DANAK
PROD Reg. No. 7026

FORCE Certification

EU-Type Examination Certificate

Measuring Instrument Directive

Certificate number: DK-0200-MI001-041

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:	KWM2231
Valid until:	2032-03-25
Number of pages:	11, including appendix
Date of issue:	2022-12-20
Version:	5 This version of DK-0200-MI001-041 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 The previous certificate is withdrawn.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.
This EU-type examination certificate may not be reproduced except in full, without written permission by FORCE Certification A/S.

FORCE Certification references: TASK no.: 122-24673.06 and ID no.: 0200-MID-12560-5

Appendix to

EU-Type Examination Certificate

Measuring Instrument Directive
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Revision	Issue date	Changes
DK-0200-MI001-041	2022-03-25	Original certificate
DK-0200-MI001-041 ver 1	2022-06-10	New SW versions E1 and F1 added
DK-0200-MI001-041 ver 2	2022-07-08	New SW version G1 added
DK-0200-MI001-041 ver 3	2022-08-24	New SW version H1 added
DK-0200-MI001-041 ver 4	2022-10-18	New SW version J1 added, description of SW changes (legally relevant and non-legally relevant) added
DK-0200-MI001-041 ver 5	2022-12-20	New SW version K1 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:

KWM2231 Water meter

Description:

KWM2231 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. KWM2231 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.

KWM2231 is power supplied from internal lithium batteries (2xA-cell) 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:

- 122-24673.06
- 122-24673.05
- 122-24673.04
- 122-24673.03
- 122-24673.02
- 122-24673.01

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, 165, 170	G¾B	15
1.6 [m^3/h]	110, 165, 170	G¾B	15

Flow designation for T30 and T50

Meters with Q_3 = 4.0 m^3/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 Q_3 = 2.5 m^3/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 m^3/h and measuring path 30261219

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				

Meters with Q_3 = 1.6 m^3/h and measuring path 30261143

Dynamic range Q_3/Q_1	1000	800	630	500	400	315
Q_1 Minimum flow rate [l/h]	1.6	2	2.6	3.2	4	5.1
Q_2 Transitional flow rate [l/h]	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 m^3/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 m^3/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 m^3/h and measuring path 30261219

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						

Meters with Q_3 = 1.6 m^3/h and measuring path 30261143

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				

Other designations

Instrument type:	Complete water meter
Temperature class:	T30 (0.1 – 30 °C) Also tested T50 and 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 (2xA-cell)
Battery lifetime:	Up to 16 years

Communication

Communication modules:

Module designation	Module description
02K-51	Wireless M-Bus C1/T1, linkIQ, 868 MHz

Approved software versions

Module description	Version no.	Checksum for metrological part of the software	Description
Wireless M-Bus C1/T1 OMS linkIQ®	D1	2398958373 (Dec) 8EFD 3325 (Hex)	N
	E1	1486166669 (Dec) 5895 1A8D (Hex)	N
	F1	2950536095 (Dec) AFDD 9B9F (Hex)	N
	G1	3703978337 (Dec) DCC6 3961 (Hex)	N
	H1	2573719644 (Dec) 9967 D85C (Hex)	N
	J1	3361564058 (Dec) C85D 659A (Hex)	N
	K1	1319936688 (Dec) 4EAC A2B0 (Hex)	N

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

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 and verification according to OIML R 49:2013
It is also possible to use water at a temperature of 20 °C ± 10 °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

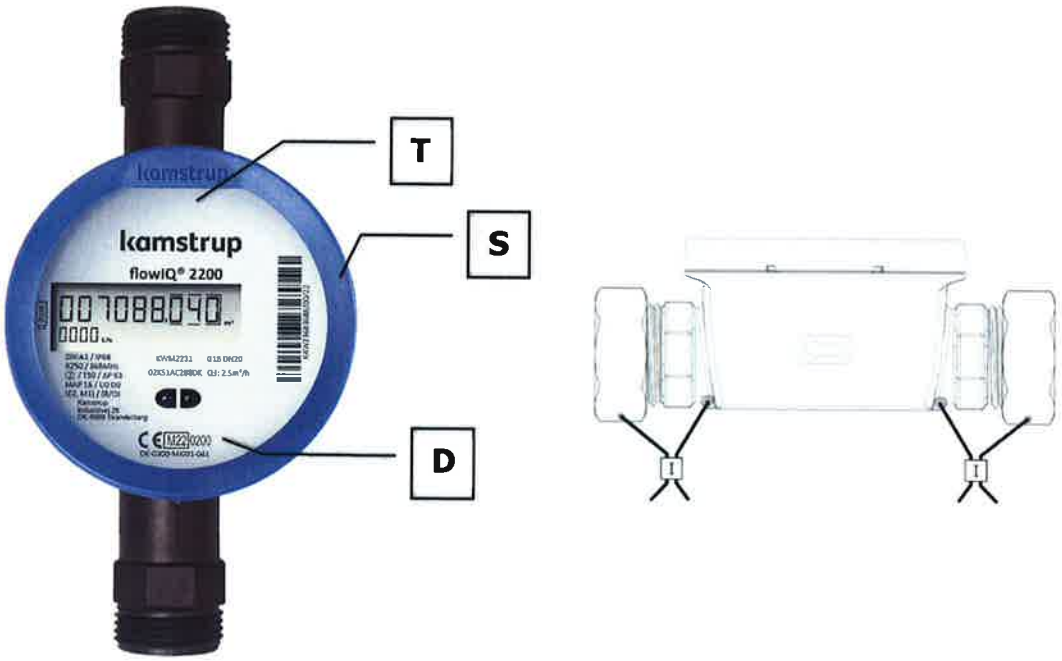
Pulse Interface type 66-99-143 mounted on KWM2231 water meter via the optical support type 65-61-355.

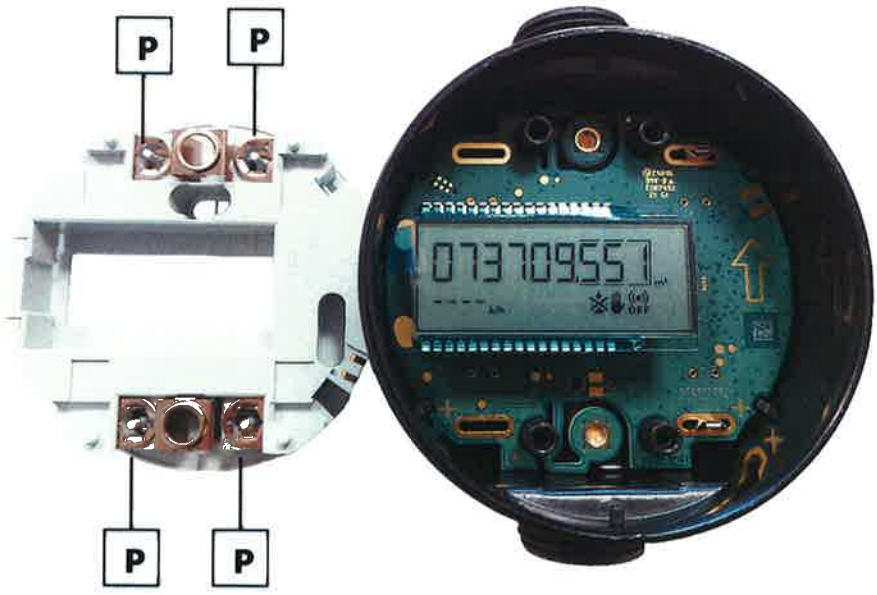
Optical holder wireless 65-61-355

Pulse interface 66-99-143

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)
- **P** Security seals (Snap points for sealing)





Inscriptions

Front cover for KWM2231

- System designation
- Manufacturer designation or logo
- Manufacturer 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: K1)

[1] KWM2231 water meter may be labelled with a lower dynamic range than used under the verification procedure.

DK-0200-MI001-041

Photo of KWM2231