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Harmonized standards applied: LST EN 1434-1:2016, LST EN 1434-2:2016, LST EN 1434-4:2016, LST EN 1434-5:2016.
Additionally documents applied:
WELMEC 7.2 – Software guide (Issue 6).

The measuring instrument must correspond to following specifications:

1 Design of the instrument

1.1 Construction

Complete compact heat meter consists of the inseparable connected sub-assemblies: single-jet flow sensor, electronic calculator and temperature sensor Pt 500 pair, connected to the calculator.
The flow sensor consists of the brass body with a rotating impeller in the measuring chamber. On the flow sensor is mounted microprocessor-based calculator with inseparable connected, direct mounted, DS type temperature sensor pair. Cable length of the temperature sensors is 1,2 m. The inlet or outlet temperature sensor is mounted in the flow sensor body.
The meter is powered by 3,6 V DC non-replaceable internal battery.

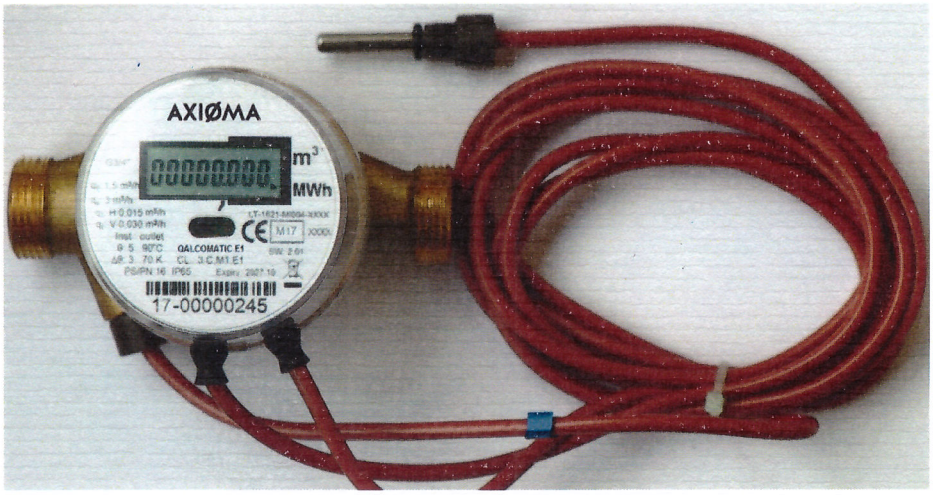
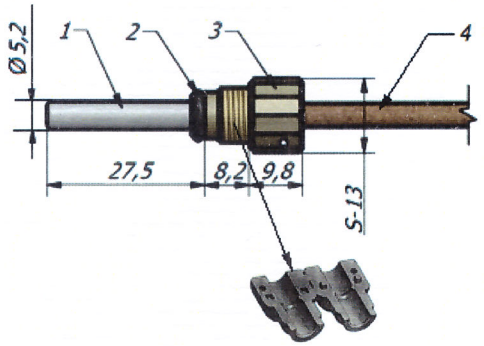


Fig.1.Heat meter CALCOMATIC E1

1.2 Measurand sensor

The heat meter consist of an single-jet flow sensor with impeller and calculator with the connected type DS resistance temperature sensors Pt 500. Design and main dimensions of the temperature sensor are described in Fig. 2.



1- sensor body
2- sealing ring
3- nut
4- sensor cable

Fig.2. Temperature sensor design and main dimensions

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1.3 Measurand processing

Heat-conveying liquid passing through the meter rotates impeller with asymmetric metallic plate, which rotational periodicity changes the decrement of the measuring coils. The electronic block of the calculator measures this decrement, counts the rev of the impeller and calculates the volume of heat-conveying liquid passing through the flow sensor.
The energy, consumed for heating, is calculated by integrating the temperature difference and the volume of the heat-conveying liquid over time. The temperature difference is calculated from the resistance of the temperature sensors pair connected to the calculator and converts it to temperature according to formulas of LST EN 60751.

1.4 Indication of the measurement results

The accumulated quantity of thermal energy is presented on the 8-line LCD display in the MWh. Other units (Gcal, GJ) can be chosen too as an option.

1.5 Optional equipment and functions subject to MID requirements

None.

1.6 Technical documentation

Heat meter QALCOMATIC E1. Technical description, user manual, passport: PLEM1V02, 21-11-2017.
Test instruction of the heat meter QALCOMATIC E1, 01-2018.

Other reference documents on which basis this certificate is issued, are stored in a file Nr.LEI-12-MP-067.17.

1.7 Integrated equipment and functions not subject to MID

Optical interface according to the requirements of LST EN 62056-21, integrated in the meter, is intended for data reading, meter parameters setting and TEST mode control.
Pulse output in TEST mode: energy pulse value - 1 Wh, volume pulse value - 2 ml.

The heat meter can be without communication module or equipped with one of the following modules:

- 868 MHz (RF) radio module;
- M-Bus module.

2 Technical data

2.1 Rated operating conditions

2.1.1 Measurand

Heating energy, calculated from the measured volume of water and the measured difference of water temperature in inlet and outlet.

2.1.2 Measurement range

Limits of the temperature Θ	:	5 °C to 90 °C;
Limits of temperature differences $\Delta\Theta$	:	3 K to 70 K;
Temperature limits of heat conveying liquid Θ_q	:	5 °C to 90 °C.

Technical data of heat meter flow sensor are presented in Table 1:

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Table 1

End connections	Flow-rate, m³/h				Overall length, mm
	Permanent q_p	Maximum q_s	Minimum q_i		
			Horizontal (H) mounting	Vertical (V) mounting	
G ¾	0,6	1,2	0,012	0,024	110
G ¾	1,5	3,0	0,015	0,030	110
G 1	2,5	5,0	0,025	0,050	130

2.1.3 Accuracy class

Accuracy class : 3 according to LST EN 1434-1.

2.1.4 Environmental conditions / Influence quantities

Ambient temperature : 5 °C to 55 °C;
Humidity level : condensing;
Installations : indoor;
Mechanical environment : class M1;
Electromagnetic environment : class E2.

2.1.5 Maximum admissible working pressure

The maximum admissible working pressure/nominal pressure (PS/PN) of heat meter is 16 bar.

2.1.6 Mounting position of the heat meter

Heat meter can be mounted either horizontally (indicating device positioned at the top or at the side) or vertically.

Remark: the minimum flow-rate q_i for the meter rotated about horizontal axis is the same as for vertically mounted meter.

3 Interfaces and compatibility conditions

Communication interfaces are presented in section 1.7 of this appendix.

4 Requirements on production, putting into use and utilization

4.1 Requirements on production

At the end of the manufacturing and adjustment process the heat meters shall be tested according to the requirements of the LST EN 1434-5. Errors of heat meters shall not exceed the maximum permissible errors, described in Annex VI (MI-004) of Directive 2014/32/EU.
The flow sensors can be tested with cold water (25 ± 5) °C.

4.2 Requirements on putting into use

The heat meter must be installed in accordance with the requirements of technical description listed in section 1.6.
The straight pipelines upstream and downstream the meter is not necessary.

4.3 Requirements for consistent utilization

No special requirements identified.

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5 Control of the measuring process after tasks of the instrument in use

5.1 Documentation of the procedure
Test instruction of the heat meter QALCOMATIC E1, 01-2018.

5.2 Special equipment or software
- optical reading head according to standard LST EN 62056-21;
- service software **EVSconfig**.

5.3 Identification of hardware and software
Identification of hardware:
- see Fig. 1 and Fig. 2 of this appendix.

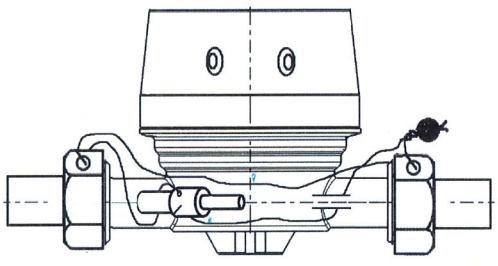
Identification of software: version number of the software is **2.01**. This number (SW:2.01) is shown on the meter label.

5.4 Calibration-adjustment procedure
The tests are carried out according to the test instruction of the heat meter QALCOMATIC E1 given on pages 6 and 7 of this appendix in accordance with the requirements of the LST EN 1434-5.

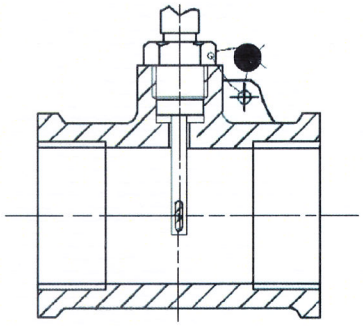
6 Security measures

6.1 Sealing
Calculator is permanently connected to the flow sensor body with protective cap which can't be removed without breaking. The temperature sensor pair is permanently connected to the calculator.

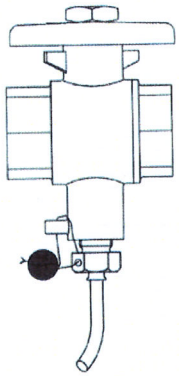
The temperature sensors must be sealed with hanged seal of heat supplier to ensure that after the temperature sensors have been installed, it is not possibility of dismantle, remove or altering the sensors without evident damage on the sensors or the seal (Fig. 3).



a) Sealing of the temperature sensor, mounted in the flow sensor body



b) Sealing of the temperature sensor, mounted in the three-way fitting



c) Sealing of the temperature sensor, mounted in the ball valve

Fig.3. Sealing of the temperature sensors

6.2 Data logger
Energy and water quantity data archive is stored in the meter's memory for the last fourteen months. Archive data can be read via optical or M-bus interface.

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7 Marking and inscriptions

7.1 Information to be borne by and to accompany the measuring instrument

At least the following information shall appear on the heat meter calculator label:

- EU-type examination certificate number (LT-1621-MI004-026 rev. 2);
- manufacturer's mark or name;
- type designation;
- year of manufacture and serial number;
- limits of the temperature;
- limits of temperature differences;
- limits of flow-rate: maximum q_s, permanent q_p and minimum q_i;
- the maximum admissible working pressure/nominal pressure (PS/PN);
- flow sensor to be installed in the inlet or outlet;
- accuracy class;
- climatic class;
- electromagnetic class;
- mechanical class;
- software version number.

Arrow to indicate the direction of the flow shall appear on flow sensor body.
The inlet temperature sensor cable must be marked with a red plastic tube.
The outlet temperature sensor cable must be marked with a blue plastic tube.

7.2 Conformity marking

In addition, the label of heat meter calculator should contain the following marking:

- „CE" marking;
- metrology marking, consisting of the capital letter „M" and the last two digits of the year of its affixing, surrounded by a rectangle;
- identification number of the notified body, which carried out the conformity assessment.

8 List of the drawings attached to the certificate.

Drawings are not added.

9 Certificate history

Issue	Date and reference №	Description
1	2	3
LT-1621-MI004-026	05-12-2016, No. LEI-12-MP-037.15	Type examination certificate first issued
LT-1621-MI004-026 Revision 1	23-02-2017, No. LEI-12-MP-057.17	1. Manufacturer's trade mark QALCO on the meter label changed to manufacturer's name AB AXIS INDUSTRIES. 2. The document PLMATICheat1V01, issued 29-09-2015, has been replaced by the document PLMATICheat1V02, issued 10-02-2017.

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Issue	Date and reference №	Description
1	2	3
LT-1621-MI004-026 Revision 2	12-02-2018, No. LEI-12-MP-067.17	1. Manufacturer's name AB „Axis Industries" changed by name UAB „Axioma LEZ". 2. The name of the meter type from QALCOMATIC HEAT 1 changed by QALCOMATIC E1. 3. On the meter label, the manufacturer's name AXIS INDUSTRIES changed by manufacturer's brand AXIOMA. 4. The document PLMATICheat1V02, issued 10-02-2017, has been replaced by the document PLEM1V03, issued 21-11-2017.

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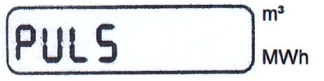
Test instruction of the heat meter QALCOMATIC E1

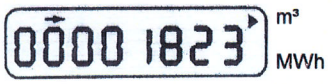
1. Energy measuring errors determination test

For calculator with temperature sensor pair the energy measuring errors determination is carried out immersing the temperature sensors in a temperature regulated baths, in the following test order.

1) Using an optical head and **EVSconfig** software the TEST mode is activated for the meter. Optical head should be connected to the computer RS-232 interface (see connection diagram Fig. 1p). Open the program startup window („**Actual**“) and the computer port number (to which optical head is connected) is entered in the field „**Com Port**“. Select „**Calibration**“ and click button „**start test**“ in the new window. If the operation succeeded, the additional window appears with note „**Operation done**”. In this window click „**OK**”. When the TEST mode is activated, the meter periodically every two seconds will display the following parameters:

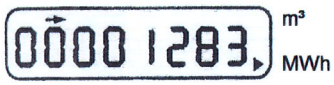


- indication of the TEST mode;



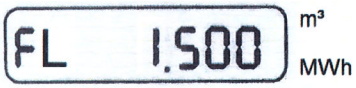
- volume indication (ml);

- flow-rate indication (m³/h)



- energy indication (mWh, J or cal).

2) The temperature sensors of the meter are immersed in a temperature regulated baths in which are generated temperature and temperature difference ranges according to LST EN 1434-5.
3) The start values of the energy and volume read directly from the meter indicating device.
4) Using the software **EVSconfig** and optical head starts the volume simulation for the testing meter. This is done by clicking the „**Sim. Flow Start**” button in the window „**Calibration**”. If the operation succeeded, the additional window appears with note „**Operation done**”. In this window click „**OK**”, after 40 second begins volume simulation of the heat-conveying liquid, which is recognized, the meter periodically displaying permanent flow rate q_p (m³/h):



5) After 180 seconds the volume pulse simulation has finished, the meter will display flow rate 0,000 m³/h. The end values of the energy and volume read directly from the meter indicating device. Simulated volume of the heat conveying liquid and energy are calculated as difference between start and end indicated values.
6) After the test, used the software **EVSconfig** and optical head to get out from the TEST mode. This is done by clicking the „**stop test**” button in the window „**Calibration**”. If the TETS mode is not turn off, after 12 hours meter automatically switches to the operating mode.

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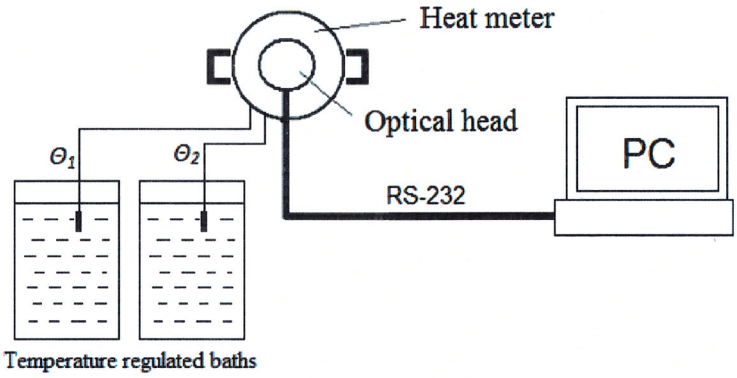

Fig. 1p. Connection diagram for the test of the heat meter QALCOMATIC E1.
Energy measuring errors determination test

2. Volume measuring errors determination test

The volume measuring errors should be evaluated using hydrodynamic test bench, in the following order.

1) The TEST mode is activated for the testing meter using the **EVSconfig** software and optical head (identically, as by energy measuring errors determination test).
2) The volume measuring errors should be evaluated at control flow rates specified in LST EN1434-5. The volume of water, passing through the meter can be read directly from the indicating device (with resolution 1 ml) or via meter optical output, using the reading head with special holder (see connection diagram Fig. 2p). Volume pulse value in TEST mode – 2 ml.
3) After the test, used the software **EVSconfig** and optical head to get out from the TEST mode (identically, as by energy measuring errors determination test).

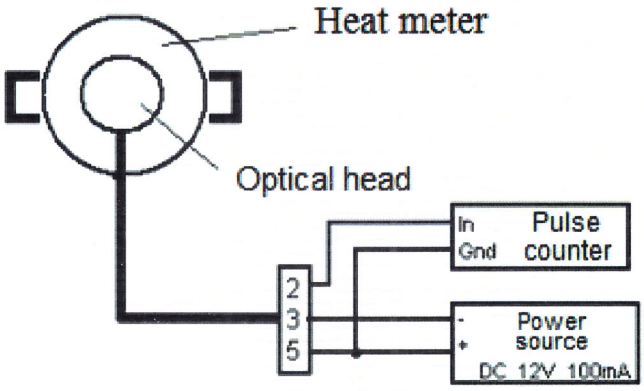

Fig. 2p. Connection diagram for the test of the heat meter QALCOMATIC E1.
Volume measuring errors determination test

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