



T550 (UC50...)



Note: In the following text, the term calculator refers to both heat meter calculator and cooling meter calculator, unless they are otherwise differentiated.

1. General

The calculator left the factory in a faultless condition where safety is concerned. Adjustments, maintenance work, replacement of parts or repairs may only be carried out by specialist staffs who are aware of the associated hazards. The manufacturer will provide additional technical support on request. Calibration relevant security seals on the calculator must not be damaged or removed. Otherwise the guarantee and calibration validity of the meter will lapse.

- Keep the packaging so that you can transport the calculator in its original packaging following expiry of the calibration validity.
- Lay all cables at a minimum distance of 500 mm to high voltage and high frequency cables.
- A relative humidity of < 93 % at 25 °C is permissible (without condensation).
- The 110 V / 230 V network parts correspond to protection rating II so that the line voltage does not need to be disconnected when changing the meter.

2. Safety Information



The calculator may only be used in building service engineering systems and only for the applications described.



The local regulations (installation etc.) must be adhered to.



Adhere to the operating conditions according to the dial plate during use. Non-adherence can cause hazards and the guarantee will lapse.



Guarantee and calibration validity will lapse if the calibration relevant security seals are broken.



Only clean the calculator from outside with a soft, lightly wetted cloth. Do not use any spirit or cleaning solvent.



The 110 V / 230 V connections may only be made by an electrician.



The calculator may only be powered up once the installation has been completed. There is otherwise a danger of electronic shock on the terminals.



A defective or obviously damaged appliance must be disconnected from the power supply immediately and replaced.



As far as disposal is concerned, the calculator is a waste electronic appliance in the sense of European Directive 2012/19/EU (WEEE) and it must not be disposed of as domestic waste. The relevant national, legal regulations must be observed as the appliance must be disposed of via the channels provided for this purpose. The local and currently valid legislation must be observed.



The calculator may contain lithium batteries. Do not dispose of the calculator and the batteries with domestic waste. Observe the local stipulations and laws on disposal.



You can return the lithium batteries to the manufacturer for appropriate disposal following use. When shipping please observe legal regulations, in particular, those governing the labelling and packaging of hazardous goods.



Do not open the batteries. Do not bring batteries into contact with water or expose to temperatures above 80 °C.



The calculator does not have any lightning protection. Ensure lightning protection via the in-house installation.



Only fit one compartment for the power supply. Do not remove the red locking hatch.

3. Installation



Note: The **mounting place** and the **pulse value** of flow sensors with pulse output must correspond to the in the calculator set values (see LOOP 2).

Service loop 2 („LOOP 2“)

Service loop 2 displays the installation details.

LOOP 2	Head of the loop
P05 cold	Mounting place of the flow sensor: cold side or
P05 hot	Mounting place of the flow sensor: hot side
P1000 1000 L1	Pulse value



Note: At a **heat meter calculator** or combined heat/cold meter calculator the mounting place of the flow sensor cold side is equivalent to return. The mounting place of the flow sensor hot side is equivalent to flow.



Note: At a **cooling meter calculator** the mounting place of the flow sensor hot side is equivalent to the return. The mounting place of the flow sensor cold side is equivalent to flow.



Attention: Calculators with one-time adjustable pulse value and adaptable mounting place being

characterized by: 



Attention: At calculators with one-time adjustable pulse value, the pulse value must be adjusted during commissioning in accordance with the flow sensor and the mounting place must be checked!

As long as the pulse value has not been set, the calculator does not cumulated energy and volume.

The mounting place can be adapted and is fully locked by entering the pulse value.

32 19 101 002 b

Examples of installation

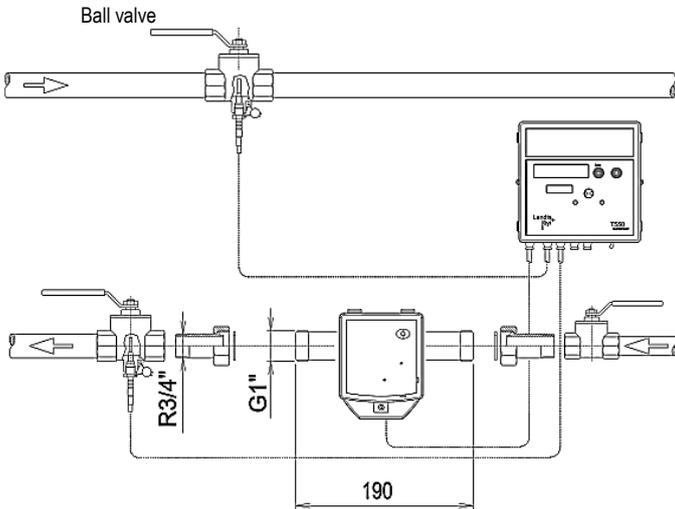


Fig. 1: Installation with a ball valve (recommended up to and including DN25)

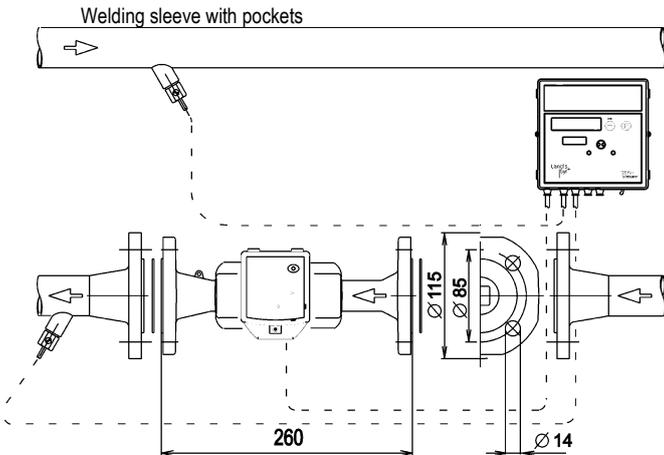


Fig. 2: Installation with pockets (recommended up to DN32)

3.1 Temperature sensors

- Note:** The temperature sensor type PT 100/500 must correspond to the information on the dial plate.
- Note:** If detachable temperature sensors are used they must have their own calibration or certification of conformity!
- Note:** The maximum cable length of the temperature sensors is 10 m. Extension is not permitted.

- Press the 4 side lugs of the housing cover inwards and remove the cover.
- Guide the wire of the temperature sensor from the outside through the 2nd sleeve from the left and the return sensor through the 3rd sleeve from the left.
- Strip both wires as in the figure 3.

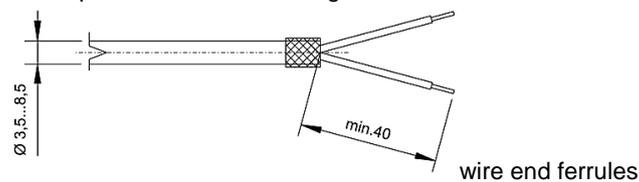


Fig. 3

- Connect the cores in line with the inscription printed on the meter.
The 2-wire connection occurs on terminal 5/6 and 7/8.
This also applies to a connection of 2-wire temperature sensors on a 4-wire connection terminal.

- Note:** Do not connect the shielding braid on the calculator side.

- Insert the temperature sensors into the pockets, ball-valves or T-pieces. The end of the temperature sensors must reach at least to the centre of the pipe cross-section.
- Seal the temperature sensors to protect against manipulation.
- Put the housing cover in position and press it gently until all the lugs click into place audibly.

3.2 Connection of flow sensor

- Note:** The flow sensor must be installed at the same circuit as the temperature sensors.

- Note:** When a polarity dependent pulse transmitter is used, take care of the correct orientation.

- Connect the negative reference potential (-) or GND on the right spring-type terminal.
- Connect the positive reference potential (+) on the left spring-type terminal.
- If the line has a shielding braid, push the shielding braid covering over the counter covering of the cable.
- For stain relief, fix the line on the outer sheath by a clamp.

- Note:** The shielding braid must not be connected to T550 (UC50...) when the flow sensor has its own ground connection.

- Note:** The cage clamp terminals can be used for cable cross-section of 0.5 ... 1.5 mm² (solid or stranded). In order to preserve the IP protection class of the housing, the outside diameter of the cable sheath shall be 3.7 ... 4.4 mm.

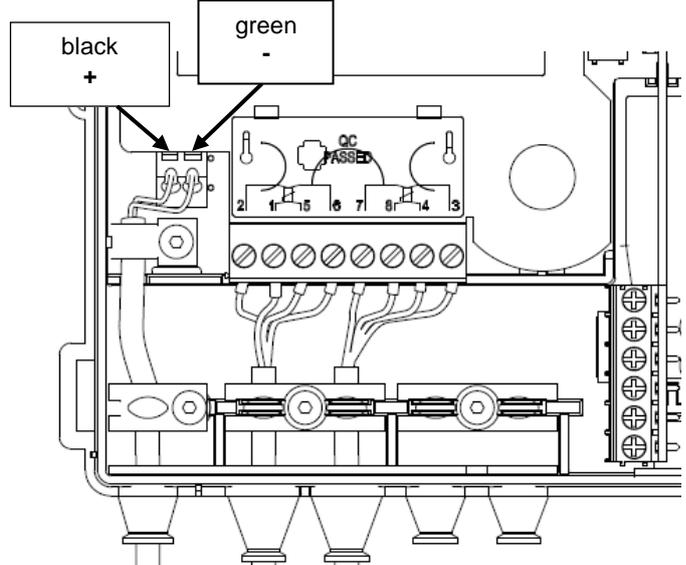


Fig. 4

3.3 Electronic unit

The ambient temperature of the electronic unit must not exceed 55 °C. Avoid direct sunlight.

Wall fitting

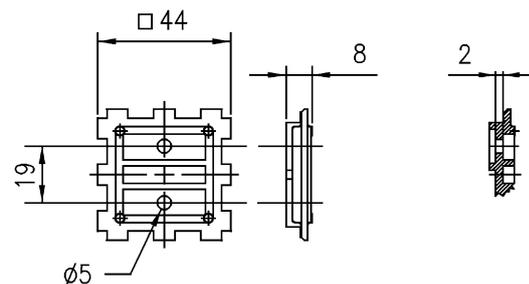


Fig. 5: Plan view and cross section of the adapter plate

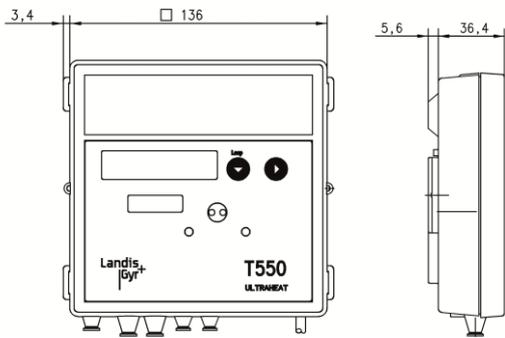


Fig. 6: Dimensions of the electronic unit

For wall mounting proceed as follows:

- Fit the adapter plate to the wall.
- Push the electronic unit onto the adapter plate.

3.4 Power supply

The calculator can be supplied with power via a battery or via power supply modules as preferred. The power supply modules 110 V / 230 V are encapsulated and comply with safety class II. You can modify or upgrade the modules at any time.

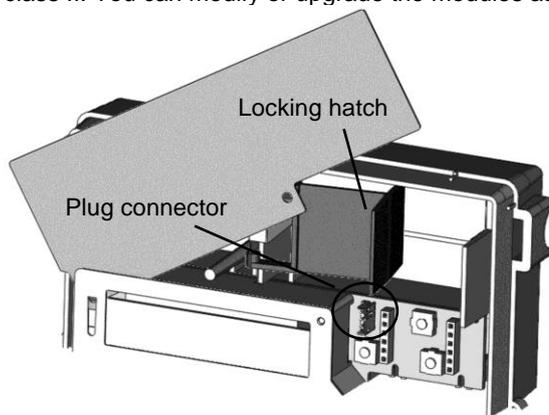


Fig. 7



Attention: Do not open the batteries. Do not bring batteries into contact with water or expose to temperatures above 80 °C. Dispose of used batteries at suitable collection points.

In the 110 V AC and 230 V AC versions a cable is fitted at the factory leading outwards which must be connected to the network voltage indicated. The 24 V ACDC version has connection terminals instead of a cable.



Note: The year of manufacture is characterised by: ✕ 2016



Note: The battery lifetime is characterised for example by:

Installing the battery



Note: Only batteries approved by the manufacturer may be installed.



Note: In case of a meter's return via airfreight the battery (C-cell and D-cell) has to be generally dismounted and forwarded separately from the meter!

To install a battery proceed as follows:

- Press the four side lugs of the housing cover inwards.
- Remove the cover.
- Turn the dial plate in an anti-clockwise direction until it comes to a noticeable stop.
- In order to free up the appropriate battery compartment, move the red locking hatch accordingly.



Note: Left compartment for 2x AA-cells or 1x C-cell, right compartment for 1x D-cell.



Note: The AA and C batteries are clicked into place in a holder.

- Insert the battery into the corresponding battery with the correct polarity in accordance with the markings.
- Turn the dial plate in clockwise direction into the starting position.
- Put the housing cover in position and press it gently until all the lugs click into place audibly.

Installing power supply module



Note: The 110 V / 230 V connections may only be made by an electrician.

To install a power supply module proceed as follows:

- Move the red locking hatch to the left.
- Move the right outside rubber sleeve upwards and outwards.
- Pull the sealing plug.
- Thread the module's mains voltage connection cable through the sleeve.
- Insert the module into the right upper corner of the electronic unit.
- Put the sleeve with the cable back into place from above.
- Connect the conductors in line with the inscription.
- Plug the connection cable for low voltages into the plug connector on the PCB.



Note: Only use cable with a diameter of 5.0 ... 6.0 mm for the 24 V ACDC version.



Note: The 110 V or 230 V power supply must be fused near the meter with a 6 A separator in accordance with the applicable safety standards. The separating device must be marked in accordance with applicable safety standards and be easily accessible for emergencies. Protect the power supply against manipulation.

Power supply module for meter exchange

Proceed as follows to exchange the meter following expiry of the calibration validity:

- Pull out the power supply module with cable and sleeve.
- Install the new calculator.
- Put the module in.



Note: The network does not need to be disconnected while doing this due to safety class II.

Set date / time

Calculators with mainspower supply or battery installed at site start with a date / time set menu directly.

<input type="text" value="230711"/>	Date input
<input type="text" value="105959"/>	Time input
<input type="text" value="N2-----"/>	Return to normal operation (manual)

Proceed as follows to set date and time:

- Press button 1 until the desired value is displayed.
- Press button 2. Change the values for date and time as described in chapter 4.6 „Parameterisation“.

Electronic unit interfaces

The calculator is equipped with an optical interface in accordance with EN 62056-21:2002 as standard. You can additionally use up to 2 of the following communication modules for remote reading:

- Pulse module
- CL module
- M-Bus module G2
- M-Bus module G4
- M-Bus module G4 MI with 2 pulse inputs

- Analog module
- Radio module 434 MHz
- GSM module
- GPRS module
- Radio module 868 MHz
- ZigBee module

These modules do not have an effect on the measurement. You can retrofit the modules at any time without damaging the security seal.

3.5 Communication modules

Note: Observe the necessary ESD protective measures while installing modules.

Up to 2 communication modules can be installed.

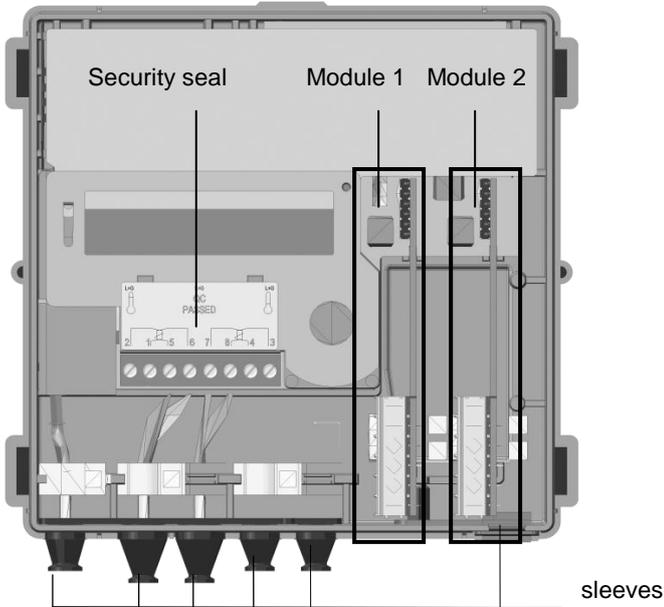


Fig. 8

Installing the communication module

The communication modules are connected via a 6-pole reaction-free connector so that installation or replacement is possible at any time.

To install a communication module proceed as follows:

- Put the communication module into the correct position.
- Place the communication module carefully in both the guide slots and push it in.
- To connect an external cable, open the sleeve matching the cross section of the connection cable.

Note: Open the cable sleeves in such a way that they enclose the cable tightly.

- Guide the cable through the sleeve from outside.
- Strip the cable and connect it.

Note: Do not connect the shielding braid on the calculator side.

Note: Take note of the permitted combinations and the correct slot for the communication modules.

Note: You will find the technical details and data on communication modules in their documentation.

Note: You will find the permitted combinations in the T550 (UC50...) technical description.

Note: The meter recognises the inserted modules automatically 30 seconds at most after installation and is ready for communications or pulse output.

Note: The type of module inserted can be displayed within the service loop depending on the display parameterisation.

4. Parameterisation

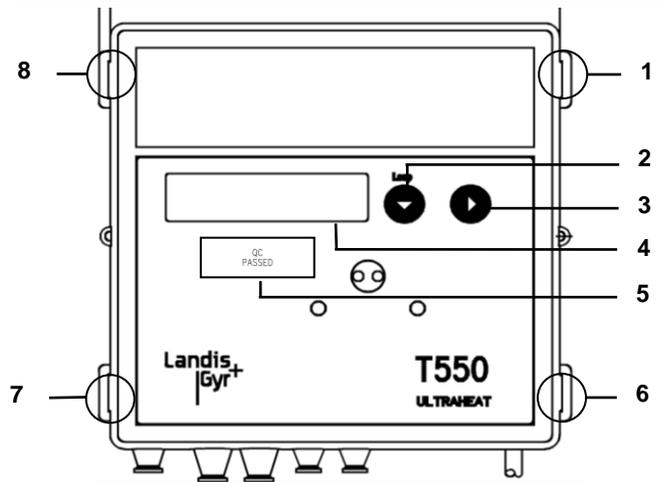


Fig. 9

Number	Description
1; 6; 7; 8	Cover lugs
2	Button 1
3	Button 2
4	LCD
5	Security seal

Note: Remove the housing cover temporarily in order to operate the service button.

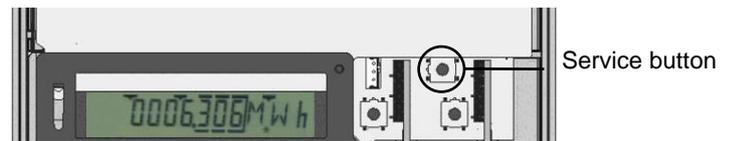


Fig. 10

4.1 Parameterisation meter

Note: For battery operation a D-cell is required for fast pulses.

Note: The parameters must be set appropriately with the service software for the desired fast pulses.

4.2 Adjustable parameters

The following parameters can be set on the calculator:

<input type="text" value="Ma"/>	Reset maxima
<input type="text" value="Fd"/>	Reset missing time and flow measurement time
<input type="text" value="SD 3105--"/>	Enter yearly set day (DD, MM) *
<input type="text" value="SD 31--"/>	Enter monthly set day (DD) *
<input type="text" value="D 230711"/>	Enter date (DD, MM, YY) *
<input type="text" value="T 105959"/>	Enter time (hh, mm, ss) *
<input type="text" value="K 12345678"/>	Enter 8-digit property number (corresponds to M-Bus secondary address)
<input type="text" value="AP1 0"/>	Enter M-Bus primary address for module 1 (0..255) *
<input type="text" value="AP2 0"/>	Enter M-Bus primary address for module 2 (0..255) *
<input type="text" value="Modul 1-1 CE"/>	Select first module function for module 1 (CE or C2)
<input type="text" value="Modul 1-1 C2"/>	
<input type="text" value="Modul 1-2 CV"/>	Select second module function for module 1 (CV or CT or RI)
<input type="text" value="Modul 1-2 CT"/>	
<input type="text" value="Modul 1-2 RI"/>	

Modul 2-1 CE Modul 2-1 C2	Select first module function for module 2 (CE or C2)
Modul 2-2 CV Modul 2-2 CT Modul 2-2 RI	Select second module for module 2 (CV or CT or RI)
MP 60 min	Select maxima measurement period (7.5, 15, 30, 60 min / 3, 6, 12, 24 h)
PI000 1000 L/h	Pulse value
POS col d	Mounting place of the flow (here: cold side)
Nb-----	Return to normal mode

* Ensure that sensible values are entered. The calculator does not carry out a plausibility test. This means that incorrect values can also be entered (e. g. month > 12).

Note: The calculator can be parameterised even if the modules have not yet been installed.

4.3 Parameterisation of pulse value and mounting place of the flow sensor

Attention: Calculators with one-time adjustable pulse value and adaptable mounting place being characterized by: 

The pulse value must be set in the para menu before the first use. The right mounting place of the flow sensor must be checked. As long as the pulse value hasn't yet been entered, the mounting place can be adapted.

PI000 1000 L/h	Pulse value
POS col d	Mounting place of the flow sensor (here: cold side)
Nb-----	Return to normal mode (manual)

Both entries will be adopted with the return in the normal operation and subsequently cannot be changed anymore! LCD display will adopt automatically.

4.4 Call up parameter operation

Proceed as follows to call up the parameter operation:

- Hold the service button for 3 seconds until **PRUEF----** appears on the LCD.
- Press button 1 to switch the display until **PARA----** appears on the LCD.
- Press button 2 to select the menu.

Note: To reset error F8 or the maxima press button 2.

4.5 Selecting parameters

To select a parameter proceed as follows:

- To switch the display press button 1.
- To activate the parameter to be changed press button 2.

4.6 Parameterisation

For parameterisation proceed as follows:

- To change the blinking value press button 2.
- To enter the set value press button 1.

The next digit to the right blinks. Repeat the steps above for all digits.

- The LCD displays a star symbol briefly to confirm.
- If inputs are incorrect, parameterisation can be repeated.

4.7 Completing parameterisation

To leave the parameterisation operation proceeds as follows:

- Hold button 1 until the LCD shows **Nb-----**.
- Press button 2.

4.8 Cancelling Input

To close the parameterisation proceeds as follows:

- Press the service button during parameterisation (ESC function).

The LCD display shows the last valid value.

4.9 Service software

With the service software, tariffs and communication modules can be set in parameterisation mode

5. Getting started

Attention: Calculators with one-time adjustable pulse value and adaptable mounting place being characterized by: 

Attention: At calculators with one-time adjustable pulse value, the pulse value must be adjusted during commissioning in accordance with the flow sensor and the mounting place must be checked!

At long as not the pulse value has be set, the calculator not cumulated energy and volume.

The mounting place can be adapted and fully locked by entering the pulse value.

For activation proceed as follows:

- Put the housing cover in position and press it gently until all the lugs click into place audibly.
- Check the measured values for flow and temperatures for plausibility.
- Fit the user locks to the electronic unit and the temperature sensors.
- Note the values.

Recommendation: Reset the maxima and the missing time.

Error messages for incorrect installation:

DIFF nEB

Error "negative temperature difference"

Check whether the temperature sensors are installed correctly. If the sensors are not installed correctly, change the installation position of the temperature sensors.

Heat meter:

Temperature sensor in the flow-pipe with higher temperatures; temperature sensor in return-pipe with lower temperature

Cooling meter:

Temperature sensor in the flow-pipe with lower temperatures; temperature sensor in return-pipe with higher temperature

Note: When the appliance is idle, these messages may appear even if there has been no incorrect installation.

6. Display / priority rating

The display is limited to up to 7 digits. At pulse parameterization, the resolution will adapt automatically.

The display resolution can be selected from the following:

Pulse	Energy	Energy	Volume	Flow	Power
[l/p]	[MWh]	[GJ]	[m³]	[m³/h]	[kW]
1	0000.001	0000.001	00000.01	000.001	00000.1
2.5	0000.001	00000.01	00000.01	000.001	00000.1
10	00000.01	00000.01	000000.1	000.001	00000.1
25	00000.01	000000.1	000000.1	000.001	00000.1
100	000000.1	000000.1	0000001	0000.01	000001
250	000000.1	0000001	0000001	0000.01	000001
1.000	000000.1	0000001	0000001	0000.01	000001
2.500	000000.1	0000001	0000001	0000.01	000001



Note: Calculators up to 2.5 l/p can be parameterized to kWh. Calculators with 1 l/p can be parameterized to MJ.

The pulse values are restricted by following connection conditions:

Pulse [l/p]	Max. power [MW]	Max. flow [m ³ /h]
1	3.3	24
2.5	3.3	24
10	33	240
25	33	240
100	330	2400
250	330	2400
1.000	330	2400
2.500	330	2400

The full range of functions of LCD is described in detail in the "Operating Instructions" (enclosed).

7. Error messages

The calculator continuously runs a self-diagnosis and can thus recognise and display various installation or meter error messages.

Error code	Error	Service guidelines
DIFF nEG	Negative temperature difference	Check installation point of the temperature sensors; exchange if necessary
if necessary in exchange with:		
F1	Interruption in the hot side temperature sensor	Check hot side temperature sensors; replace if necessary
F2	Interruption in the cold side temperature sensor	Check cold side temperature sensors; replace if necessary
F3	Electronics for temperature evaluation defective	Exchange the calculator
F4	Problem with the power supply; Battery flat;	Check connection; Change battery
F5	Short-circuit hot side temperature sensor	Check hot side temperature sensors; replace if necessary
F6	Short-circuit cold side temperature sensor	Check cold side temperature sensors; replace if necessary
F7	Fault in internal memory holding	Exchange the calculator
F9	Fault in the electronics	Exchange the calculator

8. Notes

The following applies for MID conforming appliances in Germany: For new installations in pipework less than or equal to DN 25, the installation of short sensors must only be made if they are directly immersed.

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