | 300 | 10 | 16 | 1600 | 2000 | 160 |

Please note that the flow rates Q1, Q2, Q3 and Q4 can be freely chosen as long as:
- Values mentioned for Q1 and Q2 are minimum values and the ratio Q2/Q1 = 1,6;
- Values mentioned for Q3 and Q4 are maximum values and the ratio Q4/Q3 = 1,25;
- The ratio Q3/Q1 is at least 40.

1.2.2 Flow characteristics of reduced bore type MUT2300

| Meter size | Ø in- and outlet [mm] | Flow rates [m³/h] | | | | Ratio Q3/Q1 |
|---|---|---|---|---|---|---|
| | | Minimum Q1 | Transitional Q2 | Permanent Q3 | Overload Q4 | |
| DN50 | 50 | 0,125 | 0,2 | 25 | 31,25 | 200 |
| DN65 | 65 | 0,2 | 0,32 | 40 | 50 | 200 |
| DN80 | 80 | 0,315 | 0,504 | 63 | 78,75 | 200 |
| DN100 | 100 | 0,5 | 0,8 | 100 | 125 | 200 |
| DN125 | 125 | 0,8 | 1,28 | 160 | 200 | 200 |
| DN150 | 150 | 1,25 | 2 | 250 | 312,5 | 200 |
| DN200 | 200 | 3,15 | 5,04 | 630 | 787,5 | 200 |
| DN250 | 250 | 5 | 8 | 1000 | 1250 | 200 |
| DN300 | 300 | 8 | 12,5 | 1000 | 1250 | 125 |

Please note that the flow rates Q1, Q2, Q3 and Q4 can be freely chosen as long as:
- Values mentioned for Q1 and Q2 are minimum values and the ratio Q2/Q1 = 1,6;
- Values mentioned for Q3 and Q4 are maximum values and the ratio Q4/Q3 = 1,25;

- The ratio Q3/Q1 is at least 40.

1.2.3 Water temperature class
- T30 (+0,1 °C / +30 °C); or
- T50 (+0,1 °C / +50 °C)

1.2.4 Maximum admissible pressure (MAP)
- 1,6 MPa (16 bar)

1.2.5 Orientation limitation
The sensor can be used in horizontal, vertical or diagonal position.

1.2.6 Flow profile sensitivity class
- U0 and D0 (0 x DN upstream and 0 x DN downstream)

1.2.7 Reverse flow
The water meter is designed to measure reverse flow. The reverse flow is recorded on a separate volume totalization. Also for reverse flow another pulse output is used.

1.2.8 Pressure loss class
- Full bore type MUT1000EL or MUT2200EL based on documentation 10713/1-02
  - All sizes: Δp 10 (0,010 MPa or 0,10 bar)
- Reduced bore type MUT2300 based on documentation 10713/4-03
  - For sizes < DN80: Δp 10 (0,010 MPa or 0,10 bar)
  - For sizes ≥ DN80: Δp 16 (0,016 MPa or 0,16 bar)
- Reduced bore type MUT2300 based on documentation 10713/1-01
  - For sizes < DN80: Δp 25 (0,025 MPa or 0,25 bar)
  - For sizes ≥ DN80: Δp 40 (0,040 MPa or 0,40 bar)

1.2.9 Temperature range ambient
- -25 °C / +55 °C

1.2.10 Environmental classification
- M1 / O (installed outdoors)

1.2.11 Electromagnetic environmental classification
- See paragraph 1.1 for the classification.

1.2.12 Measuring principle
The magnetic field, generated through the 2 magnetic coils, induces a voltage across the flowing (conductive) liquid (Faraday's law for conductors moving through a magnetic field).
This induced voltage is measured with the 2 electrodes and is directly proportional to the flow speed. By taking into account the pipe dimensions the flow rate can be calculated, displayed and outputted. By integrating over time the total measured volume can be calculated and displayed.
The other 2 electrodes are used to detect empty pipe and to fix the voltage reference to ground.

1.2.13 Operation and presentation of legal data
The meter is equipped with an electronic LCD display and can be operated using the four push buttons. The display has two lines which can be used for visualization of the totalizer and other options by using the button P3 and P4. See documentation number for operation 10713/3-01.

The display register is built up as followed, where the volume amount in whole cubic meters are presented at the first line and the decimals of the cubic meters (after the comma) are presented at the second line.

Display of full bore type MUT1000EL or MUT2200EL:

| Meter size | Indicating range (minimum value) [m³] | Verification scale interval (minimum resolution) [m³] |
|---|---|---|
| DN32, DN40 | 9 999 999 | 0,0001 |
| DN50, DN65, DN80, DN100 | 9 999 999 | 0,001 |
| DN125, DN150, DN200, DN250, DN300 | 9 999 999 | 0,01 |

Display of reduced bore type MUT2300:

| Meter size | Indicating range (minimum value) [m³] | Verification scale interval (minimum resolution) [m³] |
|---|---|---|
| DN50 | 9 999 999 | 0,0001 |
| DN65, DN80, DN100, DN125, DN150 | 9 999 999 | 0,001 |
| DN200, DN250, DN300 | 9 999 999 | 0,01 |

The following volume totalizers are used (herewith the partial totalizer is resetable):
- Total positive totalizer (T+)
- Total negative totalizer (T-)
- Partial positive totalizer (P+)
- Partial negative totalizer (P-)

1.2.14 Accountable alarms

During the measuring process the calculator and indicating device detects automatically if a fault condition occours and eventually stops the measurement reporting an alarm indication on the display. See documentation number 10713/4-01.

1.2.15 Software specification (refer to WELMEC guide 7.2):

- Software type P;
- Risk Class C;
- Extension D, while extensions L, T and S are not applicable.

| Indentification | Software versions | CRC Checksum | Remarks |
|---|---|---|---|
| Bootloader | 01.00 | 63A2EDED | Dated 29/01/2016 |
| | 01.01 | 67AEA1E4 | Dated 03/09/2016 |
| | 01.02 | DE7A99AB | Dated 24/10/2016 |
| Legally relevant firmware | 01.05 | CAA8A4C7 | Dated 19/02/2016 |
| | 01.15 | 6AA50C55 | Dated 12/04/2018 |
| | 01.16 | E93E3A1E | Dated 15/11/2018 |
| | 01.21 | 79413617 | Dated 28/03/2019 |
| | 01.23 | E7DD52E4 | Dated 21/10/2019 |

With the user interface it is possible to display:
- the firmware version and the CRC value by pressing together P1 and P4 buttons. The firmware version and the CRC value will be showed after the display test.
- the download records by pressing together P1 and P3 buttons and step through the download entries using P3 and P4 buttons.

## 1.3 Essential shapes

1.3.1 Markings

See documentation number 10713/1-04 for an example. The following inscriptions shall be clearly marked on the water meter:
- The CE-marking and the supplementary metrological marking (M + last two digits of the year in which the instrument has been placed on the market);
- Identification number of the notified body responsible for placing on the market (MID conformity assessment modules D or F);
- This EU-type examination certificate number: T10713;
- Manufacturers name and/or trade mark;
- Manufacturers postal address;
- Type;
- Year of manufacture and a serial number;
- The permanent flow rate Q3;
- The ratio between Q3 and Q1. This may be indicated as R followed by the ratio;
- The maximum working pressure, indicated as MAP followed by the max. pressure;
- Maximum water temperature, indicated as T50;
- Environmental classification;
- Electromagnetic environmental classification;
- The latest date by which the battery shall be replaced.

1.3.2 Further inscriptions
- An arrow indication the positive direction of the water flow is placed on the measurement sensor.

- For clarification of the totalizers, the following is stated on the name plate:
  - T = Non-resettable
  - P = Resettable

1.3.3 EMI protection measures
- Grounding of the measurement sensor;
- Grounding of the electronic converter;
- Shielded cables of the I/O cables;
- Grounding of the shielded I/O cables at the receiving side.

### 1.4 Conditional parts

1.4.1 Power supply MC406M
The water meter is powered by means of a replaceable battery of 3,6 V (operating range: 2,9 - 3,7 V).

1.4.2 Power supply MC406AM
The water meter is powered by means of:
- A replaceable battery of 3,6 V (operating range: 2,9 - 3,7 V); or
- DC mains 10 - 28 V.

1.4.3 Housing
The housing of the calculator and indicating device is made of plastic. Optionally a utility or installation seal may be used for securing housing against opening and access to the battery and cable connections. See documentation number 10713/6-01, 10713/6-02, 10713/1-01 and 10713/4-03.

### 1.5 Conditional characteristics

1.5.1 Programming
All parameters that influence the determination of the results of measurements are protected on the EEPROM. These can only be changed if the hardware switch located inside the electronics unit is set to close.

### 1.6 Conditional shapes

1.6.1 Cylindrical pipe
The cylindrical pipe is constructed so that the combination of material and wall thickness is such that the influence due to changing liquid pressure is negligible.

### 1.7 Non essential parts

The following outputs can be used, where in case of dispute the display of the indicating device MC406M or MC406AM forms the decisive indication of the water meter:
- Pulse output cable can be used for forward and reverse flow;
- GSM output cable.

## 2 Seals

The following seals are applied:
- The data plate is fixed to the water meter and secured against removal by seal or it will be destroyed when removed.
- The hardware switch located inside the electronics unit is sealed against activation and changing the parameters on the EEPROM. See documentation number 10713/0-06 and 10713/4-02.

- Optionally an utility or installation seal may be used for securing housing against opening and access to the battery and cable connections. See documentation number 10713/6-01, 10713/6-02, 10713/1-01 and 10713/4-03.

## 3 Conditions for conformity assessment

- At the initial verification the performance of the water meter has to be determined at least at Q1, Q2 and Q3.
- Bi-directional flow measurement
  During conformity assessment it is sufficient to verify a bi-directional meter only in one direction.
- The correct parameters shall be set by the manufacturer.
- The pulse value (if used) can be set by the manufacturer or user. This should be suitable for the application and should not exceed the maximum frequency of 100 Hz.