EU-Type Examination Certificate
Measuring Instrument Directive

Certificate number: DK-0200-MI004-042
Issued by FORCE Certification A/S, Denmark
EU-notified body number 0200

In accordance with The Danish Safety Technology Authority's statutory order no. 544 of May 28, 2018 which implements the Directive 2014/32/EU of the European Parliament and Council of February 26, 2014 on measuring instruments (MID).

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

Type of instrument:	Thermal energy meter/heat meter
Type designation:	MULTICAL® 803
Valid until:	2029-01-30
Number of pages:	15, including appendix
Date of issue:	2022-05-17
Version:	6 This new version of DK-0200-MI004-042 is issued due to new WELMEC and EN 1434 editions, fast response meter, new module 81 and calibration unit added. Further to this some editorial changes. The previous certificate is withdrawn.

Approved by

Michael Møller Nielsen
Certification Manager

Processed by

Lars Poder
Examiner

FORCE Certification references:
TASK No.: 121-22176.02 and ID. No.: 0200-MID-06425-6

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby ·Denmark · Tel +45 43 25 01 77 ·Fax +45 43 25 00 10 ·info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en

Page 1 of 15

Appendix to

EU-Type Examination Certificate
Measuring Instrument Directive

Number: DK-0200-MI004-042
Issued by FORCE Certification A/S, Denmark
EU-notified body number 0200

Revision	Issued	Changes
DK-0200-MI004-042	2019-01-30	Original certificate
DK-0200-MI004-042 ver 1	2019-02-20	New software version added
DK-0200-MI004-042 ver 2	2019-03-06	New software version added, new module added (module 83), editorial changes
DK-0200-MI004-042 ver 3	2019-05-06	New software version added, new modules added (module type 32 + 33), temperature difference cut-off added
DK-0200-MI004-042 ver 4	2019-08-21	Minor editorial changes
DK-0200-MI004-042 ver 5	2021-02-18	Editorial changes, new modules added (module type 53 + 56), changes regarding instrument types
DK-0200-MI004-042 ver 6	2022-05-17	New WELMEC 7.2:2021, EN 1434:2007/AC:2007 and FprEN 1434:2022 from 2022-04, fast response meter, new module 81 and calibration unit added. Editorial changes.

Applied standards and documents:
- EN 1434:2007/AC:2007
- EN 1434:2015+A1:2018
- FprEN 1434:2022 from 2022-04
- WELMEC 7.2:2021

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

Type designation:
MULTICAL® 803

Description:
The meter consists of a calculator, which constitute a thermal energy meter together with type approved temperature sensor pairs and type approved flow sensors.
The calculator unit has a display indicating registered thermal energy, and additionally, via pushbuttons, other values are available. MULTICAL® 803 is optionally available with up to four internal communication modules (see the section on type number combination).

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby · Denmark · Tel +45 43 25 01 77 · Fax +45 43 25 00 10 · info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en

Page 2 of 15

Technical documentation:
Reference No.:

- 121-22176.02
- 121-22176.01
- 119-20999.05
- 119-20999.04
- 119-20999.03
- 119-20999.02
- 119-20999.01

Technical data

Instrument type according to	:	EN 1434:2007/AC:2007
	:	EN 1434:2015+A1:2018
	:	FprEN 1434:2022 from 2022-04
Instrument type	:	Combined instrument or Hybrid instrument
Parts:		
- Calculator or	:	DK-0200-MI004-042
- Calculator and temperature sensors or	:	DK-0200-MI004-042, -036 or -046
- Calculator and flow sensor or	:	DK-0200-MI004-042, -008, -033 or -044
- Calculator, temp. and flow sensor	:	DK-0200-MI004-042, 036 or -046 and -008, -033 or -044

Energy indication	:	GJ, kWh or MWh (kWh in calibration mode)
Display registers	:	7 or 8 digit (programmable)
Integration/update intervals for energy, volume and temperature	:	Fixed 2 s (8 s during battery backup)
Temperature range $\theta_{min} ... \theta_{max}$	:	2 °C...180 °C (or narrower range)
Temperature diff. range $\Delta\Theta_{min} ... \Delta\Theta_{max}$	:	3 K...178 K (or narrower range)
Temperature diff. cut-off	:	0.00...2.50 K configurable (default 0.00 K)

Flow sensor, range	:	From qp 0.6 m³/h to qp 15,000 m³/h
Flow sensor, position	:	Inlet or outlet pipe (programmable)

Environment class	:	E1 and E2, M1 and M2
Climatic class	:	5...55 °C, non-condensing, closed location
		5...55 °C, condensing, closed location

Protection class	:	IP 65

Durability, combined instrument	:	Defined by the flow sensor

Fast response meter	:	DS temp. sensor response time $\tau_{0.5} \le 2.5$ s
(config L=4 or L=9)	:	Temperature sampling interval ≤ 2 s
	:	Integration time ≤ 2 s

Mains supply	:	230 VAC, 48...62 Hz (SMPS)
		24 VAC/VDC, 48...62 Hz (SMPS)

Back-up battery	:	3.65 VDC, 2 x A-cell Lithium battery

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby ·Denmark · Tel +45 43 25 01 77 ·Fax +45 43 25 00 10 ·info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en   Page 4 of 15

Temperature sensor cables (un-shielded)	: Max. 100 m sensors cables for 4-wire connections Or max. 10 m cables for Pt100 2-wire connections Or max. 20 m cables for Pt500 2-wire connections (Minimum cross-sectional area according to EN 1434-2, table 2)
Flow meter cables (un-shielded)	: Max. 10 m for ULTRAFLOW® flow sensors Max. 10 m for flow sensors w/electronic pulse output Max. 10 m for mechanical flow sensors with Reed-switch Max. 30 m via the Cable extender box, 66-99-036 Max. 100 m for flow sensors with 24 V active pulses

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby ·Denmark · Tel +45 43 25 01 77 ·Fax +45 43 25 00 10 ·info@forcecertification.com · www.forcecertification.com
1161-2-1-en-en

Page 5 of 15

Software identification

Software revision	G1 (0701)					0	7	0	1
Kamstrup Internal Item No.	50981489	1	4	8	9				
Software Identification		1	4	8	9	0	7	0	1

The Software identification and checksum can be shown on the display of the calculator (display No. 10 and No. 11)

Software Identification	Date	CRC-16 sum[1]	Description
14890301 (C1)	2018-12-20	50467	N: Initial release for production
14890401 (D1)	2019-02-08	18273	N: Second release for production
14890501 (E1)	2019-02-21	54712	N: Third release for production
14890601 (F1)	2019-04-12	53819	N: Fourth release for production

Software Identification	Date	CRC-32 sum[1]	Description
14890701 (G1)	2021-11-08	A3cAdE85	N: Fifth release for production

[1] The CRC-16 is displayed in decimal and the CRC-32 is displayed in hexadecimal values. The CRC-32 is shown in upper/lower case as the letters appears on the meters 7-segment display.
N: Non-legally Relevant Software change
L: Legally Relevant Software change

Only for member states where software download is allowed

Software download according to WELMEC 7.2

The calculator is approved for software download, both direct (via cable) and remote (via wireless). The software download function is separated between legally relevant (the software in the calculator) and legally non-relevant software (the software in the communication modules). The software separation is implemented via hardware separation, whereby the level of separation exceeds Extension S. The calculator is a Type P instrument and Risk Class C applies.

The legally relevant software download function can be disabled for use in member states where software download for instruments in use is not allowed. In this case download of legally relevant software cannot be done without breaking the verification seal.

Type number combination MULTICAL® 803

Static data	803-xxxx — Laser engraved
Dynamic data	xxxx — In display
Dynamic data	xxxxxxxx — In display

Type 803 - ☐ - ☐ - ☐☐ - ☐ - ☐☐ - ☐ - ☐☐ ☐☐ ☐☐ ☐☐

Calculator type			
Pt100/Pt500, 2/4-wire			A

Meter type			
Heat meter	MID module B+D		2
Heat/Cooling meter	MID module B+D & TS 27.02	Θ_{HC}= OFF	3
Heat/Cooling meter	MID module B+D & TS 27.02	Θ_{HC} = ON	6

Country code		
See country code specification		XX

Flow sensor		
Connection type		X

Temperature sensor set		
Sensor type		XX

Supply			
1 x 230 VAC	Supply of modules M1+M2		A
1 x 24 VAC/VDC	Supply of modules M1+M2		b
2 x 230 VAC	Supply of modules M1+M2+M3+M4	1 x 24 VDC Aux. supply	C
2 x 24 VAC/VDC	Supply of modules M1+M2+M3+M4	1 x 24 VDC Aux. supply	d

Communication modules (4 module slots)	M1	M2	M3	M4
Data Pulse, inputs (In-A, In-B)	10	10	10	10
Data Pulse, outputs (Out-C, Out-D)	11	11	11	11
Wired M-Bus, inputs (In-A, In-B)	20	20	20	20
Wired M-Bus, outputs (Out-C, Out-D)	21	21	21	21
Wired M-Bus, Thermal Disconnect	22	22	22	22
Wireless M-Bus, inputs (In-A, In-B), 868 MHz	30	30	30	30
Wireless M-Bus, outputs (Out-C, Out-D), 868 MHz	31	31	31	31
LinkIQ/wM-Bus, Inputs (In-A, In-B), EU	32	32	32	32
LinkIQ/wM-Bus, Outputs (Out-C, Out-D), EU	33	33	33	33
Analog outputs 2 x 0/4…20 mA	40	40	40	40
Analog inputs 2 x 4…20 mA / 0…10 V	41	41	41	41
KNX communication	42	42	42	42
PQT Controller	43	43	43	43
Low Power Radio, inputs (In-A, In-B), 434 MHz	50	50	50	50
Low Power Radio GDPR, inputs (In-A, In-B), 434 MHz	51	51	51	51
LoRaWan (Elvaco), 868 MHz	53	53	53	53
NB-IoT, inputs (In-A, In-B)	56	56	56	56
LON TP/FT-10, inputs (In-A, In-B)	60	60	60	60
BACnet MS/TP, inputs (In-A, In-B)	66	66	66	66
Modbus RTU, inputs (In-A, In-B)	67	67	67	67
2G/4G Network, inputs (In-A, In-B)	80	80	80	80
BACnet IP, Inputs (In-A, In-B)	81	81	81	81
Modbus/KMP TCP/IP, inputs (In-A, In-B)	82	82	82	82
READy Ethernet, inputs (In-A, In-B)	83	83	83	83
High Power Radio Router, inputs (In-A, In-B), 444 MHz	84	84	84	84
High Power Radio Router GDPR, inputs (In-A, In-B), 444 MHz	85	85	85	85

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby ·Denmark · Tel +45 43 25 01 77 ·Fax +45 43 25 00 10 ·info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en

Page 7 of 15

Verification

Errors: [Maximum permissible errors according to Directive 2014/32/EU of the European Parliament and Council of February 26, 2014 on measurement instruments (MID), Annex VI, Thermal energy meters (MI-004)]

Procedure: (Test points and verification requirements according to EN 1434-5)

Complete meter to: [3.] (6.7)
Calculator according to (6.4)
Calculator with temperature sensors according to (6.5)

Alternative test points

	Inlet	Outlet		Inlet	Outlet		Inlet	Outlet
	a) 44.3 °C	41 °C	or	a) 43 °C	40 °C	or	a) 43 °C	40 °C
	b) 80 °C	65 °C		b) 50 °C	40 °C		b) 50 °C	40 °C
	c) 160 °C	20 °C		c) 130 °C	40 °C		c) 160 °C	40 °C
or	a) 53 °C	50 °C	or	a) 43 °C	40 °C	or	a) 43 °C	40 °C
	b) 70 °C	50 °C		b) 50 °C	40 °C		b) 110 °C	40 °C
	c) 130 °C	20 °C		c) 130 °C	40 °C		c) 160 °C	40 °C

Tolerances on simulated temperatures: ±1 °C. Tolerances on temperature differences shall follow EN 1434-5

After verification, the calculator can be reprogrammed with a view to:
- Installation of flow sensor in inlet or outlet pipe, according to the sign in the display
- Measuring unit of energy indication (kWh, MWh or GJ)
- Decimal point in energy* and volume* indication

*) *Register resolution requirements according to EN 1434 must be observed*

Auto Detect functions

The calculator is available with an Auto Detect function, which automatically sets the pulse value, when connected to ULTRAFLOW® x4 flow sensors (e.g. DK-0200-MI004-008 and DK-0200-MI004-033). The detected pulse value (e.g. in the range of 300 pulses/litre to 0.15 pulse/litre) as well as the flow sensors nominal size (e.g. in the range of qp 0.6 to 1000 m³/h) is available in the calculator's display.

The calculator automatically detects if the connected temperature sensors are Pt100 or Pt500. However, all connected temperature sensors to a calculator must be the same type.

Temperature offset

The temperature reading can be offset adjusted from -0.99...0.99 K, commonly for the inlet and outlet, in order to compensate for the sensor cable influence on the absolute temperature.

During change of temperature sensor pairs, it is recommended to adjust the calculators offset temperature according to the newly mounted sensor pair. Alternatively adjust the offset to 0.00 K whereby the function is disabled (OFF).

Example: If the temperature sensor pair has an error at +0.20 K at zero, then the calculators offset should be -0.20 K in order to compensate.
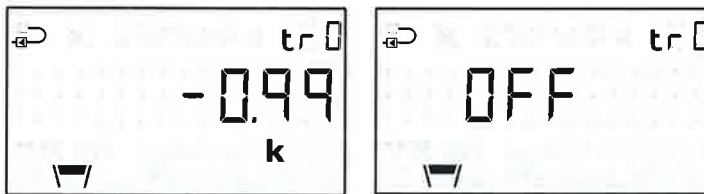
Test mode

During test of the calculator, the internal high-resolution registers are useful to reduce the test duration.

Flow sensor size
qp ≤ 1.5
1.5 < qp ≤ 15
15 < qp ≤ 150
150 < qp ≤ 1500
1500 < qp ≤ 15000

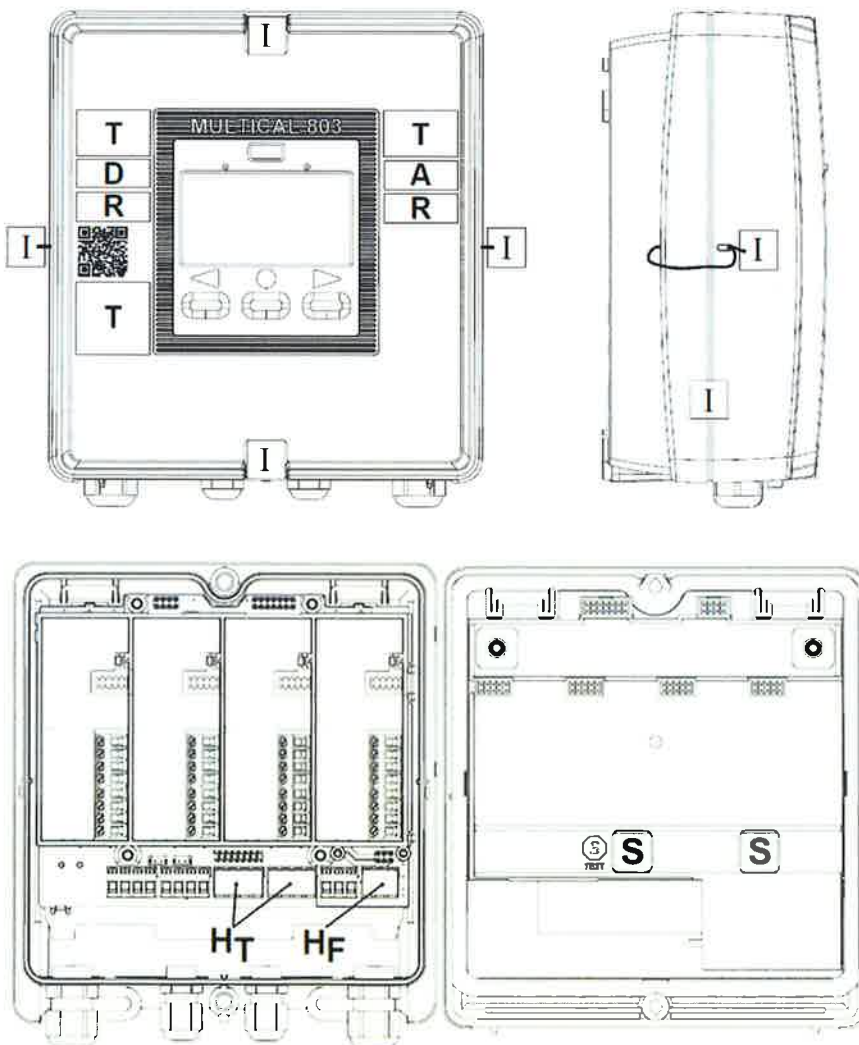| High resolution	
0.001 kWh	0.01 litre
0.01 kWh	0.1 litre
0.1 kWh	1 litre
1 kWh	0.01 m^3
0.01 MWh	0.1 m^3

Configuration data logger

The calculator includes several non-volatile data loggers, e.g. for configuration changes. The data logger read-out is done by means of an IEC 1107 optical head, placed above the display on the calculator and connected to a standard PC or Tablet, using the PC-programme LogView, which is available from Kamstrup.

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby ·Denmark · Tel +45 43 25 01 77 ·Fax +45 43 25 00 10 ·info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en   Page 9 of 15
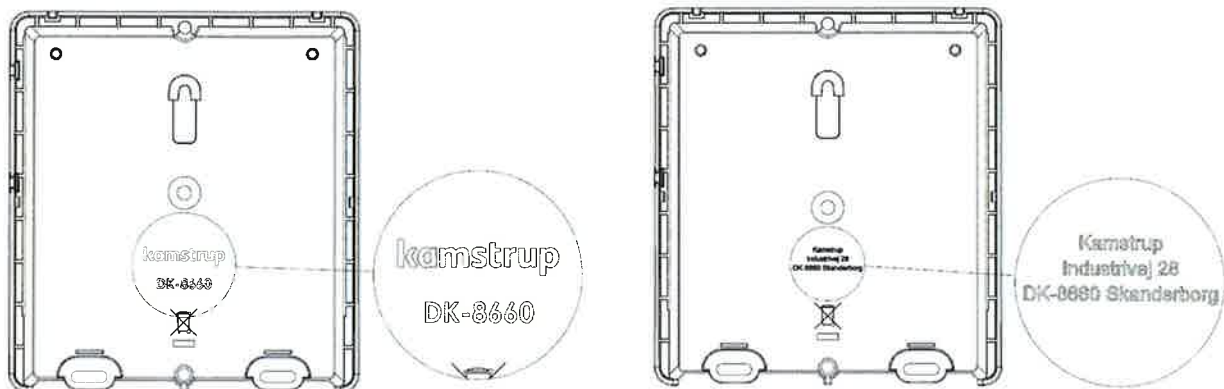
Security measures
Sealing

S	Security seals. Covering release for PCB box (label or integrated part of PCB box)
H$_F$	Additional seal for inseparable flow sensor
H$_T$	Additional seal for inseparable temperature sensors
D	Module D marking (engraving or separate label)
T	Type marking
I	Installation seals (sealing wires on the sides or void labels on the sides or on the front)
A	Alternative approval marking
R	Re-verification marking

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby · Denmark · Tel +45 43 25 01 77 · Fax +45 43 25 00 10 · info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en   Page 10 of 15

Inscriptions

Marking for MULTICAL® 803

Manufacturer postal address (on the base/rear side)

Address marking through 2021

CE marking and the supplementary metrology marking
System designation (No. of the EU-type Examination Certificate)
Type, production year and serial number
Temperature limits ($\theta_{min} ... \theta_{max}$)
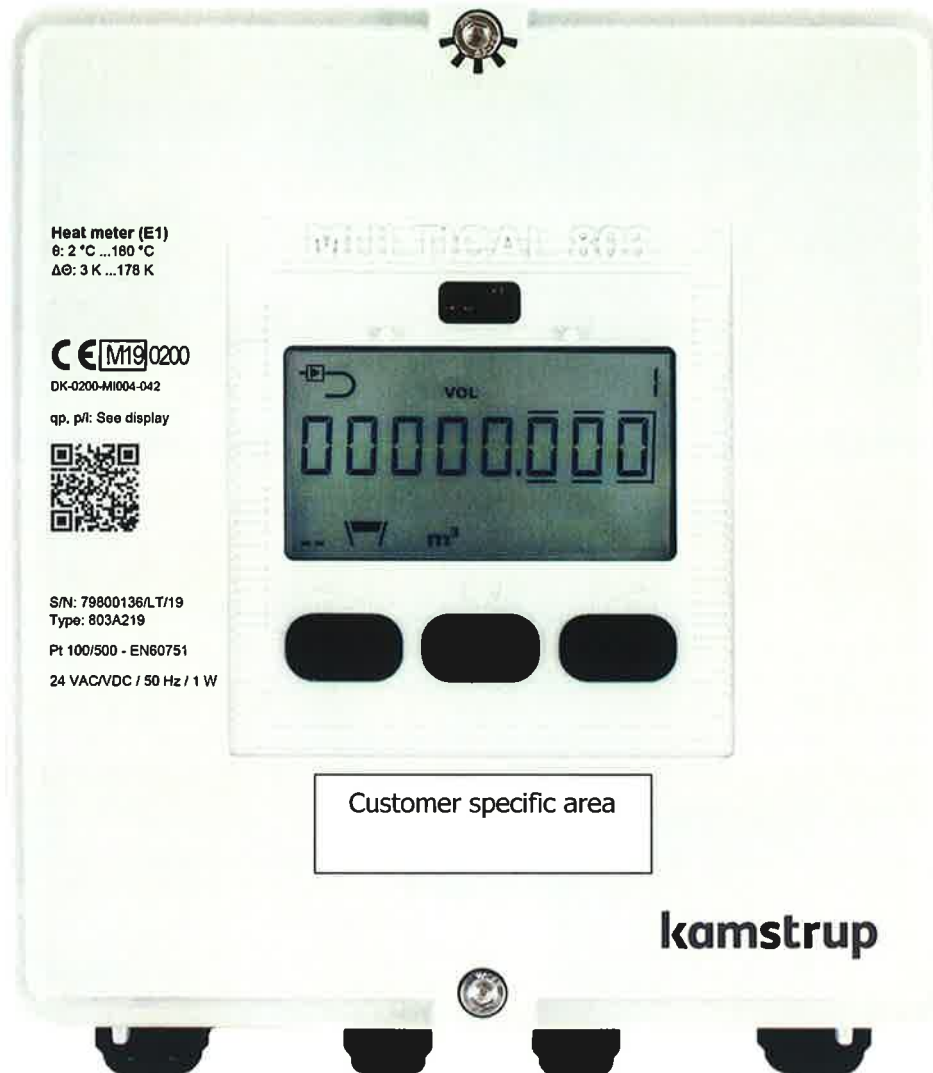Differential temperature limits ($\Delta\Theta_{min} ... \Delta\Theta_{max}$)

Below information is available in the installation manual:
Mechanical and electromagnetic environment classes
Climatic class
Condensing/closed location

Other information about the product
-Software identification in the display
-Unit of measurement in the display
-Mounting the flow sensor in inlet or outlet pipe in the display
-Meter factor (pulse value), qp and Pt100 or 500 in the display

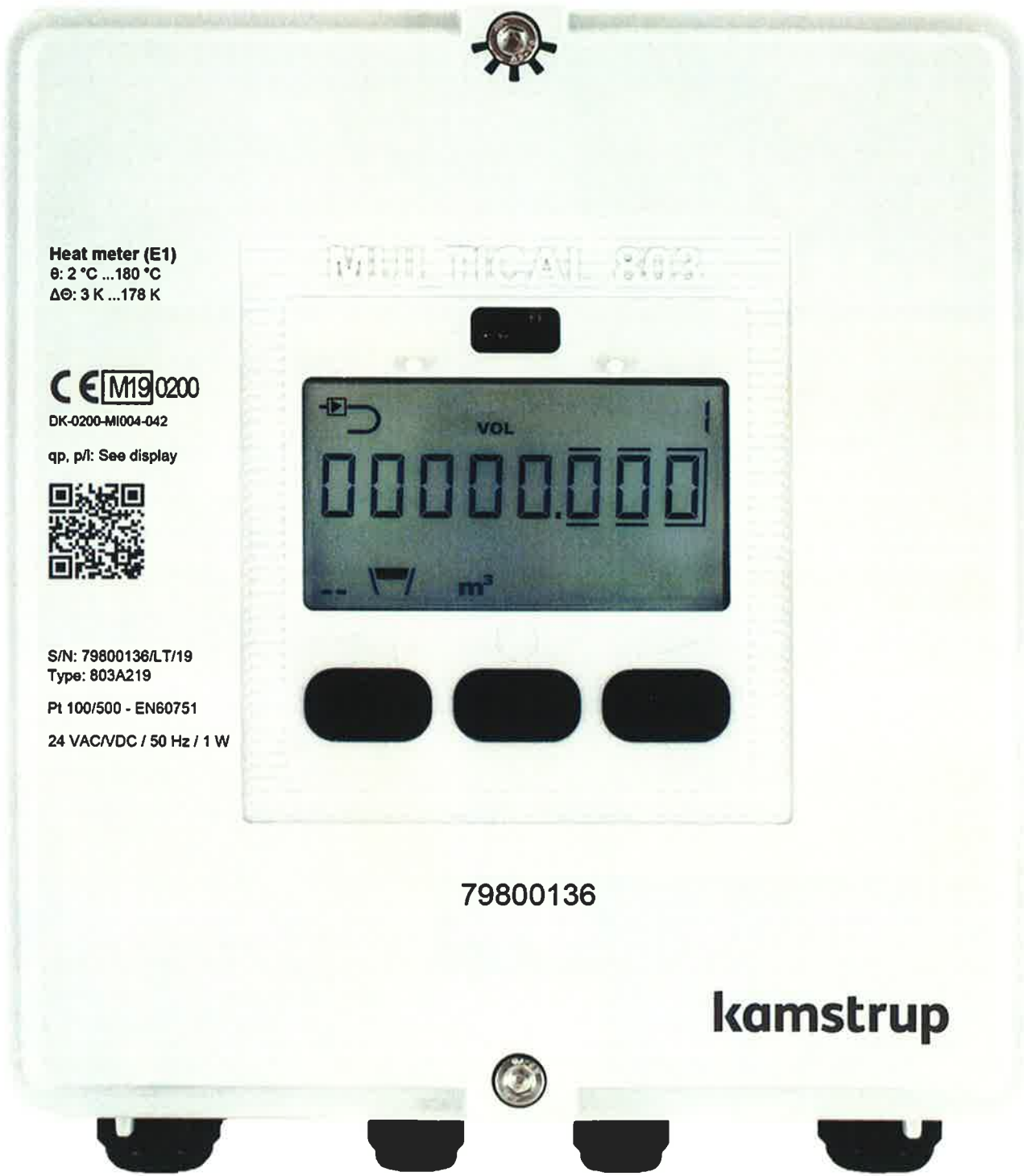FORCE Certification A/S · Park Allé 345 · 2605 Brøndby ·Denmark · Tel +45 43 25 01 77 ·Fax +45 43 25 00 10 ·info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en   Page 11 of 15

Example of type marking for MULTICAL® 803

Heat meter (E1)
θ: 2 °C ...180 °C
ΔΘ: 3 K ...178 K

CE M19 0200
DK-0200-MI004-042

qp, p/i: See display

S/N: 79800136/LT/19
Type: 803A219

Pt 100/500 - EN60751

24 VAC/VDC / 50 Hz / 1 W

VOL

00000.000   m³

Customer specific area

kamstrup

Marking:

Symbols, as an alternative to textual inscriptions, are acceptable, if explained in the installation manual.

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby ·Denmark · Tel +45 43 25 01 77 ·Fax +45 43 25 00 10 ·info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en   Page 12 of 15

Photos of MULTICAL® 803

Heat meter (E1)
θ: 2 °C ...180 °C
ΔΘ: 3 K ...178 K

C E M19 0200
DK-0200-MI004-042

qp, p/l: See display

S/N: 79800136/LT/19
Type: 803A219

Pt 100/500 - EN60751

24 VAC/VDC / 50 Hz / 1 W

VOL

00000.000

m³

79800136

kamstrup

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby ·Denmark · Tel +45 43 25 01 77 ·Fax +45 43 25 00 10 ·info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en
Page 13 of 15

Informative Annex

Integrated functions not subject to the Measuring Instruments Directive:

Integrated bi-functional Heat/Cooling function

The MULTICAL® 803 is type tested as Heating, Cooling and as bi-functional Heating/Cooling energy calculator according to EN 1434-4:2015+A1:2018 and FprEN 1434-4:2022 from 2022-04.

On this basis, the energy calculator is national type approved for Cooling according to the Danish law[1], System designation TS 27.02 013.

The integrated bi-functional Heating/Cooling function can therefore be utilized under the operating conditions as described in this certificate.

The calculator is type tested in the temperature differential range $\Delta\Theta_{min}$ - $\Delta\Theta_{max}$: 2 K...178 K and can be used as so.

Alternative energy units for use outside the EU

The calculator is also available with configuration as to register thermal energy in Gcal.

Re-verification

Re-verification of MULTICAL® 803 may be performed according to EN 1434-5 under the same conditions as stated in this certificate for verification of MULTICAL® 803, under consideration of national law.

Re-verification of the calculator as a heat calculator or as a cooling calculator is allowed, due to the extended type test.

Calibration of intelligent flow sensors through the calculator

The calculator facilitates password-protected adjustment of intelligent flow sensors via serial data, whereby the subassemblies calculator and flow sensor commonly is calibrated and adjusted as a compact meter in the laboratory, if the calculator and flow sensor have the same serial number.

Calibration unit for MULTICAL® 803 as a calculator sub-assembly
Technical description, Document No.: 5512-3274
Type No.: 6699-361 (Pt500 4-Wire) or Type No.: 6699-362 (Pt100 4-Wire)
Temperature test points:
Heat: 44.3 °C − 41 °C = 3.3 K / 80 °C − 65 °C = 15 K / 160 °C − 20 °C = 140 K
Cooling: 15 °C − 18.3 °C = − 3.3 K / 6 °C − 20 °C = − 14 K

---

[1] BEK No. 1178 of 06/11/2014, Ordinance on metrological control of meters used for measuring consumption of cooling energy in district cooling systems and central cooling systems as amended by BEK. No. 549 of 01/06/2016.

Manufacturer or distributors logo
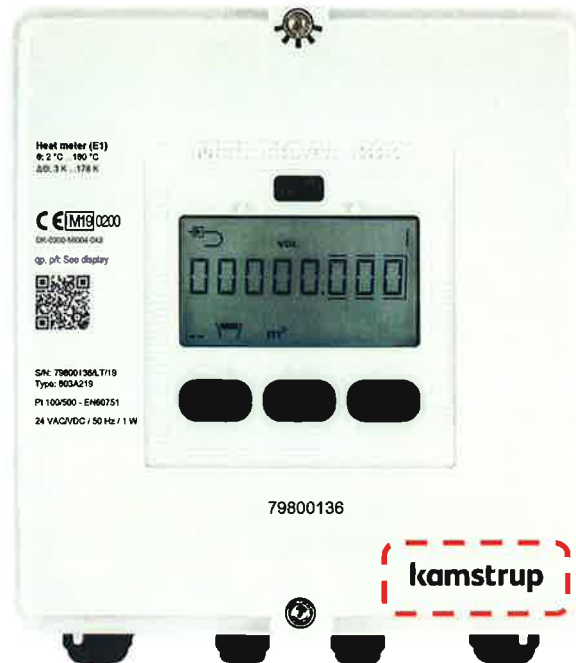
The manufacturer or distributors logo is located at the lower right part of the front, shown in the dotted red marking.

Beside Kamstrup as manufacturer logo, distributor logos from the following companies can be used:

- Schneider
- Berg

FORCE Certification A/S · Park Allé 345 · 2605 Brøndby · Denmark · Tel +45 43 25 01 77 · Fax +45 43 25 00 10 · info@forcecertification.com · www.forcecertification.com

1161-2-1-en-en   Page 15 of 15