

## **EU-Type Examination Certificate**

### **Measuring Instrument Directive**

**Certificate number: DK-0200-MI001-015**

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: MULTICAL® 21 or flowIQ® 2101

Valid until: 2027-02-14

Number of pages: 13, including appendix

Date of issue: 2022-10-26

Version: 37  
This new version of DK-0200-MI001-015 is issued due to a minor editorial addition. The previous certificate is withdrawn.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.: 119-23261.07 and ID no.: 0200-MID-09690**

## Appendix to

### EU-Type Examination Certificate Measuring Instrument Directive

**Number: DK-0200-MI001-015**

Issued by FORCE Certification A/S, Denmark

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Version	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
DK-0200-MI001-015 rev 10	2016-02-26	New radio frequency added
DK-0200-MI001-015 ver 11	2016-06-20	G <sup>3</sup> / <sub>4</sub> variants re-tested according to OIML R 49:2013 because of introduction of a new flow tube
DK-0200-MI001-015 ver 12	2016-09-16	New meter variant added, new type number combination
DK-0200-MI001-015 ver 13	2016-10-26	New meter variant added, new type number combination
DK-0200-MI001-015 ver 14	2016-11-11	New software version added
DK-0200-MI001-015 ver 15	2017-01-06	New software version added
DK-0200-MI001-015 ver 16	2017-02-14	Meters re-tested according to OIML R 49:2013, new dynamic ranges added, new software version added, extension of the validity period
DK-0200-MI001-015 ver 17	2017-03-03	New configuration modules added
DK-0200-MI001-015 ver 18	2017-04-24	New software version added
DK-0200-MI001-015 ver 19	2017-05-24	New software version added
DK-0200-MI001-015 ver 20	2017-06-28	New software version added
DK-0200-MI001-015 ver 21	2017-09-04	New radio communication and software version added
DK-0200-MI001-015 ver 22	2017-11-07	Auxiliary components added to the RF circuit, new software version added

**DK-0200-MI001-015**

Version	Issue date	Changes
DK-0200-MI001-015 ver 23	2017-11-15	New software versions added
DK-0200-MI001-015 ver 24	2017-11-28	New software version added
DK-0200-MI001-015 ver 25	2017-12-15	New software version added
DK-0200-MI001-015 ver 26	2018-02-07	New software version added
DK-0200-MI001-015 ver 27	2018-03-15	Module update for communication – changes only applies to the radio package
DK-0200-MI001-015 ver 28	2018-04-20	New 170 mm meter variant added
DK-0200-MI001-015 ver 29	2018-08-06	New software version added
DK-0200-MI001-015 ver 30	2018-09-19	New software version added
DK-0200-MI001-015 ver 31	2019-02-12	New software version added
DK-0200-MI001-015 ver 32	2019-03-22	New Sigfox power supply added, minor editorial change to the verification section
DK-0200-MI001-015 ver 33	2019-04-08	New LinkIQ radio and new software version added
DK-0200-MI001-015 ver 34	2019-07-10	New software versions added
DK-0200-MI001-015 ver 35	2020-03-13	New Sigfox software version added
DK-0200-MI001-015 ver 36	2020-11-26	Minor editorial change on page 6
DK-0200-MI001-015 ver 37	2022-10-26	Description of SW changes (legally relevant and non-legally relevant) 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:**

MULTICAL® 21 or flowIQ® 2101

**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.

**DK-0200-MI001-015**

**Technical documentation:**

Reference numbers:

- 119-23261.07
- 119-23261.06
- 119-23261.05
- 119-23261.04
- 119-23261.03
- 119-23261.02
- 119-23261.01
- 118-22879.05
- 118-22879.04
- 118-22879.03
- 118-22879.02
- 118-22879.01
- 117-20905.11
- 117-20905.10
- 117-20905.09
- 117-20905.08
- 117-20905.07
- 117-20905.06
- 117-20905.05
- 117-20905.04
- 117-20905.03
- 117-20905.02
- 117-20905.01
- 116-26995.12
- 116-26995.10
- 116-26995.06
- 116-26995.03
- 114-33017.03.09
- 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

### Flow designation

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 [ $\text{m}^3/\text{h}$ ]	4.0						
$Q_4$ Overload flow rate [ $\text{m}^3/\text{h}$ ]	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 [ $\text{m}^3/\text{h}$ ]	2.5						
$Q_4$ Overload flow rate [ $\text{m}^3/\text{h}$ ]	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 [ $\text{m}^3/\text{h}$ ]	1.6						
$Q_4$ Overload flow rate [ $\text{m}^3/\text{h}$ ]	2.0						

### Meter dimensions

Meter with $Q_3$	Overall meter length [mm]	Meter connection	Diameter [DN]
4.0 [ $\text{m}^3/\text{h}$ ]	130, 190	G1B	20
2.5 [ $\text{m}^3/\text{h}$ ]	105, 130, 190	G1B	20
2.5 [ $\text{m}^3/\text{h}$ ]	110, 170	G $\frac{3}{4}$ B	15
1.6 [ $\text{m}^3/\text{h}$ ]	110, 170	G $\frac{3}{4}$ B	15

## **Other designations**

Instrument type:	Complete meter
Temperature class:	T30 (0.1 – 30 °C) Also tested T50, T70 and T30/70 according to OIML R 49:2013
Pressure stage:	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
Protection class:	IP68
Orientation requirements:	None
Power supply:	3.65 VDC lithium battery
Battery lifetime:	Up to 16 years

## Communication

Communication modules:

Module designation	Module description
021-10	Sigfox EU 1-way
021-15	Sigfox RCZ1 Daily Advanced
021-29	LinkIQ
021-30	Wired M-Bus
021-46	Wireless M-Bus, 868 MHz, mode C1 – ver. 2
021-47	Wireless M-Bus, 868 MHz, mode T1 – OMS – ver. 2
021-66	Wireless M-Bus, 868 MHz, mode C1
021-67	Wireless M-Bus, 868 MHz, mode T1 – OMS
021-90	Wireless M-Bus, 434 MHz, mode C1
021-91	Wireless M-Bus, 434 MHz, mode T1 – OMS

## Configuration

Configuration modules:

Module designation	Module description
021-11	Sigfox, Daily values, 16-year battery
021-12	Sigfox, Hourly values, 5-year battery
021-13	Sigfox, Daily values sequence, 16-year battery
021-14	Sigfox, Hourly values sequence, 5-year battery
021-16	Sigfox RCZ1 Hourly Advanced
021-17	Sigfox RCZ1 Daily Sequence Advanced
021-18	Sigfox RCZ1 Hourly Sequence Advanced
021-19	Sigfox RCZ1 Hourly Compressed Advanced
021-95	Sigfox RCZ1 Radio Off Advanced
021-97	Sigfox, Radio disabled, 16-year battery
021-40	Wireless M-Bus, 868 MHz, mode C1
021-41	Wireless M-Bus, 868 MHz, mode T1 – OMS
021-42	Wireless M-Bus, 868 MHz, Mode T1 BSI
021-43	Wireless M-Bus, 434 MHz, Mode C1
021-44	Wireless M-Bus, 434 MHz, Mode T1 OMS, 12-year battery
021-45	Wireless M-Bus, 868 MHz, Mode C1, Extended Info
021-48	Wireless M-Bus, 868 MHz, Mode C1, 10-year battery
021-49	Wireless M-Bus, 434 MHz, Mode C1, 10-year battery
021-50	Wireless M-Bus, 868 MHz, Mode T1 OMS, 16-year battery
021-51	Wireless M-Bus, 434 MHz, Mode T1 OMS, 16-year battery
021-52	Wireless M-Bus, 868 MHz, Mode C1, 10-year batt. flow rate
021-60	Wireless M-Bus, 868 MHz, Monthly values, Mode C1
021-61	Wireless M-Bus, 868 MHz, Monthly values, Mode T1 OMS, 12-year battery
021-62	Wireless M-Bus, 868 MHz, Monthly values, Mode T1 BSI
021-63	Wireless M-Bus, 868 MHz, Yearly values, Mode C1
021-64	Wireless M-Bus, 868 MHz, Yearly values, Mode T1 OMS, 12-year battery
021-65	Wireless M-Bus, 868 MHz, Yearly values, Mode T1 BSI
021-71	Wireless M-Bus, 868 MHz, Monthly values, Mode C1, full log
021-72	Wireless M-Bus, 868 MHz, Monthly values, Mode T1 OMS, full log
021-73	Wireless M-Bus, 868 MHz, Monthly values, Mode T1 BSI, full log
021-74	Wireless M-Bus, 868 MHz, Yearly values, Mode C1, full log
021-75	Wireless M-Bus, 868 MHz, Yearly values, Mode T1 OMS, full log
021-76	Wireless M-Bus, 868 MHz, Yearly values, Mode T1 BSI, full log
021-96	Radio disabled, 868 MHz, full log
021-98	Radio disabled, 434 MHz
021-99	Radio disabled, 868 MHz



**Approved software versions**

Module description	Version no.	Checksum for metrological part of the SW	Description
Sigfox EU 1-way	xxxx0301/C1	40484	N
	xxxx0401/D1 <sup>1</sup>	50816	N
	xxxx0501/E1 <sup>2</sup>	14914	N
	xxxx0601/F1	18145	N
	xxxx0701/G1	9851	N
	xxxx0801/H1	65508	N
	xxxx0A01/J1	36895	N
	xxxx0B01/K1	28931	N
	xxxx0C01/L1	48738	N
	xxxx0D01/M1	10820	N
	xxxx0E01/N1	8487	N
	xxxx1001/P1	64663	N
	xxxx1101/Q1	31263	N
LinkIQ	xxxx0201/B1	38243	N
	xxxx0301/C1	1458	N
Wired M-Bus	xxxx0401/D1	44771	N
	xxxx0501/E1	26886	N
	xxxx0601/F1	47773	N
Wireless M-Bus C1/T1 OMS	xxxx0501/E1	25048	N
	xxxx0601/F1	47849	N
	xxxx0701/G1	22098	N
	xxxx0801/H1	55019	N
	xxxx0A01/J1	3880	N
	xxxx0B01/K1	51612	N
	xxxx0C01/L1	2941	N
	xxxx0D01/M1	52475	N
	xxxx0E01/N1	24735	N
	xxxx1001/P1	62145	N
	xxxx1101/Q1	44419	N
	xxxx1201/R1	43133	N
	xxxx1301/S1	54982	N
	xxxx1401/T1	14057	N
	xxxx1501/U1	58546	N
	xxxx1601/V1	63114	N
xxxx1701/W1	59383	N	
xxxx1801/X1	60936	N	
xxxx1901/Y1	48414	N	
xxxx1A01/Z1	3785	N	

N: Non-legally Relevant Software Change

L: Legally Relevant Software Change

<sup>1</sup> This version is not available in marketed products

<sup>2</sup> This version is not available in marketed products

## Verification procedure

- According to: Directive 2014/32/EU and OIML R 49:2013
- 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: Flow rate requirements according to OIML R 49:2013.  
It is also a possibility 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 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)

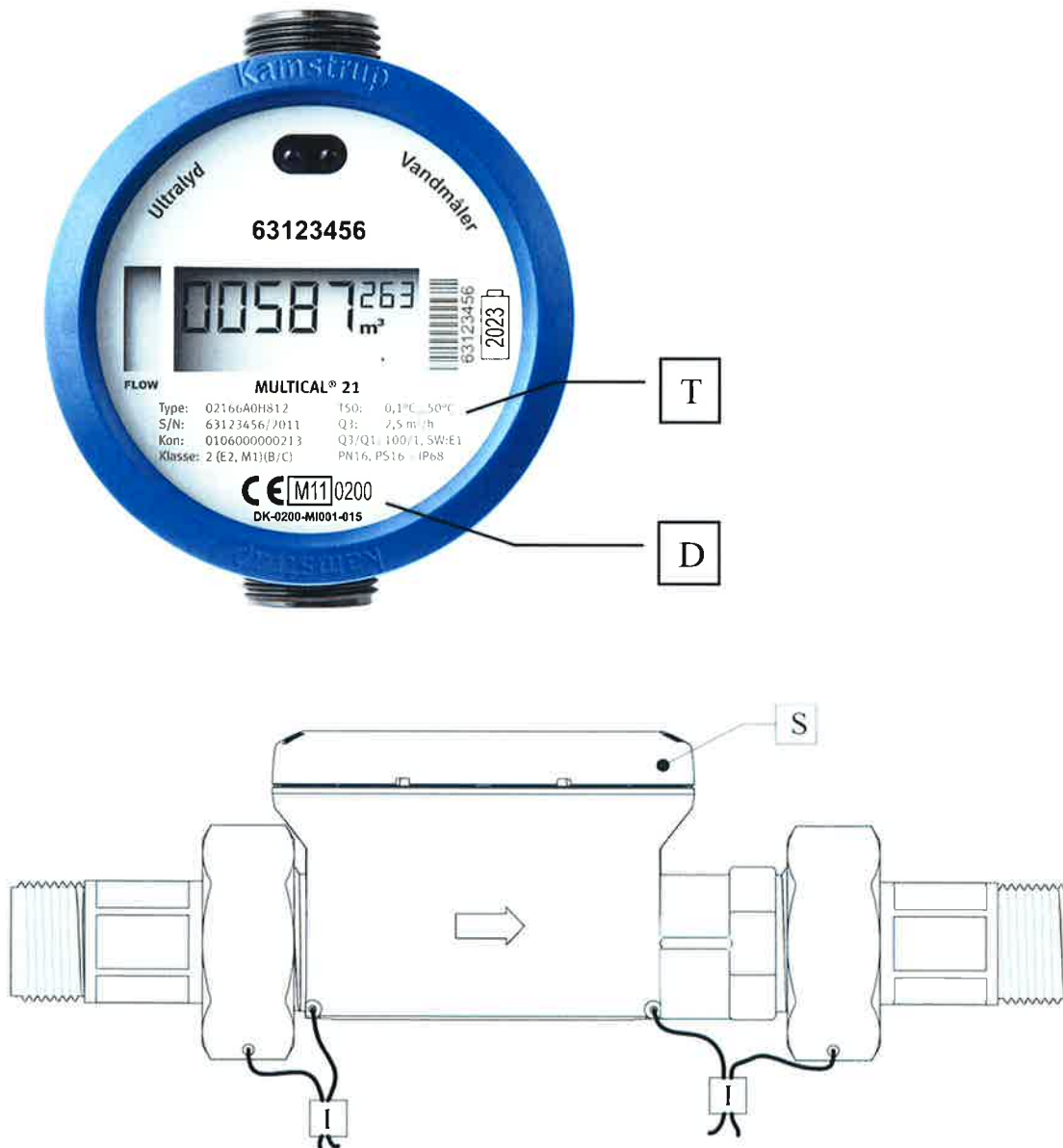
- Preparation: Connect a pulse interface type 66-99-143 to each water meter in the test rig and connect the volume pulse output to the pulse input on the test rig
- Mount the water meter in the test rig
  - Connect flow and wait for stabilisation of flow rate
  - The measuring period is started and stopped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



## **Inscriptions**

### **Front cover for MULTICAL<sup>®</sup> 21 or flowIQ<sup>®</sup> 2101**

- System designation
- Manufacturer designation or logo
- Manufacturer postal address
- Type, production year and serial number
- Accuracy class
- Mechanical and electromagnetic environment classes
- Climatic class
- Flow limits
- Temperature of medium
- Maximum working pressure (PN)
- Protection class
- Dynamic Range (Q3/Q1)<sup>3</sup>
- Software version (e.g.: SW:Z1)

## **Regulations regarding installation angle**

MULTICAL<sup>®</sup> 21 or flowIQ<sup>®</sup> 2101 water meter may be installed in all possible angles and positions.

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<sup>3</sup> MULTICAL<sup>®</sup> 21 or flowIQ<sup>®</sup> 2101 water meter may be labelled with a lower dynamic range than used under the verification procedure.

**Photo of MULTICAL® 21 / flowIQ® 2101**

