



Ultrasonic heat and cooling energy meters 2WR6..

Ultrasonic heat and cooling energy meters to measure flow and energy in hydronic heating or cooling circuits.

- Non-wearing due to non-moving parts
- Approved in accordance with EN 1434 and MID accuracy class 2
- Mounting position optional (horizontal or vertical), in return or flow
- Metering range for flow 1:100 as per EN1434 (total range 1:500)
- No inlet or outlet settling paths required
- Optical interface as per EN 62056-21
- M-bus communication
- Self-diagnostics

Use

The 2WR6.. heat and cooling energy meter is used to acquire energy consumption in a physically correct way. The device consists of a flow measuring section, 2 ready connected temperature sensors and a processor to calculate the energy consumption based on the flow rate and the temperature differential. The 2WR6.. is of compact design and therefore ideally suited for use in apartments. It is available for heat or cooling energy.

Restrictions

Temperature sensors and battery of the 2WR6.. cannot be replaced.
The product is not suited for use in systems operating on water-glycol mixtures.

Functions

Basic design

The heat meter consists of processor, flow measuring section and 2 temperature sensors (return temperature sensor is always integrated in the measuring tube).

- Pt500, type DS M10x1 mm, direct immersion, immersion length 27.5 mm
- Pt500, type PS Ø 5.2x45 mm, direct immersion or for protection pocket

The processor is alternatively powered by ...

- a battery with a life of 11 years
- external power supply AC/DC 24 V

Ultrasonic measuring principle

The volume flow is acquired based on the ultrasonic measuring principle, free from wear due to the use of non-moving parts.

The amount of energy supplied by the medium to the consumer during a certain period of time is proportional to the temperature differential of flow and return and the volume flow passing through the meter.

The **water volume** is acquired in the measuring tube by ultrasonic pulses transmitted in the direction of flow and against the direction of flow. Downstream, the time required by the pulses to travel from the transmitter to the receiver is reduced, upstream it is increased. The water volume is then calculated based on these measured values.

The **flow and return temperatures** are acquired by platinum sensors. The water volume and the difference in temperature between flow and return are multiplied and its product is integrated. The result, which is the consumed **quantity of thermal or cooling energy**, is recorded and displayed in the physical unit **kWh/MWh** or **MJ/GJ**, the volume in **m³**.

Processor

A standard processor is used for all flow rate values with identical operation and an integrated service unit.

Optical communication interface

The heat meter is equipped with an optical communication interface, enabling the device to be read and parameterized on site with the help of the WZR-OP-USP optical read head and the UltraAssist software.

Manipulations

To open the meter, the calibration seal on the front of the 2WR6.. must be destroyed.

Self-diagnostics

The meter performs constantly self-diagnostics, allowing it to detect a number of mounting or device errors and to display them.

Type summary 2WR6..

The types of ultrasonic heat meters listed below are equipped as follows:

Place of installation	Return
Rated pressure	PN 16
Length of control cable	1.5 m
Sensor mounting	Return sensor, integrated in the flow measuring section
Temperature sensor type	Pt500, Ø 5.2 mm, length = 45 mm Pt500, DS M10x1, length = 27.5 mm
Power supply	Battery with a life of 11 years or AC/DC 24 V
Temperature sensor cable length	1.5 m
Communication	M-bus
Approval	EN 1434 class 2 MID 2004/22/EG
Energy unit	kWh/MWh

	<i>Options</i>	<i>Stock number</i>	<i>Product no.</i>
Rated flow 0.6 m³/h	Mounting length 110 mm, connecting thread G ¾", DS M10x1 mm, battery life 11 years	S55561-F100	2WR605-MBE
	Mounting length 110 mm, connecting thread G ¾", DS M10x1 mm, AC/DC 24 V	S55561-F101	2WR605-MBG
	Mounting length 110 mm, connecting thread G ¾", Ø 5.2 mm, battery life 11 years	LYU:2WR605-MHE	2WR605-MHE
	Mounting length 110 mm, connecting thread G ¾", Ø 5.2 mm, AC/DC 24 V	S55561-F103	2WR605-MHG
Rated flow 1.5 m³/h	Mounting length 110 mm, connecting thread G ¾", DS M10x1 mm, battery life 11 years	S55561-F104	2WR621-MBE
	Mounting length 110 mm, connecting thread G ¾", DS M10x1 mm, AC/DC 24 V	S55561-F105	2WR621-MBG
	Mounting length 110 mm, connecting thread G ¾", Ø 5.2 mm, battery life 11 years	LYU:2WR621-MHE	2WR621-MHE
	Mounting length 110 mm, connecting thread G ¾", Ø 5.2 mm, AC/DC 24 V	S55561-F107	2WR621-MHG
Rated flow 2.5 m³/h	Mounting length 130 mm, connecting thread G 1", DS M10x1 mm, battery life 11 years	S55561-F108	2WR636-MBE
	Mounting length 130 mm, connecting thread G 1", DS M10x1 mm, AC/DC 24 V	S55561-F109	2WR636-MBG
	Mounting length 130 mm, connecting thread G 1", Ø 5.2 mm, battery life 11 years	LYU:2WR636-MHE	2WR636-MHE
	Mounting length 130 mm, connecting thread G 1", Ø 5.2 mm, AC/DC 24 V	S55561-F111	2WR636-MHG

Note

Further types on request

Mounting accessories for 2WR6..

<i>Component</i>	<i>Stock number</i>	<i>Product no.</i>
Mounting set for L = 110 mm consisting of: - 1 spacer ¾", length 110 mm - 2 fittings G ¾ B" with coupling nut G ¾ B" - 1 protection pocket for flow sensor Ø 5.2x45 mm, incl. gasket made of copper - 2 gaskets	LYU:99T34110	99T34110

<i>Component</i>	<i>Stock number</i>	<i>Product no.</i>
Mounting set for L = 130 mm consisting of: - 1 spacer 1", length 130 mm - 2 fittings G 1 B" with coupling nut G 1 B" - 1 protection pocket for flow sensor Ø 5.2x45 mm, incl. gasket made of copper - 2 gaskets	LYU:99T01130	99T01130
Mounting kit, consisting of: - 2 coupling nuts G ¾" - 2 inserts R ½" - 2 gaskets	S55563-F124	WZM-E34
Mounting kit, consisting of: - 2 coupling nuts G 1" - 2 inserts R ¾" - 2 gaskets	S55563-F123	WZM-E1
Adapter from 110 mm to 130 mm, consisting of: - 1 fitting G ¾ B" to G ¾ B" - 2 gaskets	LYU:WZM-V130	WZM-V130
Adapter from 110 mm to 130 mm, consisting of: - 2 fitting G ¾ B" to G 1 B" - 2 gaskets G ¾" - 2 gaskets G 1"	LYU:WZM-V130.G1	WZM-V130.G1
Adapter from 110 mm to 165 mm, consisting of: - 2 fitting G ¾ B" to G ¾ B" - 4 gaskets	LYU:WZM-V165	WZM-V165
Adapter from 110 mm to 190 mm, consisting of: - 2 fitting G ¾ B" to G 1 B" - 2 gaskets G ¾" - 2 gaskets G 1"	LYU:WZM-V190	WZM-V190
Spacer G ¾", length 110 mm, incl. 2x gaskets	LYU:WZM-G110	WZM-G110
Spacer G 1", length 130 mm, incl. 2 gaskets	LYU:WZM-G130	WZM-G130
Spacer G 1", length 190 mm, incl. 2 gaskets	LYU:WZM-G190	WZM-G190
Sealing disk thread G ¾", for threaded connection R ½"	LYU:9060944002	9060944002
Sealing disk thread G 1", for threaded connection R ¾"	LYU:9060944003	9060944003
Welding sleeve with threaded hole for tem- perature sensor DS M10x1 mm	S55563-F121	WZT-G10
Welding sleeve G ½", 45° to pipe axis, with threaded hole G ½"	S55563-F122	WZT-G12
Welding sleeve G ½", 90° to pipe axis, with threaded hole G ½"	LYU:WZT-GLG	WZT-GLG
Ball valve Rp ½" to mount sensor DS M10x1 mm, length 28 mm, max. water temperature 130 °C, PN 25	S55563-F104	WZT-K12
Ball valve Rp ¾" to mount sensor DS M10x1 mm, length 28 mm, max. water temperature 130 °C, PN 25	S55563-F120	WZT-K34

<i>Component</i>	<i>Stock number</i>	<i>Product no.</i>
Ball valve Rp 1" to mount sensor DS M10x1 mm, length 28 mm, max. water temperature 130 °C, PN 25	S55563-F119	WZT-K1
Ball valve R ½" with union nut G ¾"	LYU:WZT-K12-34	WZT-K12-34
Ball valve R ¾" with union nut G ¾"	LYU:WZT-K34-34	WZT-K34-34
Ball valve R ¾" with union nut G 1"	LYU:WZT-K34-1	WZT-K34-1
Ball valve R 1" with union nut G 1"	LYU:WZT-K1-1	WZT-K1-1
Adapter for ball valve to install sensor DS M10x1 mm, length 38 mm	S55563-F105	9930128002
Mounting kit for direct mounting of sensor Ø 5.2x45 mm, consisting of: - 1 sensor fitting M10x1 mm made of brass - 1 O-ring - 1 grooved pin	LYU:9930127002	9930127002
Adapter kit, consisting of: - 1 plastic adapter Ø 5.2x45 mm - 1 mounting aid for sensor Ø 5.2x45 mm - 2 O-rings	LYU:9956230	9956230
Sealing disk for temperature sensor DS M10x1 mm, Ø 8.6/5.3, size 1 mm	LYU:9060944001	9060944001
Sealing disc ½" made of copper	LYU:9060948	9060948
Adapter G ½ B" with threaded hole for sensor DS M10x1 mm, incl. gasket G ½" made of copper	S55563-F116	WZT-A12
Adapter G ¾ B" with threaded hole for sensor DS M10x1 mm, incl. gasket G ¾" made of copper	LYU:WZT-A34	WZT-A34
Protection pocket G ½ B" made of brass, Ø 5.2x35 mm for sensor Ø 5.2x45 mm	S55563-F103	WZT-M35
Protection pocket G ½ B" made of brass, Ø 5.2x50 mm for sensor Ø 5.2x45 mm	LYU:WZT-M50	WZT-M50
Programming accessories		
Optical read head with USB plug for PC interface	LYU: WZR-OP-USB	WZR-OP-USB
UltraAssist Standard, first license, CD with dongle for printer interface	LYU:WZX-UA-SED	WZX-UA-SED
UltraAssist Standard, second license, with dongle for printer interface	LYU:WZX-UA-SFD	WZX-UA-SFD
UltraAssist Standard, first license, CD with dongle as PCMCIA card	LYU:WZX-UA-SEP	WZX-UA-SEP
UltraAssist Standard, second license, with dongle as PCMCIA card	LYU:WZX-UA-SFP	WZX-UA-SFP
UltraAssist Standard, first license, CD with dongle for USB interface	LYU:WZX-UA-SEU	WZX-UA-SEU
UltraAssist Standard, second license, with dongle for USB interface	LYU:WZX-UA-SFU	WZX-UA-SFU

Read and parameterization software

The UltraAssist Light read and parameterization software is free and available on request.

Ordering

When ordering, please give quantity, description, product no. and stock number.

Order numbers

Product no.	Stock number	Description
2WR605-MBE	S55561-F100	Ultrasonic heat meter

Scope of delivery

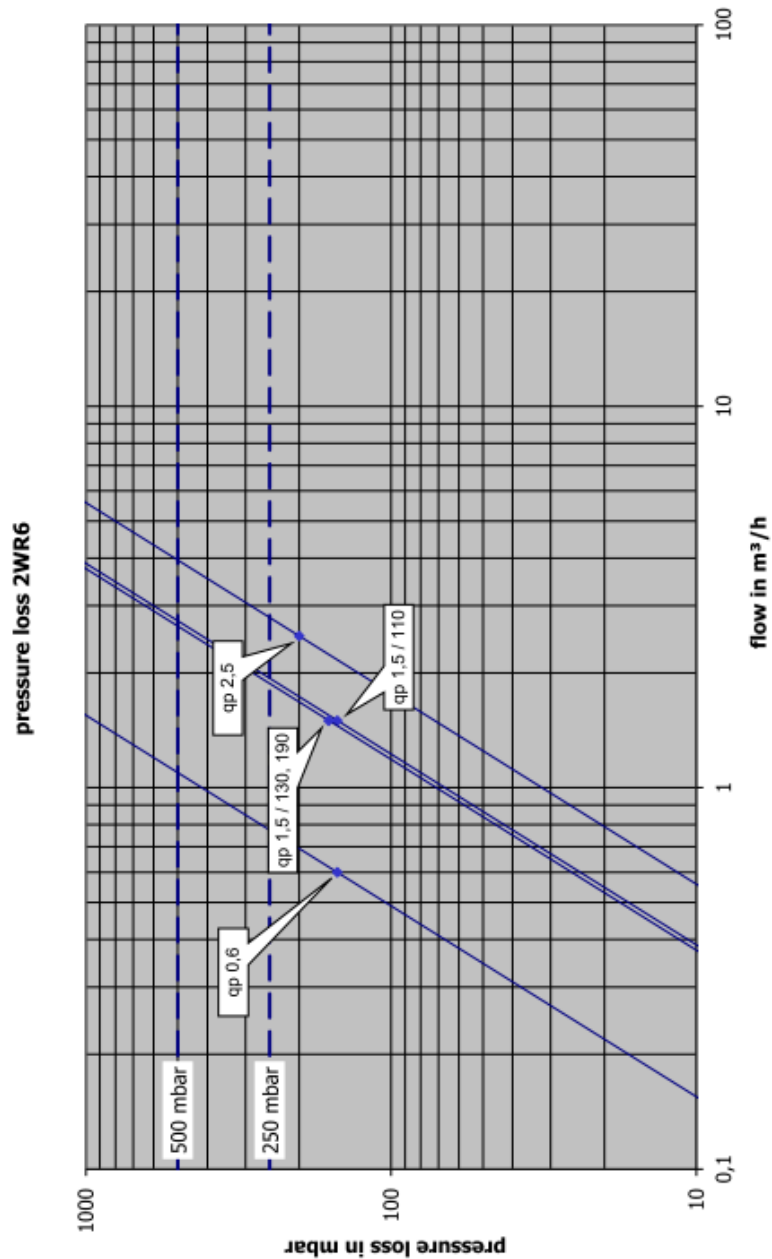
The 2WR6.. is supplied complete with Mounting Instructions in different languages, 2 gaskets and a seal.

Languages

The Mounting Instructions are supplied in 18 languages:
 Bulgarian, Chinese, Croatian, Czech, Dutch, English, French, German, Greek, Hungarian, Italian, Norwegian, Polish, Russian, Slovakian, Slovenian, Spanish and Turkish.

Technical design

Pressure drop characteristic

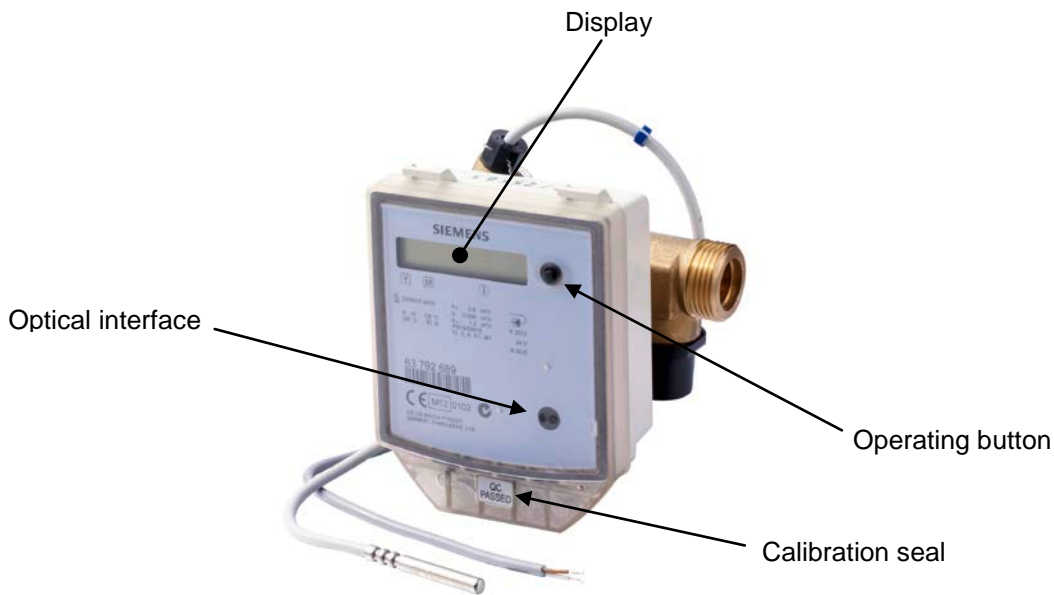


The 2WR6.. has an easy-to-read 7-digit LCD to show different readings (e.g. energy or volume).

The meter's display is arranged in the form of 2 loops:

- User loop
- Service loop

When making a short press (<2 seconds), the user loop appears, showing line by line. After the last line, the first line reappears. When making a long press (>10 seconds), the service loop returns to the first line. Short presses then show the loop's individual lines. The service loop can be quit by pressing the button (3 seconds), or automatically after 30 minutes.



User loop
LOOP 0

1234567	kWh	Cumulated quantity of energy
12345.67	m ³	Cumulated volume
888888	kWh	Segment test
F-----		Error message with error number

Service loop
LOOP 1

0.739	m ³ /h	Current flow rate
19.7	kW	Current output
80 47	°C	Current flow and return temperature
01.08.12	D	Date
1234	Bh	Number of operating hours
17	Fh	Missing hours
1234567		Device number (7 digits)
PULSE	CH	Remote reading mode (optional)
123	A	Primary address with optional M-bus
1234567	K	Customer number (7 digits)
15.08.12	F0	Data stamp for F0 prewarning
3-01	FW	Firmware version
31.12.11	V	Storage day previous year (due date)
1234567	kWh	Energy previous year on due date
1234567	m ³	Volume previous year on due date

123	Fh	Missing hours previous year
--.--	C	Code input for parameterization
31.07.12		Storage day month 1...15
		Press button >3 s
1234567	kWh	Energy previous month on due date
1234567	m ³	Volume previous month on due date
8	Fh	Missing hours previous month on due date

For a period of 15 months on the monthly due date, the meter stores the values of ...

- energy (meter reading),
- volume (meter reading), and
- missing hours (metering hours).

When the meter displays the monthly due date, the respective monthly values can be made to appear when pressing the button for 3 seconds. The monthly values can also be read via the optical interface.

Error messages

Error code Error Remedy (service personnel)

FL nEG	Wrong direction of flow	Check flow or installation direction; correct if necessary
Possibly alternating with:		
DIFF nEG	Negative temperature differential	Check place of installation of sensors; correct if necessary
Possibly alternating with:		
F0	No metering of flow	Air in the measuring section/ pipe, vent pipe (delivery condition)
F1	Interruption in the flow sensor	Meter exchange by specialist
F2	Interruption in the return sensor	Meter exchange by specialist
F3	Electronics for temperature evaluation defective	Meter exchange by specialist
F4	Battery exhausted	Meter exchange by specialist
F5	Short-circuit in the flow sensor	Meter exchange by specialist
F6	Short-circuit in the return sensor	Meter exchange by specialist
F7	Memory internally malfunctioning	Meter exchange by specialist
F8	Error F1, F2, F3, F5 or F6 pending for more than 8 hours, detection of tampering attempts. No further metering.	Measure to be taken depend on error code. Error message F8 must be reset by service personnel
F9	Error in electronics	Meter exchange by specialist

Previous year values

The processor stores the meter readings of energy, volume and missing time with their date stamps on a yearly due day.

The due day for previous year values can be parameterized.

Monthly values

The processor stores the meter readings of energy, volume and missing time with their date stamps for up to 15 months on the due day of each month.

Standard parameters

The 2WR6.. comes programmed as follows:

- Due day [TT.MM]: 01.01

Mounting

Flow measuring section

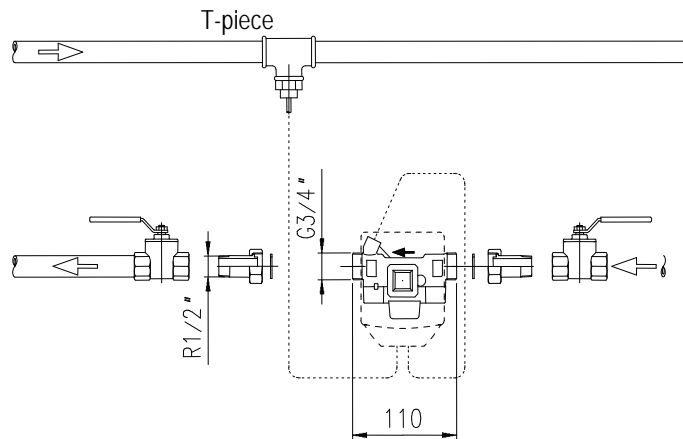
The meter's mounting position is optional, the place of installation (return or flow) must correspond to the type of meter used.

Note

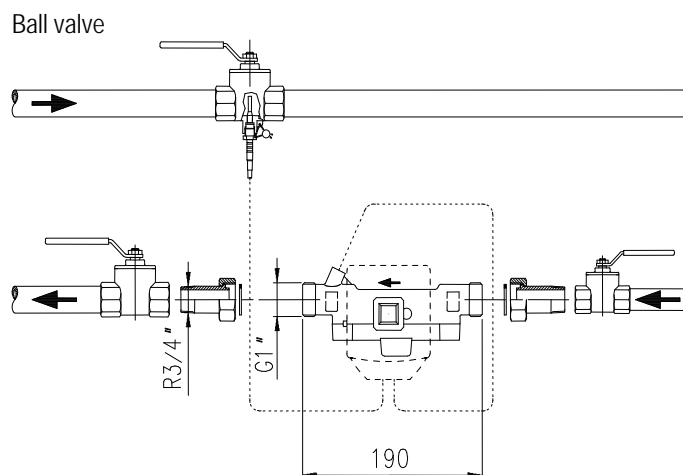
The flow measuring section must always be installed in the return.

Inlet or outlet settling paths are not required. If the meter is installed in the common return of 2 heating circuits (e.g. space heating and DHW), the place of installation must have an adequate distance from the T-piece (min. 10 x DN) to allow the different water temperatures to properly mix.

Before installing the meter, the system must be thoroughly flushed. Install the flow measuring section between 2 shutoff valves with the arrow pointing in the direction of flow. The sensors must be installed in the same water circuit as the flow measuring section (observe mixing). The sensors can be fitted in T-pieces, ball valves, direct immersed or in pockets (national regulations must be observed). In any case, the end of the sensors must extend to at least the pipe center. Temperature sensors and fittings must be sealed to prevent tampering.

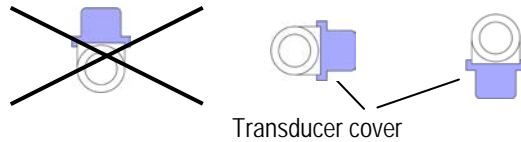


Example of integration with T-piece and meter with 110 mm fitting



Example of integration with ball valve and meter with 190 mm fitting

When used as a cooling energy meter, it must be made certain that the black cover on the measuring tube points to the side or downward to avoid problems resulting from condensation. In that case, the processor must be detached from the flow measuring section to be mounted on the wall, for instance.



Permissible mounting position when metering cooling energy

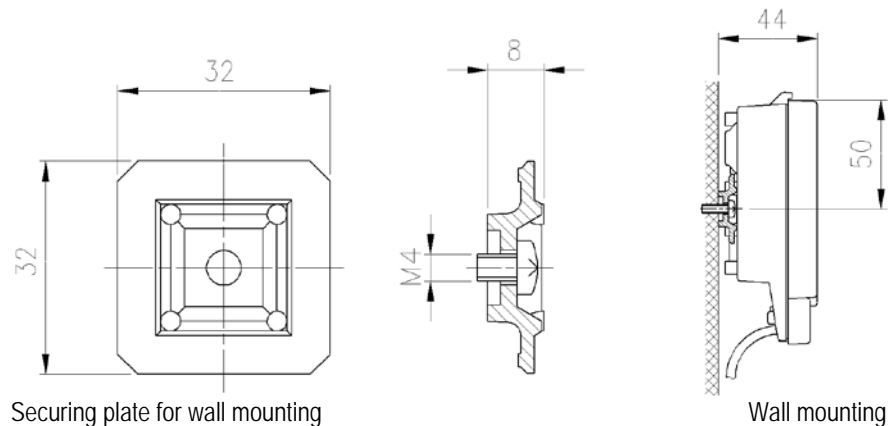
Processor

The ambient temperature at the processor must not exceed 55 °C. Direct sunlight must be avoided.

For water temperatures between 10 °C and 90 °C, the processor can be left on the flow measuring section or can be secured to the wall (detached mounting). To reposition the processor, remove it from the flow measuring section, turn it by 90° or 180° and replace it on the adapter plate until it snaps into place.

For water temperatures above 90 °C or below 10 °C, the processor must be secured to the wall (split mounting).

To mount the processor on the wall, remove it from the flow measuring section including the adapter plate. The latter must then be secured to the wall so that the processor can be replaced on the adapter plate until it snaps into place.



Maintenance notes

Maintenance

The meters are maintenance-free.
National calibration regulations must be observed.

Disposal



The devices are considered electronics devices for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.
- Dispose of empty batteries at designated collection points.

Warranty service

The application-related technical data are only guaranteed together with the products mentioned in this Data Sheet.

If the meters are used in connection with third-party devices that are not explicitly mentioned, the user must ensure proper functioning. In that case, Siemens will not provide any service or warranty.

Technical data

Processor

Power supply alternatively

- Battery

Battery

- Battery type	Lithium battery (cannot be replaced)
- Battery voltage	3.6 V
- Battery service life	11 years

- AC/DC 24 V

Via external SELV

- Voltage range	AC 12...36 V or DC 12...42 V
- Frequency	50 / 60 Hz or DC
- Maximum power consumption	0,8 VA
- Length of connecting cable	1.5 m
- Galvanic separation	Existing

Function data

Measuring range
(national approvals may differ)

2...180 °C

Range of temperature differential $\Delta\Theta$

3...80 K

Temperature response threshold

0.2 K

Thermal coefficient

Shifting-compensated

Temperature measuring error without sensor

(0.5 + $\Delta\Theta_{\min}/\Delta\Theta$) %, max. 1.5% at $\Delta\Theta = 3$ K

Temperature sensors

Sensing element

Pt500 as per EN 60751

Type

Ø 5.2x45 mm

DS M10x1 mm as per EN 1434

Flow measuring section

Function data

Temperature range

5...105 °C

(national approvals may differ)

Max. temperature t_{\max} .

- Heat

105 °C

- Cooling energy

50 °C

Rated pressure

1.6 MPa (PN 16)

Rated flow q_p

m³/h

0.6

1.5

2.5

Metrological class

1:100*

1:100*

1:100*

Max. flow q_s

m³/h

1.2

3

5

Min. flow q_i

l/h

6**

15**

25**

Response threshold

l/h

2.4

6.0

10

Pressure drop at q_p

Mounting length 110 mm Δp

mbar

150

150

Mounting length 130 mm Δp

mbar

160

200

Mounting length 190 mm Δp

mbar

150

160

200

Flow rate at $\Delta p = 1$ bar, k_v

110 mm

m³/h

1.5

3.9

130 mm

m³/h

3.8

5.6

190 mm

m³/h

1.5

3.8

5.6

Mounting position

Optional

* In Germany: 1:50

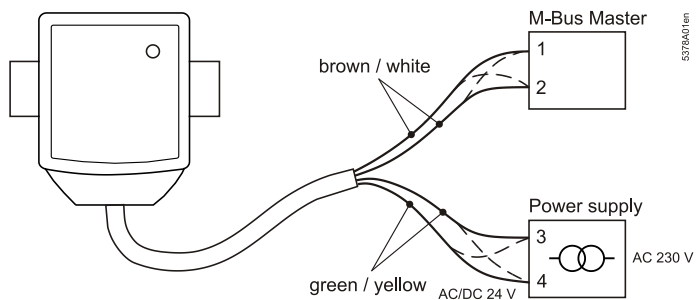
** In Germany: Twice as high

Communication	Optical interface				
	- Design		Similar to EN 62056-21		
	- Protocol		As per EN 13757-2 / -3		
	M-bus interface				
	- Voltage V_{max} .		50 V		
	- Current draw		1.3 M-bus loads		
	- Addressing		Primary or secondary		
	- Permissible average reading frequency		1x every 3 hours @ 2400 Bd 1x every 24 hours @300 Bd as per EN 13757-2/-3		
	Pulse output				
	- Pulse valency		1 pulse per kWh or MJ/1 pulse/100 liters		
	- Pulse duration		100 ms		
	- Voltage		Max. 30 V		
	- Current		Max. 30 mA		
	- Classification		OB (as per EN 1434-2)		
	- Voltage drop		Approx. 1.3 V at 20 mA		
	- Dielectric strength		500 V_{eff} against ground as per EN 1434-2		
Cable length	Control cable		1 m		
Protection data	Insulation safety class		III		
Housing protection data	Degree of protection according EN 60529				
	- Processor		IP54		
	- Flow measuring section		IP65 (only for cooling energy meters)		
Ambient conditions			Operation	Transport	Storage
			EN 60721-3-3	EN 60721-3-2	EN 60721-3-1
	Climatic conditions		Class A	Class A	Class A
	Temperature		5...55 °C	-20...60 °C	-20...60 °C
	Humidity		<93% r.h. at 25 °C (non-condensing)	<93% r.h. at 25 °C (non-condensing)	<93% r.h. at 25 °C (non-condensing)
	Mechanical conditions		Class M1	Class M1	Class M1
	Max. altitude		Min. 700 hPa, corresponding to max. 2000 m above sea level		
Directives and standards	Product standard		DIN EN 1434-x (heat meters)		
	EU Conformity (CE)		CE2T5378xx *)		
	RCM Conformity		CE2T5372en_C1*)		
Environmental compatibility	The product environmental declaration CE2E5378en contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).				
Dimensions	(W x H x D):				
	- Processor		88 x 112 x 40 mm		
	- Flow measuring section		110 x 85 x 45 mm (without cable)		
Housing material	Cover		PC-Marolon 2805		
	Bottom section		PC GF10		
Housing colors	Cover		Transparent		
	Bottom section		RAL 9002		
Weight	Rated flow q_p	m^3/h	0.6	1.5	2.5
	Meter packed complete with accessories	kg	1	1	1,5

*) The documents can be downloaded from <http://siemens.com/bt/download>.

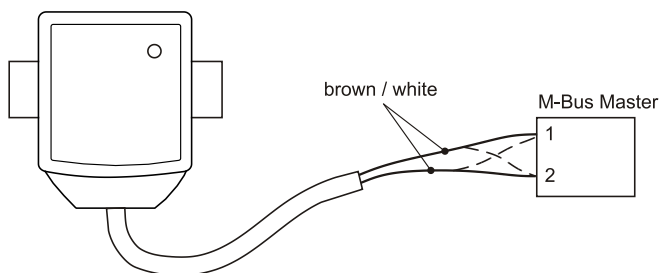
Connection diagram

Power supply AC/DC 24 V
and M-bus



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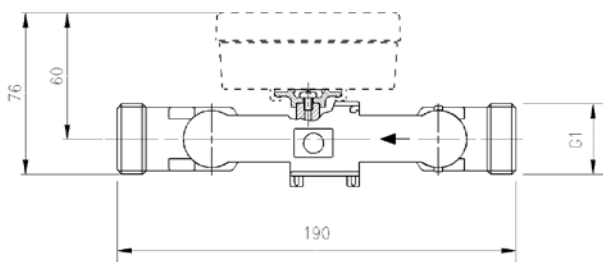
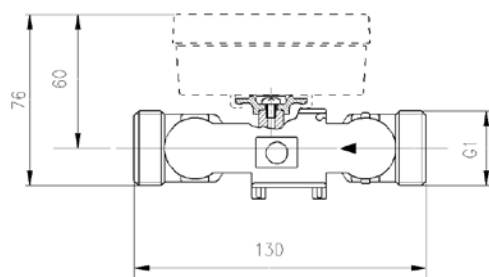
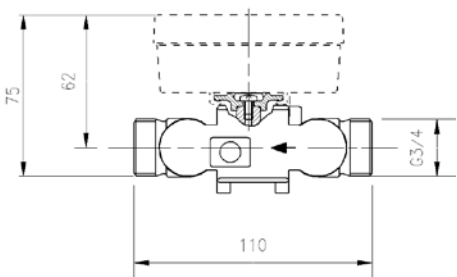
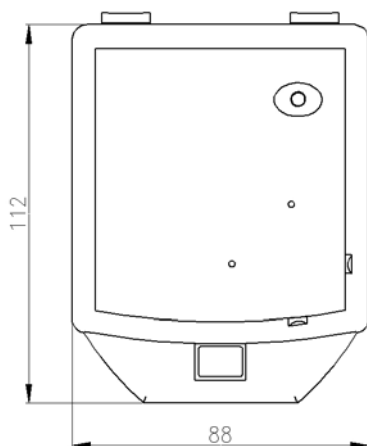
Battery power supply
and M-bus



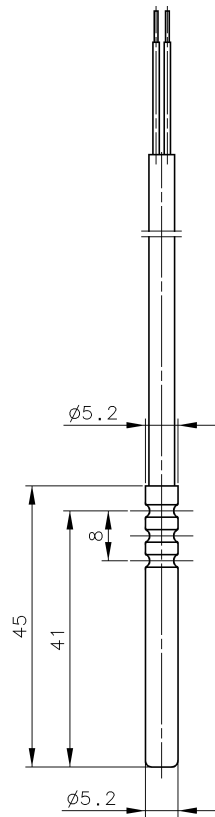
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Dimensions

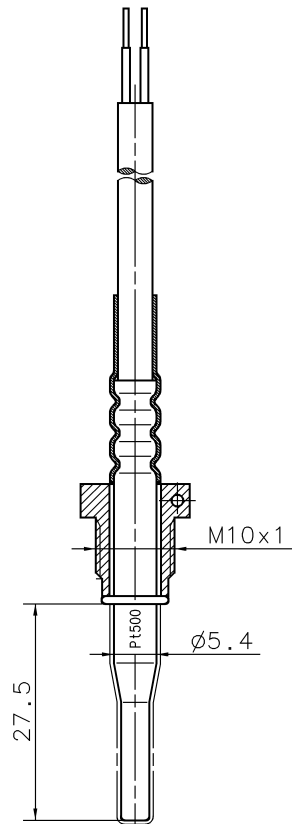
Dimensions in mm



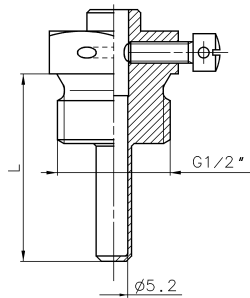
Temperature sensor 45 mm for protection pocket mm for direct fitting



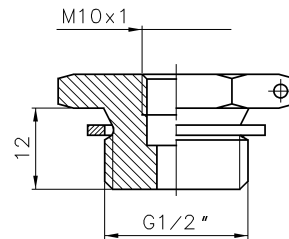
Temperature sensor 27.5



Protection pocket



Adapter



Mounting sensor adapter set

