

Operating manual

IMPORTANT!
READ THROUGH CAREFULLY BEFORE USE.
KEEP ACCESSIBLE THROUGHOUT THE PRODUCT LIFETIME.



Heat meter

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Important information

This product must be installed professionally and in accordance with the prescribed assembly guidelines and may therefore only be installed by qualified and trained experts.

Intended use

Heat meters are for the centralized recording of the consumption of heat energy or cooling energy. Depending on their design, they are for measuring hot water or hot water with glycol additives. Heat meters must be used exclusively for this purpose.

Any use other than the use described previously and any changes made to the device constitute improper use. Uses and changes must be queried in writing beforehand and are subject to special approval.



The installed meter is a pressurized component.

There is a risk of persons suffering scolds from hot water.

Warranty and guarantee

Warranty and guarantee claims are only valid if the parts in question have been used in accordance with their intended use and if the technical requirements and any applicable technical regulations have been observed.

Measuring devices connected to the impulse input

No liability is accepted for the plausibility of transmitted data.

In cases of doubt the measured value of the measuring device shall be valid.

Safety notes

Meters for heating water with glycol additives may only be used with the glycol additive specified on the device.

Safety notes for lithium batteries

The heat meter is equipped with a lithium battery. This type of battery is classified as hazardous.

VALID TRANSPORT REGULATIONS ARE TO BE ADHERED TO IN EACH CASE!

Inspection documents for the batteries used are available on request.

Handling of lithium batteries:

- Store protected from dampness and moisture
- Do not heat to above 100°C or throw into fire
- Do not short-circuit
- Do not open or damage
- Do not charge
- Do not store within the reach of children

Technical data

Norms and standards

Conformity	see EU Declaration of Conformity
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Protection rating

IP protection rating	IP65 according to EN 60529
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Heat meter

European Measuring Instruments Directive (MID)	2004/22/EC
EC-type examination certificate	DE-12-MI004-PTB009
Heat meter	CEN EN1434
Quality of heat medium	in accordance with VDI guideline 2035 in accordance with AGFW standard 510

Influencing quantities

Electromagnetic class	E1
Mechanical class	M1
Environment class	A
Precision class	3

Calculator unit

Temperature range

Heat meter	10 ... 105 °C
Heat meter with optional cold range	5 ... 105 °C
Approved temperature difference	3 - 70 K
Switch-on value temperature difference	Heat: 1.0 K / cold ^(†) : 0.2 K (can be selected using art. no.)
Ambient temperature	5 ... 55 °C

Power supply

Lithium battery	Nominal voltage 3.0 V
Service life	> 6 (opt. 10) years + 6 months reserve

Display levels

Standard	min. 2, up to 10 (depending on the version and options included)
Display	8-digit LCD + pictograms
Energy display	kWh <--> MWh (optionally MJ <--> GJ)
Cable length	
Calculator unit - flow sensor	approx. 40 cm

^(†) Outside the Measuring Instruments Directive

Flow sensor screw-type meter

Connection sizes and dimensions		0.6 m ³ /h	1.5 m ³ /h	1.5 m ³ /h	2.5 m ³ /h
Length		110 mm	80 mm	110 mm	130 mm
Connection		G ¾ B	G ¾ B	G ¾ B	G 1 B
Weight	compact	668 g	575 g	650 g	743 g
	detachable	820 g	709 g	802 g	895 g
Installation position		horizontal/vertical			
Nominal flow qp		0.6 m ³ /h	1.5 m ³ /h		2.5 m ³ /h
Minimum flow qi	horizontal	24 l/h	30 l/h		50 l/h
	vertical	24 l/h	30 l/h		50 l/h
Ratio qp/qi	horizontal	25:1 ^(*)	50:1	50:1 ^(*)	50:1 ^(*)
	vertical	25:1	50:1		50:1
Ratio qs/qp		2:1			
Start-up		3-4 l/h	4-5 l/h		6-7 l/h
Max. permissible operating pressure		1.6 MPa (16 bar)			
Min. system pressure to avoid cavitation		0.1 MPa (1bar)			
Temperature range		10 ... 90 °C			

^(*) Versions with a higher dynamic range are also available as options

Technical data

Flow sensor 2" capsule meter

Connection sizes and dimensions		0.6 m ³ /h	1.5 m ³ /h	2.5 m ³ /h
Installation length of the EAT		110 mm	110 mm	130 mm
Pipe connection		G 3/4" Solder 15 mm or solder 18 mm		G 1" Solder 22 mm
Weight	compact	605 g	605 g	607 g
	detachable	757 g	757 g	759 g
Installation position		horizontal/vertical		
Meter thread at the EAT		G 2 B	G 2 B	G 2 B

Nominal flow qp		0.6 m ³ /h	1.5 m ³ /h	2.5 m ³ /h
Minimum flow qi	horizontal	30 l/h	30 l/h	50 l/h
	vertical	30 l/h	30 l/h	50 l/h
Ratio qp/qi	horizontal	20:1 ^(*)	50:1 ^(*)	50:1 ^(*)
	vertical	20:1	50:1	50:1
Ratio qs/qp		2:1		
Start-up		3-4 l/h	4-5 l/h	6-7 l/h
Max. permissible operating pressure		1.6 MPa (16 bar)		
Min. system pressure to avoid cavitation		0.1 MPa (1bar)		
Temperature range		10 ... 90 °C		

^(*) Versions with a higher dynamic range are also available as options

Temperature sensor

Measuring element		Pt 1000 according to EN 60751
Execution		Type DS
Diameter		5.0 mm - 5.2 mm - 6.0 mm - AGFW
Type of installation		5.0 mm - direct (ball valve) / indirect (immersion sleeve) 5.2 mm - direct (ball valve) / indirect (immersion sleeve) 6.0 mm - indirect (immersion sleeve) AGFW - direct (ball valve)
Cable length	Standard	1.5 m
	Optional	3.0 m

Device elements



- (1) LC display
The display is off as standard (sleep mode).
The display can be activated by pressing a key.
- (2) Key <H> (horizontal)
- (3) Key <V> (vertical)
- (4) IrDA interface
- (5) Interface cover
- (6) Module interface
- (7) Attachment holes for external optical modules
- (8) User protection and slots for external cable connections

Navigating within the levels

1. To open the display loop or level operating scheme



Press the <H> or <V> key **briefly** to open the fast readout display loop.

Press the <H> or <V> key **longer than 3 seconds** to open the level operating scheme.

2. To change from any position on one level to the next level



Press the <H> key

3. To change to the next display within one level



Press the <V> key

Status displays

Display	Description
	The data displayed apply for: <ul style="list-style-type: none"> •Heat •Cool = Cold •Imp1 = Impulse input 1 •Imp2 = Impulse input 2
	<ul style="list-style-type: none"> •(empty) = Displayed value is the current value •M (Memory) = Value on a monthly or due date
	Displayed value is a date value: <ul style="list-style-type: none"> •Day = Current date •M-Day = Date applies for a saved annual or monthly value
	Displayed value is a checksum: <ul style="list-style-type: none"> •Check = Checksum refers to the current consumption value •M-Check = Checksum is valid for a saved annual or monthly value

Display

Opening the fast readout display loop

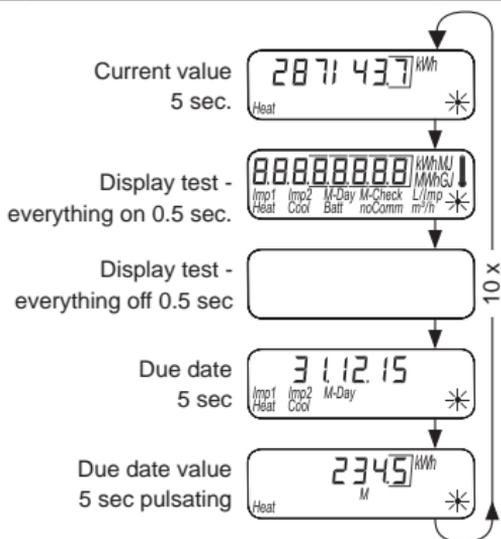
The default setting is with the display off. (Sleep mode -)



Press the < H > key **briefly** or



the < V > key **briefly**



The fast readout display starts with the current consumption value.

After 10 repetitions, the display automatically changes back to sleep mode.

You can change to the level operating scheme at any time. To do so, press the <H> or <V> key for longer than 3 seconds.

Error messages are displayed with the error number and error date for 5 seconds before the "Current value" display.

Opening the level operating scheme of the standard levels

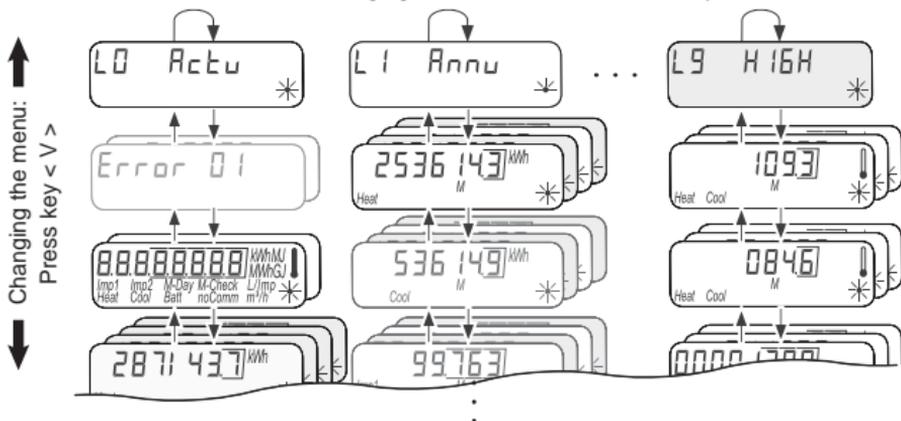


Press the < H > key or

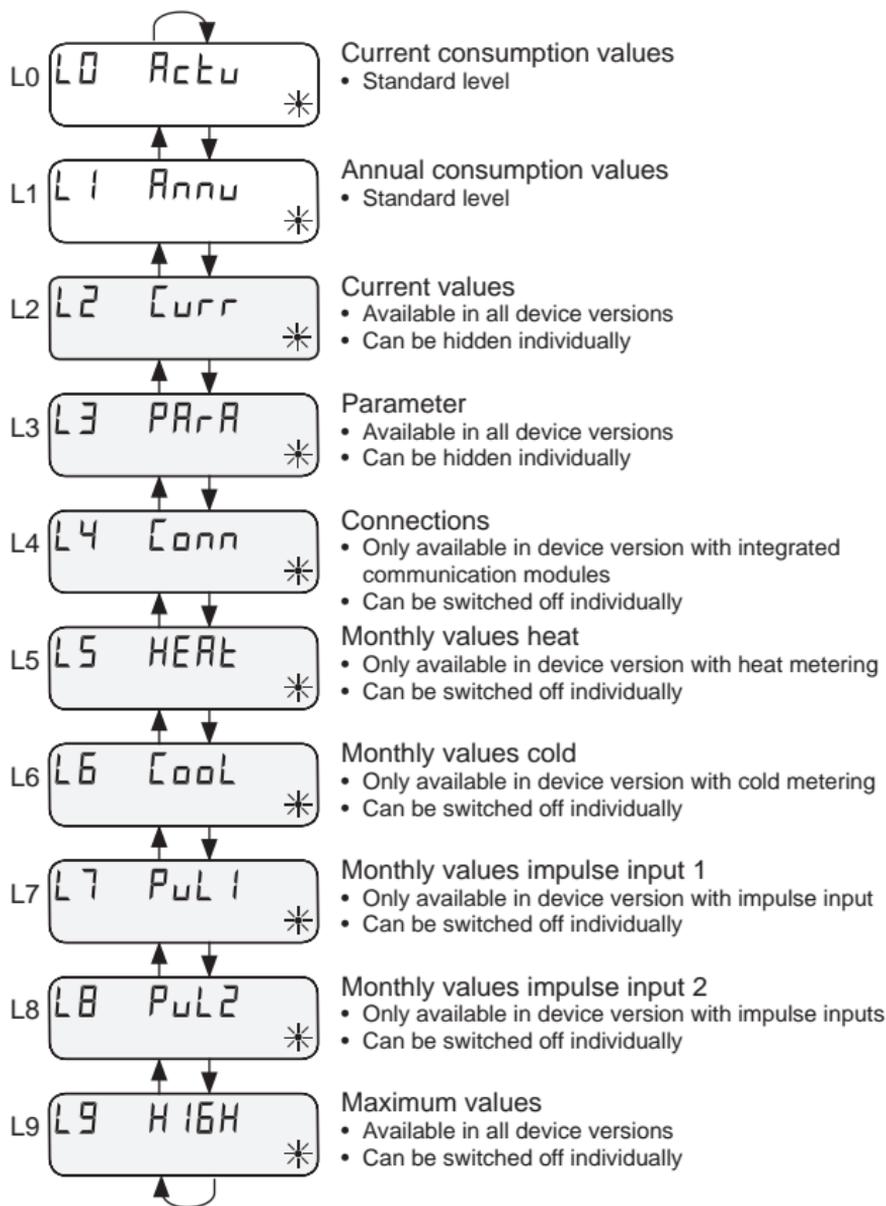


the < V > key for **longer than 3 seconds**

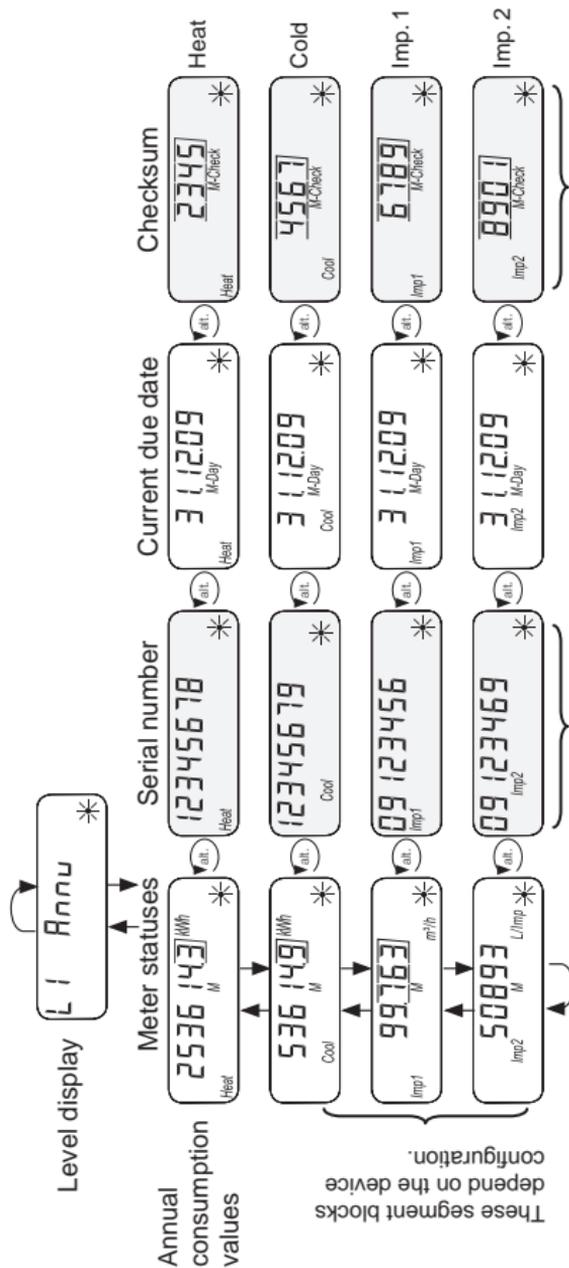
← Changing the level: Press the < H > key →



Overview of levels

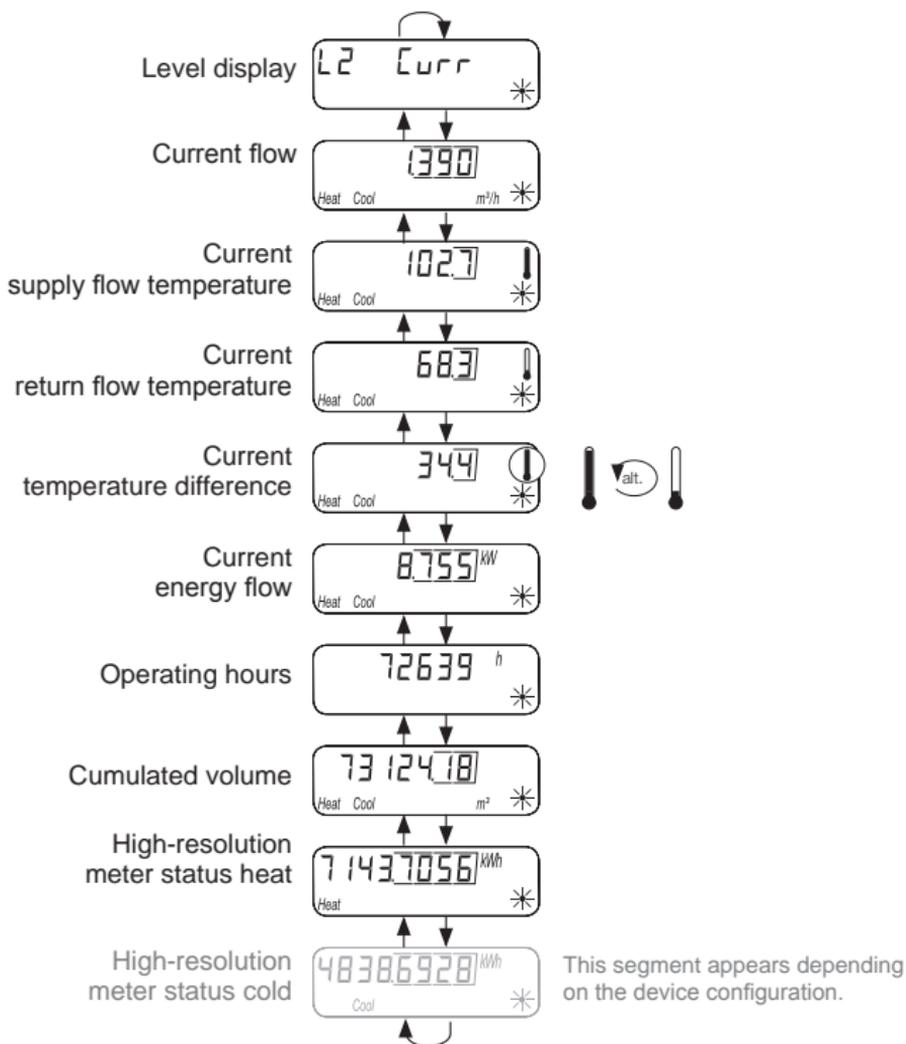


Display level L1 – Annual consumption values

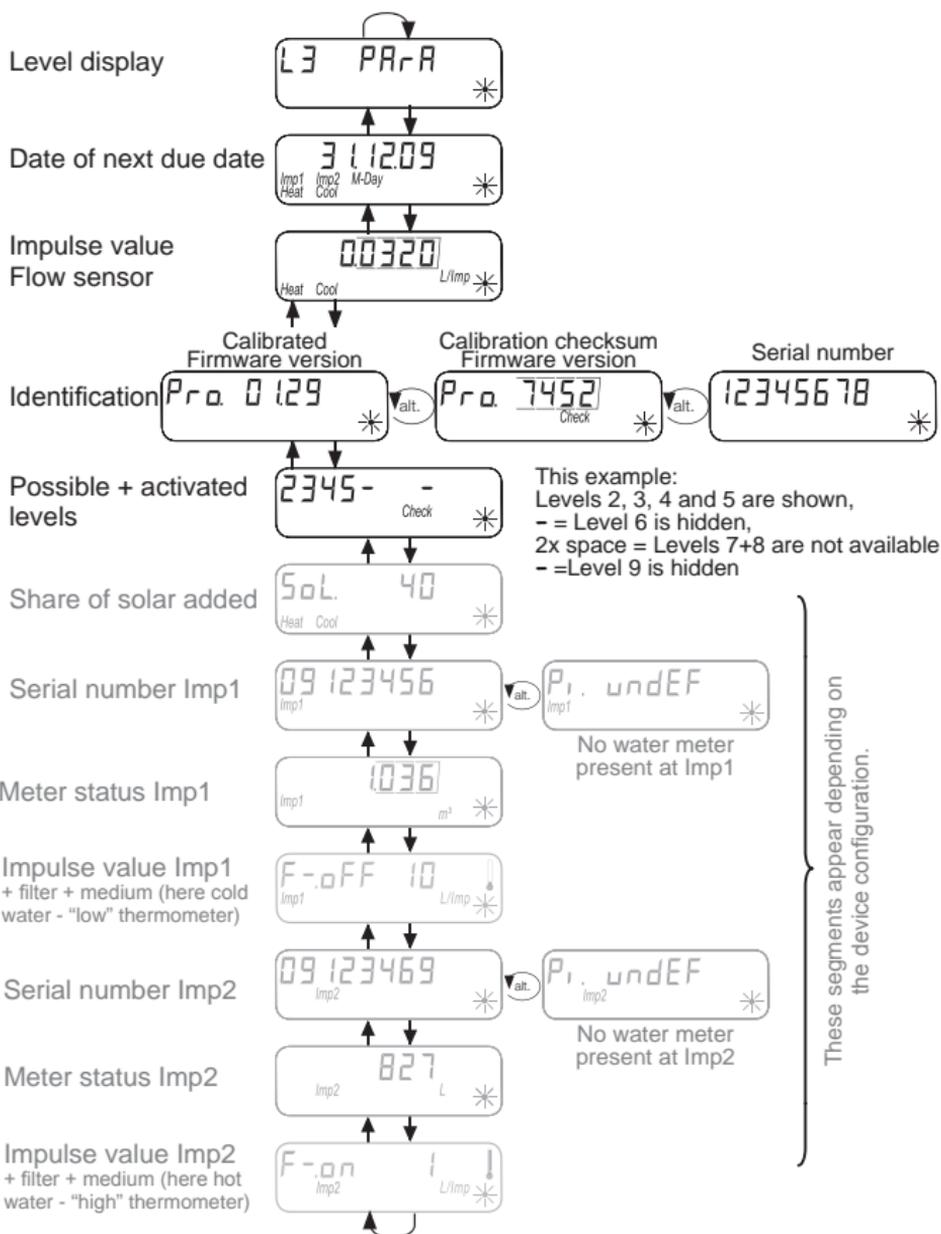


The displays coloured grey are optional or can be added and switched off as required.

Display level L2 – Current values



Display level L3 – Parameters

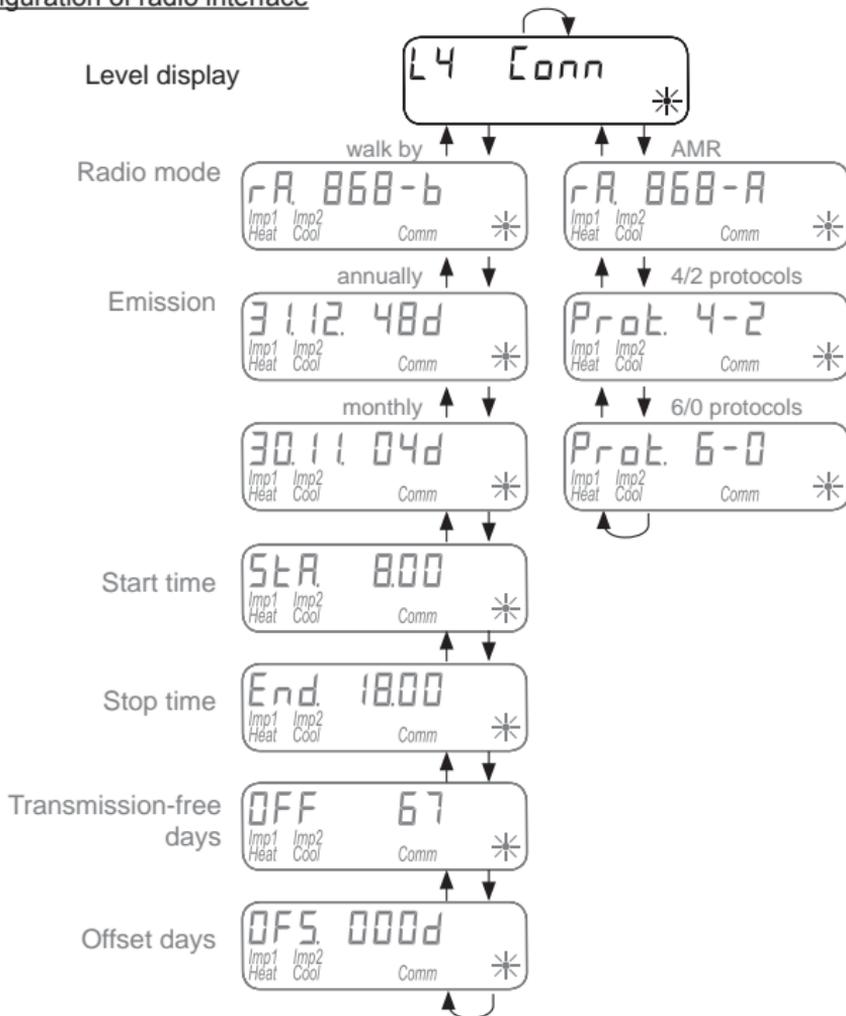


Display

Display level L4 – Connections

These segment blocks appear depending on the device configuration.

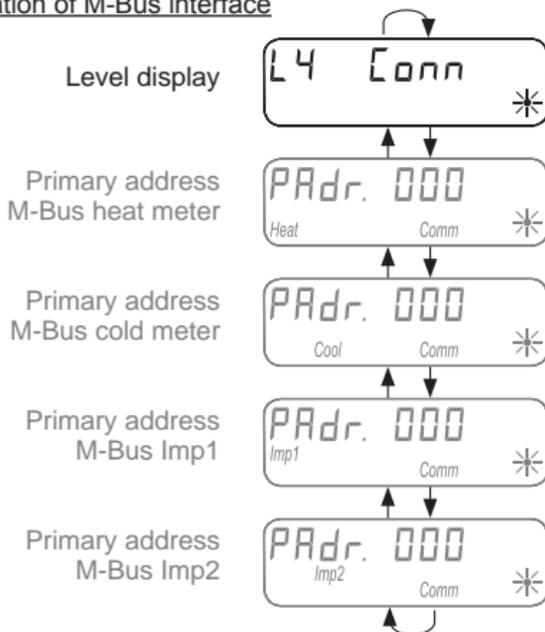
Configuration of radio interface



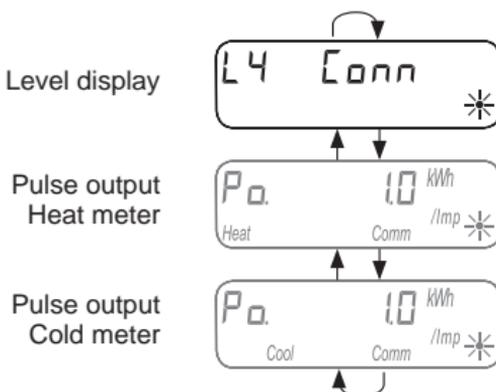
Display level L4 – Connections

These segment blocks appear depending on the device configuration.

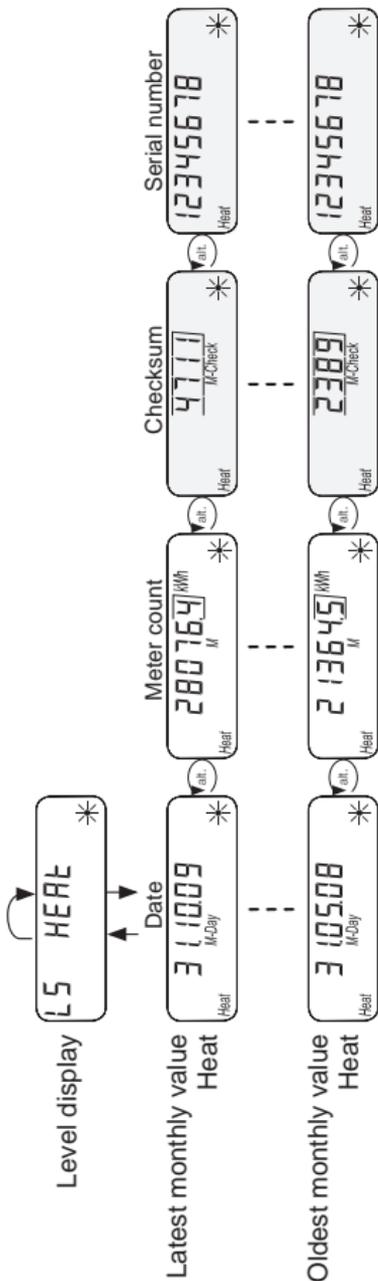
Configuration of M-Bus interface



Configuration of impulse output

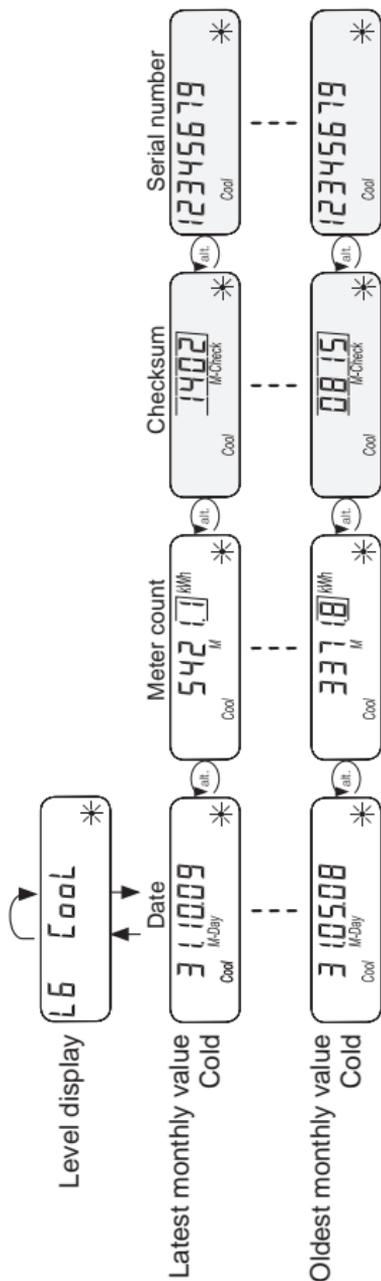


Display level L5 – Monthly values heat

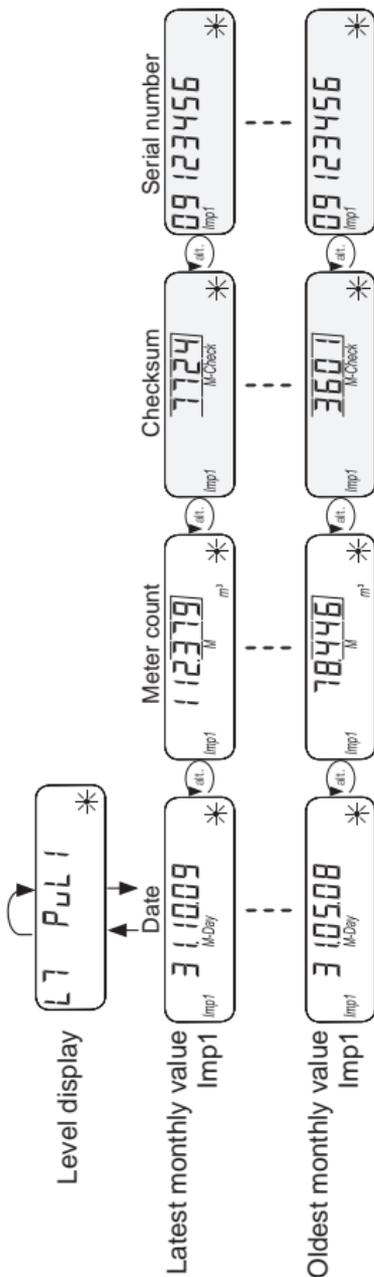
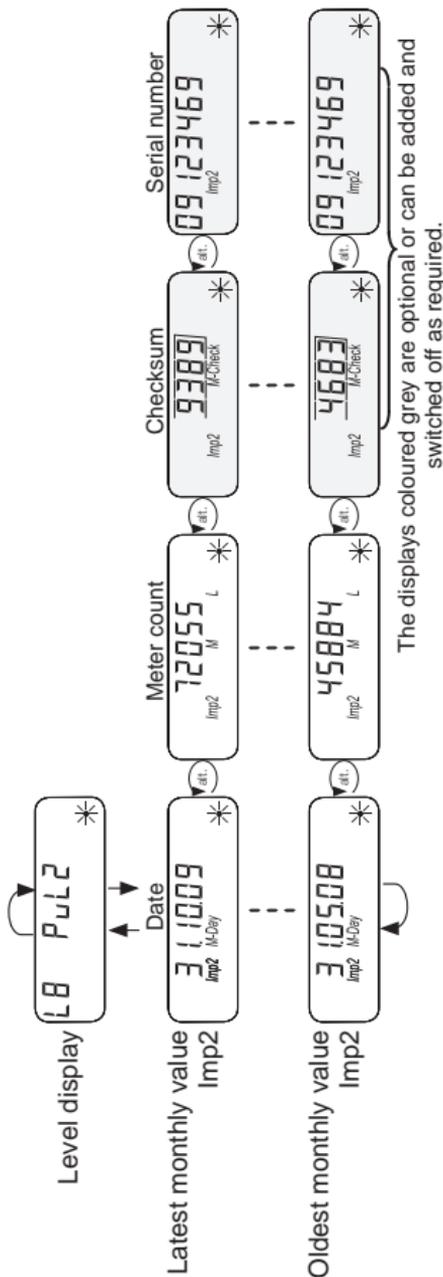


The displays coloured grey are optional or can be added and switched off as required.

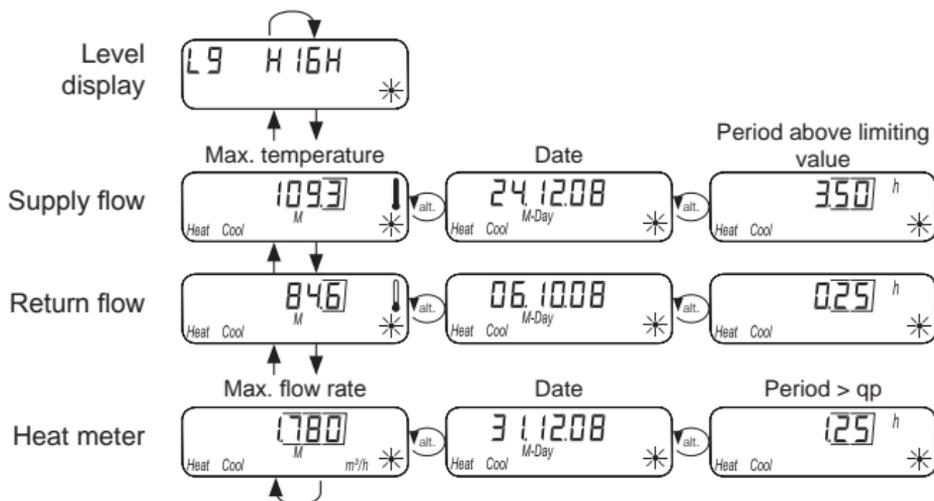
Display level L6 – Monthly values cold



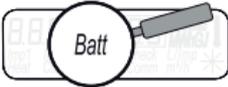
The displays coloured grey are optional or can be added and switched off as required.

Display level L7 – Monthly values Imp1**Display level L8 – Monthly values Imp2**

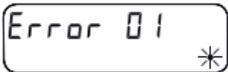
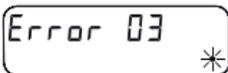
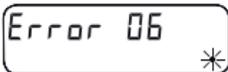
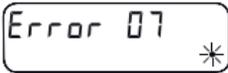
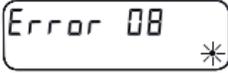
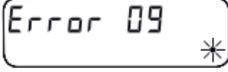
Display level L9 – Maximum values



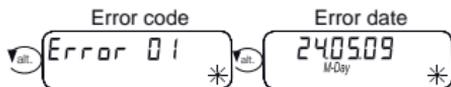
Special operating states

Display	Description	Measures/Notes
	• Communication credit of the module interface or IrDA exceeded	• Is eliminated after the credit period (module = current day; IrDA = current month) has passed.
	• Operating time expired	• Device must be replaced
	• Wrong direction of flow	• Check installation (note arrow on flow sensor) • Check piping • Check recirculating pumps and thermostats for correct function
	• Temperature sensors have been mixed up or fitted incorrectly	• Check whether flow sensor has been fitted in the right strand or • check type of installation of temperature sensor

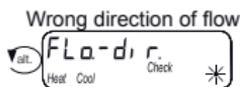
Error messages

Error display	Error description	Measures/Notes
	• Hardware error or damaged firmware	<ul style="list-style-type: none"> • Check flow sensor, connection cable and calculator unit for external damage • Device must be replaced
	• Add-on module has been paired with another meter before	<ul style="list-style-type: none"> • The module has the measuring data of another heat meter • Save data, since these are overwritten after a short time • Press any key to delete the display
	• Supply flow sensor broken	<ul style="list-style-type: none"> • Check temperature sensor and pipes for mechanical damage • Device must be replaced
	• Short circuit supply flow sensor	<ul style="list-style-type: none"> • Check temperature sensor and pipes for mechanical damage • Device must be replaced
	• Return flow sensor broken	<ul style="list-style-type: none"> • Check temperature sensor and pipes for mechanical damage • Device must be replaced
	• Short circuit return flow sensor	<ul style="list-style-type: none"> • Check temperature sensor and pipes for mechanical damage • Device must be replaced

If a serious error occurs with the device, the error code and error date are displayed in the display loop.



If the incorrect direction of flow is established, the message "Flo.-dir." appears on the display.



Devices with integrated communication interface

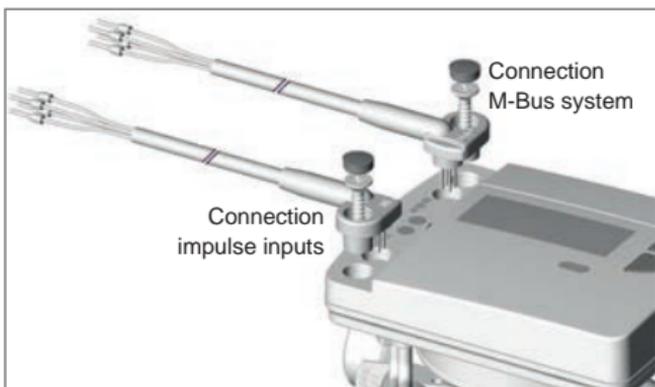
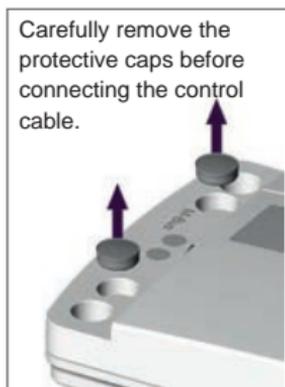
Device information

The heat meter is equipped with an M-Bus interface and two impulse inputs. The M-Bus interface is used to transmit the consumption values measured to an M-Bus control unit.

The impulses from up to two water meters with impulse output are recorded by two impulse inputs and transmitted to the M-Bus control unit.

The heat meter is equipped with a detachable calculator unit.

 A screw-type meter as a compact version or a 2" capsule meter are not available. The installation of add-on modules is not possible with this heat meter.



Colour assignment connection cable

Impulse input	Imp1	orange (ground)	brown
	Imp2	red (ground)	black
M-Bus	M-Bus	orange (<i>not occupied</i>)	brown (<i>not occupied</i>)
	M-Bus	red	black

Temperature sensor

Measuring element		Pt 1000 according to EN 60751
Execution		Type DS
Diameter		5.0 mm - 5.2 mm
Type of installation	5.0 mm - direct (ball valve) / indirect (immersion sleeve) 5.2 mm - direct (ball valve) / indirect (immersion sleeve)	
Cable length	Standard	1.5 m
	Optional	3.0 m

Impulse input device

Classification	in accordance with EN 1434-2, Class IB Restriction: Switching threshold at low level max. 0.25 V	
Impulse length	≥ 100 ms	
Impulse frequency	≤ 5 Hz (2.5 Hz with filter setting "on")	
Source current	≤ 0.1 mA	
Number of impulse inputs	2	

Impulse outputs (sources)

Solenoid switch	Reed contact
Integrated circuit	Open collector
Namur sensor	Not possible

Connection to the M-Bus

The M-Bus cable is installed on the basis of EN 13757-2.

Please note the following instructions:

- ▶ Use high-quality spring-loaded terminals or crimped connections suitable for the cross-sections.
- ▶ Avoid unnecessary scanning of the M-Bus.
- ▶ Put the M-Bus into operation in one session if possible.
- ▶ Avoid switching the M-Bus off.
- ▶ Avoid short-circuits in the M-Bus cable during service work and retrofit installations.

Devices with integrated communication interface

Secondary and primary addresses in the M-Bus system

All logical devices (heat and cold meter, hot/cold water meter, ...) are identified in the M-Bus system with a secondary and primary address.

Secondary addresses

Use of secondary addressing is the default setting. With secondary addressing, the meter number and other device properties are used for identification.

These parameters are used to generate a 16-digit secondary address that is used for identification in the M-Bus system.

Example heat meter:

You connect a heat meter to the M-Bus system. Following a search run in the M-Bus control unit, the heat meter is detected **automatically** and a secondary address is formed from the heat meter device number and other properties of the heat meter.

Example water meter at impulse input:

You connect a water meter to Imp1. Following **manual input** of the water meter device number and meter properties such as existing meter status or impulse value, a secondary address is formed for identification in the M-Bus system.

The water meter device number and meter properties are defined on level L3 (Parameters) on the heat meter.

The manufacturer code is part of the secondary address. This manufacturer code is always shown as "LSE" in the secondary address, no matter who the actual manufacturer of the water meter is.

Primary addresses

Alternatively, a 3-digit primary address can be allocated for each logical device and used to identify the heat meter or the water meters connected to the impulse inputs in the M-Bus system.

The primary addresses (1-250) are allocated in level L4 (Conn) on the heat meter.

Transmitting consumption data to the M-Bus

Transmission of the cold quantity

In the case of a heat meter with optional cold range, a second metering device with an ID number calculated from the parameter FabNo. of the heat meter +1 is displayed in the M-Bus system for cooling energy metering. This device is assigned the medium "Cold" in the data record.

Example: ID Heat 00.123.456
ID Cold 00.123.457

Readout parameters heat/cold metering

The following parameters are read out of the heat meter with optional cold range and transmitted to the M-Bus control unit:

- › Device number (8-digit)
 - › Medium/software version
 - › Time/date
 - › Error status (readout 5 or 45 times per day)
 - › Error date
 - › Current consumption values (heat or cold)
 - › Due date (identical to heat meter)
 - › Due date value (heat or cold)
 - › 15 monthly values (heat or cold)
- Can be read out using Q suite 5:

Transmission of the impulse values

If additional water meters with impulse output are connected to the heat meter, the heat meter transmits the impulse measurement data in addition to the heat and cold metering data.

Readout parameters impulse measurement

- › Device number (8-digit)
 - › Medium/software version
 - › Time/date
 - › Error status (readout 5 or 45 times per day)
 - › Error date
 - › Current consumption values (volume hot or cold water)
 - › Due date (identical to heat meter)
 - › Due data value (hot or cold water)
 - › 15 monthly values (hot or cold water)
- Can be read out using Q suite 5:

Devices with integrated communication interface

Setting parameters for impulse inputs

For water meters with impulse output to be able to be read out, the meter number and meter properties must be defined.

Possible properties include input impulse value and the unit which the external water meter uses for counting. The initial values can also be set, however. The current meter values of the connected water meters should be used for input.

Setting possibilities: Impulse value, units, filter

Impulse value (volume metering)	Unit shown on the display
1 litre per impulse	Litres or m ³
10 litres per impulse	Litres or m ³

Water meter	1 L per impulse	10 L per impulse
Qn 2.5 (Qp 1.5)	Filter: "on" / "off"	Filter: "on" / "off"
> Qn 4 (Qp 2.5)	Filter: "off" only	Filter: "on" / "off"

Setting the filter

 The activated filter ("on") reduces the scanning rate of the impulse frequency from 5 Hz to 2.5 Hz. A lower scanning rate increases the immunity against external impulses.

The filter settings are found on display level L3 "Parameters" under parameter setting for impulse inputs 1 and 2.

Setting password parameters

 To be able to activate parameter setting mode, you have to be prove authorisation by entering a PIN.

The default standard PIN (3-digit figure) is printed on the packaging product label.

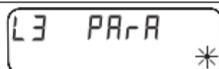
Once the PIN has been accepted, further parameters can be set without PIN input. Validity is lost if a level other than L3 or L4 is selected.

Setting parameters for external water meters

Activate the standard operating scheme by pressing the < V > or < H > key for longer than 3 seconds. In the following example, parameters are set for impulse input 1. (*Imp1*)



Open level L3.



Open the *Imp1* display.



“Pi. and EF” appears if a water meter with a device number has not been assigned to impulse input 1 *Imp1* yet.

Otherwise the water meter device number will appear.

Setting parameters for Imp1



Press and hold the < H > key and then the < V > for the password query.



Use the < H > and < V > keys to enter the password.
Example: “666”



Press and hold the < H > key and then the < V > to confirm the password.

The meter number input mask will appear on the display.



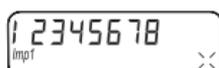
Use the < H > and < V > keys to enter the 8-digit meter number.

Example: “12345678”.



Press and hold the < H > key and then the < V > to confirm the meter number.

The 8-digit meter number is shown on the display.



Use the < V > key to change to the display for setting the parameters for the meter status and display units
L or m³.



Press and hold the < H > key and then the < V > to change to parameter setting mode.



Use the < H > and < V > keys to enter the meter status and display unit.

Example: “00004711” and m³ as display unit.



Parameter setting continued on the next page

Continued: Setting parameters for Imp1



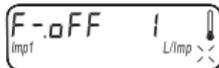
Press and hold the < H > key and then



the < V > to confirm the entries.



The display will show the meter status “4711” and m^3 as the display unit.



Press and hold the < H > key and then



the < V > to change to parameter setting mode.



Use the < H > and < V > keys to adapt the filter, the impulse value (volume metering) and the unit. Example:



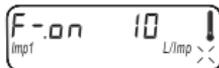
Filter “on” (reduction of scanning frequency) - “10” - “hot water”



Press and hold the < H > key and then



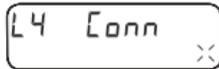
the < V > to confirm the entries.



Use the < V > key if you wish to set parameters for the second impulse output *Imp2*.



Press the < H > key to leave parameter setting mode and return to the standard operating scheme.



End of setting parameters for Imp1

Checking parameter settings



Open level L3 in the standard operating scheme.



Use the < V > key to scroll through the displays for *Imp1* and *Imp2*.



Resetting the water meter number

You can reset the water meter number for *Imp1* and *Imp2* by entering an 8-digit “0” as the meter number. “Pi. and EF” appears in the display again for a free impulse input.

i When meter numbers are reset, all the meter impulses counted up to this point are reset and deleted permanently.

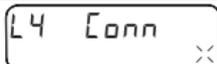
Setting the primary address parameters for the M-Bus

Activate the standard operating scheme by pressing the < V > or < H > key for longer than 3 seconds.

The following example shows how to set parameters for the M-Bus primary address.



Open level L4.



Open the primary address display.



Defining the primary address for the M-Bus



Press and hold the < H > key and then the < V > for the password query.



Use the < H > and < V > keys to enter the password.
Example: "666"



Press and hold the < H > key and then the < V > to confirm the password.

The input mask will appear on the display.



Use the < H > and < V > keys to enter the 3-digit primary address.

Example: "123".



Press and hold the < H > key and then the < V > to confirm the primary address.

The 3-digit primary address is shown on the display.



Press the < H > key to leave parameter setting mode and return to the standard operating scheme.



End of setting parameters for M-Bus primary address

Checking parameter settings



Open level L4 in the standard operating scheme.



Use the < V > key to scroll through the displays.

