

EU-Type Examination Certificate

Measuring Instrument Directive

Certificate number: DK-0200-MI004-008

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-XXAX-XXX, 65-5-XXCX-XXX, 65-5-XXDX-XXX, 65-5-XXEX-XXX)

Valid until: 2027-10-05

Number of pages: 18, including appendix

Date of issue: 2022-06-28

Version No.: 12
This new version of DK-0200-MI004-008 is issued due to new WELMEC and EN 1434 editions and major 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 The previous certificate is withdrawn.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.: 117-33255.02 and ID no.: 0200-MID-02913-12

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Appendix to

EU-Type Examination Certificate Measuring Instrument Directive

Number: DK-0200-MI004-008

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

Revision	Issue date	Changes
DK-0200-MI004-008	2007-12-06	Original certificate.
DK-0200-MI004-008	2009-08-28	Serial version added, labeling changed, DN 100 added, PN40 models added.
DK-0200-MI004-008 rev 1-2011	2011-02-22	Program meter factor, pulse length, 'SVM' added.
DK-0200-MI004-008 rev 1-2012	2012-04-10	Adding output module.
DK-0200-MI004-008 rev 2-2012	2012-09-18	New section concerning cooling and heating/cooling added to 'Description'.
DK-0200-MI004-008 rev 1-2014	2014-02-04	Description updated, Technical Data updated, Verification procedure updated.
DK-0200-MI004-008 rev 2-2014	2014-04-25	New pulse transmitter and pulse divider added, labelling examples corrected.
DK-0200-MI004-008 rev 3-2014	2014-09-22	Correction of type numbers, labeling examples updated.
DK-0200-MI004-008 rev 9	2015-02-27	DN300x500_PN16_qp 1000 m ³ /h added, SW update DN15...125.
DK-0200-MI004-008 ver 10	2016-05-27	DN20x190_PN16/PN25_qp 0.6 m ³ /h added, SW version for pulse divider added.
DK-0200-MI004-008 ver 11	2017-10-05	Updated to EN 1434:2015, validity extension, cable extension added, environmental data updated, various textual corrections.
DK-0200-MI004-008 ver 12	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. Major editorial changes have been performed. Discontinued items are removed from the certificate.

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-XXAX-XXX, 65-5-XXCX-XXX, 65-5-XXDX-XXX, 65-5-XXEX-XXX)

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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.

Flow sensors q_p 0.6...100 m³/h use two ultrasound transducers, which 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 and 1.5 m³/h) or 4 (q_p 2.5...100 m³/h) reflectors through the measuring pipe. The PCB is integrated in a plastic cabinet, which is mounted directly on the meter housing.

Flow sensors q_p 150...1000 m³/h use two sets of transducers (= four transducers), which are mounted next to each other. The ultrasound signal is in this case for each set propagating directly from one side of the meter housing diagonally across the measuring section to the opposite side of the meter housing. The PCB is integrated in a plastic cabinet, which is connected to the transducers with shielded coaxial cables.

The PCB includes in each case 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. 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, a built-in supply module ($q_p \geq 150$ m³/h only), or a separate Pulse Transmitter/ Pulse Divider (only relevant for q_p 0.6...100 m³/h).

Technical documentation:

Reference No.:

- 117-33255.02
- 117-33255.01
- 114-33017.04.16
- 114-33017.04.04
- 114-21535.0004.0022
- 114-21535.0004.0014
- 114-21535.0004.0012
- 112-23383.0004.0006
- 112-23383.0004.0001

Force Certification A/S File No.:

- 80.976-210/11
- 80.976-105/09
- 80.976-024/07

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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-MI004-008
- Flow sensor and calculator or	: DK-0200-MI004-008 and (-040 or -042)
- Flow sensor, calculator and temp. sensor	: DK-0200-MI004-008 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	
ULTRAFLOW® 54 DN15...125	: IP65
ULTRAFLOW® 54 DN150...300	: IP67 ¹
Pulse Transmitter/Pulse Divider	: IP67
Straight inlet requirement q _p 0.6...250 m ³ /h, q _p 400 m ³ /h (DN250x600), q _p 600 m ³ /h (DN250x600) and q _p 1000 m ³ /h (DN300x500)	: 0D ² (No requirements for straight inlet)
Straight inlet requirement q _p 400 m ³ /h (DN150x500 and DN200x500), q _p 600 m ³ /h (DN200x500) and q _p 1000 m ³ /h (DN250x600)	: 0D ³ (No requirements for straight inlet)
Installation angle	: Horizontally, vertically or at an angle
Temperature of medium, flow sensor θ _q q _p 0.6...100 m ³ /h	: 15...130 °C (or narrower range)
Temperature of medium, flow sensor θ _q q _p 150...1000 m ³ /h	: 2...150 °C (or narrower range)

¹ Limited by electronics box.

² According to EN 1434:2007/AC:2007, EN 1434:2015+A1:2018 and FprEN 1434:2022 from 2022-04.

³ According to EN 1434:2007/AC:2007 and EN 1434:2015+A1:2018.

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Technical data (continued)

Pressure stage q_p 0.6...40 m ³ /h Types 65-5-XXAX-XXX and 65-5-XXCX-XXX	: PN16, PS16 and PN25, PS25 and PN16/PN25, PS25
Pressure stage q_p 60, 100 m ³ /h and q_p 150...1000 m ³ /h Type 65-5-XXCX-XXX, DN100, DN125 and DN150...DN250	: PN25, PS25
Pressure stage q_p 3.5, 10, 15, and 25 m ³ /h Type 65-5-XXEX-XXX	: PN40, PS32
Pressure stage q_p 100, 1000 m ³ /h Type 65-5-XXDX-XXX, DN100, DN300	: PN16, PS16

Nom. flow q_p [m ³ /h]	Installation dimensions		
0.6	DN20x190 mm		
1.5	DN20x190 mm		
2.5	DN20x190 mm		
3.5	DN25x220 mm	DN25x260 mm	
6	G1Bx190 mm	DN25x260 mm	DN32x260 mm
10	DN40x256 mm	DN40x300 mm	
15	DN50x250 mm	DN50x270 mm	
25	DN65x300 mm		
40	DN80x300 mm	DN80x350 mm	
60	DN100x360 mm	DN100x400 mm	
100	DN100x360 mm	DN125x350 mm	
150	DN150x500 mm		
250	DN150x500 mm		
400	DN150x500 mm	DN200x500 mm	DN250x600 mm
600	DN200x500 mm	DN250x600 mm	
1000	DN250x600 mm	DN300x500 mm	

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Technical data (continued)

Dynamic range
 q_p 0.6...1000 m³/h
 $q_p:q_i$: 100:1, 50:1, and 25:1
 $q_s:q_p$: 2:1 and 1.8:1

Dynamic range
 q_p 1.5, 3.5, 6.0, 15, 25, 40 m³/h
 (DN80x350, ø40) and q_p 100 m³/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)
 ULTRAFLOW® 54 q_p 0.6...100 m³/h : Volume sampling interval ≤ 2 s
 ULTRAFLOW® 54 q_p ≥ 150 m³/h : Volume sampling interval ≤ 1 s

Provision for built-in temperature sensor : Type 65-5-CHAF-XXX (M10x1 connection)

Internal supply voltage : 3.6 VDC ±0.1 V

Power supply : 230 VAC
 (Built-in supply module of Pulse Transmitter or Pulse Divider or ULTRAFLOW® 54 (q_p 150...1000 m³/h)) : 24 VAC
 3.65 VDC, Lithium battery, D-cell

Software version (Flow sensor) : ULTRAFLOW® q_p 0.6...100 m³/h

Revision	Date	Checksum (hex/dec)
5098-467 Rev. B1	2007-10	N: 0x7F8A/32650
5098-467 Rev. C1	2010-12	N: 0x5C16/23574
5098-467 Rev. D1	2015-01	N: 0x9898/39064

: ULTRAFLOW® q_p 150...1000 m³/h

Revision	Date	Checksum
5098-700 Rev. B1	2010-12	N: 0x15F1/5617

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

Revision	Date	Checksum
5098-1026 Rev. B1	2013-11	N: 0x6ACF/27343

Software version
 (Pulse Divider)

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.

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Technical data (continued)

Meter factor : 0.0004...300 pulses/l
(depending on programming)

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

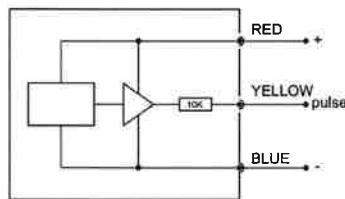
Pulse output – Galvanically connected:

(ULTRAFLOW® 54 q_p 0.6...100 m³/h and
output module of ULTRAFLOW® 54 q_p ≥ 150 m³/h (**Y = 1**))

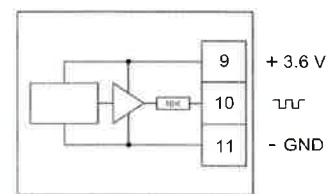
Type	Push-Pull
Output impedance	~10 kΩ
Meter factor	0.0004...300 pulses/l
Pulse duration	2...100 ms
Pause time	Depending on current pulse frequency

Block diagram pulse output on ULTRAFLOW®:

ULTRAFLOW® 54 q_p 0.6...100 m³/h



ULTRAFLOW® 54 q_p ≥ 150 m³/h (**Y = 1**)



Pulse output – Galvanically separated:

(Pulse Transmitter type 66-99-903-YZ-XXX, Pulse Divider type 66-99-907-YZ-XXX and
ULTRAFLOW® 54 (q_p 150...1000 m³/h)):

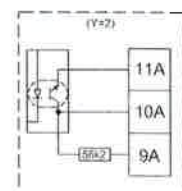
Type	Optocoupler
Meter factor	0.0004...300 pulses/l
Pulse duration	2...100 ms
Pause	Depending on current pulse frequency

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 ≤ 0.3 V @ 0.1 mA	U _{CE} ≤ 2.5 V @ 12 mA
OFF condition	R ≥ 6 MΩ	R ≥ 6 MΩ



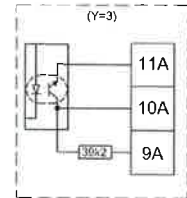
Technical data (continued)

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 and pulse output (Y = 1) to galvanically connected calculator	Max 10 m
From flow sensor's electronics box and pulse output (Y = 1) to galvanically connected calculator using Cable Extender Box no. 66-99-036	Max 30 m
From flow sensor's electronics box and pulse output (Y = 1) to galvanically connected Pulse Transmitter/ Pulse Divider input	Max 10 m
From galvanically separated output module (Y = 2) in Pulse Transmitter/ Pulse Divider or ULTRAFLOW® 54 $q_p \geq 150 \text{ m}^3/\text{h}$ 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 ULTRAFLOW® 54 q_p 150...1000 m^3/h , Pulse Transmitter type 66-99-903-YZ-XXX and Pulse Divider type 66-99-907- YZ-XXX:

- 5550-1061 Galvanically connected output module (Y=1) (q_p 150...1000 m^3/h only)
- 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.

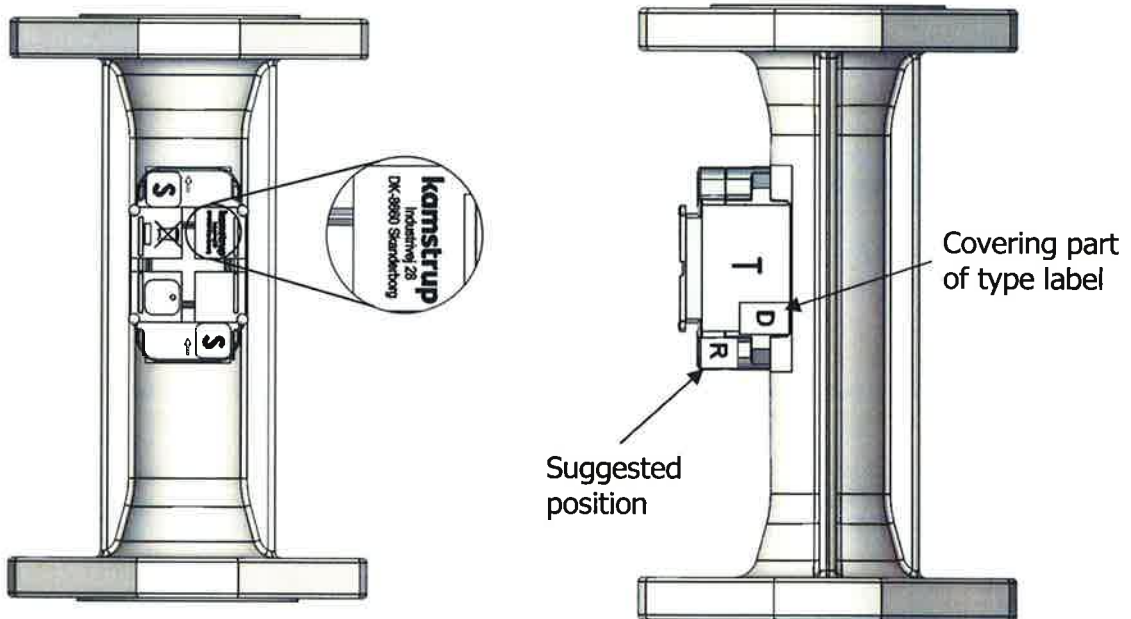
For dynamic ranges $q_p:q_i$ 25:1, 50:1 and 100:1, 250:1 can be used as an alternative.

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)
- A** Alternative approval marking as integrated part of the type label
- R** Re-verification marking - suggested position

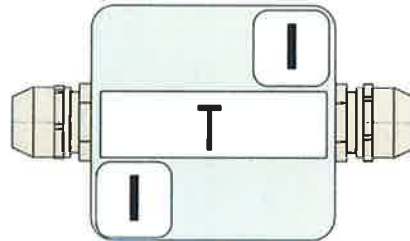
ULTRAFLOW® 54 (q_p 0.6...100 m³/h)



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Seals and markings (continued)

Cable extender box (Type 66-99-036)



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



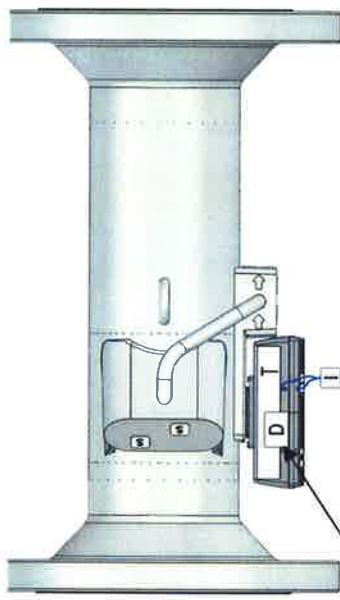
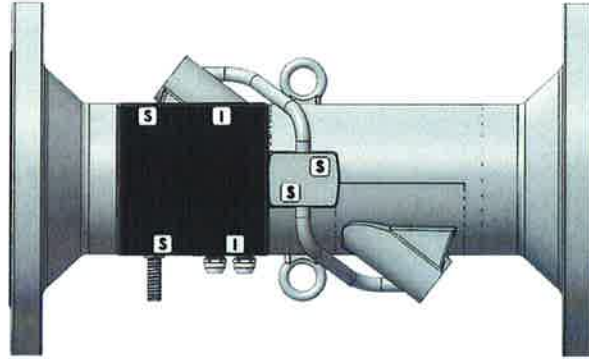
Pulse Divider (Type 66-99-907-YZ-XXX)



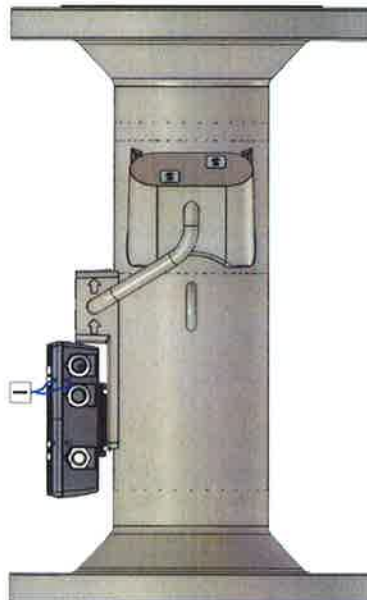
DK-0200-MI004-008

Seals and markings (continued)

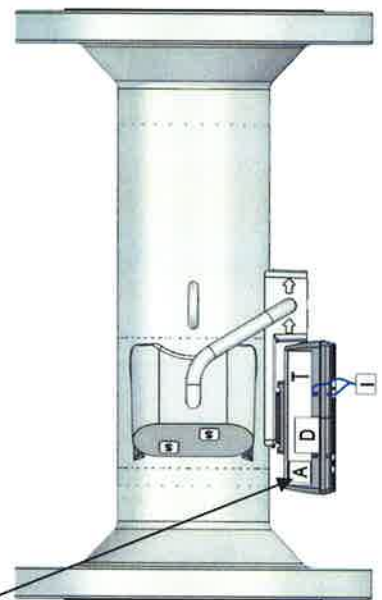
ULTRAFLOW® 54 ($q_p \geq 150 \text{ m}^3/\text{h}$)



Covering part of type label

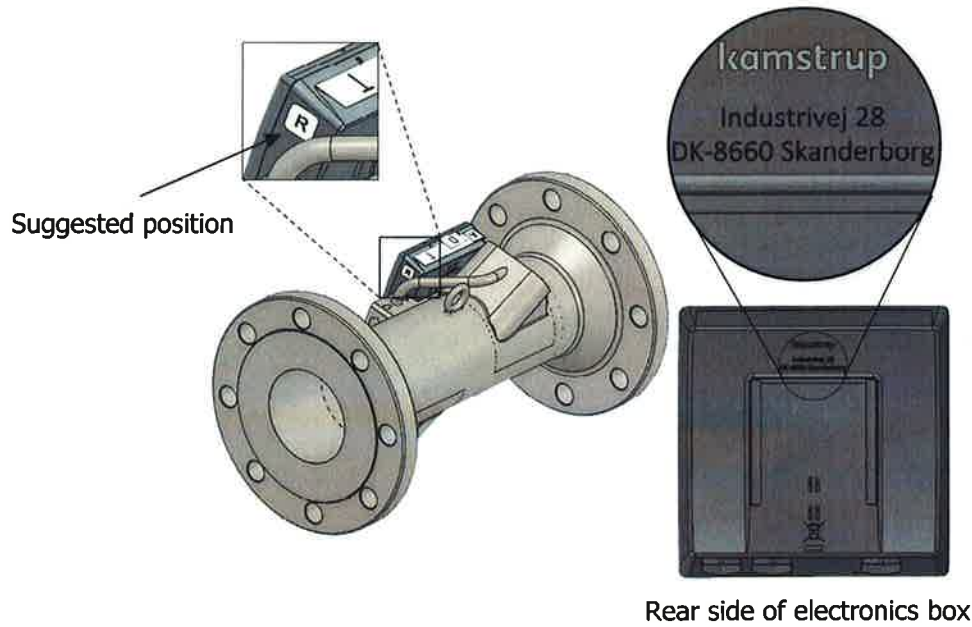


Integrated part of type label



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Seals and markings (continued)



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_i , 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

Manufacturers 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

Additional inscriptions for ULTRAFLOW® 54 ($q_p \geq 150 \text{ m}^3/\text{h}$)



Duration of output pulse

Supply

DK-0200-MI004-008

Examples of type label

ULTRAFLOW® 54 (q_p 0.6...100 m³/h)

ULTRAFLOW® 54 S/N:2022/301234567
 TYPE: 65-5-CECA-219
 DK-0200-MI004-008 CI: 2 (M2,E2)
 DN20 x 190 mm 60 imp/l
 PN16/PN25, PS25 qp: 2.5 m³/h
 θ 15 ... 130°C qi: 0.025 m³/h
 Δp: 0.03 bar qs: 5.0 m³/h
 SW: C1
 5925123
 ← 

ULTRAFLOW® 54 ($q_p \geq 150$ m³/h)

ULTRAFLOW® 54 TYPE: 65-5-FCCN-219 S/N: 2022/301234567
 qp: 150 m³/h DN150x500 DK-0200-MI004-008 987654321
 qi: 1.5 m³/h PN25, PS25 CI: 2 (M2,E2) SW: B1
 qs: 300 m³/h Δp: 0.02 bar
 1 imp/l 5925123
 θ: 2 ... 150°C  

ULTRAFLOW® 54 TYPE: 65-5-FCCN-319 S/N: 2022/301234567
 qp: 150 m³/h DN150x500 TS 27.02.002 987654321
 qi: 1.5 m³/h PN25, PS25 CI: 2 (M2,E2) SW: B1 5925123
 qs: 300 m³/h Δp: 0.02 bar   
 θ: 2 ... 130°C DK-0200-MI004-008

ULTRAFLOW® 54 TYPE: 65-5-FCCN-27-219 Prog: 36-4 S/N: 2022/123456789
 qp: 150 m³/h DN150x500 DK-0200-MI004-008 987654321
 qi: 1.5 m³/h PN25, PS25 CI: 2 (M2,E2) SW: B1
 qs: 300 m³/h Δp: 0.02 bar
 1000 l/imp, 20 ms Galv separated 5925341
 θ: 2...150°C 230 VAC  

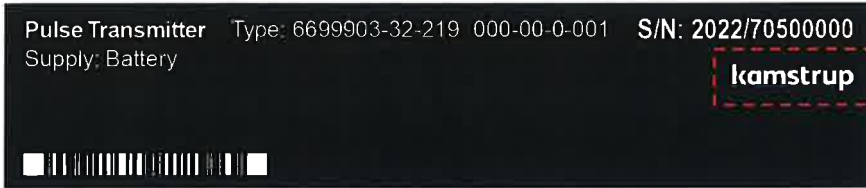
ULTRAFLOW® 54 TYPE: 65-5-FCCN-32-319 Prog: 33-1 S/N: 2022/123456789
 qp: 150 m³/h DN150x500 TS 27.02.002 987654321
 qi: 1.5 m³/h PN25, PS25 CI: 2 (M2,E2) SW: B1 5925341
 qs: 300 m³/h Δp: 0.02 bar   
 1.00 imp/l, 3.9 ms Galv separated
 θ: 2...130°C Battery DK-0200-MI004-008

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

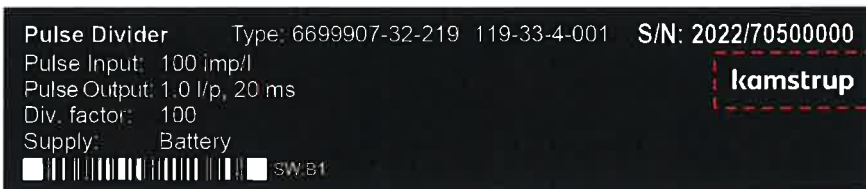
DK-0200-MI004-008

Examples of type labels (continued)

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

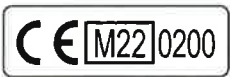


Pulse Divider type 66-99-907-YZ-XXX



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

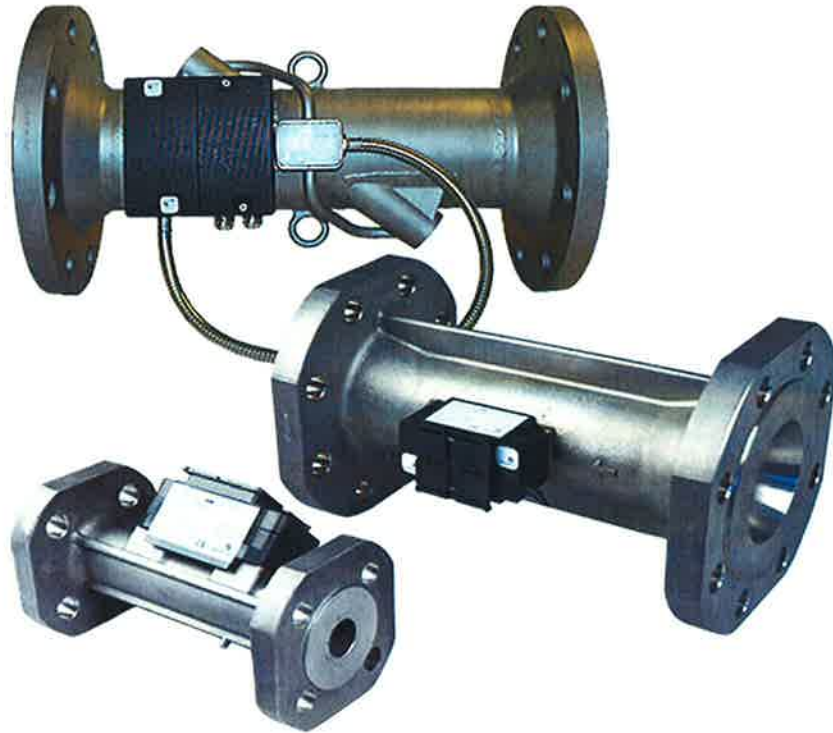
Example of CE marking and supplementary metrology marking



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Photos

ULTRAFLOW® 54



Pulse Divider / (Pulse Transmitter)



Cable Extender Box



Informative Annex

Integrated functions not subject to the Measuring Instruments Directive:

Integrated bi-functional Heat/Cooling function

The flow sensors ULTRAFLOW® 54 q_p 150...1000 m³/h are type tested as Heating, Cooling and as bi-functional Heating/Cooling flow sensors according to EN 1434-4:2015 + A1:2018 and FprEN 1434:2022 from 2022-04.

On this basis, the flow sensors are national type approved for Cooling according to the Danish law⁴, System designation TS 27.02 002.

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

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.

⁴ 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.