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Harmonized standards applied: EN 1434-1:2007, EN 1434-2:2007, EN 1434-2:2007/AC:2007, EN 1434-3:2008, EN 1434-4:2007, EN 1434-4:2007/AC:2007, EN 1434-5:2007.

Additionally documents applied:

WELMEC 7.2 – Software guide (Issue 5).

The measuring instrument must correspond to following specifications:

1 Design of the instrument

1.1 Construction

Heat meter calculator Infocal 9 is a sub-assembly of the heat meter designed for accounting of heating energy consumption and operates together with the connected type approved flow sensor and type approved temperature sensor pair. The calculator is microprocessor-based measuring device. It can measure and record simultaneously parameters from two heating systems. The calculator can be powered by 3,6 V DC lithium battery either 230 V AC main.

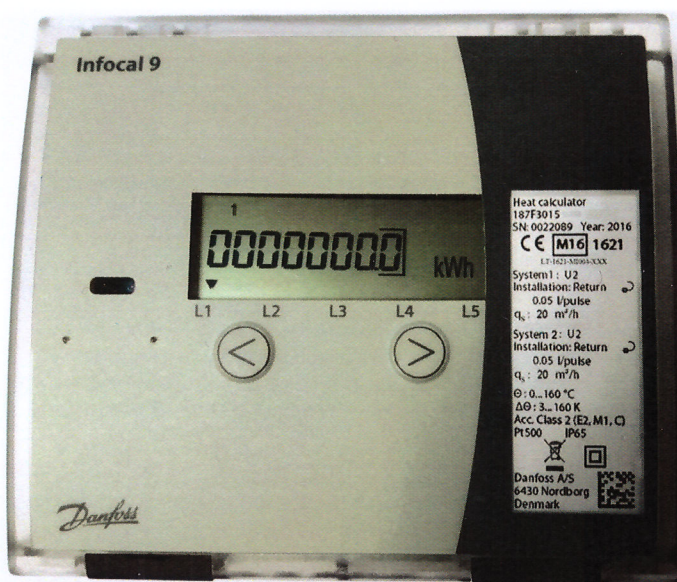


Fig.1. Heat meter calculator Infocal 9

The user may select (when orders) one of two energy measurement schemes, to which requirements of the Directive 2014/32/EU are applied (Table 1), and one of six energy measurement schemes, to which requirements of the Directive 2014/32/EU are not applied (Table 2). Energy measurement scheme options for 1-st and 2-nd calculator measurement system are given in Table 1 and Table 2.

Table1

Energy measurement scheme application	Reference designation	Options	
		1-st system	2-nd system
For closed systems. Flow sensor in supply pipe	U1	specified	specified
For closed systems. Flow sensor in return pipe	U2	specified	specified



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1.2 Measurand sensor

The calculator measures the resistance of type approved temperature sensor pair with Pt 500 elements and converts it to temperature according to formulas of EN 60751. The calculator also measures the volume of the heat-conveying liquid by processing signals (volume pulses) from the type approved flow sensor.

1.3 Measurand processing

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 measured resistance of the temperature sensor pair.

1.4 Indication of the measurement results

The accumulated quantity of thermal energy is presented on the LCD display in the kWh. Other units (MWh, Gcal, GJ) can be chosen too.

1.5 Optional equipment and functions subject to MID requirements

None.

1.6 Technical documentation

Heat meter calculator Infocal 9 - Technical description, installation and user instructions: PEINFOCAL9V01, 09-2016.

Other reference documents on which basis this certificate is issued, are stored in a file Nr.LEI-12-MP-048.16.

1.7 Integrated equipment and functions not subject to MID

Energy measurement schemes of the calculator, to which requirements of the Directive 2014/32/EU are not applied, presented in Table 2.

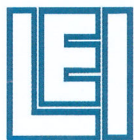
Table 2

Energy measurement scheme application	Reference designation	Options	
		1-st system	2-nd system
For closed heat supply systems. Flow sensor installed in heating circuit.	U3	specified	not specified
For open heat supply systems. Flow sensors in supply and return pipes.	A1	specified	not specified
For open heat supply systems. Flow sensors in replenishment and return pipes.	A2	specified	not specified
For single-pipe hot water supply systems.	A3	specified	not specified
For open heat supply systems. Flow sensors in replenishment and supply pipes.	A4	specified	not specified
For flow, temperature and pressure measurement.	U0	not specified	specified

Note: - at least one of installed measurement schemes of the calculator must be U1 or U2, for which requirements of the Directive 2014/32/EU are applied.

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

- M-Bus module;
- RS232 module;



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- 868 MHz RF radio module;
- M-Bus, CL, or RS232 communication module with pulse outputs;
- M-Bus, CL, or RS232 communication module with current outputs.

Optical interface according to requirements of EN 62056-21 is integrated in the calculator.

Programmable relay output.

Inputs for connection of the additional flow and temperature sensors.

Two pulse outputs for test signals.

Two pressure measurement channels (current inputs).

The technical characteristics of the calculator inputs /outputs and communication interfaces are presented in section 3 of this appendix.

The calculator can be used also for cooling energy measurement under rated operating conditions, listed in section 2.1.

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 flow and return pipes.

2.1.2 Measurement range

- limits of the temperature Θ : 0 °C to 160 °C;
- limits of temperature differences * $\Delta\Theta$: 2 K to 160 K or 3 K to 160 K.

Note: * - the lower limit of the temperature difference of the calculator and connected temperature sensor pair must be the same.

2.1.3 Maximum permissible error

$$E_c = \pm (0,5 + \Delta \Theta_{min} / \Delta\Theta), \%$$

where: $\Delta \Theta_{min}$ - the lower limit of temperature difference of calculator, K;
 $\Delta\Theta$ - measured temperature difference, K.

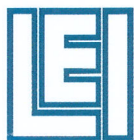
2.1.4 Environmental conditions / Influence quantities

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

3 Interfaces and compatibility conditions

Five temperature measurement channels for connecting of the temperature sensors Pt 500.
Connection of the temperature sensors is according to the 2-wire or 4-wire method.

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Five pulse inputs for connecting of the flow sensors. Class of pulse input device – IB (or IC, if noise filter is out) according to EN 1434-2. The volume pulse value is programmable.

Two current inputs for pressure measurement. Current range: 0 mA to 5 mA or 0 mA to 20 mA, or 4 mA to 20 mA.

Two programmable pulse/frequency outputs (available with plug-in multi module SKU46). Class of pulse output device – OD according to EN 1434-2.

Two programmable current outputs (available with mains supply and with plug-in multi module SKU45). Current range: 0 mA to 20 mA or 4 mA to 20 mA.

Programmable relay 230 V, 2A output for limiting regulation or alarm function (available with mains supply module SKM37).

Serial interface M-Bus (available with plug-in module SKU46, SKU45 or SKS43), CL (available with plug-in module SKU46 or SKU45), or RS232 (available with plug-in module SKU46, SKU45 or SKS48).

Wireless interface (available with 868 MHz RF module).

Two programmable pulse outputs for test signals. Class of pulse output device – OD according to EN 1434-2, active pulses with amplitude $3,5 \text{ V} \pm 0,3 \text{ V}$, maximum current level – 0,1 mA.

4 Requirements on production, putting into use and utilization

4.1 Requirements on production

At the end of the manufacturing and adjustment process the calculators shall be tested according to the requirements of the EN 1434-5. Errors of indication shall not exceed the maximum permissible errors, described in Annex VI (MI-004) of Directive 2014/32/EU.

4.2 Requirements on putting into use

The calculator must be installed in accordance with the requirements of document listed in section 1.6.

4.3 Requirements for consistent utilization

No special requirements identified.

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

5.1 Documentation of the procedure

None.

5.2 Special equipment or software

No special requirements identified.

5.3 Identification of hardware and software

Identification of hardware:

- see Fig.1 of this appendix.

Identification of software: version number of the firmware is **1.02**. This number on demand can be shown on the display.

5.4 Calibration-adjustment procedure

Calculator errors determination test shall be carried out when TEST mode is activated as indicated in section 8.7 of the document noted in section 1.6 of the present appendix.

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Determination of the energy errors shall be carried out using internal volume simulation in TEST mode, while value of energy measured can be read directly from display or by counting energy pulses from pulse output. Supply and return flow temperatures should be simulated using precise resistors. Test should be carried out in accordance with section 5.4 of EN 1434-5.

6 Security measures

6.1 Sealing

The following calculator sealing is provided:

- manufacturer's adhesive seal-sticker on the fixing bolt of electronic module under protecting cover (Fig. 2, pos. 1) and on the one bolt of cover protecting electronic module, which protect the access to the adjustment activation jumper (Fig. 2, pos. 2);
- the locks of top and bottom parts of the calculator are sealed with one or two hanged seals of heat supplier after installation (Fig. 2, pos. 3).

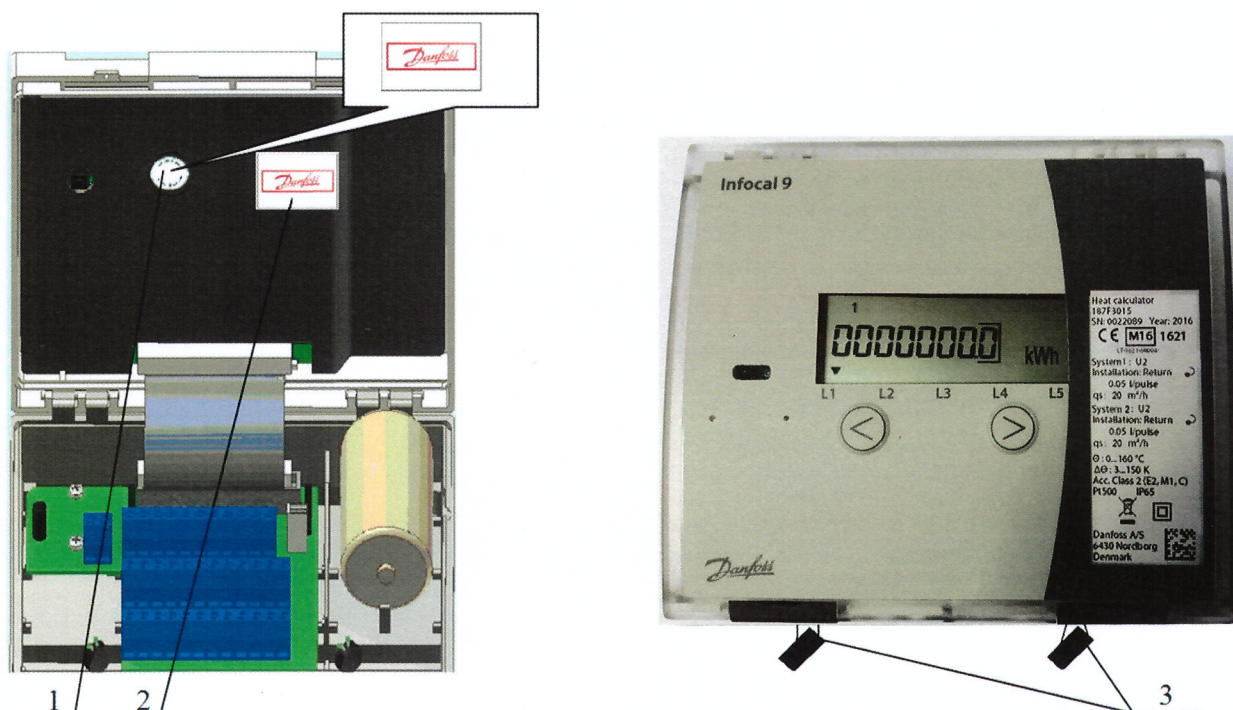


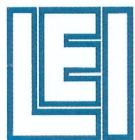
Fig.2. Sealing of the calculator Infocal 9



Fig. 3. Manufacturer's adhesive seal-sticker

6.2 Data logger

Archive data retention time is at least 12 years.



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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 in legible and indelible characters on the calculator casing and his label:

- EU-type examination certificate number (LT-1621-MI004-028);
- manufacturer's mark or name;
- type designation;
- year of manufacture and serial number;
- limits of the temperature;
- limits of temperature differences;
- type of temperature sensors (Pt 500);
- meter factor (pulse value) for the flow sensor;
- flow sensor to be installed in the flow (supply) or return;
- climatic class;
- electromagnetic class;
- mechanical class;
- voltage level for external power supply;
- reference designation of the measurement schemes for 1st and 2nd calculator measurement system (see Table 1 and Table 2 of the present appendix).

7.2 Conformity marking

In addition, the label of 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 No.	Description
LT-1621-MI004-028	14-12-2016, No. LEI-12-MP-048.16	Type examination certificate first issued

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