DANAK
PROD Reg. No. 7026

FORCE Certification

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:	2034-10-09
Number of pages:	17, including appendix
Date of issue:	2024-10-09
Version No.:	5 This new version of DK-0200-MI004-033 is issued due to a validity extension. In addition, the WELMEC 7.2 and one EN 1434 reference is updated, and an OIML R75 reference is added. Discontinued types are removed from the certificate and editorial changes are performed. The previous certificate is withdrawn.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.: 124-27294.01 and ID no.: 0200-MID-03536-4

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.
DK-0200-MI004-033 ver. 5	2024-10-09	Validity extension. Updated references to WELMEC 7.2:2023 (May 2024), and EN 1434:2022. OIML R 75:2002 added. Discontinued types are removed from the certificate. Editorial changes have been performed for clarity.

Applied standards and documents:

- EN 1434:2007/AC:2007
- EN 1434:2015+A1:2018
- EN 1434:2022
- WELMEC 7.2:2023 (May 2024)
- OIML R 75:2002

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

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

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 m^3/h; Types 65-5-XXHX-XXX) or 4 (q_p 3.5...10 m^3/h; Types 65-5-XXJX-XXX) reflectors through the measuring pipe.

Depending on the meter size for q_p 0.6...2.5 m^3/h combinations of 2 types of threaded (G¾B, 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 m^3/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.:

- 124-27294.01
- 118-20653.03
- 118-20653.02
- 118-20653.01
- 117-29700.01
- 114-33017.04.10
- 114-21535.0004.0019

Technical data

Legal measuring data according to	: EN 1434:2007/AC:2007 : EN 1434:2015+A1:2018 : EN 1434:2022 : OIML R 75:2002
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	: 0D (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 [m³/h]	Installation dimensions				
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	G1¼Bx260 mm				
6	G1¼Bx260 mm	G1½Bx260 mm			
10	G2Bx300 mm				

Technical data (continued)

Dynamic range q_p 0.6	$q_p:q_i$ $q_s:q_p$	: 100:1, 50:1 and 25:1 : 2:1
Dynamic range q_p 1.5...10 m³/h	$q_p:q_i$ $q_s:q_p$	: 250:1, 100:1, 50:1 and 25:1 : 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 ≤ 2 s
Provision for built-in temperature sensor		: q_p 0.6...10 m³/h (M10x1 connection)
Internal supply voltage		: 3.6 VDC ±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 m³/h)	: Rev. B1	2014-05	N: 0xEAB0/60080
	Rev. C1	2015-01	N: 0x8667/34407
5098-467 (Flow sensors q_p 3.5...10 m³/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)

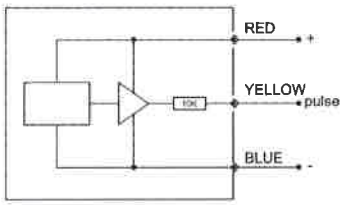
Pulse output
Pulse duration : 2...100 ms (depending on programming)
Pause : Depending on current pulse frequency

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®:



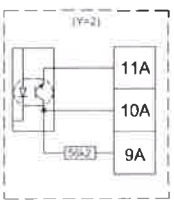
Pulse output – Galvanically separated:

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

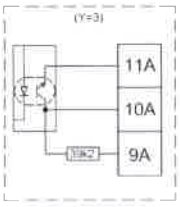


Technical data (continued)

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 ≤ 0.3 V @ 0.1 mA
OFF condition	R ≥ 6 MΩ



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 (Z=2)
5550-1051	24 VAC supply module (Z=8)
5550-1052	230 VAC supply module (Z=7)

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.

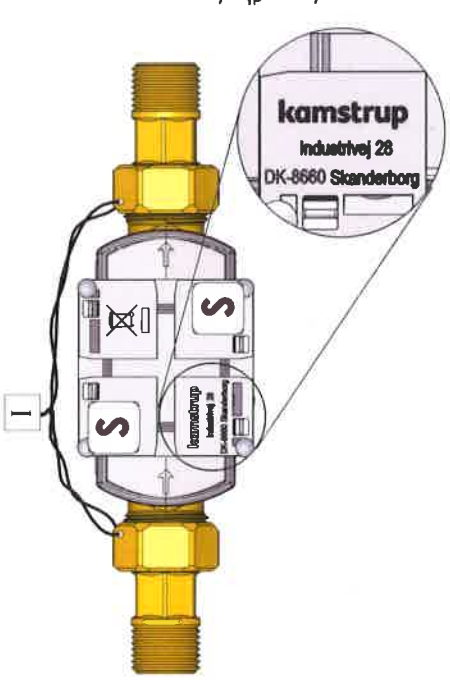
During verification a water temperature of (20 ± 5) °C can be used as an alternative.

Seals and markings

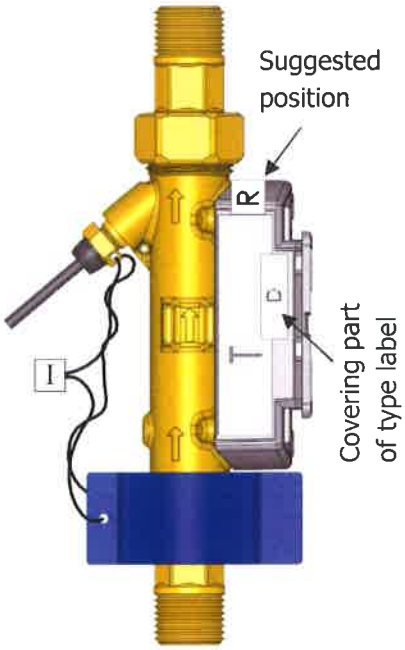
D	Security seal or module D/F label (Depending on type label)
S	Security seals[1]. Covering screws or parts of type label
T	Type label (as void label or protected with security seal D or S)
I	Installation seals (wire and seal or void label or sealing cup), if required[2]
R	Re-verification marking, if required - suggested position

The following illustrations specify the place(s) where a security seal "S" has to be applied.
For installation sealing "I" see footnote [2].

ULTRAFLOW® 54
(Types 65-5-XXHX-XXX; q_p 0.6, 1.5 and 2.5 m^3/h)



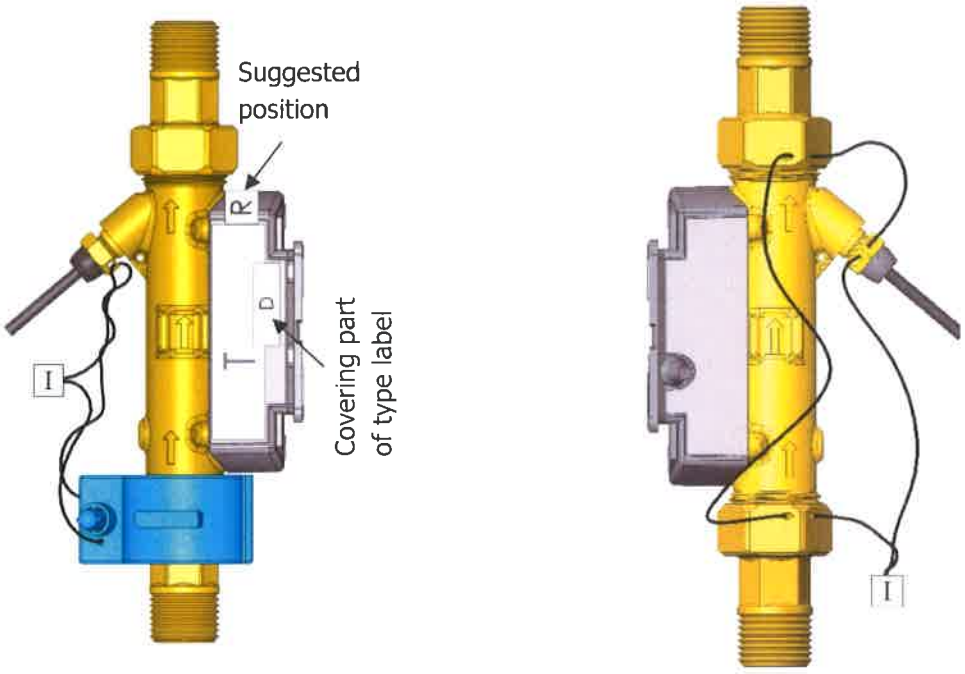
(a)



(b)

[1] Security seals are identical to metrological seals defined in WELMEC 13.3:2021.
[2] According to WELMEC 13.3:2021 installation sealing is advisable. The shown methods for installation sealing are examples, but other securing measures for the installation may equally be suitable. National requirements concerning installation sealing shall be taken into account.

Seals and markings (continued)

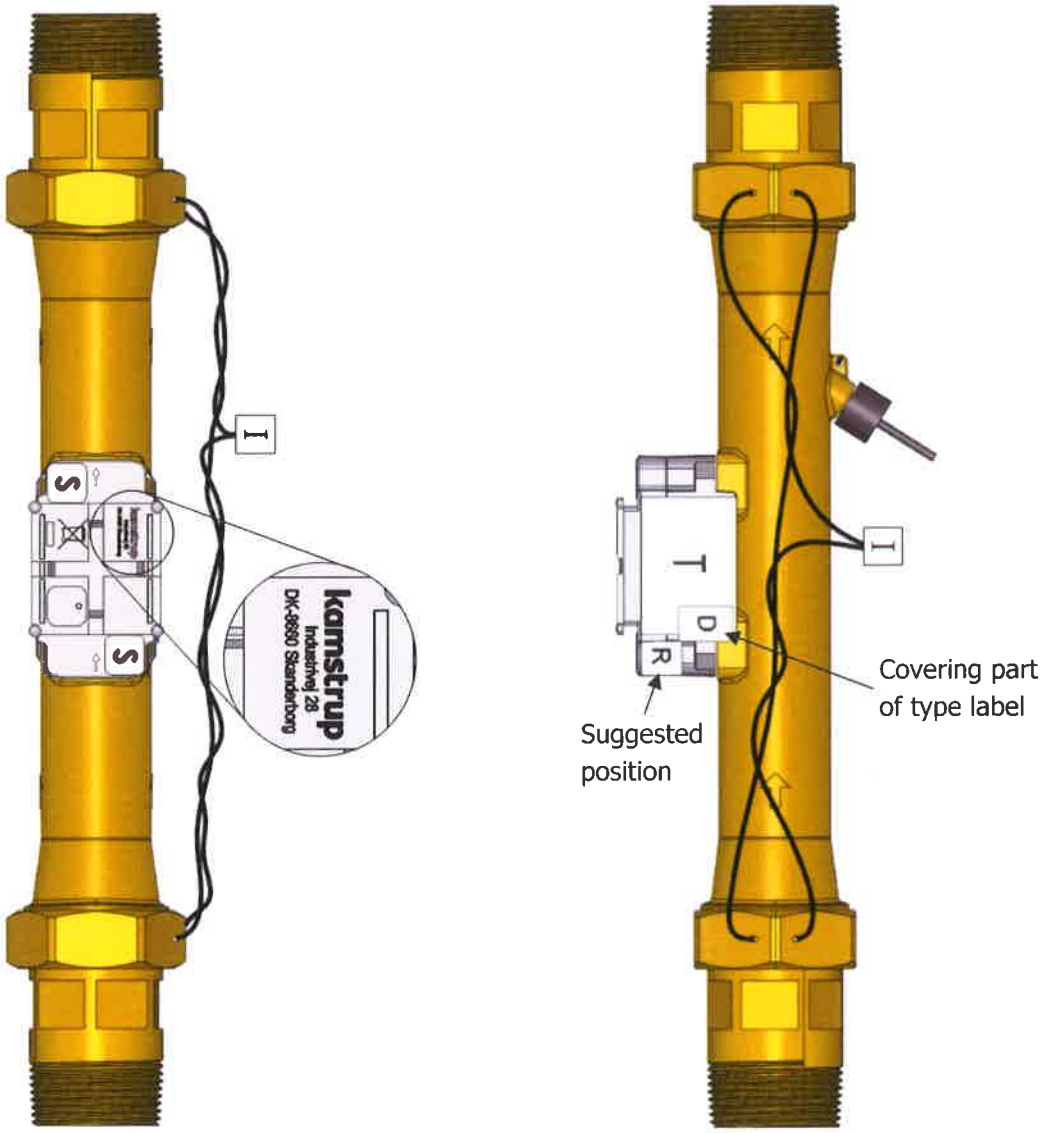


(c) (d)

Sealing examples illustrating (a) void label "S" covering screws and wire and seal "I" for couplings, (b) and (c) with sealing cup "I" as well as wire and seal "I" for temperature sensor and coupling and module D label covering type label, (d) wire and seal for installation sealing "I" of couplings and temperature sensor.

Seals and markings (continued)

ULTRAFLOW® 54
(Types 65-5-XXJX-XXX; q_p 3.5, 6 and 10 m^3/h)

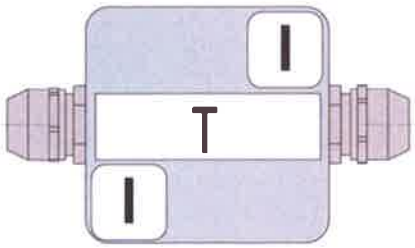


(a) (b)

Sealing examples illustrating (a) void labels "S" covering screws and wire and seal "I" for couplings, (b) wire and seal for installation sealing of couplings and sealing cup "I" for temperature sensor.

Seals and markings (continued)

Cable Extender Box (Type 66-99-036)
Type label does not need to be a void label.



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

Type label does not need to be a void label.

Marking of output (Y)/supply (Z) module can be adapted, when changing the output/supply module.

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

Marking of output (Y)/supply (Z) module can be adapted, when changing the output/supply module.

(a)

(b)

Sealing examples of (a) Pulse Transmitter and (b) Pulse Divider with void labels covering screws (and type label).

Seals and markings (continued)

(c)

(d)

Sealing examples of (c) Pulse Transmitter with seal and wire and (d) Pulse Divider with void labels covering screws (and type label) and seal and wire.

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

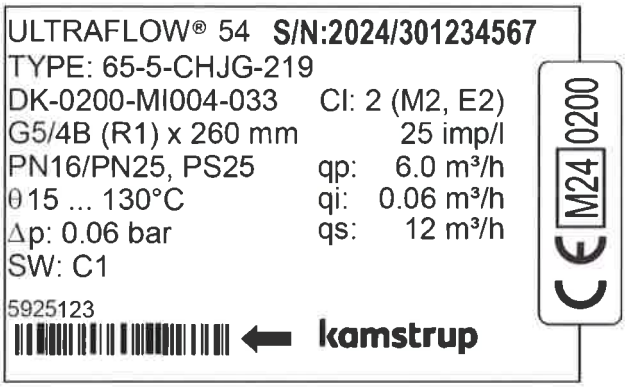
Additional inscriptions for Pulse Divider
"Meter factor input and Meter factor output" or "Division factor"
Duration of output pulse
Supply
Software Version

Examples of type labels

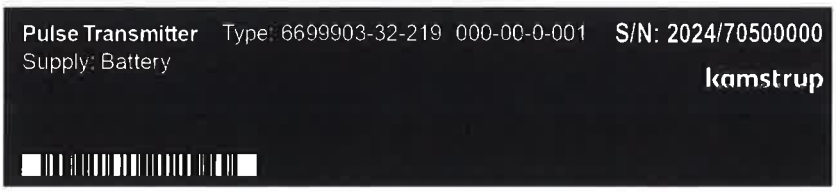
ULTRAFLOW® 54 inclusive CE marking and supplementary metrology marking covering the type label

(Types: 65-5-XXHX-XXX; q_p 0.6, 1.5 and 2.5 m^3/h)

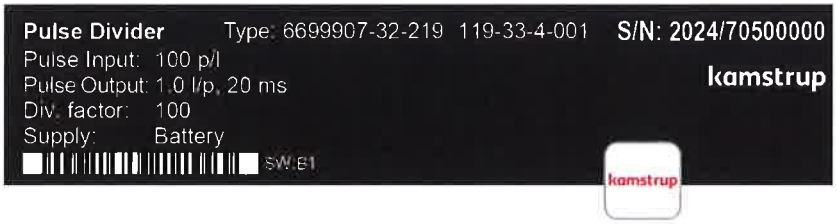
(Types: 65-5-XXJX-XXX; q_p 3.5, 6 and 10 m^3/h)



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



Pulse Divider type 66-99-907-YZ-XXX including void label covering type label with security seal "S"



The manufacturer or distributor logo is located on the respective type label.

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.