22PEC-5XX Series Thermal Energy Meters

Operation Manual -

Measurement Canada AV2478C certified

Edition 2024-09

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Notes

General information

Use and function

The thermal energy meter records the thermal energy in closed heating systems, cooling systems or heating/cooling systems.

Scope of delivery

– Thermal energy meter
– 2 security seals consecutively numbered (once) with attached wire approx. 40 cm
– Silicone grommet
– Installation instructions

Requirements for the water quality

The measuring stability of the counters is only given if the water quality meets the conditions of AGFW recommendation FW-510 and VDI 2035.

Energy meter installation

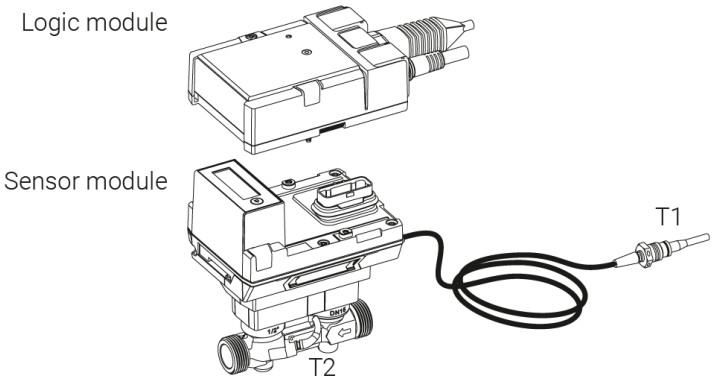
Before commissioning and installing the thermal energy meter, the operating manual should be carefully studied to prevent errors during installation and commissioning.

The operating instructions are valid for the following thermal energy meters

Product type from Belimo	DN	DN (Inches)	G (Inches)	Nominal flow qp (gpm)
22PEC-5UC	15	½	¾	6.6
22PEC-5UD	20	¾	1	11
22PEC-5UE	25	1	1¼	15.4
22PEC-5UF	32	1¼	1½	26.4
22PEC-5UG	40	1½	2	44
22PEC-5UH	50	2	2½	66

Structure of the thermal energy meter

The thermal energy meter consists of a sensor module with connected temperature sensors, which houses the calculator unit and measuring system, and the logic module, which connects the thermal energy meter to the power supply and provides the bus and NFC communication interface. The sensor module is available as a spare part.



Belimo Assistant 2 App

For successful commissioning/activation of the thermal energy meter, it is necessary to set system-specific parameters using the Belimo Assistant 2 App. Communication from the smartphone to the thermal energy meter takes place via NFC (Near Field Communication). The settings made in the process are finally shown on the display of the thermal energy meter for inspection (see chapter “Activation of the thermal energy meter”). The NFC logo on the thermal energy meter indicates that the device can be operated with the Belimo Assistant 2 App.

NFC Connection

The NFC logo on the thermal energy meter indicates that the device can be operated with the Belimo Assistant 2 App.

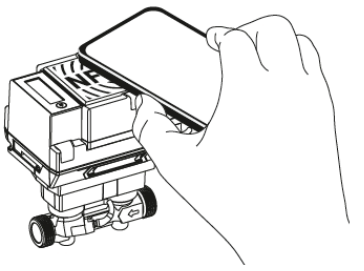
Requirement:
- NFC or Bluetooth-enabled smartphone
- Belimo Assistant 2 App (Google Play and Apple App Store)

NFC: Position the NFC-enabled smartphone on the thermal energy meter so that both NFC antennas of the smartphone and thermal energy meter are on top of each other.

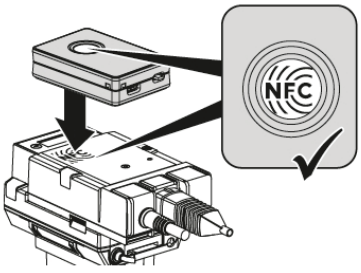
Bluetooth: Connect the Bluetooth-enabled smartphone to the thermal energy meter via "Bluetooth NFC converter" ZIP-BT-NFC.

Technical data and operating instructions can be found on the ZIP-BT-NFC data sheet.

NFC



Bluetooth



Selecting the physical address

In order for the thermal energy meter to operate successfully with bus communication, the device must be assigned a physical address. The address is programmed using the Belimo Assistant 2 App or the web server.

Legal Notice

Authorization

The thermal energy meter has left the factory in perfect condition. All installation work may only be carried out by a trained and authorized specialist.

Conformity and guarantee

The factory seals of the thermal energy meter must not be changed, damaged or removed - otherwise the guarantee and conformity of the device are void.

Application for cooling measurement

The thermal energy meter can optionally display the accumulated heat quantity and the accumulated cooling quantity. In doing so, the national regulations regarding the measurement of cooling quantities must be observed.

Use of Belimo Cloud Services

Use of Belimo Cloud Services is governed by the “Terms of Use for Belimo Cloud Services” in their currently valid version. Cloud usage can be disabled in the Startup Assistant of the web server or in the general settings of the Belimo Assistant 2 if required.

Calibration certificate

A calibration certificate is available in the Belimo Cloud for each thermal energy meter. If required, this can be downloaded as a PDF with the Belimo Assistant 2 or via the Belimo Cloud frontend.

Installation Notes

Installation position

a) Recommended installation position

b) Prohibited installation position due to the risk of air accumulation

c) Acceptable installation position in closed systems

d) Installation directly downstream from valves is prohibited.
Exception: if it is a isolation valve without constriction and is 100% open.

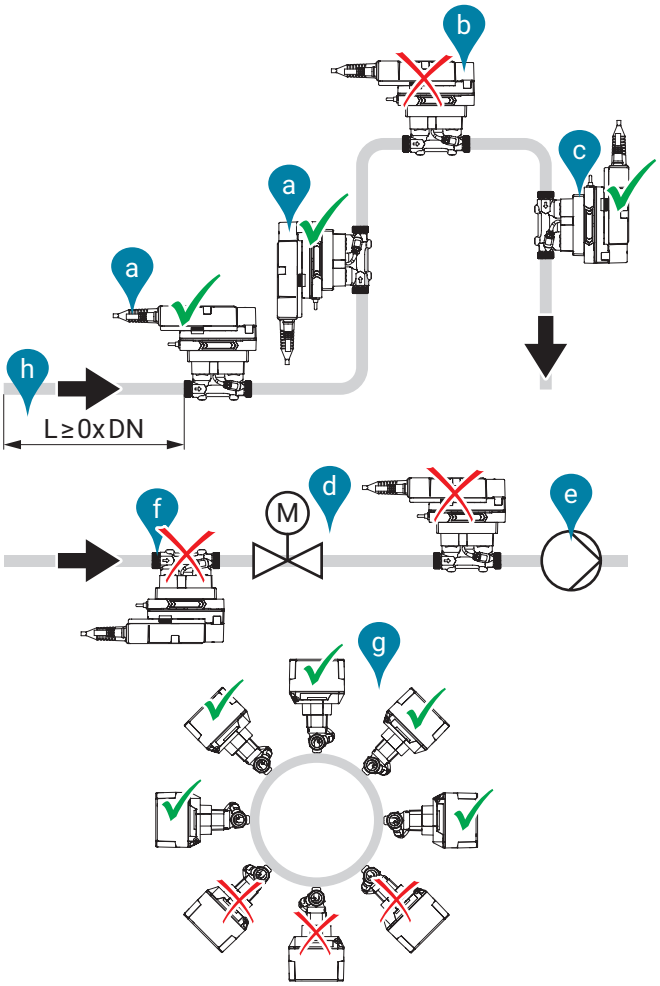
e) Installation on the suction side of a pump is prohibited.

f) The thermal energy meter must not be installed upside down.

g) Upright to horizontal installation is permitted, but suspended installation is prohibited

h) There are no requirements for straight inlet sections prior to the flow sensor.

Product has been tested to and fulfills the requirements of EN1434-4:2022



Flow direction

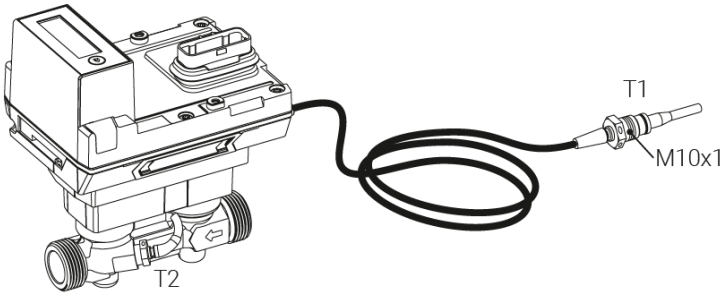
The direction of flow indicated by an arrow on the logic module and flow measuring pipe must be complied with, otherwise the flow will be measured incorrectly or not at all.

Preventing cavitation

To prevent cavitation, the system pressure at the output of the thermal energy meter must be at least 1 bar at qs (maximum flow) and temperatures up to 90°C. At a temperature of 120°C the system pressure at the output of the thermal energy meter must be at least 2.5 bar.

Installation of temperature sensor T1

For new installations, direct installation of temperature sensor T1 is preferred. National regulations must be observed when using (stock) thermowells.



The connecting cable of temperature sensor T1 should not be laid along hot pipes or wound around them, as the wire resistance and its temperature dependency affect the measurement result of temperature sensors in two-wire technology.

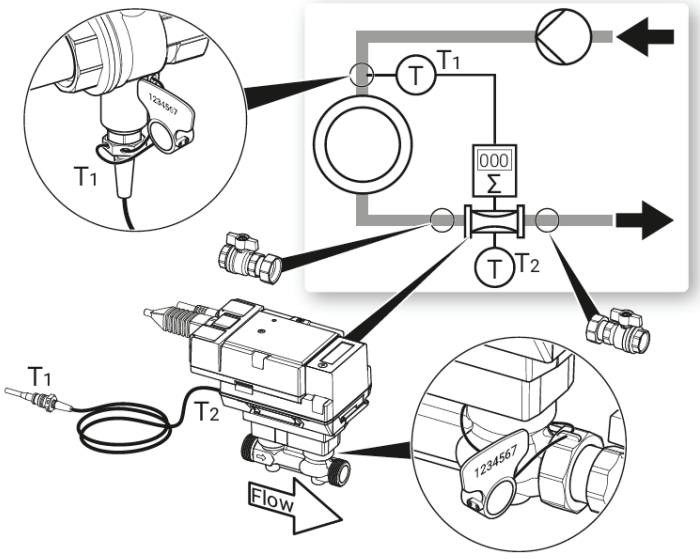
Installation in the return (default)

Assignment and configuration
The Belimo Assistant 2 App must be used to inform the thermal energy meter that it is located in the return (see chapter “Activation of the thermal energy meter”).

Picture 1 shows the principle. The thermal energy meter is in the return of the consumer. Temperature sensor T2 installed directly in the sensor module records the return temperature. The external temperature sensor T1 can be installed in the temperature measurement ball valve, which is located in the supply, via the brass screw connection with M10x1 thread, which surrounds the sensor. During installation of the sensor in the temperature measurement ball valve, ensure that the flat seal surrounding the sensor is clean and has a proper fit. The brass screw connection of the sensor is tightened slightly (6...10 Nm) with an open-end wrench.

After checking the installation, temperature sensor T1 installed in the temperature measurement ball valve is fitted with a security seal (protection against manipulation). The security seal is included in the scope of delivery.

When installing the thermal energy meter, the direction of flow must be considered. The direction of flow is indicated by the arrows on the flow body (on both sides) and on the logic module. The thermal energy meter is installed between two isolation valves. After installation, one of the isolation valves along with the flow body is fitted with a security seal (protection against manipulation). The security seal is included in the scope of delivery. Temperature sensors T1 and T2 are permanently connected to the thermal energy meter. The cable length must not be changed. If the sensor module is replaced, both temperature sensors T1 and T2 are also replaced.



Picture 1

Installation in the supply (alternative)

Assignment and configuration
The Belimo Assistant 2 App must be used to inform the thermal energy meter that it is located in the supply (see chapter "Activation of the thermal energy meter").

Picture 2 shows the principle (alternative). The thermal energy meter is located in the supply. Temperature sensor T2 installed directly in the sensor module records the supply temperature. The external temperature sensor T1 can be installed in the temperature measurement ball valve, which is located in the return, via the brass screw connection with M10x1 thread, which surrounds the sensor. During installation of the sensor in the temperature measurement ball valve, ensure that the flat seal surrounding the sensor is clean and has a proper fit. The brass screw connection of the sensor is tightened slightly (6...10 Nm) with an open-end wrench.

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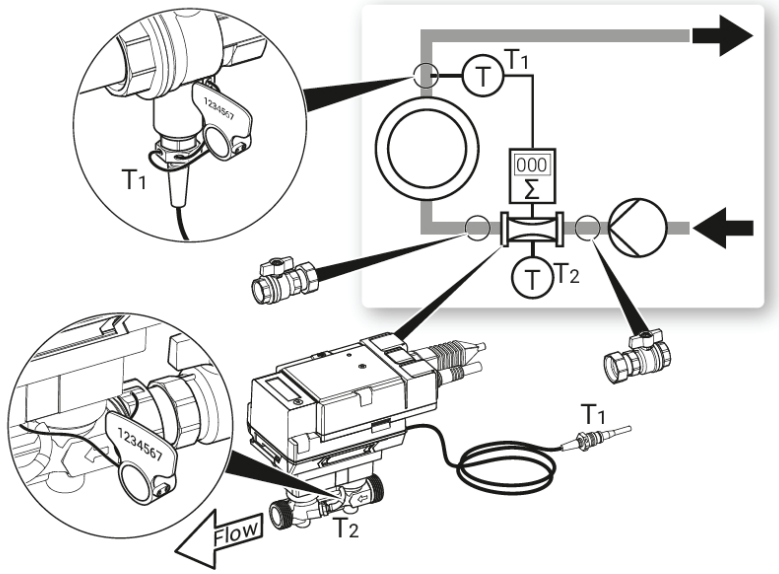


Picture 2

Supply voltage

Supply with AC/DC 24 V

The supply voltage of the thermal energy meter is 24 Volt AC or DC.

Supply via PoE

Alternatively, the thermal energy meter can be supplied with Power over Ethernet (PoE) via the Ethernet socket. The meter requires at least 11 W from the PoE switch for operation. The PoE switch must support the IEEE 802.3af, class 3 standard or higher.

It is also possible for the PoE supplied thermal energy meter to supply an external device such as an actuator or an active sensor, as described in the “Wiring diagrams” chapter. Wires 1 and 2 of the meter are used as DC 24 V voltage output and must not be supplied with external voltage at the same time. The maximum output power is 8 W. The PoE supply of the external device can be activated via the Belimo Assistant App under the item “power supply” on the device.

Caution: PoE may only be enabled if an external device is connected to wires 1 and 2 or wires 1 and 2 are insulated**.**

Backup Battery

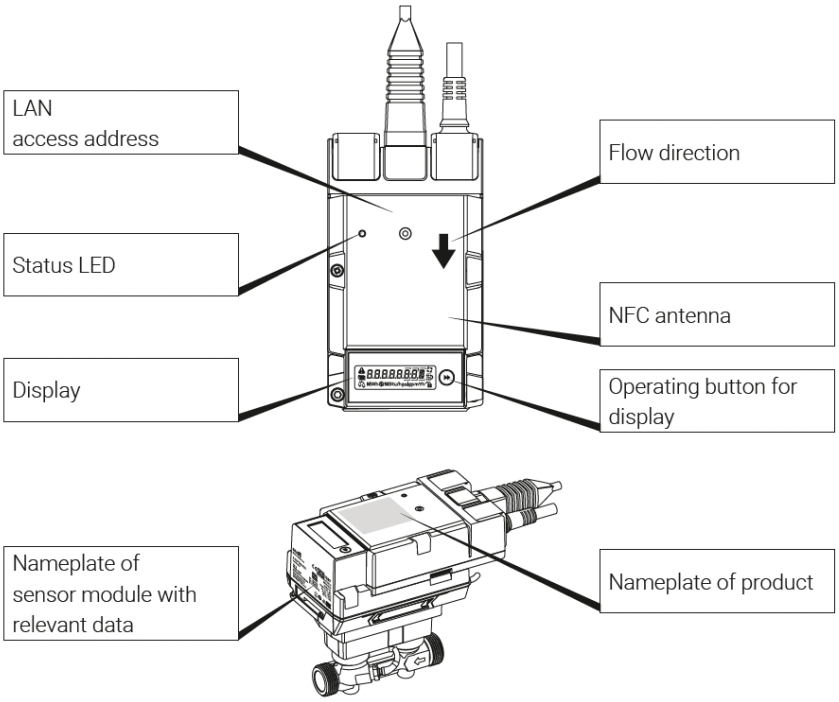
The thermal energy meter is equipped with a non-rechargeable backup battery to bridge possible power failures for a total 14 months. The battery is activated when the thermal energy meter is activated and ensures that the thermal energy continues to be reliably recorded in the event of temporary power failures. While the thermal energy meter is running on the battery, the values can only be read out via the display.

Active use of the display (pressing the button next to it) reduces the battery capacity and thus the possible bridging time for power failures. It is therefore recommended to restore the power supply as soon as possible. In the case of battery operation, the sensor data sampling rates are reduced. The thermal energy meter must not be installed in such a way that intentional voltage interruptions are possible.

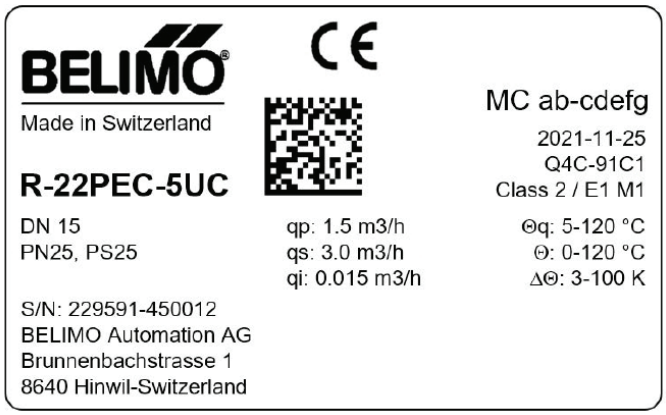
Operating controls and indicators

Status LED display

LED	Status	Action
Lights up continously	Everything ok	
Flashing	Action required	Use smart-phone app
Off	No voltage	



Nameplate of sensor module with relevant data
(Example DN15)

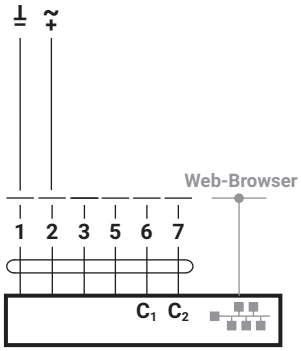


Wiring diagrams

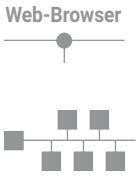
Notes

- The wiring of the line for BACnet MS/TP and Modbus RTU must be carried out according to the relevant RS485 guidelines.
- Modbus/BACnet: Power supply and communication are not galvanically separated. Connect earth signal for devices with one another.
- Sensor interface: A sensor can optionally be connected to the thermal energy meter. This can be a passive resistance sensor (Pt1000, Ni1000 or NTC), an active sensor (e.g. with a DC 0...10 V output) or a switching contact. As a result, the analogue signal of the sensor can be easily digitised with the thermal energy meter and transferred to the corresponding bus system.
- Analog output: an analog output is available at the thermal energy meter. This can be selected as DC 0...10 V, DC 0.5...10 V or DC 2...10 V and freely selectable within the specified limits. For example, the flow or the temperature of temperature sensor T1/T2 can be output as an analog value.
- IP protection: IP protection is only guaranteed if either the Ethernet connector socket is protected with the cover cap or a connected Ethernet cable is protected with the enclosed silicone sleeve.
- Equipotential bonding: equipotential bonding must be installed on the flow body, if this is not already done via the pipeline.

Connection assignment



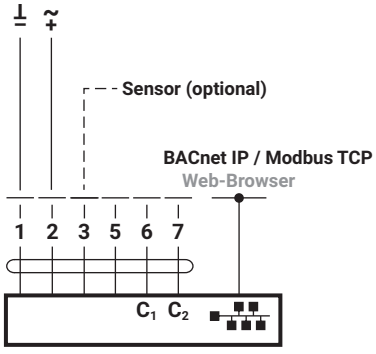
Wire colours:
1 = black, GND
2 = red, AC/DC 24 V
3 = white, sensor
5 = orange, MP, DC 0...10 V
6 = pink, C1 = D– = A
7 = grey, C2 = D+ = B



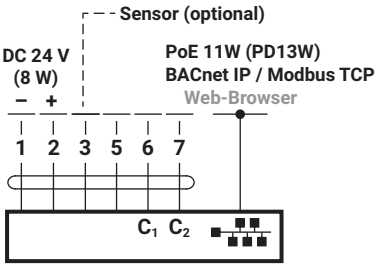
Connection via RJ45 for access to the integrated web server

Connections BACnet, Modbus, MP-Bus

BACnet IP or Modbus TCP

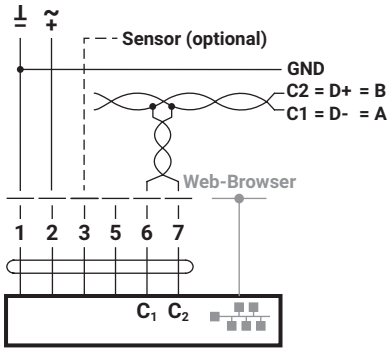


PoE with BACnet IP or Modbus TCP

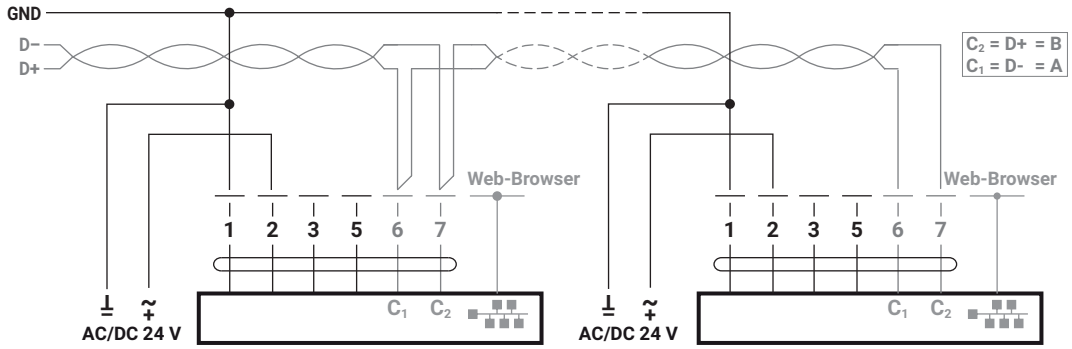


Wiring diagrams

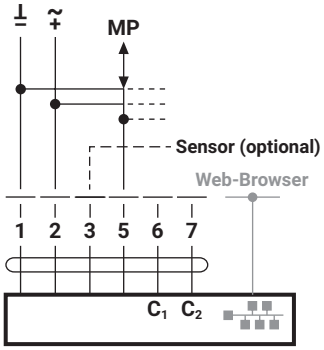
BACnet MS/TP or Modbus RTU



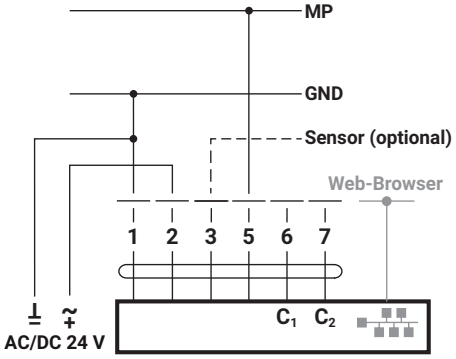
Wiring BACnet MS/TP or Modbus RTU (daisy chain)



MP-Bus, supply via 3-wire



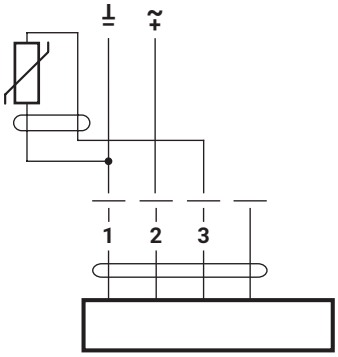
MP-Bus via 2-wire local power supply



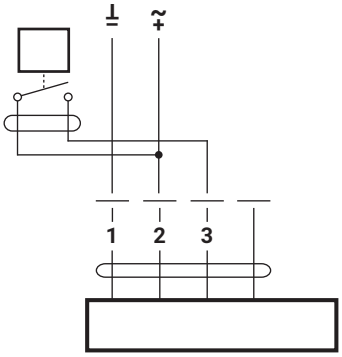
Wiring Diagrams

Sensor connections

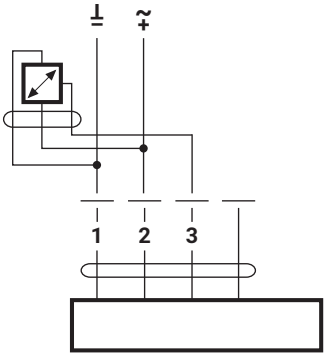
Passive sensor connection



Switch connection

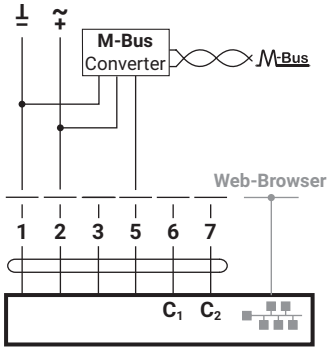


Connection active sensor

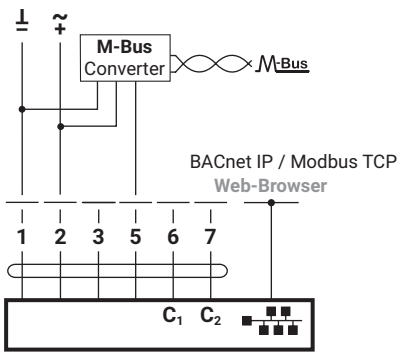


Connections to M-Bus

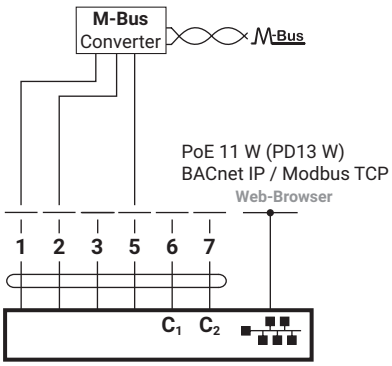
M-Bus via M-Bus converter



M-Bus with converter in parallel operation with BACnet IP or Modbus TCP



M-Bus with converter in parallel operation with PoE BACnet IP or Modbus TCP



Activation of the thermal energy meter

Display symbols

Symbol	Meaning
	Flow is signalled
	Energy meter is installed in the supply
	Energy meter is installed in the return
	Energy meter already activated
	Energy meter not yet activated
	Cooling quantity is displayed
	Error present Note: details can be queried in the diagnostic loop
	Diagnostic loop is active
	Findings check mode active

Notes on activation

To successfully commission the thermal energy meter, it is necessary to set system-specific parameters using the Belimo Assistant 2 App. Communication from the smartphone to the thermal energy meter takes place via NFC (Near Field Communication). The settings made are then shown on the display of the thermal energy meter for verification and must be confirmed by pressing a button on the device to activate it. Once activated, the thermal energy meter will begin to accumulate the measured energy. The correct configuration of the thermal energy meter is a prerequisite for correct functioning.

The parameters can be set **once** and cannot be changed after activation.

Important:
- Activation takes place once and is irreversible, i.e., it should be done carefully and attentively. In case of incorrect activation, the device will measure incorrectly and will have to be removed and replaced at your own cost.
- Whoever carries out commissioning is obliged to check all relevant parameters.
- Activation requires a Belimo cloud account. You can register for the Belimo cloud account via www.cloud.belimo.com. In addition, credentials are required, which can be obtained by completing an online learning module. The online learning module is available on a special website, www.belimo. ch/tem-activation.

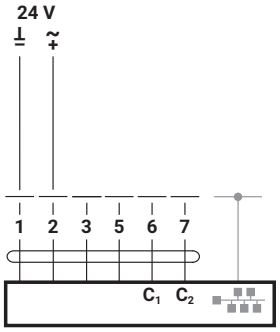
The following chapter describes how to activate the thermal energy meter using the Belimo Assistant 2 App.

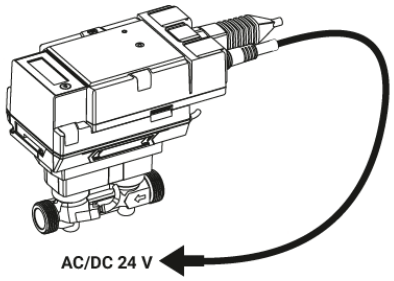
Notes on smartphones with Bluetooth

Bluetooth-enabled smartphones can be connected to the thermal energy meter via "Bluetooth-NFC converter" ZIP-BT-NFC (see chapter "NFC connection" in the "General notes").

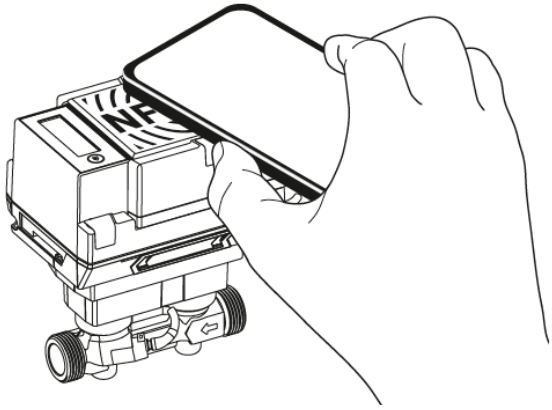
Procedure for activation

Step 1.
Connect the thermal energy meter to AC or DC 24 Volt or PoE (Power over Ethernet). Wait for the boot process until the status LED starts flashing.



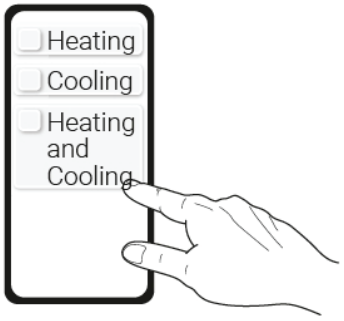


Step 2.
Scan the thermal energy meter via NFC and read out data. The activation process can now be started via the overview page.
Initial situation:
– Status ok
– Energy meter not activated



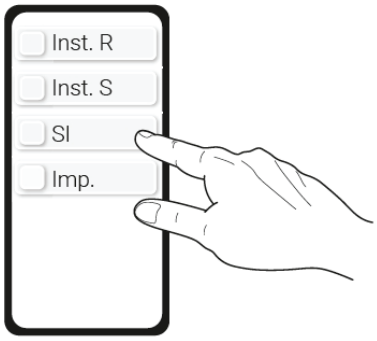
Step 3.
Log in with Belimo Cloud Account ID

Step 4.
Select the application according to system design
a) Heating
b) Cooling
c) Heating and cooling



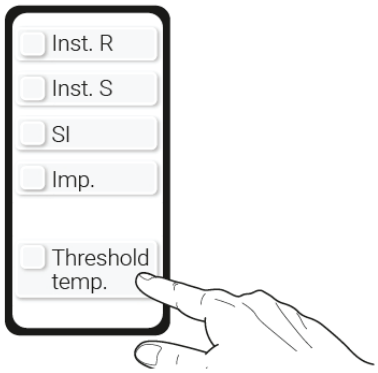
Step 5.
Select parameters for the corresponding application

Heating



- Choice of installation in return (R) or in supply (S)
- The system of units must be selected (SI = International System of Units, Imperial = US System of Units)

Cooling
Heating / cooling

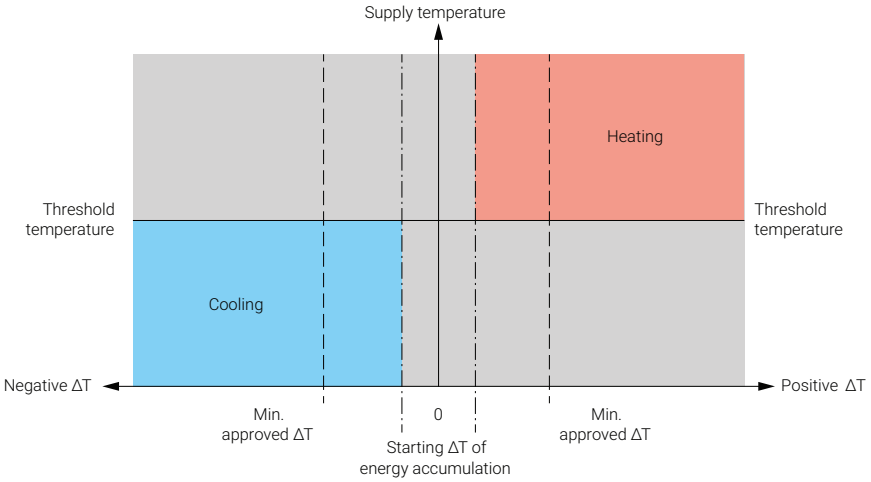


- Choice of installation in return (R) or in supply (S)
- The system of units must be selected (SI = International System of Units, Imperial = US System of Units)
- Advanced setting: the threshold temperature can be set as an option (threshold temp.)

Note on threshold temperature:

The threshold temperature is the temperature that is decisive for automatic switching between heating and cooling registers. The factory setting of 20°C is used for all applications, i. e. for heating, cooling or heating/cooling. It is adjustable from 0…50°C for cooling as well as combined heating and cooling. This is fixed at the time of activation and, like the settings relating to the installation location and system of units, **cannot be changed afterwards.**
The value should only be changed if a very high supply temperature is selected for a cooling application. National regulations on how to set the threshold temperature may apply. According to standard EN 1434, the threshold temperature should be 3°C above the highest supply temperature in cooling mode and 3°C below the lowest supply temperature in heating mode.
The threshold temperature cannot be deactivated due to legal requirements for billing purposes, particularly for combined heating and cooling operation.

Graphical representation



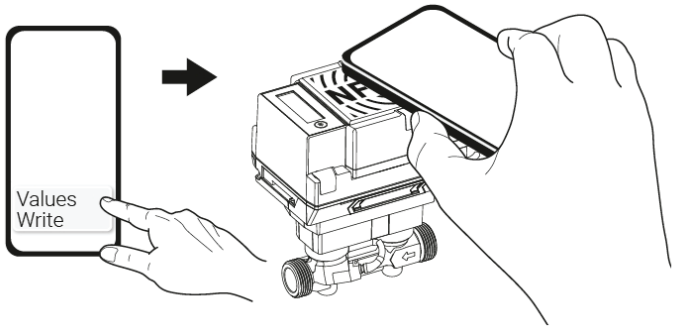
Definition of heating/cooling with threshold temperature and differential temperatures (ΔT) according to EN 1434.

Based on this, entries are made in the heating or cooling register under the following conditions:
Energy recording in heating register if:
– measured ΔT > starting ΔT for energy accumulation and
– supply temperature > threshold temperature

Energy recording in cooling register if:
– measured ΔT < starting ΔT for energy accumulation and
– supply temperature < threshold temperature

Note: The minimum approved differential temperature of the thermal energy meter according to the type approval must be considered when designing the system. Above this, compliance with the permissible errors according to the type approval is guaranteed. See datasheet of the thermal energy meter. Energy accumulation starts at starting ΔT of 0.5 K.

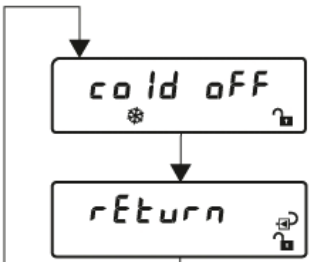
Step 6.
Transfer values to the thermal energy meter via NFC



Step 7.
The parameters selected in step 5 are now visible on the smartphone. At the same time, the "commissioning loop" is initiated on the display of the thermal energy meter. The display views are automatically changed in ascending order with an interval of 2.5 s. Once the last display view is reached, the first one is displayed again. **Whoever carries out commissioning is obliged to check all relevant parameters.** If all parameters are correct, they must be confirmed by pressing the display button on the thermal energy meter (>2 s) within 5 minutes. Note: if the key is not pressed, the app will display the message "Values not written". In this case, activation must be restarted. After a time-out of 5 minutes, the "commissioning loop" is terminated and the commissioning process aborted.

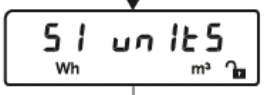
Heating

Loop
During 5 minutes



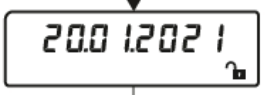
Cooling quantity:
Indication of whether the cooling quantity is shown on the display. For heating applications, the cooling coil is switched off (off) and for cooling applications it is switched on (on).

Installation of the energy meter:
indication of whether the thermal energy meter is in supply or return
R = return S = supply

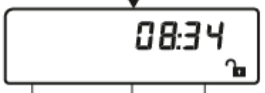


Unit system:
Indication of whether the unit system of the thermal energy meter is set to SI or Imperial (US). According to the European Measuring Instruments Directive (MID), the energy meter must be set to SI unit.

Threshold temperature:
the threshold temperature is displayed, which is decisive for automatic switchover between the heating and cooling coil.



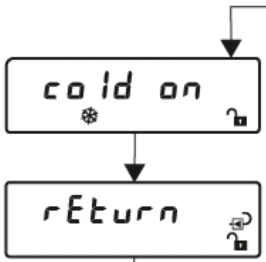
Display view, date:
Current date display formatted as DD.MM.YYYY

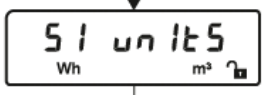


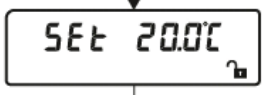
Display view, current time:
The current time is displayed (range 00:00...23:59) regardless of the set unit system. The thermal energy meter automatically adopts the time and date of the smartphone.

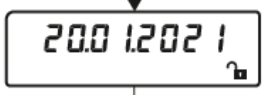
Cooling
Heating / cooling

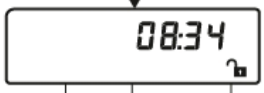
Loop
During 5 minutes

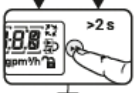




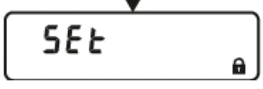


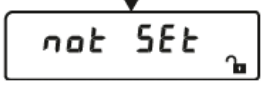






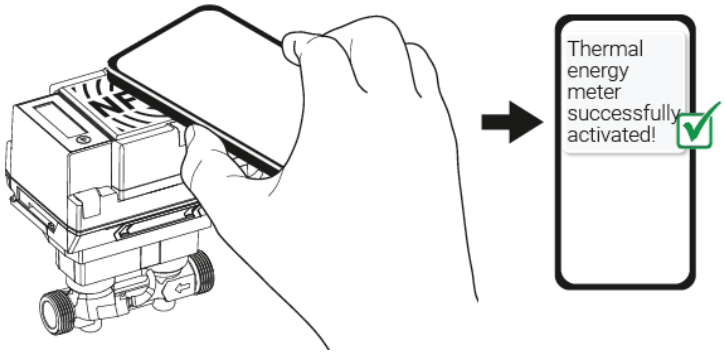
If the button is not pressed within 5 minutes..





Result of commissioning
After pressing the, the display shows whether the activation of the energy meter was successful.
SEt = successful, not SEt = not successful

Step 8.
Scan thermal energy meter via NFC:
– Message appears: thermal energy meter successfully activated!



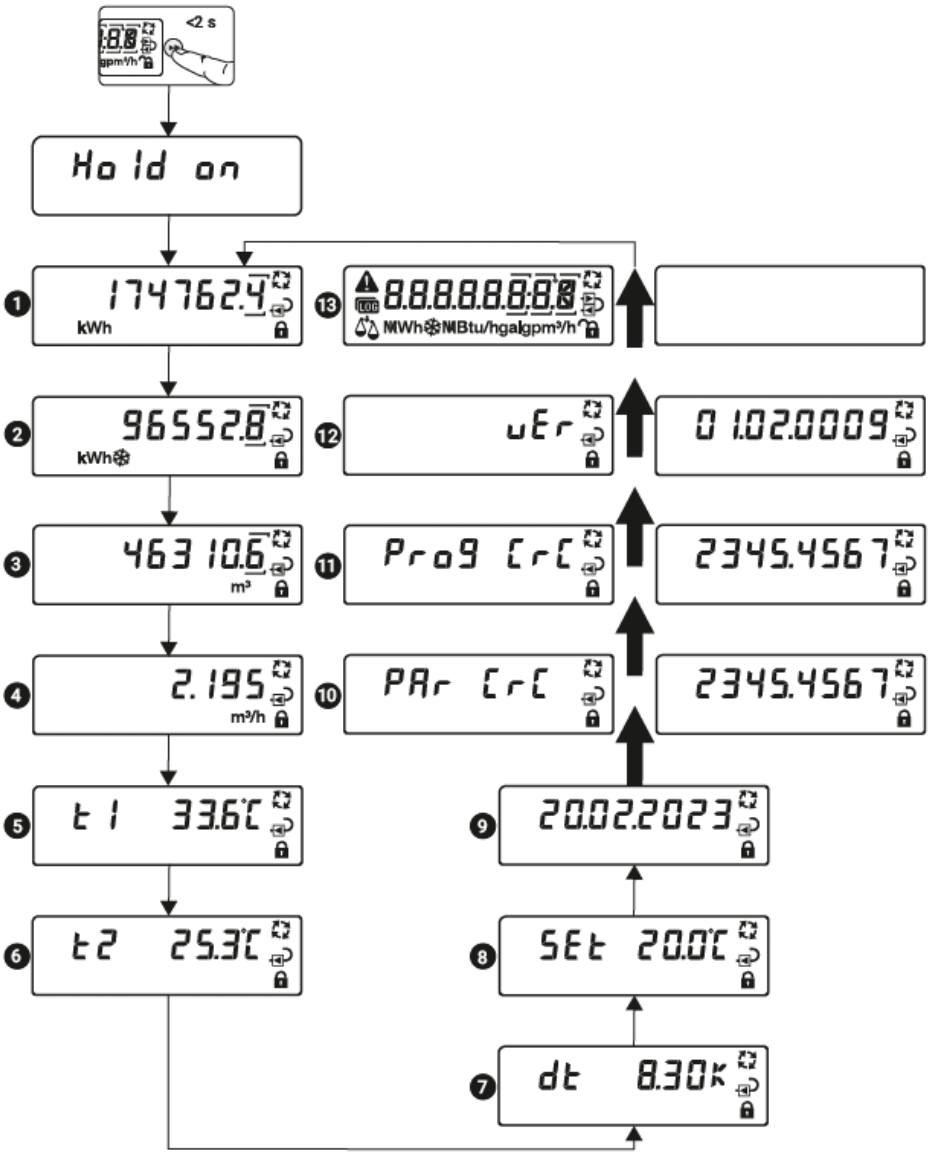
Commissioning protocol

To prevent installation errors, it is recommended to have an installation and commissioning certificate issued when the thermal energy meter is reassembled or replaced. Documenting all measuring point data, counter data, the installation situation and the operating states ensures that the correct installation and the function of the thermal energy meter is reliably verified. As a result, the legal certainty of subsequent auxiliary cost statements can be additionally substantiated and tenant objections can be invalidated. The commissioning protocol of the thermal energy meter is based on the submission of the technical guideline K9 of the German Physikalisch-Technische Bundesanstalt (PTB). After commissioning the thermal energy meter, the commissioning log is saved on device owner›s Belimo Cloud account.

Display loops

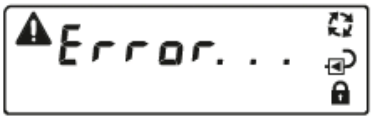
User loop

The “user loop” is started by activating the dark LCD display by briefly pressing (<2 s) the display button. It may take a moment for display view 1 to appear. During this time, “Hold on” is displayed. The view can be changed in ascending order by briefly pressing the display button. When the last entry in the table is reached, the first entry is displayed again. The “user loop” is exited after a timeout of 30 s. The timeout is restarted each time the display button is pressed. After a timeout the display is switched off.

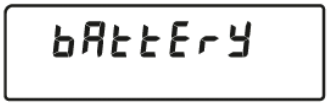


Description of the display views
“User loop”

If there are error messages, the adjacent display appears. The errors are displayed in ascending order (... = error code 00...99). In the other display views 1...11 of the user loop, a warning triangle is displayed. If there are no errors, this display does not appear.



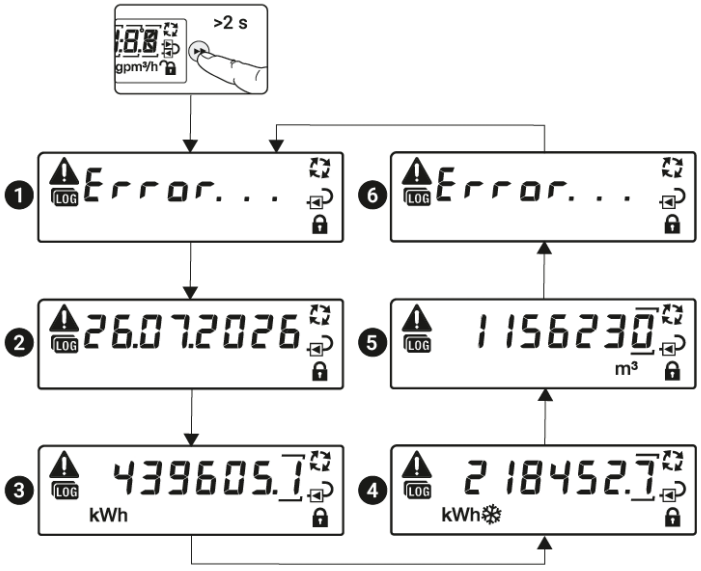
1	**Accumulated heat quantity**	The current accumulated heat quantity is displayed. If there is a permanent error (error codes 1...16), the last permanently stored accumulated heat quantity is displayed.
2	**Accumulated cooling quantity**	The current accumulated cooling quantity is displayed. If there is a permanent error (error codes 1...16), the last permanently stored accumulated cooling quantity is displayed. This display does not appear for pure heating applications.
3	**Accumulated volume**	The current accumulated volume is displayed. If there is a permanent error (error codes 1...16), the last permanently stored accumulated volume is displayed.
4	**Current volumetric flow**	The current volumetric flow is displayed.
5	**Current temperature of external temperature sensor T1**	The current temperature of the external temperature sensor is displayed.
6	**Current temperature of the temperature sensor T2 integrated in the thermal energy meter**	The current temperature of the temperature sensor integrated in the thermal energy meter is displayed.
7	**Temperature difference**	The current differential temperature between the supply and return temperature is displayed.
8	**Threshold temperature**	The threshold temperature is displayed, which is decisive for the automatic switchover between the heat and cooling coil.
9	**Date**	Current date display formatted as DD.MM.YYYY
10	**CRC type-specific parameter**	For display purposes, the two display views are alternately displayed at 1-s intervals. The CRC code is used to indicate that the factory settings have not been changed.
11	**CRC program code**	For display purposes, the two display views are alternately displayed at 1-s intervals. The CRC code is used to indicate that the program code has not been changed.
12	**Software version**	For display purposes, the two display views are alternately displayed at 1-s intervals.
13	**LCD test**	The LCD display is being tested. In 1-s intervals, all characters are displayed and then deleted again. During this process, you can check that all characters and symbols are shown on the display.



To save the battery, the LCD display is deactivated when the battery voltage is critical. In this case, the adjacent display appears. The measuring operation continues nevertheless. To reactivate the display, the thermal energy meter must be supplied with external voltage. This should be done promptly after the battery warning occurs to prevent the battery voltage from dropping further below a critical value, which would result in persistent error 08.

Diagnostic loop

The “diagnostic loop” is started from the “user loop” by pressing the display key (>2 s) and indicated by the LOG symbol. You can switch from the “user loop” to the “diagnostic loop” and back by pressing and holding the display key (>2 s). The display view can be changed in ascending order by briefly pressing the display key. After the last display is reached, the first display is shown again. The “diagnostic loop” is exited after a time-out of 30 s. The time-out is restarted each time the display button is pressed. After a timeout the display is switched off.



Description of the display views
“Diagnostic loop”

If there are error messages, the adjacent display appears. The errors are displayed in ascending order (... = error code 00…99). In the other display views 1…11 of the user loop, a warning triangle is displayed. If there are no errors, this display does not appear.

1	**Error number (... = error code 00...99)**	The error with the lowest error number is displayed (permanent errors have lower error numbers).
2	**Date**	Date of the last permanently stored counter readings is displayed.
3	**Accumulated heat quantity**	The last permanently stored accumulated heat quantity is displayed.
4	**Accumulated cooling quantity**	The last permanently stored accumulated cooling quantity is displayed. Is only displayed if the cooling quantities are activated.
5	**Accumulated volume**	The last permanently stored volume is displayed.
6	**Other errors (... = error code 00...99)**	If available, additional error codes are displayed.

Error codes

Permanent errors

Error Code	Meaning
Err 01	Temperature sensor T2 (temperature sensor integrated in the sensor module) is short-circuited, and this has been detected in several successive measurements (only released after legal commissioning of the device)
Err 02	Temperature sensor T2 (temperature sensor integrated in the sensor module) is interrupted, and this has been detected in several successive measurements (only released after legal commissioning of the device)
Err 03	Temperature sensor T1 (external temperature sensor) is shortcircuited, and this has been detected in several successive measurements (only released after legal commissioning of the device)
Err 04	Temperature sensor T1 (external temperature sensor) is interrupted, and this has been detected in several successive measurements (only released after legal commissioning of the device)
Err 05	Permanent communication errot with non-volatile memory (SPI)
Err 06	Program code integrity check failed
Err 07	Parameter integrity failed
Err 08	Power failure after completion of commissioning requiring calibration (only for MID/CSA devices)
Err 09	The data format in the non-volatile memory does not match the data format in the sensor uC software
Err 10	Integrity check of data in non-volatile memory failed
Err 11	An error counter has reached the maximum value
Err 12	
Err 13	
Err 14	
Err 15	
Err 16	

Temporary errors

Error Code	Meaning
Err 17	
Err 18	The ultrasonic path is interrupted (air bubbles in the system, connection to ultrasonic transducers interrupted)
Err 19	Ultrasonic transit time out of range
Err 20	Automatic gain controller out of range (problem with the ultrasonic transducer or wong fluid)
Err 21	
Err 22	Volume accumulation failed
Err 23	Heat/cold accumulation failed
Err 24	The raw resistance measurement of temperature sensor T1 (external temperature sensor) or temperature sensor T2 (temperature sensor integrated in the sensor module) is invalid
Err 25	Calculation error
Err 26	Temperature sensor T2 (temperature sensor integrated in the sensor module) is short circuited
Err 27	Temperature sensor T2 (temperature sensor integrated in the sensor module) is interrupted
Err 28	Temperature sensor T1 (external temperature sensor) is short circuited
Err 29	Temperature sensor T1 (external temperature sensor) is interrupted
Err 30	Flow in reverse direction (backflow) detected
Err 31	Flow above the upper limit value
Err 32	Invalid flow

Sealing and lead sealing

Factory-applied seals

The following seals are applied at the factory.

Seal 1

Seal (1) visualises manipulations of the internal temperature sensor T2.

Seal 2

Seal (2) visualises manipulations of the sensor module (calculator unit).

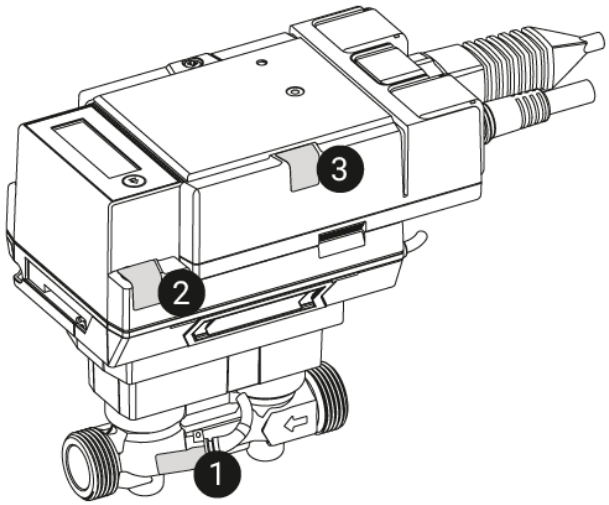
Seal 3

Seal (3) visualises manipulations of the logic module.

Note:

If the sensor module is purchased as a spare part, a seal (3) is included. The authorised person who replaces the sensor module must reapply the seal (3) after work has been carried out.

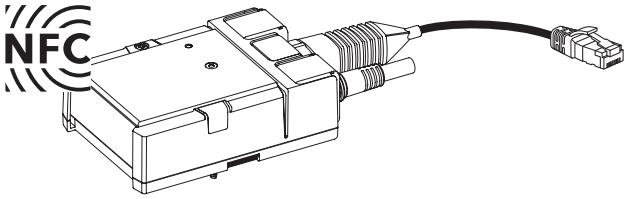
The factory seals (1) and (2) of the thermal energy meter must not be changed, damaged or removed - otherwise the guarantee and conformity of the device are void.



Exchanging the sensor module

Logic module of the thermal energy meter

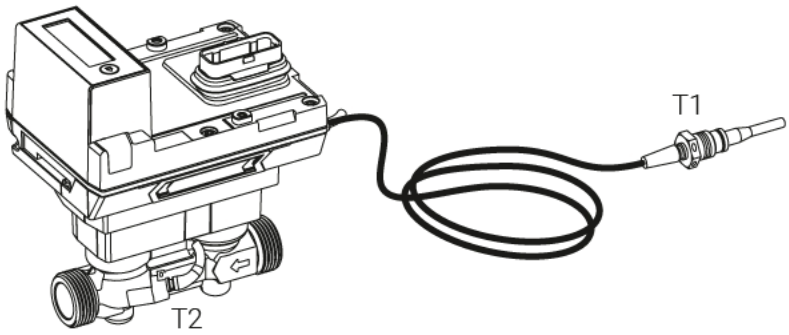
The thermal energy meter is supplied with voltage via the logic module. The bus and NFC communication interface is also available on the logic module. If the sensor module is disconnected from the logic module for replacement, the connecting cables can remain connected to the logic module and the system.



Sensor module of the thermal energy meter

The sensor module contains the integrated temperature sensor T2 and the external temperature sensor T1 is connected via a cable. If the sensor module is replaced, both temperature sensors T1 and T2 must also be replaced. The sensor module also houses the calculator unit and the ultrasonic flow measurement system.

In certain countries, the sensor module must be replaced periodically for recalibration and is therefore available as a spare part. Relevant national regulations must be observed.

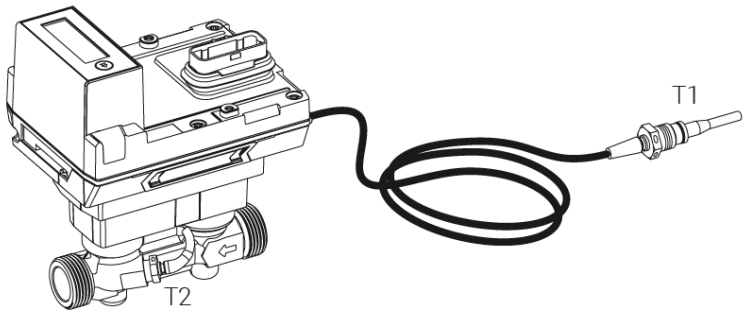


Sensor module as a spare part

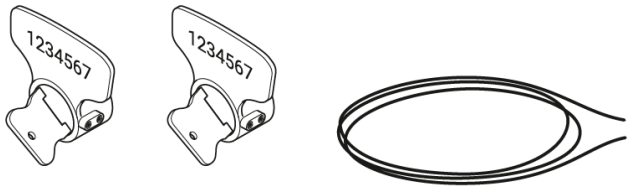
Product type from Belimo	DN	DN (Inches)	G (Inches)
22PEC-5UC	15	½	¾
22PEC-5UD	20	¾	1
22PEC-5UE	25	1	1¼
22PEC-5UF	32	1¼	1½
22PEC-5UG	40	1½	2
22PEC-5UH	50	2	2½

Comprising:

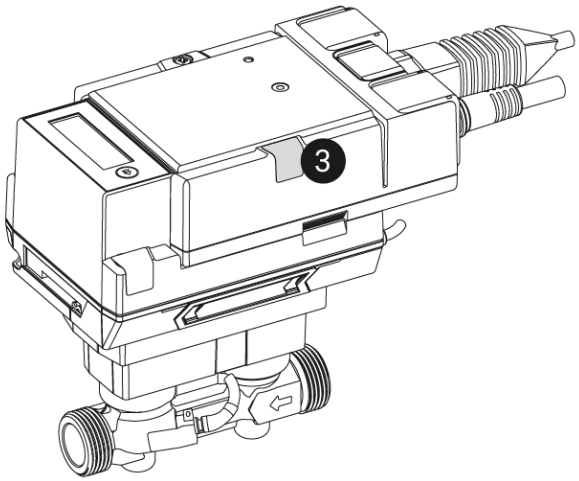
– Sensor module including the built-in temperature sensor T2 and the external temperature sensor T1



– 2 security seals consecutively numbered (once) with attached wire approx. 40 cm



– 1 seal (seal 3)



Exceptional service

For over 40 years, Belimo has successfully focused on the heating, ventilation, and air conditioning markets providing quality solutions that will increase energy efficiency and reduce installation costs with the fastest delivery times in the industry. Our innovative products have always been designed to help achieve objectives better, faster, and more economically. Investing in new technology is key to our success, and Belimo will continue to offer products to help businesses succeed.

- 5-year warranty
- Global support
- Tested quality
- On-time delivery
- Extensive service
- Complete product range

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