

# Static Ultrasonic Meter T230

## Operating and Installation Instructions

3250 008 101 e

Note: In the following text the term Meter covers the Heat Meter as well as the Cooling Meter if not mentioned otherwise.

### 1 Safety instructions



- The meter is designed for circulating water of heating systems (not for drinking water!).
- The requirements for circulating water of the AGFW (FW510) must be observed.
- Installation and removal must be performed by qualified personnel only.
- Mounting and dismounting are only permitted when the system is not under pressure.
- After the installation the tightness must be proved by pressurizing with cold water.
- Only use under operating conditions, otherwise dangers can arise and the warranty may expire (Note the information on the meter!).
- Breaking the security seal voids the warranty, conformity and calibration.
- Batteries must not be opened, not come into contact with water or be exposed temperatures above 80°C. The meter contains Lithium batteries, so it is not allowed to dispose it with the household waste. Return of the Lithium batteries must be carried out professionally. It is possible to return the product after use for proper disposal to the manufacturer. Please follow the legal regulations at the shipment of Lithium batteries, which rules amongst others the declaration and the packaging of hazardous goods.
- Lightning protection cannot be ensured; this must be provided by the building wiring.
- The cleaning of the meter may only take place from outside with a soft wet cloth; do not use detergents.

### 2 Introduction

This meter is a measuring instrument for physically correct recording of energy consumption. The device consists of a high-tech plastic volume measuring unit, two permanently connected temperature sensors, and an electronic unit that calculates the energy consumption from the volume and temperature difference. The volume measuring unit is a non-wearing ultrasonic measuring device without mechanically moving parts. By comparing the operating times of ultrasonic signals in and against the direction of flow, the flow is calculated with highest precision by taking the temperature dependence into account. The long-life battery is designed for the entire period of meter usage (see meter dial plate). The meter cannot be opened without breaking the security seal. The meter must only be operated under the conditions stated in the manual and on the dial plate.

### 3 Installation of the meter

#### 3.1 Instruction for installation

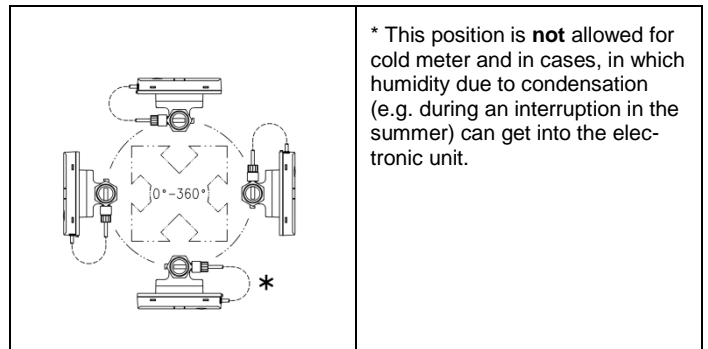
- Do not weld, solder or drill next to the meter.
- The meter should remain in its original packaging until all connecting, insulating and discharge of materials are completed.
- Always install the meter in accordance with the imprinted mounting situation (standard: return) on the dial plate.  
Symbol for return installation:   
(Symbol for flow installation: )
- To avoid damages the meter must be protected against impacts and vibration, that can arise at the installation place. When put into operation the valves have to be opened slowly.
- The meter must not be exposed tensions or forces caused by pipes or fittings. If this can not be assured permanently, the mounting place must be improved or the piping must be properly anchored, e.g. through appropriate connection bracket.
- Use only the supplied rubber EPDM gaskets!
- The meter is made of robust and durable material. Anyway during the installation it must be taken care, that the maximum area of tightening torque 10 – 25 Nm (with meter thread 3/4") or 20 – 50 Nm (with meter thread 1") is not exceeded, otherwise the meter can be damaged! If there are aligned pipe joints a rotation

angle of the coupling nut of 120 ... 180° (3/4") is enough resp. 90 ... 120° (1") from contact of the sealing with the coupling nut.

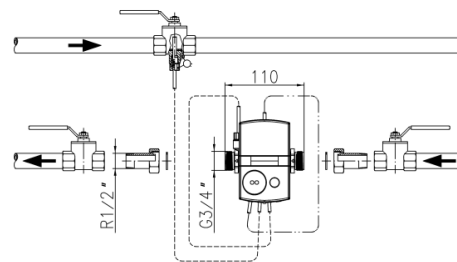
- The mounting place should be chosen this way that the control cable of the flow sensor and the temperature sensor cables are not in the vicinity of power lines and high frequency cables or electromagnetic interferences (minimum distance: 50 cm)
- Avoid cavitations over the entire measurement range by over-pressure, i.e. **at least 1 bar at  $q_p$**  and about **2 bar at  $q_s$**  (valid for ca. 80°C).
- It's recommended to install the meter not on the suction side of a pump. On the pressure side should be kept a minimum distance of 10 x DN.

#### 3.2 Mounting

If more than one meter are installed in a unit (e.g. apartment), it's recommended that all meters have the same installation conditions. If the meter is installed in the shared return of two systems, the mounting location must be in a sufficient distance from the T element (**min. 10 x DN**) to allow the different water temperatures to mix well. Rinse the system thoroughly before mounting the meter. The meter can be installed in any position e.g. horizontally or vertically. To avoid accumulation of air and disruption in operation, the meter should not be mounted in the top section of a line (recommendation: vertical mounting position).



Mount the volume measuring unit horizontally or vertically between two shut-off valves with the arrow pointing in the direction of flow. The sensors must be mounted in the same water circuit as the volume measuring unit (pay attention to admixture). The sensors can be mounted in T elements, ball valves, direct immersed or in pockets (countries regulations must be observed). The end of the sensors must extend in any case as far as the centre of the pipe cross-section. Temperature sensors and screw connections must be sealed against manipulation.



#### 3.3 Instruction for mounting sensor adapter set

For meters with temperature sensor 5.2x45 mm a mounting set is enclosed. Hereby the sensor can be installed direct immersed e.g. in a mounting element or a ball valve.

Mounting advice (see figure): Install O-ring with enclosed fit-up aid/fit-up pen in the mounting point. Take both halves of the plastic bolting and put them around the 3 grooves of the sensor, compress and screw in until bed stop (hand-screwed, fastening torque 3 – 5 Nm).

### 3.4 Mounting as a cold meter

If the **water temperature is below 10°C**, the electronic unit must be split from the flow rate measuring tube and, for example, mounted on the wall (wall adapter as accessories available). Make sure that condensed water cannot run along the connected pipes into the electronic unit or into the volume measuring tube (building a loop downwards). The temperature sensors must be mounted from the bottom up.

### 4 Electronic unit and power supply

The ambient temperature of the electronic must not exceed 55°C. Avoid direct sunlight. Mounting can be vertical or horizontal with respect to the volume measuring unit. Therefore it can be rotated into the required position. In order to remove the electronic unit (e.g. for wall mounting), rotate it 45° and remove it from the volume measuring unit. Mount the wall adapter (accessories) to the wall and set up electronic unit at a 45° angle and screw it. The meter has a long time battery for 6 or 11 years operating time.

#### 4.1 Interfaces and communication

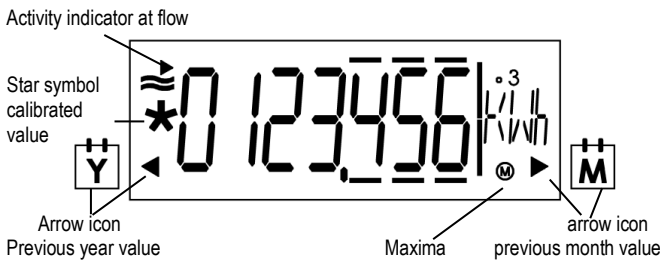
The meter is equipped with an optical interface acc. EN 62056-21 with M-Bus-protocol. If the meter is equipped with the option „M-Bus“, it is delivered with a 2-wire cable, which can be extended (set junction box).

#### 4.2 Temperature sensor

The lines must not be disconnected, shortened or extended.

### 5 Display content

The meter has a 7 digit LCD to display different values.



The arrow icons mark the display of a stored value of the previous year or previous month. A calibrated value (e.g. energy) is marked on the display through a star symbol.

By a „short press“ (< 2 sec.) the current loop is passed through line by line. After the last line the first line is displayed again.

By a „long press“ (> 3 sec.) the first line of the next loop is displayed. After the last loop the first loop is shown again.

After 30 seconds inactivity in the user loop (Loop 0), the display returns to the default display (e.g. energy).

**Note:** Depending on how the meter is parameterized, the display size and the data displayed may differ from this description. Certain button functions may also be disabled.

User loop	Current values	Previous month values
Energy	Current flow	Saving day
Volume	Current thermal power	Energy and volume on set day
Segment test	Current flow-....	Missing time on set day
In case of error: message with error code	and return temperature alternating in 2 sec cycle	Max. flow rate on the set day, at 2s intervals with date stamp
	Operating time	Max. power on the set day, at 2s intervals with date stamp
	Missing time	Max. flow temperature on the set day, at 2s intervals with date stamp
	Time with flow rate	Max. return temperature on the set day, at 2s intervals with date stamp
General/communication	Other	Other
Device number, 7-digits	Yearly set day	Date
Optional interface	Monthly set day	Time
Primary address (only for M-Bus)	Firmware version	Code entry for test/para operation
Secondary address 7-digit (only for M-Bus)	CRC-Code part	

After 30 seconds inactivity in Loop 1...4 the display returns to the default display (e.g. energy).

#### 5.1 Monthly values

At a predetermined monthly set day each month the maxima of flow rate, power, flow and return temperature with their date stamps (date and time), the missing time, volume and the energy are stored. 24 monthly values are possible.

## 5.2 Parameterization

If the code entry is displayed in the LCD, a parameterization mode can be opened through entering a code. Here for example, date and M-Bus primary address can be set. For the parameterization there is an own instruction.

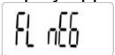


## 6 Commissioning

Open shut-off valves. Check the system for tightness and vent it thoroughly. Press briefly the button on the meter, after about 10s the message F0 disappears. After that, check the measured values "temperatures" and "flow rate" for plausibility. Continue venting until the displayed flow rate is stable.

Attach user locks on screw connections and sensors (the meter is arranged with two self lock-seals, with which a sensor and a screw connection can be sealed). Read out and write down the meter readings of energy/ volume and operating-/ missing times.

If the flow meter has been installed against the flow direction, on the display appears:



Error "flow direction negative"


It has to be checked, whether the flow direction arrows on the volume measuring unit really agree with the flow direction of the system. If this is not the case, the volume measuring unit has to be turned 180°.

If on the display appears



Error "negative temperature difference"

it has to be checked, whether the sensors are installed correct (for heat meters: flow sensor in flow direction - pipe line with higher temperatures; return sensor in return direction - pipe line with lower temperatures; for cooling meters: flow sensor in flow direction - pipeline with lower temperatures; return sensors in return direction - pipe line with higher temperatures). If this isn't the case, the mounting place of the sensors must be changed.

If the response limits are exceeded and the flow rate and temperature difference are positive, the quantity of energy and the volume are summated. With the segment test, all segments of the display are activated to test the display itself. The flow rate, the power, and the temperature difference are acquired with the correct sign. If the flow is positive, in the user loop appears the activity indicator  on the LCD.



If the response threshold is not exceeded, a "u" is displayed in front of the value for flow rate, power and temperature. The time of operation is counted from initial connection of the power supply. "Time of operation with flow" is saved as soon as there is positive flow. Missing time is summated if a fault prevents the meter from measuring. Stored maximum values are marked with a "M" in the lower right area of the LCD.

## 7 Error codes and IDs

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

Error code	Error	Measures
FL nEG	Wrong flow direction	Check / correct flow or mounting direction
<b>Possibly alternating with:</b>		
DIFF nEG	Negative temperature difference	Check / exchange installation place of sensors
<b>Possibly alternating with:</b>		
F0	No flow measureable	Air in the volume measurement part/pipe, vent it (delivery condition)
F1	Break in supply sensor	Exchange meter
F2	Break in return sensor	Exchange meter
F3	Fault in electronic of temperature analysis	Exchange meter
F4	Battery empty	Exchange meter
F5	Short circuit in supply sensor	Exchange meter
F6	Short circuit in return sensor	Exchange meter
F7	Disruption of internal memory holding	Exchange meter

Error code	Error	Measures
F8	Fault F1, F2, F3, F5 or F6 persist longer than 8 hours; detection of fraud. No more measurements are taken.	Action depending on error code. Error message F8 can be reset by the service.
F9	Fault in electronic	Exchange meter

## 8 Technical data

The information on the meter must be strictly observed!

### 8.1 General information

Environment class	A (EN1434) for indoor installation
Mechanical class	M1 *)
Electromagnetic class	E1 *)
*) according to 2004/22/EG EC directive	
Storage temperature	- 20 to 60°C
Max. height	2000 above MSL
Ambient humidity	< 93 % r.h. at 25°C without condensation

### 8.2 Electronic unit

Ambient temperature	5 - 55°C
Display	7-digits
Temperature range	0 - 180°C
Temperature difference	3 - 80 K
Power supply	Battery for 6 or 11 years
Safety class	IP54 acc. EN 60529
Optical interface	as standard, EN62056-21
Communication	optional e.g. M-Bus
Splittable	always removable, cable length about 1.5 m

### 8.3 Temperature sensor

Type	Pt 500 acc. to EN 60751, not solvable
Connection type	Pt 500, 2 wire technique
Cable length	1.5 m (optional 5m)
Design	bulb sensor ø 5.2 x 45 mm
Temperature range	0 - 95°C

### 8.4 Flow measuring unit

Temperature range	<b>5 - 90°C</b> (national approvals may differ)
Nominal pressure	1.6 MPa (PN 16)
Superior pressure	1.6 MPa (PS 16)
Overload	qs = 2 x qp, permanent
Mounting orientation	any, horizontally or vertically
Measuring range	1:100
Measuring accuracy	EN 1434 class 2 and 3

q <sub>p</sub> m³/h	Overall length and connection	
0.6	110 mm (3/4")	
1.5	110 mm (3/4")	130 mm (1")
2.5	130 mm (1")	

## 9 Asymetric mounting (temperature sensor)

The T230 can be mounted asymetric, too. This means one temperature sensor is directly immersed in the volume measuring tube, whereas the other temperature sensor is mounted in a protection pocket. For the lower value of the temperature difference is then 5 K valid at the respective lower flow limit  $q_l$ . At this kind of installation the mentioned protection pockets must be used.

Furthermore the national regulations of the respective country have to be observed.

Type of protection pocket	Inside diameter [mm]	Rack length [mm] from upper edge [mm]	Thread size
SPX/50/5,2	5.2	42	1/2"
WZT-M50,	5.2	46	1/2"
JUMO 00326403	5.2	46	1/2"

## 10 EC Declaration of conformity

Landis+Gyr GmbH, Humboldtstr. 64, D-90459 Nuremberg herewith declares that the products of type T230 comply with the requirements of the following directives:

- **2004/108/EC** Electromagnetic compatibility
- **2004/22/EC** Measuring instruments directive
- **1999/5/EC** Directive on radio equipment and telecommunications terminal equipment (R&TTE)
- **2002/95/EC** Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

Nürnberg, 07.03.2012

Brunner, COO .....  ..... signature  
Kolk, R&D .....  ..... signature

This declaration and the corresponding documents are lodged at Mr. Kolk c/o Landis+Gyr under the number CE T230 003/02.12.

EC type-examination certificate  
**DE-11-MI004-PTB004**

EC design examination certificate  
**DE-11-MI004-PTB003**

Certificate of the approval of a quality management system  
**DE-12-AQ-PTB0006MID**

Notified body: PTB Braunschweig and Berlin, Germany; Nr. 0102

You will find more up-to-date information about our meters in the Internet at [www.landisgyr.com](http://www.landisgyr.com).

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