

EU-Type Examination Certificate

Measuring Instrument Directive

Certificate number: DK-0200-MI004-033

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
Denmark

Type of instrument: Thermal energy meter, flow sensor

Type designation: ULTRAFLOW® 54
(Types: 65-5-XXHX-XXX, 65-5-XXJX-XXX)

Valid until: 2024-10-20

Number of pages: 15, including appendix

Date of issue: 2022-06-28

Version No.: 4
This new version of DK-0200-MI004-033 is issued due to new WELMEC and EN 1434 editions and minor editorial changes. M2 and fast response meter is added. The previous certificate is withdrawn.

Approved by

Processed by



Michael Møller Nielsen
Certification Manager



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.: 118-20653.03 and ID no.: 0200-MID-03536-3

Appendix to

EU-Type Examination Certificate Measuring Instrument Directive

Number: DK-0200-MI004-033

Issued by FORCE Certification A/S, Denmark

EU-notified body number 0200

Revision	Issue date	Changes
DK-0200-MI004-033	2014-10-20	Original certificate
DK-0200-MI004-033 rev. 1	2015-03-02	SW update, logo/inscriptions update
DK-0200-MI004-033 ver. 2	2017-06-23	EN 1434-4:2015 update Cable Extender Box added Climatic class condensing, closed location added Protection class added New flow sensors qp 1.5 and 2.5 m ³ /h added New flow sensors qp 3.5-6-10 m ³ /h added
DK-0200-MI004-033 ver. 3	2018-01-04	New flow sensors qp 3.5-6-10 m ³ /h added Type label to Cable Extender Box added
DK-0200-MI004-033 ver. 4	2022-06-28	Updated to new WELMEC 7.2:2021, EN 1434:2007/AC:2007 and FprEN 1434:2022 from 2022-04. M2 and fast response meter is added. Not created types are removed from the certificate. Minor editorial changes have been performed.

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:

ULTRAFLOW® 54 (Types: 65-5-XXHX-XXX, 65-5-XXJX-XXX)

DK-0200-MI004-033

Description:

The flow sensor is measuring the transit time difference of an ultrasound signal running along or against the flow direction in order to calculate the volume flow. The measuring unit consists of a body in brass or stainless steel. Two ultrasound transducers are mounted on the same side parallel to the meter housing. The ultrasound signal needs therefore to be guided by 2 (q_p 0.6...2.5 m³/h; Types 65-5-XXHX-XXX) or 4 (q_p 3.5...10 m³/h; Types 65-5-XXJX-XXX) reflectors through the measuring pipe.

Depending on the meter size for q_p 0.6...2.5 m³/h combinations of 2 types of threaded (G $\frac{3}{4}$ B, G1B) housings (DN15, DN20) are used with the corresponding reflector bases as well as 3 measuring pipes with a varying inner diameter. For meter sizes q_p 3.5...10 m³/h 3 additional measuring pipes with 4 integrated reflectors and varying inner diameter are used.

Two different kinds of plastic cabinets including a PCB, to which the signal cable is connected, are mounted on the meter. Both of the two types of PCB include a four-pinned plug. In connection with verification this plug can be used to supply the meter, pick-up pulses, change to high-resolution condition, control start/stop during serial verification as well as read serial data, respectively.

The flow sensor can be connected to a separate Pulse Transmitter / Pulse Divider or Cable Extender Box. The flow sensor is supplied by a calculator e.g. MULTICAL[®] 603 or a built-in supply module in a separate Pulse Transmitter / Pulse Divider.

Technical documentation:

Reference No.:

- 118-20653.03
- 118-20653.02
- 118-20653.01
- 117-29700.01
- 114-33017.04.10
- 114-21535.0004.0019

DK-0200-MI004-033
Technical data

Legal measuring data according to	: EN 1434:2007/AC:2007 : EN 1434:2015+A1:2018 : FprEN 1434:2022 from 2022-04
Instrument type	: Sub-assembly to be used as a part of a Complete instrument or a Combined instrument or a Hybrid instrument
Parts:	
- Flow sensor or	: DK-0200-MI004-033
- Flow sensor and calculator or	: DK-0200-MI004-033 and (-040 or -042)
- Flow sensor, calculator and temp. sensor	: DK-0200-MI004-033 and (-040 or -042) and (-036 or -046)
Accuracy class	: 2 and 3
Environment class	: E1 and E2, M1 and M2
Climatic class	: 5...55 °C, non-condensing, closed location and 5...55 °C, condensing, closed location
Protection class	
Flow sensor	: IP 65
Pulse Transmitter/ Pulse Divider	: IP 67
Straight inlet requirement q _p 0.6-2.5 m ³ /h, q _p 3.5 m ³ /h (G1¼B x 260), q _p 6 m ³ /h (G1¼B x 260, G1½B x 260), q _p 10 m ³ /h	: 0D ¹ (No requirements for straight inlet)
Straight inlet requirement q _p 3.5 and 6 m ³ /h (G1¼B x 135 and G1¼B x 150)	: 0D ² (No requirements for straight inlet)
Installation angle	: Horizontally, vertically or at an angle
Temperature of medium, flow sensor θ _q	: 15...130 °C (or narrower range)
Pressure stage	: PN16, PS16 and PN25, PS25 and PN16/PN25, PS25

Nom. flow q _p [m ³ /h]	Installation dimensions				
	G¾Bx110 mm	G1Bx130 mm	G1Bx190 mm		
0.6	G¾Bx110 mm	G1Bx130 mm	G1Bx190 mm		
1.5	G¾Bx110 mm	G¾Bx165 mm	G1Bx110 mm	G1Bx130 mm	G1Bx190 mm
2.5	G1Bx130 mm	G1Bx190 mm			
3.5	G1¼Bx135 mm	G1¼Bx150 mm	G1¼Bx260 mm		
6	G1¼Bx135 mm	G1¼Bx150 mm	G1¼Bx260 mm	G1½Bx260 mm	
10	G2Bx200 mm	G2Bx300 mm			

¹ According to EN 1434:2007/AC:2007, EN 1434:2015+A1:2018, and FprEN 1434:2022 from 2022-04

² According to EN 1434:2007/AC:2007 and EN 1434:2015+A1:2018

Technical data (continued)

Dynamic range q_p 0.6	$q_p:q_i$: 100:1, 50:1 and 25:1 $q_s:q_p$: 2:1
Dynamic range q_p 1.5...10 m ³ /h	$q_p:q_i$: 250:1, 100:1, 50:1 and 25:1 $q_s:q_p$: 2:1 and 1.8:1
Durability specification	: Minimum 10 years (Long life flow sensor)
Fast response meter (sub-assembly flow sensor)	: Volume sampling interval \leq 2 s
Provision for built-in temperature sensor	: q_p 0.6...10 m ³ /h (M10x1 connection)
Internal supply voltage	: 3.6 VDC \pm 0.1 VDC
Power supply (Built-in supply module of Pulse Transmitter or Pulse Divider)	: 230 VAC 24 VAC 3.65 VDC, Lithium battery, D-cell
Software version	Revision Date Checksum (hex/dec)
5098-1060 (Flow sensors q_p 0.6...2.5 m ³ /h)	: Rev. B1 2014-05 N: 0xEAB0/60080 Rev. C1 2015-01 N: 0x8667/34407
5098-467 (Flow sensors q_p 3.5...10 m ³ /h)	: Rev. B1 2007-10 N: 0x7F8A/32650 Rev. C1 2010-12 N: 0x5C16/23574 Rev. D1 2015-01 N: 0x9898/39064
5098-1026 (Pulse Divider)	: Rev. B1 2013-11 N: 0x6ACF/27343

N: Non-legally Relevant Software change

L: Legally Relevant Software change

Note: The software version (Checksum) can be shown via the PC-software METERTOOL, which can be acquired from Kamstrup A/S.

The communication is facilitated e. g. by a cable with USB connector to the PC and a connector to the flow sensor/Pulse Divider PCB.

Technical data (continued)

Meter factor : 0.04...300 pulses/l
(depending on programming)

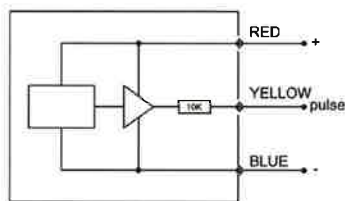
Pulse output
Pulse duration : 2...100 ms (depending on programming)
Pause : Depending on current pulse frequency

Pulse output - Galvanically connected:

(ULTRAFLOW®)

Type Push-Pull
Output impedance ~10 kΩ
Meter factor 1.5...300 pulses/l
Pulse duration 2...6 ms
Pause time Depending on current pulse frequency

Block diagram pulse output on ULTRAFLOW®:



Pulse output – Galvanically separated:

(Pulse Transmitter type 66-99-903-YZ-XXX and Pulse Divider type 66-99-907-YZ-XXX)

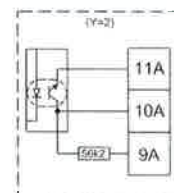
Type Optocoupler
Meter factor 0.04...300 pulses/l
Pulse duration 2...100 ms
Pause Depending on current pulse frequency

Galvanically separated output module (Y = 2):

Open collector.

2-wire connection or 3-wire connection via the integrated pull-up resistor of 56.2 kΩ

Module Y=2	OC and OD	(OB) Kam
Max input voltage	6 V	30 V
Max input current	0.1 mA	12 mA
ON condition	$U \leq 0.3 \text{ V @ } 0.1 \text{ mA}$	$U_{CE} \leq 2.5 \text{ V @ } 12 \text{ mA}$
OFF condition	$R \geq 6 \text{ M}\Omega$	$R \geq 6 \text{ M}\Omega$



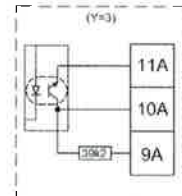
Technical data (continued)

Galvanically separated output module "Low power" (Y = 3):

Open collector.

2-wire connection or 3-wire connection via the integrated pull-up resistor of 39.2 kΩ

Module Y=3	OC and OD
Max input voltage	6 V
Max input current	0.1 mA
ON condition	$U \leq 0.3 \text{ V @ } 0.1 \text{ mA}$
OFF condition	$R \geq 6 \text{ M}\Omega$



- | | |
|---|-----------|
| Cable length: From flow sensor's electronics box to galvanically connected calculator | Max 10 m |
| From flow sensor's electronics box to galvanically connected calculator using Cable Extender Box no. 66-99-036 | Max 30 m |
| From flow sensor's electronics box to galvanically connected Pulse Transmitter/ Pulse Divider input | Max 10 m |
| From galvanically separated output module (Y = 2) in Pulse Transmitter/ Pulse Divider in 2-wire connection to galvanically separated calculator input, e. g. MULTICAL® 603-G with external 24 VDC supply or MULTICAL® 803-XXXX-P with built-in 24 VDC supply. | Max 100 m |

Modules:

Output and supply modules for Pulse Transmitter type 66-99-903-YZ-XXX and Pulse Divider type 66-99-907-YZ-XXX:

- | | |
|-----------|--|
| 5550-1062 | Galvanically separated output module (Y=2) |
| 5550-1219 | Galvanically separated output module "Low power" (Y=3) |
| 1606-064 | Battery, 3.65 VDC, D-cell with 2-pin connector |
| 5550-1051 | 24 VAC supply module |
| 5550-1052 | 230 VAC supply module |

Verification

- Errors : [Maximum permissible errors according to Directive 2014/32/EU of the European Parliament and Council of February 26th, 2014 on measurement instruments (MID), Annex VI MI-004]
- Procedure : (Test points and verification requirements according to EN 1434-5)
- Complete meter acc. to : [3.] (6.7)
- Hybrid and combined meter acc. to : (6.6), i.e. [7.1] (6.2), [7.2] (6.3), [7.3] (6.4) and (6.5)

The flow sensor can be verified by counting the volume proportional pulses in either standard mode or high-resolution mode. Furthermore, verification can be carried out using the serial data output.

Initial verification can be carried out via the four-pin plug of the measuring electronics or via the three-wired signal cable coming from the measuring electronics.

After verification before sealing, Meter factor and Pulse duration can be configured.

For dynamic ranges $q_p:q_i$ 25:1 and 50:1, 100:1 can be used as an alternative.

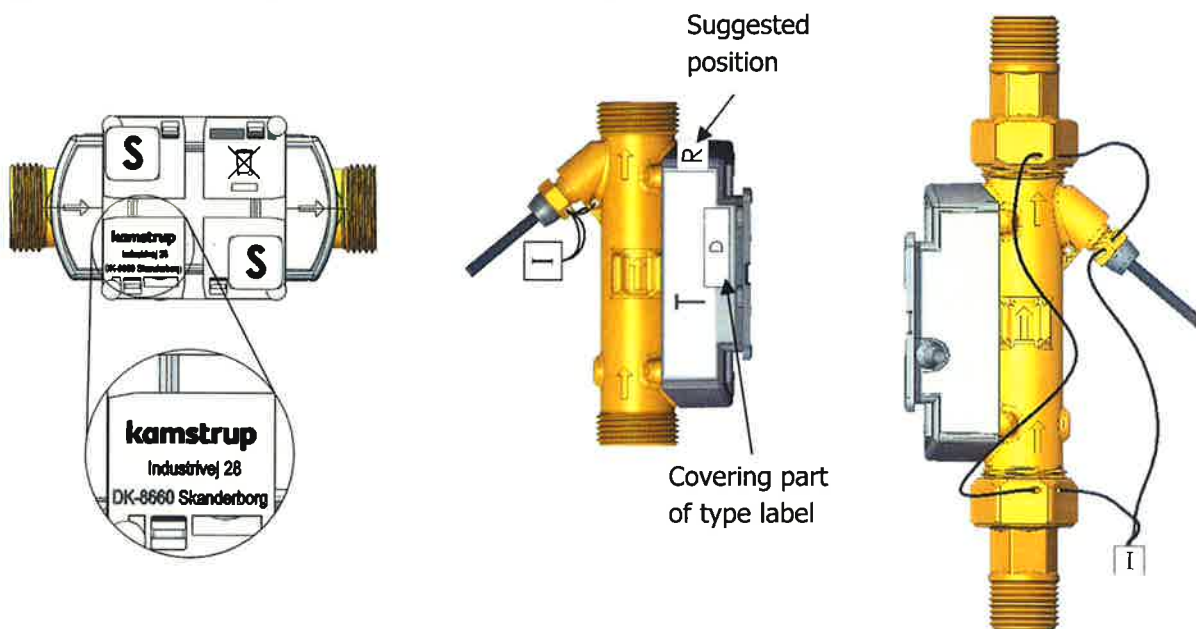
For dynamic ranges $q_p:q_i$ 25:1, 50:1 and 100:1, 250:1 can be used as an alternative.

During verification a water temperature of (20 ± 5) °C can be used as an alternative.

Seals and markings

- D** Security seal or module D/F label (Depending on type label)
- S** Security seals. Covering screws or parts of type label
- T** Type label (as void label or with security seal D)
- I** Installation seals (wire and seal or void label)
- R** Re-verification marking - suggested position

ULTRAFLOW® 54
(Types 65-5-XXHX-XXX; q_p 0.6, 1.5 and 2.5 m³/h)

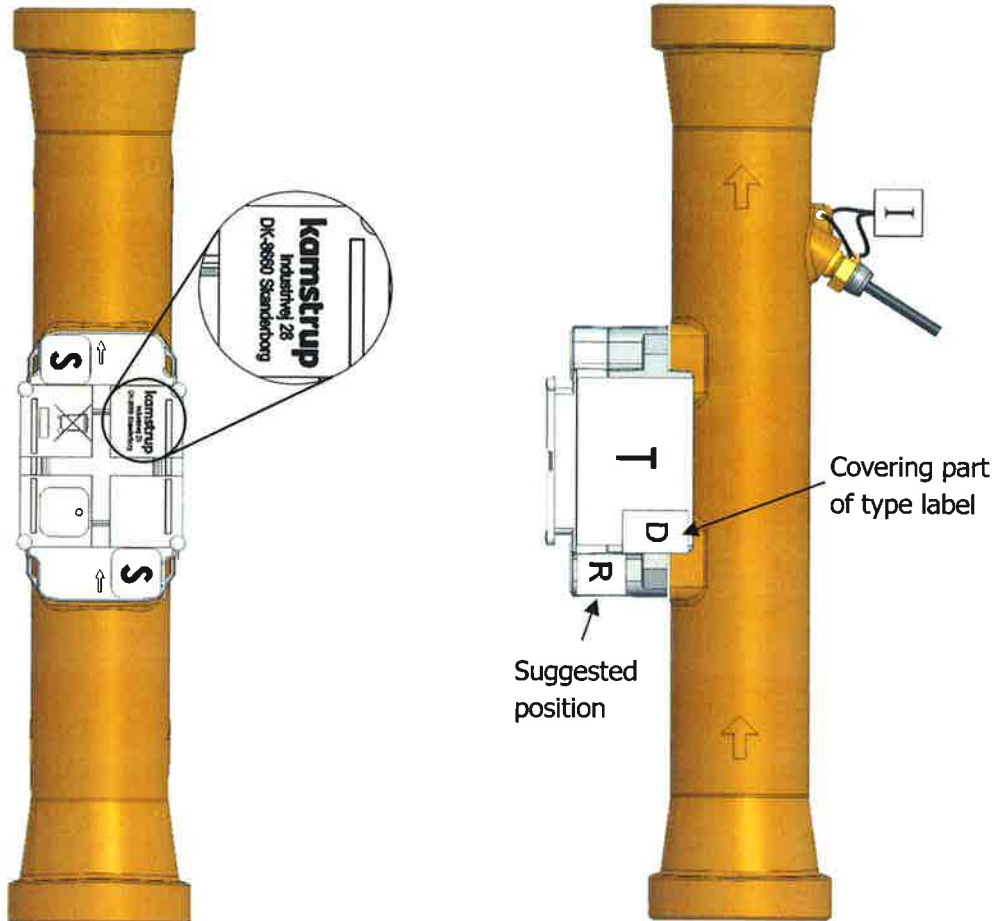


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Seals and markings (continued)

ULTRAFLOW® 54

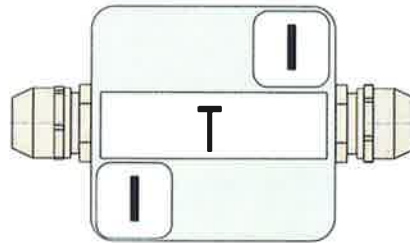
(Types 65-5-XXJX-XXX; q_p 3.5, 6 and 10 m³/h)



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Seals and markings (continued)

Cable Extender Box (Type 66-99-036)



Pulse Transmitter (Type 66-99-903-YZ-XXX)



Pulse Divider (Type 66-99-907-YZ-XXX)



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Labelling and inscriptions

Inscriptions on ULTRAFLOW® 54

CE marking and the supplementary metrology marking

Manufacturer's postal address:
(casted in plastic casing or as a label)

Kamstrup
Industrivej 28
DK-8660 Skanderborg

Arrow for flow direction

Type label placed on the flow sensor with the following imprint:

System designation (No. of the EU-type examination certificate)

Type, production year and serial number

Accuracy class

Mechanical and electromagnetic environment classes

Flow limits q_l , q_p , q_s

Temperature of medium θ_q (θ_{min} - θ_{max})

Nominal pressure (PN)

Maximum admissible working pressure (PS)

Meter Factor

Software Version

Manufacturer's or distributor logo

Additional inscriptions for Pulse Transmitter

Supply

Additional inscriptions for Pulse Divider

"Meter factor input and Meter factor output" or "Division factor"

Duration of output pulse

Supply

Software Version

DK-0200-MI004-033

Examples of type label

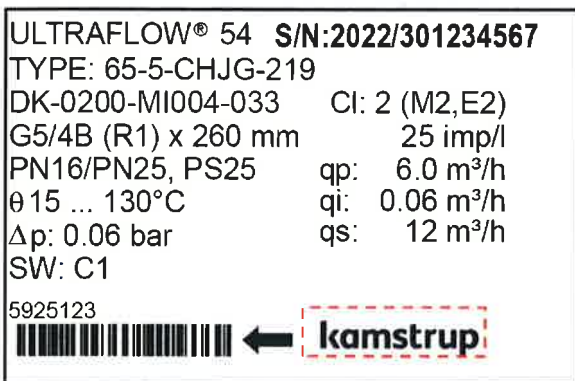
ULTRAFLOW® 54

(Types: 65-5-XXHX-XXX; q_p 0.6, 1.5 and 2.5 m³/h)

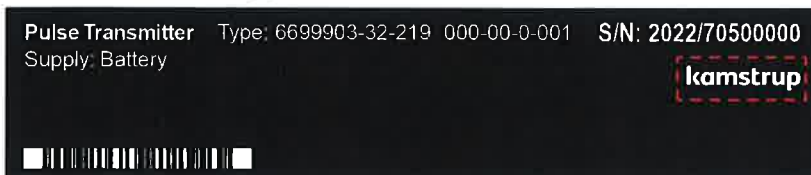


ULTRAFLOW® 54

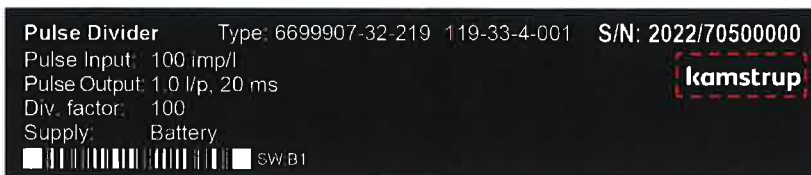
(Types: 65-5-XXJX-XXX; q_p 3.5, 6 and 10 m³/h)



Pulse Transmitter type 66-99-903-YZ-XXX

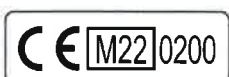


Pulse Divider type 66-99-907-YZ-XXX



The manufacturer or distributor logo is located on the respective type label, shown in the dashed red marking.

Example of CE marking and supplementary metrology marking



DK-0200-MI004-033

Photos

ULTRAFLOW® 54
(65-5-XXHX-XXX)



ULTRAFLOW® 54
(65-5-XXJX-XXX)



Pulse Divider / (Pulse Transmitter)



Cable Extender Box



Informative Annex

Integrated functions not subject to the Measuring Instruments Directive:

Re-verification

Re-verification of ULTRAFLOW® 54 may be performed according to EN 1434-5 under the same conditions as stated in this certificate for verification of ULTRAFLOW® 54, under consideration of national law.

During re-verification of the flow sensor a water temperature of (20 ± 5) °C can be used as an alternative.