Contents

1. General Information

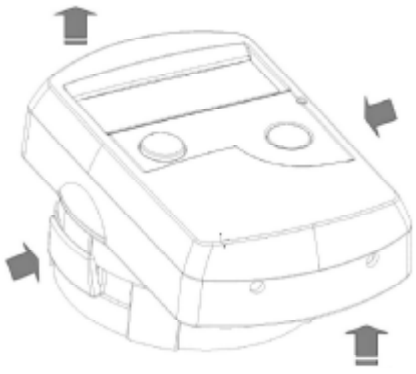
- The valid standard for the application of heat meters is EN 1434, parts 1 + 6. The regulations for electrical installations are to be observed.
- The heat meter left the factory in conformance with all applicable safety regulations. All maintenance and repair work is to be carried out only by qualified and authorized technical personnel.
- All details and specifications listed on the data sheet of the heat meter must be adhered to.
- The seals and locking wires required for the verification of the heat meter mustn't be damaged or removed – otherwise the verification and guarantee of the instrument no longer apply!
- All electrical connections must be laid at a **minimum distance of 20 cm** to sources of electromagnetic interference (switches, controllers, pumps, etc.) In addition, all instrument connections must be laid at a **minimum distance of 5 cm** to other current-carrying wires.
- The temperature sensor cables must not be kinked, rolled up, lengthened or shortened.
- To protect against damage and dirt the heat meter should only be removed from the packaging directly before installation.
- To clean the heat meter (only if necessary) use a slightly moist (not dripping wet!) cloth.
- According to the weights and measures regulations on verification, the verification period in Germany for heat meters is 5 years.
- If several heat meters are installed in one unit, care must be taken to ensure that all the meters have the same installation conditions.
- Pay attention to the mounting location of the heat meter: return flow pipe unless the optional forward flow version was ordered.
- In the case of heat meters with two declarations on the identification plate, such as: **Q≥ 24l/h** D**T: 3-100 K / Q≥ 12l/h** D**T: 6-100K** the declaration that is not valid for the local installation situation must be made unrecognizable. For example, for floor heating: **Q≥ 24l/h** D**T: 3-100 K /** ~~**Q≥ 12l/h** D**T: 6-100K**~~ for example, for radiator heating: ~~**Q≥ 24l/h** D**T: 3-100 K**~~ **/ Q≥ 12l/h** D**T: 6-100K**

2. Mounting the Flow Sensor

- Close shut-off valves
- Unscrew the union nut (coupling ring)
- Remove old gaskets
- Clean the sealing surfaces
- Insert new gasket
- Lubricate the external thread of the flow sensor with a thin layer of silicone grease
- Position the flow sensor correctly, taking into account the direction of flow
- Tighten the union nut (coupling ring)
- Rotate the calculator into the correct reading position

Note:

In order to simplify mounting in a narrow installation space the calculator can be removed from the flow sensor. To separate the calculator press on the side surfaces shown in the illustration and carefully lift off the top part of the housing.



3. Mounting the Temperature Sensors

3.1. Installation in temperature pocket

- Place the O-ring in the middle groove. Slide the sealing screw nut up to the O-ring.
- *Holding the screw nut in place*, insert the sensor into the ball valve and tighten the screw nut.

3.2. Installation in a ball valve

- Remove the blind cap or plug and its gasket. Check that all surfaces are clean.
- Place the O-ring in the groove closest to the tip of the sensor. Slide the sealing screw nut up to the O-ring.
- *Holding the screw nut in place*, insert the sensor into the ball valve and tighten the screw nut.

4. Start of Operation

- Slowly open the shut-off valves
- Check for leakage and proper functioning
- Clean the calculator

After confirming that the heat meter is functioning properly, insert and tighten the sealing wires for the temperature sensors and the heat meter itself.

When replacing a meter at the end of a verification period note the meter readings and the serial numbers of the old and new meters.

Please also check the following points:

- Is the heat meter the appropriate size?
- Is the heating system in operation?
- Are the shut-off valves open?
- Is the heating system clear (dirt filters not clogged)?
- Are the temperature sensors sealed with wires (to avoid tampering)?
- Is the directional arrow on the flow sensor in the correct direction?
- Is a flow volume displayed?
- Is a plausible temperature difference displayed?
- For instruments with two external temperature sensors, is the forward flow sensor (red) in the forward flow and the return flow sensor (blue) in return flow pipe?
- For instruments with a built-in return flow temperature sensor, is the flow sensor mounted in the return flow?

5. Technical Data

Type		0.6	1.5	2.5
Flow sensor				
Nominal flow	m^3/h	0.6	1.5	2.5
Maximum flow	m^3/h	1.2	3.0	5.0
Nominal pressure	bar	10		
Low flow horizontal threshold vertical	l/h	3.5 4	7 7	10 10
Temperature range	°C	15…90		
Mounting position		any		
Calculator				
Ambient temperature	°C	5…55		
Temperature range	°C	1…130		
Temperature difference	K	3…100		
Power supply		3 V, Lithium		
Operating life	Years	6 + 1 (10 + 1 optional)		
Data storage		E²PROM, daily		
Display		8-digit		
Interfaces		Infrared		
		M-bus (optional)		
		Pulse output (optional)		
Temperature sensors				
Type		Platinum precision resistor		
Connection		2-wire technique		
Diameter	mm	5.0 (optional 5.2)		
Cable length	m	1.5 (optional 3.0)		

6. The Display Set-up

The calculator has a liquid crystal display with 8 digits and special characters. The values that can be shown are divided into three display loops.

- main loop
- technician's loop
- statistics loop

All data is retrieved using the key next to the display. The standard display has been set to permanently show the total heat quantity consumed since the meter was put into operation.

At the start you are automatically in the main loop. By pressing the key longer than 4 seconds you change to the next loop. Keep the key pressed until you reach the desired information loop.

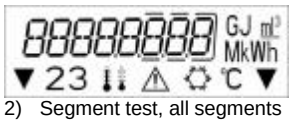
To change the information display within a loop, simply give a short press to the key. In this way, you can scan all the information in the loop.

After one minute of non-use, the display returns to the total heat quantity, the standard display.

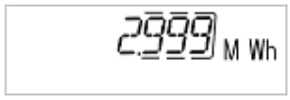
7. Display Information

1. Level / Main Loop

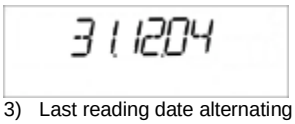
1) Total heat quantity in MWh – standard display



2) Segment test, all segments triggered simultaneously.



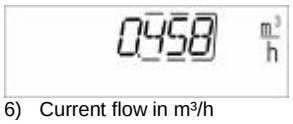
3) Heat quantity at last reading date alternating with last reading date*



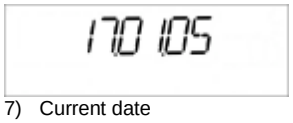
3) Last reading date alternating with heat quantity at last reading date*

4) Total volume since installation in m³

5) Current power in kW



6) Current flow in m³/h



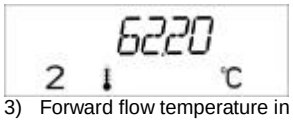
7) Current date

8) Error message (alternating binary and hexadecimal display)

2. Level / Technician's Loop

1) Maximum power in kW

2) Maximum flow in m³/h

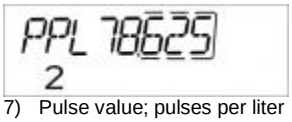


3) Forward flow temperature in °C

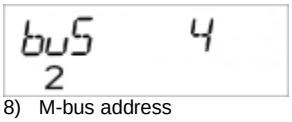
4) Return flow temperature in °C

5) Temperature difference

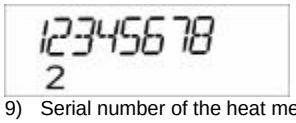
6) Days in operation since verification



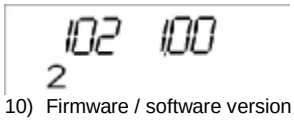
7) Pulse value; pulses per liter



8) M-bus address

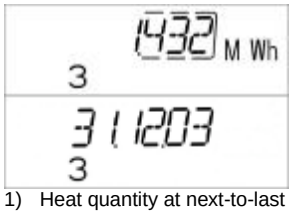


9) Serial number of the heat meter

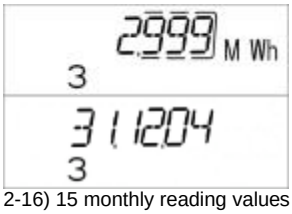


10) Firmware / software version

3. Level: Statistics Loop



1) Heat quantity at next-to-last reading date alternating with that reading date



2-16) 15 monthly reading values alternating with the corresponding reading dates*

***** Up to the end of the month the consumption and reading date for that month will be shown as 0.

8. Error Codes

When the instrument detects an error, the standard display changes to include the error symbol and error number alternating with the regular standard display, total heat quantity. There are seven possible causes of error, and they can appear in combination with each other, depending on the situation.

The occurring error is shown on the LCD in the format “Err xx”. The “xx” stands for the error no., shown in hexadecimal form.

For example, Err 08 -> scanning coil fault

Error Code								
left digit				right digit				
error code (hexadecimal)	check sum fault	E²PROM fault	reset	error code (hexadecimal)	scanning coil fault	ref-sensor fault	rf-sensor fault	ff-sensor fault
1x			X	x1				X
2x		X		x2			X	
3x		X	X	x3			X	X
4x	X			x4		X		
5x	X		X	x5		X		X
6x	X	X		x6		X	X	
7x	X	X	X	x7		X	X	X
8x				x8	X			
9x			X	x9	X			X
Ax		X		xA	X		X	
Bx		X	X	xB	X		X	X
Cx	X			xC	X	X		
Dx	X		X	xD	X	X		X
Ex	X	X		xE	X	X	X	
Fx	X	X	X	xF	X	X	X	X

Error description

Error	*Description*	*Effect*	*Possible cause*
ff-sensor fault	The forward flow temperature sensor is defective.	No calculations are carried out. The registers for flow and energy are not being updated (no new data is being stored).	Sensor cable severed; sensor cable shorted out.
rf-sensor fault	The return flow temperature sensor is defective.	No calculations are carried out. The registers for flow and energy are not being updated (no new data is being stored).	Sensor cable severed; sensor cable shorted out.
ref-sensor fault	Error during the reference measurement.	No calculations are carried out. The registers for flow and energy are not being updated (no new data is being stored).	A defect on the calculator circuit board.
coil fault	The scanning is not functioning properly.	No calculations are carried out. The registers for flow and energy are not being updated (no new data is being stored).	Coil shorted out; connecting cable between calculator housing and flow sensor damaged.
reset	The calculator electronics have been reset.	The measurements since the last storage of data in the E^2PROM are lost (max. one day)	EMC
E²PROM fault	No communication with the E^2PROM.	After a reset, the instrument is without function.	Defective component
check sum fault	The configuration of the instrument stored in the E²PROM is not correct.	No calculations are carried out. The registers for flow and energy are not being updated.	Defective component

When an error occurs, with the exception of a reset error, the instrument must be exchanged and sent to the manufacturer for examination.

9. Interfaces and Options

9.1 Optical infrared interface

In order for a PC to be able to communicate with a **microCLIMA** instrument, it is necessary to connect an optocoupler to the serial interface of the PC. The optocoupler and the necessary software „ **microCLIMA-**Monitor“ are available as options. The optical infrared interface is activated with the key**.** If within 60 seconds neither a valid telegram is received nor the key pressed again, then the interface is deactivated.

9.2 M-bus

An M-bus interface is also available as a built-in option for the **microCLIMA** (must be stated when ordering). Verification-relevant values and measurement data can not be altered using this port.
Protocol according to EN1434-3 and the M-bus Recommendation (version 4.8 from Nov. 1997) with the basic standard IEC 870 parts 1, 2 and 4.
Baud rate: standard: 2400 Bd.
It is important to note that the topology of the M-bus network (lengths of connecting cables, cable cross-sections) must correspond to the baud rate of the terminal instruments, in this case, the heat meters.
During communication over the M-bus with an addressed heat meter it is not possible to use the other instrument interfaces (the key, optical interface), and vice versa.
Note: The heat meters are supplied by a battery, for this reason the number of requests for each instrument is limited:
In a maximum-sized M-bus network of 250 slaves (heat meters), 24 requests per day are possible for each meter. If fewer requests are made and/or fewer heat meters are connected to the bus, the unused amount of available requests are stored in the instrument.
The lifetime of the battery depends on the amount of communication carried out, but at the baud rate set at the factory, the lifetime is at least 6 years plus one year storage.

9.3 Contact output (potential-free)

The potential-free contact available as a built-in option (state when ordering) is an electronic switch for flexible use (class A0 according to EN1434), which outputs the counting pulses of the heat meter. The pulse output closes, corresponding to the pulse value of the flow sensor (see the identification plate on the instrument) for a duration of 125 ms. If several pulses are output during a measurement, the interval between two pulses is likewise 125 ms. As long as the nominal and boundary values of the contact are taken into consideration, the user is free to define his contact data within a wide range. A wide variety of data acquisition instruments can be connected to the contact outputs.

The lifetime of the battery for heat meters with potential-free contact outputs is at least 6 years plus one year storage.

Pulse values:

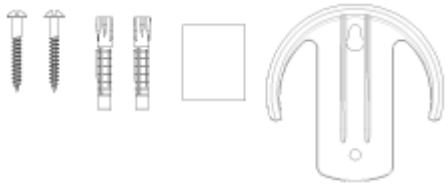
- Heat: standard: 1kWh/pulse, or optionally
- Volume: standard: 100 l/pulse

Technical data:

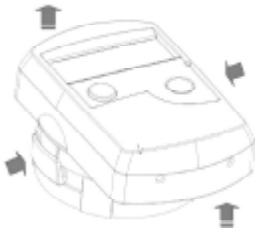
Max. switching current	300mA~/-
Max. switching voltage	35 V~/-
Max. switching power	300 mW
Insulation resistance	> 10^{09} Ohm
Contact resistance	max. 25 Ohm
Contact capacity	max. 1.5 pF
Maximum current	120 mA
Dielectric strength (open contact)	350V~/-

10. Mounting with Wall Support

Parts included in delivery:



A. Mounting with a sticker pad

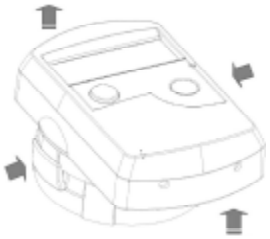


1. Press the locking positions on the side of the adapter lightly with one hand while pulling up the calculator housing with the other hand.

2. Latch the wall mounting support onto the instrument. Remove the protective foil from the sticker pad and press the pad firmly onto the wall support.
3. Remove the second protective foil from the sticker pad and press the instrument with the wall mounting support firmly in place on the wall.

B. Mounting with dowels

1. Press the locking positions on the side of the adapter lightly with one hand while pulling up the calculator housing with the other hand.



2. Drill holes for the dowels (∅ 6mm, depth 40 mm). Take into account the maximum length of the white connecting cable between the flow sensor and the heat meter.
3. Screw on the wall mounting support.

4. Attach the instrument to the mounting support.

C. Removing the heat meter from the mounting support

Pull the instrument upwards and away from the wall.

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