

## Data sheet

### ULTRAFLow® 44 DN15-125

- Ultrasonic flow sensor ( $q_p$  1.5...100 m<sup>3</sup>/h)
- Static sensor, no moving parts and no wear
- Excellent water resistance (IP68)
- Allows insulation and submersion
- Enables direct mounting of a temperature sensor ( $q_p$  1.5...10 m<sup>3</sup>/h)
- Small pressure loss
- Large dynamic range
- Exceptionally accurate
- Durable



MID 2014/32/EU

CE M24 0200

EN 1434

DK-BEK 1178 – 06/11/2014



EN 1434

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## Description

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ULTRAFLOW® 44 is a static flow sensor based on the ultrasonic measuring principle. It is used primarily as a sub-assembly of a thermal energy meter in combination with the separate calculators MULTICAL® 603 or MULTICAL® 803 and a set of TemperatureSensor 63. ULTRAFLOW® 44 has been designed with particular focus on water resistance by gel-encapsulated transducers and by physical removal of the flow sensor's PCB from the meter housing. As the PCB itself is also waterproof encapsulated, the flow sensor withstands even temporary submersion (up to 2 months).

ULTRAFLOW® 44 is thereby particularly suitable for use in cooling installations, but can also be used for heat/cooling installations as well as heat installations, which require a flow sensor with particular good water resistance.

ULTRAFLOW® 44 operates with water as the thermal energy-conveying liquid, but is not suitable for use with other media than water and should therefore not be used with e.g. non-freezing additives like glycol.

ULTRAFLOW® 44 employs microprocessor technology. The flow is measured using bidirectional ultrasonic technique based on the transit time method. All circuits for calculating and measuring are collected on a single board, providing a compact and rational design in addition to an exceptionally high level of measuring accuracy and proven longterm stability.

A three-wire cable is used to connect ULTRAFLOW® 44 to separate MULTICAL® calculators. This cable is used to supply the flow sensor from the calculator and also to send volume-proportional pulses to the calculator.

To achieve the easiest possible adjustment (e.g. during reverification), it is recommended to order ULTRAFLOW® 44 together with MULTICAL® 603 or MULTICAL® 803 whereby the flow sensor and the calculator will be delivered with identical serial numbers. Adjustment of separately delivered ULTRAFLOW® 44 requires individual encryption keys.

If ULTRAFLOW® 44 is used as a flow sensor for other equipment, it must be connected through a Pulse Transmitter. If ULTRAFLOW® is connected to another calculator with a different meter factor than the one supplied by ULTRAFLOW®, a Pulse Divider is used instead. Pulse Transmitter and Pulse Divider have galvanically separated pulse outputs and a built-in supply for ULTRAFLOW® 44.

If the distance between MULTICAL® and ULTRAFLOW® 44 is more than 10 m, a Pulse Transmitter allows prolongation of the connecting cable (up to 100 m). Alternatively, a Cable Extender Box can be used for this purpose for distances up to 30 m between MULTICAL® and ULTRAFLOW® 44.

## Compliance

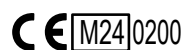
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### Type approval

ULTRAFLow® 44 is approved as a heat meter in accordance with MID-2014/32/EU:

EU-Type Examination Certificate      DK-0200-MI004-044

MID-certified according to Module D      DK-0200-MID-D-001



ULTRAFLow® 44 is approved as a cooling meter in accordance with DK-BEK 1178 – 06/11/2014:

System designation      TS 27.02 014

Verification      DANAK accreditation 268



Please contact Kamstrup A/S for further information relating to type approval and verification.

### Standards and documents

EN 1434:2007/AC2007

EN 1434:2015+A1:2015

EN 1434:2022

WELMEC 7.2:2021

### CE marking

ULTRAFLow® 44 is marked in accordance with:

- EMC directive      2014/30/EU
- LV directive      2014/35/EU (together with Pulse Transmitter or Pulse Divider)
- PE directive      2014/68/EU (DN50...DN125 category I)

### Approved meter data

MID designation

- Mechanical environment      M1 (vibrations and shocks of low significance)  
M2 (significant or high levels of vibrations and shocks)
- Electromagnetic environment      E1 (residential, commercial and light industrial buildings)  
E2 (other industrial buildings)
- Climatic environment      5...55 °C, condensing, closed location (indoors)
- Accuracy class      2 and 3

EN 1434 designation

- Environmental class      C (high electrical and electromagnetic conditions)
- Fast response meter      Volume sampling interval ≤ 2 s (sub-assembly flow sensor)

## Technical data

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### Electrical data

Supply voltage	3.6 VDC ± 0.1 VDC
Battery (MULTICAL® or Pulse Transmitter/ Pulse Divider)	3.65 VDC, D-cell lithium
Battery lifetime (replacement interval) – ULTRAFLOW® 44 and MULTICAL® – Pulse Transmitter/Pulse Divider	Up to 16 years @ $t_{BAT} < 30\text{ °C}$ 6 years @ $t_{BAT} < 30\text{ °C}$ (Y=3)
Mains supply – MULTICAL® or – Pulse Transmitter/Pulse Divider	230 VAC +15/-30 %, 50 Hz or 60 Hz 24 VAC ± 50 %, 50 Hz or 60 Hz
Backup supply	Integral supercap eliminates operational disturbances due to short-term power cuts
Cable length – Flow sensor – Pulse Transmitter/Pulse Divider – Cable Extender Box	Max 10 m Depends on calculator – max 100 m when connected to MULTICAL® (Y=2) Depends on calculator – max 30 m when connected to MULTICAL® (does not provide galvanic separation, but supports extended info codes)
Electromagnetic environment	Fulfil EN 1434 class C, MID E1 and E2
Pulse output – Type – Output impedance – Pulse duration – Pause time	Galvanically connected (ULTRAFLOW®) Push-Pull 10 k $\Omega$ 2...6 ms Depending on current pulse frequency

### Mechanical data

Accuracy class	2 and 3
Electromagnetic environment	Fulfil EN 1434 class C, MID E1 and E2
Mechanical environment	MID M1 and M2
Ambient conditions	5...55 °C, closed location (installation indoors)
Protection class – Flow sensor – Pulse Transmitter/Pulse Divider – Cable Extender Box	IP68 IP67 IP65
Medium in flow sensor	Water – recommended water quality as in CEN TR 16911 and AGFW FW510
Medium temperature*	2...130 °C or narrower range
Storage temperature (empty sensor)	-25...60 °C
Pressure stage	PN16, PS16 or PN25, PS25 or PN16/PN25, PS25, see marking
Straight inlet requirement	OD (according to EN 1434)
Installation angle	Horizontally, vertically and at an angle

\* At medium temperatures above 90°C, the use of flange meters is recommended.  
At medium temperatures above 90 °C or below the ambient temperature, the calculator and Pulse Transmitter/Pulse Divider must not be mounted on the flow sensor. Instead wall mounting is recommended.

## Flow data

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Nom. flow $q_p$	Meter factor *	Dynamic range $q_p:q_i$	$q_s:q_p$	Flow@125 Hz **	Min. cut-off
[m³/h]	[p/l]			[m³/h]	[l/h]
1.5	100	100:1	2:1	4.5	3
2.5	60	100:1	2:1	7.5	5
3.5	50	100:1	2:1	9	7
6	25	100:1	2:1	18	12
10	15	100:1	2:1	30	20
15	10	100:1	2:1	45	30
25	6	100:1	2:1	75	50
40	5	100:1	2:1	90	80
60	2.5	100:1	2:1	180	120
100	1.5	100:1	2:1	300	200

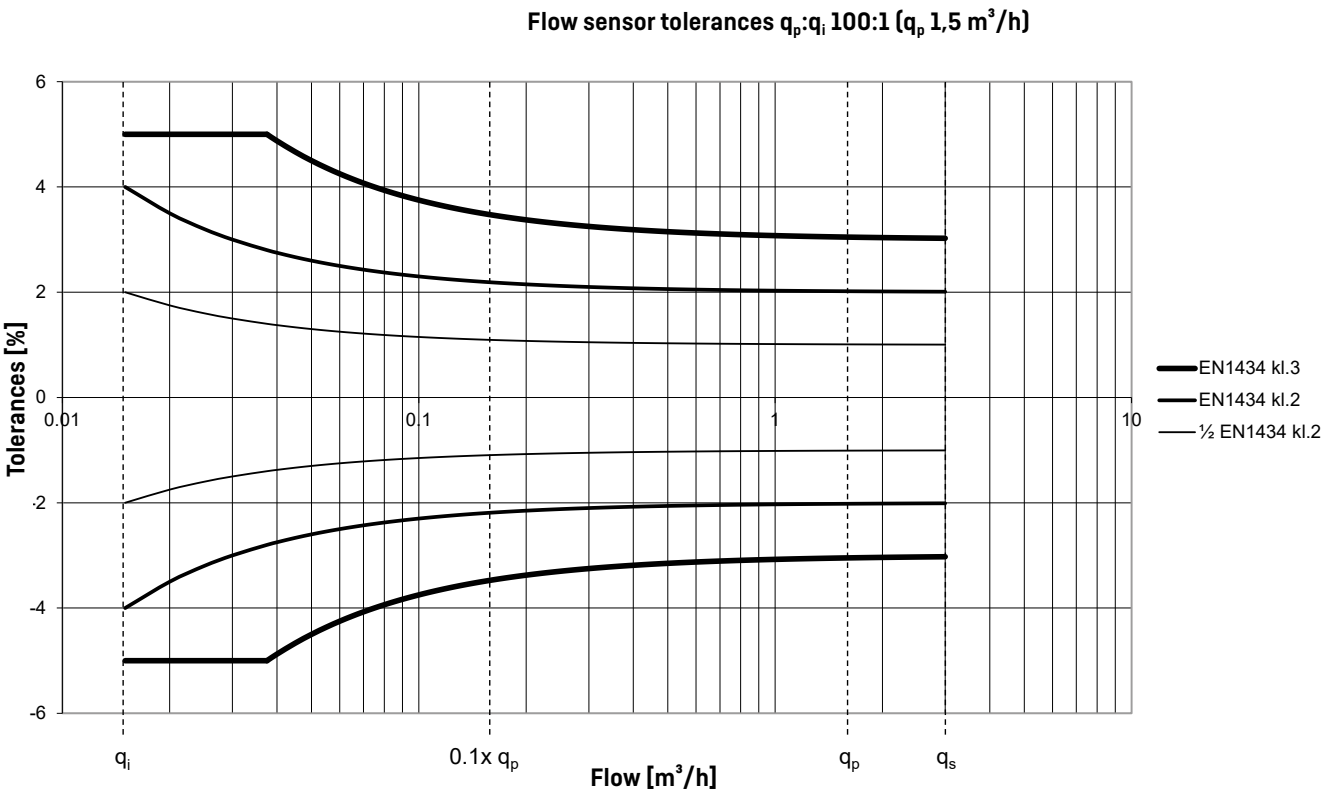
\* The meter factor appears from the type label.

\*\* Saturation flow 125 Hz. Max pulse frequency is maintained at higher flow rates.

Measurement accuracy

Class 3	$E_f = \pm[3 + 0.05 \, q_p/q]$ , but not above $\pm 5\%$
Class 2	$E_f = \pm[2 + 0.02 \, q_p/q]$ , but not above $\pm 5\%$
Typical *	$E_f = \pm[1 + 0.01 \, q_p/q]$

\* Documented with DANAK-accredited certificate at flow  $q_i$ ,  $0.1 \, q_p$  and  $q_p$ .



## Materials

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### Wetted parts

Housing, thread	DZR brass (dezincification-resistant brass) CW602N, to be discontinued in 2024 CW511L with max 0.1% Pb, to be implemented in 2024
Blind plug	DZR brass (dezincification resistant brass) CW614 N, to be discontinued in 2024 CW510L with max 0.1% Pb, to be implemented in 2024
Housing, flange	Stainless steel, W.no. 1.4308
Transducer (membrane)	Stainless steel, W.no. 1.4404
O-ring	Ethylene propylene (EPDM)
Reflector base/reflector	Thermoplastic, PESU 30 % GF and stainless steel, similar to AISI 304 or AISI 316 ( $q_p$ 0.6...2.5 m <sup>3</sup> /h) Thermoplastic, PESU 30 % GF and stainless steel, similar to AISI 304 ( $q_p$ 6 and 10 m <sup>3</sup> /h) Stainless steel, similar to AISI 304 or AISI 316 - ( $q_p$ 3.5, 15...100 m <sup>3</sup> /h)
Measuring tube	Thermoplastic, PESU – only flow sensor type 65-4-XXHX-XXX/Thermoplastic, PESU 30% GF

### Electronics housing

PCB box	Thermoplastic, inside - polyolefin, outside - polyamide
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#### 65-4-XXHX-XXX

– Base (flow sensor)	Thermoplastic, PESU 30% GF
– Cover (flow sensor)	Thermoplastic, PC 10% GF

#### 65-4-XXCX-XXX, 65-4-XXJX-XXX and 65-4-XXLX-XXX

– Base (flow sensor)	Thermoplastic, PC 10% GF
– Cover (flow sensor)	Thermoplastic, PC 10% GF

### Cables

Coaxial cable	Copper cable with silicone jacket and inner fluoropolymer insulation
Connection cable	Silicone cable (3 x 0.25 mm <sup>2</sup> )

### Housing, Cable Extender Box

Base, cover	Thermoplastic, acrylonitrile butadiene styrene (ABS)
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### Housing, Pulse Transmitter/ Pulse Divider

Base, cover	Thermoplastic, PC 10% GF
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Type summary

Nom. flow $q_p$ [m³/h]	Installation dimensions		
1.5	G¾B x 110 mm	G1B x 130 mm	
2.5	G1B x 190 mm		
3.5	G1¼B x 260 mm		
6	G1¼B x 260 mm	G1½B x 260 mm	DN25 x 260 mm
10	G2B x 300 mm	DN40 x 300 mm	
15	DN50 x 270 mm		
25	DN65 x 300 mm		
40	DN80 x 300 mm		
60	DN100 x 360 mm		
100	DN100 x 360 mm	DN125 x 350 mm	

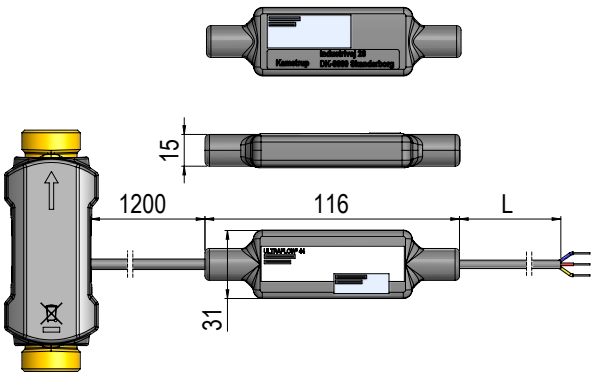
Thread EN ISO 228-1  
Flangefacing type B, raised face according to EN 1092-1, PN25

Dimensional sketches

All ULTRAFLOW® 44 flow sensors include a separate electronics box, which contains the PCB. This electronics box is connected to the plastic casing on the respective meter housing with a coaxial cable with a length of  $l < 1.2$  m. The plastic casing on the meter housing contains the transducers of the flow sensor. Flow sensors of size  $q_p$  1.5...10 m³/h have the provision for built-in temperature sensors (M10x1 connection).

ULTRAFLOW® 44 - PCB and cables

All measurements are in mm, unless otherwise stated.



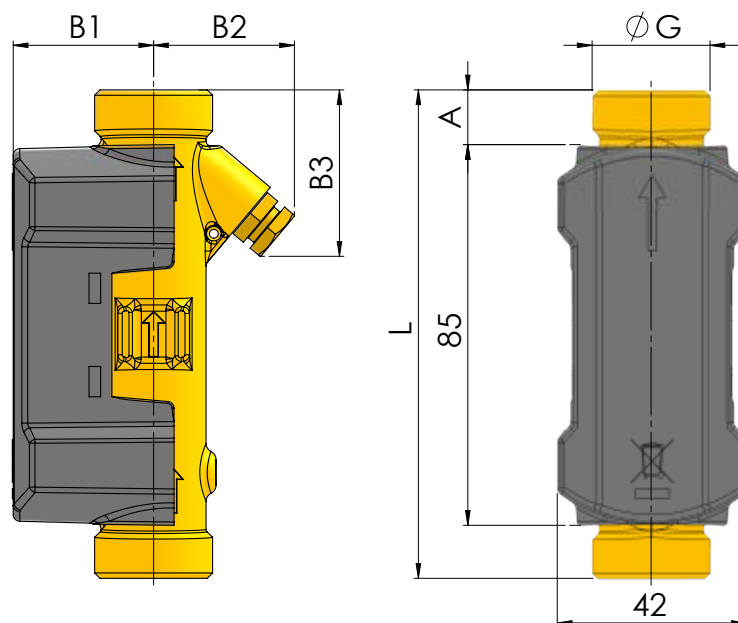
Nom. flow	L [m]	Approx. weight* [kg]
$q_p$ 1.5 and 2.5 m³/h	2.5	0.18
$q_p$ 1.5-100 m³/h	10	0.36

\* Electronics box together with coaxial cable and 2.5 m signal cable.



## Dimensional sketches

### ULTRAFLOW® 44, G $\frac{3}{4}$ B and G1B

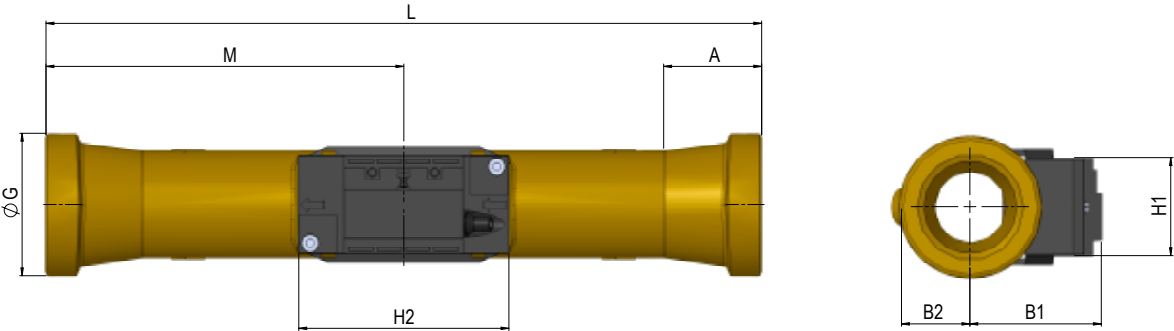


Thread EN ISO 228-1	L	A	B1	B2	B3	Approx weight * [kg]
G $\frac{3}{4}$ B [q <sub>p</sub> 1.5]	110	12	35	32	38	0.6
G1B [q <sub>p</sub> 1.5]	130	22	38	32	48	0.7
G1B [q <sub>p</sub> 2.5]	190	52	38	38	78	0.9

\* Including the electronics box and 2.5 m signal cable.

Dimensional sketches

ULTRAFLOW® 44, G1¼B, G1½B and G2B

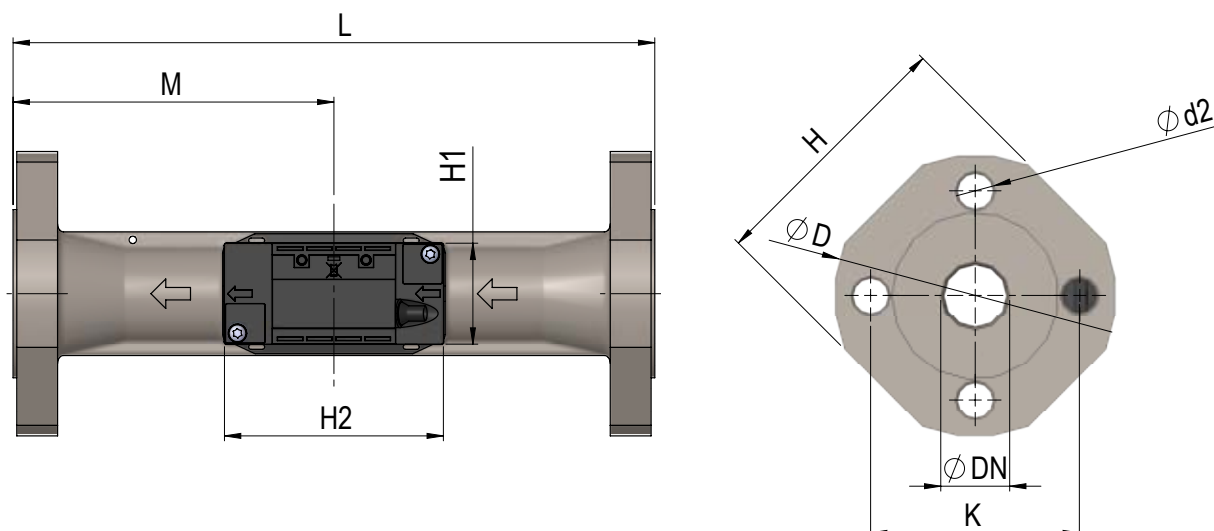


Thread EN ISO 228-1	L	M	H2	A	B1	B2	H1	Approx weight * [kg]
G1¼B [q <sub>p</sub> 3.5]	260	L/2	88	16	51	20	41	1.9
G1¼ [q <sub>p</sub> 6.0]	260	L/2	88	16	53	20	41	2.0
G1½ [q <sub>p</sub> 6.0]	260	L/2	88	31	60	24	41	2.0
G2B [q <sub>p</sub> 10]	300	L/2	88	40.2	55	29	41	2.9

\* Including the electronics box and 10 m signal cable.

## Dimensional sketches

### ULTRAFLOW® 44, DN25, DN40 and DN50



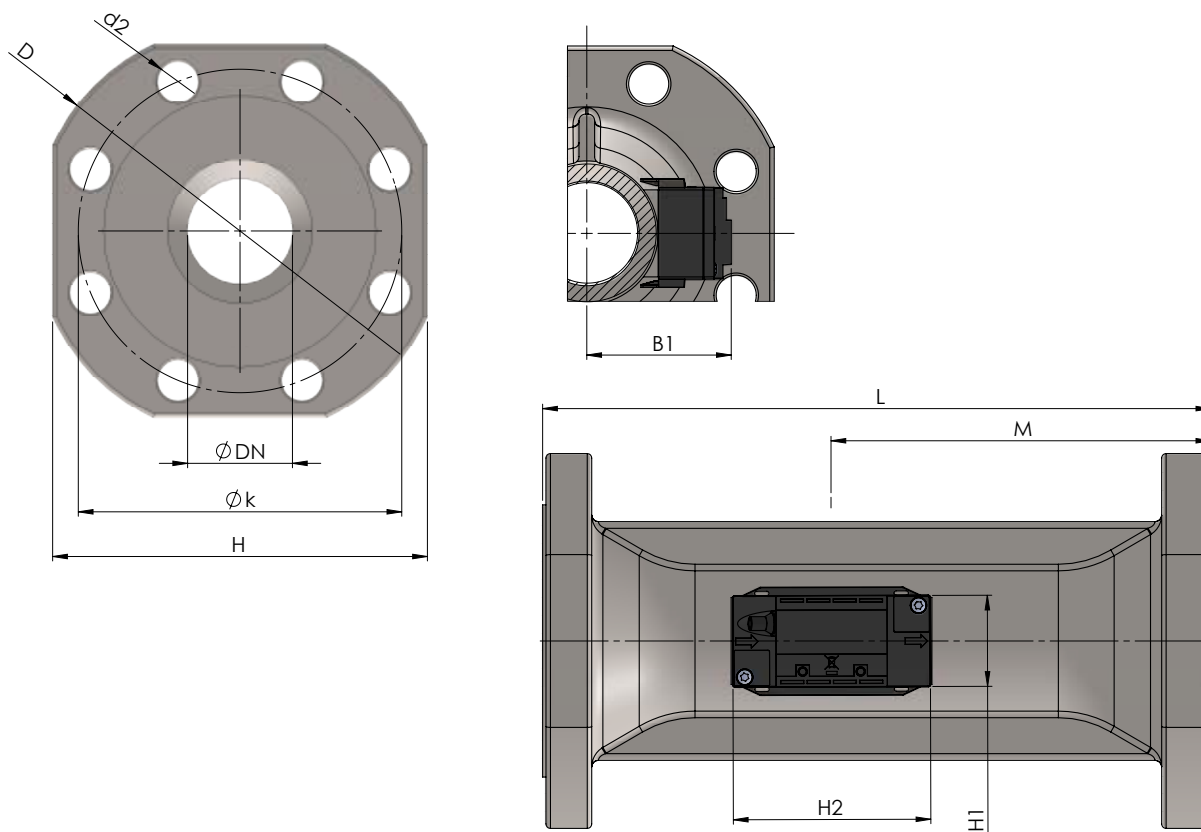
### Flange facing type B, raised face according to EN 1092-1, PN25

Nom. diameter	L	M	H2	D	H	k	H1	Bolts			Approx weight *
								No.	Thread	d <sub>2</sub>	
DN25 (q <sub>p</sub> 6.0)	260	L/2	88	115	106	85	41	4	M12	14	4.5
DN40 (q <sub>p</sub> 10)	300	L/2	88	150	140	110	41	4	M16	18	7.4
DN50 (q <sub>p</sub> 15)	270	155	88	165	145	125	41	4	M16	18	8.5

\* Including the electronics box and 10 m signal cable.

## Dimensional sketches

### ULTRAFLOW® 44, DN65 to DN125



### Flange facing type B, raised face according to EN 1092-1, PN25

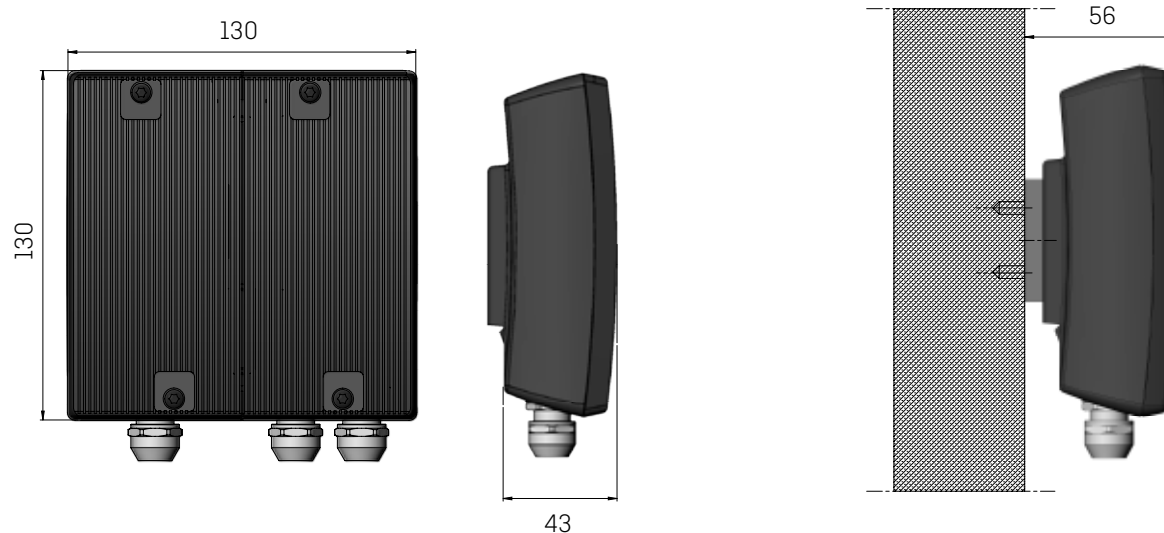
Nom. diameter	L	M	H1	H2	B1	D	H	k	Bolts			Approx weight *
									No.	Thread	d <sub>2</sub>	
DN65 (q <sub>p</sub> 25)	300	170	41	88	<H/2	185	168	145	8	M16	18	13.5
DN80 (q <sub>p</sub> 40)	300	170	41	88	<H/2	200	184	160	8	M16	18	17.1
DN100 (q <sub>p</sub> 60 and 100)	360	210	41	88	<H/2	235	220	190	8	M20	22	22.0
DN125 (q <sub>p</sub> 100)	350	212	41	88	<H/2	270	260	220	8	M24	26	28.5

\* Including the electronics box and 10 m signal cable.

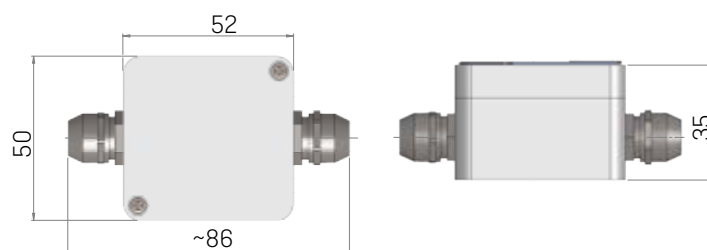
## Dimensional sketches

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### Pulse Transmitter



### Cable Extender Box



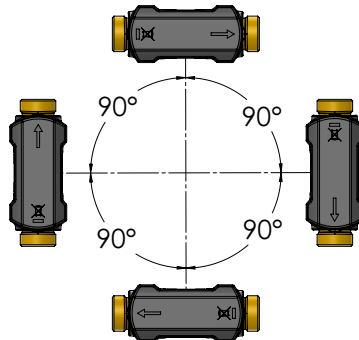
💡 To achieve the easiest possible adjustment (e.g. during reverification), it is recommended to order ULTRAFLOW® 44 together with MULTICAL® 603 or MULTICAL® 803 whereby the flow sensor and the calculator will be delivered with identical serial numbers. Adjustment of separately delivered ULTRAFLOW® 44 requires individual encryption keys.

## Installation

### Orientation of Kamstrup flow sensors (mounted separately)

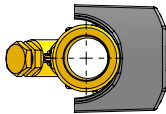
Kamstrup flow sensors can be installed horizontally, vertically or at an angle. For vertical mounting, Kamstrup flow sensors can be turned  $\pm 360^\circ$  around the pipe axis.

⚠ The plastic box on the flow sensor must be turned to the side (when installed horizontally).

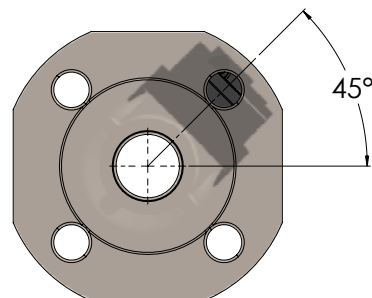
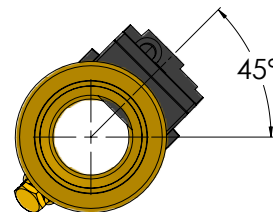


### Recommendations for cooling and combined heat/cooling installations

Threaded flow sensors with  $q_p \leq 2.5 \text{ m}^3/\text{h}$



Threaded flow sensors with  $q_p \geq 3.5 \text{ m}^3/\text{h}$  and flanged flow sensors



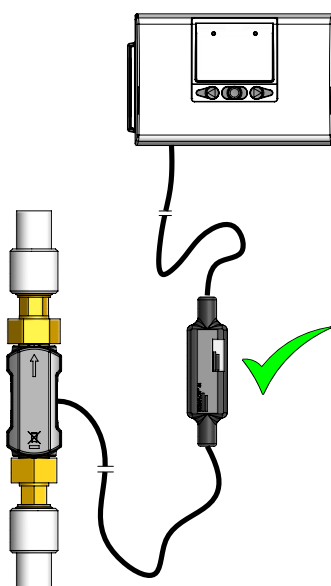
### Recommendations for heat installations

See the Technical description 5512-2599-GB, which can be downloaded from [www.kamstrup.com](http://www.kamstrup.com).

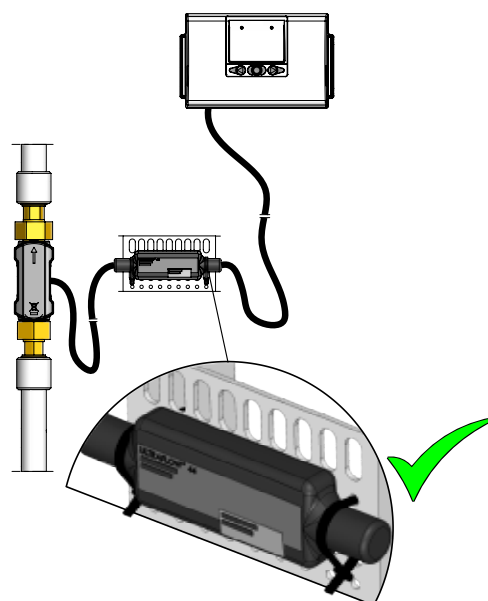
## Examples of installation

### Mounting of the ULTRAFLOW® 44 electronics box

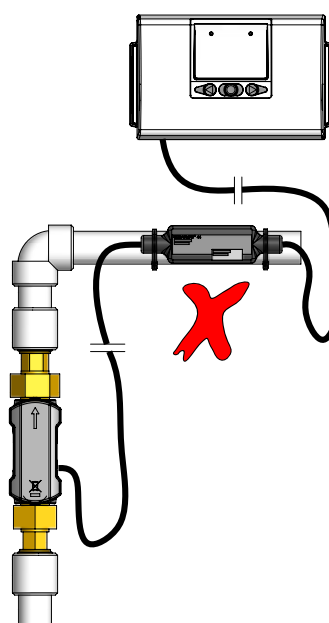
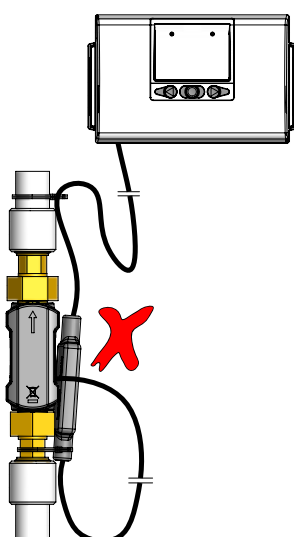
Freely hanging



Horizontally mounted with cable strips in humid environments



Must NOT be mounted on flow sensor or on pipes



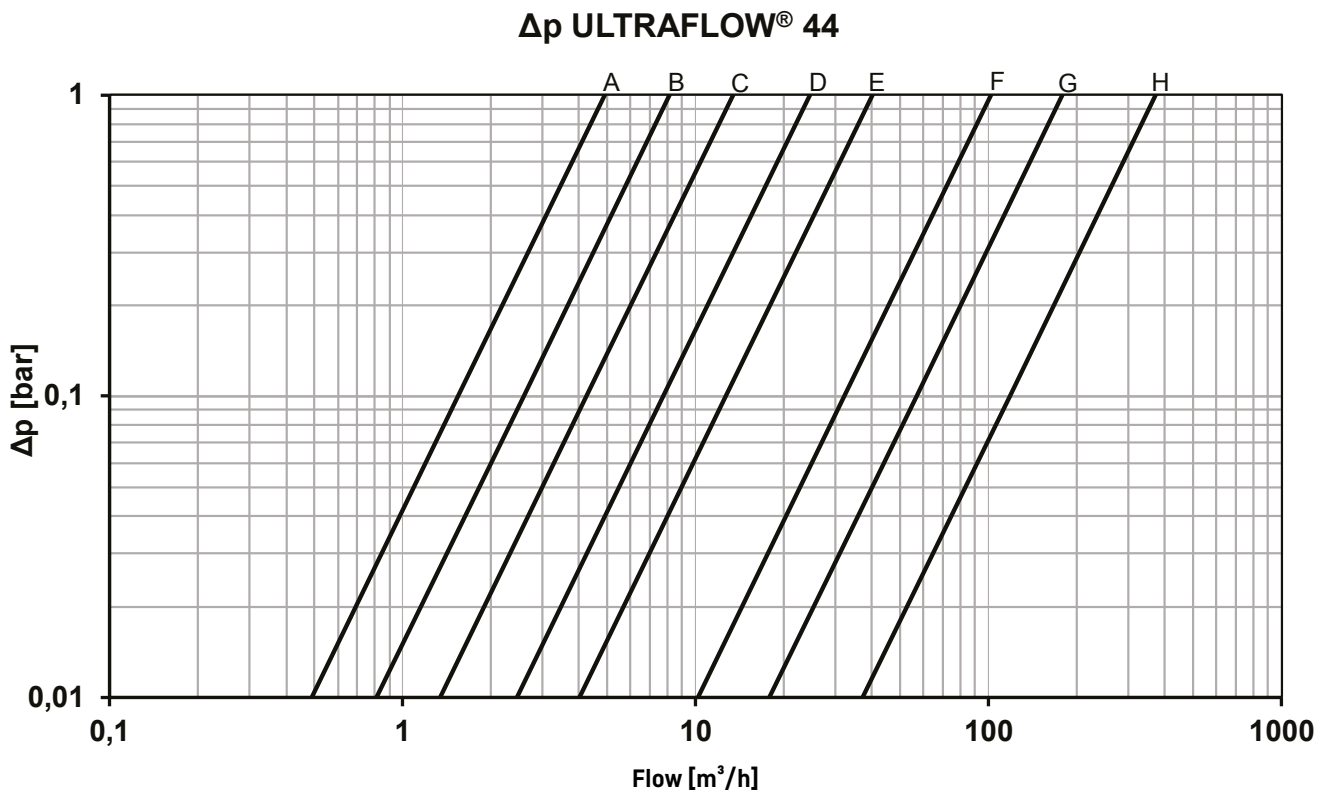
#### Insulation

For further information about insulation of ULTRAFLOW® 44, see the Technical description 5512-2599-GB, which can be downloaded from [www.kamstrup.com](http://www.kamstrup.com).

Pressure loss

Graph	Nom. flow $q_p$ [m³/h]	Nom. diameter [mm]	$\Delta p@q_p$ [bar]	$k_v$ *	$q@0.25\text{ bar}$ [m³/h]
A	1.5	DN15/DN20	0.09	4.9	2.4
B	2.5	DN20	0.09	8.2	4.1
C	3.5	DN25	0.07	13.4	6.8
D	6	DN25/DN32	0.06	24.5	12.3
E	10	DN40	0.06	40	20
E	15	DN50	0.14	40	20
F	25	DN65	0.06	102	51
G	40	DN80	0.05	179	90
H	60	DN100	0.03	373	187
H	100	DN100/DN125	0.07	373	187

\*  $q=k_v \times \sqrt{\Delta p}$





## Installation

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### Straight inlet

ULTRAFLW® requires neither straight inlet nor outlet to meet the Measuring Instruments Directive (MID) 2014/32/EU, OIML R75:2002 and EN 1434. Only in case of heavy flow disturbances before the meter, a straight inlet section will be necessary. It is recommended to follow the guidelines in CEN CR 13582.

### Operating pressure

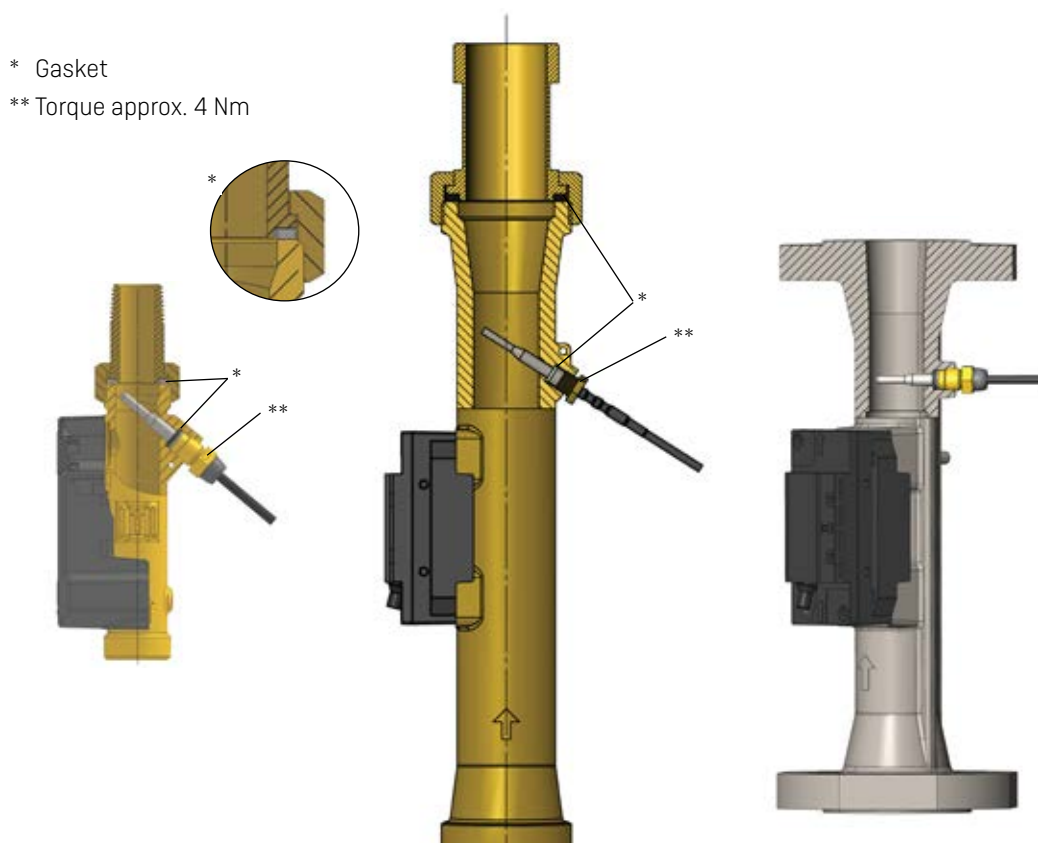
To minimise the risk of measuring errors as a result of cavitation or air in the water, it is recommended to keep a sufficient static pressure at the flow sensor outlet of min. 1.5 bar [1.0 bar for ULTRAFLW® 44 type 65-4-XXHX-XXX] up to  $q_p$  and min. 2.5 bar [2.0 bar for ULTRAFLW® 44 type 65-4-XXHX-XXX] at  $q_s$ . This applies to temperatures up to approx. 80 °C. It is particularly recommended to follow this advice during meter testing. In absence of cavitation, the flow sensor is typically functioning at lower operating pressure. Furthermore, ULTRAFLW® must not be exposed to lower pressure than the ambient pressure (vacuum). This minimises the risk of transducer damage.

ULTRAFLW® 44 tolerates periodical submersion. This applies to the meter housing as well as the electronics (PCB) of ULTRAFLW® 44. If ULTRAFLW® 44 is flooded, the connected MULTICAL® must not be flooded. Furthermore, temperature sensors must also not be flooded and therefore must be mounted elsewhere in the installation.

### Couplings and direct short sensor fitted in ULTRAFLW® 44

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A temperature sensor can be directly mounted in the outlet of flow sensors  $q_p$  1.5...10 m³/h.



Electrical connection

Connecting MULTICAL® and ULTRAFLOW® 44

ULTRAFLOW® 44	->	MULTICAL®
Blue [GND]	->	11
Red [supply]	->	9
Yellow [signal]	->	10

Connecting via Pulse Transmitter/Pulse Divider/Cable Extender Box

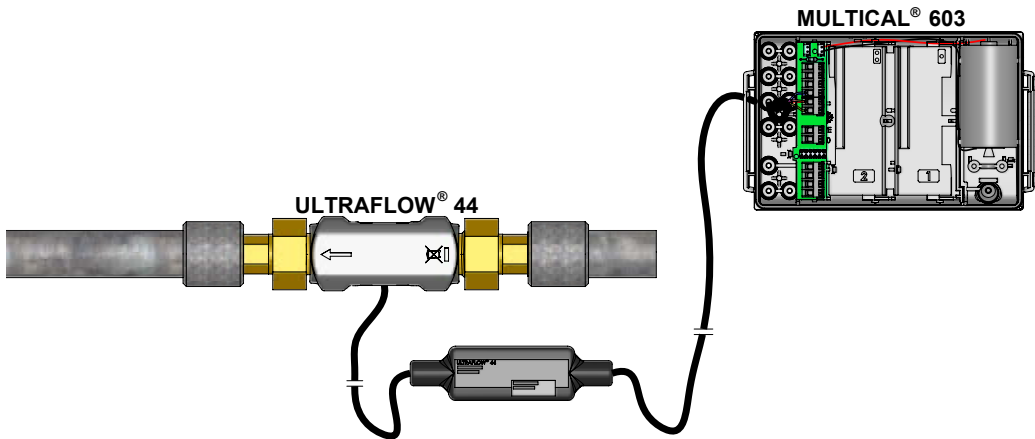
ULTRAFLOW® 44	->	Pulse Transmitter/Pulse Divider/ Cable Extender Box		->	MULTICAL®
		Input	Output		
Blue [GND]	->	11	11A/11	->	11
Red [supply]	->	9	9A/9	->	9
Yellow [signal]	->	10	10A/10	->	10

Pulse Transmitter/Pulse Divider provides galvanic separation, but does not support extended info codes.  
Cable Extender Box does not provide galvanic separation, but supports extended info codes.  
If long signal cables are used, please consider the installation carefully. There must be **at least 25 cm** between the signal cable and all other cables due to EMC.

For further information about Pulse Transmitter/Pulse Divider and Cable Extender Box, see the Technical description 5512-2599, which can be downloaded from [www.kamstrup.com](http://www.kamstrup.com).

Example of connecting ULTRAFLOW® 44 and MULTICAL®

ULTRAFLOW® 44 and MULTICAL® 603



## Order specification

Type number *	q <sub>p</sub> [m <sup>3</sup> /h]	q <sub>i</sub> [m <sup>3</sup> /h]	q <sub>s</sub> [m <sup>3</sup> /h]	Connection	Length [mm]	PN [bar]	Meter factor [p/l]	Material (housing)
65-4- CDHA -XXX	1.5	0.015	3	G¾B (R½)	110	16/25	100	Brass
65-4- CDHD -XXX	1.5	0.015	3	G1B (R¾)	130	16/25	100	Brass
65-4- CEHF -XXX	2.5	0.025	5	G1B (R¾)	190	16/25	60	Brass
65-4- CGJG -XXX	3.5	0.035	7	G1¼B (R1)	260	16/25	50	Brass
65-4- CHJG -XXX	6	0.06	12	G1¼B (R1)	260	16/25	25	Brass
65-4- CHLB -XXX	6	0.06	12	DN25	260	16/25	25	Stainless steel
65-4- CHJH -XXX	6	0.06	12	G1¼B(R1¼)	260	16/25	25	Brass
65-4- CJJJ -XXX	10	0.1	20	G2B (R1½)	300	16/25	15	Brass
65-4- CJLD -XXX	10	0.1	20	DN40	300	16/25	15	Stainless steel
65-4- CKCE -XXX	15	0.15	30	DN50	270	16/25	10	Stainless steel
65-4- CLCG -XXX	25	0.25	50	DN65	300	16/25	6	Stainless steel
65-4- CMCH -XXX	40	0.4	80	DN80	300	16/25	5	Stainless steel
65-4- FACL -XXX	60	0.6	120	DN100	360	25	2.5	Stainless steel
65-4- FBCL -XXX	100	1	200	DN100	360	25	1.5	Stainless steel
65-4- FBCM -XXX	100	1	200	DN125	350	25	1.5	Stainless steel

\* XXX code pertaining to final assembly, approvals, etc. is determined by Kamstrup A/S.  
Some variants may not be available in national approvals.

ULTRAFLOW® 44 flow sensors with q<sub>p</sub> 1.5 and 2.5 m<sup>3</sup>/h are by default delivered with 2.5 m cable, but can also be delivered with 10 m cable.

ULTRAFLOW® 44 flow sensors with q<sub>p</sub> 3.5...100 m<sup>3</sup>/h are exclusively delivered with 10 m cable.

### Pulse Transmitter/Pulse Divider – type no. 6699-903/6699-907

Pulse Transmitter/Pulse Divider is delivered with built-in supply for ULTRAFLOW® 44. Battery, 24 VAC and 230 VAC supply are available. Please state the required supply type when ordering.

### Cable Extender Box – type no. 6699-036

If ULTRAFLOW® must be connected to MULTICAL® 603 or MULTICAL® 803 with a cable length between 10 m and 30 m and galvanic separation is not necessary, a Cable Extender Box can be utilized. See document no. 5512-2008 [DK-GB-DE-RO] for further information.

Pulse Transmitter provides galvanic separation, but does not support extended info codes.

Cable Extender Box does not provide galvanic separation, but supports extended info codes.

For further information about Pulse Transmitter/Pulse Divider and Cable Extender Box, see the Technical description 5512-2599-GB, which can be downloaded from [www.kamstrup.com](http://www.kamstrup.com).

## Accessories

### Couplings including gaskets (PN16 and PN25)

Size	Nipple	Union	Type no. (1 pc.)	Type no. (2 pcs.)
DN15	R½	G¾	-	6561-323
DN20	R¾	G1	-	6561-324
DN25	R1	G1¼	6561-325	-
DN32	R1¼	G1½	6561-314	-
DN40	R1½	G2	6561-315	-

### Gaskets for couplings (PN16 and PN25)

Size (union)	Type no. (1 pc.)
G¾	2210-061
G1	2210-062
G1¼	2210-063
G1½	2210-064
G2	2210-065

### Gaskets for flanged meters (PN16 and PN25)

Size	Type no. (1 pc.)
DN25	2210-133
DN40	2210-132
DN50	2210-099
DN65	2210-141
DN80	2210-140

### Gaskets for flanged meters (PN25)

Size	Type no. (1 pc.)
DN100	1150-142
DN125	1150-153

For further information about ULTRAFLow® 44 DN15-125, see the Technical description 5512-2599-GB, which can be downloaded from [www.kamstrup.com](http://www.kamstrup.com).

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