

Issued by

NMi Certin B.V.,
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

ABB Limited
Oldends Lane
GL10 3TA Stonehouse
United Kingdom

Measuring instrument

An electromagnetic **water meter**
Type : WaterMaster Model FEV1 & FET1

Further properties are described in the annexes:

- Description T11992 revision 1;
- Documentation folder T11992-1.

Valid until

12 February 2031

Remark

- This revision replaces the previous revisions;
- The documentation folder is not changed.

Issuing Authority

NMi Certin B.V., Notified Body number 0122
7 July 2022

Certification Board

NMi Certin B.V.
Thijssseweg 11
2629 JA Delft
The Netherlands
T +31 88 636 2332
certin@nmi.nl
www.nmi.nl

This document is issued under the provision that
no liability is accepted and that the manufacturer
shall indemnify third-party liability.

The designation of NMi Certin B.V. as Notified
Body can be verified at
[http://ec.europa.eu/growth/tools-
databases/nando/](http://ec.europa.eu/growth/tools-databases/nando/)

Reproduction of the complete
document only is permitted.

This document is digitally
signed and sealed. The digital
signature can be verified in the
blue ribbon at the top of the
electronic version of this
certificate.

1 General information on the water meter

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



Example of the water meter

1.1 Essential parts

Description	Documents	Remarks
Measurement sensor	11992/0-01	<p>The cylindrical measuring tube of the measurement sensor has a full bore.</p> <p>The inside of the cylindrical measuring tube is covered with an insulating liner. Through the liner, the 4 electrodes are in contact with the liquid. The flow sensor is equipped with a magnetic circuit containing the electromagnetic coil(s)</p>
Calculator and indicating device	11992/0-03 11992/0-04 11992/0-05 11992/0-06 11992/0-07 11992/0-08 11992/0-09 11992/0-10	<p>Signal converter and meter reading. Used to drive the magnetic spool and convert the electrode voltage to a flow rate.</p> <p>Integral and remote version available.</p>
Mobus/Profibus option card	11992/0-11 11992/0-12	<p>Optional printed circuit board for the calculator and indicating device.</p>

1.2 Essential characteristics

1.2.1 Flow characteristics

Meter size	Flow rates [m ³ /h]				Max. ratio Q3/Q1
	Minimum Q1	Transitional Q2	Permanent Q3	Overload Q4	
DN40	0,127	0,203	40	50	315
DN50	0,2	0,32	63	78,75	315
DN65	0,317	0,508	100	125	315
DN80	0,508	0,813	160	200	315
DN100	0,794	1,270	250	312,5	315
DN125	0,794	1,270	250	312,5	315
DN150	2	3,2	630	787,5	315
DN200	3,175	5,079	1000	1250	315
DN250	5,079	8,1270	1600	2000	315
DN300	7,937	12,698	2500	3125	315

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 Water temperature class

- T50 (+0,1 °C / +50 °C)

1.2.3 Maximum admissible pressure (MAP)

- 1,6 MPa (16 bar)

1.2.4 Orientation limitation

The sensor can be used in horizontal, vertical or diagonal position (all positions).

1.2.5 Flow profile sensitivity class

- U5 and D0 (5 x DN upstream and 0 x DN downstream)

1.2.6 Reverse flow

The sensor is also designed to measure reverse flow.

1.2.7 Pressure loss class

- Δp 25 (0,25 bar)

1.2.8 Temperature range ambient

- -25 °C / +55 °C

1.2.9 Power supply

The water meter is powered by means of:

- AC mains: 85 – 265 VAC @ 50/60 Hz
24 VAC (+10 % ... -30 %) @ 50/60 Hz
- DC mains: 24 V (+/- 30 %)

1.2.10 Environmental classification
 - M1 / E2 / O (installed outdoors)

1.2.11 Measuring principle
 The magnetic field, generated through the magnetic coil, induces a voltage across the flowing (conductive) liquid (Faraday's law for conductors moving through a magnetic field).
 This induced voltage is measured with two horizontal 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. Two vertical electrodes are used for grounding.

1.2.12 Operation and presentation of legal data
 The meter is equipped with an electronic LCD display and can be operated using the four key actuations (up, down, left, right). The LCD display is used for the presentation of the measured volume and for the menu system (programming) of the water meter.

The display register is built up as followed:

Meter size	Indicating range (minimum value) [m ³]	Verification scale interval (minimum resolution) [m ³]
DN40	99999	0,0001
DN50	99999	0,001
DN65, DN80, DN100, DN125	999999	0,001
DN150	999999	0,01
DN200, DN250, DN300	9999999	0,01

When the maximum indicating range of the volume totalization is reached, the indicating range will continue measuring starting from zero cubic meter.

1.2.13 Accountable alarms
 During the measuring process the calculator and indicating device detects automatically if a fault condition occurs and eventually stops the measurement reporting an alarm indication on the display.

1.2.14 Software specification (refer to WELMEC 7.2):

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

Part	Software I.D.	Versions	CRC Checksum
Main Application – HART	WAJC 2506	01.07.01	0x2926C54D
Main Application – Profibus	WAJC 2540	01.05.00	0xD4AD6E41
Main Application – Modbus	WAJC 2547	01.02.01	0xA634EDDB
Sensor PIC	WAJC 2501	02.02.00	0x5BBA6C2C
MSP HART Software	WAJC 2505	01.00.00	0x56302F5D

The software version and checksum can be displayed on the meter by following menu steps:

- Navigate to the “Device Info” page on the transmitter’s user interface using the buttons on the interface.



- Advance through to the “Transmitter” menu, then enter and advance through to the “TX Version” menu. The items in this menu are “Application” (software part/version number), “Application CRC” (software checksum) which can validate the transmitter has an approved software program installed, plus some other information outside scope of legal relevance.

1.3 Essential shapes

1.3.1 Markings

See documentation number 11992/0-02 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: T11992;
- Manufacturers name, registered trade name 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.

1.3.2 Further inscriptions

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

- 1.3.3 EMI protection measures
- Grounding of the measurement sensor;
 - Grounding of the calculator and indicating device;
 - Shielded cables of the I/O cables.

1.4 Conditional parts

- 1.4.1 Housing
 The housing of the calculator and indicating device is made of carbon steel and is available for an intergral or remote version available.

1.5 Conditional characteristics

- 1.5.1 Programming
 It is not possible to program the water meter after the 'Read Only' switch within the housing is activated. The housing can be secured with anti-tamper seals to detect unauthorized physical access to the device.

- 1.5.2 Parameter settings
 The legally relevant settings, which cannot be altered anymore after putting the device into Custody Transfer Mode, are as follows:

Designation	Related to	Value for compliance where necessary
Flow units	Type	m ³ /h
Q _{max}	Type	Q3 for the sensor type/size
Totaliser / pulse units	Type	m ³
Volume format	Device	Depends on FEV sensor size
Damping	Type	3
Mains frequency	Type	50 Hz
Sensor calibration type	Device	OIML Cert'd Class 1 (for Class1 accuracy sensors) OIML Cert'd Class 2 (for Class2 accuracy sensors)
Span S _s	Device	Matches value on factory calibration certificate
Zero S _z	Device	Matches value on factory calibration certificate
Drive mode	Device	5A
Sensor Size (Bore)	Device	Matches sensor size specified on build label
Factory cutoff	Type	5 mm/s
S _c	Device	Depends on FEV sensor size: DN40: -2 DN50: -2 DN65: -1.4 DN80: -1 DN100: -1.3 DN125: -1.3 DN150: -1 DN200: 0 DN300: 0
S _v	Device	Depends on FEV sensor size: DN40: -9 DN50: -11

Designation	Related to	Value for compliance where necessary
		DN65: -15 DN80: -11 DN100: -8 DN125: -8 DN150: -11 DN200: 0 DN300: 0
Simulation mode	Type	None

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 forms the decisive indication of the water meter:

- Digital pulse output;
- HART interface;
- 4 to 20 mA current loop;
- Profibus DP;
- Modbus interface.

1.8 Non essential characteristics

- Digital input and outputs.

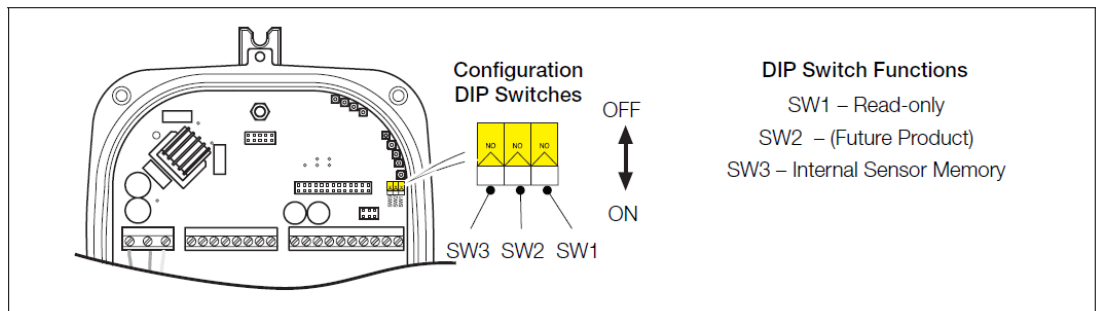
2 Seals

The following seals are applied:

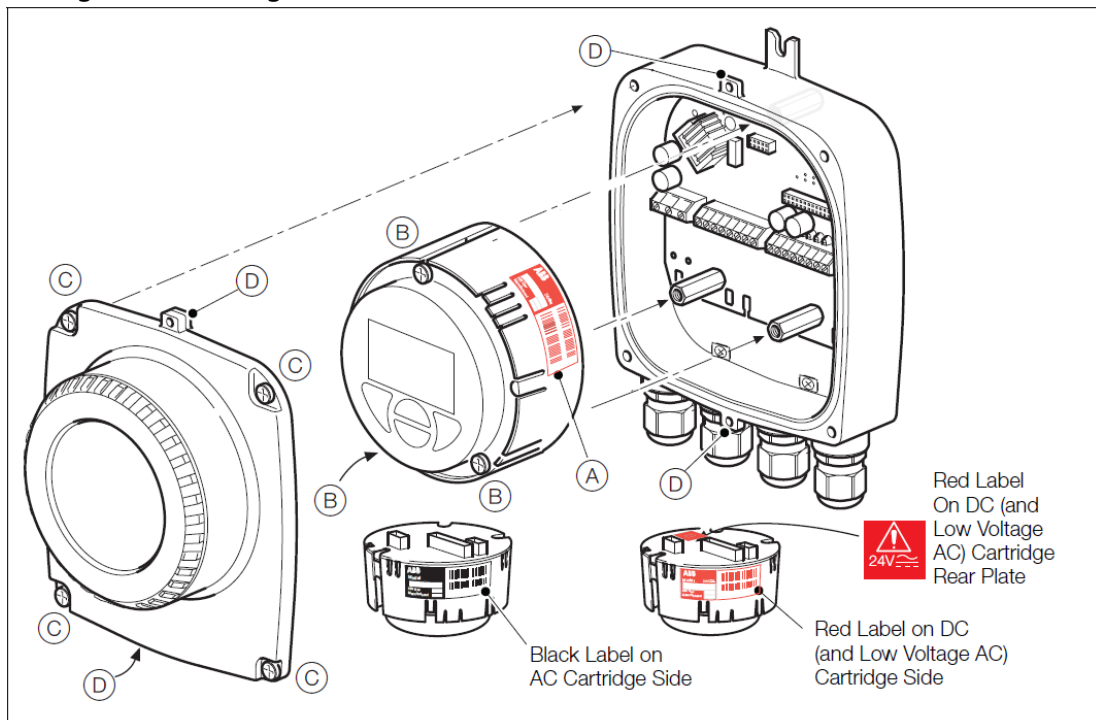
- The markings are fixed to the water meter and secured against removal by seal or it will be destroyed when removed.
- The housing of the calculator and indicating device is sealed against opening after the 'Read Only' switch within the housing is activated. See below pictures with instructions:

'Read Only' switch settings shall be:

- SW1 = ON
- SW2 = OFF
- SW3 = OFF if a remote sensor is connected or ON if an integral sensor is connected.



Sealing of the housing at location D:



3 Conditions for conformity assessment

- At the initial verification, the performance of the water meter has to be determined by measuring the errors (of indication) at least at the following flow rate ranges:
 - $Q2 \pm 10\%$;
 - $\frac{1}{3}$ of $Q3 \pm 10\%$;
 - $Q1 \pm 10\%$, only if the error at $\frac{1}{3}$ of $Q3 \pm 10\%$ is more than $\frac{1}{4}$ of the MPE applicable for point Q3, and at $Q2 \pm 10\%$ is more than $\frac{1}{2}$ of the MPE applicable for point Q2.
- 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 according to paragraph 1.5.2.
- 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 5250 Hz and with a pulse width between 0,089 ms and 2000 ms (Maximum pulse frequency is recalculated where the pulse width setting prevents the full frequency range from being achieved).