

MULTICAL® 303

Thermal energy meter

Your benefits

- Ultrasonic Technology:
  Long-term stable energy measurement with highest measurement accuracy
- Large dynamic range:
  Measurement stability
- Low pressure loss:
  Energy efficiency in the grid and cost savings in dimensioning
- Small and compact:
  Suitable for tight installation spaces
- Robust:
  PN 25 flow sensor, approved up to 130 °C

Applications

- Replacement of mechanical impeller heat meters
- Heat and/or cooling consumption measurement in building services engineering

Properties

- Nominal diameters from DN 15 to DN 20
- Nominal flow rates from q_p 1,5 to q_p 2,5
- Any installation position
- Low pressure loss
- Media temperature 2 to 90 °C at compact mounting (up to 130 °C for wall mounting)
- Battery life up to 16 years (depending on environment and configuration conditions)
- Pt 500 temperature sensor
- Storage of the last 36 monthly and 20-year values
- Type testing / Approval:
  - Heat: CE Conformity according to the European Measuring Instruments Directive (MID)
  - Cold: Swiss approval (METAS) including initial verification

Options

- M-Bus
- Wireless M-Bus, OMS T1 radio, 868 MHz (11-year battery life)

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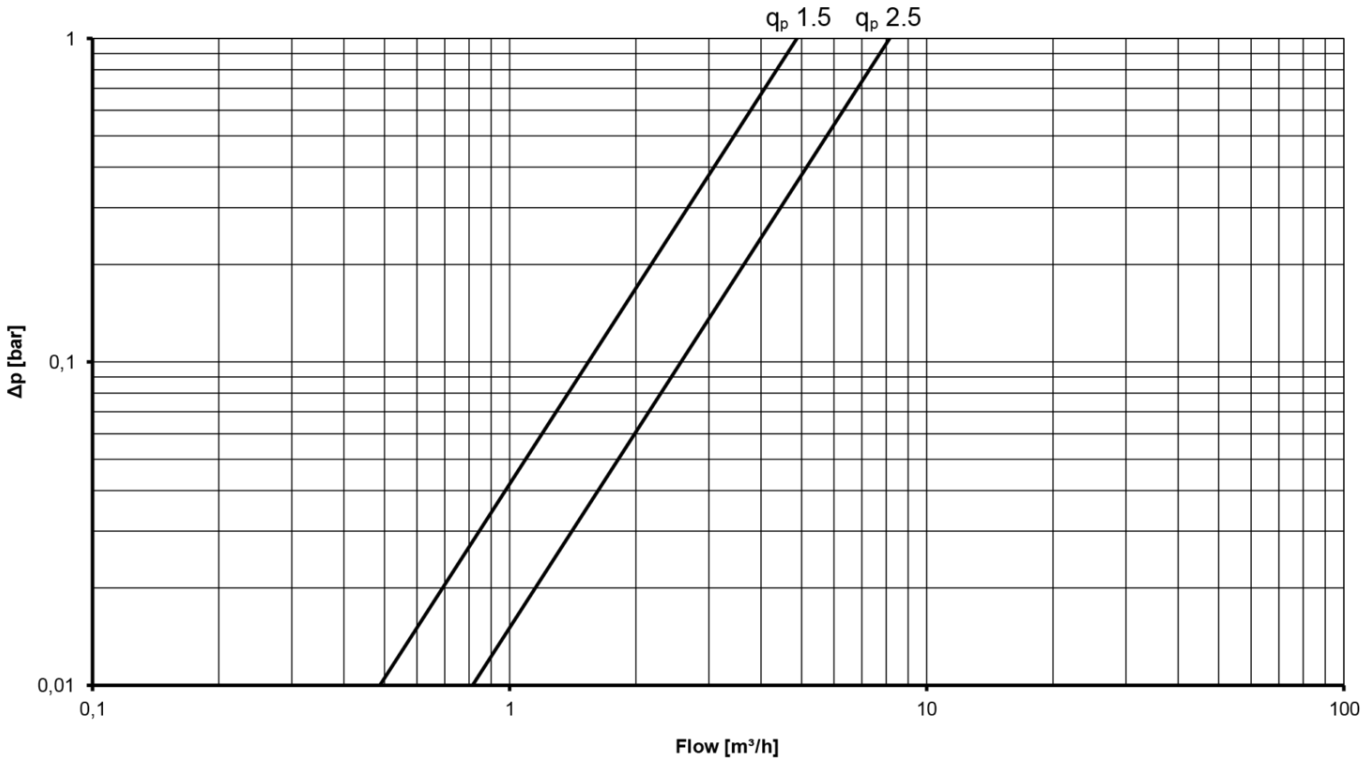
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Technical Data

MULTICAL® 303 Series					
Nominal diameter	**DN**	**mm**	**15**	**20**	**20**
Nominal flow rate	**q_p**	**m^3/h**	**1,5**	**1,5**	**2,5**
Connection thread on the meter	G...B	Inch	¾	1	1
Maximum flow rate	q_s	m^3/h	3	3	5
Minimum flow rate	q_i	l/h	15	15	25
Starting value		l/h	3	3	5
Kvs value		m^3/h	4,89	4,89	8,15
Maximum pressure	PN		25		
Standard measuring range	q_p / q_i		100:1		
Protection class			Calculator IP65 Flow sensor IP68		

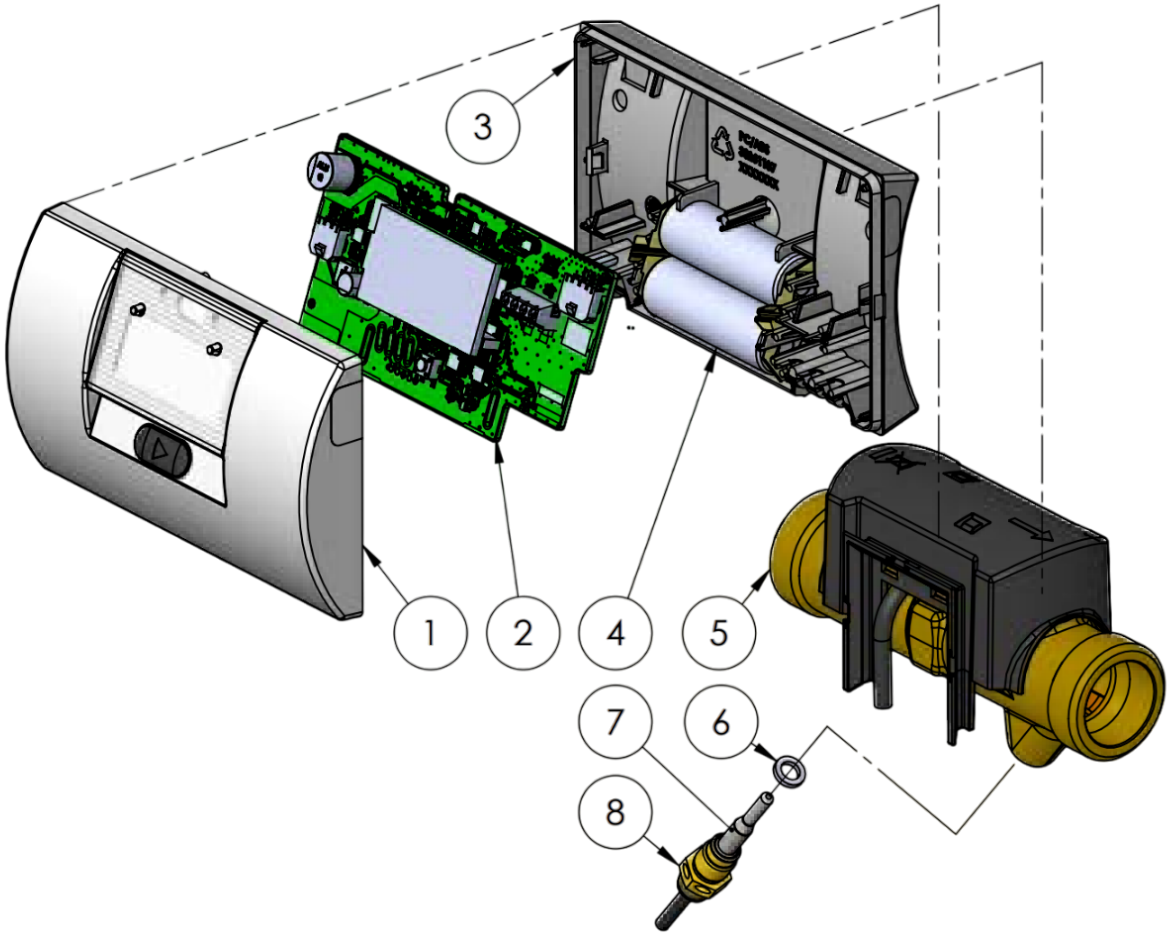
Pressure loss

The pressure loss in a flow sensor is stated as the maximum pressure loss at q_p.
According to EN 1434, the maximum pressure loss must not exceed 0,25 bar.



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Mechanical design



1 Top cover with front key and laser engraving
2 PCB with microcontroller, flow-ASIC, display, etc.
3 Base cover (may only be opened by an authorised laboratory)
4 One or two A-cell batteries
5 Flow sensor cover (may only be opened by an authorised laboratory)
6 O-ring, temperature sensor
7 Union, temperature sensor
8 Temperature sensor

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Mechanical data

MULTICAL® 303	
Weight (depending on the flow sensor size)	0,7 kg – 0,8 kg
Ambient temperature	5…55 °C. Non-condensing, closed location (indoor installation)
Media temperatures	2…130 °C (At media temperatures below the ambient temperature or above 90 °C, wall-mounting of the calculator is recommended)
Medium in flow sensor	Water (district heating water as described in CEN TR 16911 and AGFW FW510)
Storage temperature	-25…60 °C (drained flow sensor)
Flow sensor cable	1,5 m (the cable is non-detachable)
Temperature sensor cables	1,5 m

Materials	
Case, coupling	Hot forged, dezincification-resistant brass (CW 602N)
Transducer	Stainless steel, W. No. 1.4404
O-rings	EPDM
Measuring tube	Thermoplastic, PES 30 % GF
Reflektors	Thermoplastic, PES 30 % GF and stainless steel, W. No. 1.4306
Flow sensor cover	Thermoplastic, PC 20 % GF
Wall bracket	Thermoplastic, PC 20 % GF
Calculator Top	Thermoplastic, PC 10 % GF with TPE (thermoplastic elastomer)
Calculator Base	Thermoplastic, PC/ABS
Cables	Silicone cable with inner Teflon insulation

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Approved meter data

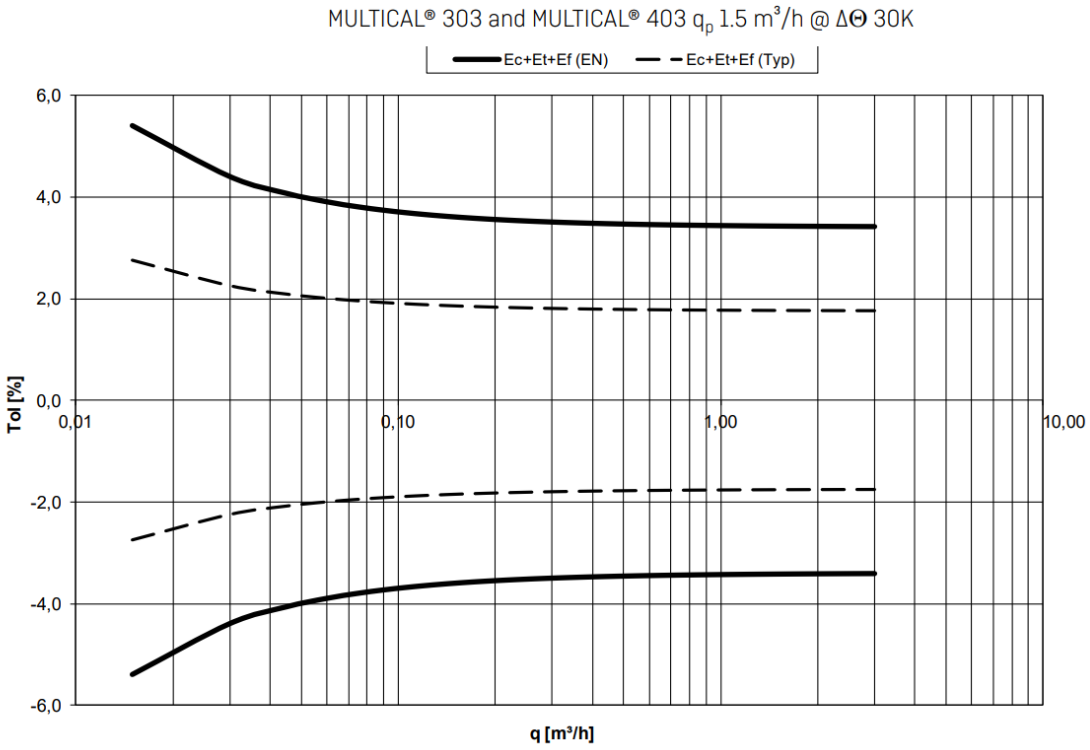
MULTICAL® 303	
Heat meter	DK-0200-MI004-045
Bifunctional heat/cooling meter	DK-0200-MI004-045 and TS 27.02 015
Temperature range	θ: 2 °C...180 °C
Differential range	Δθ: 3 K...178 K
Total Temperature range	The stated minimum temperatures only relate to the type approval. The meter has no cut-off for low temperature and thus measures down to 0,01 °C and 0,01 K.
Standards and norms	EN 1434:2007/AC:2007 EN 1434:2015+A1:2018 EN 1434:2022 BEK1178
EU directives	Measuring Instruments Directive Low Voltage Directive Electromagnetic Compatibility Directive Radio Equipment Directive RoHS Directive Pressurised Equipment Directive
EN 1434 designation	Environmental class A
MID Mechanical environment	Class M1 and M2
MID Electromagnetic environment	Class E1
Temperature sensor	Pt 500 – EN 60751

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Accuracy

Meter components	MPE according to EN 1434-1	MULTICAL® 303, typical accuracy
Calculator	Ec= ± (0,5 + ΔΘ min/ΔΘ) %	Ec= ± (0,15 + 2/ΔΘ) %
Flow sensor	Ef = ± (2 + 0,02 q_p/q), but not over ± 5 %	Ef= ± (1 + 0,01 q_p/q) %
Sensor set	Et= ± (0,5 + 3 ΔΘ min/ΔΘ) %	Et= ± (0,4 + 4/ΔΘ) %

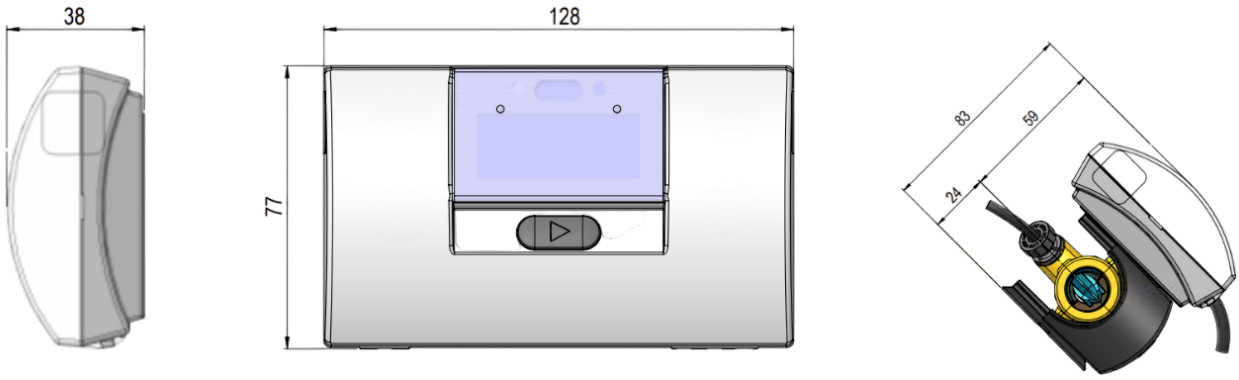
Total typical accuracy of MULTICAL® 303 compared to EN 1434-1.



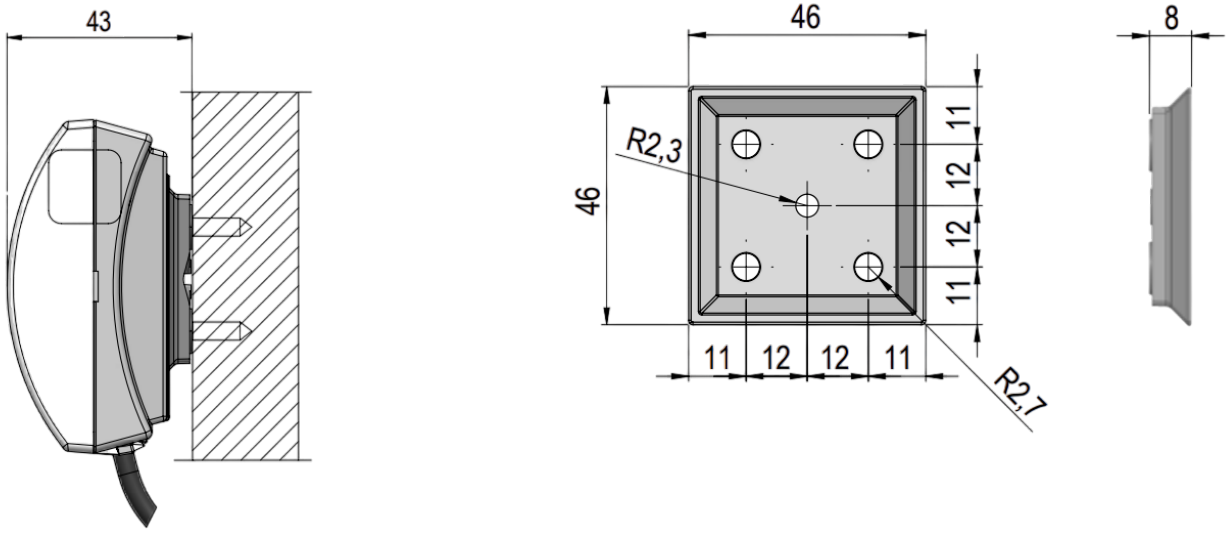
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Dimensioned sketches

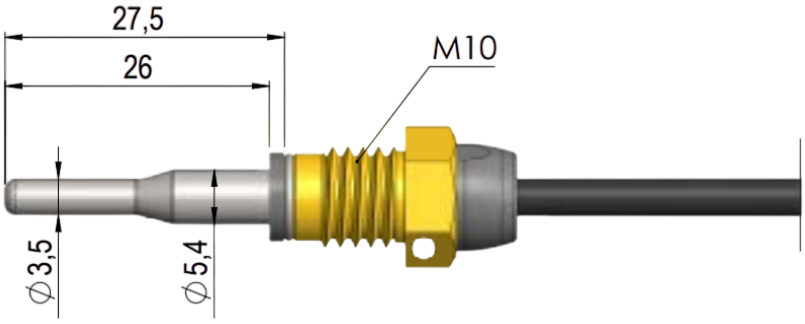
Calculator



Calculator mounted with wall bracket

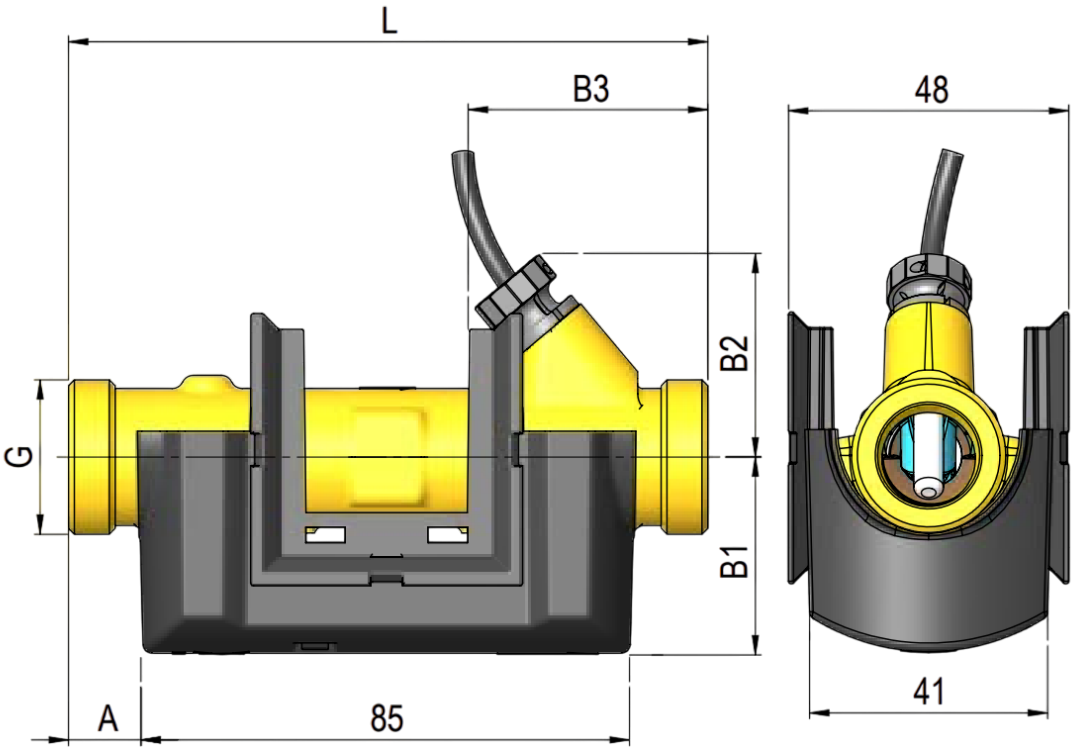


Temperature sensor



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Flow sensor



Flow sensor				
Thread	**G**	**Inch**	**G¾B (R½)**	**G1B (R¾)**
Total length	**L**	**mm**	**110**	**130**
Total height	H	mm	70	70
Total width	W	mm	48	48
Dimension A	A	mm	12	22
Dimension B1	B1	mm	35	38
Dimension B2	B2	mm	35	38
Dimension B3	B3	mm	40	50
Weight		app. kg	0,7	0,8

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Electrical data

MULTICAL® 303	
Display	LCD – 7 or 8 digits with a digit height of 6,8 mm (Standard 7)
Resolutions	9999,999 – 99999,99 – 999999,9 – 9999999 99999,999 – 999999,99 – 9999999,9 – 99999999
Energy units	MWh – kWh – GJ (Standard kWh)
Data logger contents	Programmable - all registers can be selected
Data logging interval	Programmable - from 1 minute to 1 year
Data Logging depth	Programmable - standard: 20 years, 36 months, 460 days, 72 hours
Info logger (EEPROM)	50 info codes (50 latest are shown in the display)
Clock/calendar (with backup battery)	Clock, calendar, leap year compensation, target date
Daylight saving time/wintertime (DST)	Programmable The function can be disabled so that "technical normal time" is used
Clock accuracy	Without external adjustments: Less than 15 minutes/year With external adjustment every 48 hours: Less than 7 s from legal time
Data communication	KMP protocol with CRC16 is used for optical communication
Power in temperature sensors	<10 µW RMS
Supply voltage	3,6 V DC ± 0,1 V DC
Battery type	3,65 V DC 2 x A-cell
Battery life	Up to 16 years @ tBAT<30 °C The battery lifetime is affected by the meter's communication and setup parameters as well as transmission interval, transmission power and datagram contents.
Lithium contents	2 x app. 0,9 g

Installation note

MULTICAL® 303 does not require a straight inlet or outlet section. MULTICAL® 303 must not be exposed to pressures lower than ambient pressure (vacuum).

Installation Recommendations:
Severe flow disturbances usually occur in connection with valves and pumps that are not fully open, as well as with multiple bends. The minimum distances listed below have proven effective in the installation of thermal energy meters (best practice approach):

Minimum recommended distances	
Inlet section	5 x DN
Outlet section	3 x DN

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