

ULTRAFLOW® 85

Ultrasonic volume measuring device
DN 150 - DN 300

Your benefits

- Durable, wear-free ultrasonic volume measuring unit:
  High measuring stability and operational reliability
- Compact design:
  Little installation space required on site
- High resolution of the pulse value:
  Precise instantaneous values
- CH refrigeration approval (METAS) incl. initial calibration:
  Approved for use in clearing traffic

Applications

- Especially suitable for district heating/cooling applications (main meters, transfer stations, etc.) in billing traffic
- Heating and/or cooling consumption measurement in the building services sector
- MID-approved bidirectional flow measurement

Properties

- Nominal flow rate: q_p 150 - q_p 1000 m³/h
- Nominal diameter: DN 150 bis DN 300
- Low pressure loss
- Built-in display
- Medium temperature: 2 to 130 °C
- Type testing/approval:
  - Heat: CE Conformity in accordance with the European Measuring Instruments Directive (MID)
  - Cooling: CH approval (METAS) incl. initial calibration

Options

- Pulse transmitter with its own power supply for cable lengths >10 m

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Compliance

Type approval

Approved volume measuring meter for heating in accordance with MID 2014/32/EU	
EU-Type Examination certificate	DK-0200-MI004-048
MID-certified according to Module D	DK-0200-MID-D-001

Tested volume measuring meter for cooling in accordance with DK-BEK 1178 – 06/11/2014	
System designation	TS 27.02 019
Verification	DANAK accreditation 268

Standards and documents	
EN	EN 1434:2022
OIML	OIML R75:2002
WELMEC	WELMEC 7.2:2023 (May 2024)

CE-marking	
ULTRAFLOW® 85 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 (category I or II)

Approved meter data	
MID designation	
Mechanical environment	M1 (vibrations and shocks of low significance) M2 (significant or high levels of vibrations and shocks)
Electromagnetic environment	E1 (residential, commercial and light industrial buildings) E2 (other industrial buildings
Ambient conditions	5...55 °C, condensing, closed location (indoors installation)
Accuracy class	2 and 3
EN 1434 designation	
Environmental class	C (high electrical and electromagnetic conditions)
Fast response meter	Volume sampling interval (sub-assembly flow sensor) depends on connected calculator. Down to 0,5 s with MULTICAL® 603-S/603-U/803-A. Requires mains supply. Otherwise 1 s.

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Technical Data

Electrical data	
Internal supply voltage battery:	3,6 V DC ± 0,1 V DC
Display backlight	OFF
(MULTICAL® or Pulse Transmitter/Pulse Divider)	3,65 V DC, D-cell lithium
Battery lifetime (replacement interval):	
ULTRAFLOW® 85 and MULTICAL® - serial mode - pulse mode	Up to 16 years @ tBAT <30 °C Up to 13 years @ tBAT <30 °C
- Pulse Transmitter/Pulse Divider	6 years @ tBAT <30 °C (Y=3)
Mains supply:	
Display backlight	ON
- MULTICAL®	230 V AC +15/-30 %, 50 Hz or 60 Hz
- Pulse Transmitter/Pulse Divider	24 V AC ± 50 %, 50 Hz or 60 Hz
Backup supply	**Integral capacitor eliminates operational disturbances due to short-term power cuts**
Cable length:	
- Flow sensor	Max. 10 m
- Pulse Transmitter/Pulse Divider	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 measurement of forward and reverse flow as well as extended info codes)
Electromagnetic environment	Fulfils EN 1434 class C, MID E1 and E2
Pulse output	**Galvanically connected (ULTRAFLOW®)**
- Typ	Push-Pull
- Output impedance	10 kW
- Pulse duration	2...6 ms
- Pause time	Depending on current pulse frequency

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Mechanical data	
Accuracy class	2 and 3
Electromagnetic environment	Fulfils EN 1434 class C, MID E1 and E2
Mechanical environment	MID M1 and M2
Ambient conditions	5...55 °C, closed location (installation indoors)
Protection class:	
- Flow sensor - Cable extender box - Pulse Transmitter/Pulse Divider	IP68 IP68 IP67
Medium in flow sensor	Water – recommended water quality as in CEN TR 16911 and AGFW FW510
Medium temperature[1)]	2...150 °C or narrower range
Storage temperature	-25...60 °C
Pressure stage	PN16, PS16 (DN 300) PN25, PS25 or PN16, PS16 (DN 150-250); see marking
Straight inlet requirement	0D (according to EN 1434:2022 and OIML R75:2002)
Installation angle	Horizontally, vertically and at an angle

1] At medium temperature above 120 °C ULTRAFLOW® 85 must be insulated! Do not cover the hole of the extension tube, when insulating ULTRAFLOW® 85!

Flow data

Flow data							
Nominal flow rate	**q_p**	**m^3/h**	**150**	**250**	**400**	**600**	**1000**
Meter factor[1)]		p/l	1	0,6	0,4	0,25	0,15
Dynamic range	$q_p:q_i$		100:1				
Dynamic range	$q_s:q_p$		2:1				
Flow at 125 Hz[2)]	q	m^3/h	450	750	1125	1800	3000
Min. cutoff		l/h	750	1250	2000	3000	5000

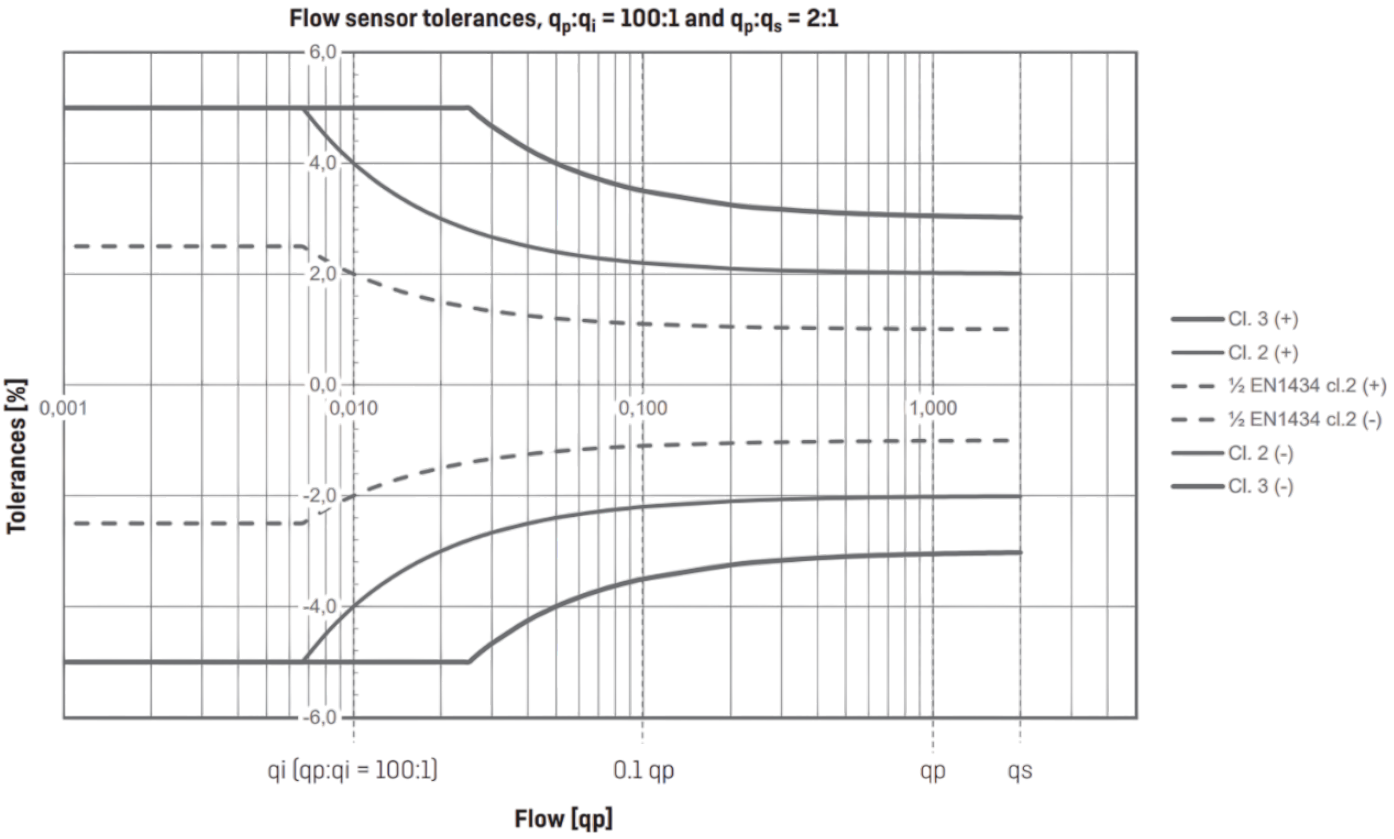
1] The meter factor appears from the type label.
2] Saturation flow 125 Hz. Max. pulse frequency is maintained at higher flow.

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Measurement accuracy

Measurement accuracy	
Class 3	$E_f = \pm(3 + 0{,}05\ q_p/q)$, but not above ±5 %
Class 2	$E_f = \pm(2 + 0{,}02\ q_p/q)$, but not above ±5 %
Typical[1)]	$E_f = \pm(1 + 0{,}01\ q_p/q)$

1] Documented with DANAK-accredited certificate at flow qi, 0,1 qp and qp.



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Materials

Wetted parts	
Housing	Stainless steel, W. no. 1.4308
Flanges	Stainless steel, W. no. 1.4301
Transducer	Titanium
Gaskets	Fibre

Electronic box	
Extension tube	Thermoplastic, 40 % glass-reinforced Polyphenylenesulfide (PPS)
Base part	Thermoplastic, 10 % glass-reinforced polycarbonate (PC)
Transparent lid	Thermoplastic, Polycarbonate (PC)
Top cover	Thermoplastic, 10 % glass-reinforced polycarbonate (PC)
Calculator mount bracket	Thermoplastic, 10 % glass-reinforced polycarbonate (PC)
Signal cable (optional)	Silicone cable (3 x 0,5 mm^2)
Power supply cable 24/230 VAC (optional for Pulse Transmitter/Pulse Divider)	Cable with PVC mantle (2 x 0,75 mm^2)

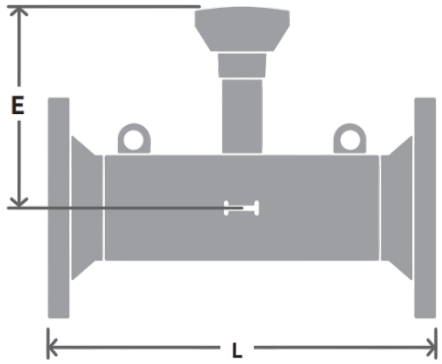
Housing, Cable Extender Box	
Base, cover	Thermoplastic, acrylonitrile butadiene styrene (ABS)

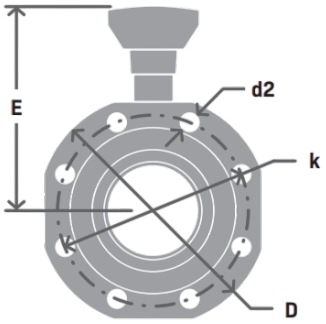
Housing, Pulse Transmitter/Pulse Divider	
Base, cover	Thermoplastic, 10 % glass-reinforced polycarbonate (PC)

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Dimensional sketches ULTRAFLOW® 85

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





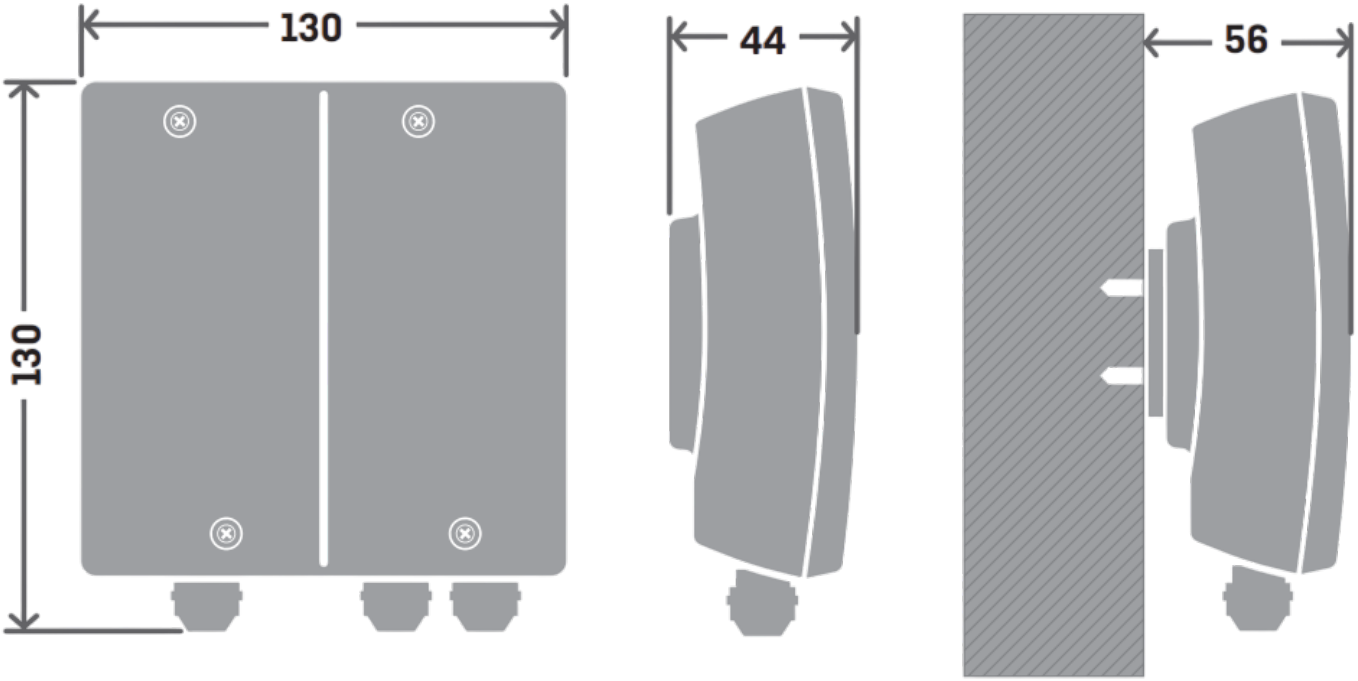
ULTRAFLOW® 85 PN16															
Nominal flow rate	**q_p**	**m^3/h**	**150**		**250**		**250**		**400**		**400**		**600**		**600**		**1000**
Nominal diameter	**DN**	**mm**	**150**		**150**		**200**		**200**		**250**		**250**		**300**		**300**
Nominal pressure	**PN,PS**	**bar**	**16**														
Length	L	mm	500								600				500		
Flange diameter	D	mm	285				340				405				460		
Pitch circle diameter	k	mm	240				295				355				410		
Bolt quantity		Pcs.	8								12						
Bolt thread			M20								M24						
Bolt diameter	d2	mm	22								26						
Height from pipe centre line	E	mm	264				281				341				370		
Weight		kg	27				41				67				80		

ULTRAFLOW® 85 PN25												
Nominal flow rate	**q_p**	**m^3/h**	**150**	**250**	**250**		**400**		**400**		**600**	
Nominal diameter	**DN**	**mm**	**150**	**150**	**200**		**200**		**250**		**250**	
Nominal pressure	**PN,PS**	**bar**	**25**									
Length	L	mm	500						600			
Flange diameter	D	mm	300		360				425			
Pitch circle diameter	k	mm	250		310				370			
Bolt quantity		Pcs.	8		12							
Bolt thread			M24						M27			
Bolt diameter	d2	mm	26						31			
Height from pipe centre line	E	mm	264		281				341			
Weight		kg	33		53				83			

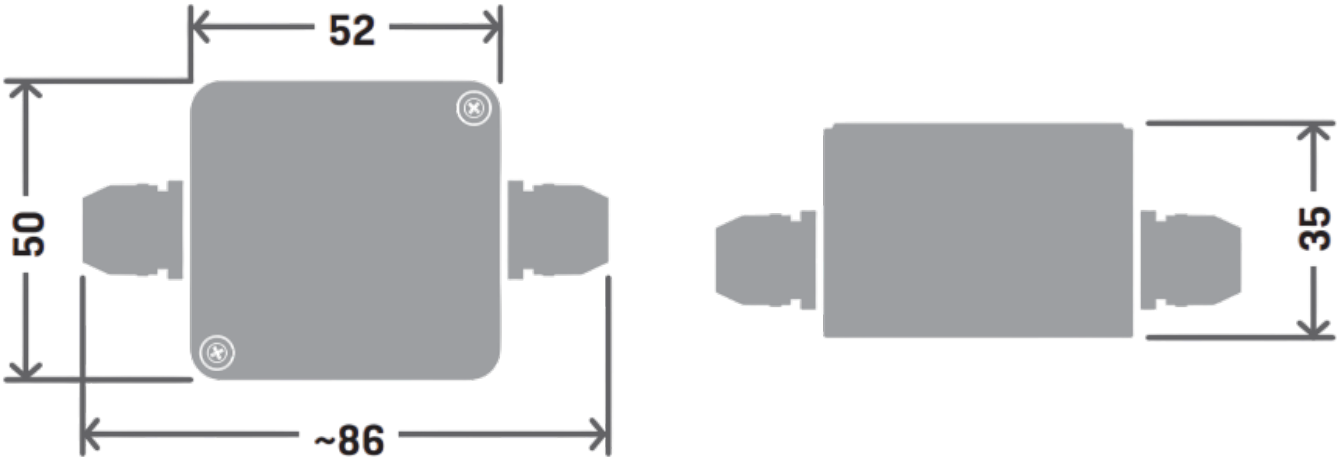
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Dimensional sketches boxes

Pulse Transmitter/Pulse Divider



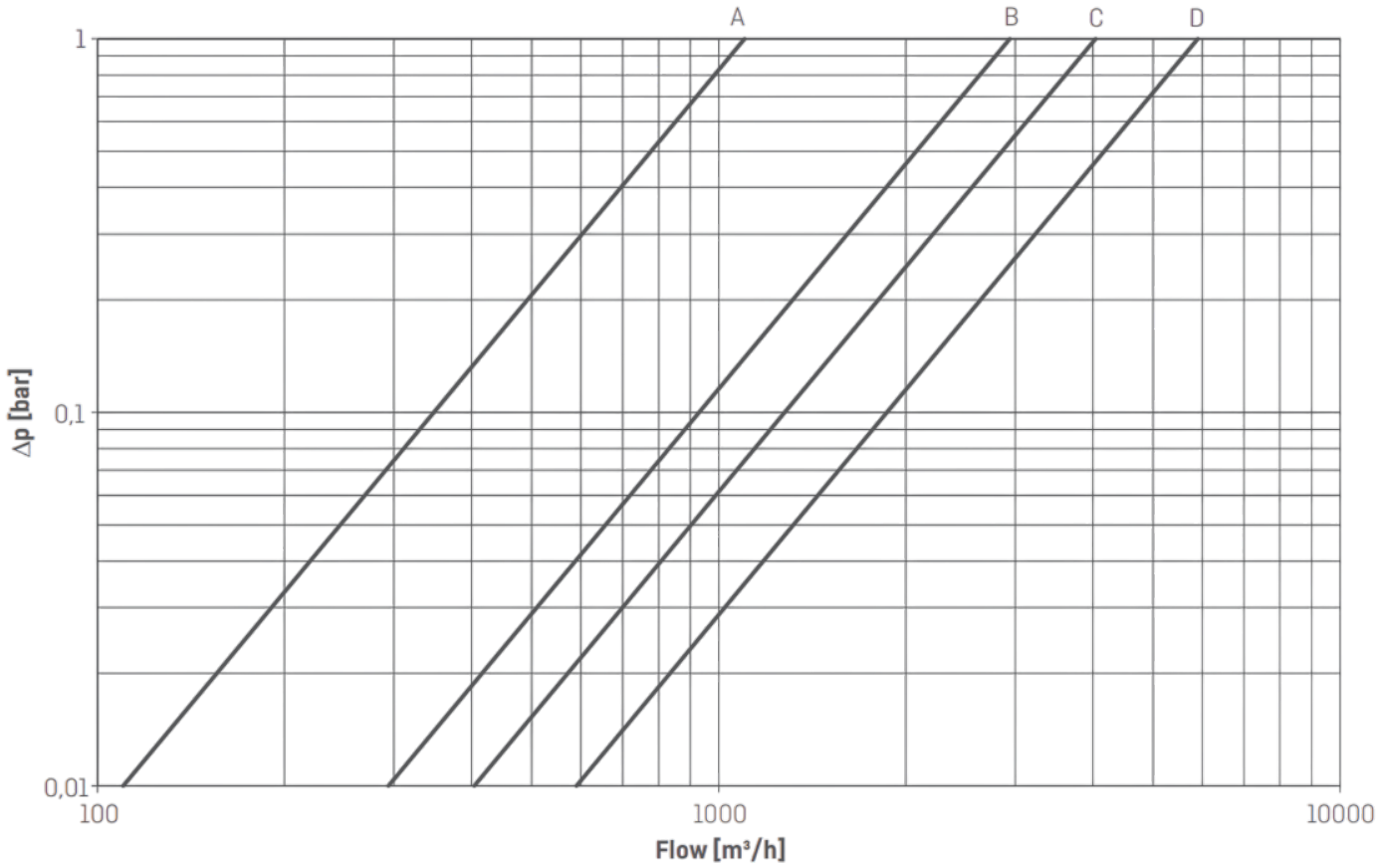
Cable Extender Box



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Pressure loss

			A		B		C		D	
Nominal flow rate	**q_p**	**m³/h**	**150**	**250**	**250**	**400**	**400**	**600**	**600**	**1000**
Nominal diameter	**DN**	**mm**	**150**	**150**	**200**	**200**	**250**	**250**	**300**	**300**
Length		mm	500		500		600		500	
Pressure loss at q_p		bar	0,02	0,06	0,02	0,04	0,02	0,04	0,01	0,03
kv value		m³/h	1100		1945		2940		5900	
Flow rate at 0,25 bar		m³/h	550		973		1470		2950	



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Installation

Please read this chapter carefully before installing the meter

In case of incorrect mounting, manufacturer's guarantee obligations no longer apply. By connecting to 230 V supply, there is a risk of electric shock. When working on the flow sensor in the installation, there is a risk of outflow of (hot) water under pressure. At a media temperature higher than 60 °C, the flow sensor should be shielded from unintended contact. 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 forward flow direction is indicated by an arrow on the flow sensor.

ULTRAFLOW® 85 may be lifted in the lifting rings only.

Pressure stage: PN16, PS16 or PN25, PS25. See marking on flange or label.
Temperature of medium: 2...150 °C or narrower range. See marking on label.
Mechanical environment: M1 and M2 (fixed installation with minimum vibration and fixed installation with considerable or high vibration level respectively).
Electromagnetic environment: E1 and E2 (housing/light industry and industry respectively). The meter's signal cables must be drawn at min. 25 cm distance to other installations.
Ambient conditions: The ambient temperature must be within 5...55 °C. Installation must be in closed locations (indoors).
Protection class: IP68 – The flow sensor is durable, even in permanently wet conditions.
Insulation: ULTRAFLOW® 85 can be insulated. At medium temperature above 120 °C ULTRAFLOW® 85 must be insulated.
Maintenance and repair: The flow sensor is verified separately and can, therefore, be separated from the calculator. It is permitted to replace the transparent lid and the 3-wire cable from ULTRAFLOW® 85 on-site. Other repairs must be performed in a workshop and requires subsequent reverification in an accredited laboratory.

Heat installations	The tower can point in any direction.	
Cooling installations	The tower must always point upwards to avoid risking condensation damaging the electronics.	

Inlet section ULTRAFLOW® 85

ULTRAFLOW® 85 requires neither straight inlet nor outlet in order to fulfil the Measuring Instruments Directive (MID) 2014/32/EU and EN 1434. Only in case of heavy flow disturbances before the meter will a straight inlet section be necessary. We recommend following the guidelines in CEN TR 13582.

Operating pressure

To minimise the risk of measuring errors as a result of cavitation or air in the water, it is recommended to keep a sufficient static pressure at the flow sensor outlet of min. 1,5 bar at q_p and min. 2,5 bar at q_s . This applies to temperatures up to app. 80 °C.

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Electrical connection

Connecting via Pulse Transmitter/Pulse Divider/Cable Extender Box

ULTRAFLOW® 85	→	Pulse Transmitter/Pulse Divider/Cable Extender Box		→	MULTICAL®
		Input	Output		
Blue (GND)	→	11	11A/11	→	11
Red (supply)	→	9	9A/9	→	9
Yellow (signal)	→	10	10A/10	→	10

Pulse Transmitter/Pulse Divider provides galvanic separation, but does not support extended info codes and bi-directional flow measurement.

Cable Extender Box does not provide galvanic separation, but supports extended info codes and does not prohibit bi-directional flow measurement.

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® 85 is preferentially mains supplied e. g. via MULTICAL® 603-S/-U to achieve e. g. the highest volume sampling frequency.

In case of battery supply the battery lifetime depends on many parameters like e. g. data communication, integration mode and environmental temperature. For further information, see the technical documentation of the connected MULTICAL® calculator.

ULTRAFLOW® 85	→	MULTICAL®	Designation	Color
11	→	11	GND	(Blue)
9	→	9	+3,6 V	(Red)
10	→	10	Signal	(Yellow)

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