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Harmonized standards applied: LST EN 1434-1:2007, LST EN 1434-2+AC:2007, LST EN 1434-4+AC:2007, LST EN 1434-5:2007.

Additionally documents applied:
WELMEC 7.2 – Software guide (Issue 4).

The measuring instrument must correspond with the following specifications:

1 Design of the instrument

1.1 Construction

Ultrasonic flow sensor for heat meter SDU-3 is designed for measuring heat-conveying liquid volume in heating/cooling systems and conversion it into electrical pulse signal. It is used in conjunction with the type approved heating/cooling energy calculator.

Flow sensor consists of the measuring section (brass housing with installed ultrasound transducers) and of the electronic unit, which can be mounted directly on a measuring section or separately.

The flow sensor is operated by 3.6 V lithium battery.

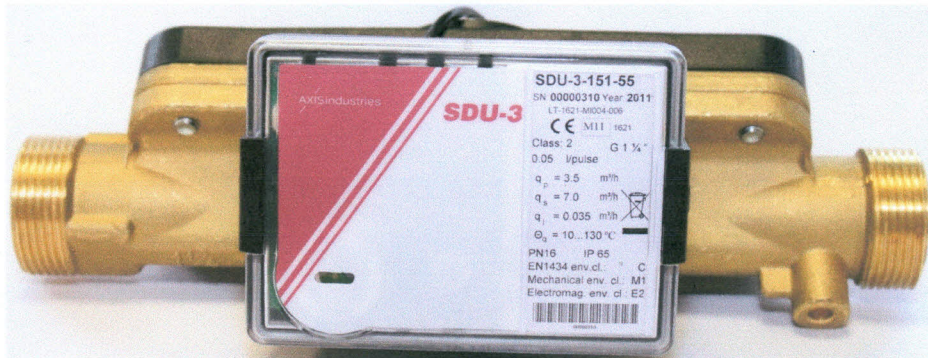


Fig.1. Flow sensor SDU-3 (measuring section and electronic unit)



Fig.2. Electronic unit of the flow sensor



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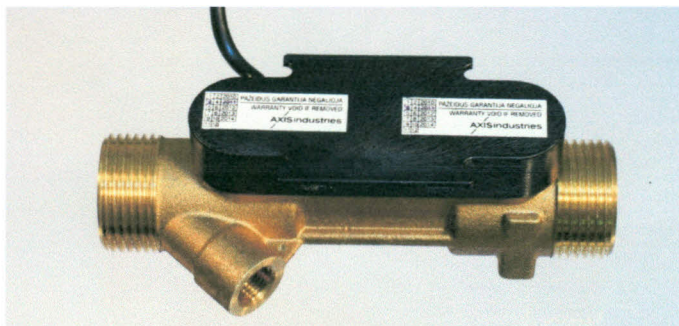


Fig. 3. Measuring section of the flow sensor $q_p = 0,6/1,0/1,5/2,5 \text{ m}^3/\text{h}$

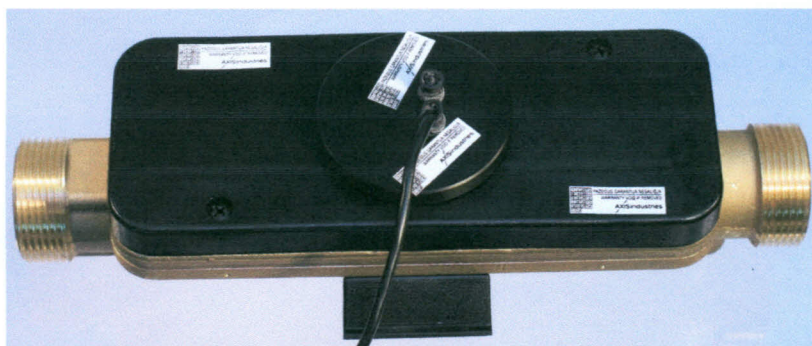


Fig. 4. Measuring section of the flow sensor $q_p = 3,5/6,0 \text{ m}^3/\text{h}$

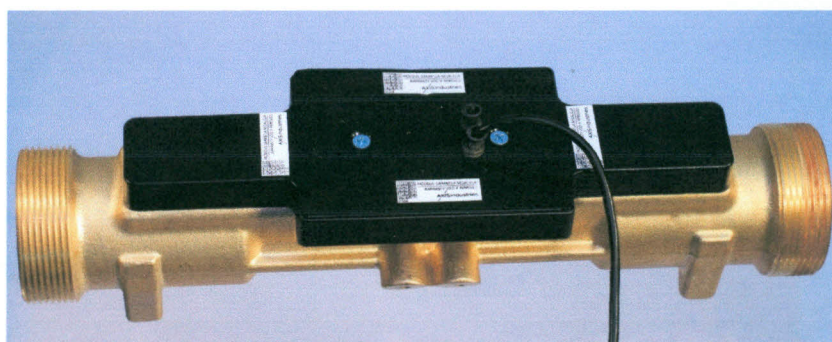


Fig. 5. Measuring section of the flow sensor $q_p = 10,0 \text{ m}^3/\text{h}$

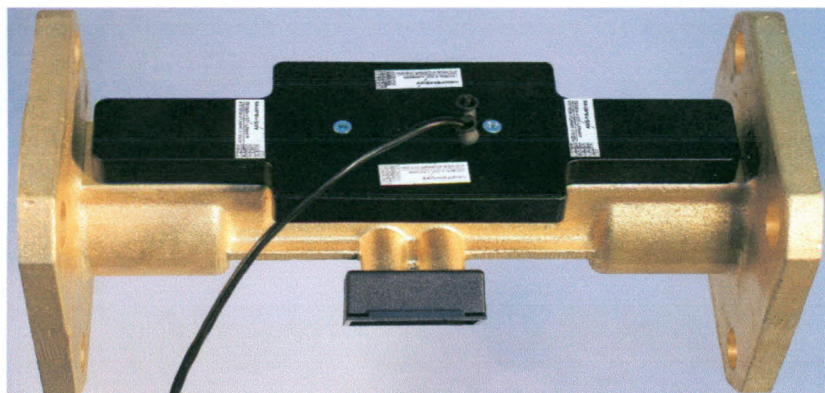


Fig. 6. Measuring section of the flow sensor $q_p = 15,0 \text{ m}^3/\text{h}$

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Type number combination of the flow sensor SDU-3

SDU-3 – -NM

Type			
Ratio of flow-rate limits (q_p/q_i):	Code		
100	1		
250 (only for sensors $q_p=1,5 \text{ m}^3/\text{h}; 2,5 \text{ m}^3/\text{h}; 6,0 \text{ m}^3/\text{h}; 15 \text{ m}^3/\text{h}$)	2		
Technical data of the flow sensor:			
Permanent flow rate, m^3/h	Overall length, mm	End connections	Code
0,6	110	G $\frac{3}{4}$	1
1,0	110	G $\frac{3}{4}$	2
1,5	110	G $\frac{3}{4}$	3
2,5	130	G1	4
3,5	260	G1 $\frac{1}{4}$	5
6,0	260	G1 $\frac{1}{4}$	6
10,0	300	G2	7
10,0	300	DN40	8
15,0	270	DN50	9
Length of the connection cable between measuring section and electronic unit:			
Cable length		Code	
None		0	
1,2 m		1	
2,5 m		2	
5 m		3	
Pulse value of the flow sensor $N \cdot 10^{-M} \text{ m}^3/\text{puls}^*$			

* - where N- possible number 1...9, M – possible number 1...5.

1.2 Measurand sensor

Two ultrasound transducers, mounted in a housing of the measuring section.

1.3 Measurand processing

Volume measurement is made by means of bi directional ultrasonic technique according to the transit time method. Measured volume of heat-conveying liquid is converted into the pulses quantity that is transferred in output pulse terminal.

Integrated software version of flow sensor is **1.00**.

1.4 Indication of the measurement results

Pulse output signal (l / pulse) is transferred to the heat meter calculator.

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1.5 Optional equipment and functions subject to MID requirements

Not applicable.

1.6 Technical documentation

Technical description, operating instruction, certificate PLSDU3V01, 2011-02-01.

Description of the integrated software structure PIASDU3MIDV01, 2011-02-01.

Other reference documents on which basis this certificate is issued, are stored in a file Nr.LEI-12-MP-006-10.

1.7 Integrated equipment and functions not subject to MID

Not applicable.

2 Technical data

2.1 Rated operating conditions

2.1.1 Measurand

Quantity of a heat-conveying liquid, which has passed through the flow sensor, is transferred in the form of pulse volume (l / pulse).

2.1.2 Measurement range

Heat meter flow sensor technical data are presented in Table 1:

Table 1

End connection	Flow rate, m ³ /h			Overall length , mm
	Permanent q_p	Maximum q_s	Minimum q_i	
G3/4"	0,6	1,2	0,006	110
G3/4"	1,0	2,0	0,01	110
G3/4"	1,5	3,0	0,015	110
G3/4"	1,5	3,0	0,006	110
G1"	2,5	5,0	0,025	130
G1"	2,5	5,0	0,01	130
G1 1/4"	3,5	7,0	0,035	260
G1 1/4"	6,0	12,0	0,06	260
G1 1/4"	6,0	12,0	0,024	260
G2" or DN40	10,0	20,0	0,100	300
DN50	15,0	30,0	0,150	270
DN50	15,0	30,0	0,06	270

Temperature limits of heat conveying liquid:

-for flow sensors $q_p \leq 2,5 \text{ m}^3/\text{h}$

$$\Theta_q = 5 \text{ }^\circ\text{C} \dots 130 \text{ }^\circ\text{C};$$

-for flow sensors $q_p \geq 3,5 \text{ m}^3/\text{h}$

$$\Theta_q = 10 \text{ }^\circ\text{C} \dots 130 \text{ }^\circ\text{C}.$$



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2.1.3 Accuracy class

Accuracy class – 2 according to LST EN 1434-1:2007.

2.1.4 Environmental conditions / Influence quantities

Ambient temperature	:	+5°C to +55°C;
Humidity	:	non condensing;
Location	:	closed;
Mechanical environment	:	class M1;
Electromagnetic environment	:	class E2.

2.2 Other operating conditions

2.2.1 Maximum admissible working pressure

The maximum admissible working pressure of flow sensor is 16 bar (PN16).

2.2.2 Mounting position of the flow sensor

Flow sensor can be mounted both horizontally and vertically.

2.2.3 Pulse values of volume on pulse output device

The minimum presumable pulse output values are specified in Table 2:

Table 2

Permanent flow-rate q_p , m ³ /h	0,6/1,0/1,5	2,5	3,5	6,0	10,0	15,0
Pulse value, l/pulse	0,01	0,02	0,05	0,1	0,2	0,5

3 Interfaces and compatibility conditions

The pulse output device of flow sensor is connected to terminals of the volume input device of the heat meter calculator. The volume pulse value of input pulse device of the calculator should correspond to value of output pulse of the flow sensor. Class of pulse output device—OD according to LST EN1434-2+AC:2007.

4 Requirements on production, putting into use and utilization

4.1 Requirements on production

No special requirements identified.

4.2 Requirements on putting into use

The flow sensor SDU-3 must be installed in accordance with the requirements of documents, listed in 1.6.

Necessary straight line length for flow sensor installation:

$q_p \leq 6 \text{ m}^3/\text{h}$	no requirements for straight pipeline length in upstream and downstream
$q_p > 6 \text{ m}^3/\text{h}$	upstream straight pipeline length $\geq 5 \times \text{DN}$ and downstream $\geq 3 \times \text{DN}$

Initial verification test of flow sensor can be carried out with cold water (25 ± 5) °C.



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4.3 Requirements for utilization

Not applicable.

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

5.1 Documentation of the procedure

Not applicable.

5.2 Special equipment or software

Not applicable.

5.3 Identification of hardware and software

Not applicable.

5.4 Calibration-adjustment procedure

Not applicable.

6 Security measures

6.1 Sealing

The following flow sensor sealing is provided:

Manufacturer's seals:

- manufacturer adhesive seal-sticker on the fixing bolt of electronic module and access to the adjustment activation jumper (see Fig.7, pos.1) and on the fixer of the cover protecting electronic module (see Fig.7, pos.2);
- manufacturer adhesive warranty seal-sticker on the bolts of the cover (see Fig.8, Fig.9, Fig.10, Fig.11);

Mounting seal:

- two hanged seals on the fixers of junction of the case and cover of the electronic module (see Fig.7, pos.3) are arranged after installation.

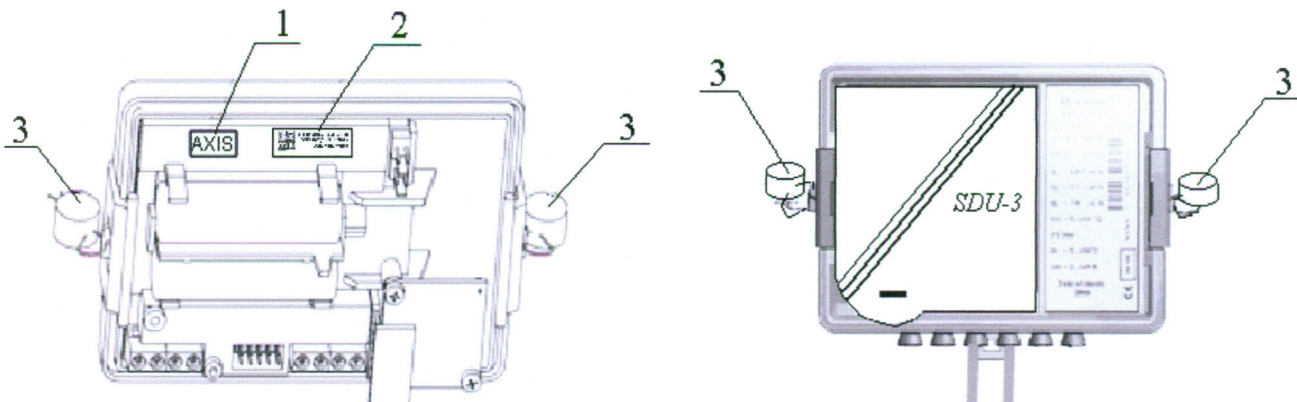


Fig.7. Sealing of the electronic unit for flow sensor SDU-3

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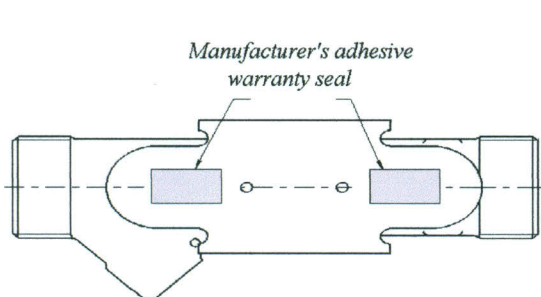


Fig. 8. Sealing of the flow sensor
 $q_p=0,6/1,0/1,5/2,5 \text{ m}^3/\text{h}$

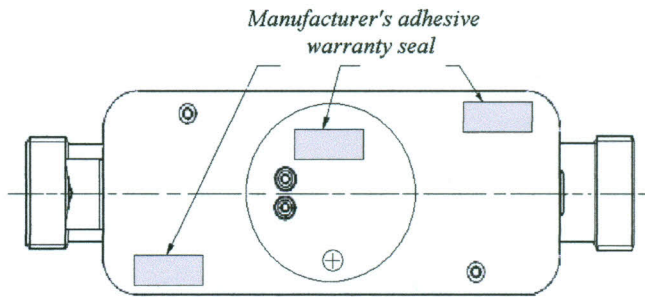


Fig. 9. Sealing of the flow sensor
 $q_p=3,5/6,0 \text{ m}^3/\text{h}$

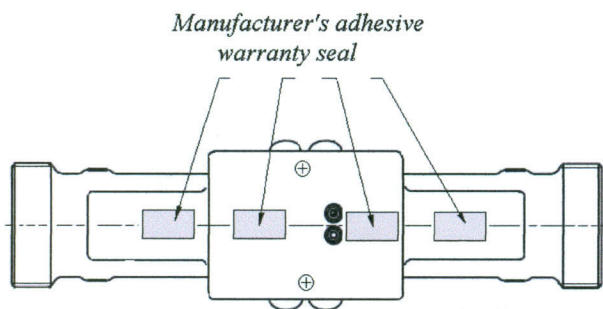


Fig. 10. Sealing of the flow sensor
 $q_p= 10,0 \text{ m}^3/\text{h}$

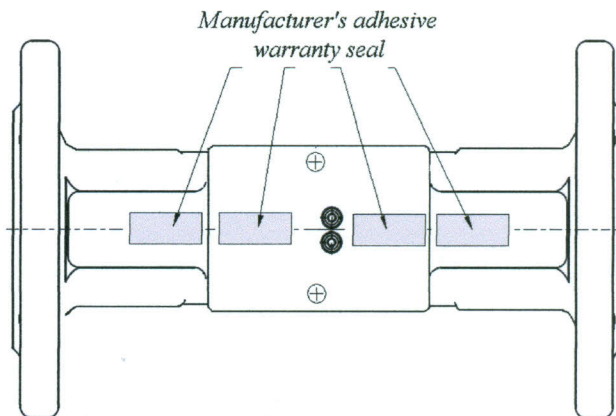
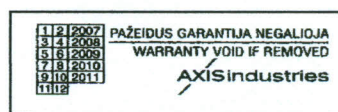


Fig. 11. Sealing of the flow sensor
 $q_p=15,0 \text{ m}^3/\text{h}$



a) Manufacturer security seal – adhesive sticker



b) Manufacturer warranty seal – adhesive sticker

Fig.12. Examples of security seals

6.2 Data logger

Not applicable.

7 Marking and inscriptions

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

The following information shall appear on the type label of the electronic unit of flow sensor:

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- EC-type examination certificate number (LT-1621-MI004-006);
- manufacturer name or his trade mark;
- identity marking (type designation and type number);
- year of manufacture and serial number;
- meter factor (pulse value of volume);
- limits of heat conveying liquid temperature;
- limits of flow-rate: maximum q_s , permanent q_p and minimum q_i ;
- the maximum admissible working pressure;
- accuracy class;
- climatic class;
- electromagnetic class;
- mechanical class.

Arrow to indicate direction of the flow shall appear on the housing of measuring section.

7.2 Conformity marking

In addition, the label of flow sensor 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 Nr.	Date	Description
LT-1621-MI004-006	2011-05-26	Type examination certificate first issued

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