

Data sheet

ULTRAFLOW® 44 DN15-125

- Ultrasonic flow sensor (q_p 1.5...100 m³/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 m³/h)
- Exceptionally accurate
- Large dynamic range
- Small pressure loss



MID 2014/32/EU

CE M20 0200

EN 1434

DK-BEK 1178 – 06/11/2014



EN 1434

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Application

ULTRAFLOW® 44 is a static flow sensor based on the ultrasonic measuring principle. It is used as a volume flow rate sensor primarily for thermal energy meters such as MULTICAL® 603 and MULTICAL® 803. ULTRAFLOW® 44 has been designed for use in cooling installations, with water as the thermal energy-conveying liquid, and can also be used for heat/cooling installations.

ULTRAFLOW® 44 is not suitable for use with other media than water and should therefore not be used with e.g. non-freezing additives like glycol.

Particular focus has been spent on condensation/water protection of ULTRAFLOW® 44 by gel-encapsulated transducers and by physical removal of the flow sensor's PCB from the meter housing. As the PCB itself is also water-proof encapsulated, it withstands even temporary submersion (up to 2 months).

ULTRAFLOW® 44 employs microprocessor technology and ultrasonic measuring techniques. All circuits for calculating and measuring are collected on a single board, providing compact and rational design in addition to an exceptionally high level of measuring accuracy and reliability.

The flow is measured using bidirectional ultrasonic technique based on the transit time method, with proven long-term stability and accuracy. Two ultrasonic transducers are used to send the sound signal both against and with the flow direction.

The ultrasonic signal travelling with the flow direction reaches the opposite transducer first. The time difference between the two signals can be converted to a flow velocity and thus a volume.

A three-wire signal cable is used to connect ULTRAFLOW® 44 to MULTICAL®. This cable is used to supply the flow sensor from the calculator and also to send the signal to the calculator. The signal corresponds to the flow or, more correctly, a number of pulses proportional to the water volume flowing through the meter is transmitted.

To achieve the easiest possible adjustment (e.g. during reverification), we recommend to order ULTRAFLOW® 44 together with MULTICAL® 603 or MULTICAL® 803 whereby the flow sensor and the calculator will be delivered with identical serial number. 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. The Pulse Transmitter has a galvanically separated pulse output 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.

Approvals

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 certificate acc. 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.

Standard

EN 1434:2015

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)

MID designation

– Mechanical environment	Class M1 and M2
– Electromagnetic environment	Class E1 and E2
– Ambient temperature	5...55 °C, condensing and non-condensing, closed location (indoor installation)

Technical data

Mechanical data

Metrological class	2 or 3
Environmental class	Complies with EN 1434 class C
Ambient temperature	5...55 °C, condensing and non-condensing, closed location (indoor installation)
Protection class	
– Flow sensor	IP68
– Pulse Transmitter	IP67
– Cable Extender Box	IP65
Medium in flow sensor	Water (recommended water quality as in CEN TR 16911 and AGFW FW510)
Temperature* of medium	2...50 °C or 2...130 °C
Storage temperature (empty sensor)	-25...60 °C
Pressure stage	PN16, PS16 PN25, PS25

* If the temperature of the medium exceeds 90 °C, a flanged meter should be used.
At a medium temperature above 90 °C or at a medium temperature below the ambient temperature, calculator and Pulse Transmitter must not be mounted on the flow sensor. Instead wall mounting is recommended.

Electrical data

ULTRAFLOW® 44 and MULTICAL®

Supply voltage	3.6 VDC ± 0.1 VDC
Battery	3.65 VDC, D-Cell lithium
Replacement interval	Up to 16 years @ $t_{BAT} < 30$ °C
Power supply	230 VAC +15/-30 %, 50 Hz or 24 VAC ± 50 %, 50 Hz
Backup supply	Integral supercap eliminates operational disturbances due to short-term power cuts
Cable length	
– Flow sensor	Max 10 m
– Cable Extender Box	Depends on calculator. Max 30 m when connected to MULTICAL® 603 or 803 (does not provide galvanic separation, but supports extended info codes)
EMC data	Complies with EN 1434 class C

ULTRAFLOW® 44 and Pulse Transmitter

Supply voltage	3.6 VDC ± 0.1 VDC
Battery (Pulse Transmitter)	3.65 VDC, D-Cell lithium
Replacement interval	6 years @ $t_{BAT} < 30$ °C
Power supply (Pulse Transmitter)	230 VAC +15/-30 %, 50 Hz or 24 VAC ± 50 %, 50 Hz
Backup supply	Integral supercap eliminates operational disturbances due to short-term power cuts
Cable length	
– Flow sensor	Max 10 m
– Pulse Transmitter	Depends on calculator. Max 100 m when connected to MULTICAL® (Y=2)
EMC data	Complies with EN 1434 class C

Flow data

Nom. flow q_p [m ³ /h]	Meter factor * [pulses/l]	Dynamic range $q_p:q_i$	$q_s:q_p$	Flow@125 Hz ** [m ³ /h]	Min. cut off [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.

Materials

Wetted parts

ULTRAFLOW® 44, q_p 1.5 and 2.5 m³/h

Housing, thread	DZR brass (dezincification resistant brass), CW602N
Transducers	Stainless steel, W.no. 1.4404
O-ring	Ethylene-propylene (EPDM)
Reflectors	Thermoplastic, 30 % glass fibre-reinforced polyethersulfone (PESU 30 % GF) and stainless steel, similar to AISI 304
Measuring tube	Thermoplastic, Polyethersulfone (PESU)

ULTRAFLOW® 44, q_p 3.5 to 100 m³/h

Housing, thread	DZR brass (dezincification resistant brass), CW602N
Housing, flange	Stainless steel, W.no. 1.4308
Transducers	Stainless steel, W.no. 1.4404
O-ring	Ethylene-propylene (EPDM)
Reflectors	Thermoplastic, 30 % glass fibre-reinforced polyethersulfone (PESU 30 % GF) and stainless steel, similar to AISI 304 - (q_p 6.0 and 10 m ³ /h) Stainless steel, similar to AISI 304 or AISI 316 - (q_p 3.5, 15...100 m ³ /h)
Measuring tube	Thermoplastic, 30 % glass fibre-reinforced polyethersulfone (PESU 30 % GF)

Materials

Electronics housing

q_p 1.5...100 m³/h

PCB box

Thermoplastic, inside - polyolefin, outside - polyamide

q_p 1.5 and 2.5 m³/h

Base (flow sensor)

Thermoplastic, 30 % glass fibre-reinforced polyethersulfone (PESU 30 % GF)

Top cover (flow sensor)

Thermoplastic, 10 % glass fibre-reinforced polycarbonate (PC 10 % GF)

$q_p \geq 3.5$ m³/h

Base (flow sensor)

Thermoplastic, 10 % glass fibre-reinforced polycarbonate (PC 10 % GF)

Cover (flow sensor)

Thermoplastic, 10 % glass fibre-reinforced polycarbonate (PC 10 % GF)

Cables

Coaxial cable

Copper cable with silicon jacket and inner fluoropolymer insulation

Signal cable

Silicone cable (3 x 0.25 mm²)

Housing, Cable Extender Box

Base, cover

Thermoplastic, acrylonitrile butadiene styrene (ABS)

Type summary

Nom. flow q_p [m ³ /h]	Installation size		
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.

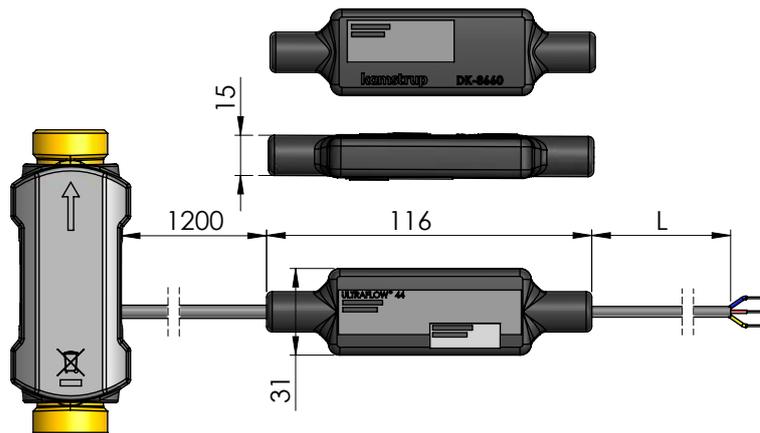
Flange facing type B, raised face according to EN 1092-1, PN25.

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.

ULTRAFLOW® 44 - PCB and cables

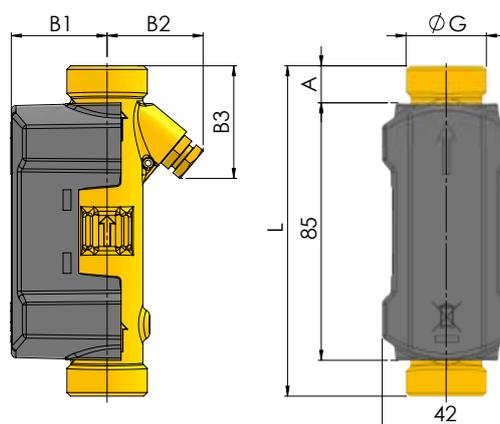
All measurements are in mm, unless otherwise stated.



Nom. flow	L [m]	Approx. weight* [kg]
qp 1.5 and 2.5 m ³ /h	2.5	0.18
qp 1.5-100 m ³ /h	10	0.36

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

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

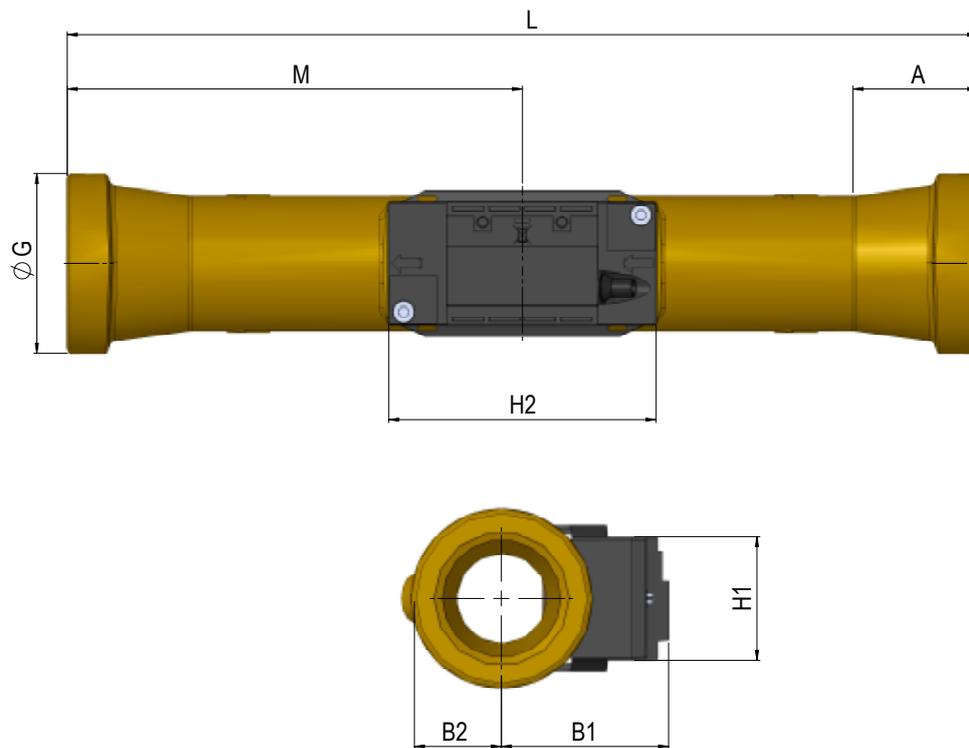


Thread EN ISO 228-1	L	A	B1	B2	B3	Approx weight * [kg]
G $\frac{3}{4}$ B (q _p 1.5)	110	12	35	32	38	0.6
G1B (q _p 1.5)	130	22	38	32	48	0.7
G1B (q _p 2.5)	190	52	38	38	78	0.9

* Including the electronics box and 2.5 m signal cable.

Dimensional sketches

ULTRAFLOW® 44, G1½B, G1½B and G2B

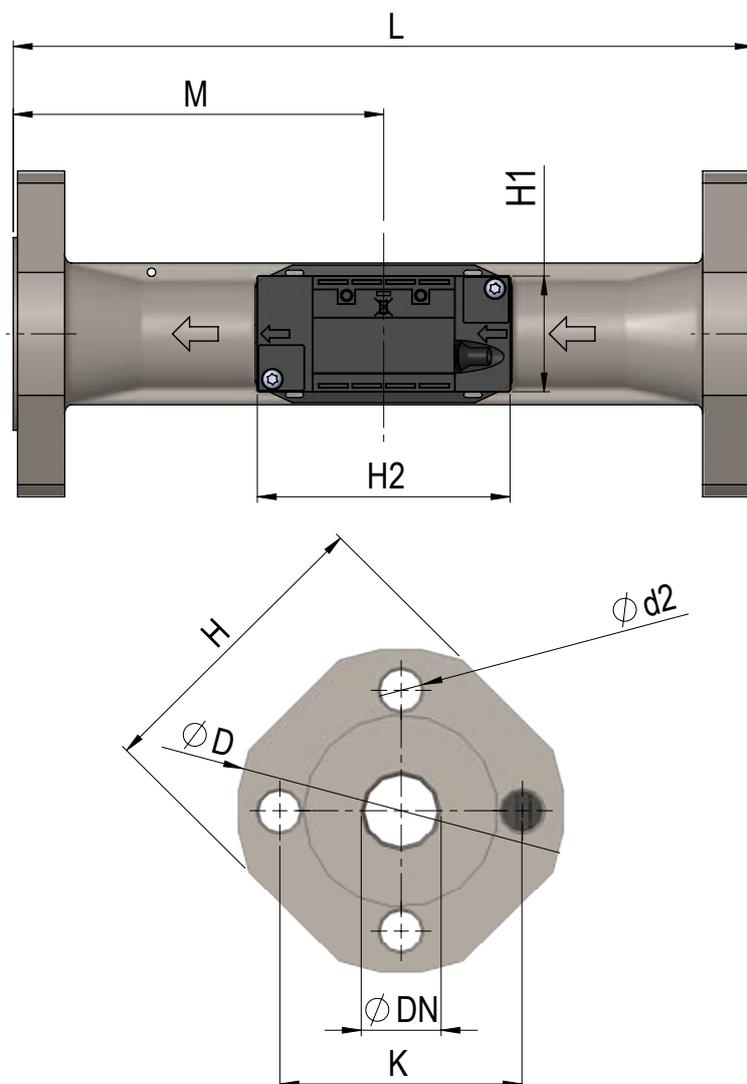


Thread EN ISO 228-1	L	M	H2	A	B1	B2	H1	Approx weight * [kg]
G1½B (q _p 3.5)	260	L/2	88	16	51	20	41	1.9
G1½ (q _p 6.0)	260	L/2	88	16	53	20	41	2.0
G1½ (q _p 6.0)	260	L/2	88	31	60	24	41	2.0
G2B (q _p 10)	300	L/2	88	40.2	55	29	41	2.9

* Including the electronics box and 10 m signal cable.

Dimensional sketches

ULTRAFLOW® 44, DN25, DN40 and DN50



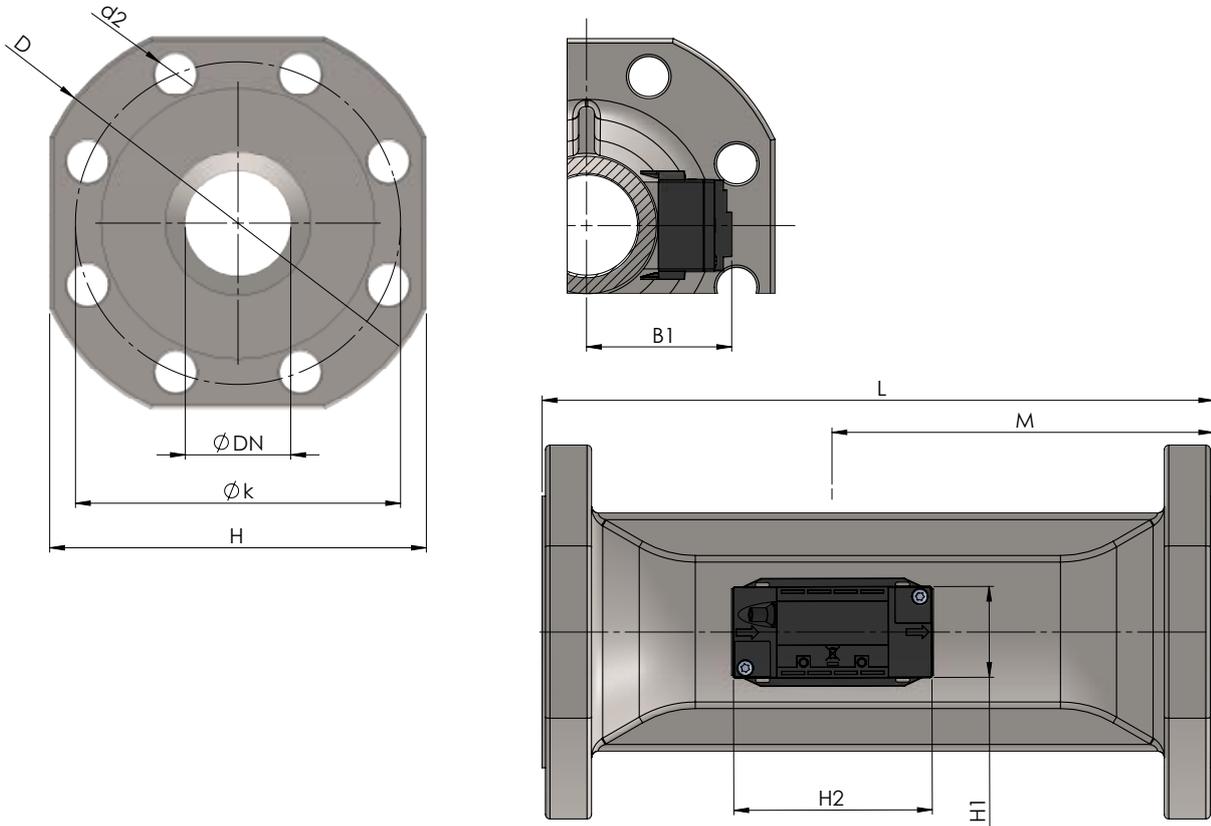
Flange facing type B, raised face according to EN 1092-1, PN25

Nom. diameter	L	M	H2	D	H	k	H1	Bolts			Approx weight * [kg]
								No.	Thread	d ₂	
DN25 (q _p 6.0)	260	L/2	88	115	106	85	41	4	M12	14	4.5
DN40 (q _p 10)	300	L/2	88	150	140	110	41	4	M16	18	7.4
DN50 (q _p 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



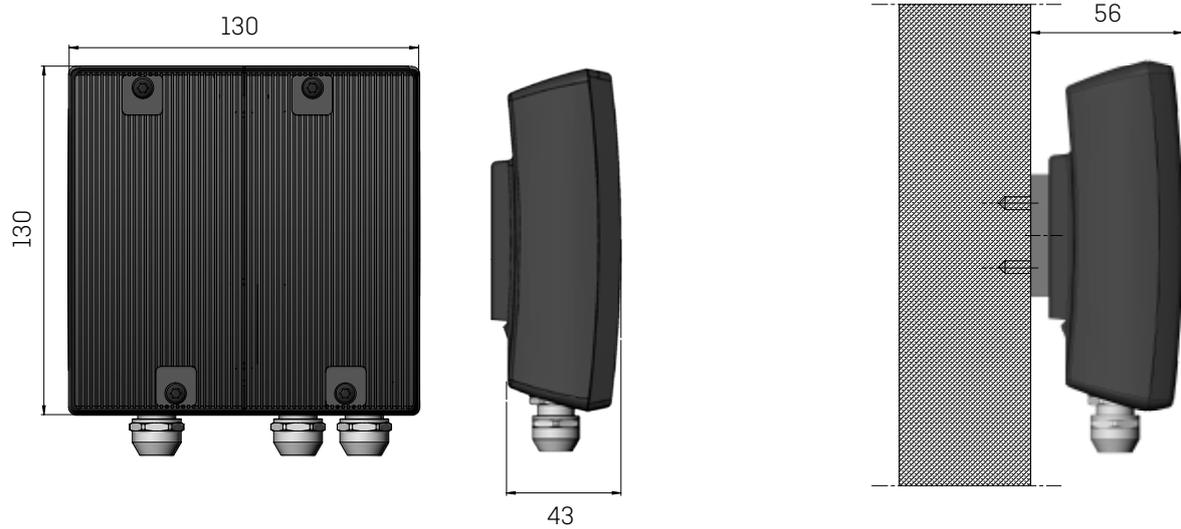
Flange facing type B, raised face according to EN 1092-1, PN25

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

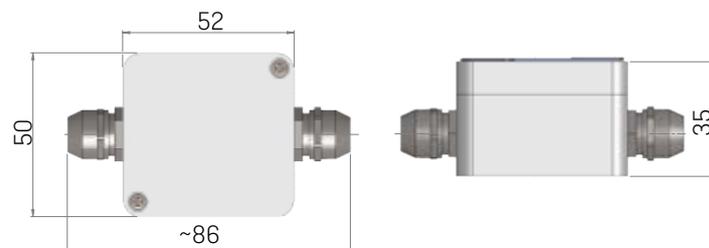
* Including the electronics box and 10 m signal cable.

Dimensional sketches

Pulse Transmitter



Cable Extender Box



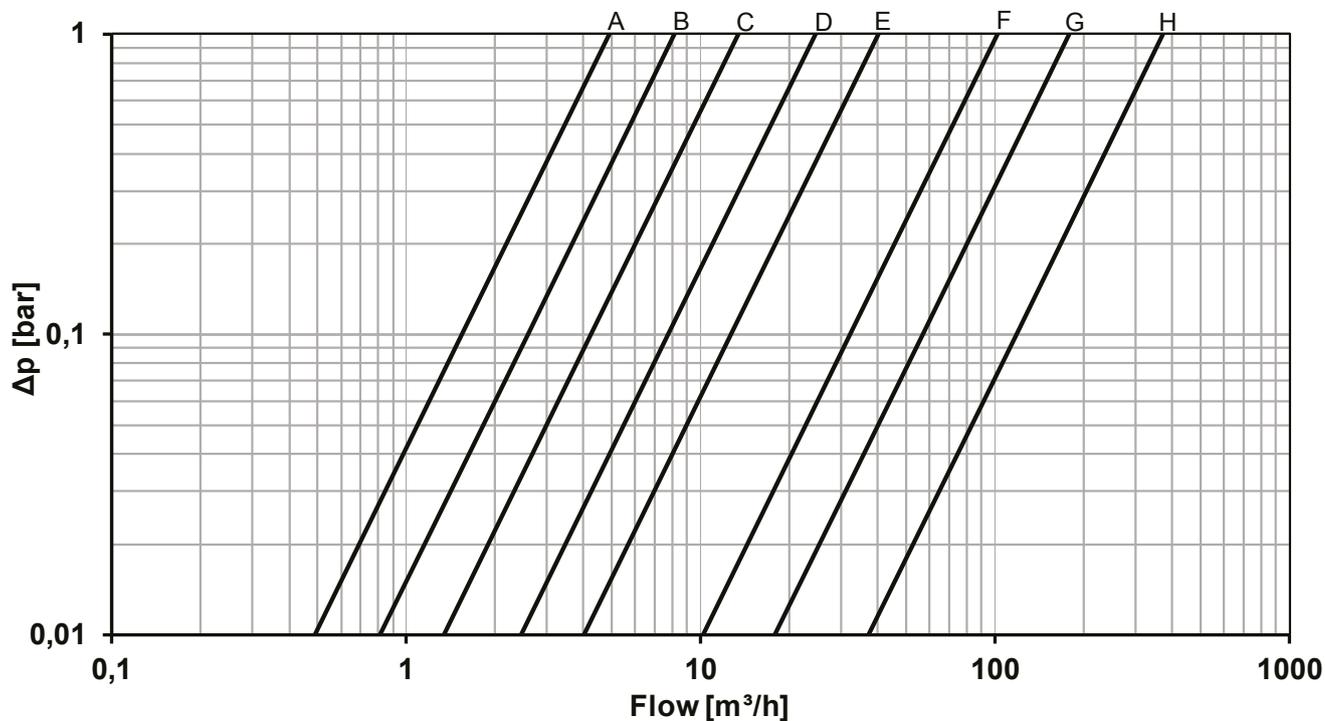
Note: To achieve the easiest possible adjustment (e.g. during reverification), we recommend to order ULTRAFLOW® 44 together with MULTICAL® 603 or MULTICAL® 803 whereby the flow sensor and the calculator will be delivered with identical serial number. Adjustment of separately delivered ULTRAFLOW® 44 requires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

Pressure loss

Graph	Nom. flow q_p [m ³ /h]	Nom. diameter [mm]	$\Delta p@q_p$ [bar]	k_v^*	$q@0.25 \text{ bar}$ [m ³ /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

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

Δp ULTRAFLOW® 44



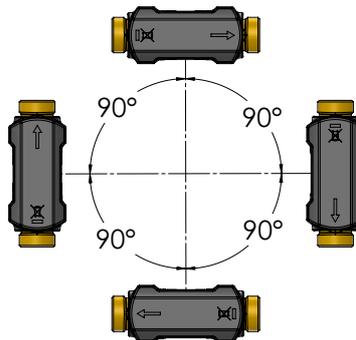
Installation

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.

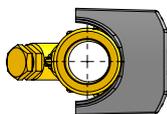
IMPORTANT!

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

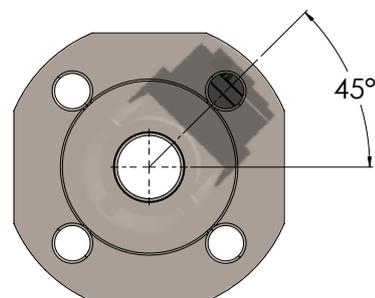
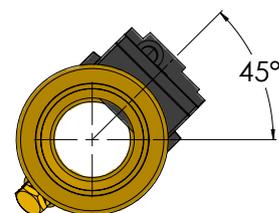


Recommendations for cooling and combined heat/cooling applications

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

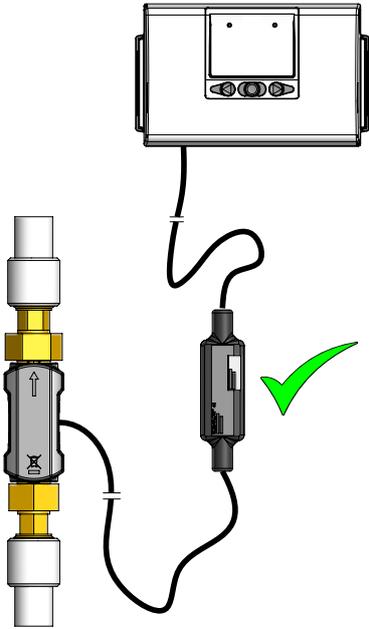


Recommendations for heat applications

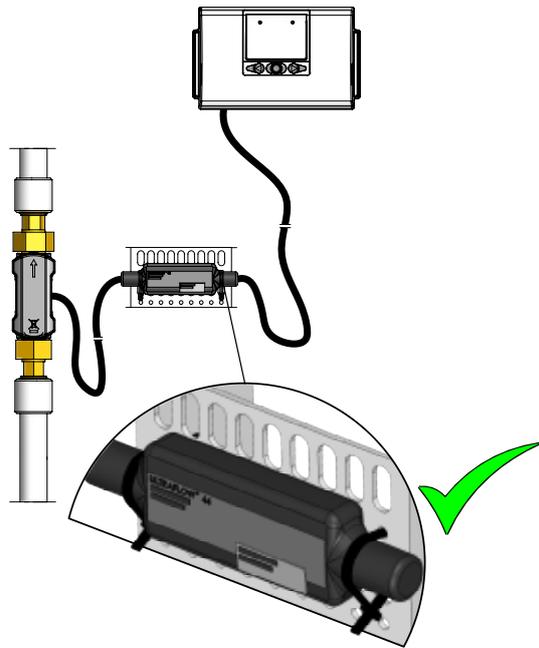
See the technical description for ULTRAFLOW® 44, doc. no. 5512-2599_GB.

Mounting of the ULTRAFLOW® 44 electronics box

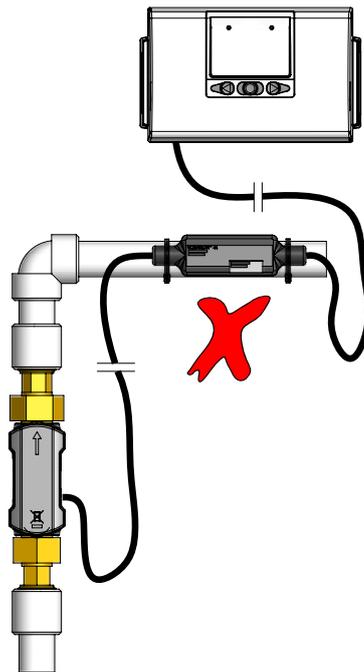
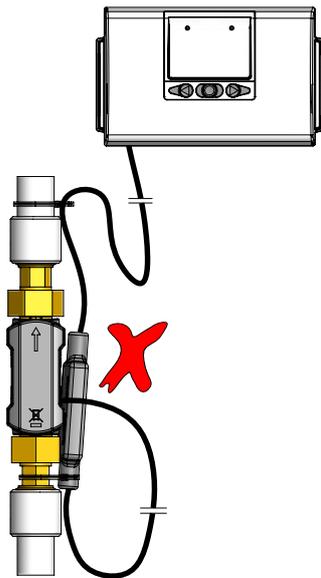
Freely hanging



Horizontally mounted with cable strips in humid environments



Must NOT be mounted on flow sensor or on pipes



Installation

Straight inlet

ULTRAFLOW® requires neither straight inlet nor outlet to meet the Measuring Instruments Directive (MID) 2014/32/EU, OIML R75:2002 and EN 1434:2015. A straight inlet section is only necessary in case of heavy flow disturbances before the meter. We recommend to follow the guidelines in CEN CR 13582.

Operating pressure

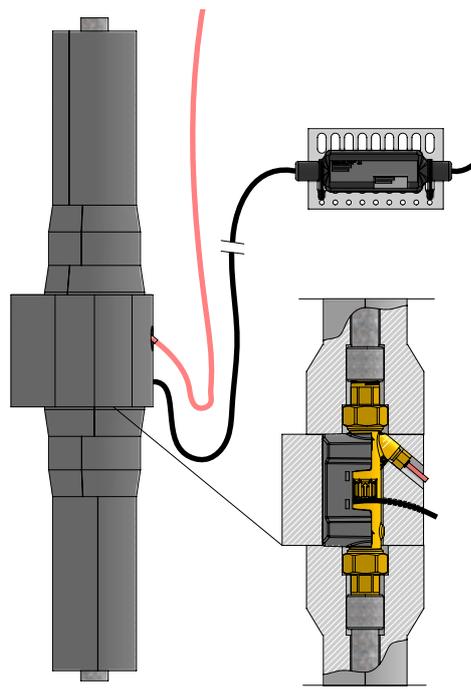
In order to prevent cavitation, the static pressure at the flow sensor outlet of ULTRAFLOW® 44 must be min. 1.5 bar (1.0 bar for ULTRAFLOW® 44 type 65-4-XXHX-XXX) at q_p and min. 2.5 bar (2.0 bar for ULTRAFLOW® 44 type 65-4-XXHX-XXX) at q_s . This applies to temperatures up to approx. 80 °C.

ULTRAFLOW® 44 must not be exposed to lower pressure than the ambient pressure (vacuum).

Insulation and water resistance

ULTRAFLOW® 44 can, dependent on the medium temperature, be permanently insulated or enclosed including the plastic casing on the meter housing. If ULTRAFLOW® 44 is insulated, the electronics (PCB) must remain uninsulated and be moved away from the meter housing. Furthermore, temperature sensors (mounted in the flow sensor) must also remain uninsulated.

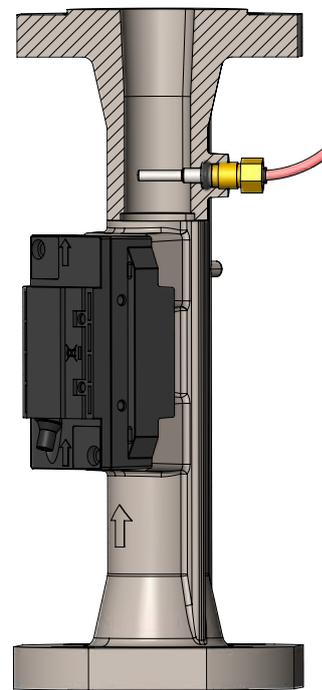
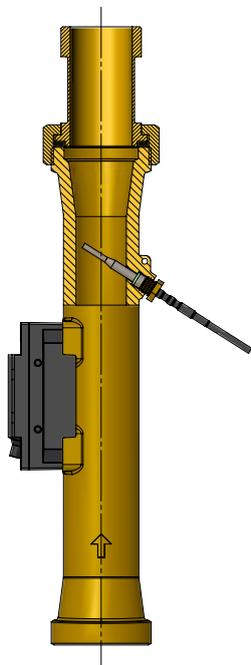
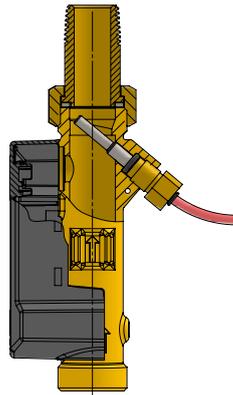
For further information about insulation of ULTRAFLOW® 44, see the technical description 5512-2599_GB, which can be downloaded from products.kamstrup.com.



ULTRAFLOW® 44 tolerates periodical submersion. This applies to the meter housing as well as the electronics (PCB) of ULTRAFLOW® 44. If ULTRAFLOW® 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 ULTRAFLOW® 44

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/Cable Extender Box

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

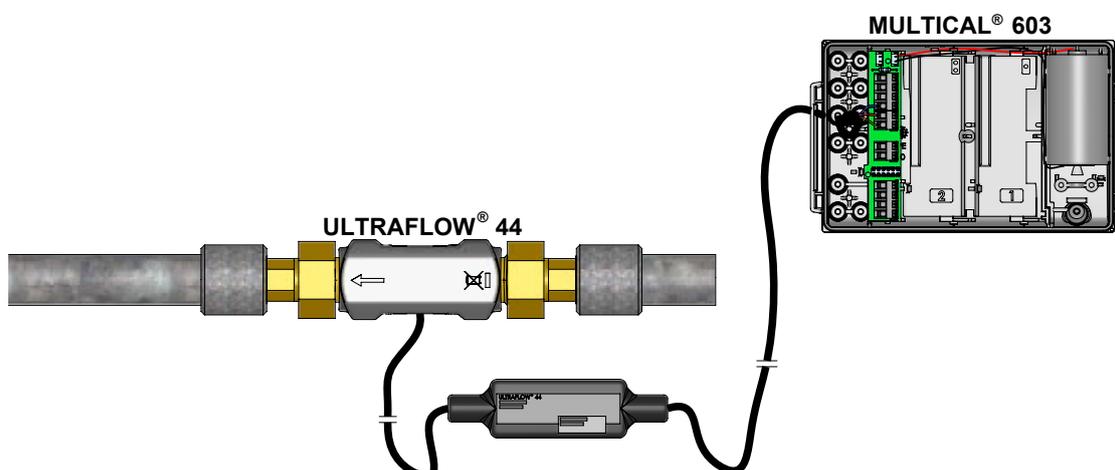
The Pulse Transmitter provides galvanic separation, but does not support extended info codes.

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

If long signal cables are used, 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 and Cable Extender Box, see the technical description 5512-2599_GB, which can be downloaded from products.kamstrup.com.

Example of connecting ULTRAFLOW® 44 and MULTICAL®



Order specification

Type number *	q _p [m ³ /h]	q _i [m ³ /h]	q _s [m ³ /h]	Connection	Length [mm]	PN [bar]	Meter factor [pulses/l]	Material
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	25	25	Stainless steel
65-4- CHJH -XXX	6	0.06	12	G1½B(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	25	15	Stainless steel
65-4- CKCE -XXX	15	0.15	30	DN50	270	25	10	Stainless steel
65-4- CLCG -XXX	25	0.25	50	DN65	300	25	6	Stainless steel
65-4- CMCH -XXX	40	0.4	80	DN80	300	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 included in national approvals.

ULTRAFLOW® 44 flow sensors with q_p 1.5 and 2.5 m³/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_p 3.5...100 m³/h are exclusively delivered with 10 m cable.

Pulse Transmitter – type no. 6699-903

The Pulse Transmitter is delivered with built-in supply for ULTRAFLOW® 44. Battery, 24 VAC and 230 VAC supply are available. 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.

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 (PN25)

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

ULTRAFLOW® 44 DN15-125

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