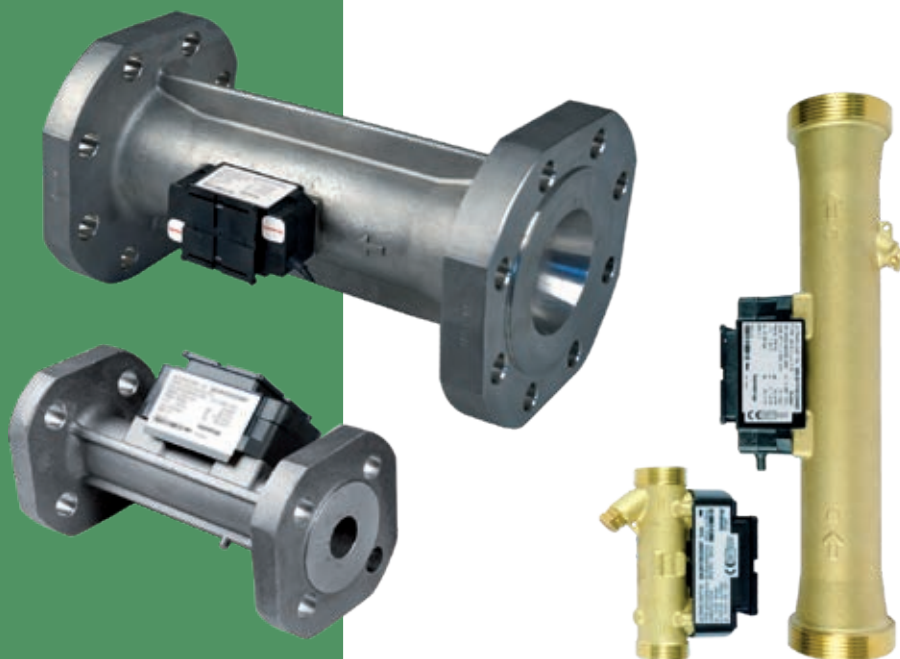


Data sheet

## ULTRAFLOW® 54 DN15-125

- Ultrasonic flow sensor
- For flow from 0.6 m<sup>3</sup>/h up to 100 m<sup>3</sup>/h
- Compact design
- Static meter with no moving parts
- Large dynamic range
- No wear
- Exceptionally accurate
- Longevity



MID 2014/32/EU

CE M19 0200

EN 1434

## Contents

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## Application

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ULTRAFLOW® 54 is a static flow sensor based on the ultrasonic measuring principle. The prime area of application is as a volume flow sensor for use with thermal heat meters such as MULTICAL®. ULTRAFLOW® 54 has been designed for use in heating installations where water is used as the heat-bearing medium.

ULTRAFLOW® 54 employs micro-processor 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 pulse cable is used to connect ULTRAFLOW® 54 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.

If ULTRAFLOW® 54 is used as a pulse generator for other equipment, it must be connected through a Pulse Transmitter. The Pulse Transmitter has a galvanically separated pulse outlet and a built-in supply for ULTRAFLOW® 54.

If the distance between MULTICAL® and ULTRAFLOW® 54 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® 54.

## Approvals

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### Type approval

ULTRAFLOW® 54 approved as a heat meter in accordance with MID-2014/32/EU.

EC-type examination certificates DK-0200-MI004-008, DK-0200-MI004-033

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



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

### Standard

EN 1434:2015

### CE-marking

ULTRAFLOW® 54 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 flow sensor type 65-5-XXHX-XXX only
- Electromagnetic environment Class E1 and E2
- Ambient temperature 5...55 °C, non-condensing closed location (indoor installation)

## Technical data

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### Mechanical data

Metrological class	2 or 3
Environmental class	Complies with EN 1434 class C
Ambient temperature	5...55 °C, non-condensing closed location (indoor installation)
Humidity	< 93 % RH, non-condensing
Protection class	
- Flow sensor	IP65
- Pulse Transmitter	IP67
- Cable Extender Box	IP65
Medium in flow sensor	Water – recommended water quality as in CEN TR 16911 and AGFW FW510
Medium temperature*	15...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 flange meter should be used. Additionally, the MULTICAL® calculator or the Pulse Transmitter should be wall-mounted.

## Technical data

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### Electrical data

Supply voltage	3.6 VDC ± 0.1 VDC
Battery (Pulse Transmitter)	3.65 VDC, D-cell lithium
Replacement interval	6 years @ $t_{BAT} < 30\text{ °C}$
Power supply (Pulse Transmitter)	230 VAC +15/-30 %, 50 Hz 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).
– Cable Extender Box	Depends on calculator. Max 30 m when connected to MULTICAL® (does not provide galvanic separation, but supports extended info codes).
EMC data	Complies with EN 1434 class C

### Flow data

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Nom. flow $q_p$ [m³/h]	Nom. diameter [mm]	Meter factor * [pulses/l]	Dynamic range $q_p:q_i$	$q_s:q_p$	Flow @125 Hz ** [m³/h]	$\Delta p@q_p$ [bar]	Min. cut-off [l/h]
0.6	DN15/DN20	300	100:1	2:1	1.5	0.03	2
1.5	DN15/DN20	100	100:1	2:1	4.5	0.09	3
2.5	DN20	60	100:1	2:1	7.5	0.09	5
2.5	DN20 (Flange)	60	100:1	2:1	7.5	0.03	5
3.5	DN25	50	100:1	2:1	9	0.07	7
6	DN25/DN32	25	100:1	2:1	18	0.06	12
6	DN25/DN32 (Flange)	25	100:1	2:1	18	0.20	12
10	DN40	15	100:1	2:1	30	0.06	20
15	DN50	10	100:1	2:1	45	0.14	30
25	DN65	6	100:1	2:1	75	0.06	50
40	DN80	5	100:1	2:1	90	0.05	80
60	DN100	2.5	100:1	2:1	180	0.03	120
100	DN100/DN125	1.5	100:1	2:1	300	0.07	200

\* The meter factor appears from the type label.

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

## Materials

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### Wetted parts

Housing, thread	DZR brass (Dezincification resistant brass), CW602N
Housing, flange	Stainless steel, W.no. 1.4308
Transducers	Stainless steel, W.no. 1.4401
Gaskets	EPDM
Reflectors	Thermoplastic, PES 30 % GF and stainless steel, W.no. 1.4301 /Stainless steel, W.no. 1.4301
Measuring pipe	Thermoplastic, PES (65-5-XXHX-XXX)/PES 30 % GF

### Electronic housing

#### 65-5-XXHX-XXX

Base	Thermoplastic, PES 30 % GF
Lid	Thermoplastic, PC 10 % GF

#### 65-5-XXCX-XXX and 65-5-XXJX-XXX

Base	Thermoplastic, PC 10 % GF
Lid	Thermoplastic, PC 20 % GF

### Connection cable

Silicone cable (3 x 0.25 mm<sup>2</sup>)

## Type summary

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Nom. flow $q_p$ [m <sup>3</sup> /h]	Installation dimensions			
0.6	G¾B x 110 mm	G1B x 130 mm		
1.5	G¾B x 110 mm	G¾B x 165 mm	G1B x 130 mm	G1B x 190 mm
2.5	G1B x 190 mm	DN20 x 190 mm		
3.5	G1¼B x 260 mm	DN25 x 260 mm		
6	G1¼B x 260 mm	G1½B x 260 mm	DN25 x 260 mm	DN32 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		

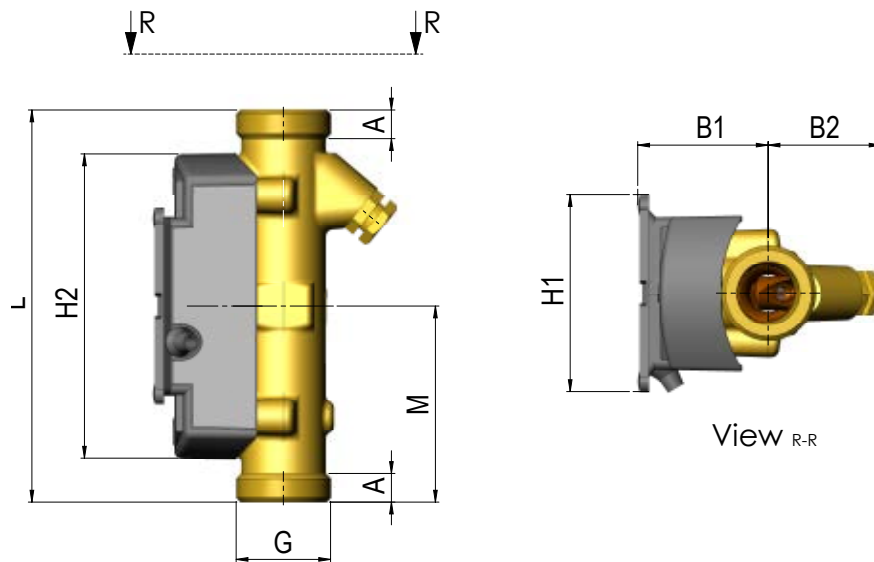
Thread EN ISO 228-1

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

## Dimensional sketches

### ULTRAFLOW® 54 (H), G¾B and G1B

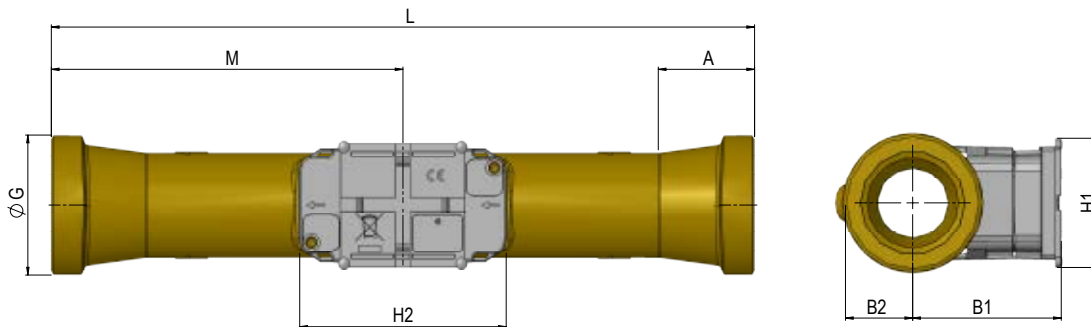
All measurements are in mm, unless otherwise stated.



Thread EN ISO 228-1	L	M	H2	A	B1	B2	H1	Approx. weight [kg]
G¾B (q <sub>p</sub> 0.6;1.5)	110	L/2	86	8	37	32	55	0.41
G1B (q <sub>p</sub> 0.6;1.5)	130	L/2	86	12	37	32	55	0.51
G¾B (q <sub>p</sub> 1.5)	165	L/2	86	8	37	32	55	0.51
G1B (q <sub>p</sub> 1.5)	190	L/2	86	12	37	32	55	0.61
G1B (q <sub>p</sub> 2.5)	190	L/2	86	12	40	35	55	0.67

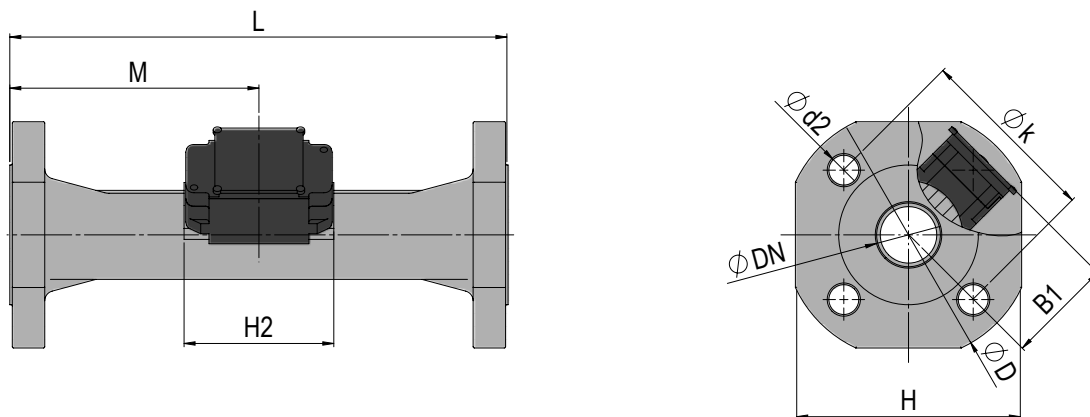
## Dimensional sketches

### ULTRAFLOW® 54 (J), G5/4B and G2B



Thread EN ISO 228-1	L	M	H2	A	B1	B2	H1	Approx. weight [kg]
G1½B (q <sub>p</sub> 3.5)	260	L/2	89	16	58	20	55	1.5
G1½B (q <sub>p</sub> 6.0)	260	L/2	89	16	60	20	55	1.6
G1½B	260	L/2	89	31	60	24	55	1.7
G2B	300	L/2	89	40,2	63	29	55	2.5

### ULTRAFLOW® 54, DN20 to DN50

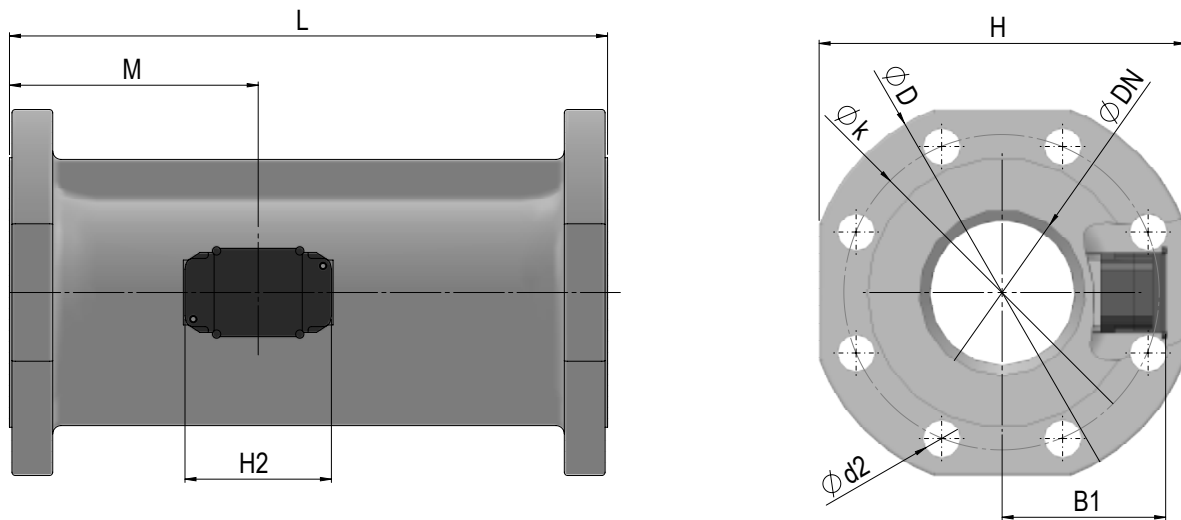


#### Flange facing type B, raised face according to EN 1092-1, PN25

Nom. diameter	L	M	H2	B1	D	H	k	Bolts			Approx. weight [kg]
								No.	Thread	d <sub>2</sub>	
DN20	190	L/2	89	58	105	95	75	4	M12	14	2.9
DN25	260	L/2	89	58	115	106	85	4	M12	14	5.0
DN32	260	L/2	89	<D/2	140	128	100	4	M16	18	5.2
DN40	300	L/2	89	<D/2	150	136	110	4	M16	18	8.3
DN50	270	155	89	<D/2	165	145	125	4	M16	18	10.1

## Dimensional sketches

### ULTRAFLOW® 54, DN65 to DN125



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

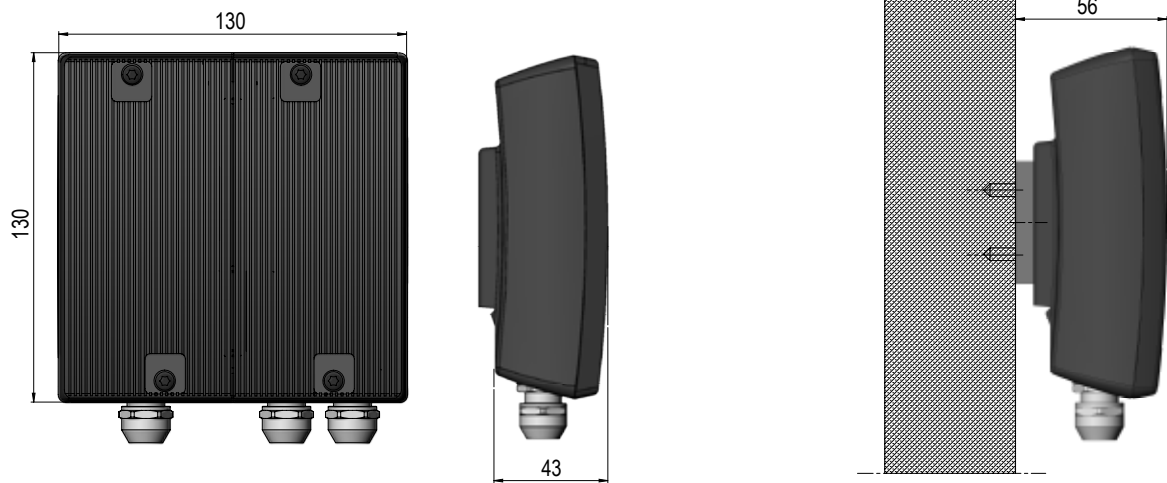
Nom. diameter	L	M	H2	B1	D	H	k	Bolts		Approx. weight [kg]	
								No.	Thread		
DN65	300	170	89	<H/2	185	168	145	8	M16	18	13.2
DN80	300	170	89	<H/2	200	184	160	8	M16	18	16.8
DN100	360	210	89	<H/2	235	220	190	8	M20	22	21.7
DN125	350	212	89	<H/2	270	260	220	8	M24	26	28.2



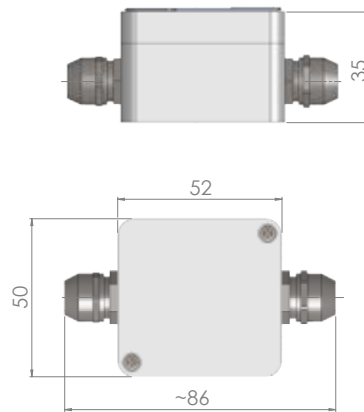
## Dimensional sketches

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### Pulse Transmitter



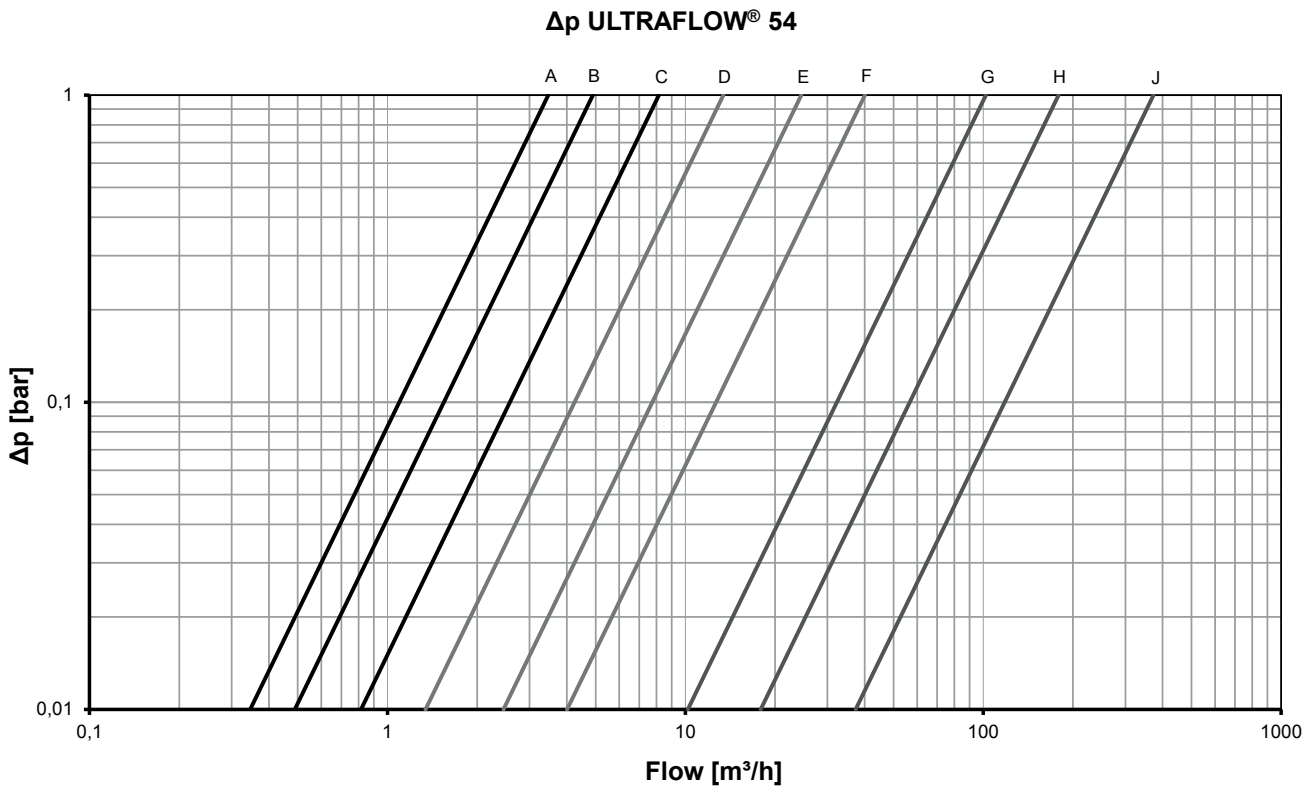
### Cable Extender Box



## Pressure loss

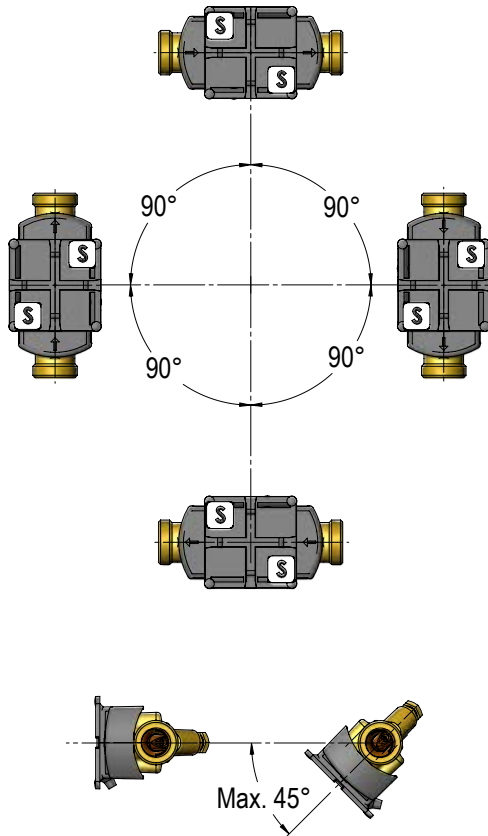
Graph	q <sub>p</sub> [m <sup>3</sup> /h]	Nom. diameter [mm]	Δp@q <sub>p</sub> [bar]	k <sub>v</sub> <sup>*</sup>	q@0.25 bar [m <sup>3</sup> /h]
A	0.6	DN15/DN20	0.03	3.5	1.7
B	1.5	DN15/DN20	0.09	4.9	2.4
C	2.5	DN20	0.09	8.2	4.1
D	2.5	DN20 (Flange)	0.03	13.4	6.8
D	3.5	DN25	0.07	13.4	6.8
D	6	DN25/DN32 (Flange)	0.20	13.4	6.8
E	6	DN25/DN32	0.06	24.5	12.3
F	10	DN40	0.06	40.8	20
F	15	DN50	0.14	40.1	20
G	25	DN65	0.06	102	51
H	40	DN80	0.05	179	90
J	60	DN100	0.03	373	187
J	100	DN100/DN125	0.07	373	187

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



## Installation

### Installation angle for ULTRAFLOW® 54



ULTRAFLOW® 54 may be installed horizontally, vertically or at an angle.

#### **IMPORTANT!**

With ULTRAFLOW® 54, the electronics/plastic case must be placed to the side (with horizontal installation).

The flow sensor type 65-5-XXHX-XXX may be turned up to 45° downwards in relation to the pipe axis as shown, if required.

The flow sensor types 65-5-XXCX-XXX and 65-5-XXJX-XXX may also be turned 45° upwards.

### 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. Only in case of heavy flow disturbances before the meter, a straight inlet section will be necessary. We recommend following the guidelines in CEN CR 13582.

### Working pressure

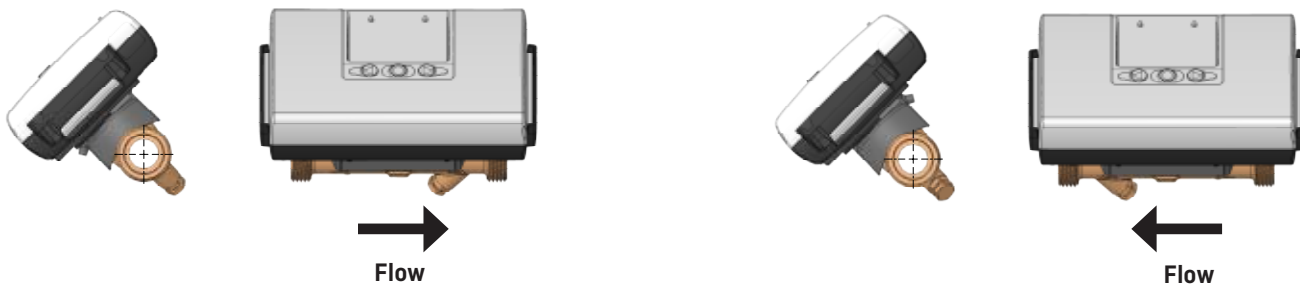
In order to prevent cavitation, the pressure at the flow sensor outlet at ULTRAFLOW® 54 must be min. 1.5 bar (1.0 bar for type 65-5-XXHX-XXX) at  $q_p$  and min. 2.5 bar (2.0 bar for type 65-5-XXHX-XXX) at  $q_s$ . This applies to temperatures up to approx. 80 °C.

ULTRAFLOW® 54 must not be exposed to lower pressure than the ambient pressure (vacuum).

## Examples of installation

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Threaded meter with MULTICAL® fitted directly on ULTRAFLOW® 54.



Flanged meter with MULTICAL® fitted directly on ULTRAFLOW® 54.

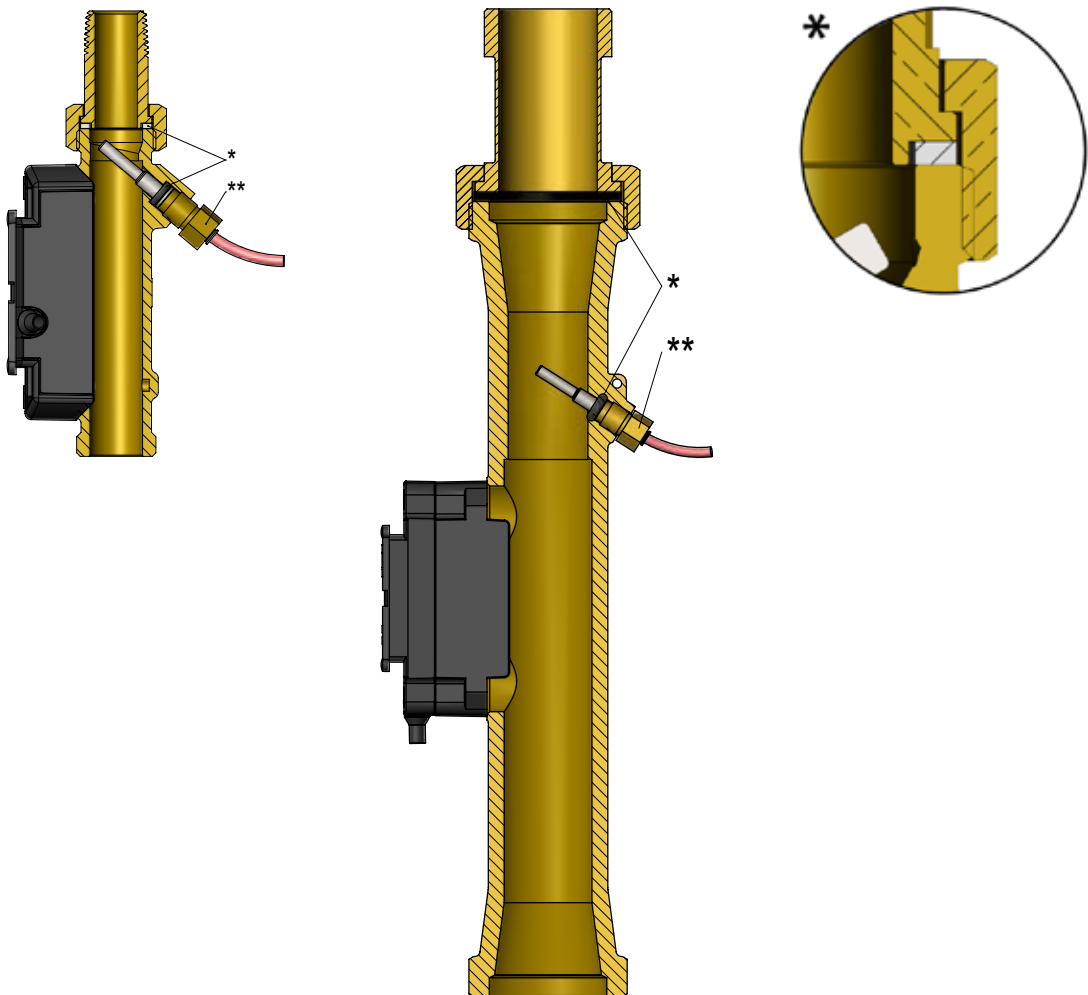


**Note:** At a medium temperature above 90 °C, calculator and Pulse Transmitter must not be mounted on the flow sensor. Instead wall mounting is recommended.

## Coupling and short direct sensor fitted in ULTRAFLOW® 54

A temperature sensor can be directly mounted in the outlet of all flow sensors with threaded meter housings ( $q_p$  0.6...10 m<sup>3</sup>/h).

- \* Gasket
- \*\* Torque approx. 4 Nm



## Electrical connection

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### Connecting MULTICAL® & ULTRAFLOW® 54

ULTRAFLOW® 54	->	MULTICAL®
Blue (GND)	->	11
Red (supply)	->	9
Yellow (signal)	->	10

### Connecting via Pulse Transmitter/Cable Extender Box

ULTRAFLOW® 54	->	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.

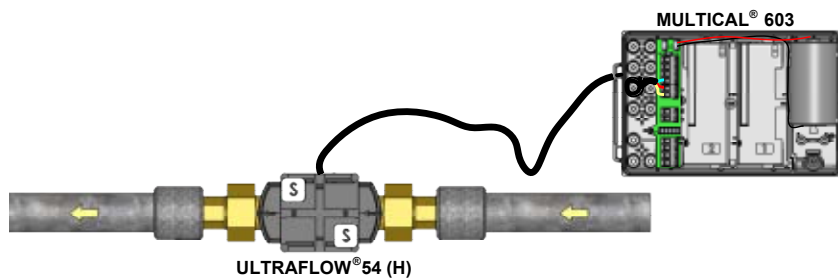
If long signal cables are used, please consider the installation carefully. There must be **at least 25 cm** between the signal cable and all other cables due to EMC.

For further information about Pulse Transmitter and Cable Extender Box, please see the technical descriptions 5512-1554 or 5512-385 that can be found on [products.kamstrup.com](http://products.kamstrup.com).

### Example of connecting ULTRAFLOW® 54 and MULTICAL®

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#### ULTRAFLOW® 54 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 [pulses/l]	Material housing
65-5- CAHA -XXX	0.6	0.006	1,2	G¾B (R¾)	110	16/25	300	Brass
65-5- CAHD -XXX	0.6	0.006	1,2	G1B (R¾)	130	16/25	300	Brass
65-5- CDHA -XXX	1.5	0.015	3	G¾B (R¾)	110	16/25	100	Brass
65-5- CDHC -XXX	1.5	0.015	3	G¾B (R¾)	165	16/25	100	Brass
65-5- CDHD -XXX	1.5	0.015	3	G1B (R¾)	130	16/25	100	Brass
65-5- CDHF -XXX	1.5	0.015	3	G1B (R¾)	190	16/25	100	Brass
65-5- CEHF -XXX	2.5	0.025	5	G1B (R¾)	190	16/25	60	Brass
65-5- CECA -XXX	2.5	0.025	5	DN20	190	25	60	Stainless steel
65-5- CGJG -XXX	3.5	0.035	7	G1½B (R1)	260	16/25	50	Brass
65-5- CGCB -XXX	3.5	0.035	7	DN25	260	25	50	Stainless steel
65-5- CHJG -XXX	6	0.06	12	G1½B (R1)	260	16/25	25	Brass
65-5- CHJH -XXX	6	0.06	12	G1½B (R1¼)	260	16/25	25	Brass
65-5- CHCB -XXX	6	0.06	12	DN25	260	25	25	Stainless steel
65-5- CHCC -XXX	6	0.06	12	DN32	260	25	25	Stainless steel
65-5- CJJJ -XXX	10	0.1	20	G2B (R1½)	300	16/25	15	Brass
65-5- CJCD -XXX	10	0.1	20	DN40	300	25	15	Stainless steel
65-5- CKCE -XXX	15	0.15	30	DN50	270	25	10	Stainless steel
65-5- CLCG -XXX	25	0.25	50	DN65	300	25	6	Stainless steel
65-5- CMCH -XXX	40	0.4	80	DN80	300	25	5	Stainless steel
65-5- FACL -XXX	60	0.6	120	DN100	360	25	2.5	Stainless steel
65-5- FBCL -XXX	100	1	200	DN100	360	25	1.5	Stainless steel
65-5- FBCM -XXX	100	1	200	DN125	350	25	1.5	Stainless steel

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

By default, ULTRAFLOW® 54 is delivered with 2.5 m cable, but can also be delivered with 5 or 10 m cable.

### Pulse Transmitter – type no. 6699-903

The Pulse Transmitter is delivered with built-in supply for ULTRAFLOW® 54. 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® 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

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### 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)
DN20	2210-147
DN25	2210-133
DN32	2210-217
DN40	2210-132
DN50	2210-099
DN65	2210-141
DN80	2210-140
DN100	1150-142
DN125	1150-153

For further information about ULTRAFLOW® 54 DN15-125, please see the technical descriptions 5512-1554 and 5512-385 that can be found on [products.kamstrup.com](http://products.kamstrup.com).

#### Kamstrup A/S

Industrivej 28, Stilling  
 DK-8660 Skanderborg  
 T: +45 89 93 10 00  
 F: +45 89 93 10 01  
[info@kamstrup.com](mailto:info@kamstrup.com)  
[kamstrup.com](http://kamstrup.com)