SIEMENS

5372


# Ultrasonic heat and cooling energy meters

WSM5..

**Ultrasonic 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**
- **Compact meters with flow measuring section made of high-tech plastic**
- **Mounting position optional (horizontal or vertical), return or flow**
- **Measuring range of flow 1:100 conforming to EN 1434 (total range 1:1000)**
- **No inlet or outlet settling paths required**
- **Optical interface conforming to EN 62056-21**
- **M-bus communication (optional)**
- **Self-diagnostics**

CE2N5372en
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**Building Technologies**

## Use

The WSM5.. is a measuring instrument used for the physically correct acquisition of energy consumption. The device consists of a flow measuring section made of high-tech plastic, 2 ready connected temperature sensors, and an electronic unit which calculates the energy consumption from the flow and the temperature differential. The WSM5.. is of compact design and therefore ideally suited for use in apartments. It is available in different versions for metering heat or cooling energy.

Restrictions

The temperature sensors and battery of the WSM5.. cannot be replaced.

## Functions

**Meter design**

The meter consists of electronic unit, flow measuring section and 2 temperature sensors. The electronic unit is equipped with longlife batteries, ensuring up to 11 years of operation.

**Ultrasonic measuring principle**

The flow is acquired based on the non-wearing ultrasonic measuring principle, which requires no moving parts.

The amount of energy transferred from the medium to the consumer over a defined period of time is proportional to the temperature differential between flow and return and the volume of water that has passed through.

The **water volume** is measured in the measuring tube by ultrasonic pulses which are transmitted in the direction of flow and against the direction of flow. Downstream, the time difference between the transmitter and receiver is reduced, upstream it is increased. The water volume is then calculated using the measured values of the time difference.

The **flow and return temperatures** are acquired by platinum resistors.

The water volume and the temperature differential between flow and return are multiplied and the product integrated. The result, which is the consumed **amount of thermal energy,** is stored and displayed in the physical units **kWh/MWh or MJ/GJ**, the volume in **$m^3$**.
The WSM5.. uses an **intelligent, adaptive temperature-measuring interval**. With changing system conditions (e.g. rapid increase of flow), the WSM5.. changes for a certain time to a fast temperature-measuring interval. Thus, the meter always adapts itself to the current situation and acquires the system temperatures very accurately.

**Electronic unit**

A standard electronic unit is used for all measuring tubes with an integrated service unit.

**Optical communication interface**

The WSM5.. is equipped with an optical communication interface which facilitates readout and parameterization on site with the help of the optical read head WZR-OP-USP and matching UltraAssist software.

**M-bus communication** (optional)

If the meter uses M-bus communication, it can be read out from a remote location via an M-bus master unit.

**Tampering**

To open the device, the calibration seal at the top of the WSM5.. must be destroyed.

**Self-diagnostics**

The meter makes constantly self-diagnostics, enabling it to detect and display various installation and device errors.

## Type summary WSM5..

The types of meters listed below are equipped as follows:

| | |
|---|---|
| Mounting location | 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 |
| Temperature sensor cable length | 1.5 m |
| Approval | EN 1434 class 2<br>MID 2004/22/EG |
| Energy unit | kWh |

| | *Options* | *Stock number* | *Product no.* |
|---|---|---|---|
| **Rated flow 0.6 $m^3/h$** | Mounting length 110 mm, connecting thread G ¾ “, battery life 6 years without communication | LYU:WSM506-0A | WSM506-0A |
| | Mounting length 110 mm, connecting thread G ¾ “, battery life 11 years without communication | S55561-F133 | WSM506-0E |
| | Mounting length 110 mm, connecting thread G ¾", battery life 11 years, M-bus | S55561-F194 | WSM506-BE |
| **Rated flow 1.5 $m^3/h$** | Mounting length 110 mm, connecting thread G ¾ “, battery life 6 years without communication | LYU:WSM515-0A | WSM515-0A |
| | Mounting length 110 mm, connecting thread G ¾ “, battery life 11 years without communication | S55561-F135 | WSM515-0E |
| | Mounting length 110 mm, connecting thread G ¾", battery life 11 years, M-bus | S55561-F195 | WSM515-BE |
| **Rated flow 2.5 $m^3/h$** | Mounting length 130 mm, connecting thread G 1“, battery life 6 years without communication | LYU:WSM525-0A | WSM525-0A |
| | Mounting length 130 mm, connecting thread G 1“, battery life 11 years without communication | S55561-F137 | WSM525-0E |
| | Mounting length 130 mm, connecting thread G 1", battery life 11 years, M-bus | S55561-F196 | WSM525-BE |

| **Accessories for WSM5..** | *Component* | *Stock number* | *Product no.* |
|---|---|---|---|
| | Mounting kit, consisting of:<br>- 2 coupling nuts G 3/4“<br>- 2 inserts R 1/2“<br>- 2 packings made of EPDM | LYU:T23-E34 | T23-E34 |
| | Mounting kit, consisting of:<br>- 2 union nuts G 1“<br>- 2 inserts R 3/4“<br>- 2 packings made of EPDM | LYU:T23-E1 | T23-E1 |
| | Ball valve R 1/2“ with union nut G 3/4“ | LYU:WZT-K12-34 | WZT-K12-34 |
| | Ball valve R 3/4“ with union nut G 3/4“ | LYU:WZT-K34-34 | WZT-K34-34 |
| | Ball valve R 3/4“ 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 |

| | *Component* | *Stock number* | *Product no.* |
|---|---|---|---|
| | Adapter G 3/8 B” with threaded hole M10x1 mm for sensor, incl. gasket G 3/8” made of copper | LYU:WZT-A38 | WZT-A38 |
| | Adapter G 1/2 B” with threaded hole M10x1 mm for sensor, incl. gasket G 1/2” made of copper | S55563-F116 | WZT-A12 |
| | Adapter G 3/4 B” with threaded hole M10x1 mm for sensor, incl. gasket G 3/4” 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 |
| | Adapter kit, consisting of:<br>- 1 plastic adapter Ø 5.2x45 mm<br>- 1 mounting aid for sensor Ø 5.2x45 mm<br>- 2 O-rings | LYU:9956230 | 9956230 |
| | Spacer G ¾", length 110 mm, incl. 2 gaskets | LYU:WZM-G110 | WZM-G110 |
| | Spacer G 1", length 130 mm, incl. 2 gaskets | LYU:WZM-G130 | WZM-G130 |
| | Sealing disk G ¾", for threaded connection R ½" | LYU:9060944002 | 9060944002 |
| | Sealing disk G 1", for threaded connection R $^{3}/_{4}$" | LYU:9060944003 | 9060944003 |
| | Welding sleeve with threaded hole for temperature sensor DS M10x1 mm | S55563-F121 | WZT-G10 |
| | 10 wall adapters for mounting the electronic unit on the wall, incl. 2 screws and 2 dowels | LYU:T23-WA10 | T23-WA10 |
| | 10 EPDM gaskets for mounting the flow measuring section ¾“ | LYU:T23-34EPDM10 | T23-34EPDM10 |
| | 10 EPDM gaskets for mounting the flow measuring section 1“ | LYU:T23-1EPDM10 | T23-1EPDM10 |
| **Programming accessories** | Optical read head with USB plug for PC interface | LYU: WZR-OP-USB | WZR-OP-USB |
| | Readout and parameterization software<br>- UltraAssist Light | Download | WZX-UA-L |
| | - 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 |

## Ordering

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

**Order numbers**

| *Product no.* | *Stock number* | *Description* |
|---|---|---|
| WSM506-0E | S55561-F133 | Ultrasonic heat meter |

**Scope of delivery**

The WSM5.. is supplied complete with Mounting Instructions in different languages, an adapter kit, 2 gaskets and a seal.

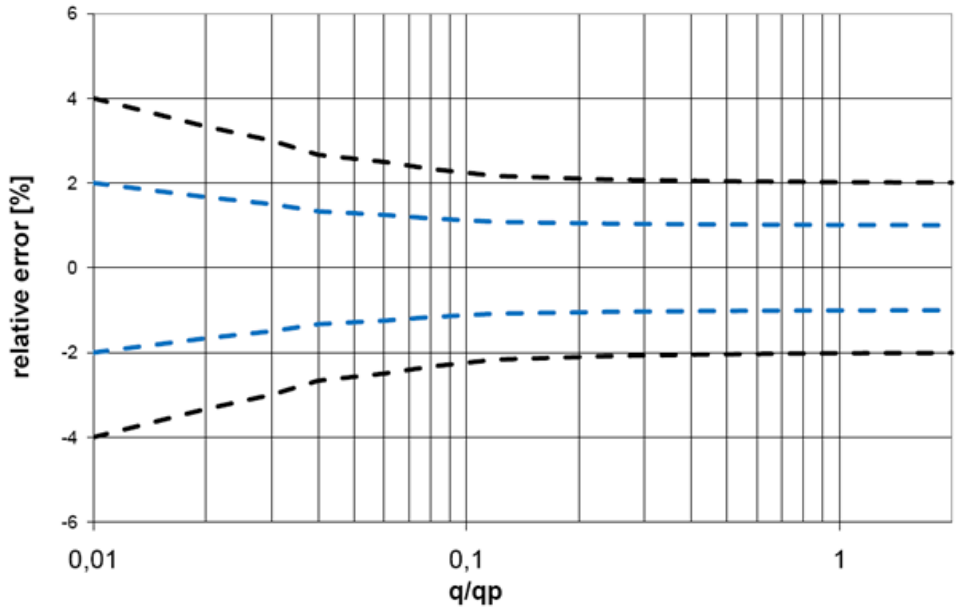
Languages

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

## Technical design

**Metering accuracy as per EN 1434**

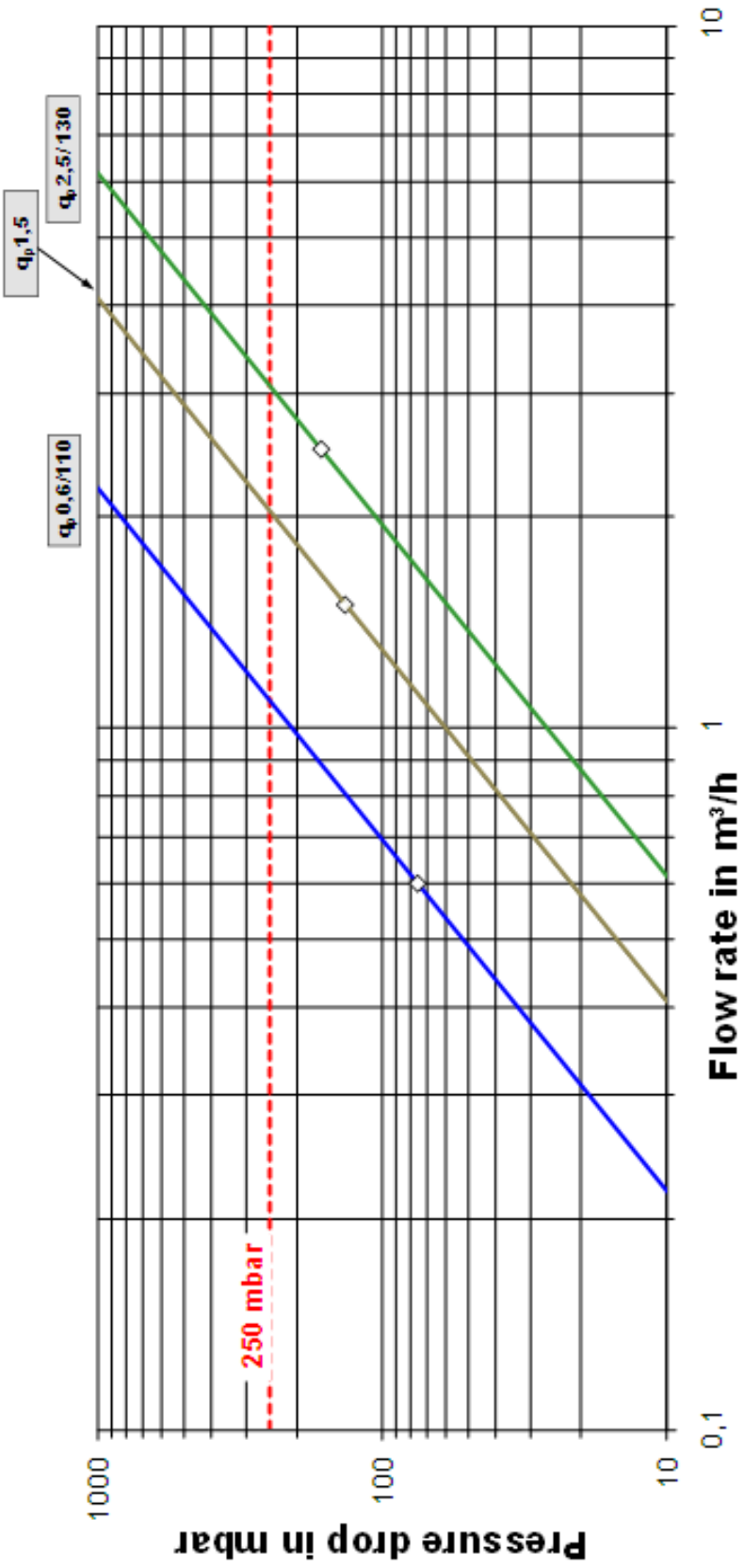
The diagram below shows the typical accuracy of the WSM5.. in comparison with the error limits as per to EN 1434 class 2.




Legend: WSM5.. typical

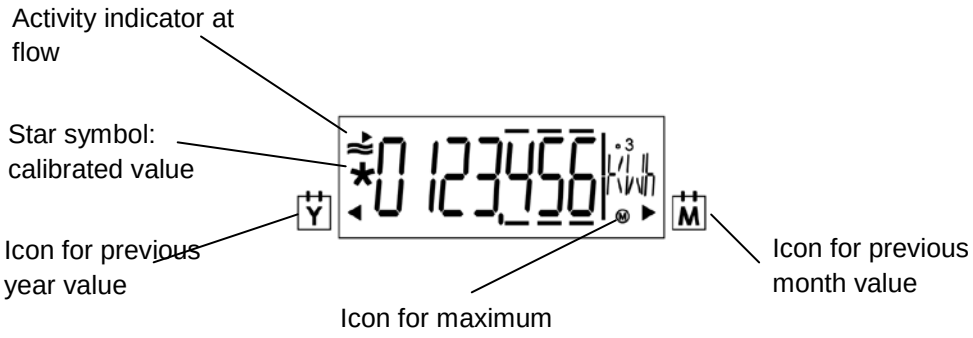
EN 1434 class 2

**Pressure loss characteristics**



## Display

The WSM5.. has a large, easy-to-read LCD with 7 digits to display different values (e.g. energy or flow). This new type of dynamic display enables users to identify positive flow at a glance. Icons for previous year values and previous month values support the easy-to-understand display concept.




The meter‘s display is subdivided into several loops.

A short press on the button (<2 s) lets the current loop pass through line by line. After the last line, the first line is displayed again. A long press (>3 s) displays the first line of the next loop. After the last loop, the first loop reappears.

The arrow icons mark the display of a stored value of the previous year or previous month. A calibrated value (e.g. energy) is marked on the display by a star symbol. The decimal places of displayed values are indicated by a frame.

| | | | |
|---|---|---|---|
| **User loop**<br>LOOP 0 | 1234567 | kWh | Energy |
| | 1234567 | $m^3$ | Volume |
| | 0000000 | | Segment test |
| | F------- | | In case of error message with error code |
| **Current values**<br>LOOP 1 | 1234567 | $m^3/h$ | Current flow |
| | 1234567 | kW | Current thermal power |
| | 80,0 | °C | Current flow temperature |
| | 50,0 | °C | Current return temperature |
| | Bd 1234 | h | Operating time |
| | Fd 123 | h | Missing time |
| | Pd 1234 | h | Time with flow rate |
| **Previous month values**<br>LOOP 2 | 01.06.2011 | | Monthly date (due date) saving day |
| | 1234567 | kWh | Monthly value (due date) energy on set day |
| | 1234567 | $m^3$ | Monthly value (due date) volume on set day |
| | Fd 123 | h | Missing time on set day |
| | 3,123 | $m^3/h$ | Max. flow rate |
| | 03.02.10 | | Date stamp of max. flow rate |
| | 279,4 | kW | Max. power |
| | 03.02.10 | | Date stamp of max. power |
| | 93,7 | °C | Max. flow temperature |
| | 03.02.10 | | Date stamp of max. flow temperature |
| | 64,8 | °C | Max. return temperature |
| | 03.02.10 | | Date stamp of max. return temperature |
| **General/ communication**<br>LOOP 3 | 1234567 | | Device number, 7 digits |
| | MbuS | | Interface (only for M-bus) |
| | 127A | | Primary address (only for M-bus) |
| | 0000000A | | Secondary address (only for M-bus) |
| | 01.01 | | Due date (yearly set day) |
| | 01.--.-- | | Monthly value (monthly set day) |
| | I 5-00 | FW | Firmware version |
| | CrC 1234 | | CRC code, part requiring calibration |
| **Other**<br>LOOP 4 | 17.11.11 | | Current date [TT.MM.JJ] |
| | 10.38.57 | | Current time of day [hh.mm.ss] |
| | ------- | C | Code entry for test/parameter operation |

**Error codes**

The meter performs self-diagnostics continually and can thus detect and display different installation or device errors:

| | | |
|---|---|---|
| FL | nEG | Wrong direction of flow |
| DIFF | nEG | Negative temperature differential |
| F0 | | No flow measurable |
| F1 | | Break in supply sensor |
| F2 | | Break in return sensor |
| F3 | | Electronics for temperature evaluation faulty |
| F4 | | Battery exhausted |
| F5 | | Short-circuit in flow sensor |
| F6 | | Short-circuit in return sensor |
| F7 | | Disruption of internal memory operation |
| F8 | | F1, F2, F3, F5 or F6 persist longer than 8 hours<br>Detection of tampering<br>No more measurements made |
| F9 | | Electronics faulty |

**Previous year values**

The electronic unit stores the meter readings for energy, volume, missing time, and flow measuring time as well as the current maximum values of flow rate, power, flow and return temperature with their date stamps on a yearly set day. The set day for previous year values can be parameterized.

**Monthly values**

The electronic unit stores the meter readings for energy, volume, missing time, and flow measuring time as well as the monthly maximum values of flow rate, power, flow and return temperature with their date stamp for up to 24 months on the set day of each month.
The set day for previous monthly values can be parameterized.
In addition, a second programmable monthly set day is available for 24 months – the day on which energy and volume are stored.

**Standard parameters**

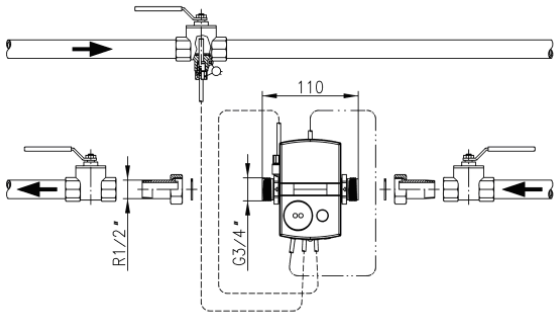
The WSM5.. comes programmed as follows:

- Set day [TT.MM]: 01.01

## Mounting

**Flow measuring section**

The mounting orientation is optional, the mounting location (return or flow) must correspond to the type of meter used.
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 mounting location must be in an adequate distance from the T-piece (min. 10 x DN) to allow the different water temperatures to properly mix.
Before mounting the meter, the system must be properly flushed.
Mount the flow measuring section between 2 shutoff valves with the arrow pointing in the direction of flow. The sensors must be mounted 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.

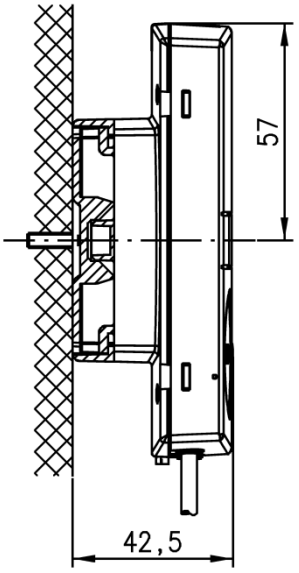



Mounting with ball valve

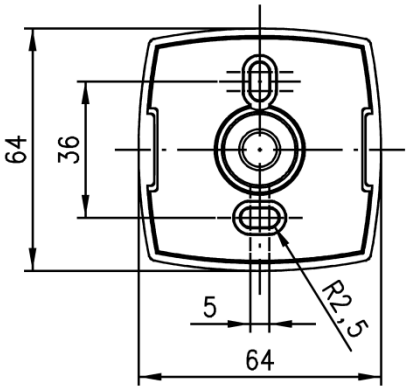
**Electronic unit**

The ambient temperature of the electronic unit must not exceed 55 °C. Direct solar irradiance must be avoided.

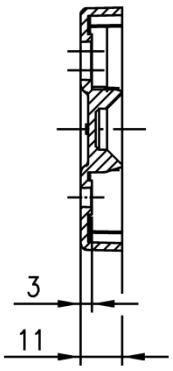
**With water temperatures between 10 °C and 90 °C**, the electronic unit can be left on the flow measuring section or can be fitted to a wall (detached mounting). The adapter plate on the wall or the flow measuring section can be aligned as needed to ensure ease of reading. To remove the electronic unit, turn the housing by 45° to the side and lift it up.



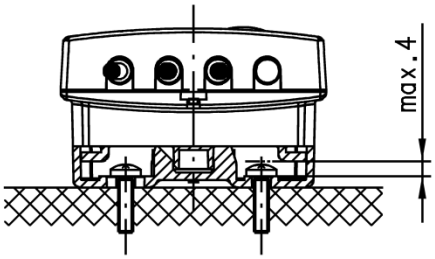

Wall mounting




Wall adapter (view from above)




Wall adapter (side view)




Maximum screw head height
(if using the wall bracket)

## 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 services and warranty.**

## Technical data

### Electronic unit

| | | |
|---|---|---|
| Power supply | Battery type | Lithium battery (cannot be replaced) |
| | Battery power | 3.6 V |
| | Battery service life | 6 or 11 years |
| Function data | Measuring range | 0…180 °C |
| | Range of temperature differential ΔΘ | 3…80 K |
| | Temperature response threshold | 0.2 K |
| | Thermal coefficient | Shifting-compensated |
| | Temperature-measuring error without sensor | (0.5 + ΔΘmin./ ΔΘ) %,<br>max. 1.5 % at ΔΘ = 3 K |
| Temperature sensors | Sensing element | Pt500 |
| | Type | Ø 5.2 x 45 mm |

### Flow measuring section

| | | | | | |
|---|---|---|---|---|---|
| Function data | Temperature range<br>(national approvals may differ) | | | 5…90 °C | |
| | Max. temperature $t_{max.}$ | °C | | 90 | |
| | Rated pressure | MPa | | 1.6 (PN 16) | |
| | Rated flow $q_p$ | $m^3/h$ | **0.6** | **1.5** | **2.5** |
| | Metrological class | | 1:100 | 1:100 | 1:100 |
| | Max. flow $q_s$ | $m^3/h$ | 1.2 | 3 | 5 |
| | Min. flow $q_i$ | l/h | 6 | 15 | 25 |
| | Response threshold | l/h | 1.2 | 3 | 5 |
| | Pressure loss at qp | | | | |
| | Mounting length 110 mm Δp | mbar | 75 | 135 | --- |
| | Mounting length 130 mm Δp | mbar | --- | 135 | 165 |
| | Flow rate at Δp = 1 bar, $K_v$ | $m^3/h$ | 2.2 | 4.1 | 6.2 |
| | Mounting orientation | | | Optional | |

| | | |
|---|---|---|
| **Communication** | Optical interface | |
| | - Design | Similar to EN 62056-21 |
| | - Protocol | As per EN 13757-2 / -3 |
| | M-bus interface | Optional |
| | - Voltage Vmax. | 50 V |
| | - Current draw | 1 M-bus load |
| | - Addressing | Primary and secondary |
| | - Baud rate | 300 or 2,400 baud |
| | - Max. permissible reading frequency | 1x per minute |
| | - Protocol | As per EN 13757-2/-3, EN 1434-3 |
| | - Connecting cable length and cross sectional area | 1.5 m, 2x AWG24/0.2 $mm^2$ |
| Cable length | Control cable | 1.5 m |
| **Protection data** | Safety class | III |
| | Degree of protection | |
| | - Electronic unit | IP54 |
| | - Flow measuring section | IP65 |

**Ambient conditions**

| | Operation EN 60721-3-3 | Transport EN 60721-3-2 | Storage 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-condens-ing) | <93% r.h. at 25 °C (non-condens-ing) | <93% r.h. at 25 °C (non-condens-ing) |
| 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) | CE2T5372xx *) |
| RCM Conformity | CE2T5372en_C1 *) |

**Environmental compatibility**

The product environmental declaration CE2E5372en contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

**Dimensions**

(W x H x D):

| | |
|---|---|
| - Electronic unit | 116 x 71 x 32 mm |
| - Flow measuring section | 110 x 43 x 64 mm (without cable) |

**Housing material**

| | |
|---|---|
| Cover | ABS |
| Bottom section | PC GF10 |
| Battery compartment | PC clear |

**Housing colors**

| | |
|---|---|
| Cover | RAL 9006 |
| Bottom section | RAL 9002 |

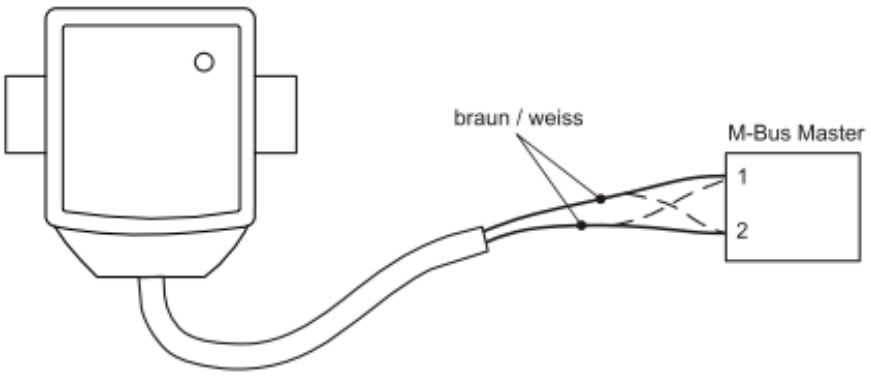
**Weight**

| | |
|---|---|
| Device packed with accessories | 1 kg |

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

## Connection diagram

For meters with M-bus communication



## Dimensions

Dimensions in mm