

EU-Type Examination Certificate

Measuring Instrument Directive

Certificate number: DK-0200-MI001-038

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: **Kamstrup A/S**
Industrivej 28, Stilling
DK-8660 Skanderborg

Type of instrument: Water meter

Type designation: KWM2230

Valid until: 2031-02-10

Number of pages: 12, including appendix

Date of issue: 2024-09-23

Version: 17
This version of DK-0200-MI001-038 is issued due to changes to the meter.
The previous certificate is withdrawn.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.: 124-30953.02 and ID no.: 0200-MID-18080-1

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Appendix to

EU-Type Examination Certificate

Measuring Instrument Directive

Number: DK-0200-MI001-038

Issued by FORCE Certification A/S, Denmark

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Revision	Issue date	Changes
DK-0200-MI001-038	2021-02-10	Original certificate
DK-0200-MI001-038 ver 1	2021-03-25	New SW version added
DK-0200-MI001-038 ver 2	2021-05-17	New SW version added
DK-0200-MI001-038 ver 3	2021-06-14	New SW version added, component for temperature measurement added
DK-0200-MI001-038 ver 4	2021-10-07	New SW versions added
DK-0200-MI001-038 ver 5	2021-10-26	New SW version added, new communication module added
DK-0200-MI001-038 ver 6	2022-01-18	New SW versions added, new communication modules added
DK-0200-MI001-038 ver 7	2022-02-03	New SW version added
DK-0200-MI001-038 ver 8	2022-02-23	New SW version added
DK-0200-MI001-038 ver 9	2022-03-25	New SW version added
DK-0200-MI001-038 ver 10	2022-05-17	New communication modules 65 and 91 added
DK-0200-MI001-038 ver 11	2022-10-26	Description of SW changes (legally relevant and non-legally relevant) added
DK-0200-MI001-038 ver 12	2023-01-20	New SW version added, new Wired M-Bus module added
DK-0200-MI001-038 ver 13	2023-09-19	New SW version added
DK-0200-MI001-038 ver 14	2023-12-15	New SW version added
DK-0200-MI001-038 ver 15	2024-05-23	New SW version H1 added
DK-0200-MI001-038 ver 16	2024-09-19	New SW versions E1C1 and E1D1 added
DK-0200-MI001-038 ver 17	2024-09-23	New SW version D1H1 added

Applied standards and documents:

OIML R 49:2013 (ISO 4064:2014)

WELMEC Guide 7.2:2020

The instruments/measuring systems shall correspond with the following specifications:

Type designation:

KWM2230 Water meter

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Description:

KWM2230 is an integrated and hermetically sealed static water meter based on the ultrasonic measuring principle. The meter body is made of PPS composite material. The volume measurements are made by means of bidirectional ultrasonic technique according to the transit time method. KWM2230 has a display indicating the registered volume, measuring unit, error codes and more. Furthermore, an optical eye is located on the front, whereby data reading of data loggers and configuration of the meter, can be made for service and diagnostic purposes. The meter has a wired connection in front of the meter, hidden behind a blind cover. Behind the blind cover, the meter has 3 pins for the wire connection. This would not cause any problems even on submerged water meters.

The blind cover only protects the pins from mechanical impact and is not a seal of the connection.

The cover is mounted from factory and must be removed before installing the cable. It can be re-moved without use of any tools.

KWM2230 is power supplied from an internal lithium D-cell battery providing long battery life, even with high performance communication. A separate pulse interface can be used for converting the data telegram into volume pulses during calibration of the meter.

Technical documentation (Reference numbers):

- 124-30953.02
- 124-30953.01
- 121-22288.16
- 121-22288.15
- 121-22288.14
- 121-22288.13
- 121-22288.12
- 121-22288.11
- 121-22288.10
- 121-22288.09
- 121-22288.08
- 121-22288.07
- 121-22288.06
- 121-22288.05
- 121-22288.04
- 121-22288.03
- 121-22288.02
- 121-22288.01

Technical data

Meter dimensions

Meter with Q ₃	Overall meter length [mm]	Meter connection	Diameter [DN]
4.0 [m ³ /h]	130, 190	G1B	20
2.5 [m ³ /h]	105, 130, 190	G1B	20
2.5 [m ³ /h]	110, 170	G ³ / ₄ B	15
1.6 [m ³ /h]	110, 170	G ³ / ₄ B	15

Flow designation for T30 and T50

Meters with Q₃ = 4.0 m³/h:

Dynamic range Q ₃ /Q ₁	1600	1000	800	630	500	400	315
Q ₁ Minimum flow rate [l/h]	2.5	4	5	6.3	8	10	12.7
Q ₂ Transitional flow rate [l/h]	4	6.4	8	10.2	12.8	16	20.3
Q ₃ Permanent flow rate [m ³ /h]	4.0						
Q ₄ Overload flow rate [m ³ /h]	5.0						

Dynamic range Q ₃ /Q ₁	250	200	160	125	100
Q ₁ Minimum flow rate [l/h]	16	20	25	32	40
Q ₂ Transitional flow rate [l/h]	25.6	32	40	51.2	64
Q ₃ Permanent flow rate [m ³ /h]	4.0				
Q ₄ Overload flow rate [m ³ /h]	5.0				

Meters with Q₃ = 2.5 m³/h:

Dynamic range Q ₃ /Q ₁	1600	1000	800	630	500	400	315
Q ₁ Minimum flow rate [l/h]	1.6	2.5	3.1	4	5	6.3	7.9
Q ₂ Transitional flow rate [l/h]	2.5	4	5	6.3	8	10	12.7
Q ₃ Permanent flow rate [m ³ /h]	2.5						
Q ₄ Overload flow rate [m ³ /h]	3.125						

Dynamic range Q ₃ /Q ₁	250	200	160	125	100
Q ₁ Minimum flow rate [l/h]	10	12.5	15.6	20	25
Q ₂ Transitional flow rate [l/h]	16	20	25	32	40
Q ₃ Permanent flow rate [m ³ /h]	2.5				
Q ₄ Overload flow rate [m ³ /h]	3.125				

Flow designation for T30 and T50 continued

Meters with $Q_3 = 1.6 \text{ m}^3/\text{h}$:

Dynamic range Q_3/Q_1	1600	1000	800	630	500	400	315
Q_1 Minimum flow rate [l/h]	1	1.6	2	2.6	3.2	4	5.1
Q_2 Transitional flow rate [l/h]	1.6	2.6	3.2	4	5.1	6.4	8.1
Q_3 Permanent flow rate [m^3/h]	1.6						
Q_4 Overload flow rate [m^3/h]	2.0						

Dynamic range Q_3/Q_1	250	200	160	125	100
Q_1 Minimum flow rate [l/h]	6.4	8	10	12.8	16
Q_2 Transitional flow rate [l/h]	10.2	12.8	16	20.5	25.6
Q_3 Permanent flow rate [m^3/h]	1.6				
Q_4 Overload flow rate [m^3/h]	2.0				

Flow designation for T70

Meters with $Q_3 = 4.0 \text{ m}^3/\text{h}$:

Dynamic range Q_3/Q_1	400	315	250	200	160	125	100
Q_1 Minimum flow rate [l/h]	10	12.7	16	20	25	32	40
Q_2 Transitional flow rate [l/h]	16	20.3	25.6	32	40	51.2	64
Q_3 Permanent flow rate [m^3/h]	4.0						
Q_4 Overload flow rate [m^3/h]	5.0						

Meters with $Q_3 = 2.5 \text{ m}^3/\text{h}$:

Dynamic range Q_3/Q_1	400	315	250	200	160	125	100
Q_1 Minimum flow rate [l/h]	6.3	7.9	10	12.5	15.6	20	25
Q_2 Transitional flow rate [l/h]	10	12.7	16	20	25	32	40
Q_3 Permanent flow rate [m^3/h]	2.5						
Q_4 Overload flow rate [m^3/h]	3.125						

Meters with $Q_3 = 1.6 \text{ m}^3/\text{h}$:

Dynamic range Q_3/Q_1	400	315	250	200	160	125	100
Q_1 Minimum flow rate [l/h]	4	5.1	6.4	8	10	12.8	16
Q_2 Transitional flow rate [l/h]	6.4	8.1	10.2	12.8	16	20.5	25.6
Q_3 Permanent flow rate [m^3/h]	1.6						
Q_4 Overload flow rate [m^3/h]	2.0						

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Other designations

Instrument type:	Complete water meter
Temperature class:	T30 (0.1 – 30 °C) Also tested T50 & T70 according to OIML R 49:2013
Pressure stage:	PN6, PN10 and PN16
Accuracy class:	2
Electromagnetic environment class:	E1 and E2
Mechanical environment class:	M1, Class B and O (building and outdoors)
Climatic class:	-25 °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:	IP68
Power supply:	3.65 VDC lithium battery
Battery lifetime:	Up to 20 years

Communication

Communication modules:

Module designation	Module description
02K-31	Wired M-Bus Wireless M-Bus C1/T1 OMS linkIQ®
02K-32	Wired M-Bus Radio disabled
02K-60	Wireless M-Bus C1/T1 OMS linkIQ® without plug
02K-61	Serial communication for flowIQ® Gateway. Composite – cold
02K-62	Serial communication for flowIQ® Gateway. Composite – hot
02K-65	Wireless M-Bus/linkIQ® Serial communication + Ext. Power
02K-71	LoRaWAN
02K-72	LoRaWAN/Sigfox
02K-81	NB-IoT
02K-82	NB-IoT 1.5
02K-91	Serial communication + Ext. Power

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Approved software versions

Module description	Version No.	Checksum for metrological part of the SW		Description
		Calculator SW	ASIC SW	
Wireless M-Bus C1/T1 OMS linkIQ® and Wired output	A1B1	086D (Hex)	BE41 (Hex)	N
	B1D1	CB73 (Hex)	F496 (Hex)	N
	D1D1	2456 (Hex)	F496 (Hex)	N
	D1E1	2456 (Hex)	9DCB (Hex)	L
	E1E1	004F (Hex)	9DCB (Hex)	L
	D1F1	2456 (Hex)	41CF (Hex)	N
	E1F1	004F (Hex)	41CF (Hex)	N
	F1F1	46FB (Hex)	41CF (Hex)	N
	F1G1	46FB (Hex)	23A5CA6B (Hex) 598067819 (Dec)	N
	G1F1	504A4821 (Hex) 1347045409 (Dec)	41CF (Hex)	N
	G1G1	504A4821 (Hex) 1347045409 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	F1H1	46FB (Hex)	BBFCA136 (Hex) 3153895734 (Dec)	N
	G1H1	504A4821 (Hex) 1347045409 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
	H1H1	A7B7AC40 (Hex) 2813832256 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
LoRaWAN	D1F1	1887EB74 (Hex) 411560820 (Dec)	41CF (Hex)	N
	D1G1	1887EB74 (Hex) 411560820 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	E1F1	7BB41719 (Hex) 2075399961 (Dec)	41CF (Hex)	N
	E1G1	7BB41719 (Hex) 2075399961 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	D1H1	1887EB74 (Hex) 411560820 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
	E1H1	7BB41719 (Hex) 2075399961 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
LoRaWAN/Sigfox	D1F1	68CA1DCB (Hex) 1758076363 (Dec)	41CF (Hex)	N
	D1G1	68CA1DCB (Hex) 1758076363 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	E1F1	781E6F6B (Hex) 2015260523 (Dec)	41CF (Hex)	N
	E1G1	781E6F6B (Hex) 2015260523 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	D1H1	68CA1DCB (Hex) 1758076363 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
	E1H1	781E6F6B (Hex) 2015260523 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
	F1G1	ACFD0693 (Hex) 2902263443 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	F1H1	ACFD0693 (Hex) 2902263443 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
	G1G1	C0B9C1FD (Hex) 3233399293 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	G1H1	C0B9C1FD (Hex) 3233399293 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N

N: Non-legally Relevant Software Change, L: Legally Relevant Software Change

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Approved software versions continued

Module description	Version No.	Checksum for metrological part of the SW		Description
		Calculator SW	ASIC SW	
NB-IoT	B1F1	FD1CE794 (Hex) 4246529940 (Dec)	41CF (Hex)	N
	B1G1	FD1CE794 (Hex) 4246529940 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	C1F1	3DC35DOF (Hex) 1036213519 (Dec)	41CF (Hex)	N
	C1G1	3DC35DOF (Hex) 1036213519 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	B1H1	FD1CE794 (Hex) 4246529940 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
	C1H1	3DC35DOF (Hex) 1036213519 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
	D1H1	A960D939 (Hex) 2841696569 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N
NB-IoT 1.5	E1C1	8404C174 (Hex) 2214904180 (Dec)	8895BB1F (Hex) 2291514143 (Dec)	L
	E1D1	8404C174 (Hex) 2214904180 (Dec)	A80F5D18 (Hex) 2819579160 (Dec)	L
Wired M-Bus	G1G1	A516AE7B (Hex) 2769727099 (Dec)	23A5CA6B (Hex) 598067819 (Dec)	N
	G1H1	A516AE7B (Hex) 2769727099 (Dec)	BBFCA136 (Hex) 3153895734 (Dec)	N

N: Non-legally Relevant Software Change

L: Legally Relevant Software Change

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Verification procedure

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

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

Test points (flows): $Q_1 \leq Q \leq 1.1 Q_1$
 $Q_2 \leq Q \leq 1.1 Q_2$
 $0.9 Q_3 \leq Q \leq Q_3$

Test of water meter via display reading (Standing start/stop)

Preparation: Use the software Kamstrup LABTOOL and an optical head to set the meter in high resolution display mode (00000,001 L)



- Mount the water meter in the test rig
- Connect flow (start)
- Disconnect flow (stop)
- Read the LC-Display and compare the reading to the actual volume

Test of water meter via pulse interface (Flying start/stop)

Preparation: Connect a pulse interface type 66-99-143 to each water meter in the test rig and connect the volume pulse output to the pulse input on the test rig

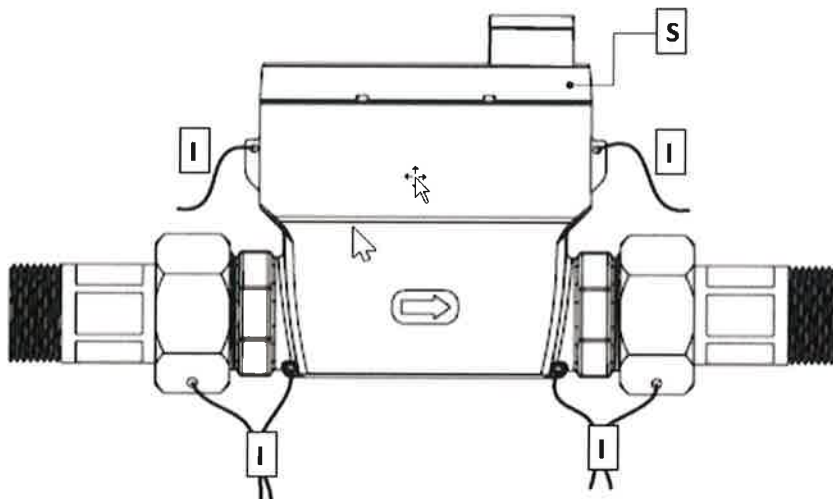
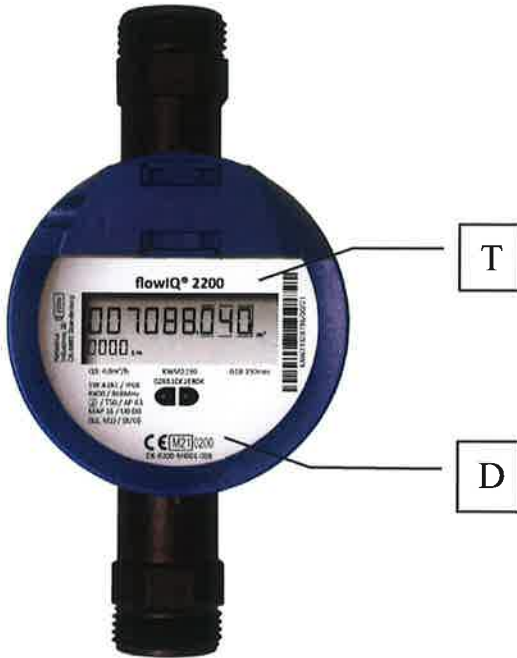
- Mount the water meter in the test rig
- Connect flow and wait for stabilisation of flow rate
- The measuring period is started and stopped
- Compare the EUT volume pulses to the master volume

Pulse Interface type 66-99-143 mounted on KWM2230 water meter via the optical support type 65-61-355.

	<p>Optical holder wireless</p>	<p>65-61-355</p>
	<p>Pulse interface</p>	<p>66-99-143</p>

Seals and markings

- D** Module D label (Behind the front glass)
- S** Security seal (Void sealing ring)
- T** Type label (Behind the front glass)
- I** Installation seals (Wire and seals)



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Inscriptions

Front cover for KWM2230

- System designation
- Manufacturer designation or logo
- Manufacturers postal address
- Type, production year and serial number
- Accuracy class
- Frequency
- Max pressure loss
- Mechanical and electromagnetic environment classes
- Climatic class
- Flow limits
- Sensitivity velocity field classes
- Temperature of medium
- Maximum working pressure (PN)
- Protection class
- Dynamic Range (Q3/Q1) ¹
- Software version (e.g.: SW: H1H1)

¹ KWM2230 water meter may be labelled with a lower dynamic range than used under the verification procedure.

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Photo of KWM2230

