

EU-Type Examination Certificate

Measuring Instrument Directive

Certificate number: DK-0200-MI001-049

Issued by FORCE Certification A/S, Denmark

EU-notified body number 0200

In accordance with Annex II Module B of the Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of measuring instruments (MID).

Issued to: **Siemens AG**
DE-76181
Karlsruhe
Germany

Type of instrument: Water meter
Type designation: FM520 consisting of FMS500 and FMT020
Valid until: 2035-07-07
Number of pages: 14 including appendix
Date of issue: 2025-12-10
Version: 1
This version of DK-0200-MI001-049 is issued due to addition of more meter sizes.
The previous certificate is withdrawn.

Approved by



Michael Møller Nielsen
Certification Manager

Processed by



Lars Poder
Examiner

The conformity markings may only be affixed to the above type approved equipment. The manufacturer's Declaration of Conformity may only be issued and the notified body identification number may only be affixed on the instrument when the production/product assessment module (D or F) of the Directive is fully complied with and controlled by a written inspection agreement with a notified body.
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FORCE Certification references: TASK no.: 125-27857.02 and ID no.: 0200-MID-19742-2

Appendix to

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Version	Issue date	Changes
DK-0200-MI001-049	2025-07-07	Original certificate
DK-0200-MI001-049 ver 1	2025-12-10	Addition of more meter sizes: ▪ DN350-400-450-500-600 ▪ DN700-750-800-900-1000-1200 ▪ DN1400-1500-1600-1800-2000

Applied standards and documents:

OIML R 49:2013

WELMEC Guide 7.2:2023 – with editorial changes

OIML R 49-1:2024 Annex D "Requirements for software-controlled water meters"

The instrument/measuring system shall correspond with the following specifications:

Type designation:

FM520 consisting of FMS500 and FMT020.

Description:

The operating principle of this electromagnetic water meter FM520 is that a constant pulsed DC electrical current through the coil circuit results in a magnetic field through the sensor bore with direction from coil to coil. When a conductive liquid passes through the magnetic field a differential DC voltage is induced between the measuring electrodes, and this voltage is proportional to the fluid velocity (Faraday's Law).

FM520 is designed for the following main applications: Water abstraction, Water treatment, Water distribution network (leak detection management), custody transfer water meters, Irrigation, Wastewater treatment, Filtration plant (e.g. reverse osmosis and ultra-filtration), Industrial water applications. For OIML R 49, the product can be used only for cold potable water and hot water (according to OIML R 49).

Technical documentation:

Test reports

- Performance tests: 124-30210-2_Type evaluation report - Siemens AG - OIML R 49-2 tests of FM520 water meter version 2
- Environmental tests: 124-31871-2 - Test report - Siemens AG - OIML R 49-2 tests of FM520 water meter

FORCE Certification internal file folder

- 125-27857.01
- 125-27857.02

Technical data:

Instrument type:	Complete water meter
Temperature class:	T30 (0.1 – 30 °C) and T50 (0.1 – 50 °C)
Accuracy class:	2
Pressure class:	MAWP 16
Electromagnetic environment class:	E2
Mechanical environment class:	M1, Class B and O (building and outdoors)
Climatic class:	-20 °C – 55 °C, condensing
Sensitivity to irregularity upstream velocity field classes:	U0
Sensitivity to irregularity downstream velocity field classes:	D0
Orientation requirements:	Horizontal, vertical or at an intermediate angle
Protection class:	IP67 or IP68
Power supply:	12 – 42 VDC, 12W 100 – 240 VAC, 50 – 60 Hz, 25 VA

Approved sensor variants:

The table below shows the sensor variants that have been approved based on the type approval tests performed.

Other sensor variants are also covered by this approval provided the following is fulfilled:

- "R" (Q_3/Q_1) shall not exceed the values in the tables and shall be chosen from OIML R 49-1:2013 list 4.1.4
- Q_3 shall not exceed the values in the tables and shall be chosen from OIML R 49-1:2013 list 4.1.3
- Q_1 shall be larger than the values in the tables
- Q_2 shall be larger than the values in the tables

Type details:

SIZE	DN50 (2")	DN65 (2½")	DN80 (3")	DN100 (4")	DN125 (5")	DN150 (6")	DN200 (8")	DN250 (10")	DN300 (12")
"R" Q_3/Q_1	400	400	400	400	400	400	400	400	400
Q_1 [m³/h]	0.16	0.25	0.4	0.63	1	1.6	2.5	4	4
Q_2 [m³/h]	0.25	0.4	0.63	1	1.6	2.5	4	6.4	6.4
Q_3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q_4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000

SIZE	DN350 (14")	DN400 (16")	DN450 (18")	DN500 (20")	DN600 (24")	DN700 (28")	DN750 (30")	DN800 (32")	DN900 (36")
"R" Q_3/Q_1	400	400	400	400	400	160	160	160	160
Q_1 [m³/h]	6.3	10	10	15.8	15.8	39.4	39.4	39.4	62.5
Q_2 [m³/h]	10	16	16	25.2	25.2	63	63	63	100
Q_3 [m³/h]	2500	4000	4000	6300	6300	6300	6300	6300	10000
Q_4 [m³/h]	3125	5000	5000	7875	7875	7875	7875	7875	12500

SIZE	DN1000 (40")	DN1200 (48")	DN1400 (56")	DN1500 (60")	DN1600 (64")	DN1800 (72")	DN2000 (80")
"R" Q_3/Q_1	160	160	80	80	80	80	80
Q_1 [m³/h]	62.5	62.5	125	125	125	125	125
Q_2 [m³/h]	100	100	200	200	200	200	200
Q_3 [m³/h]	10000	10000	10000	10000	10000	10000	10000
Q_4 [m³/h]	12500	12500	12500	12500	12500	12500	12500

Communication:

Communication modules are considered as ancillary devices (OIML R 49-1:2013, clause 4.3.6).

They can be ordered as an option on the meter:

- Profinet
- Ethernet IP
- Modbus
- Hart

Where national regulations permit, the remote reading ancillary device may be used for testing and verification and for remote reading of the water meter. It has been tested during the type-examination tests that the addition of these devices does not alter the metrological characteristics of the water meter.

Approved Hardware and Software versions:

HW bundle: 1.00.00

SW bundles: 1.02.04 and 1.03.04

The tables below describe the Software bundle composition with firmware version of all product components (Transmitter, Sensor, HMI, Communication modules and Web app).

Software Bundle 1.02.04	
TRN	5.09.01-43
SEN FW	1.02.03-00
HMI Config	1.03.03-11
Com FW HART MB IO*	1.00.01-04
Com Profibus FW*	2.03.06-03
Com PNIO FW	1.00.01-00
Com EIP FW	1.00.00-12
PN/EIP WebApp	1.00.00-10

Software Bundle 1.03.04	
TRN FW	5.09.07-64
SEN FW	1.03.00-02
HMI Config	1.04.02-03
Com HART/ Modbus IO FW*	1.00.01-04
Com Profibus FW *	2.03.07-06
Com PNIO FW	2.01.01-01
Com EIP FW	2.01.02-02
Com Modbus TCP *	2.00.02-05
WebApp	1.00.00-11

* These options are not certified yet but are listed as part of the SW and HW bundles.

Hardware and Software bundle versions are printed on the product label. Hardware and all Firmware versions can be shown directly on the products HMI.

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Checksum:

The tables below describe the checksums belonging to the approved Firmware versions. Only the TRN Firmware checksum is printed on the product label.

SW 1.02.04		
FW	Version	Checksum
TRN	5.09.01-43	1EFD9D24B1171E8A7D99EB7151187C25
SEN	1.02.03-00	57209790EF36F07E01DFED454411A66A
HMI CONFIG	1.03.03-11	FDCF9F71B690DCE89CC3B05220B95199
COM HART COM MODBUS COM IO*	1.00.01-04	09FEAF3555B9F2A92DCCEE06366C7DB9
COM PROFIBUS*	2.03.06-03	0D8B1B8ABA796B2C5F3C4923F31310B9
COM PROFINET	1.00.01-00	A1732A787352F543DB8593F67DB4E096
COM ETHERNET/IP	1.00.00-12	70B26C68DE2C1A1E4132C5A5280AE647
WEBAPP	1.00.00-10	F60DFBF54C2931F91E751BAFB35C98B5

* These options are not certified yet but are listed as part of the SW and HW bundles.

SW 1.03.04		
FW	Version	Checksum
TRN	5.09.07-64	1507E7B4824A0CB78511C0B7F6DAE5B3
SEN	1.03.00-02	3970567CB8EF4E7C12435F9A6F9BD85D
HMI CONFIG	1.04.02-03	68E026C2DE22BC37CB214C0CF8747106
COM HART COM MODBUS COM IO*	1.00.01-04	09FEAF3555B9F2A92DCCEE06366C7DB9
COM PROFIBUS*	2.03.07-06	10AEDFD9B08BD527CCCF02EE02B42039
COM PROFINET	2.01.01-01	DA8FF1A14A714C792152F8FBAF5A7E90
COM ETHERNET/IP	2.01.02-02	D8EC0048F44377BAEA8E70D73C7EB5DA
COM MODBUS TCP/IP*	2.00.02-05	2E6625632D72C455E2DA39FDBE518D72
WEBAPP	1.00.00-11	97AF100AD7A5E3061F6FF451E4B3E8F1

* These options are not certified yet but are listed as part of the SW and HW bundles

Verification:

Errors: Maximum permissible errors according to Directive 2014/32/EU of the European Parliament and Council of February 26, 2014 on measuring instruments (MID), Annex III (MI-001).

Procedure: The test points and verification according to OIML R 49:2013.
It is also possible to use water at a temperature of $20\text{ °C} \pm 10\text{ °C}$

At least the following three flow rates shall be used for verification

$$Q_1 \leq Q \leq 1.1 \times Q_1 (\pm 5\%)$$

$$Q_2 \leq Q \leq 1.1 \times Q_2 (\pm 2\%)$$

$$0.9 \times Q_3 \leq Q \leq Q_3 (\pm 2\%)$$

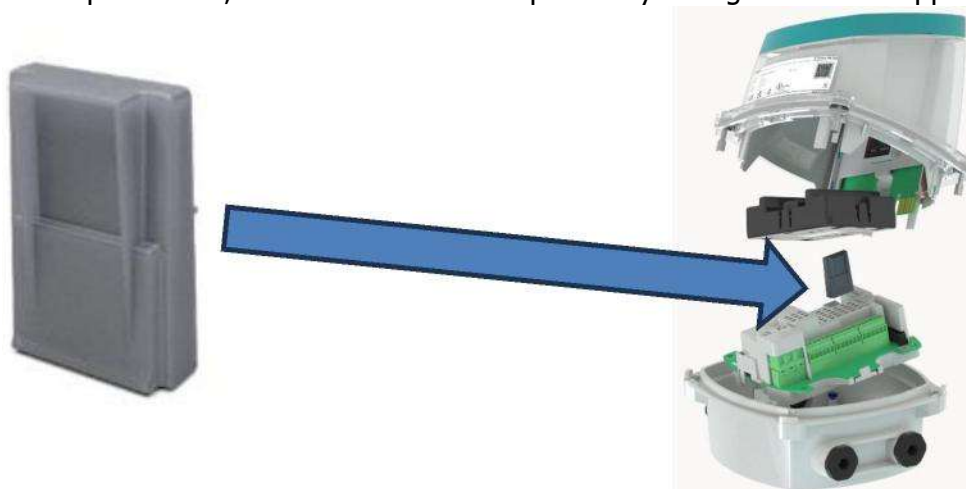
Security measures:

Parameter protection mechanism

While being produced, FM520 systems will pass several parametrization operations ensuring that the match-pair system, made of a FMS500 sensor and a FMT020 transmitter can ensure CT mode, which supports metrological parameter protection mechanism.

FMS500 sensor parameter protection in SENSORPROM

During sensor production, the SENSORPROM is specifically configured for CT application.



Picture 1 - Programmed SENSORPROM

FMT020 transmitter parameter protection in EEPROM

During transmitter production, the transmitter is specifically configured for CT application.



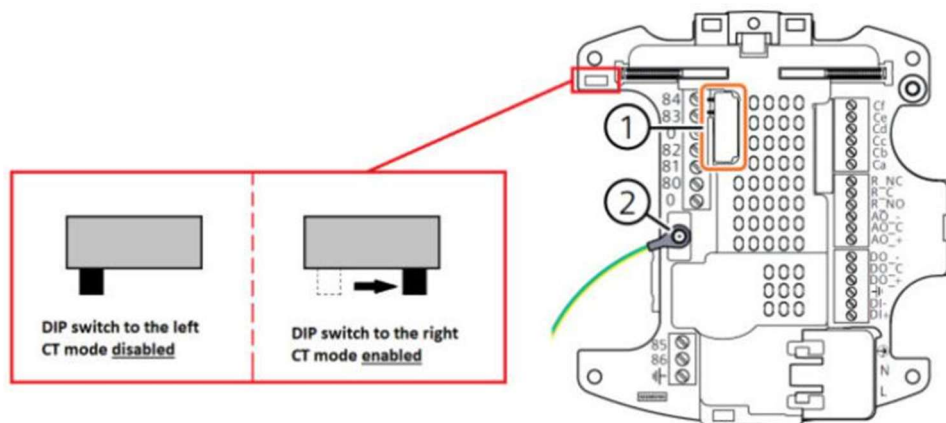
Picture 2 - FMT020 transmitter

HW switch

CT mode is activated when the CT switch on the PSU is switched to the right side.

The CT switch position is secured with an internal seal.

This CT switch is the physical mean for the user of the system to enter or exit the CT mode.



Picture 3 - CT switch on power supply unit

CT mode enabled

The combination of the three following steps allows the system to enter CT mode:

- SENSORPROM programmed for CT purpose
- FMT020 programmed for CT purpose
- CT switch of the PSU positioned to CT mode enabled

When CT mode is enabled a logo (see blue arrow below) on the HMI indicates to the user that the system is running into CT mode. CT mode protects all metrological relevant parameters.



Picture 4 - Identification of CT mode enabled on FMT020 HMI

Audit trails

The FMT020 transmitter maintains multiple detailed audit trails that record all critical system interventions.

These include the firmware update history log, the parameter change log, the alarm history log and the security event log.

For each of these logs, only the most recent 100 entries are stored within the device, ensuring that the audit trails remain current without compromising system performance. Each log entry is timestamped and provides a clear record of the respective event or intervention.

To further protect the integrity of these records, any reset or clearance operations for these audit trails are CT protected, meaning that they cannot be modified or erased without a deliberate and secure intervention.

The audit trails can be displayed on command in the HMI:

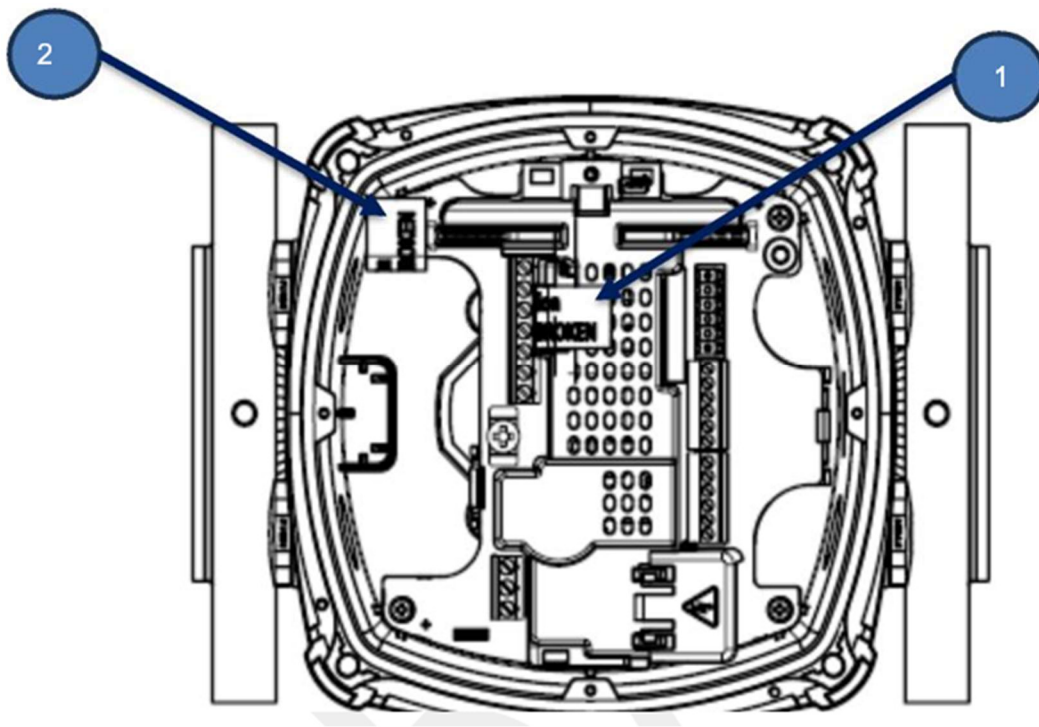
Audit trail	Menu to access the audit trail
Parameter change log	3.9.1
Alarm history log	3.2.2
Firmware update history log	3.9.3
Security event log	5.9

Sealing:

Internal sealing – metrological sealings

The internal sealing is carried out at factory to prevent the unauthorized dismantling of the SENSORPROM (1), containing metrological characteristics of the systems.

Another seal is applied to the CT switch and to one fixing screw of the PSU (2) to secure the position of the CT switch and to prevent the disassembly of the PSU from the terminal box.



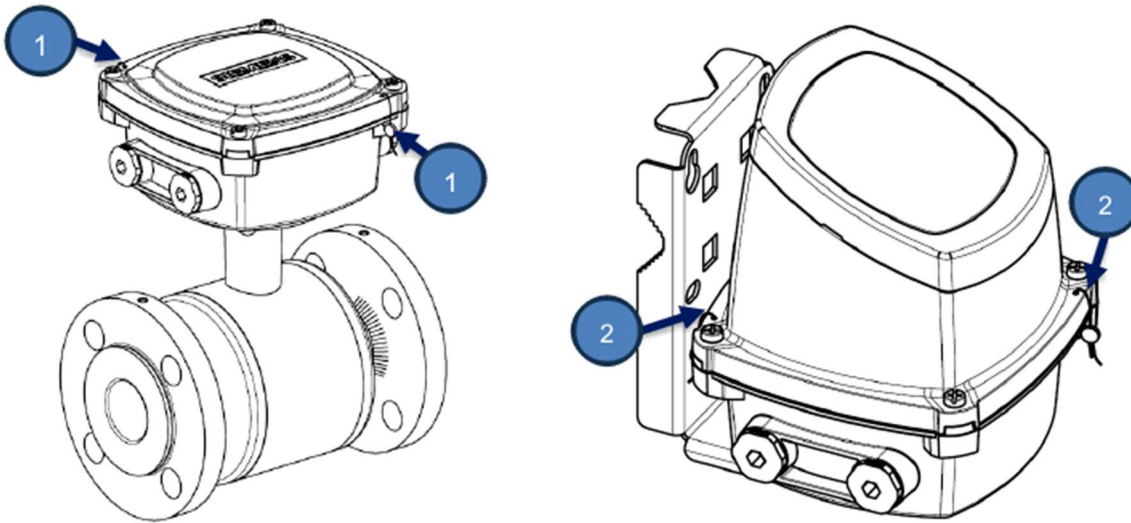
Picture 5 - Internal sealing securing the SENSORPROM and the CT-switch into the PSU

External sealing – user sealings

FM520 systems are delivered with user sealings. These user sealings are meant to be installed in the field, after commissioning, by an authorized person. These sealings prevent the opening of the enclosure and any replacement of the terminal box by an unauthorized person.

User sealing in remote operation

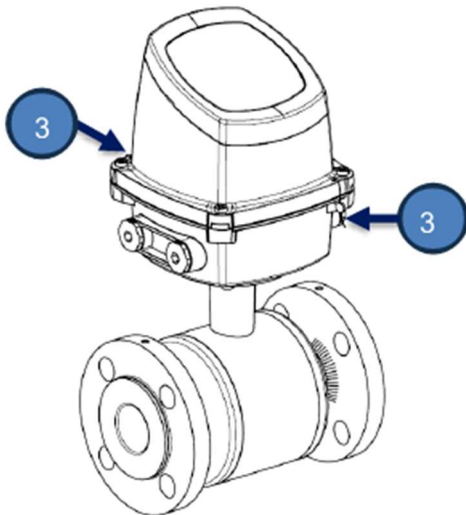
User sealing in remote operation consists of four seals. Two seals installed on the sensor terminal box (1) prevent access to the sensor connections. Two seals installed on the transmitter prevent unauthorized access to the electronic parts of the system.



Picture 6 - User sealing in remote operation

User sealing in compact operation

User sealing in compact operation consists of two seals (3), preventing the access to the sensor connections and to the electronic parts of the system.



Picture 7 – User sealing in compact operation

Installation:

FM520 requires 0D of straight pipe upstream from the sensor and 0D of straight pipe downstream from the sensor.

The sensor can be installed in all orientations up to DN300.

The sensor can be installed in horizontal and vertical orientation from DN350 up to DN1200.

The sensor must be installed in horizontal orientation from DN1400 up to DN2000.

The signal transmitter can be fitted in all positions either compact on the sensor or remotely with a cable. Cable specification according to manufacturers (Siemens) specification. The cable length must not exceed 500 m.

Labelling and inscriptions:

Manufacturer, type, year

Serial no.

System no.

EU-Type Examination Certificate number

$T_{\max}$ and $P_{\max}$

Application temperature range

Power supply

Accuracy class

Software version

Unit of measurements: Cubic meter

Direction of flow

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Labelling examples:

Sensor labels

SIEMENS		SITRANS FM500	
Order No.:	7ME65322Y5021GA2-Z	S/N:	XXXXXXXXXX
Options:	A00+G01+G11	MFY:	2025
Process connection	AS 4087, PN16	Tamb.:	-20°C...+55°C
Sensor material:	ASTM A 105	IP67	
Elec.Hastelloy C276/2.4819		Size:	DN50/2" Q3/Q1 = 40 UOD0
		Liner:	EPDM Q3: 63m³/h Δp 10
Cal Factor:	0.00000000	All Orientation	
Tmedia min/max:	0,1°C/50°C		
MAWP (PS) at 0,1°C:	16bar/232psi/1.6MPa	 	
MAWP (PS) at 50°C:	16bar/232psi/1.6MPa		
Siemens AG, DE- 76181 Karlsruhe		0200	Made in France

SIEMENS	SITRANS FMS500
	
Siemens AG, DE- 76181 Karlsruhe	Made in France

Transmitter labels

SIEMENS		SITRANS FMT020	
Order No.:	7ME65322Y5021GA2-Z		
Options:	A00+G01+G11	FW:	1.03.04
S/N:	XXXXXXXXXX	HW:	1.00.00
Supply:	12 – 42 VDC 12W		
Tamb.:	-20°C...+55°C		
System serial number:	XXXXXXXXXX	Checksum:	1507E7B4824A0CB78511C0B7F6DAE5B3
		  	
Siemens AG, DE- 76181 Karlsruhe		Made in France	

SIEMENS		SITRANS FMT020
Certification No.: DK-0200-MI001-049 Envir. Class: E2, M1 Accuracy OIML R49 Class 2 MFY: 2025		
Siemens AG, DE- 76181 Karlsruhe		
		Made in France