

Data sheet

ULTRAFLOW® 34 DN15-125

- Ultrasonic flow sensor
- For flow from 1.5 m³/h up to 100 m³/h
- Compact design
- Static meter with no moving parts
- Large dynamic range
- No wear
- Exceptionally accurate
- Longevity



MID 2014/32/EU



EN 1434

DK-BEK 1178 – 06/11/2014



EN 1434

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Application

ULTRAFLOW® 34 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 energy meters such as MULTICAL®. ULTRAFLOW® 34 has been designed for use in cooling and heat/cooling installations where water is used as the heat-bearing medium.

ULTRAFLOW® 34 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® 34 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® 34 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 required a Pulse Transmitter can be used to supply ULTRAFLOW® 34, e.g. if the distance between MULTICAL® and ULTRAFLOW® 34 is 10 m or more. If ULTRAFLOW® 34 is used as pulse generator for other equipment, it must be connected through a Pulse Transmitter.

The Pulse Transmitter and the Pulse Divider have a built-in supply and a galvanically separated pulse output.

Approvals

Type approval

ULTRAFLOW® 34 is approved as a heat meter in accordance with MID-2014/32/EU:

EC-Type Examination certificate	DK-0200-MI004-008
MID-certificate acc. to module D	DK-0200-MID-D-001



ULTRAFLOW® 34 is approved as a cooling meter in accordance with DK-BEK 1178 – 06/11/2014:

System description	TS 27.02 002
Verification	DANAK accreditation 268



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

Standard

EN 1434:2007

CE-marking

ULTRAFLOW® 34 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
– Electromagnetic environment	Class E1 and E2
– Ambient temperature	5...55 °C, 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, closed location (indoor installation)
Protection class	
– Flow sensor	IP67
– Pulse Transmitter	IP67
Medium in flow sensor	Water (recommended water quality as in CEN TR 16911 and AGFW FW510)
Temperature* of medium	2...130 °C or 2...50 °C
Storage temperature (empty sensor)	-25...60 °C
Pressure stage	PN16, PS16 PN25, PS25 flange

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

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
Back-up supply	Integral super-cap eliminates operational disturbances due to short-term power-cuts
Cable length	
– Flow sensor	Max. 10 m
– Pulse Transmitter	Depends on calculator. For MULTICAL® max. 100 m (Y=2)
EMC data	Complies with EN 1434 class C

Flow data

Nom. flow q_p [m³/h]	Nom. diameter [mm]	Meter factor * [imp./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]
1.5	DN15 & DN20	100	100:1	2:1	4.5	0.22	3
2.5	DN20	60	100:1	2:1	7.5	0.03	5
3.5	DN25	50	100:1	2:1	9	0.07	7
6	DN25	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 can be seen on the ULTRAFLLOW® label.

** Saturation flow. Max. pulse frequency 128 Hz is maintained at higher flow rates.

Materials

Wetted parts

ULTRAFLW® 34, q_p 1.5 m³/h

Housing, thread	DZR brass (Dezincification resistant brass), CW602N
Transducers	Stainless steel, W.no. 1.4401
Gaskets	EPDM
Reflectors	Thermoplastic, PES 30 % GF and stainless steel, W.no. 1.4301
Measuring pipe	Thermoplastic, PES 30 % GF

ULTRAFLW® 34, q_p 2.5 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. 1.4401
Gaskets	EPDM
Reflectors	Stainless steel, W.no. 1.4301
Measuring pipe	Thermoplastic, PES 30 % GF

Electronic housing

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

Connection cable	Silicone cable (3 x 0.5 mm ²)
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Type summary

Nom. flow q_p [m ³ /h]	Size		
1.5	G¾B x 110 mm	G1B x 130 mm	G1B x 190 mm
2.5	G1B x 190 mm		
3.5	G5/4B x 260 mm		
6	G5/4B 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	

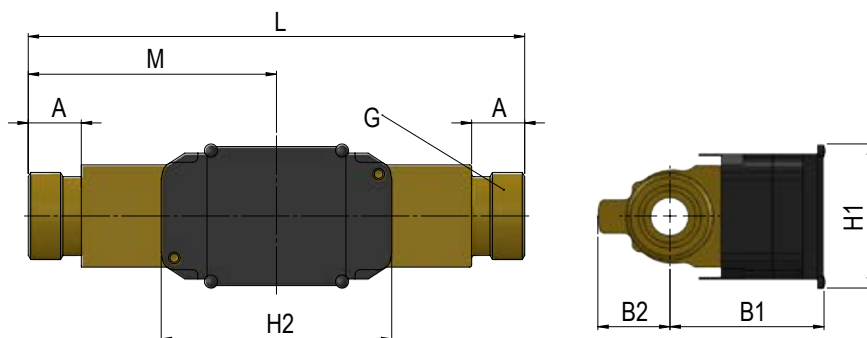
Thread EN ISO 228-1.

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

Dimensional sketches

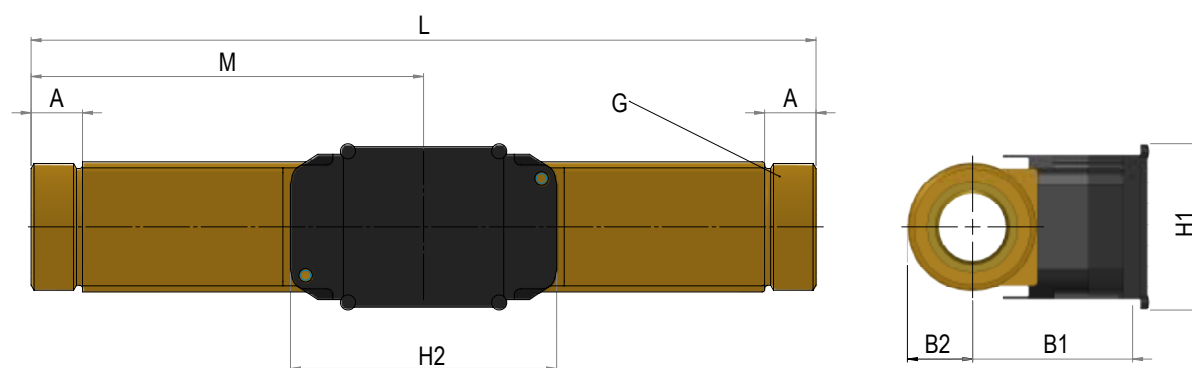
ULTRAFLOW® 34, G $\frac{3}{4}$ B and G1B

All measurements are in mm, unless otherwise stated.



Thread EN ISO 228-1	L	M	H2	A	B1	B2	H1	App. weight [kg]
G $\frac{3}{4}$ B	110	L/2	89	10.5	58	35	55	0.8
G1B	130	L/2	89	20.5	58	35	55	0.9
G1B (q _p 1.5)	190	L/2	89	20.5	58	36	55	1.4
G1B (q _p 2.5)	190	L/2	89	20.5	58	36	55	1.3

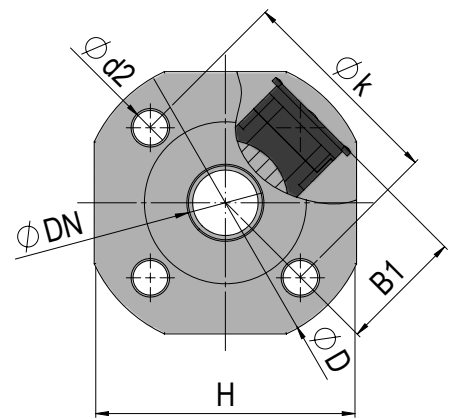
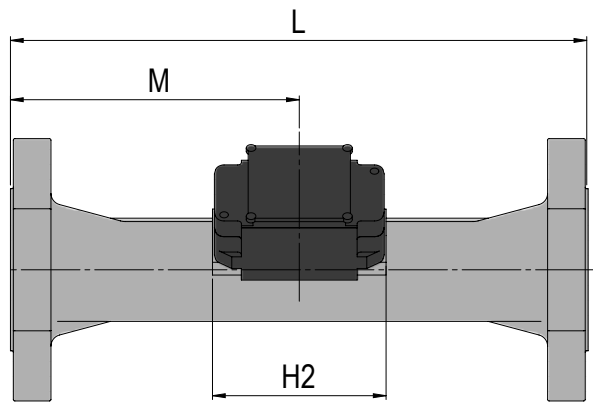
ULTRAFLOW® 34, G5/4B and G2B



Thread EN ISO 228-1	L	M	H2	A	B1	B2	H1	App. weight [kg]
G5/4B	260	L/2	89	17	58	22	55	2.3
G2B	300	L/2	89	21	65	31	55	4.5

Dimensional sketches

ULTRAFLOW® 34, DN25 to DN50

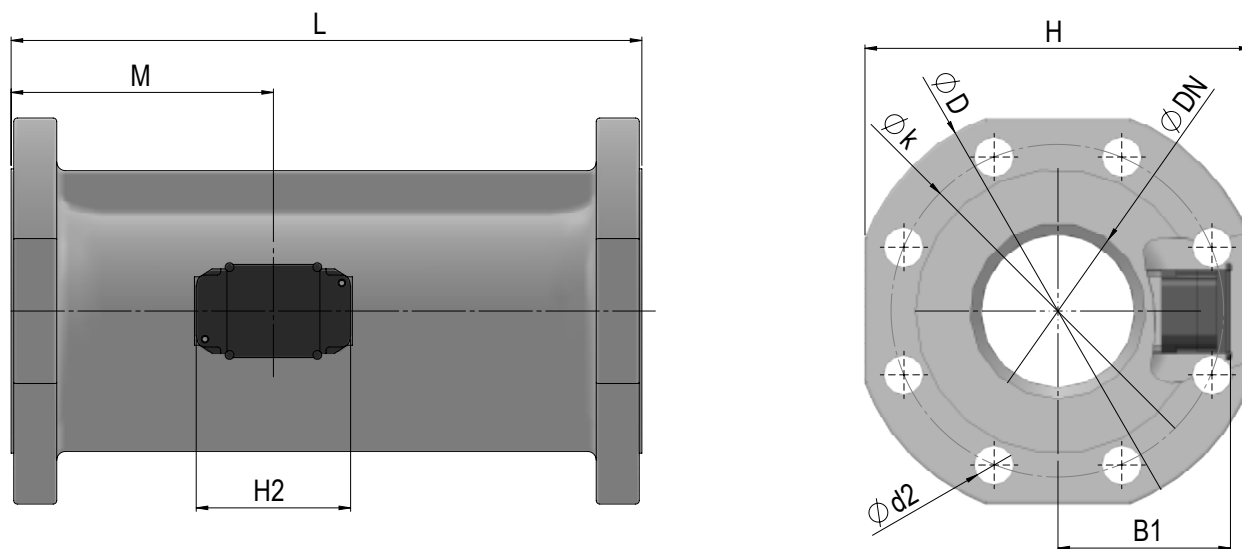


Flange EN 1092-1, PN25. Flange facing type B, raised face.

Nom. diameter	L	M	H2	B1	D	H	k	Bolts			App. weight [kg]
								No.	Thread	d ₂	
DN25	260	L/2	89	58	115	106	85	4	M12	14	5.0
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® 34, DN65 to DN125

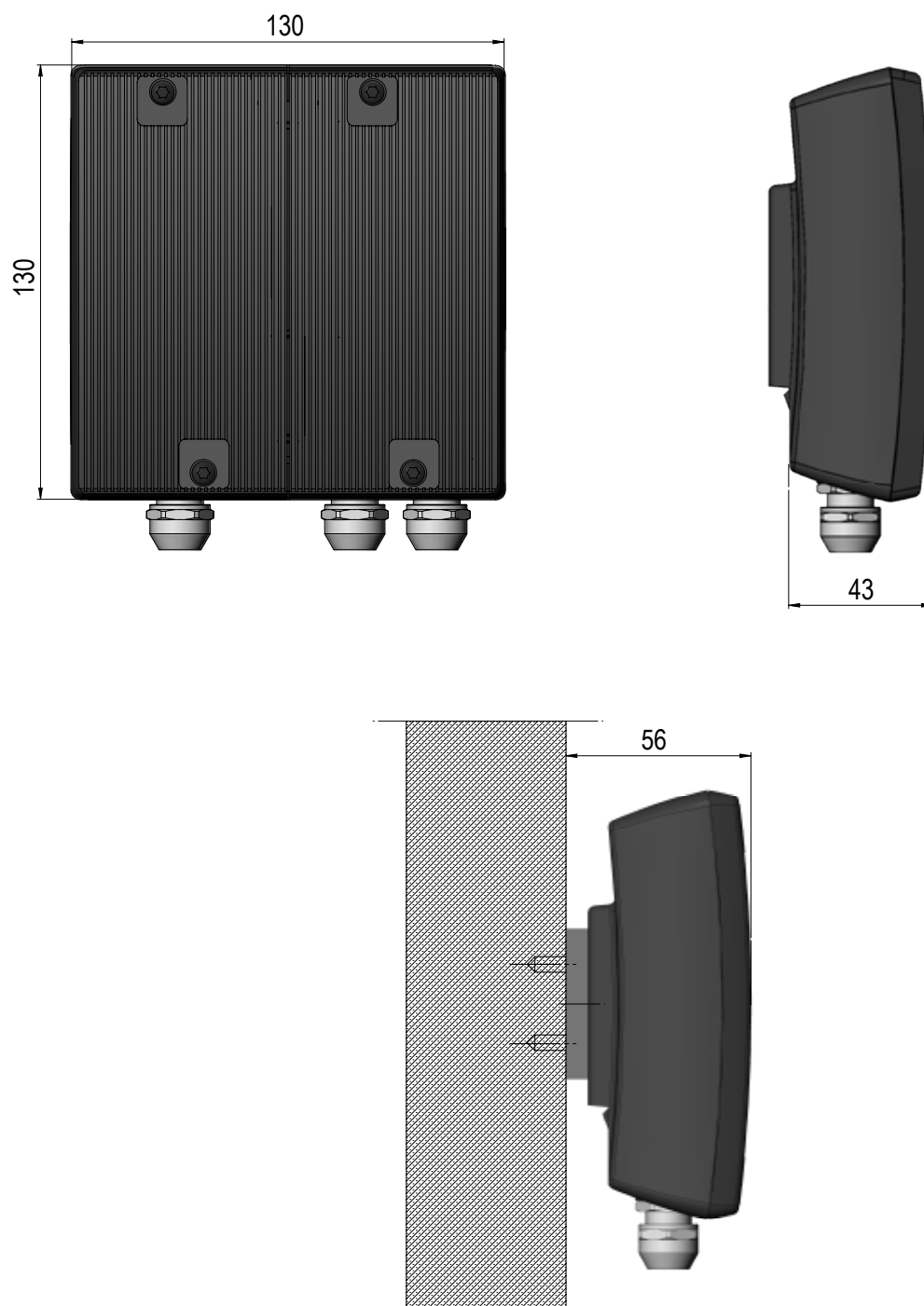


Flange EN 1092-1, PN25. Flange facing type B, raised face.

Nom. diameter	L	M	H2	B1	D	H	k	Bolts			App.weight [kg]
								No.	Thread	d ₂	
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

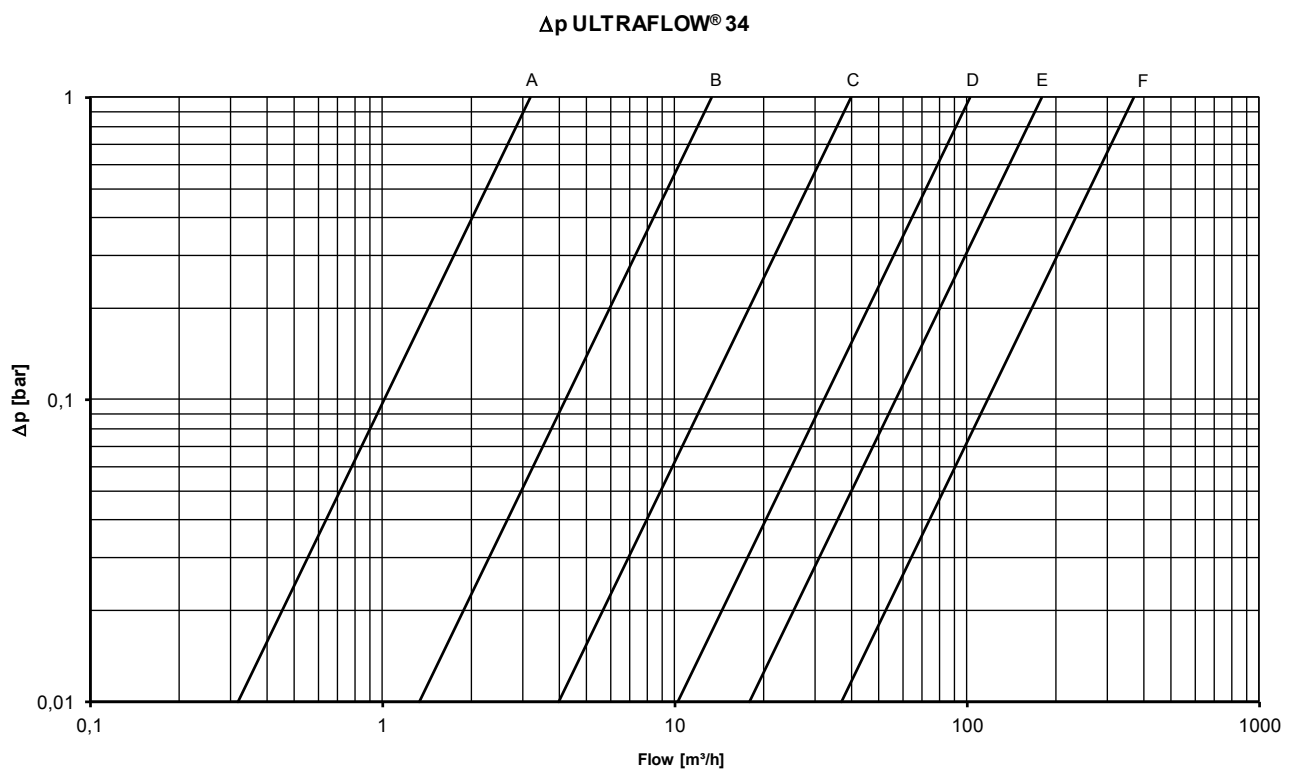
Pulse Transmitter



Pressure loss

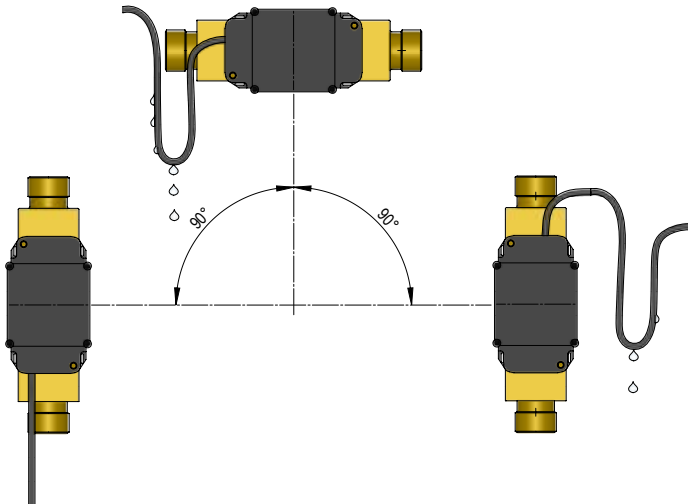
Graph	Nom. flow q_p [m ³ /h]	Nom. diameter [mm]	k_v^*	Q@0.25 bar [m ³ /h]
A	1.5	DN15 & DN20	3.2	1.6
B	2.5 & 3.5 & 6	DN20 & DN25	13.4	6.7
C	10 & 15	DN40 & DN50	40	20
D	25	DN65	102	51
E	40	DN80	179	90
F	60 & 100	DN100 & DN125	373	187

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



Installation

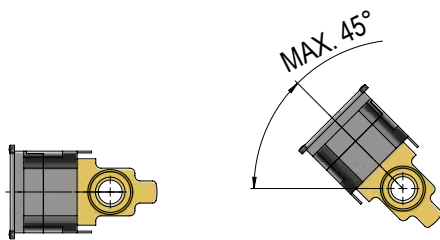
Installation angle for ULTRAFLOW® 34



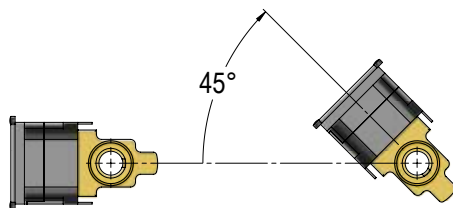
ULTRAFLOW® 34 may be installed horizontally, vertically or at an angle.

IMPORTANT!

For ULTRAFLOW® 34, the electronics/plastic case must be turned to the side (when installed horizontally).



ULTRAFLOW® 34 may be turned up to +45° around the pipe axis.



At risk of condensation, e.g. in cooling installations, or if ULTRAFLOW® 34 is installed in moist environments, ULTRAFLOW® 34 must be turned +45° around the pipe axis.

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 will a straight inlet section be necessary. We recommend to follow the guidelines in CEN CR 13582.

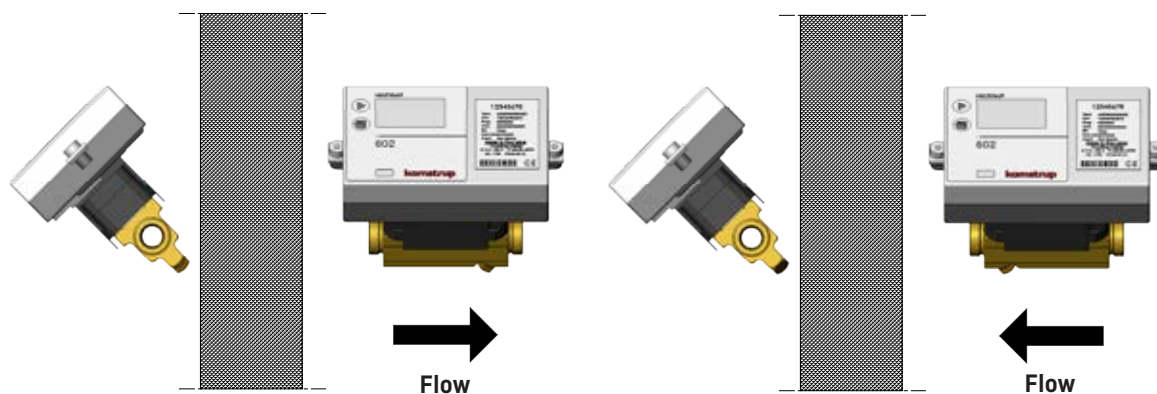
Working Pressure

In order to prevent cavitation, the back pressure at ULTRAFLOW® 34 (pressure at sensor outlet) must be min. 1.5 bar at q_p and min. 2.5 bar at q_s . This applies to temperatures up to approx. 80 °C.

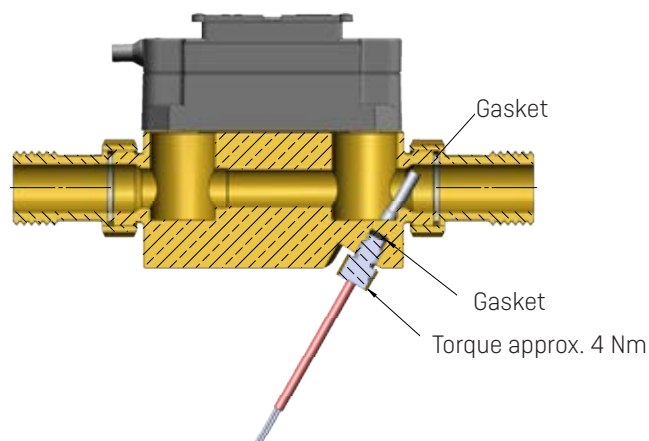
ULTRAFLOW® 34 must not be exposed to lower pressure than the ambient pressure (vacuum).

Examples of installation

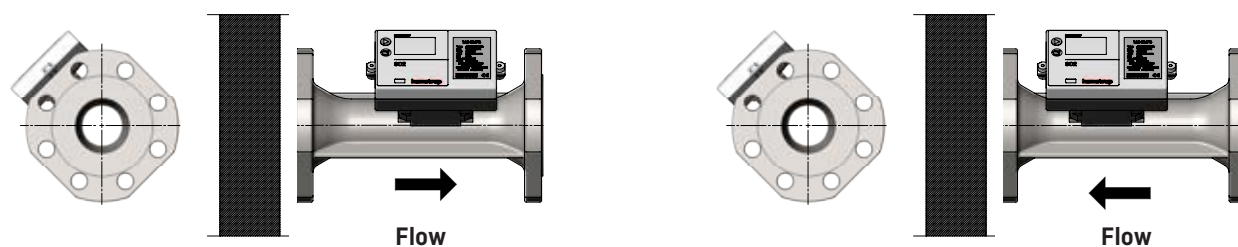
Threaded meter with MULTICAL® fitted directly on ULTRAFLW® 34.



Couplings and short direct sensor fitted in ULTRAFLW® 34 (G½B (R½) and G1B (R¼) only).



Flanged meter with MULTICAL® fitted directly on ULTRAFLW® 34.



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

Electrical connection

Connecting MULTICAL® & ULTRAFLOW® 34

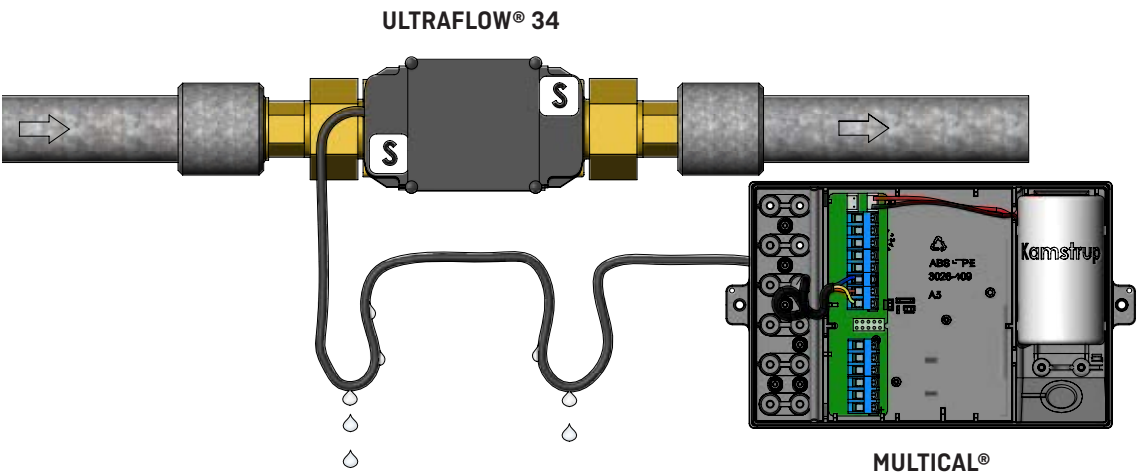
ULTRAFLOW® 34	->	MULTICAL®
Blue (GND)	->	11
Red (supply)	->	9
Yellow (signal)	->	10

Connecting via Pulse Transmitter

ULTRAFLOW® 34	->	Pulse Transmitter		->	MULTICAL®
		Input	Output		
Blue (GND)	->	11	11A	->	11
Red (supply)	->	9	9A	->	9
Yellow (signal)	->	10	10A	->	10

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, see the technical description 5512-385,
which can be downloaded via products.kamstrup.com.

Example of connecting ULTRAFLOW® 34 and MULTICAL®



Order specification

Type number *	q _p [m ³ /h]	q _i [m ³ /h]	q _s [m ³ /h]	Connection	Length [mm]	Meter factor [imp./l]	CCC ** (high res.)	Material
65-3- CDAA -XXX	1.5	0.015	3	G¾B (R½)	110	100	419 [407]	Brass
65-3- CDAD -XXX	1.5	0.015	3	G1B (R¾)	130	100	419 [407]	Brass
65-3- CDAF -XXX	1.5	0.015	3	G1B (R¾)	190	100	419 [407]	Brass
65-3- CEAF -XXX	2.5	0.025	5	G1B (R¾)	190	60	498 [-]	Brass
65-3- CGAG -XXX	3.5	0.035	7	G5/4B (R1)	260	50	451 [436]	Brass
65-3- CHAG -XXX	6	0.06	12	G5/4B (R1)	260	25	437 [438]	Brass
65-3- CHCB -XXX	6	0.06	12	DN25	260	25	437 [438]	Stainless steel
65-3- CJAJ -XXX	10	0.1	20	G2B (R1½)	300	15	478 [483]	Brass
65-3- CJCD -XXX	10	0.1	20	DN40	300	15	478 [483]	Stainless steel
65-3- CKCE -XXX	15	0.15	30	DN50	270	10	420 [485]	Stainless steel
65-3- CLCG -XXX	25	0.25	50	DN65	300	6	479 [-]	Stainless steel
65-3- CMCH -XXX	40	0.4	80	DN80	300	5	458 [486]	Stainless steel
65-3- FACL -XXX	60	0.6	120	DN100	360	2.5	470 [487]	Stainless steel
65-3- FBCL -XXX	100	1	200	DN100	360	1.5	480 [488]	Stainless steel
65-3- FBCM -XXX	100	1	200	DN125	350	1.5	480 [488]	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.

** CCC-code indicates the adaptation of MULTICAL® to the connected flow sensor type.

ULTRAFLW® 34 is as default 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 ULTRAFLW® 34.

Battery, 24 VAC and 230 VAC supply are available.

Please state the required supply type when ordering.

Accessories

Couplings including gaskets (PN16)

Size	Nipple	Union	Type No.	
			1 pc.	2 pcs.
DN15	R½	G¾	-	6561-323
DN20	R¾	G1	-	6561-324
DN25	R1	G5/4	6561-325	-
DN40	R1½	G2	6561-315	-

Gaskets for couplings

Size (union)	Type No. (1 pc.)
G¾	2210-061
G1	2210-062
G5/4	2210-063
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 ULTRAFLW® 34 DN15-125, see the technical description 5512-385 which can be downloaded via products.kamstrup.com.

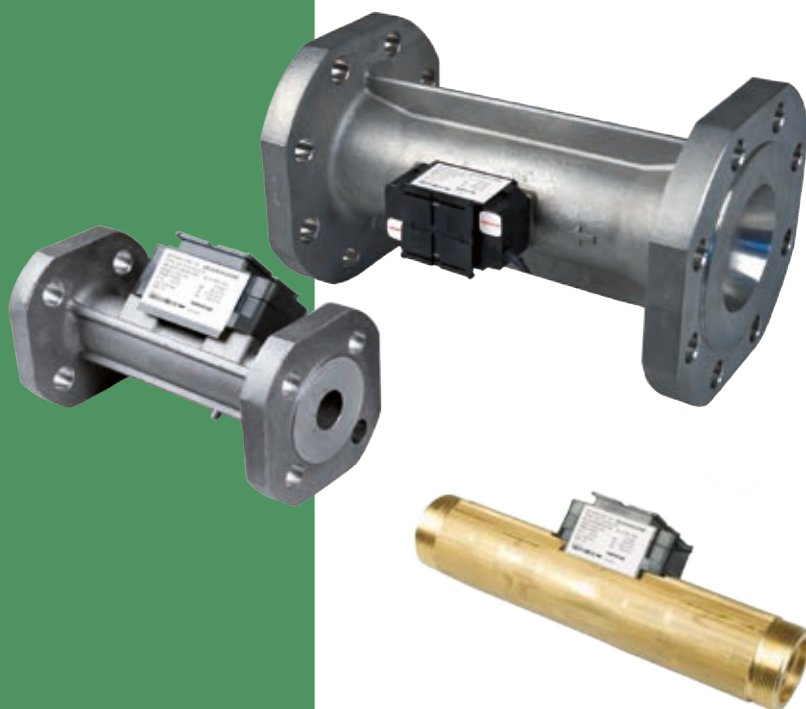
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Data sheet

ULTRAFLOW® 54 DN20-125

- Ultrasonic flow sensor
- For flow from 2.5 m³/h up to 100 m³/h
- Compact design
- Static meter with no moving parts
- Large dynamic range
- No wear
- Exceptionally accurate
- Longevity



MID-2014/32/EU



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Application

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 required a Pulse Transmitter can be used to supply ULTRAFLOW® 54, e.g. if the distance between MULTICAL® and ULTRAFLOW® 54 is 10 m or more. If ULTRAFLOW® 54 is used as pulse generator for other equipment, it must be connected through a Pulse Transmitter.

The Pulse Transmitter has a built-in supply and a galvanically separated pulse outlet.

Approvals

Type approval

ULTRAFLOW® 54 approved in accordance with MID-2014/32/EU.

EC-Type Examination certificate	DK-0200-MI004-008
MID-certificated according to Modul D	DK-0200-MID-D-001

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

CE-marking

ULTRAFLOW® 54 is marked in accordance with:

– MID-directive	2014/32/EU
– 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-2014/32/EU



MID designation

– Mechanical environment	Class M1
– Electromagnetic environment	Class E1 and E2
– Ambient temperature	5...55 °C, 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
Humidity	< 93 % RF non condensing
Protection class	
– Flow sensor	IP65
– Pulse Transmitter	IP67
Medium in flow sensor	Water
Medium temperature*	15...130 °C
Storage temperature (empty sensor)	-25...60 °C
Pressure stage	PN16, PS16/PN25, PS25 flange

* If the temperature of the medium exceeds 90 °C a flange meter should be used. Additionally, MULTICAL® calculator or the Pulse Transmitter should be wall-mounted.

Technical data

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
Back-up supply	Integral super-cap 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®)
EMC data	Complies with EN 1434 class C

Flow data

Nom. flow q_p [m³/h]	Nom. diameter [mm]	Meter factor * [imp./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]
2.5	DN20	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	0.2	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 128 Hz is maintained at higher flow rates.

Materials

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	Stainless steel, W.no. 1.4301
Measuring pipe	Thermoplastic, PES 30 % GF

Electronic housing

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

Connection cable

Silicone cable [3 x 0.5 mm²]

Type summary

Nom.flow q_p [m ³ /h]	Size		
2.5	DN20 x 190 mm		
3.5	G5/4B x 260 mm	DN25 x 260 mm	
6	G5/4B 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	

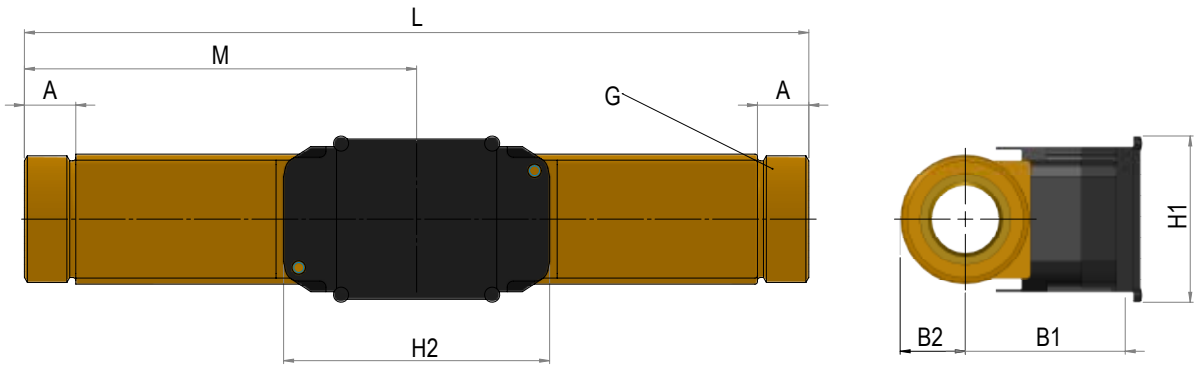
Thread EN ISO 228-1.

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

Dimensional sketches

ULTRAFLOW® 54, G5/4B and G2B

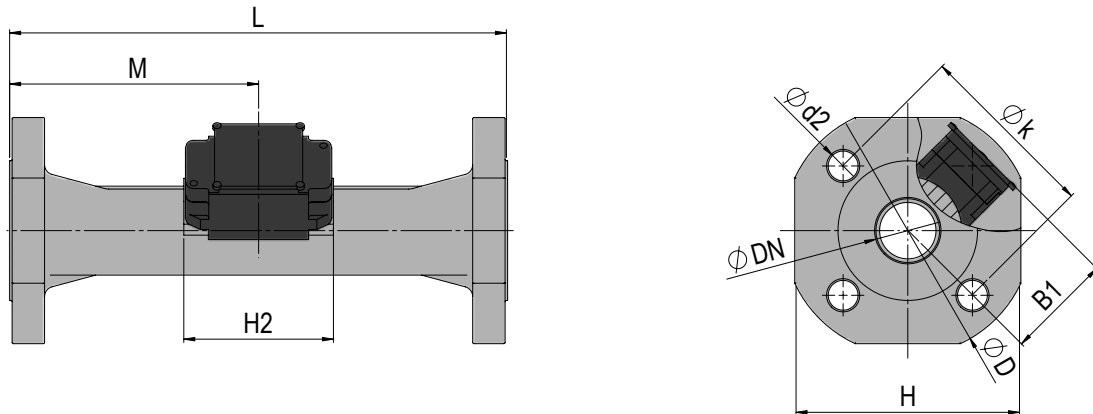
All measurements are in mm, unless otherwise stated.



Thread EN ISO 228-1	L	M	H2	A	B1	B2	H1	App. weight [kg]
G5/4B	260	L/2	89	17	58	22	55	2.3
G2B	300	L/2	89	21	65	31	55	4.5

Dimensional sketches

ULTRAFLOW® 54, DN20 to DN50

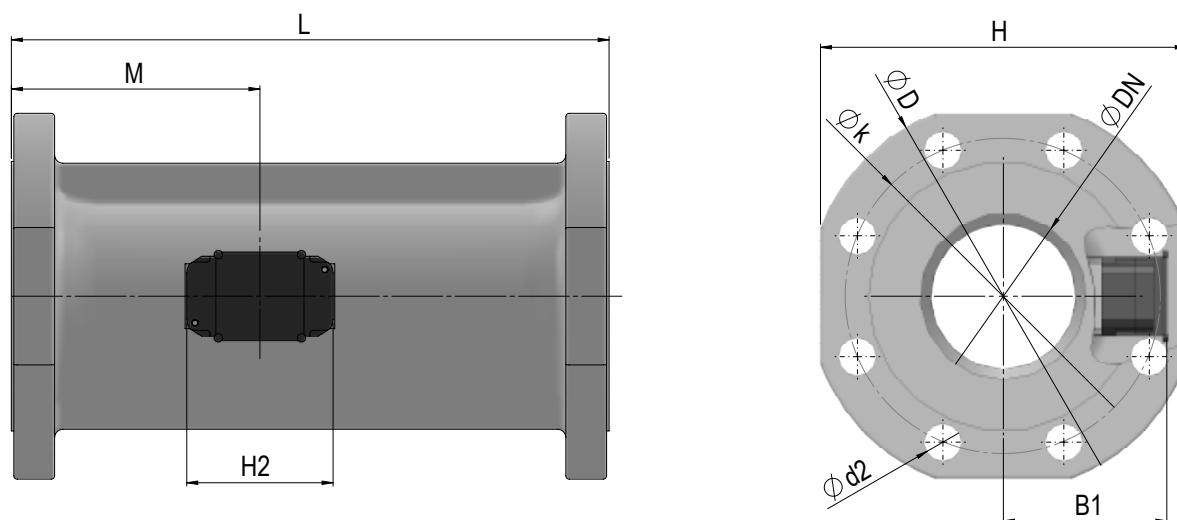


Flange EN 1092-1, PN25. Flange facing type B, raised face.

Nom. diameter	L	M	H2	B1	D	H	k	No.	Bolts Thread	d ₂	App. weight [kg]
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

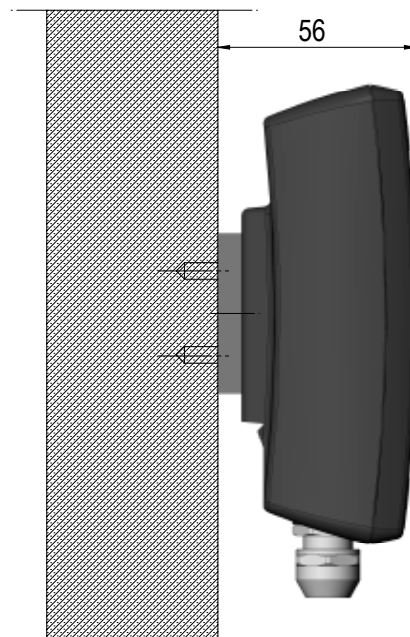
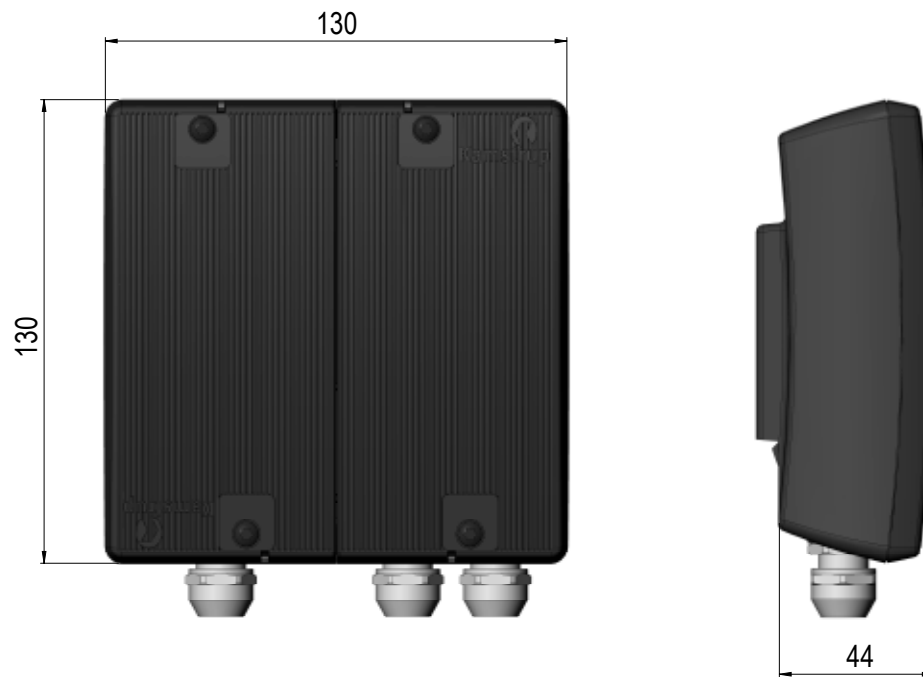


Flange EN 1092-1, PN25. Flange facing type B, raised face.

Nom. diameter	L	M	H2	B1	D	H	k	No.	Bolts Thread	d ₂	App. weight [kg]
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

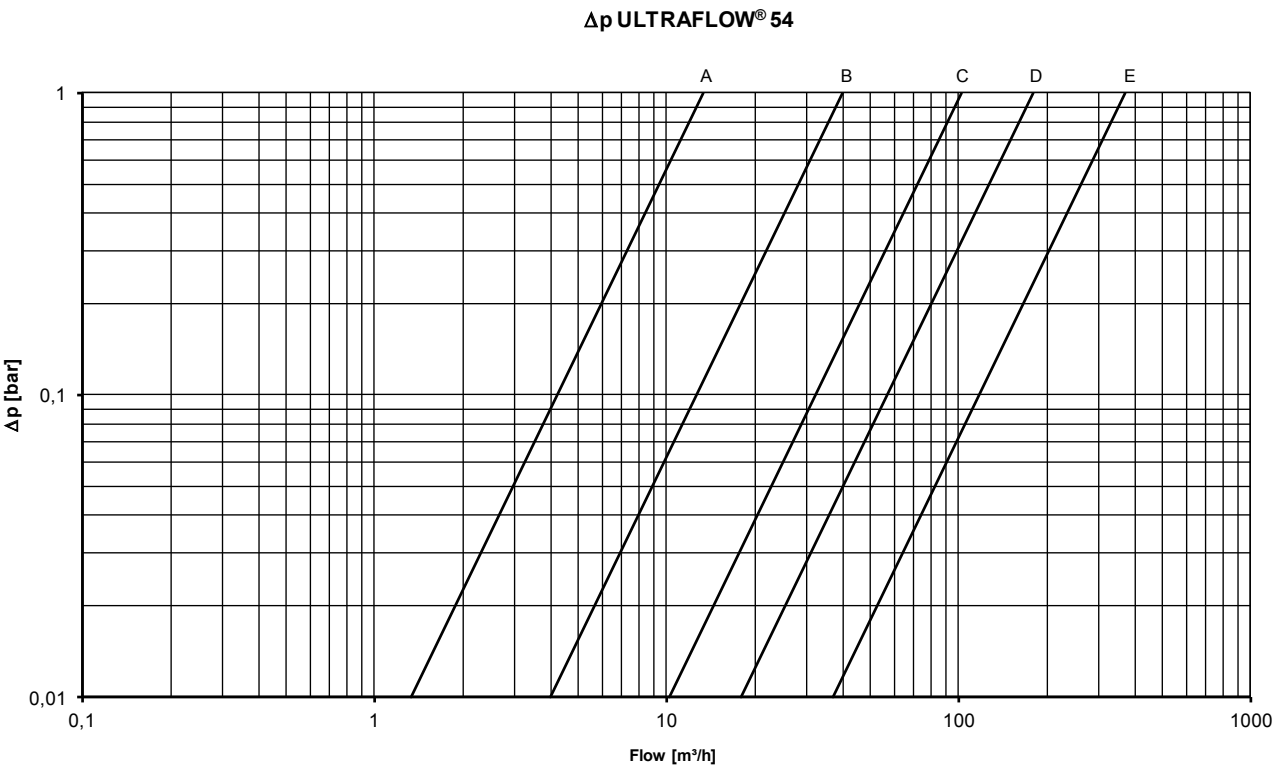
Pulse Transmitter



Pressure loss

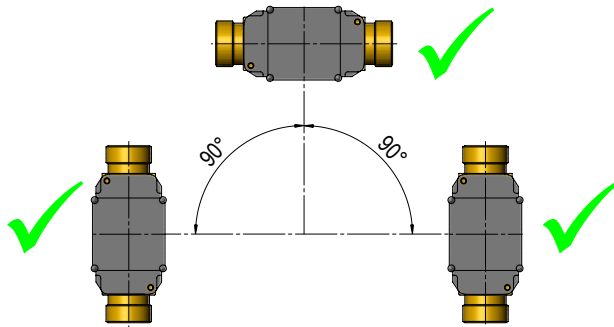
Graph	q _p [m³/h]	Nom. diameter [mm]	k _v *	Q@0.25 bar [m³/h]
A	2.5 & 3.5 & 6	DN20 & DN25 & DN32	13.4	6.7
B	10 & 15	DN40 & DN50	40	20
C	25	DN65	102	51
D	40	DN80	179	90
E	60 & 100	DN100 & DN125	373	187

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



Installation

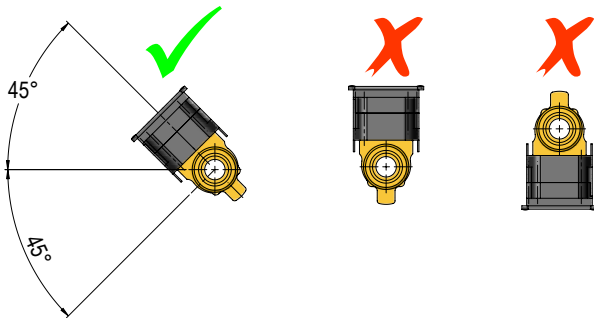
Installation angle for ULTRAFLOW® 54



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).



ULTRAFLOW® 54 may be turned up to $\pm 45^\circ$ around the pipe axis.

Straight inlet

ULTRAFLOW® requires neither straight inlet nor outlet to meet the Measuring Instruments Directive (MID) 2014/32/EU, OIML R75:2002 and EN 1434:2007. Only in case of heavy flow disturbances before the meter will a straight inlet section be necessary. We recommend following the guidelines in CEN CR 13582.

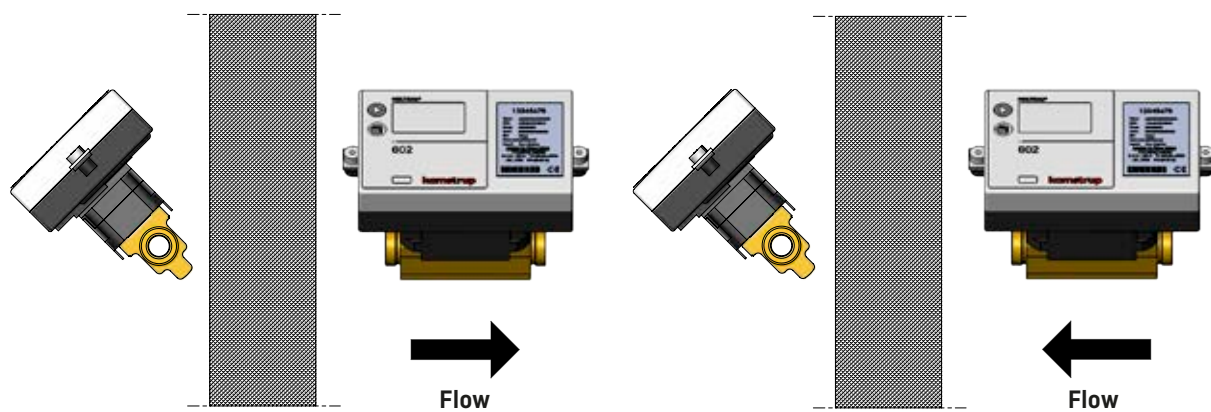
Working Pressure

In order to prevent cavitation the back pressure (pressure at flow sensor outlet) at ULTRAFLOW® 54 must be min. 1.5 bar at q_p and min. 2.5 bar at q_s . This applies to temperatures up to approx. 80 °C.

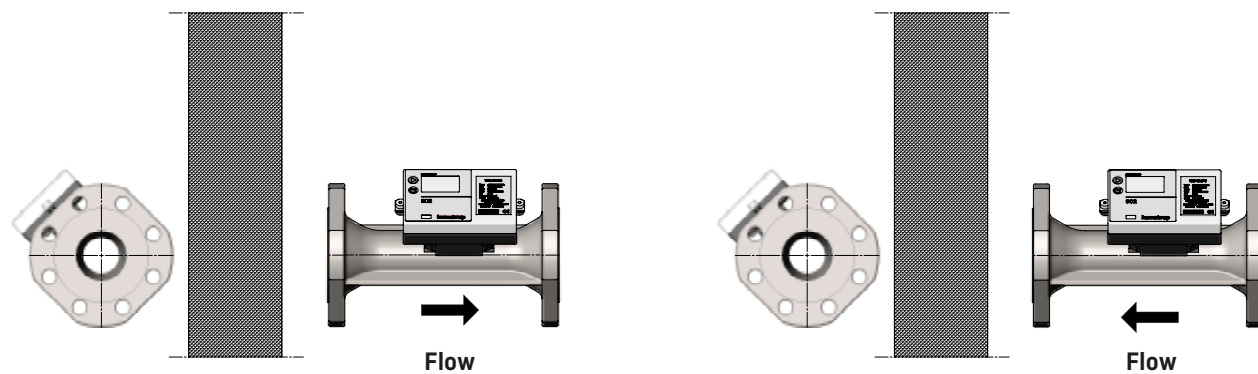
ULTRAFLOW® 54 must not be exposed to lower pressure than the ambient pressure (vacuum).

Examples of installation

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



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



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

Electrical connection

Connecting MULTICAL® & ULTRAFLOW® 54

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

Connecting via Pulse Transmitter

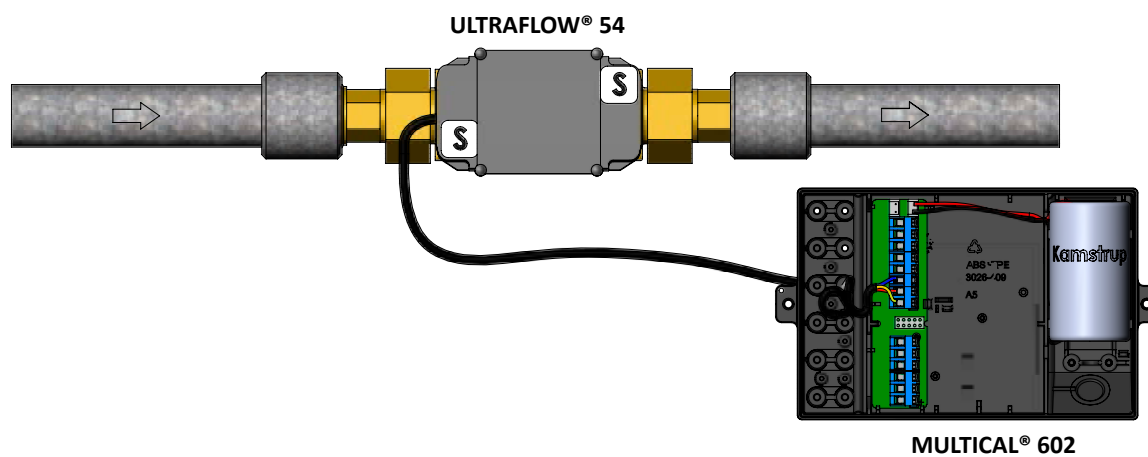
ULTRAFLOW® 54	->	Pulse Transmitter		->	MULTICAL®
		Input	Output		
Blue (GND)	->	11	11A	->	11
Red (supply)	->	9	9A	->	9
Yellow (signal)	->	10	10A	->	10

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, please see technical description 5512-385 which can be found on products.kamstrup.com.

Example of connecting ULTRAFLOW® 54 and MULTICAL®

ULTRAFLOW® 54 and MULTICAL® 602



Order specification

Type number *	q _p [m³/h]	q _i [m³/h]	q _s [m³/h]	Connection	Length [mm]	Meter factor [imp./l]	CCC ** (high res.)	Material
65-5- CECA -XXX	2.5	0.025	5	DN20	190	60	498 [-]	Stainless steel
65-5- CGAG -XXX	3.5	0.035	7	G5/4B (R1)	260	50	451 [436]	Brass
65-5- CGCB -XXX	3.5	0.035	7	DN25	260	50	451 [436]	Stainless steel
65-5- CHAG -XXX	6	0.06	12	G5/4B (R1)	260	25	437 [438]	Brass
65-5- CHCB -XXX	6	0.06	12	DN25	260	25	437 [438]	Stainless steel
65-5- CHCC -XXX	6	0.06	12	DN32	260	25	437 [438]	Stainless steel
65-5- CJAJ -XXX	10	0.1	20	G2B (R1½)	300	15	478 [483]	Brass
65-5- CJCD -XXX	10	0.1	20	DN40	300	15	478 [483]	Stainless steel
65-5- CKCE -XXX	15	0.15	30	DN50	270	10	420 [485]	Stainless steel
65-5- CLCG -XXX	25	0.25	50	DN65	300	6	479 [-]	Stainless steel
65-5- CMCH -XXX	40	0.4	80	DN80	300	5	458 [486]	Stainless steel
65-5- FACL -XXX	60	0.6	120	DN100	360	2.5	470 [487]	Stainless steel
65-5- FBCL -XXX	100	1	200	DN100	360	1.5	480 [488]	Stainless steel
65-5- FBCM -XXX	100	1	200	DN125	350	1.5	480 [488]	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.

** CCC-code is indicating the adaptation of MULTICAL® to the connected flow sensor type.

ULTRAFLOW® 54 is as default 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.

Accessories

Couplings including gaskets (PN16)

Size	Nipple	Union	Type No. (1 pc.)
DN25	R1	G5/4	6561-325
DN40	R1½	G2	6561-315

Gaskets for couplings

Size (union)	Type No. (1 pc.)
G5/4	2210-063
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 ULTRAFLW® 54 DN20-125, please see technical description 5512-385 which can be found on products.kamstrup.com.

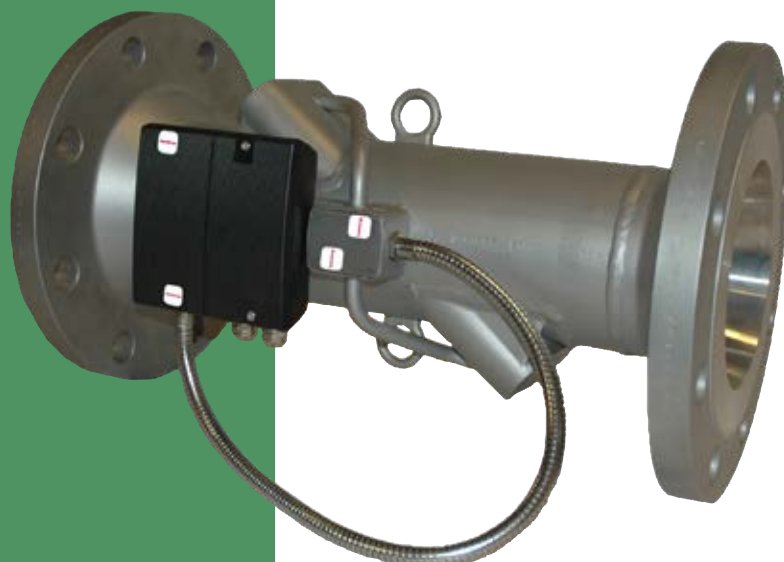
Kamstrup A/S

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DK-8660 Skanderborg
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info@kamstrup.com
kamstrup.com

Data sheet

• **ULTRAFLOW® 54**
DN150-300

- For flow from 150 m³/h up to 1000 m³/h
- Ultrasonic flow sensor
- Compact design
- Static meter, no moving parts
- Large dynamic range
- No wear
- High accuracy
- Longevity



MID 2014/32/EU



EN 1434

DK-BEK 1178 – 06/11/2014



EN 1434

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Application

ULTRAFLOW® 54 is a static flow sensor based on the ultrasonic measuring principle. It is primarily used as a volume flow sensor for energy meters such as MULTICAL®.

ULTRAFLOW® 54 has been designed for use in heating and cooling installations where water is the heat-bearing medium.

ULTRAFLOW® 54 employs ultrasonic measuring techniques and microprocessor technology. All calculating and flow measuring circuits are collected on one single board, thus providing a compact and rational design and, in addition, exceptionally high measuring accuracy and reliability is obtained.

The volume is measured using bidirectional ultrasonic technique based on the transit time method, with proven long-term stability and accuracy. Four ultrasonic transducers are used to send sound signals both against and with the flow. The ultrasonic signal travelling with the flow reaches the opposite transducer first. The time difference between the two signals can be converted into flow velocity and thereby also volume.

A three-wire signal cable is used to connect ULTRAFLOW® 54 to the Kamstrup MULTICAL® calculator. The cable supplies the flow sensor and also transfers the signal from sensor to calculator. A signal corresponding to the flow – or more correctly, a number of pulses proportional to the water volume flowing through – is transmitted.

ULTRAFLOW® 54 is available with internal supply, e.g. if the distance between MULTICAL® and ULTRAFLOW® 54 is 10 m or more.

If ULTRAFLOW® 54 is used for other equipment [e.g. other brands of calculators], the meter must be fitted with a galvanically separated output module and a supply of its own.

Approvals

Type approval

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

EC-Type Examination certificate	DK-0200-MI004-008
MID-certificate acc. to module D	DK-0200-MID-D-001



ULTRAFLOW® 54 is approved as a cooling meter in accordance with DK-BEK 1178 – 06/11/2014:

System designation	TS 27.02 002
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® 54 is marked in accordance with:

– EMC-directive	2014/30/EU
– LV-directive	2014/35/EU (when fitted with 230 VAC power supply)
– PE-directive	2014/68/EU (category II)

MID designation

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

Technical data

Electrical data

Supply voltage	3.6 VDC ± 0.1 VDC
Supply, galvanically coupled output module (Y=1)	Powered by MULTICAL®
Supply, galvanically separated output module (Y=2) *	
– Mains supply	230 VAC +15/-30 %, 50 Hz 24 VAC ±50 %, 50 Hz
– Power consumption	< 1 W
– Backup	Integral SuperCap eliminates interruptions due to short-term power failures
Supply, galvanically separated output module (Y=3)	
– Battery	3.65 VDC, D-cell lithium
– Replacement interval	6-years @ $t_{BAT} < 30\text{ °C}$
– Mains supply	230 VAC +15/-30 %, 50 Hz 24 VAC ±50 %, 50 Hz
– Power consumption	< 1 W
– Backup	Integral SuperCap eliminates interruptions due to short-term power failures
Length of signal cable, flow sensor electronics box	
– Galvanically coupled output module (Y=1)	Max. 10 m (powered by MULTICAL® calculator) Max. 30 m via Cable Extender Box (powered by MULTICAL® calculator)
– Galvanically separated output module (Y=2 and Y=3)	Depending on the calculator.
EMC data	Fulfil EN 1434:2015 class C, MID E1 and E2

* It is possible to use battery supply in combination with output module (Y=2), e.g. for temporary supply of flow sensors installed at construction sites.

Technical data

Mechanical data

Metrological class	2 or 3
Environmental class	Fulfil EN 1434 class C
Ambient temperature	5...55 °C (indoors)
Protection class	IP67
Humidity	< 93 % RH non-condensing
Medium in flow sensor	Water [recommended water quality as in CEN TR 16911 and AGFW FW510]
Medium temperature	2...150 °C [Heat and heat/cooling meters] 2...130 °C [Heat/cooling meters] 2...50 °C [Cooling meters]

At medium temperatures above 90 °C or below ambient temperature the electronics box must be wall-mounted or mounted via the enclosed distance piece.

Storage temperature [empty sensor]	-25...60 °C
Pressure stage	PN16, PS16 PN25, PS25

Flow data

Nom. flow q_p	Nom. diameter	Meter factor *	Dynamic range	$q_s : q_p$	Flow @125 Hz **	$\Delta p @ q_p$	Min. cut off
[m³/h]	[mm]	[imp./l]	$q_p : q_i$		[m³/h]	[bar]	[l/h]
150	DN150	1	100:1	2:1	450	0.02	300
250	DN150	0.6	100:1	2:1	750	0.055	500
400	DN150	0.4	100:1	2:1	1125	0.04	800
400	DN200	0.4	100:1	2:1	1125	0.01	800
400	DN250	0.4	100:1	2:1	1125	0.01	800
600	DN200	0.25	100:1	2:1	1800	0.022	1200
600	DN250	0.25	100:1	2:1	1800	0.022	1200
1000	DN250	0.15	100:1	2:1	3000	0.015	2000
1000	DN300	0.15	100:1	2:1	3000	0.015	2000

* Default value. The meter factor appears from the ULTRAFLOW® label.

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

Materials

Wetted parts

Housing	Stainless steel, W.no. 1.4307
Transducer holder	Stainless steel, W.no. 1.4308
Transducer	Titanium
Gaskets	Fibre

Electronics box

Base	Thermoplastic, PC 10 % GF
Cover	Thermoplastic, PC 10 % GF
Fitting hardware and distance piece for the electronic box	Thermoplastic, PPS 40 % GF

Signal cable

Silicone cable (3 x 0.5 mm²)

Power supply cable 24/230 VAC (optional)

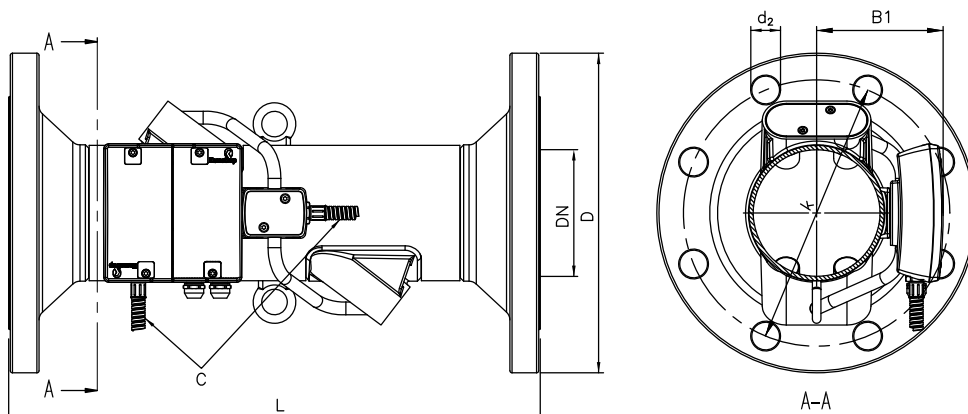
Cable with PVC mantle (2 x 0.75 mm²)

Type summary

Nom. flow q_p [m ³ /h]	Sizes		
150	DN150 x 500 mm		
250	DN150 x 500 mm		
400	DN150 x 500 mm	DN200 x 500 mm	DN250 x 600 mm
600	DN200 x 500 mm	DN250 x 600 mm	
1000	DN250 x 600 mm	DN300 x 500 mm	

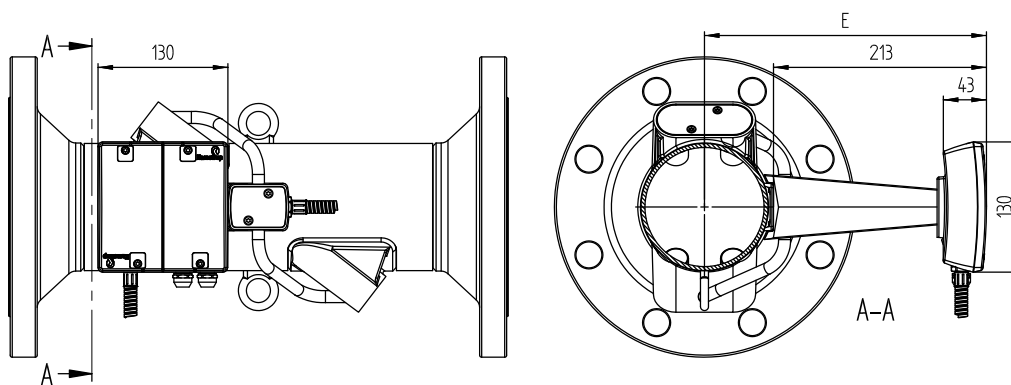
Flange EN 1092-1. Flange facing type B, raised face.

Dimensional sketches



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

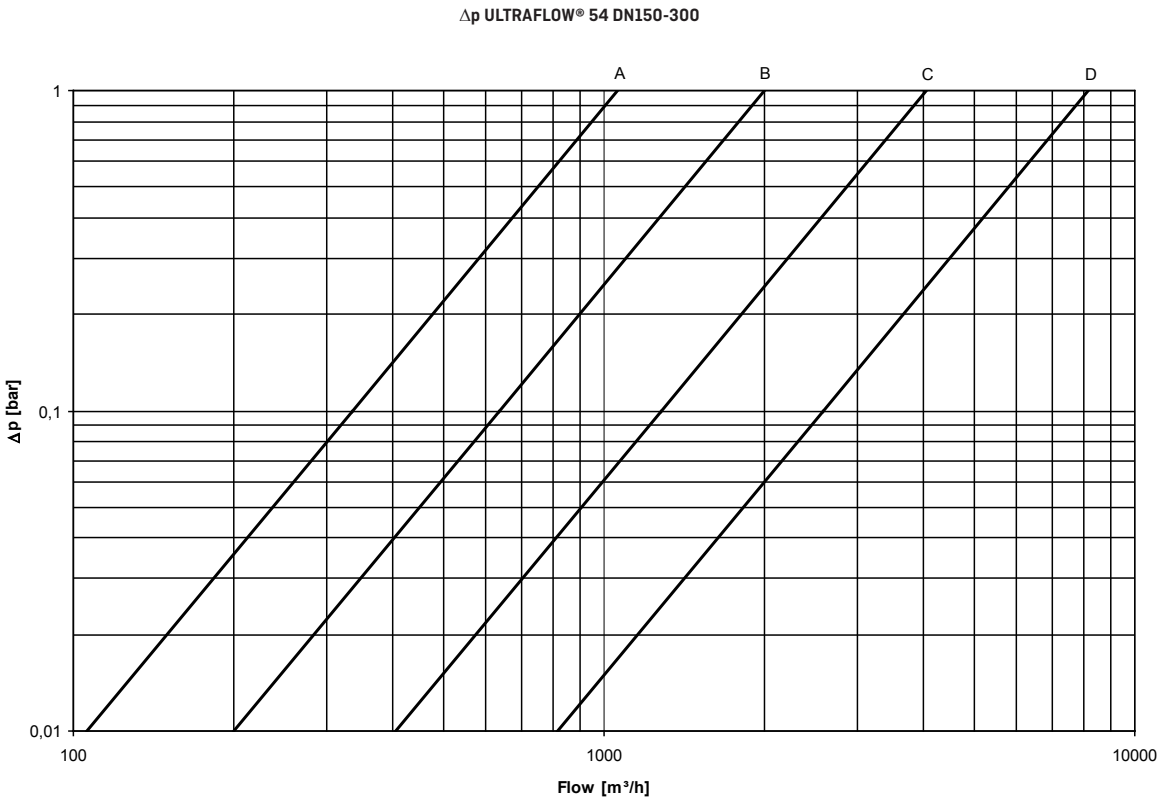
Nom. diameter	PN	Nom. flow q_p	L	D	k	Bolts			B1	E	Steel tube length C	Approx. weight
						Quantity	Thread	d_2				
[mm]	[bar]	[m³/h]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
DN150	25	150 & 250	500	300	250	8	M24	26	119	282	650	37
DN150	25	400	500	300	250	8	M24	26	140	303	625	36
DN200	25	400 & 600	500	360	310	12	M24	26	166	329	570	49
DN250	25	400 & 600	600	425	370	12	M27	30	166	329	570	79
DN250	25	1000	600	425	370	12	M27	30	194	357	500	75
DN300	16	1000	500	460	410	12	M24	26	194	357	500	76



Pressure loss

Graph	Nominal flow q_p [m³/h]	Nominal diameter [mm]	k_v^*	$q@0.25\text{ bar}$ [m³/h]
A	150 & 250	DN150	1060	530
B	400	DN150	2000	1000
C	400 & 600	DN200 & DN250	4040	2020
D	1000	DN250 & DN300	8160	4080

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



Installation

Prior to installation of the flow sensor, the system should be flushed.

Correct flow sensor position (inlet or outlet) appears from the front label of MULTICAL®. The flow direction is indicated by an arrow on the flow sensor.

Please note: ULTRAFLOW® 54 may be lifted in the lifting rings only.

Pressure stage ULTRAFLOW® 54: PN16, PS16/PN25, PS25. See marking on label.

Temperature of medium, ULTRAFLOW® 54: 2...150 °C/ 2...130 °C/2...50 °C. See marking on label.

Mechanical environment: M1 and M2 (fixed installation with minimum vibration and fixed installation with considerable or high vibration level respectively). See marking on label.

Electromagnetic environment: E1 and E2 (housing/light industry and industry respectively). See marking on label.

The meter's signal cables must be drawn at min. 25 cm distance to other installations.

Climatic environment: Must be installed in environments with non-condensing humidity as well as in closed locations (indoors).

The ambient temperature must be within 5...55 °C.

Maintenance and repair: The flow sensor is verified separately and can, therefore, be separated from the calculator.

It is permitted to replace the supply and change the supply type. For battery supply a lithium battery with connector from Kamstrup A/S must be used. Lithium batteries must be correctly handled and disposed of (see Kamstrup document 5510-408, "Lithium batteries - Handling and disposal"). Other repairs require subsequent reverification in an accredited laboratory.

If ULTRAFLOW® 54 is connected via a galvanically coupled output module, the flow sensor may be connected to a Kamstrup MULTICAL® calculator only.

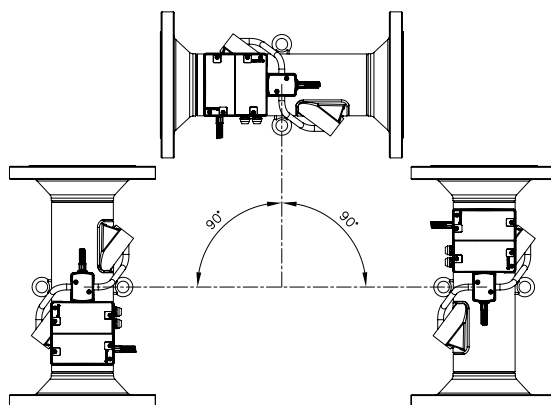
If other calculator types are connected, ULTRAFLOW® 54 must be fitted with a galvanically separated output module and a power supply of its own.

Please note: Make sure that meter factor of flow sensor and calculator are identical.

The steel tube between flow sensor housing and electronics box must not be disassembled.

At medium temperatures above 90 °C or below ambient temperature the flow sensor's electronics box must be mounted via the enclosed distance piece. Alternatively, the electronics box can be wall-mounted at a distance of minimum 170 mm from the sensor.

When the installation has been completed, water flow can be turned on. The valve on the inlet side must be opened first.



Installation angle of ULTRAFLOW® 54

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

ULTRAFLOW® 54 is normally installed horizontally, with the lifting rings oriented vertically. The ultrasound paths in the flow sensor tube will thus be vertical, which is optimal in connection with possible stratification of the medium.

Straight inlet ULTRAFLOW® 54

ULTRAFLOW® 54 requires neither straight inlet nor outlet in order to fulfil the Measuring Instruments Directive (MID) 2014/32/EU and EN 1434:2015. Only in case of heavy flow disturbances before the meter will a straight inlet section be necessary.

We recommend following the guidelines in CEN CR 13582.

Operating pressure

In order to prevent cavitation, the back pressure at ULTRAFLOW® 54 (the pressure at the flow sensor outlet) must be min. 1.5 bar at q_p and min. 2.5 bar at q_s . This applies to temperatures up to approx. 80 °C.

Connection to calculator


ULTRAFLOW® 54 and MULTICAL®, galvanically coupled

If ULTRAFLOW® 54 and MULTICAL® are connected via output module (Y=1), ULTRAFLOW® 54 is galvanically coupled with MULTICAL® and is powered via the three-wire signal cable (cable length up to 10 m).

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.

Battery life time in e.g. MULTICAL® 602 is approximately 10 years depending on data communication to the calculator.

Note: It is not permitted to mount a supply module or battery in ULTRAFLOW® 54.

ULTRAFLOW® 54	→	MULTICAL®		
11	→	11	GND	[Blue]
9	→	9	+ 3.6 V	[Red]
10	→	10		[Yellow]

Connection to calculator

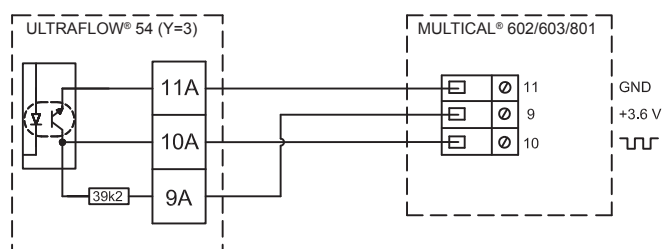
ULTRAFLOW® 54 and MULTICAL®, galvanically separated

If ULTRAFLOW® 54 and MULTICAL® are connected via output module (Y=2 or 3), ULTRAFLOW® 54 is galvanically separated from MULTICAL®.

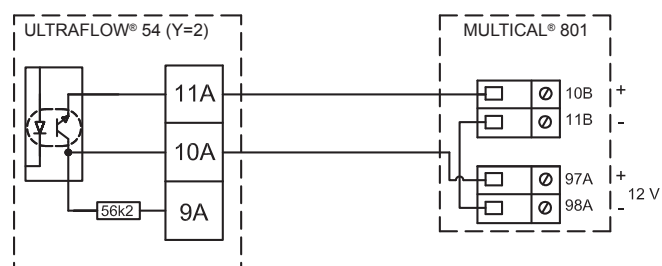
Maximum cable length depends on calculator.

Note: Flow info cannot be read.

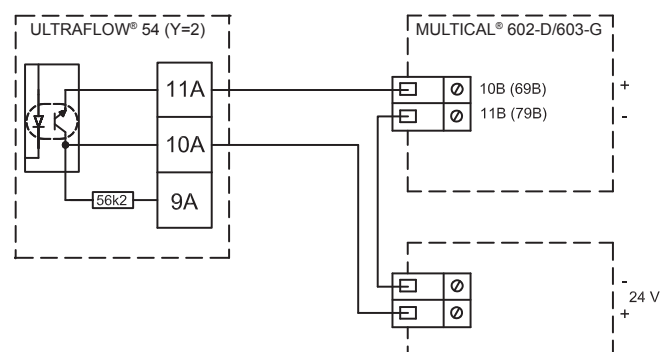
Three-wire connection,
MULTICAL® 602/603/801 via output module (Y=2 or 3).



Two-wire connection,
MULTICAL® 801 via output module (Y=2).



Two-wire connection,
MULTICAL® 602-D/603-G via output module (Y=2)
and external 24 VDC supply.



When using long signal cables, careful consideration is required in connection with installation. Due to EMC there must be a distance of min. 25 cm between signal cables and all other cables.

Type numbers of ULTRAFLOW® 54 for MULTICAL®

Type number *	Nom. flow q_p [m³/h]	Min. flow q_i [m³/h]	Max. flow q_s [m³/h]	Connection [mm]	PN [bar]	Length [mm]	Meter factor [imp./l]	Material flow sensor housing
65-5-FCCN-XXX	150	1.5	300	DN150	25	500	1	Stainless steel
65-5-FDCN-XXX	250	2.5	500	DN150	25	500	0.6	Stainless steel
65-5-FECN-XXX	400	4.0	800	DN150	25	500	0.4	Stainless steel
65-5-FECP-XXX	400	4.0	800	DN200	25	500	0.4	Stainless steel
65-5-FECP-XXX	400	4.0	800	DN250	25	600	0.4	Stainless steel
65-5-FFCP-XXX	600	6.0	1200	DN200	25	500	0.25	Stainless steel
65-5-FFCR-XXX	600	6.0	1200	DN250	25	600	0.25	Stainless steel
65-5-FGCR-XXX	1000	10.0	2000	DN250	25	600	0.15	Stainless steel
65-5-FGDS-XXX	1000	10.0	2000	DN300	16	500	0.15	Stainless steel

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

Type numbers for separate ULTRAFLOW® 54

Type number *	Nom. flow q_p [m³/h]	Min. flow q_i [m³/h]	Max. flow q_s [m³/h]	Connection [mm]	PN [bar]	Length [mm]	Material flow sensor housing
65-5-FCCN-YZ-XXX	150	1.5	300	DN150	25	500	Stainless steel
65-5-FDCN-YZ-XXX	250	2.5	500	DN150	25	500	Stainless steel
65-5-FECN-YZ-XXX	400	4.0	800	DN150	25	500	Stainless steel
65-5-FECP-YZ-XXX	400	4.0	800	DN200	25	500	Stainless steel
65-5-FECP-YZ-XXX	400	4.0	800	DN250	25	600	Stainless steel
65-5-FFCP-YZ-XXX	600	6.0	1200	DN200	25	500	Stainless steel
65-5-FFCR-YZ-XXX	600	6.0	1200	DN250	25	600	Stainless steel
65-5-FGCR-YZ-XXX	1000	10.0	2000	DN250	25	600	Stainless steel
65-5-FGDS-YZ-XXX	1000	10.0	2000	DN300	16	500	Stainless steel

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

Type number composition of separate ULTRAFLOW® 54

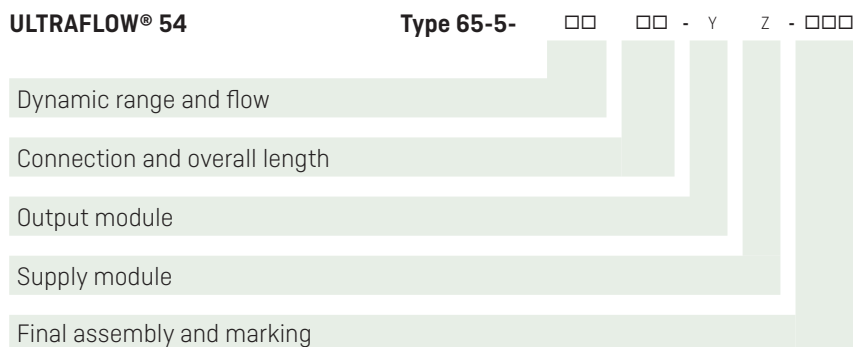
In addition to the basic variants output module (Y), supply module (Z) as well as meter factor (CC) and pulse duration (E) must be selected.

The variant with galvanically coupled output module (Y=1) is solely for use together with MULTICAL®.

The variant with galvanically separated output module (Y=2 or 3) is used in the following situations:

- A More than 10 m cable length between MULTICAL® and ULTRAFLOW® 54 is required (Y=2).
- B As flow sensor no. 2 in connection with MULTICAL®.
If two flow sensors are used together with MULTICAL®, one must include a galvanically separated output module (Y=2 or 3).
- C Together with other equipment/foreign calculators (Y=2 or 3).

Please note: Flow info cannot be read if output module with galvanic separation is used.



Type numbers of output and supply modules

Type number overview of output modules (Y) as well as supply modules (Z) for separate ULTRAFLOW® 54

Y	Output module	Corresponding supply module
1	Galvanically coupled module	0 (powered by MULTICAL®)
2	Galvanically separated module	0, 7, 8
3	Galvanically separated module, "Low power"	0, 2, 7, 8
Z	Supply module	Corresponding output module
0	No supply	1, 2, 3
2	Battery, D-cell	3
7	230 VAC supply module	2, 3
8	24 VAC supply module	2, 3

Programming variants of meter factor and pulse duration

Overview of programming variants of meter factor (CC) and pulse durations (E) for separate ULTRAFLW® 54.

q_p [m³/h]	Meter factor			Pulse duration				
	[imp./l]	[l/imp.]	CC	[ms] (E=1)	[ms] (E=4)	[ms] (E=5)	[ms] (E=6)	
150	1		33	3.9	-	-	-	Default
150		10	34	-	20	-	-	
150		25	64	-	20	-	-	
150		100	35	-	20	50	100	
150		250	65	-	20	50	100	
150		1000	36	-	20	50	100	
150		2500	66	-	20	50	100	
250	0.6		43	3.9	-	-	-	Default
250		10	34	-	20	-	-	
250		25	64	-	20	-	-	
250		100	35	-	20	50	100	
250		250	65	-	20	50	100	
250		1000	36	-	20	50	100	
250		2500	66	-	20	50	100	
400	0.4		63	3.9	-	-	-	Default
400		100	35	-	20	50	-	
400		250	65	-	20	50	100	
400		1000	36	-	20	50	100	
400		2500	66	-	20	50	100	
600	0.25		14	3.9	-	-	-	Default
600		100	35	-	20	50	-	
600		250	65	-	20	50	-	
600		1000	36	-	20	50	100	
600		2500	66	-	20	50	100	
1000	0.15		24	3.9	-	-	-	Default
1000	[0.25]	4	14	3.9	-	-	-	*)
1000		100	35	-	20	50	-	
1000		250	65	-	20	50	-	
1000		1000	36	-	20	50	100	
1000		2500	66	-	20	50	100	

* Spare part for ULTRAFLW® type 65-S/R/T q_p 1000. Configured 65-5-FGCR. No flow info.

Accessories

Description	Type number
Flange gaskets	
DN150, PN25 (1 pc.)	1150-140
DN200, PN25 (1 pc.)	1150-139
DN250, PN25 (1 pc.)	1150-141
DN300, PN16 (1 pc.)	1150-164
Supply	
D-cell lithium battery with two-pole connector	65000000-2000
230 VAC supply module	65000000-7000
24 VAC supply module	65000000-8000
Miscellaneous	
Short distance piece	6561-332
Cable Extender Box	6699-036

Cables

ULTRAFLOW® 54 DN150-300, when ordered with MULTICAL®, is delivered with 2.5 m signal cable, optionally 5 or 10 m. The cable is mounted in the ULTRAFLOW® 54 electronics box and in MULTICAL® 6xx.

When ULTRAFLOW® 54 is ordered with MULTICAL® 8xx, the calculator is delivered separately. Hence the cable is only mounted in the ULTRAFLOW® 54 electronics box.

ULTRAFLOW® 54 DN150-300, when ordered as a separate flow sensor, is optionally available with signal cable in lengths of 2.5, 5 or 10 m.

The cable is mounted in the ULTRAFLOW® 54 electronics box.

If 24/230 VAC supply module is selected, the sensor is optionally available with power cable. The cable is mounted in the sensor's electronics box from the factory.

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