ZENNER

zelsius® C5-IUF

Thermal energy measurement instrument with ultrasonic flow sensor (IUF) for heating and/or cooling systems
Optional interfaces: M-Bus, wireless M-Bus, LoRa® and 3 pulse inputs or outputs
Nominal sizes: q_p 0.6 to 10 m³/h

The thermal energy meter (also called heat or cold meter) zelsius® C5-IUF operates with an innovative ultrasonic technology, specially developed for a broad scope of application from submetering to domestic and district heating and cooling.

Specially for district heating transfer and compact apartment stations with fast temperature changes, zelsius® C5-IUF is also available as a "fast response meter" in accordance with DIN EN 1434-1.

This wear-free ultrasonic technology is stable in the long run, insensitive to dirt and measures reliably, even with very small flow volumes. The ultrasonic flow sensors can be operated permanently up to a heat medium temperature of 130 °C and are optimally suited for application in district heat supply. Because of the high overload capacity and the wear-free measurement technology they can also be used to measure energy in hot water supply systems in accordance with § 9 (2) of the German heating costs ordinance.

A single button is used to call up all the important device and consumption data, such as reference date values, maximum values or the stored monthly values over the entire lifetime of the meter.

Its diverse, optionally selectable communication interfaces mean that the zelsius® C5 guarantees efficiency and precision in the recording of consumption data, whether by M-Bus or radio.

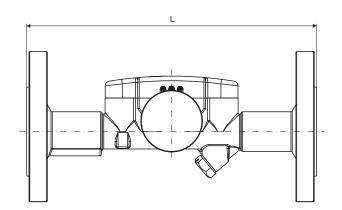## Performance characteristics at a glance

- **MID type examination certificate DE-12-MI004-PTB010 in the metrological class 2**
- **Domestic type examination certificate DE-20-M-PTB-0046 for cooling energy metering in metrological class 2**
- **OMS certification for BSI-compliant smart meter gateway connection**
- **Flow sensor with protection class IP 68**
- **No straight inlet or outlet sections required**
- **Permanent temperature load depending on the model up to 105 °C or 130 °C**
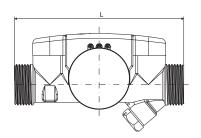- **Any installation position even "head down"**

Technical data flow sensor IUF

Technical data flow sensor IUF								
Nominal flow q_p	m³/h	0.6	1.5	2.5	3.5	6	10	
Maximal flow q_s	m³/h	1.2	3	5	7	12	20	
Minimum flow q_i	l/h	6 12	15 30	25 50	35 70	60 120	100 200	
Pressure loss at q_p	bar	≤0.25						
Temperature range [1]	°C	0≤Θq≤105 / 0≤Θq≤130						
Temperature range short-time [2]		up to 150 °C for ≤2,000 hours						
Minimum pressure (to avoid cavitation)	bar	1 bar with q_p and 80 °C media temperature range						
Meassurement accuracy class [1]		2 (optional 3)						
Nominal pressure/peak pressure [1]								
■ Body with threaded connection	PS/PN	16/16						
■ Body with flange	PS/PN	25/25						
IP protection class		68						
Installation position		in any position						
Installation point		return flow (optionally forward flow)						
Cable length up to calculator m		1.2						
Mounting hole for temperature sensors		M10 x 1						
Heat carrier		Water						

[1] optional

[2] for versions with silicone cable temperature sensors 45 x 5.2 mm, DS 27.5, DS 38 or Universal 6 x 60 - 6 x 150

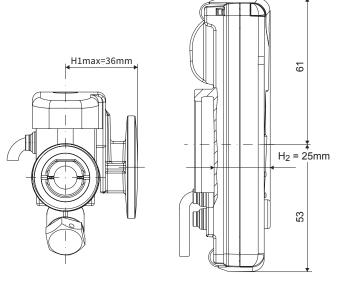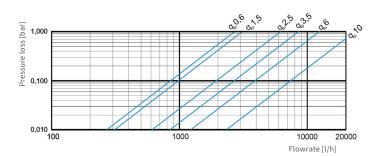## Connecting sizes [1]

Nominal flowrate q_p (m³/h)	L (mm)	Connection thread	Flange
0.6	110	G¾B	
0.6	190	G1B	DN20
1.5	110	G¾B	
1.5	190	G1B	DN20
2.5	130	G1B	
2.5	190	G1B	DN20
3.5	150	G1¼B	
3.5	260	G1¼B	DN25
6	150	G1¼B	
6	260	G1¼B G1½B	DN25 DN32
10	200	G2B	
10	300	G2B	DN40

[1] optional

Dimensions of flow sensor with flange

Dimensions of flow sensor with thread connection

Pressure loss curve

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Technical data calculator

Temperature range	°C	0...105 / 0...150
Temperature difference range	K	3... 80 / 3...130
Display range		LCD 8-digit + additional character
Ambient temperature during operation	°C	5...55
Storage temperature	°C	-20...+65
Temperature resolution	°C	0.01
Measuring intervals [1]	s	Flowrate: 2/ 4 Temperatures: 4/ 8/ 16/ 32
Unit to read the heat consumption		Standard: MWh Optional: kWh, GJ
Data storage		1 x daily
Data log		**Annual due date values for heating and/or cooling energy:** Storage over the whole running time for readout on the display (the last two annual reference date values can be read out via data telegram) **Monthly values for heating and/or cooling energy as well as volumes:** Storage over the whole running time for readout on the display (the last 24 monthly values can be read out via data telegram) **Maximum values for flowrate and heating/cooling power:** Storage of the absolute values since commissioning the meter as well as 12 monthly values, both with date and time Operation hours since commissioning the meter
Interfaces	Standard	optical interface (ZVEI, IrDA)
	optional	■ 3 pulse inputs/ outputs ■ M-Bus (2400 baud, unlimited readout frequency, remote supply via M-Bus level converter, power consumption <1.5 mA, transmission of consumption and instantaneous values) ■ wireless M-Bus: Generation 4, OMS-certified, setting options via app "ZENNER Device Manager Basic": Mode T1 or C1, Encryption Level 5 or 7, various transmission intervals and telegram contents, radio ON / OFF, transmission power: ≤25 mW (14 dBm) ■ LoRa®: Daily values or monthly values (incl. half monthly values), Diagnosis protocol [3], Transmission power ≤25 mW (14 dBm)
Power supply		3.6 V lithium battery (different capacities)
Battery lifetime [2]	Years	≥ 7, optional ≥10
IP protection class		54
Environmental class		A
Ambient conditions / climatic influencing (valid for complete compact meter)	-climatic	**Ambient temperature during operation:** +5 °C...+55 °C **Relative humidity:** <93 %, non-condensing (condensate is allowed on the outside of the flow sensor)
	- mechanical class	M1
	- electromagnetic class	E1

[1] optional

[2] The validity period for the calibration depends on the country, please observe the relevant national regulations.

[3] Values for energy and volume increment as well as the average and maximum return temperature within the transmission interval (15 minutes to 1 day can be chosen) are transmitted by the meter. Values for the average supply temperature, temperature difference, thermal power and flowrate are or can be calculated by the LoRa Server based on the energy and volume increment. See also separate description.

Technical data temperature sensors

Platinum precision resistor		Pt 1000
Sensor type [1]	mm	45 x 5.0 / 45 x 5.2 DS 27.5 / DS 38 Universal 6 x 60 - 6 x 150
Temperature range [1]	°C	0...105 / 0...150
Cable length	m	1.5 (opt. 5) for q_p 0.6 to 2.5 5 for q_p 3.5 to 10
Installation point		In the case of new installation of meters with nominal flowrates of ≤ q_p 6 m³/h and nominal pressures of ≤ PN 16 directly immersed in the heat carrier, in the case of meters with a nominal flowrate of q_p 10 m³/h also in permissible immersion sleeves. At a nominal pressure of PN 25 (usually meter with flange connection), permissible immersion sleeves are used for all nominal flowrates. For calibration exchange in existing measuring points with immersion sleeves with an overall length of ≤ 60 mm, please observe the separate information "Installation in existing immersion sleeves" as well as the immersion sleeve tolerance list from PTB (download at **www.ptb.de**).

[1] optional

Dimensions of data calculator

85

114

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Content of wireless M-Bus radio protocol with instantaneous values (type T1B)

Example	Heat meter	Unit
Medium	Thermal energy	
Manufacturer	ZRI	
Serial number	12345678	
Version	12	
Main energy meter	123456	kWh
Main volume meter	123456	L
Energy meter (consumption) on due date	119230	kWh
Date last due date	01.01.2022	
Volume flow	127	l/h
Heating power	2828	W
Supply temperature	44.3	°C
Return temperature	25.1	°C
Error code	0	
Last previous month energy value	121234	kWh
Maximum average power per hour in current month	3170	W

The type T1A radio protocol includes the 13 previous month's values for energy instead of instantaneous values and due date values.

Further zelsius® C5 versions:

zelsius® C5-CMF
Compact meter with coaxial
measuring capsule (CMF)

zelsius® C5-ISF
Compact meter with single-jet
flow sensor (ISF)

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