ULtRaFLOW® 54

Ultrasonic flow sensor

Compact design

static meter with no moving parts

Large dynamic range

No wear

exceptionally accurate

Longevity

MID-2004/22/EC

CE M07 0200

Data sheet

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

A three-wire pulse cable is used to connect ULTRAFLOW® 54 to the calculator. 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.

The PULSE TRANSMITTER has a built-in supply and a galvanically separated pulse outlet.

MAHRLO

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approvals

type approval

ULTRAFLOW® 54 approved in accordance with MID-2004/22/EC.

EC-Type Examination certificate: DK-0200-MI004-008.

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	2004/22/EC
LV-directive	73/23/EEC (together with the PULSE TRANSMITTER)
PE-directive	97/23/EC (DN50...DN80 category I)

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 and 3
Environmental class	Complies with DS/EN 1434 class C
Ambient temperature	0...55°C
Protection class	
– Flow sensor	IP65
– PULSE TRANSMITTER	IP54
Temperature* of medium	15...130°C
Storage temperature	
– meter without battery	-25...70°C
– meter with battery	-25...60°C
Pressure stage	PN16, PN25 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.*

electrical data

Supply voltage	3.6 V ±0.1 V
Battery (PULSE TRANSMITTER)	3.65 VDC, D-Cell lithium
Replacement interval	6 years @ t_{BAT} <35°C
Power supply (PULSE TRANSMITTER)	230 VAC +15/-30%, 48...52 Hz 24 VAC ±30%
Back-up supply	Integral super-cap eliminates operational disturbances due to short-term power-cuts.
Cable length, flow sensor	Max. 10 m
Cable length (PULSE TRANSMITTER)	Depends on calculator
EMC data	Complies with DS/EN 1434 class C

Flowdata

Nom. flow q_p [m³/h]	Nom. diameter	Meter factor [1] [imp./l]	Dynamic range q_i:q_p	q_s:q_p	Flow @125 hz [2] [m³/h]	□p@qp [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	0.22	3
2.5	DN20	60	1:100	2:1	9	0.03	5
3.5	DN25	50	1:100	2:1	9	0.07	7
6	DN25	25	1:100	2:1	18	0.20	12
10	DN40	15	1:100	2:1	30	0.06	20
15	DN50	10	1:100	2:1	45	0.14	30
25	DN65	6	1:100	2:1	75	0.06	50
40	DN80	5	1:100	2:1	90	0.05	80

[1] The meter factor can be seen on the label on the side of the meter.
[2] Saturation flow. Max. pulse frequency 128 Hz is maintained at higher flow rates.

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Materials

Wetted parts

ULtRaFLOW® 54, q_p 0.6 and 1.5 m³/h

Housing, gland	Dezincification resistant brass
Housing, flange	Red brass, RG5
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

ULtRaFLOW® 54, q_p 2.5 to 40 m³/h

Housing, gland	Dezincification resistant brass
Housing, flange	Red brass, RG5
Transducers	Stainless steel, W.no. 1.4401
Gaskets	EPDM
Measuring pipe	Thermoplastic, PES 30% GF
Reflectors	Stainless steel, W.no. 1.4301

electronic housing

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

Connection cable q_p 0.6 to 40 m³/h

Silicone cable (3 x 0.5□)

type summary

Nom. flow q_p [m³/h]	size					
0.6	G¾ x 110 mm	G1 x 130 mm				
1.5	G¾ x 110 mm	G¾ x 165 mm	G1 x 130 mm	G1 x 165 mm	G1 x 190 mm	DN20 x 190 mm
2.5	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					

Thread ISO 228-1
Flange EN 1092-3, PN25

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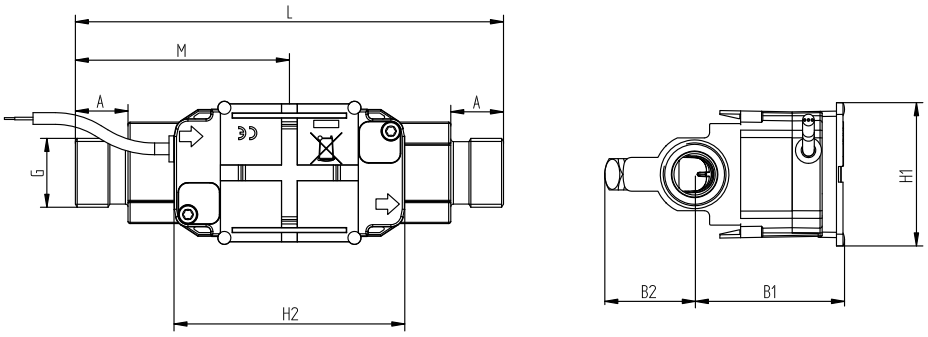
Dimension sketches

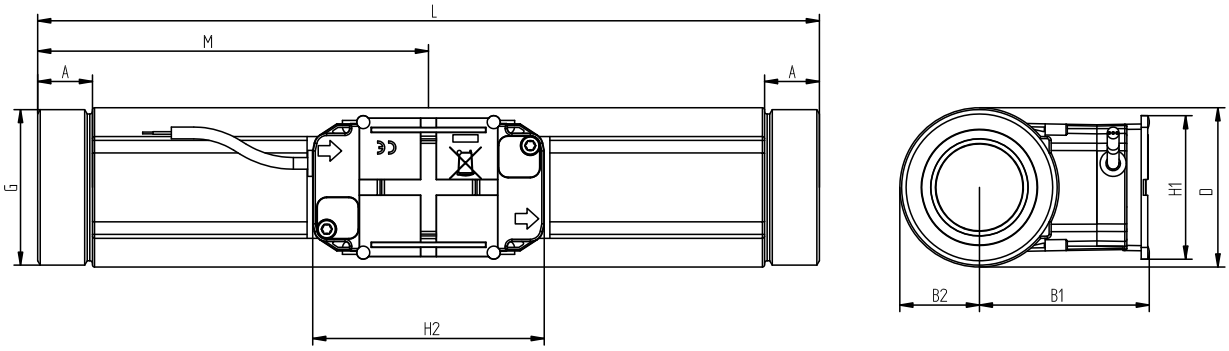
ULtRaFLOW® 54, G¾ and G1



thread ISO 228-1

thread	L	M	h2	a	B1	B2	h1	app. weight [kg]
G¾	110	L/2	89	10.5	58	35	55	0.8
G1	130	L/2	89	20.5	58	35	55	0.9
G¾	165	L/2	89	20.5	58	35	55	1.2
G1	165	L/2	89	20.5	58	35	55	1.2
G1(q_p 1.5)	190	L/2	89	20.5	58	35	55	1.4
G1(q_p 2.5)	190	L/2	89	20.5	58	36	55	1.3

ULtRaFLOW® 54, G5/4 and G2



thread ISO 228-1

thread	L	M	h2	a	B1	B2	h1	app. weight [kg]
G5/4	260	L/2	89	17	58	22	55	2.3
G2	300	L/2	89	21	65	31	55	4.5

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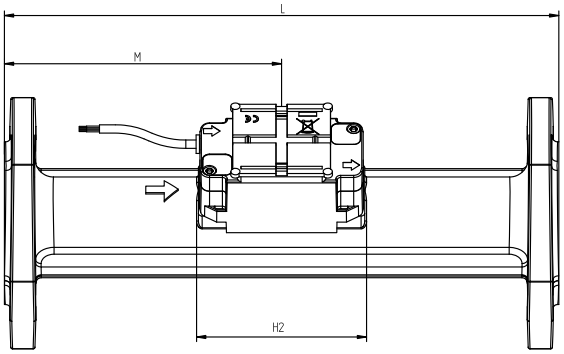
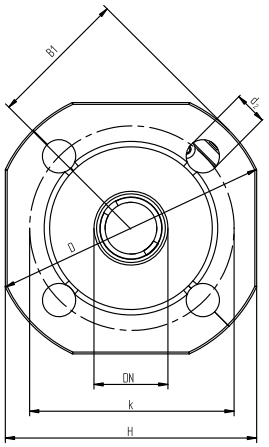
Dimension sketches

ULtRaFLOW® 54, DN20 to DN50

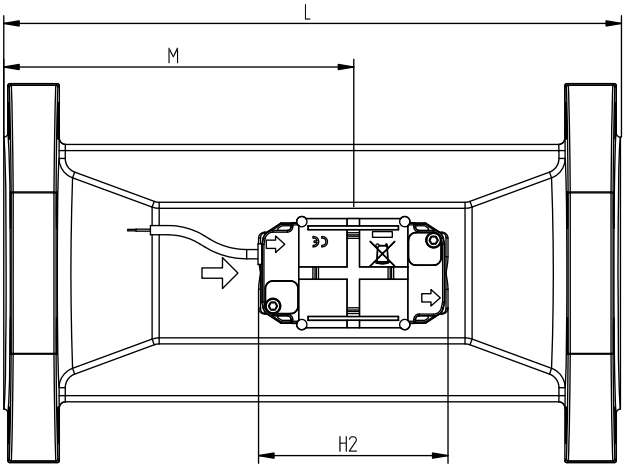


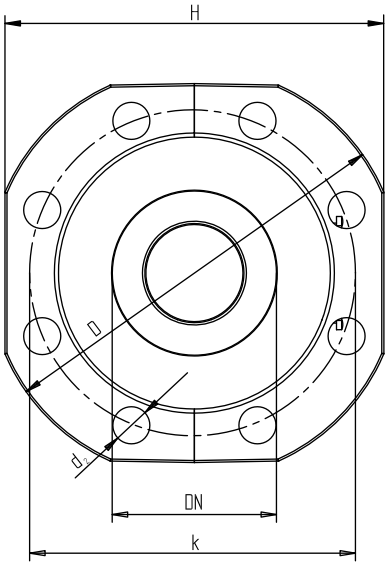


Flange eN 1092-3, type B, PN25

Nom. dia.	L	M	h2	B1	D	h	k	Bolts No.	t hread	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
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

ULtRaFLOW® 54, DN65 and DN80





Flange eN 1092-3, type B, PN25

Nom. dia.	L	M	h2	B1	D	h	k	Bolts No.	t hread	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

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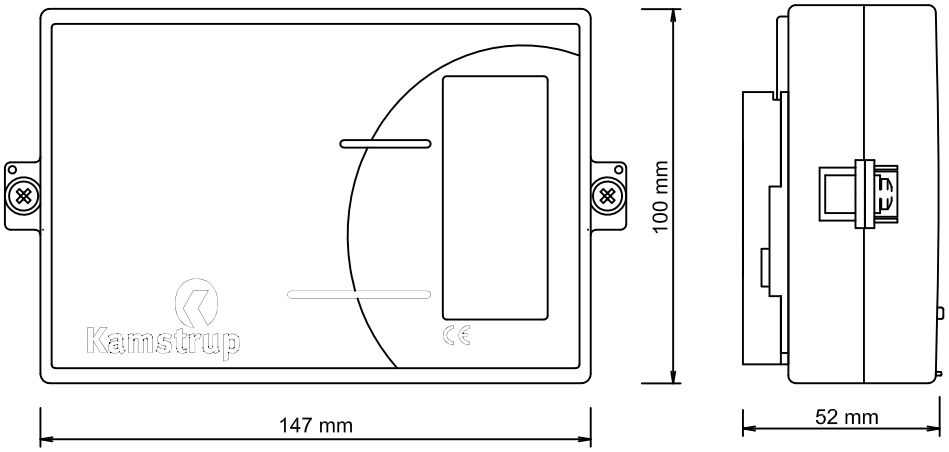
PULse t RaNs MIt t eR

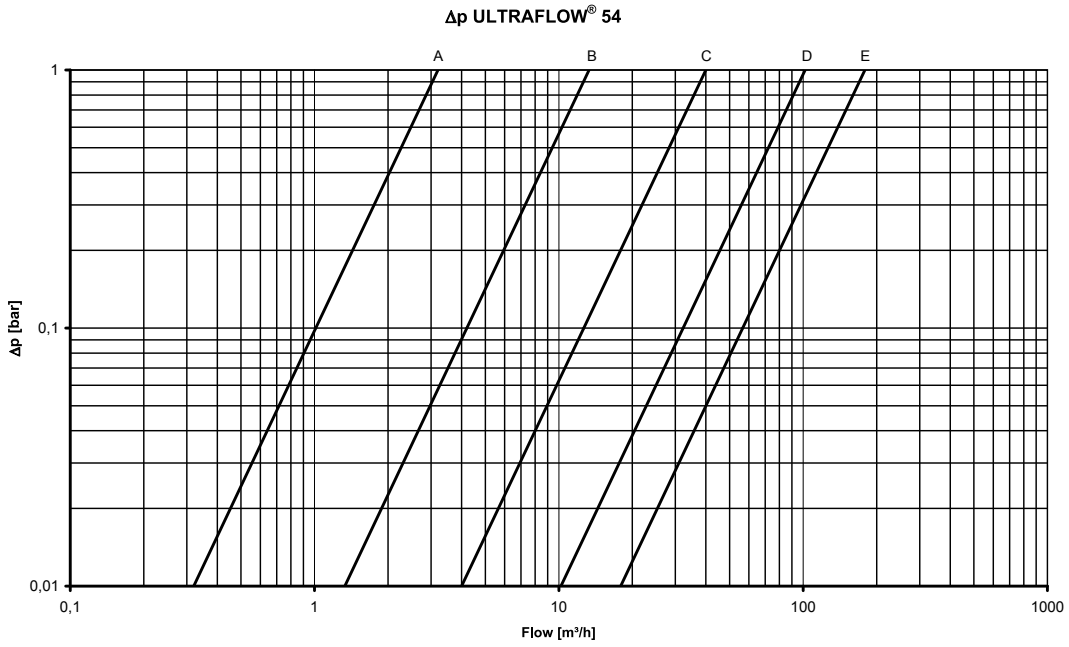


Pressure loss

Graph	q_p [m³/h]	Nom. diameter	k_v [3)]	Q@0.25 bar [m³/h]
A	0.6 & 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

[3)] $q=k_v \times \sqrt{\Delta p}$

Pressure loss graphs



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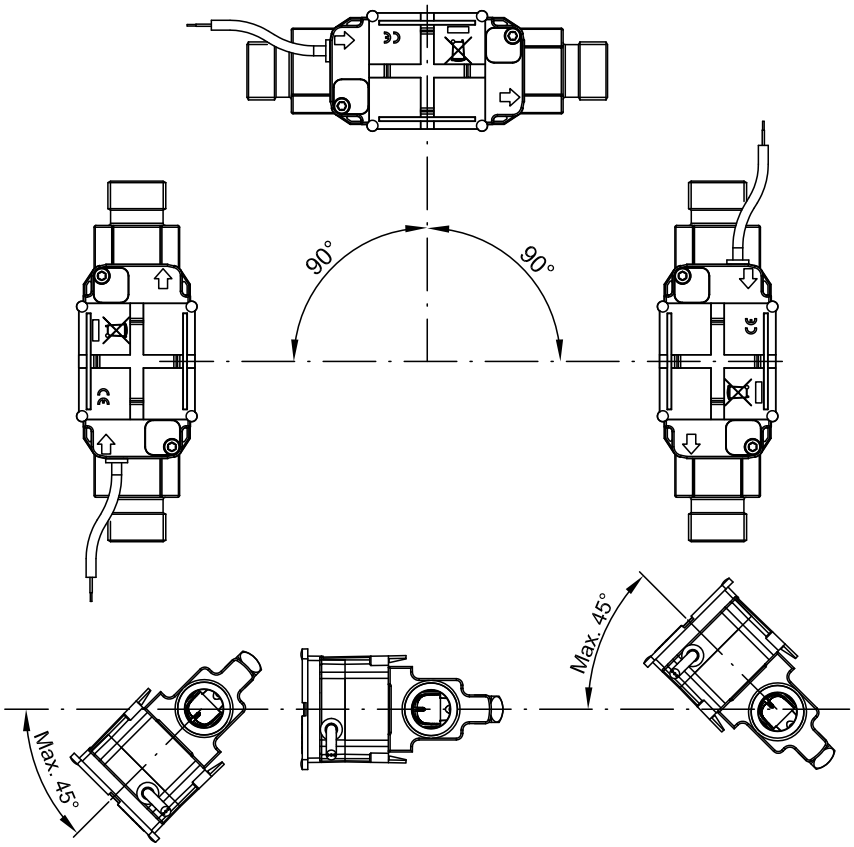
Installation

Installation angle for ULtRaFLOW® 54 □DN80



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

IMPORtaNt!

With ULTRAFLOW® 54 □DN80 (40 m³/h), the electronics/plastic case must be placed to the side (with horizontal installation).

ULTRAFLOW® 54 may be turned up to ±45° in relation to the pipe axis.

straight inlet

ULTRAFLOW® requires neither straight inlet nor outlet to meet the Measuring Instruments Directive (MID) 2004/22/EC, 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 to follow the guidelines in CEN CR 13582.

Working Pressure

In order to prevent cavitation the back pressure at ULTRAFLOW® 54 must be min. 1.5 bar at qp and min. 2.5 bar at qs (4.5 bar for DN80 x 350). This applies to temperatures up to approx. 80°C.

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

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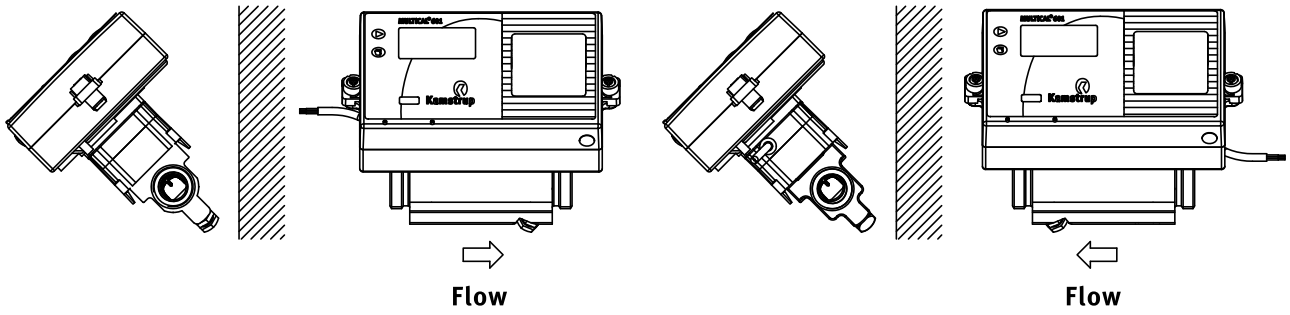
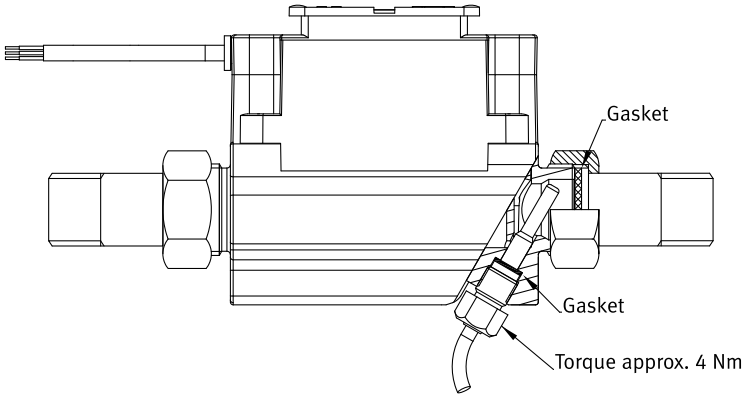
examples of installation

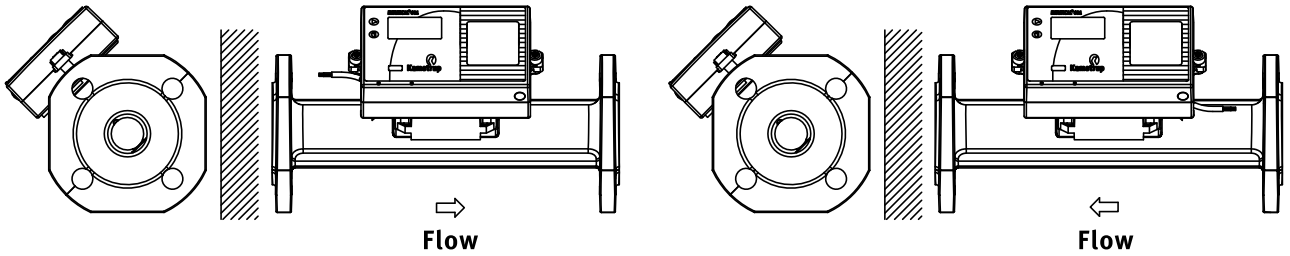
Gland meter with MULTICAL®/PULSE TRANSMITTER fitted directly on ULTRAFLOW® 54.



Glands and short direct sensor fitted in ULTRAFLOW® 54 (G¾ (R½) and G1 (R¾) only).



Flange meter with MULTICAL®/PULSE TRANSMITTER fitted directly on ULTRAFLOW® 54.



NB: For meters □DN100 MULTICAL® or the PULSE TRANSMITTER **cannot** be fitted directly on the flow part.

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electrical connection

Connecting MULtICaL®/MaXICaL III & ULtRaFLOW® 54

ULtRaFLOW® 54	->	MULtICaL®, MaXICaL III
Blue (GND)/11A	->	11
Red (supply)/9A	->	9
Yellow (signal)/10A	->	10

Connecting via PULsetRaNsMIttteR

3.65 VDC supply [4]	->	PULsetRaNsMIttteR
Red (+)	->	60
Black (-)	->	61

[4] *from battery or supply module.*

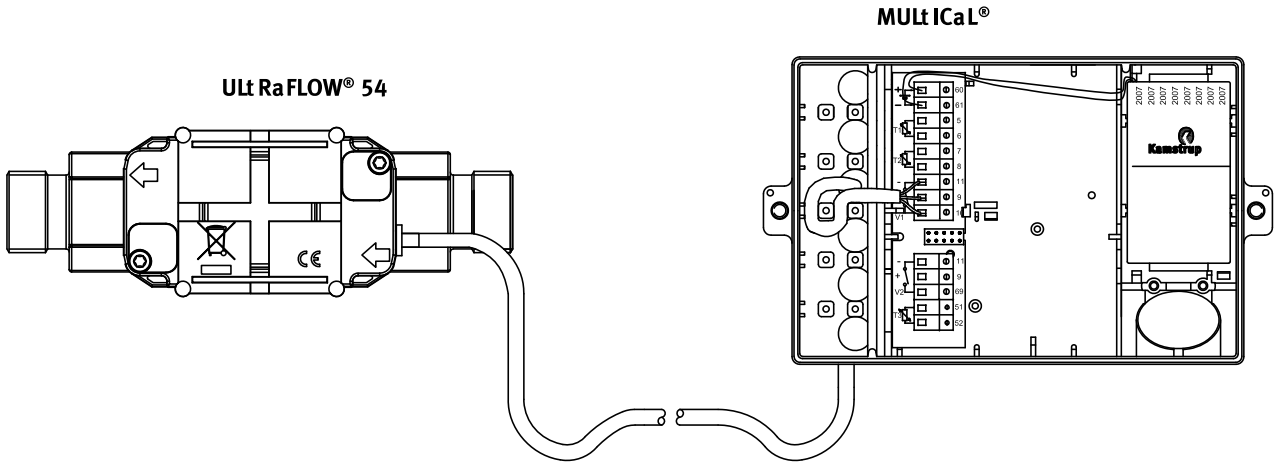
If long signal cables are used, please consider the installation carefully. There must be **at least 25 cm** between the signal cable and all other cables due to EMC.

ULtRaFLOW® 54	->	PULsetRaNsMIttteR		->	MULtICaL®
		In	Out		
Blue (GND)/11A	->	11	11A	->	11
Red (supply)/9A	->	9	9A	->	9
Yellow (signal)/10A	->	10	10A	->	10

ULtRaFLOW® 54	->	PULsetRaNsMIttteR		->	MaXICaL III
		In	Out		
Blue (GND)/11A	->	11	11A	->	11
Red (supply)/9A	->	9			
Yellow (signal)/10A	->	10	10A	->	10

example of connecting ULtRaFLOW® 54 and MULtICaL®

ULtRaFLOW® 54, q_p □40 m³/h



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Order specification

The list below shows type numbers for ULTRAFLOW® 54

type number [5]	q_p [m³/h]	q_i [m³/h]	q_s [m³/h]	Connection	Length [mm]	Meter factor [pulses/l]	CCC (high res.)
65-5-CAAA-XXX	0.6	0.006	1.2	G¾B (R½)	110	300	116 (184)
65-5-CAAD-XXX	0.6	0.006	1.2	G1B (R¾)	130	300	116 (184)
65-5-CDAA-XXX	1.5	0.015	3.0	G¾B (R½)	110	100	119 (107)
65-5-CDAC-XXX	1.5	0.015	3.0	G¾B (R½)	165	100	119 (107)
65-5-CDAD-XXX	1.5	0.015	3.0	G1B (R¾)	130	100	119 (107)
65-5-CDAE-XXX	1.5	0.015	3.0	G1B (R¾)	165	100	119 (107)
65-5-CDAF-XXX	1.5	0.015	3.0	G1B (R¾)	190	100	119 (107)
65-5-CDBA-XXX	1.5	0.015	3.0	DN20	190	100	119 (107)
65-5-CEAF-XXX	2.5	0.025	5.0	G1B (R¾)	190	60	198
65-5-CEBA-XXX	2.5	0.025	5.0	DN20	190	60	198
65-5-CGAG-XXX	3.5	0.035	7.0	G5/4B (R1)	260	50	151 (136)
65-5-CGBB-XXX	3.5	0.035	7.0	DN25	260	50	151 (136)
65-5-CHAG-XXX	6.0	0.06	12	G5/4B (R1)	260	25	137 (138)
65-5-CHBB-XXX	6.0	0.06	12	DN25	260	25	137 (138)
65-5-CJAJ-XXX	10	0.1	20	G2B (R1½)	300	15	178 (183)
65-5-CJBD-XXX	10	0.1	20	DN40	300	15	178 (183)
65-5-CKBE-XXX	15	0.15	30	DN50	270	10	120 (185)
65-5-CLBG-XXX	25	0.25	50	DN65	300	6	179
65-5-CMBH-XXX	40	0.4	80	DN80	300	5	158 (186)

[5] *XXX-code pertaining to final assembly, approvals etc. is determined by Kamstrup A/S. Some variants may not be included in national approvals.*

ULTRAFLOW® 54 is as standard supplied with 2.5 m cable, but can also be supplied with 5 or 10 m cable.

PULse t RaNsMIt t eR – type No. 66-99-603
The PULSE TRANSMITTER is supplied 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

Glands including gaskets (PN16)

size	Nipple	Union	type No.	2 pcs.
DN15	R½	G¾	65-61-311	65-61-321
DN20	R¾	G1	65-61-312	65-61-322
DN25	R1	G5/4	65-61-313	
DN40	R1½	G2	65-61-315	

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

Gaskets for glands

size (union)	type No.
G¾	2210-061
G1	2210-062
G5/4	2210-063
G2	2210-065

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