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Harmonized standards applied EN 1434-1:2015, EN 1434-2:2015, EN 1434-4:2015, EN 1434-5:2015.

Additionally documents applied:

WELMEC 7.2 – Software guide (Issue 6).

The measuring instrument must correspond with the following specifications:

1 Design of the instrument

1.1 Construction

Heat meter IFX-M4-03 consists of the primary flow sensor and the calculator with type approved pair of temperature sensors with Pt 500 elements.

Flow sensor consists of brass body with built-in ultrasound transducers. The flow sensor inseparably connected with the calculator via 1,2 m length screened cable (2,5 m and 5 m – optional) . The flow sensors $q_p = (0,6 - 6,0) \text{ m}^3/\text{h}$ has intended place for temperature sensor installation.

The calculator can be mounted directly on the flow sensor or separately.

The heat meter is powered by 3,6 V DC lithium battery either remote 12 V to 42 V DC or 12 V to 36 V AC power source.

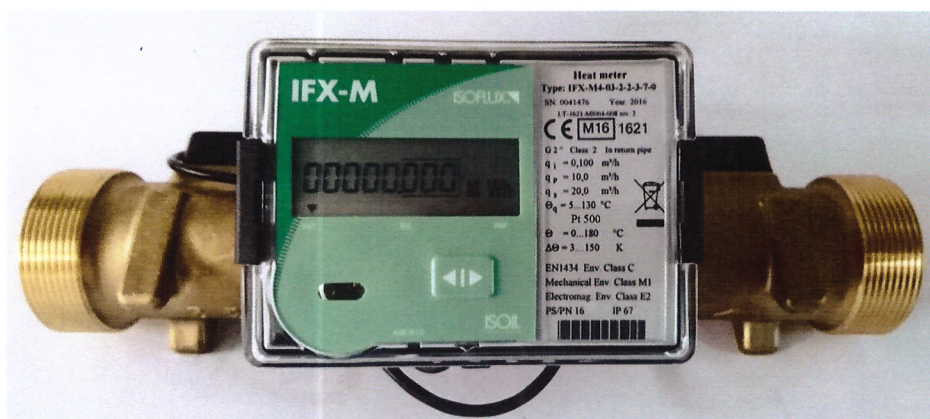
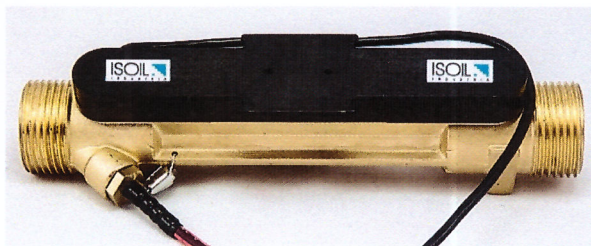


Fig.1.Heat meter IFX-M4-03 (calculator and flow sensor)

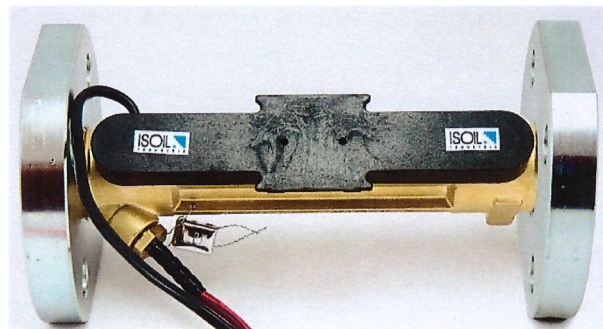


Fig.2. Calculator of the heat meter IFX-M4-03

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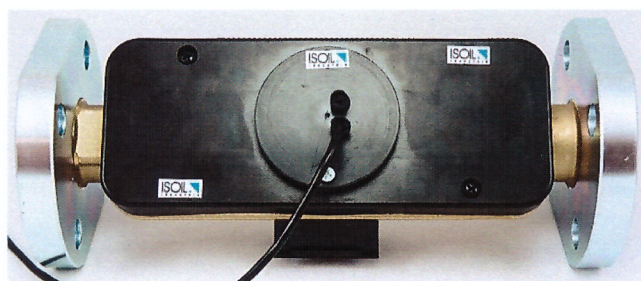
a) Flow sensor of the heat meter IFX-M4-03
 $q_p = 0,6/1,0/1,5/2,5 \text{ m}^3/\text{h}$ with threaded end connections
G $\frac{3}{4}$ B or G 1 B



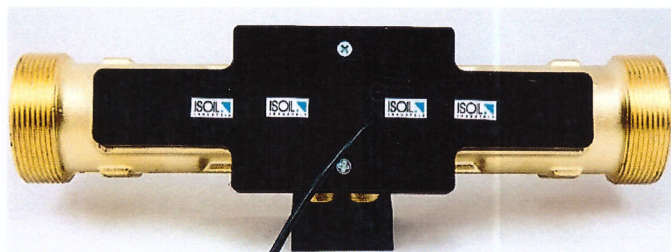
b) Flow sensor of the heat meter IFX-M4-03
 $q_p = 0,6/1,0/1,5/2,5 \text{ m}^3/\text{h}$ with flanged end connections DN20



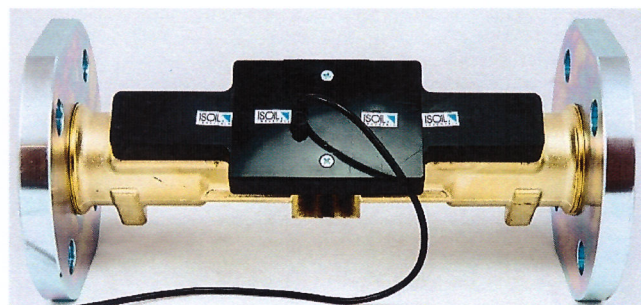
c) Flow sensor of the heat meter IFX-M4-03 $q_p = 3,5/6 \text{ m}^3/\text{h}$
with threaded end connections G $1\frac{1}{4}$ B



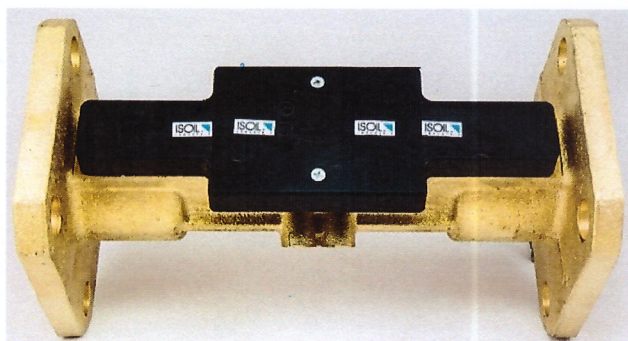
d) Flow sensor of the heat meter IFX-M4-03 $q_p = 3,5/6 \text{ m}^3/\text{h}$
with flanged end connections DN25 or DN32



e) Flow sensor of the heat meter IFX-M4-03 $q_p = 10 \text{ m}^3/\text{h}$
with threaded end connections G 2 B



f) Flow sensor of the heat meter IFX-M4-03 $q_p = 10 \text{ m}^3/\text{h}$
with flanged end connections DN40



g) Flow sensor of the heat meter IFX-M4-03 $q_p = 15 \text{ m}^3/\text{h}$
with flanged end connections DN50



g) Flow sensor of the heat meter IFX-M4-03 $q_p = 25/40/60 \text{ m}^3/\text{h}$
with flanged end connections (DN65/DN80/DN100)

Fig.3. Flow sensor of the heat meter IFX-M4-03

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Structure of type number of the heat meter IFX-M4-03

Type

IFX-M4-03

*

*

*

Installation of the flow sensor:

In flow pipe

In return pipe

Code

1

2

Destination of the meter:

Meter for heating (for measuring heating energy only)

Meter for heating and cooling

Code

1

2

Ratio of the flow rates q_p/q_i :

100

250**

100

250**

Limits of temperature differences:

2 K to 150 K

2 K to 150 K

3 K to 150 K

3 K to 150 K

Code

1

2

3

4

Flow sensor:

Permanent flow-rate, m ³ /h	Overall length, mm	End connections	Code
0,6	110	G ¾	10
1,0	110	G ¾	11
1,5	110	G ¾	15
1,5	130	G 1	14
2,5	130	G 1	20
3,5	260	G1 ¼	25
6,0	260	G1 ¼	32
10,0	300	G2	40
10,0	300	DN40	41
15,0	270	DN50	50
3,5	260	DN25	26
6,0	260	DN25	35
0,6	190	G 1	06
1,0	190	G 1	08
1,5	190	G 1	17
2,5	190	G 1	22
0,6	190	DN20	09
1,0	190	DN20	12
1,5	190	DN20	16
2,5	190	DN20	21
25	300	DN65	65
40	300	DN80	80
60	360	DN100	100

The external communication interface:

Type	Code	Type	Code
None	0	MODBUS RS485	5
M-bus	1	MiniBus	7
CL	2	BACnet	8
868 MHz RF module	4		

Power supply and nominal pressure (PN):

	Code
Internal battery 3,6 V DC – PN16	1
External power supply 24 V AC/DC – PN16	2
Internal battery 3,6 V DC – PN25	3
External power supply 24 V AC/DC – PN25	4

The length of the flow sensor signal lead/ The length of the temperature sensors signal lead:

	Code
1,2 m / 1,5 m	1
2,5 m / 2,0 m	2
5,0 m / 5,0 m	3

Temperature sensor pair:

	Code
None	0
DS	1
PL	2

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Remarks:

1. * - marked numbers are used only for order numbering (it is not used for type number);
2. ** - for meter $q_p = 1,5 \text{ m}^3/\text{h}$; $q_p = 2,5 \text{ m}^3/\text{h}$; $q_p = 6 \text{ m}^3/\text{h}$; $q_p = 10 \text{ m}^3/\text{h}$; $q_p = 15 \text{ m}^3/\text{h}$ only.

1.2 Measurand sensor

The heat meter hardware consists of an ultrasonic flow sensor and heat meter calculator with the connected temperature sensors. The calculator measures the resistance of type approved pair of temperature sensors 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, received from the ultrasound transducers of the 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 resistance of the temperature sensors pair, connected to the calculator.

1.4 Indication of the measurement results

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

1.5 Optional equipment and functions subject to MID requirements

None.

1.6 Technical documentation

Ultrasonic meter for heating and cooling IFX-M4-03. Technical description, user manual: IFX-M4-03_M_E_2018_15_REV.0, 04-2018.

Other reference documents on which basis this certificate is issued, are stored in a file Nr.LEI-12-MP-074.18.

1.7 Integrated equipment and functions not subject to MID

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

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

- M-Bus module;
- CL module;
- 868 MHz RF radio module;
- MODBUS RS485 module;
- LON module;
- MiniBus module;
- BACnet module.

Two pulse inputs with programmable pulse value: class of pulse input device – IB according to EN 1434-2.

Two pulse outputs: class of pulse output device – OB in operating mode, OD in test mode according to EN 1434-2.

The meter 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

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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

For calculator:

- limits of the temperature Θ : 0 °C to 180 °C;
- limits of temperature differences * $\Delta\Theta$: 2 K to 150 K or 3 K to 150 K.

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

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

Table 1

End connections	Flow-rate, m ³ /h			Overall length, mm
	Permanent q_p	Maximum q_s	Minimum q_i	
G ¾	0,6	1,2	0,006	110
G 1 or DN20	0,6	1,2	0,006	190
G ¾	1,0	2,0	0,010	110
G 1 or DN20	1,0	2,0	0,010	190
G ¾	1,5	3,0	0,006	110
G 1 or DN20	1,5	3,0	0,006	190
G ¾	1,5	3,0	0,015	110
G 1 or DN20	1,5	3,0	0,015	190
G 1	1,5	3,0	0,015	130
G1	2,5	5,0	0,010	130
G 1 or DN20	2,5	5,0	0,010	190
G 1	2,5	5,0	0,025	130
G 1 or DN20	2,5	5,0	0,025	190
G 1 ¼ or DN25 or DN32	3,5	7,0	0,035	260
G 1 ¼ or DN25 or DN32	6,0	12,0	0,024	260
G 1 ¼ or DN25	6,0	12,0	0,060	260
G 2 or DN40	10,0	20,0	0,040	300
G 2 or DN40	10,0	20,0	0,100	300
DN50	15,0	30,0	0,060	270
DN50	15,0	30,0	0,150	270
DN65	25,0	50,0	0,100	300
DN65	25,0	50,0	0,250	300
DN80	40,0	80,0	0,160	300
DN80	40,0	80,0	0,400	300
DN100	60,0	120,0	0,240	360
DN100	60,0	120,0	0,600	360

Temperature limits of heat conveying liquid Θ_q : 5 °C to 130 °C.

2.1.3 Accuracy class

Accuracy class : 2 according to EN 1434-1.

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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 or 25 bar.

2.1.6 Mounting position of the flow sensor of the heat meter

Flow sensor of the heat meter can be mounted either horizontally, vertically or inclined.

3 Interfaces and compatibility conditions

Two temperature measurement channels for connection of the temperature sensors Pt 500. Connection of the temperature sensors according to the two-wire scheme.

The communication interfaces of the meter, pulse inputs and outputs are described 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 EN 1434-5. Errors of indication shall not exceed the maximum permissible errors, described in Annex VI (MI-004) of Directive 2014/32/EU.

The flow sensor can be tested with cold water (25 ± 5) °C.

4.2 Requirements on putting into use

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

For flow sensors of the heat meter with nominal diameter DN65 to DN100 necessary straight pipelines lengths are: upstream $\geq 5 \times \text{DN}$, downstream $\geq 3 \times \text{DN}$. For flow sensors of other sizes the straight pipelines installation in upstream and downstream the sensor are not necessary.

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, Fig.2, Fig.3 of this appendix.

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- identification mark on the meter electronics wiring plate is SKU3-v12R8.

Identification of software: version number of the software is **0,07**. This number can be displayed on the device's display according to the request.

5.4 Calibration-adjustment procedure

Heat meter flow sensor and calculator errors determination test shall be carried out when TEST mode is activated as indicated in chapter „Activation test mode” of the document noted in section 1.6 of the present appendix.

Determination of the error of the flow sensor shall be carried out using hydrodynamic test bench within each of the flow rate ranges appointed in section 6.2 of EN 1434-5. Meter pulse output should be used.

Determination of the heat energy error shall be carried out using internal volume simulation, which is activated by a long press of calculator control button.

Value of energy measured in TEST mode 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 6.4 of EN 1434-5.

6 Security measures

6.1 Sealing

The following heat meter calculator sealing is provided:

- the manufacturer's adhesive seal - sticker on the access to the adjustment activation jumper (Fig.4, pos.1) and on the fixer of the cover protecting electronics wiring plate (Fig.4, pos.2);
- after installation the case and cover of the calculator (Fig.4, pos.3) are sealed with two hanged seals of heat supplier.

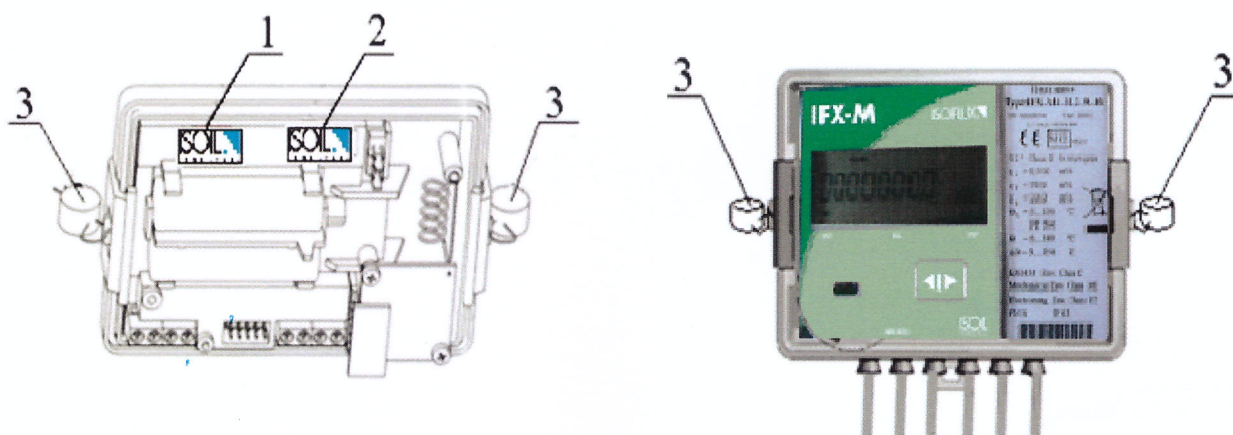


Fig.4. Sealing of the calculator of the heat meter

The following flow sensor sealing is provided:

- the manufacturer's adhesive seal - sticker on the bolts of the cover (Fig.5, Fig.6, Fig.7, Fig.8);

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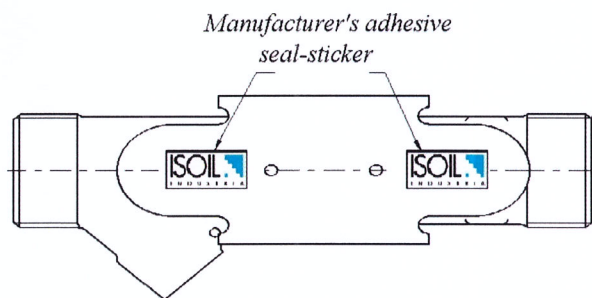


Fig. 5. Sealing of flow sensor
 $q_p = 0,6/1,0/1,5/2,5 \text{ m}^3/\text{h}$

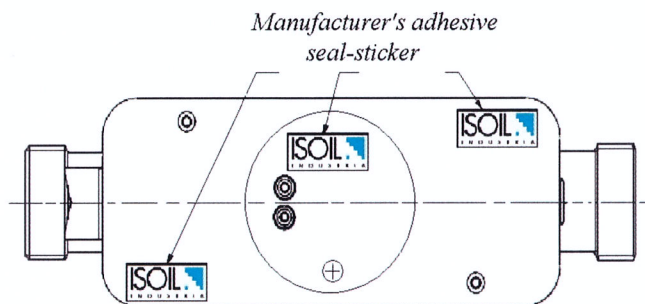


Fig. 6. Sealing of flow sensor
 $q_p = 3,5/6,0 \text{ m}^3/\text{h}$

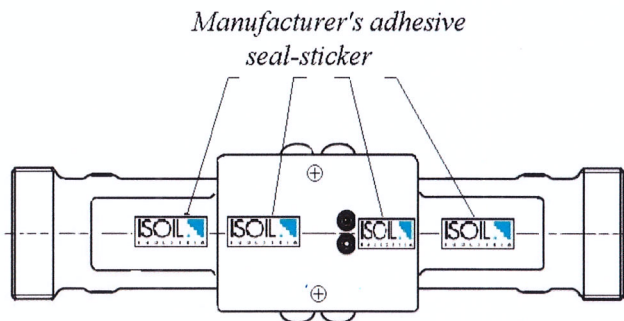


Fig. 7. Sealing of flow sensor
 $q_p = 10 \text{ m}^3/\text{h}$

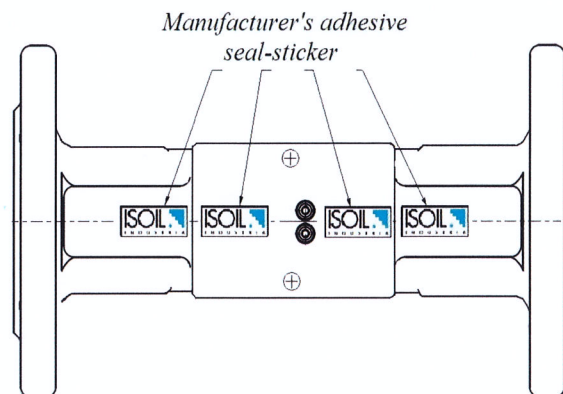


Fig. 8. Sealing of flow sensor
 $q_p = 15/25/40/60 \text{ m}^3/\text{h}$



Fig.9. Manufacturer's adhesive seal-sticker

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 heat meter calculator casing and his label:

- EU-type examination certificate number (LT-1621-MI004-008 rev. 3);
- manufacturer's mark or name;
- type designation and type number;
- year of manufacture and serial number;
- limits of the temperature;
- limits of temperature differences;

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- limits of heat conveying liquid temperature;
- type of temperature sensors (Pt 500);
- 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 flow (supply) or return;
- accuracy class;
- voltage level by external power supply;
- climatic class;
- electromagnetic class;
- mechanical class.

Arrow to indicate the direction of the flow shall appear on flow sensor body.

7.2 Conformity marking

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

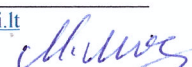
- „CE” marking;
- metrology marking, consisting of the capital letter „M” and the last two digits of the year of its affixing, surrounded by a rectangle;
- identification number of the notified body, which carried out the conformity assessment.

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-MI004-008	10-09-2012, Nr. LEI-12-MP-010.12	Type examination certificate first issued																																								
LT-1621-MI004-008 Revision 1	14-07-2014, Nr. LEI-12-MP-025.14	<div>1.Meter has been supplemented with following flow sensor modifications:</div> <table><tr><th>End connections</th><th>Permanent flow-rate q_p, m³/h</th><th>Minimum flow-rate q_i, m³/h</th><th>Overall length, mm</th></tr><tr><td>G1 or DN20</td><td>0,6</td><td>0,006</td><td>190</td></tr><tr><td>G1 or DN20</td><td>1,0</td><td>0,010</td><td>190</td></tr><tr><td>G1 or DN20</td><td>1,5</td><td>0,006</td><td>190</td></tr><tr><td>G1 or DN20</td><td>1,5</td><td>0,015</td><td>190</td></tr><tr><td>G1 or DN20</td><td>2,5</td><td>0,010</td><td>190</td></tr><tr><td>G1 or DN20</td><td>2,5</td><td>0,025</td><td>190</td></tr><tr><td>DN25</td><td>3,5</td><td>0,035</td><td>260</td></tr><tr><td>DN25</td><td>6,0</td><td>0,024</td><td>260</td></tr><tr><td>DN25</td><td>6,0</td><td>0,060</td><td>260</td></tr></table> <div>2. Energy units kWh, MWh, Gcal, GJ displayed by heat meter calculator are changed into MWh, Gcal, GJ.</div> <div>3. The document IFX-M4-03V01, issued 07-2012, has been replaced by the document IFX-M4-03V02, issued 05-2014.</div>	End connections	Permanent flow-rate q_p , m³/h	Minimum flow-rate q_i , m³/h	Overall length, mm	G1 or DN20	0,6	0,006	190	G1 or DN20	1,0	0,010	190	G1 or DN20	1,5	0,006	190	G1 or DN20	1,5	0,015	190	G1 or DN20	2,5	0,010	190	G1 or DN20	2,5	0,025	190	DN25	3,5	0,035	260	DN25	6,0	0,024	260	DN25	6,0	0,060	260
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1	2	3																												
LT-1621-MI004-008 Revision 2	17-06-2016, Nr. LEI-12-MP-045.16	<p>1. Additional modification of the meter power source: remote 12 V to 42 V DC or 12 V to 36 V AC power source.</p> <p>2. Energy units MWh, Gcal, GJ displayed by heat meter calculator are changed into kWh, MWh, Gcal, GJ.</p> <p>3. The meter additionally can be equipped with one of the following communication modules:</p> <ul style="list-style-type: none">- MODBUS RS485 module;- LON module;- MiniBus module. <p>4. Meter has been supplemented with following flow sensor modifications:</p> <table><tr><th>End connections</th><th>Permanent flow-rate q_p, m³/h</th><th>Minimum flow-rate q_i, m³/h</th><th>Overall length, mm</th></tr><tr><td>G1</td><td>1,5</td><td>0,015</td><td>130</td></tr><tr><td>DN32</td><td>3,5</td><td>0,035</td><td>260</td></tr><tr><td>DN32</td><td>6,0</td><td>0,024</td><td>260</td></tr></table> <p>5. The maximum admissible working pressure/nominal pressure 16 bar (PS/PN 16) is changed into 16 bar (PS/PN 16) or 25 bar (PS/PN 25).</p> <p>6. The straight pipelines for flow sensor installation in upstream and downstream are not necessary.</p> <p>7. The document IFX-M4-03V02, issued 05-2014, has been replaced by the document IFX-M4-03V03, issued 06-2016.</p> <p>8. New meter software version 0.07.</p> <p>9. Climatic environment of the meter „non-condensing humidity“ is changed in to „condensing humidity“.</p>	End connections	Permanent flow-rate q_p , m ³ /h	Minimum flow-rate q_i , m ³ /h	Overall length, mm	G1	1,5	0,015	130	DN32	3,5	0,035	260	DN32	6,0	0,024	260												
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LT-1621-MI004-008 Revision 3	20-04-2018, Nr. LEI-12-MP-074.18	<p>1. Meter has been supplemented with following flow sensor modifications:</p> <table><tr><th>End connections</th><th>Permanent flow-rate q_p, m³/h</th><th>Minimum flow-rate q_i, m³/h</th><th>Overall length, mm</th></tr><tr><td>DN65</td><td>25,0</td><td>0,100</td><td>300</td></tr><tr><td>DN65</td><td>25,0</td><td>0,250</td><td>300</td></tr><tr><td>DN80</td><td>40,0</td><td>0,160</td><td>300</td></tr><tr><td>DN80</td><td>40,0</td><td>0,400</td><td>300</td></tr><tr><td>DN100</td><td>60,0</td><td>0,240</td><td>360</td></tr><tr><td>DN100</td><td>60,0</td><td>0,600</td><td>360</td></tr></table> <p>2. Additional communication interface module BACnet appeared.</p> <p>3. The document IFX-M4-03V03, issued 06-2016, has been replaced by the document IFX-M4-03_M_E_2018_15_REV.0, issued 06-2016.</p>	End connections	Permanent flow-rate q_p , m ³ /h	Minimum flow-rate q_i , m ³ /h	Overall length, mm	DN65	25,0	0,100	300	DN65	25,0	0,250	300	DN80	40,0	0,160	300	DN80	40,0	0,400	300	DN100	60,0	0,240	360	DN100	60,0	0,600	360
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DN65	25,0	0,250	300																											
DN80	40,0	0,160	300																											
DN80	40,0	0,400	300																											
DN100	60,0	0,240	360																											
DN100	60,0	0,600	360																											