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**Harmonized standards applied** LST EN 1434-1:2007, LST EN 1434-2:2007, LST EN 1434-2:2007/AC:2007, LST EN 1434-3:2009, LST EN 1434-4:2007, LST EN 1434-4:2007/AC:2007, LST EN 1434-5:2007.

**Additionally documents applied:**

WELMEC 7.2 – Software guide (Issue 5).

The measuring instrument must correspond with the following specifications:

## 1 Design of the instrument

### 1.1 Construction

Heat meter calculator IFK 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 IFK is microprocessor based measuring device. It can measure and record simultaneously parameters from two heating systems. The calculator can be operated by 3,6 V lithium battery or by AC 230 V  $^{+10}_{-15}$  % main.

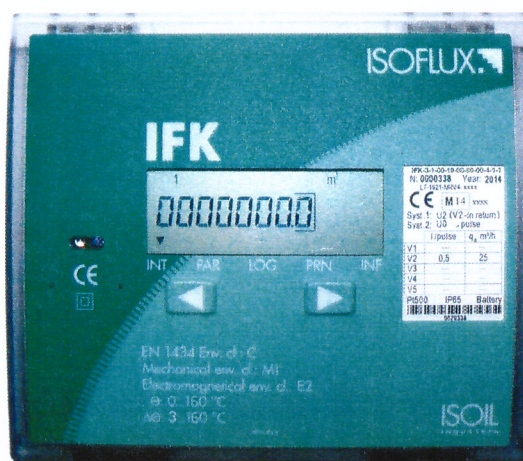


Fig.1.Heat meter calculator IFK

### 1.2 Measurand sensor

The calculator measures the resistance of type approved temperature sensor pair with Pt500 elements and converts it to temperature according to formulas of LST EN 60751:2008. 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

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 measured resistance of the temperature sensor pair.

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**Type number combination of the calculator IFK**

Type	IFK – M4 – □□ – □□ – □ – □□																		
<table border="1"><thead><tr><th>Conformity assessment:</th><th>Code</th></tr></thead><tbody><tr><td>With initial verification</td><td>M4</td></tr><tr><td>Without initial verification</td><td>M0</td></tr></tbody></table>		Conformity assessment:	Code	With initial verification	M4	Without initial verification	M0												
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Type	Code	Type	Code	Type	Code														
None	0	RS232	3	Universal with current outputs	4														
M-Bus	2	868 MHz RF module	5	Universal with pulse outputs	6														
Power supply; connection method of the temperature sensors		Code																	
3,6 V battery; 2-wire connection method of the temperature sensors		A2																	
3,6 V battery; 4-wire connection method of the temperature sensors		A4																	
230 V AC main; 2-wire connection method of the temperature sensors		C2																	
230 V AC main; 4-wire connection method of the temperature sensors		C4																	

Notes:

- \* Requirements of the Directive 2004/22/EC to this measurement scheme are not applied. Scheme U0 is applied only for measurement of individual parameters: flow, temperature, pressure.
- At least one of the installed measurement schemes of calculator must be U1 or U2, for which requirements of the Directive 2004/22/EC are applied.

**1.4 Indication of the measurement results**

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

**1.5 Optional equipment and functions subject to MID requirements**

Not applicable.

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## 1.6 Technical documentation

- Heat meter calculator IFK – Technical description. User's manual: IFKV01, 08-10-2014.

Other reference documents on which basis this certificate is issued, are stored in a file No. LEI-12-MP-028.14.

## 1.7 Integrated equipment and functions not subject to MID

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

- M-Bus module;
- RS232 module;
- 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.

Additional functions for flow, temperature and pressure measurement are provided. These additional functions don't influence operation of calculator basic functions to which requirements of the Directive 2004/22/EC are applied.

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 temperature difference in flow and return pipes.

#### 2.1.2 Measurement range

- limits of temperature  $\Theta$ : 0 °C to 160 °C;
- limits of temperature differences  $\Delta\Theta$ : 3 K to 160 K.

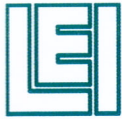
#### 2.1.3 Maximum permissible error

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

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.



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### **3 Interfaces and compatibility conditions**

#### **3.1 Compatibility conditions**

The following sensors can be connected to the calculator:

- up to five temperature sensors Pt500 using 2-wire or 4-wire connection method;
- up to five flow sensors. The pulse input device class - IB (or IC, if noise filter is out). The volume pulse value is programmable;
- up to two pressure sensors.

#### **3.2 Interfaces**

Integrated optical communication interface according to LST EN 62056-21:2003 requirements.

Two configurable pulse/frequency outputs (available with plug-in multi module SKU46). Class of pulse output device – OD according to LST EN 1434-2:2007.

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

Configurable double relay 230V, 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 configurable pulse outputs for test signals. Class of pulse output device – OD according to LST EN 1434-2:2007.

### **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 1434-5:2007. Errors of indication shall not exceed the maximum permissible errors, described in section 7.3 of Annex MI-004 of Directive 2004/22/EC.

#### **4.2 Requirements on putting into use**

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

#### **4.3 Requirements for utilization**

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

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

#### **5.1 Documentation of the procedure**

No special requirements identified.

#### **5.2 Special equipment or software**

No special requirements identified.

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### 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 „SOFT 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.

Determination of the energy errors shall be carried out using internal volume simulation in TEST mode, while value of energy measured shall 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 LST EN 1434-5:2007.

Errors of indication shall not exceed the maximum permissible errors, described in section 7.3 of Annex MI-004 of Directive 2004/22/EC.

## 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);
- locks of top and bottom parts of the calculator are sealed with one or two hanged seals after installation (Fig. 2, pos. 3).

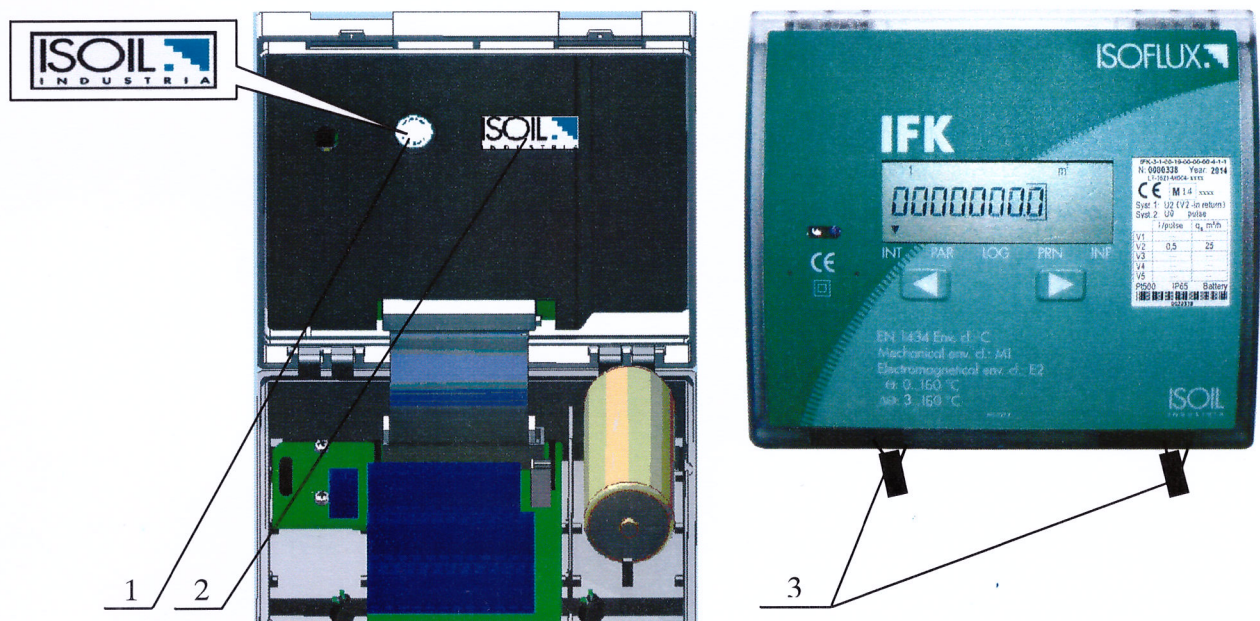


Fig.2. Sealing of the calculator IFK

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## 6.2 Data logger

Archive data retention time is at least 12 years.

## 7 Marking and inscriptions

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

The following information shall appear in legible and indelible characters on the calculator casing and his label:

- EC-type examination certificate number (LT-1621-MI004-016);
- manufacturer's mark or name;
- type designation and type number;
- year of manufacture and serial number;
- limits of the temperature;
- limits of temperature differences;
- type of temperature sensors (Pt500);
- 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;
- measurement scheme designation code for 1<sup>st</sup> and 2<sup>nd</sup> heating systems.

### 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;
- 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
<b>1</b>	<b>2</b>	<b>3</b>
LT-1621-MI004-016	10-02-2015, No. LEI-12-MP-028.14	Type examination certificate first issued