

# ULTRAFLOW®

Ultrasonic flow meter

Compact design

Static meter with no moving parts

Large dynamic range

No wear

Exceptionally accurate

Longevity



TS 27.01  
113

TS 27.01  
109

OIML R75

DS/EN 1434

## Application

ULTRAFLOW® type 65-S/R is a static flow meter based on the ultrasonic measuring principle. The prime area of application is as a volume flow meter for use with thermal heat meters such as MULTICAL® and MAXICAL. ULTRAFLOW® has been designed for use in heating installations where water is used as the heat-bearing medium.

ULTRAFLOW® 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 multiplug, placed beneath the seal, is used during communication and calibration.

A three-wire pulse cable is used to connect ULTRAFLOW® to the calculator. This cable is used to supply the flow meter 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®, e.g. if the distance between MULTICAL® and ULTRAFLOW® is 10 m or more. The pulse transmitter has a built-in supply and a galvanically separated pulse outlet.



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# Approvals

## TYPE APPROVAL

ULTRAFLOW® Types 65-S and 65-R are approved by EFS in accordance with EN1434 and OIML R75.

The test report -project K286128 - forms the basis for type approval in a number of countries, including Denmark.

**TS** 27.01  
113

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109

OIML R75 DS/EN 1434

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

## CE-MARKING

ULTRAFLOW® Types 65-S and 65-R are marked in accordance with the EMC and LV directives.

# Technical data

## MECHANICAL DATA

Metrological class	2 and 3
Environmental class	Complies with DS/EN 1434 class C
Ambient temperature	0...55°C
Protection class	
$q_p \leq 40 \text{ m}^3/\text{h}$	IP56
$q_p \geq 60 \text{ m}^3/\text{h}$	IP55
Pulse transmitter	IP54
Temperature* of medium	15...130°C
Storage temp. drained meter	-25...70°C, 60°C with fitted/supplied battery
Pressure stage	PN16, PN25 flange
Time constant	6 s, fast response meter

\* 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.

## ELECTRICAL DATA

Supply voltage	3.6 V $\pm 10\%$
Battery (pulse transmitter)	3.65 VDC, D-Cell lithium
Replacement interval	10 years @ $t_{BAT} < 35^\circ\text{C}$
Power supply (pulse transmitter)	230 VAC $\pm 15\%$ , 48...52 Hz 24 VAC/DC $\pm 30\%$
Back-up supply	Integral super-cap eliminates operational disturbances due to short-term power-cuts.
Cable length, flow meter	Max. 10 m
Cable length (pulse transmitter)	Depends on calculator
EMC data	Complies with DS/EN 1434 class C

## FLOW DATA

Nom. flow $q_p$ [m³/h]	Nom. diameter	Meter factor <sup>1)</sup> [pulses/l]	Dynamic range $q_s:q_p$	$q_s:q_p$	Flow@125 Hz <sup>2)</sup> [m³/h]	$\Delta p$ [bar]	Min. cut off [l/h]
0.6	DN15 & DN20	300	1:100	2:1	1.5	0.04	2
1.5	DN15 & DN20	100	1:100	2:1	4.5	0.23	3
3	DN20	50	1:100	2:1	9	0.04	6
3.5	DN25	50	1:100	2:1	9	0.06	7
6	DN25	25	1:100	2:1	18	0.16	12
10	DN40	15;25	1:100	2:1; 1.8:1	30, 18	0.07	20
15	DN50	10	1:100	2:1	45	0.15	30
25	DN65	6; 10	1:100	2:1; 1.8:1	75, 45	0.08	50
40	DN80	5	1:100	2:1	90	0.2	80
60	DN100	2.5	1:100	2:1	180	0.15	120
150	DN150	1	1:100	2:1	450	0.025	300
400	DN150	0.4	1:100	2:1	1125	0.18	800
400	DN250	0.4	1:100	2:1	1125	0.015	800
1000 <sup>3)</sup>	DN250	0.25	1:100	1.8:1	1800	0.01	2000

<sup>1)</sup> The meter factor can be seen on the label on the side of the meter.

<sup>2)</sup> Saturation flow. Max. pulse frequency 128 Hz is maintained at higher flow rates.

<sup>3)</sup>  $q_p$  1000 m³/h is not included in the Danish approval.

## Materials

### WETTED PARTS

#### ULTRAFLOW®, q<sub>p</sub> 0.6 and 1.5 m³/h

Housing	Enkotal (alpha brass)
Transducers	AISI 316 (W. No. 1.4401)
Gaskets	EPDM
Reflectors	PES 30% GF and AISI 304 (W. No. 1.4301)
Measuring pipe	PES 30% GF

#### ULTRAFLOW®, q<sub>p</sub> 3 to 40 m³/h

Housing, gland	Enkotal (alpha brass)
Housing, flange	RG5204 (red brass)
Transducers	AISI 316 (W. No. 1.4401)
Gaskets	EPDM
Measuring	PES 30% GF
Reflectors	AISI 304 (W. No. 1.4301)

#### ULTRAFLOW®, q<sub>p</sub> 60 m³/h

Housing	GGG40.3 (spherical cast iron)
Transducers	AISI 316 (W. No. 1.4401)
Gaskets	Viton
Measuring pipe	PPS 30% GF
Reflectors	AISI 304 (W. No. 1.4301)

#### ULTRAFLOW®, q<sub>p</sub> 150 to 1000 m³/h

Housing	GGG40.3 (spherical cast iron)
Transducers	AISI 316 (W. No. 1.4401)
Gaskets	Viton
Measuring pipe	Integral part of the housing

### ELECTRONIC HOUSING

Base	PBT 30% GF
Lid	PC 10% GF

### CONNECTION CABLE

Silicone cable (3x0.5<sup>ø</sup>)

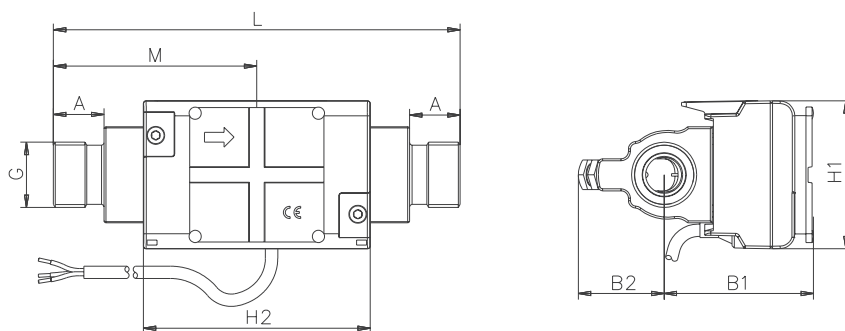
## Type summary

Nom.flow q <sub>p</sub> [m³/h]	Size				
0.6	G3/4 x 110 mm	G1 x 130 mm			
1.5	G3/4 x 110 mm	G3/4 x 165 mm	G1 x 130 mm	G1 x 165 mm	G1 x 190 mm
3	G1 x 190 mm	DN20 x 190 mm			
3.5	G5/4 x 260 mm	DN25 x 260 mm			
6	G5/4 x 260 mm	DN25 x 260 mm			
10	G2 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				
150	DN150 x 500 mm				
400	DN150 x 500 mm	DN250 x 600 mm			
1000 <sup>4)</sup>	DN250 x 600 mm				

<sup>4)</sup> Not included in the Danish type approval.

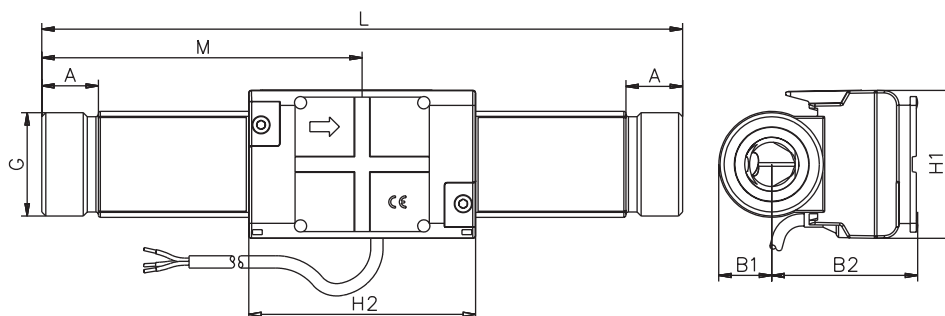
## Dimension sketches

### ULTRAFLOW® TYPE 65-S/R, G<sup>3</sup>/<sub>4</sub> AND G1



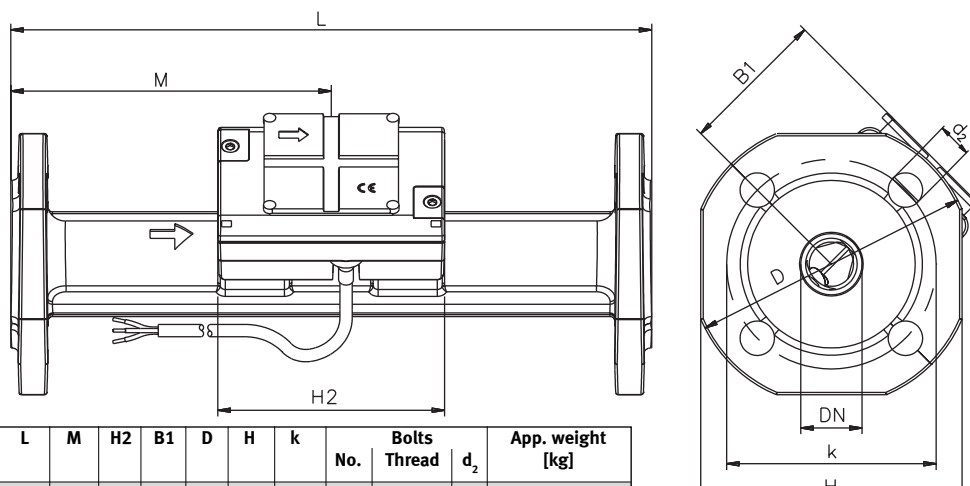
Thread	L	M	H2	A	B1	B2	H1	App. weight [kg]
G <sup>3</sup> / <sub>4</sub>	110	L/2	92	10.5	61	35	60	0.8
G1	130	L/2	92	20.5	61	35	60	0.9
G <sup>3</sup> / <sub>4</sub>	165	L/2	92	20.5	61	35	60	1.2
G1	165	L/2	92	20.5	61	35	60	1.2
G1(q <sub>p</sub> 1.5)	190	L/2	92	20.5	61	35	60	1.4
G1(q <sub>p</sub> 3.0)	190	L/2	92	20.5	60	36	60	1.3

### ULTRAFLOW® TYPE 65-S/R, G5/4 AND G2



Thread	L	M	H2	A	B1	B2	H1	App. weight [kg]
G5/4	260	L/2	92	23	60	22	60	2.3
G2	300	L/2	92	30	68	31	60	4.5

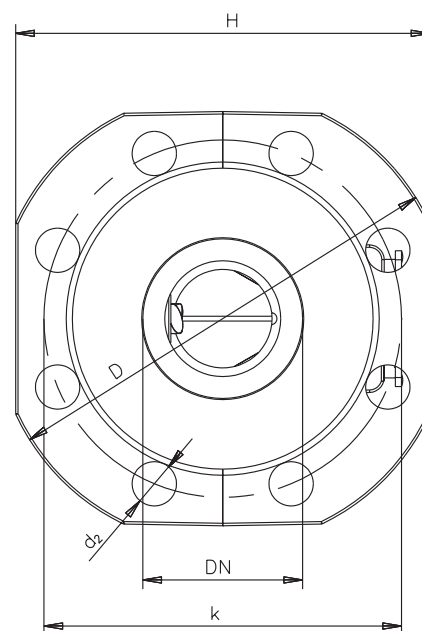
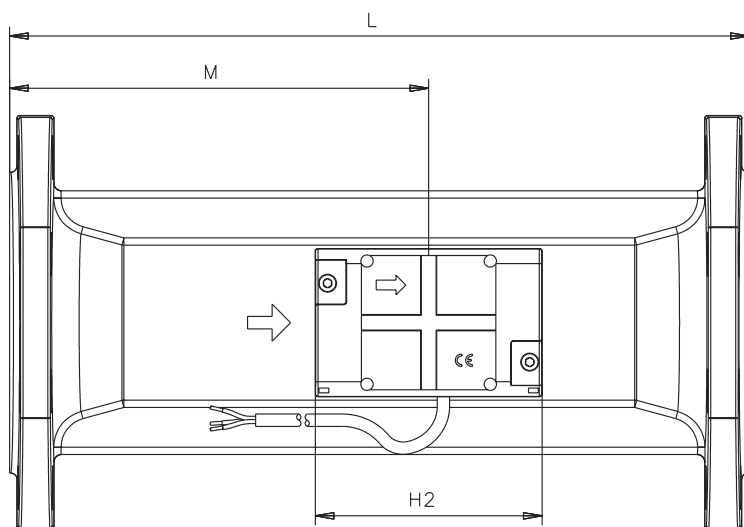
### ULTRAFLOW® TYPE 65-S/R, DN20 TO DN50



Nom. dia.	L	M	H2	B1	D	H	k	No.	Bolts Thread	d <sub>2</sub>	App. weight [kg]
DN20	190	L/2	92	60	105	95	75	4	M12	14	2.5
DN25	260	L/2	92	60	115	106	85	4	M12	14	4
DN40	300	L/2	92	<D/2	150	136	110	4	M16	18	6.9
DN50	270	155	92	<D/2	165	145	125	4	M16	18	7.8

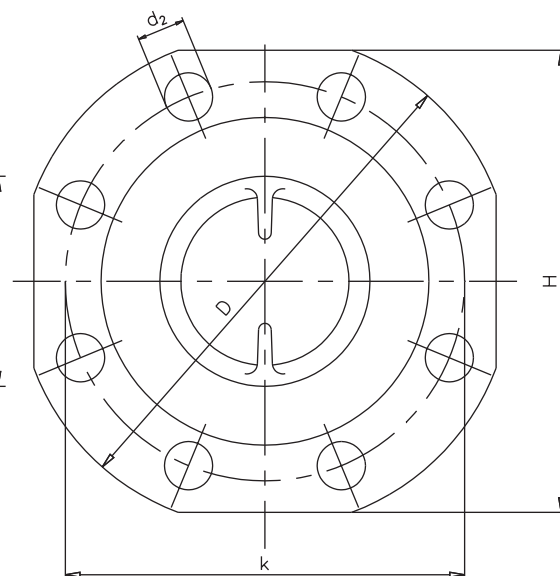
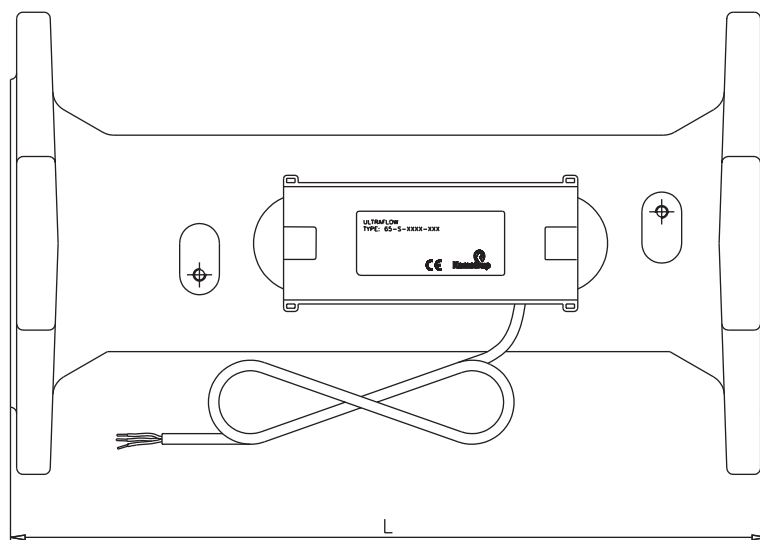
## Dimension sketches (continued)

### ULTRAFLOW® TYPE 65-S/R, DN65 AND DN80



Nom. dia.	L	M	H2	B1	D	H	k	No.	Bolts Thread	d <sub>2</sub>	App. weight [kg]
DN65	300	170	92	<H/2	185	168	145	8	M16	18	10.9
DN80	300	170	92	<H/2	200	184	160	8	M16	18	13.9

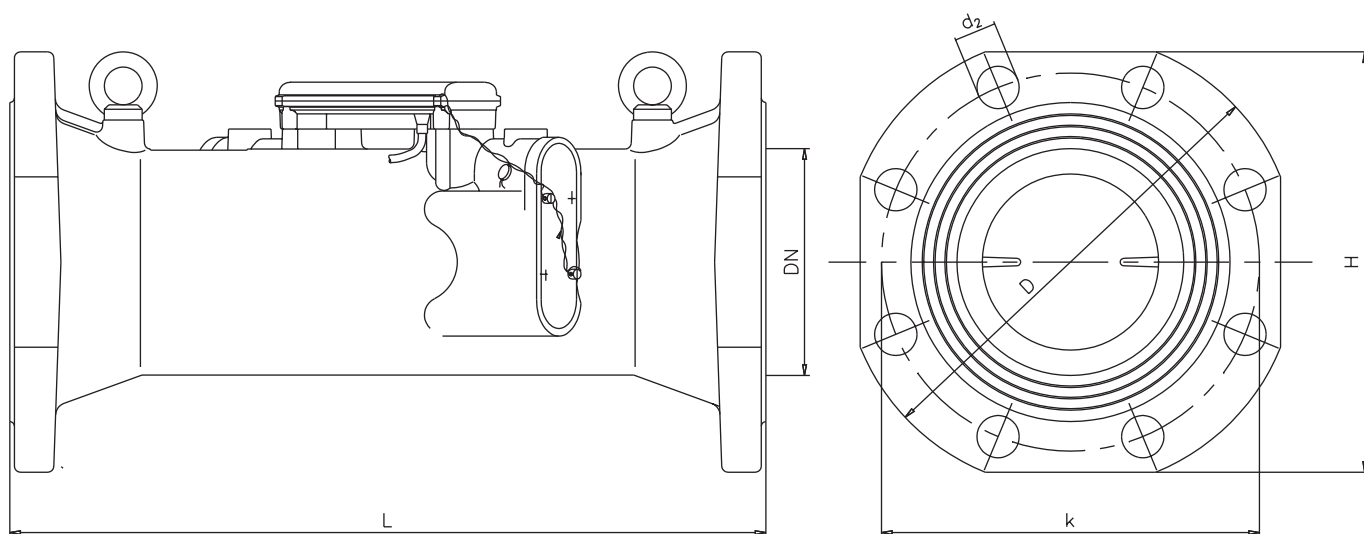
### ULTRAFLOW® TYPE 65-S/R, DN100



Nom. diameter	L	D	H	k	No.	Bolts Thread	d <sub>2</sub>	App. weight. [kg]
DN100	360	235	220	190	8	M20	23	17

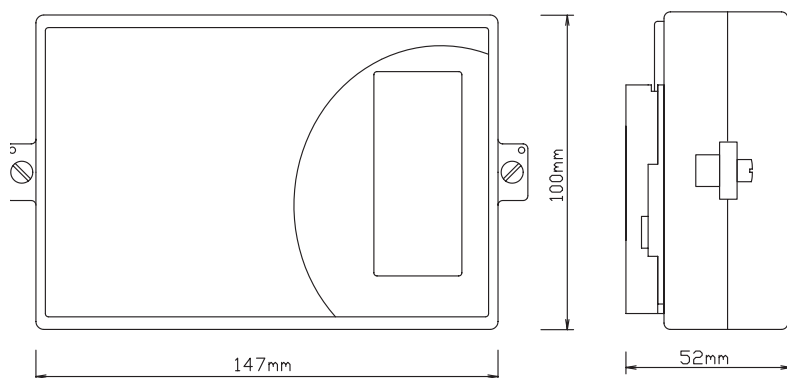
## Dimension sketches (continued)

### ULTRAFLOW® TYPE 65-S/R, DN150 AND DN250



Nom. diameter	L	D	H	k	No.	Bolts Thread	d <sub>2</sub>	App. weight. [kg]
DN150	500	300	278	250	8	M24	28	46
DN250	600	425	436	370	12	M27	31	126
DN250 (q <sub>p</sub> 1000 m³/h)	600	425	436	370	12	M27	31	112

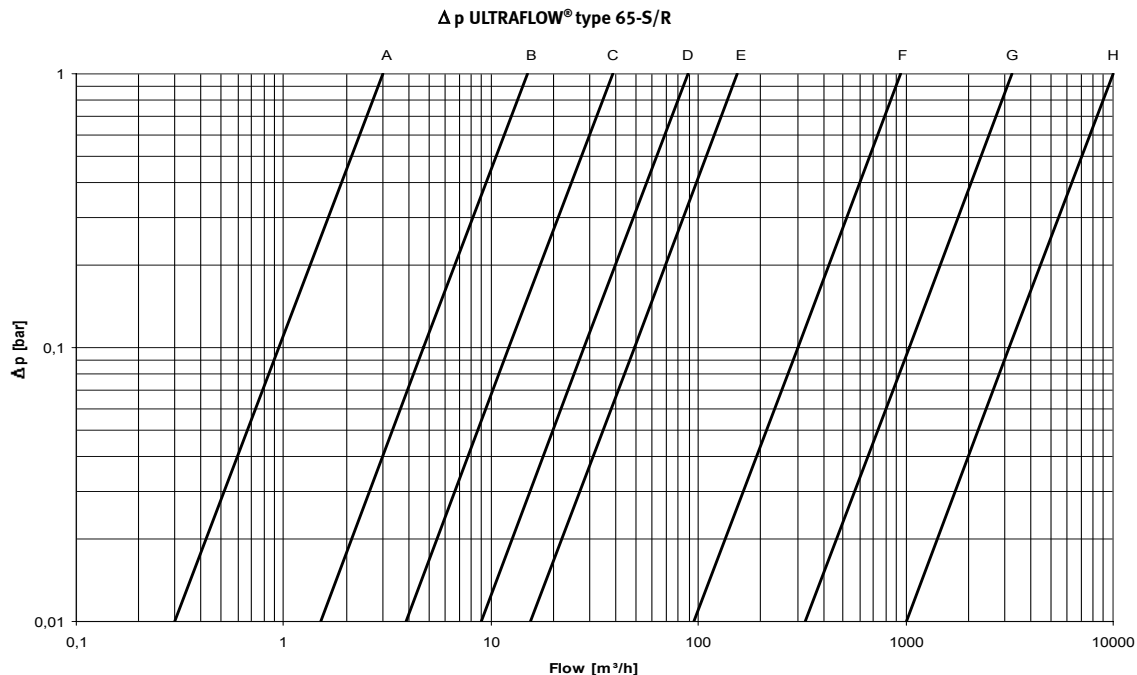
### PULSE TRANSMITTER



## Pressure loss

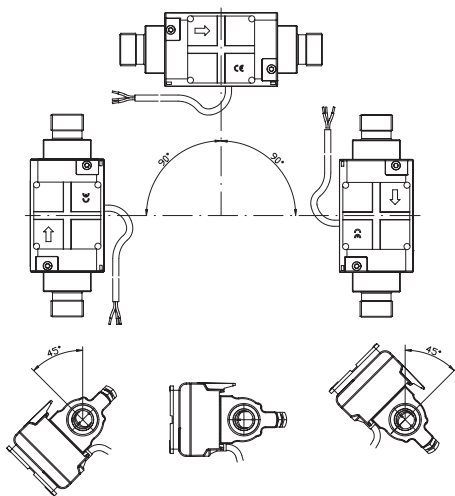
Graph	q <sub>p</sub> [m³/h]	Nom. diameter	K <sub>v</sub>	Q@0.25 bar [m³/h]
A	0.6 & 1.5	DN15 & DN20	3	1.5
B	3 & 3.5 & 6	DN20 & DN25	15	7.5
C	10 & 15	DN40 & DN50	39	19
D	25 & 40	DN65 & DN80	89	45
E	60	DN100	155	78
F	150 & 400	DN150	948	474
G	400	DN250	3266	1633
H	1000	DN250	10000	5000

## Pressure loss graphs



## Installation

### ULTRAFLOW® $\leq$ DN100



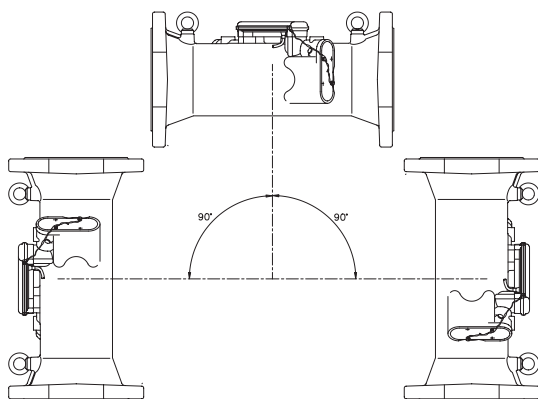
ULTRAFLOW® may be installed horizontally, vertically or at an angle.

#### IMPORTANT!

With ULTRAFLOW®  $\leq$  DN100 (100  $m^3/h$ ), the electronics/ plastic case must be placed to the side (with horizontal installation).

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

### ULTRAFLOW® $\geq$ DN150



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

#### IMPORTANT!

With ULTRAFLOW®  $\geq$  DN150 (150  $m^3/h$ ), the electronics/ plastic case must be placed upwards (with horizontal installation).

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

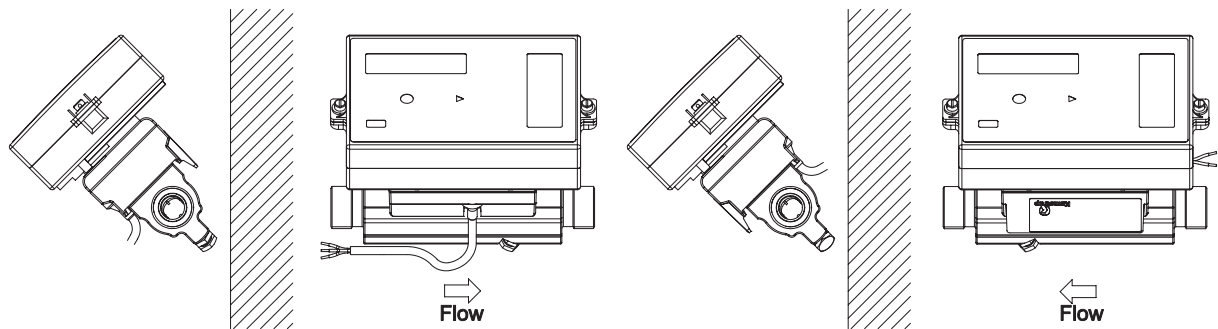
### STRAIGHT INLET

ULTRAFLOW®  $\leq$  DN20 (G1) does not require a straight inlet.

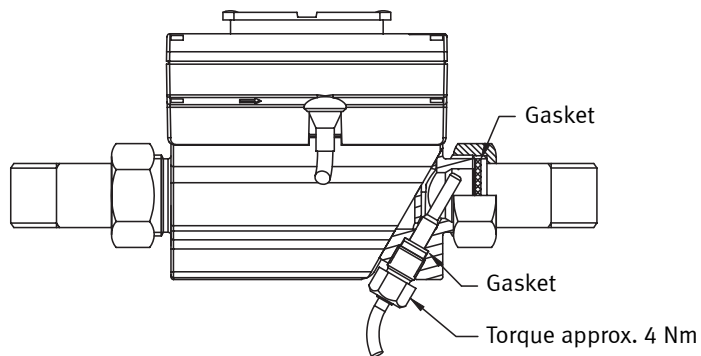
The inlet for ULTRAFLOW®  $\geq$  DN25 (G5/4) must be 3...5 x DN.

## Examples of installation

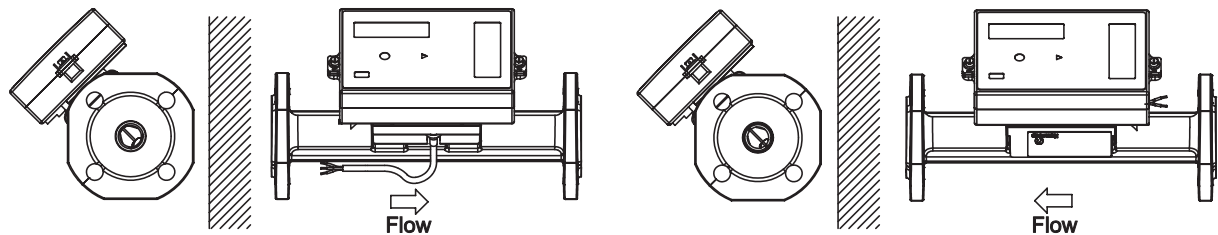
Gland meter with MULTICAL®/pulse transmitter fitted directly on ULTRAFLOW®.



Glands and short direct sensor fitted in ULTRAFLOW® (G $\frac{3}{4}$  (R $\frac{1}{2}$ ) and G1 (R $\frac{3}{4}$ ) only)



Flange meter with MULTICAL®/pulse transmitter fitted directly on ULTRAFLOW®.



NB: For meters  $\geq$ DN100 MULTICAL® or the pulse transmitter **cannot** be fitted directly on the flow part.



## Electrical connection

### CONNECTING MULTICAL®/MAXICAL III & ULTRAFLOW®

ULTRAFLOW®	->	MULTICAL®, MAXICAL III
Blue (ground)	->	11
Red (supply)	->	9
Yellow (signal)	->	10

### CONNECTING VIA PULSE TRANSMITTER

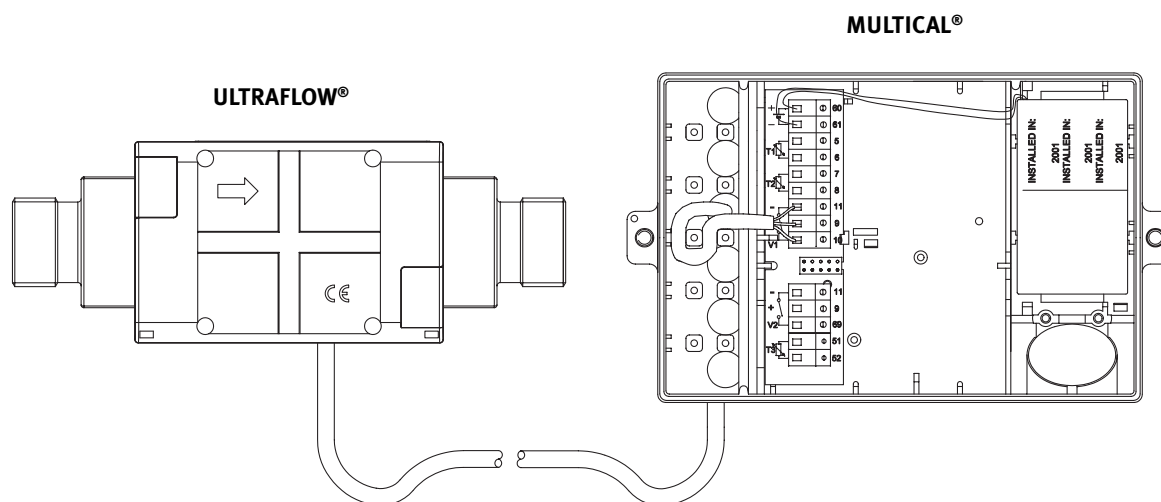
3.65 VDC supply <sup>5)</sup>	->	Pulse transmitter
Red (+)	->	60
Black (-)	->	61

<sup>5)</sup> From battery or supply module.

ULTRAFLOW®	->	Pulse transmitter->	MULTICAL®
		In	Out
Blue (ground)	->	11	11A -> 11
Red (supply)	->	9	9A -> 9
Yellow (signal)	->	10	10A -> 10

ULTRAFLOW®	->	Pulse transmitter->	MAXICAL III
		In	Out
Blue (ground)	->	11	11A -> 11
Red (supply)	->	9	
Yellow (signal)	->	10	10A -> 10

## Example of connecting ULTRAFLOW® and MULTICAL®



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.

## Order specification

The list below shows type numbers for ULTRAFLOW® type 65-S with 2.5 m cable.

Type number <sup>6)</sup>	q <sub>p</sub> [m³/h]	q <sub>i</sub> [m³/h]	q <sub>s</sub> [m³/h]	Connection	Length [mm]	Meter factor [pulses/l]	CCC
65-S-CAAA-XXX	0.6	0.006	1.2	G¾B (R½)	110	300	116
65-S-CAAD-XXX	0.6	0.006	1.2	G1B (R¾)	130	300	116
65-S-CDAA-XXX	1.5	0.015	3.0	G¾B (R½)	110	100	119
65-S-CDAC-XXX	1.5	0.015	3.0	G¾B(R½)	165	100	119
65-S-CDAD-XXX	1.5	0.015	3.0	G1B (R¾)	130	100	119
65-S-CDAE-XXX	1.5	0.015	3.0	G1B (R¾)	165	100	119
65-S-CDAF-XXX	1.5	0.015	3.0	G1B (R¾)	190	100	119
65-S-CFAF-XXX	3.0	0.03	6.0	G1B (R¾)	190	50	136
65-S-CFBA-XXX	3.0	0.03	6.0	DN20	190	50	136
65-S-CGAG-XXX	3.5	0.035	7.0	G5/4 (R1)	260	50	151
65-S-CGBB-XXX	3.5	0.035	7.0	DN25	260	50	151
65-S-CHAG-XXX	6.0	0.06	12	G5/4B (R1)	260	25	137
65-S-CHBB-XXX	6.0	0.06	12	DN25	260	25	137
65-S-C1AJ-XXX	10	0.1	18	G2B (R1 ½)	300	25	137
65-S-C1BD-XXX	10	0.1	18	DN40	300	25	137
65-S-CJAJ-XXX	10	0.1	20	G2B (R1 ½)	300	15 <sup>7)</sup>	178
65-S-CJBD-XXX	10	0.1	20	DN40	300	15 <sup>7)</sup>	178
65-S-CKBE-XXX	15	0.15	30	DN50	270	10	120
65-S-C2BG-XXX	25	0.25	45	DN65	300	10	120
65-S-CLBG-XXX	25	0.25	50	DN65	300	6 <sup>7)</sup>	179
65-S-CMBH-XXX	40	0.4	80	DN80	300	5	158
65-S-FABL-XXX	60	0.6	120	DN100	360	2.5	170
65-S-FCBN-XXX	150	1.5	300	DN150	500	1	147
65-S-FEBN-XXX	400	4	800	DN150	500	0.4	171
65-S-FEBR-XXX	400	4	800	DN250	600	0.4	171
65-S-F1BR-XXX	1000	10	1800	DN250	600	0.25	172

<sup>6)</sup> XXX-code pertaining to final assembly, approvals etc. - is determined by Kamstrup A/S.  
Some variants may not be included in national approvals.

<sup>7)</sup> New pulse figures compared with ULTRAFLOW® II.

A standard ULTRAFLOW® 65-S is supplied with 2.5 m installation cable. However, ULTRAFLOW® can also be supplied with 5 or 10 m cable.

When ordering ULTRAFLOW® with 5 or 10 m cable, please state type No. 65-R-???-XXX <sup>6)</sup> and the required cable length.

### Pulse transmitter - type No. 66-99-603

The pulse transmitter is supplied with built in supply for ULTRAFLOW®. Battery, 24 VAC/DC or 230 VAC supply are available. Please state the required supply type when ordering.

# Accessories

## GLANDS INCLUDING GASKETS (PN10)

Size	Type No.	(2 off)
DN15, (R $\frac{1}{2}$ x G $\frac{3}{4}$ )	65-61-311	(65-61-321)
DN20, (R $\frac{3}{4}$ x G1)	65-61-312	(65-61-322)
DN25, (R1 x G $\frac{5}{4}$ )	65-61-313	
DN40, (R1 $\frac{1}{2}$ x G2)	65-61-315	

## GASKETS FOR GLANDS

Size	Type No.
G $\frac{3}{4}$	2210-061
G1	2210-062
G $\frac{5}{4}$	2210-063
G2	2210-065

## GASKETS FOR FLANGE METERS

Size	Type No.
DN20	2210-147
DN25	2210-133
DN40	2210-132
DN50	2210-099
DN65	2210-141
DN80	2210-140
DN100	2210-148
DN150	2210-149
DN250	2210-150

## **Authorised distributor**

Please contact Kamstrup A/S for information about your nearest distributor.