

EC-Type Examination Certificate

Measuring Instrument Directive

Certificate number: DK-0200-MI001-015


Issued by FORCE Certification A/S, Denmark
EC-notified body number 0200

In accordance with The Danish Safety Technology Authority's statutory order no. 436 of 16th May 2006 with later amendments which implements the Directive 2004/22/EC of the European Parliament and Council of March 31st, 2004 on measuring instruments (MID) and later amendments.

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

Reference No.: 114-33017.03.03
Type of instrument: Water meter
Type designation: MULTICAL[®] 21 or flowIQ[™] 2101
Valid until: 2021-02-07
Number of pages: 9, including appendix
Date of issue: 2015-02-09
Revision No.: 9

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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DK-0200-MI001-015

Appendix to

EC-Type Examination Certificate Measuring Instrument Directive

Number: DK-0200-MI001-015

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| Revision | Issue date | Changes |
|------------------------------|------------|---|
| DK-0200-MI001-015 | 2011-02-07 | Original certificate |
| DK-0200-MI001-015 rev 1-2011 | 2011-09-23 | New temperature classes, new software versions |
| DK-0200-MI001-015 rev 1-2012 | 2012-03-16 | New meter size, new software version |
| DK-0200-MI001-015 rev 2-2012 | 2012-10-02 | New dynamic ranges |
| DK-0200-MI001-015 rev 3-2012 | 2012-11-16 | New software version, note about labeling of dynamic range added |
| DK-0200-MI001-015 rev 4-2012 | 2012-12-19 | Revised type number overview added, revised photos added |
| DK-0200-MI001-015 rev 1-2013 | 2013-02-19 | Additional new trade name added, new dynamic range, revised photos added |
| DK-0200-MI001-015 rev 1-2014 | 2014-03-12 | New radio, which lead to implementation of a new crystal in the bill of material, new antenna PCB and changes in battery connection, temperature measuring feature implemented, new software versions and new type number combination |
| DK-0200-MI001-015 rev 2-2014 | 2014-09-24 | Two new meter variants, new software version, new type number combination |
| DK-0200-MI001-015 rev 9 | 2015-02-09 | Changes to top PCB, new software versions, revision history added |

Applied standards and documents:

OIML R49:2006

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

Type designation:

MULTICAL® 21 or flowIQ™ 2101

DK-0200-MI001-015

Description:

MULTICAL® 21/flowIQ™ 2101 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.

The measuring pipe and the electronics are integrated in one construction, which cannot be separated.

MULTICAL® 21/flowIQ™ 2101 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.

MULTICAL® 21/flowIQ™ 2101 is power supplied from an internal lithium battery with a life time of 12 or 16 years, depending on the size of the battery.

A separate pulse interface can be used for converting the data telegram into volume pulses during calibration of the meter.

Technical documentation:

Reference numbers:

- 114-33017.03.03
- 114-21535.0001.0008
- 114-21535-0001.0006
- 113-21029.0001.0001
- 112-23383.0001.0007
- 112-23383.0001.0006
- 112-23383.0001.0005
- 112-23383.0001.0002

FORCE Certification A/S File numbers:

- 80.976-227/11
- 80.976-209/11

Technical data

| | | |
|-----------------------------------|-------|--|
| Instrument type according to | | : OIML R49:2006 |
| Instrument type | | : Complete meter |
| Temperature of medium | | : T30 Also approved T50, T70 and T30/70 according to OIML R49:2006 |
| Pressure stage | | : PN10 and PN16 |
| Nominal flow rate | Q3 | : 1.6 m ³ /h G ³ / ₄ x 110 mm 2.5 m ³ /h G ³ / ₄ x 110 mm 2.5 m ³ /h G1 x 105 mm, 130 mm and 190 mm 4.0 m ³ /h G1 x 130 mm and 190 mm |
| Other meter lengths via extenders | | : 165, 190 and 220 mm |
| Dynamic range | Q3/Q1 | : 1.6 m ³ /h: 160/1 and 100/1 2.5 m ³ /h: 250/1 and 100/1 4.0 m ³ /h: 250/1 and 100/1 |
| Accuracy class | | : 2 |
| Environment class | | : E1 and E2, M1 (Class B and C according to OIML R49) |
| Climatic class | | : -25°C to +55°C, condensing Open and closed location (Outdoor and indoor) |
| Protective class | | : IP68 |
| Durability specification | | : 12 Years |
| Installation angle | | : Horizontally, vertically or at an angle |
| Power supply | | : 3.65 VDC Lithium battery 12 or 16 years life time, depending on battery size |

| Software version | | : <table border="1"> <thead> <tr> <th>Version no.</th> <th>Checksum for metrological part of the software</th> </tr> </thead> <tbody> <tr><td>xxxx0501 / E1</td><td>25048</td></tr> <tr><td>xxxx0601 / F1</td><td>47849</td></tr> <tr><td>xxxx0701 / G1</td><td>22098</td></tr> <tr><td>xxxx0801 / H1</td><td>55019</td></tr> <tr><td>xxxx0A01 / J1</td><td>3880</td></tr> <tr><td>xxxx0B01 / K1</td><td>51612</td></tr> <tr><td>xxxx0C01 / L1</td><td>2941</td></tr> <tr><td>xxxx0D01 / M1</td><td>52475</td></tr> <tr><td>xxxx0E01 / N1</td><td>24735</td></tr> <tr><td>xxxx1001 / P1</td><td>62145</td></tr> <tr><td>xxxx1101 / Q1</td><td>44419</td></tr> </tbody> </table> | Version no. | Checksum for metrological part of the software | xxxx0501 / E1 | 25048 | xxxx0601 / F1 | 47849 | xxxx0701 / G1 | 22098 | xxxx0801 / H1 | 55019 | xxxx0A01 / J1 | 3880 | xxxx0B01 / K1 | 51612 | xxxx0C01 / L1 | 2941 | xxxx0D01 / M1 | 52475 | xxxx0E01 / N1 | 24735 | xxxx1001 / P1 | 62145 | xxxx1101 / Q1 | 44419 |
|------------------|--|---|-------------|--|---------------|-------|---------------|-------|---------------|-------|---------------|-------|---------------|------|---------------|-------|---------------|------|---------------|-------|---------------|-------|---------------|-------|---------------|-------|
| Version no. | Checksum for metrological part of the software | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx0501 / E1 | 25048 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx0601 / F1 | 47849 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx0701 / G1 | 22098 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx0801 / H1 | 55019 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx0A01 / J1 | 3880 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx0B01 / K1 | 51612 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx0C01 / L1 | 2941 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx0D01 / M1 | 52475 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx0E01 / N1 | 24735 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx1001 / P1 | 62145 | | | | | | | | | | | | | | | | | | | | | | | | | |
| xxxx1101 / Q1 | 44419 | | | | | | | | | | | | | | | | | | | | | | | | | |

(xxxx is the meter type)

DK-0200-MI001-015

Type number combination

| | | | | Type | 021- | □□ | □ | 0 | □ | □ | □□ | |
|---|--|-------------|---------------|----------|------|----|---|---|---|---|-----------|----------|
| Communication | | | | | | | | | | | | |
| Wireless M-Bus, 868 MHz, mode C1 – ver. 2 | | | | | | | | | | | 46 | |
| Wireless M-Bus, 868 MHz, mode T1 – OMS – ver. | | | | | | | | | | | 47 | |
| Wireless M-Bus, 868 MHz, mode C1 | | | | | | | | | | | 66 | |
| Wireless M-Bus, 868 MHz, mode T1 - OMS | | | | | | | | | | | 67 | |
| 865,5 MHz India | | | | | | | | | | | 69 | |
| Supply | | | | | | | | | | | | |
| 12 years' battery life 2xA-celle | | | | | | | | | | | A | |
| 16 years' battery life C-celle | | | | | | | | | | | C | |
| Meter size | | | | | | | | | | | | |
| Q3 [m ³ /h] | Connection | Length [mm] | Dynamic Range | | | | | | | | | |
| 1.6 | G ³ / ₄ B (R ¹ / ₂) | 110 | 1:160 | A | | | | | | | | |
| 1.6 | G ³ / ₄ B (R ¹ / ₂) | 110 | 1:100 | B | | | | | | | | |
| 2.5 | G ³ / ₄ B (R ¹ / ₂) | 110 | 1:250 | D | | | | | | | | |
| 2.5 | G ³ / ₄ B (R ¹ / ₂) | 110 | 1:100 | C | | | | | | | | |
| 2.5 | G1B (R ³ / ₄) | 105 | 1:250 | G | | | | | | | | |
| 2.5 | G1B (R ³ / ₄) | 105 | 1:100 | F | | | | | | | | |
| 2.5 | G1B (R ³ / ₄) | 130 | 1:250 | H | | | | | | | | |
| 2.5 | G1B (R ³ / ₄) | 130 | 1:100 | J | | | | | | | | |
| 2.5 | G1B (R ³ / ₄) | 190 | 1:250 | E | | | | | | | | |
| 2.5 | G1B (R ³ / ₄) | 190 | 1:100 | K | | | | | | | | |
| 4.0 | G1B (R ³ / ₄) | 130 | 1:250 | L | | | | | | | | |
| 4.0 | G1B (R ³ / ₄) | 130 | 1:100 | M | | | | | | | | |
| 4.0 | G1B (R ³ / ₄) | 190 | 1:250 | N | | | | | | | | |
| 4.0 | G1B (R ³ / ₄) | 190 | 1:100 | P | | | | | | | | |
| Meter type | | | | | | | | | | | | |
| Cold water meter | | | | | | | | | | | | 8 |
| Hot water meter | | | | | | | | | | | | 7 |
| Country code (language on label etc.) | | | | | | | | | | | XX | |

Verification procedure

- According to: Directive 2004/22/EC and OIML R49:2006
- Errors: Maximum permissible errors according to the Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measurement instruments (MID), Annex MI-001.
- Procedure: The test points and verification according to OIML R49:2006.
It is also a possibility to use water at a temperature of $20^{\circ}\text{C} \pm 10^{\circ}\text{C}$.
- 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 MULTICAL® 21 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)

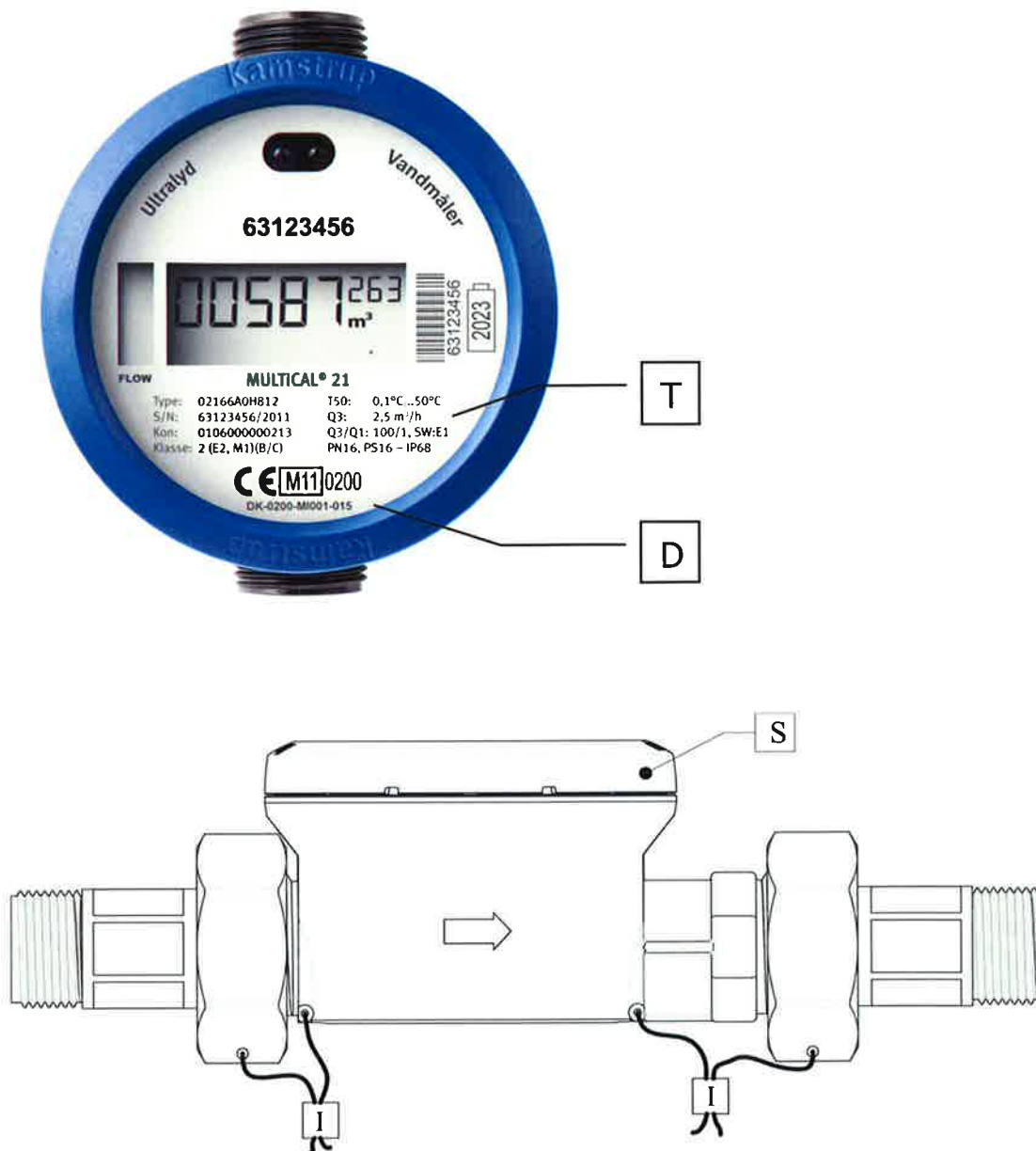
- Preparation: Connect a pulse interface type 66-99-143 to each water meter in the test rig and connect the volume pulse output to the pulse input on the test rig
- Mount the water meter in the test rig
 - Connect flow and wait for stabilisation of flow rate
 - The measuring period is started and stopped
 - Compare the EUT volume pulses to the master volume

Pulse Interface type 66-99-143 mounted on MULTICAL® 21/flowIQ™ 2101 water meter via the optical support type 65-61-331



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)



Labeling and inscriptions

Type label placed on the water meter with the following imprint:

- System designation
- Manufacturer designation or logo
- Type, production year and serial number
- Accuracy class
- Mechanical and electromagnetic environment classes
- Flow limits
- Temperature of medium
- Maximum working pressure (PN)
- Dynamic Range (Q3/Q1) ¹
- Software version (e.g.: SW:G1)

Regulations regarding installation angle

MULTICAL[®] 21 or flowIQ[™] 2101 water meter may be installed in all possible angles and positions.

- ¹ MULTICAL[®] 21 or flowIQ[™] 2101 water meter may be labelled with a lower dynamic range than used under the verification procedure.

DK-0200-MI001-015

Photos of MULTICAL® 21/ flowIQ™ 2101

