

Axioma Metering UAB

ULTRASONIC WATER METER QALCOSONIC F1 (IP68)



TECHNICAL DESCRIPTION & USER MANUAL
PLF1IP68V04

KAUNAS

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EU DECLARATION OF CONFORMITY	
Axioma Metering UAB herewith declares, that water meter QALCOSONIC F1 complies with the relevant requirements of the following directives:	
2014/32/EU	Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the member states relating to the making available on the market of measuring instruments
2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility
2014/35/EU	Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
2014/53/EU	Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the member states relating to the making available on the market of radio equipment and repealing directive 1999/5/EC
Kaunas, 2018-08-20	
Head of Innovation and Technology Division	
 (signature)	Virgilijus Pamakštis
EU-type examination certificate: LT-1621-MI004-019	
Quality system certificate No: KS-1621-MP-003.18	
Notified body:	
Lithuanian Energy Institute, Laboratory of heat equipment research and testing, Lithuania	
Body No: 1621	

For EU Customers only - WEEE Marking

The device is classified as waste electronic equipment in terms of the European Directive 2012/19/EU (WEEE). Marking of electrical and electronic equipment in accordance with Article 14 (2) of Directive 2012/19/EU



This symbol on the product indicates that it must not be disposed of as unsorted municipal waste. It must be handed over to the applicable take-back scheme for the recycling of electrical and electronic equipment. Observe all local and applicable laws. For more detailed information about the recycling of this product, please contact your local municipal office.



SAFETY INFORMATION

Before beginning installation works you must to read this document and follow its instructions.

The meter is powered from the battery (3.6 V), risk factors during the meter installation and service fluid flowing within flow sensor with inner pressure up to 2,5 MPa and temperature up to 90 °C.

- Only qualified technical personnel may install and maintain water meters. Personnel must be familiar with appropriate technical documentation and general safety instructions. It is necessary to follow general safety requirements during installation and maintenance process.
- Safety guarantees at installation and service of meter is:
 - Reliable insulation of electrical circuits,
 - Hermetic fitting of primary flow and temperature sensors into the pipeline,
 - Reliable fastening of water meter at installation.

Warning! Mounting of the sub-assemblies of water meter is permissible only after ensuring of absence of fluid and pressure in the pipeline.

- Caution: If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- The meter can be used at ambient temperature: 5 °C ... +70 °C
- Storage and transportation temperature: -25°C...70 °C (drained flow part)

1. APPLICATION FIELD

Ultrasonic water meter QALCOSONIC F1 (IP68) is designed for measurement of cold and hot water consumption in households and blocks of flats well as industry.

The meter corresponds to essential requirements of the Technical Regulation requirements Annexes I and MI 001. The meter complies with the requirements of European Standards EN ISO 4064 and requirements of OIML R49-1.

Ordering code combination of the meter :

Meter QALCOSONIC **F1** - - - - -

Type

Temperature class:		Code
T30		1
T30/90		2
T90		3

Connection type and overall length (L):	Code	Connection type and overall length (L):	Code
G 3/4 L =105mm	11	DN40 L =300mm	6F
G 3/4 L =110mm	01	DN50 L =270mm	07
G 3/4 L =165mm	02	DN65 L =300mm (brass)	08
G 1 L =105mm	12	DN65 L =300mm (steel)	8S
G 1 L =110mm	13	DN80 L =350mm (brass)	09
G 1 L =130mm	03	DN80 L =350mm (steel)	9S
G 1 L =190mm	04	DN80 L =350mm (brass)	19
G 1 1/4 L =260mm	05	DN100 L =350mm (brass)	10
G 2 L =300mm	06	DN100 L =350mm (steel)	1S
DN20 L =190mm	4F	DN100 L =360mm (brass)	20
DN25 L =260mm	5F		

Permanent flow rate Q ₃ , m ³ /h	Code	Permanent flow rate Q ₃ , m ³ /h	Code
1,6	1	16	6
2,5	2	25	7
4	3	40	8
6,3	4	63	9
10	5	100	0

The ratio Q ₃ /Q ₁ (R)	Code
R 250	1
R 400	2

Communication module:	Code	Communication module:	Code
none	0	MODBUS RS485	5
M-bus	1	LON	6
CL	2	MiniBus	7
RF module 868 MHz	4		

IP class and temperature measurement function:	Code
IP68, without temperature measurement	6
IP68, with temperature measurement	7

Supply type and pulse inputs/outputs	Code
Battery, without pulse inputs/outputs	1
Battery, with pulse inputs/outputs	2
24V AC/DC, without pulse inputs/outputs	3
24V AC/DC, with pulse inputs/outputs	4

2. TECHNICAL DATA

Permanent flow rate Q_3 , flow rate ratio Q_3/Q_1 (R), overload flow rate Q_4 , minimum flow rate Q_1 , transitional flow rate Q_2 , threshold value in m^3/h , end connections type, overall length (L) and pressure losses class ΔP are presented in 1.1 table.

1.1 Table

Q_3 , m^3/h	R Q_3/Q_1	Q_4 , m^3/h	Q_1 , m^3/h	Q_2 , m^3/h	Threshold value, m^3/h	Joining to the pipeline (Thread – G, flange–DN)	Overall length L, mm	ΔP (bar x 100)
1,6	R250	2	0,0064	0,01	0,003	G3/4"	105,110, 165	ΔP 63 or ΔP 25
						G1"	105,110	ΔP 63 or ΔP 25
						G1"or DN20	190	ΔP 25
2,5	R250	3,125	0,01	0,016	0,005	G3/4"	105,110, 165	ΔP 63
						G1"	105,110	ΔP 63
						G1"	130	ΔP 25
						G1"or DN20	190	ΔP 25
2,5	R400	3,125	0,0063	0,01	0,003	G3/4"	105,110, 165	ΔP 63
						G1"	105,110	ΔP 63
						G1"or DN20	190	ΔP 25
4	R250	5	0,016	0,026	0,008	G1"or DN20	190	ΔP 63 or ΔP 25
						G1"	130	ΔP 63
4	R400	5	0,01	0,016	0,005	G1"	130	ΔP 63
						G1"or DN20	190	ΔP 63 or ΔP 25
6,3	R250	7,875	0,0252	0,04	0,012	G1"or DN20	190	ΔP 63
						G1 1/4"or DN25	260	ΔP 25
6,3	R400	7,875	0,016	0,026	0,008	G1"or DN20	190	ΔP 63
10	R250	12,5	0,04	0,064	0,02	G1 1/4"or DN25	260	ΔP 63
						G2"or DN40	300	ΔP 25
10	R400	12,5	0,025	0,04	0,012	G1 1/4"or DN25	260	ΔP 63
16	R250	20	0,064	0,1	0,03	G2"or DN40	300	ΔP 63
						DN50	270	ΔP 25
16	R400	20	0,04	0,064	0,02	G2"or DN40	300	ΔP 63
25	R250	31,25	0,1	0,16	0,05	DN50	270	ΔP 63
						DN65	300	ΔP 25
25	R400	31,25	0,063	0,1	0,03	DN50	270	ΔP 63
40	R250	50	0,16	0,26	0,08	DN65	300	ΔP 63
						DN80	300, 350	ΔP 25
40	R400	50	0,1	0,16	0,05	DN65	300	ΔP 63
63	R250	78,75	0,252	0,4	0,12	DN80	300, 350	ΔP 63
						DN100	350, 360	ΔP 25
63	R400	78,75	0,16	0,26	0,08	DN80	300, 350	ΔP 63
100	R250	125	0,4	0,64	0,2	DN100	350, 360	ΔP 63
100	R400	125	0,25	0,4	0,12	DN100	350, 360	ΔP 63

Temperature classes:

T30 (0,1...30 °C)
T30/90 (30...90 °C)
T90 (0,1...90 °C)

Flow profile sensitivity class:

U5 D3 (for DN65, DN80, DN100)
U0 D0 (for other sizes of meters)

Mechanical environment class:

M1

Electromagnetic environment class:

E2

Ambient temperature:

5 °C...+70 °C

Environmental class:

B

Transportation conditions:

-25 °C...+65 °C

Relative humidity:

< 98 % (condensing)

Reverse flow:

allowed, displayed, but not measured

Firmware version **0.08**
 Behavior of the meter, when the flow rate exceeds the maximum Q value
 $Q \leq 1,2Q_4$ linear
 $Q > 1,2Q_4$ limit $1,2Q_4$, The error „Maximum allowable value of flow rate is exceeded“ is registered and duration of error is calculated.

Protection class IP68
 Volume measurement unit's m^3
 Resolution of a displaying device $0,001 m^3$
 Displaying range $99999,999 m^3$

The maximum permissible error (MPE), on volumes delivered at flow rate between the transitional flow rate Q_2 (included) and the overload flow rate Q_4 (included) is:

- When water temperature $\leq +30 \text{ }^\circ\text{C}$ $\pm 2 \%$
- When water temperature $> +30 \text{ }^\circ\text{C}$ $\pm 3 \%$

The maximum permissible error (MPE), on volumes delivered at flow rate between the minimum flow rate Q_1 (included) and the transitional flow rate Q_2 (excluded) for water having any temperature is: $\pm 5\%$

Maximum admissible working pressure 16 bar (MAP 16), 25 bar (MAP 25)

Pulse inputs (additional):

Number of pulse inputs 2
 Measurement unit's m^3
 Pulse value programmable
 Type of pulses IB by LST EN1434-2
 Maximum permissible frequency of input pulses 3 Hz
 Maximum permissible voltage of input pulses 3,6 V
 Condition of maintenance of high level 3,6V via 3,3M $\square\square$ resistor

Display (LCD):

The device is equipped with 8-digits LCD (Liquid Crystal Display) with special symbols to display parameters, measurement units and operation modes

The following information can be displayed: integral and instantaneous measured parameters, and archive data, and device configuration information listed in p.6.3.

Display resolution of volume: $00000,001 m^3$

If internal battery is discharged or disconnected - all integral values and archive data are stored for at least 15 years and can be accessed by connecting the working condition of the battery power.

Data registration and storage:

Every hour, day and month values of the measured parameters are stored in memory of the meter

All data from archive can be read only by means of the remote reading (see p.6.5)

In addition data logger records of monthly parameters can be seen on the display (see p. 6.3.1)

Following hourly, daily and monthly parameter values are recorded in water meter memory:

Total volume (possibility for special ordering)
Forward volume
Revers volume (possibility for special ordering)
Integrated pulse value in pulse input 1
Integrated pulse value in pulse input 2
Maximum flow rate value and date
Maximal temperature and date (if used)
Minimal temperature and date (if used)
Operating time without an error
Total error code
Time when the flow rate exceeded $1.2 Q_4$
Time when the flow rate was less than Q_1

Data logger capacity:

- up to 1480 h – for hourly records.
- up to 1130 days - for daily records,
- up to 36 last months - for monthly records,

Archive data storage time not less than 36 months

Storage time of measured integrated parameters even if device is disconnected from power supply not less than 16 years.

External communication modules and interfaces

Optical interface

Integrated into the front panel of calculator. It is designed for data reading via M-bus protocol and parameterizing of the meter. In addition, optical interface is intended for output pulses control in verification mode "TEST". It is activated by a magnetic button (After 5 minutes of the end of the communication or after pressing the button - automatically switch off).

Optional plug in communication modules:

M-Bus module
CL
LON
MODBUS RS485
RF-module 868 MHz
MiniBus

Communication modules are designed for data reading via M-bus protocol and parameterization of the meter. If meter is powered from internal battery - the total working time of serial communication interface is limited up to 200 minutes per month (for protection of the battery against premature discharge). Unused limit of communications are summarized. The interface is blocked after the expiration of a limit and only after change of the hour, the new time limit of communications will be given (for 16 seconds for each next hour).

Pulse outputs:

2 (OB-normal mode, OD-test mode)
Type: open collector, permissible current up to 20mA, voltage up to 50V.
Pulse duration: 125 ms – in the normal operating mode, 1.2 ms – in the test mode

Pulse values on pulse output device in the operating mode as specified in the table below:

Permanent flow rate $Q_3, m^3/h$	1,6 ... 6,3	10 ... 100
Pulse value, l/pulse	1	10

Temperature measurement (additionaly, by special order)

Temperature measuring ranges 0 °C...60 °C (by order 0 °C...180 °C)
Temperature sensor type: Pt500 by EN60751
2-wire connection method, cable length: up to 5 m

Power supply (one of following, dependently on meter configuration):

-AA battery 3,6 V 2,4 Ah (Li-SOCl₂) battery, exploitation time at least 16 years (if pulse outputs are used for at least 11 years),
-12...42 V DC or 12...36 V 50/60Hz AC external power supply, used current 20 mA and back up battery AA 3,6 V (Li-SOCl₂), exploitation time at least 16 years (without reading data through digital interfaces).

Mechanical data :

Dimensions of flow sensors According to Annex B
Dimensions of calculator, not more than 117 mm x 44 mm x 89,5 mm
Weight:

End connections (overall length)	Weight of meter, not more than, kg
G3/4" (105, 110 mm)	0,7
G3/4" (165 mm)	0,7
G1" (105,110, 130 mm)	0,8
G1" (190 mm)	0,9
DN20 (190 mm)	2,5
G1 1/4"	3,2
DN25	5,6
G2"	3,7
DN40	6,8
DN50	8,5
DN65	10,5
DN80	13,5
DN100	14

3. OPERATING PRINCIPLE

The flow measuring principle is based on ultrasonic measurement method. The ultrasonic signal along the measuring section moves many times before, and the flow downstream between the ultrasonic sensors have to perform transmitter and receiver functions. From the resulting time difference the flow rate is calculated.

The calculator calculates the volume of water integrating the measured flow rate during the time and indicates the data in display.

Water meter calculator provides all the necessary measurement and data storage functions. Below are the most important:

- High stability in measuring water volume and detection characteristics of overload;
- Calculation of the maximum values and their storage in archive;
- Storage of data required for reporting annually and monthly date to be determined; set day parameter values
- Archive data storage time 36 months, including the calculated volume and tariff register;
- Detection of errors and leakage detection;
- Displaying of values of parameters (optional) and displaying of faults
- Verification and service functions.

4. MARKING AND SEALING

4.1. Marking

Marking of Calculator

There are following information on the front panel of the calculator of the meter - manufacturer's trade mark, distributor's logo (if applicable), type of meter, EC-type examination certificate number, serial number, year of manufacture, electromagnetic and mechanical environmental class, permanent flow Q_3 and ratio $R(Q_3/Q_1)$, maximum admissible working pressure and voltage level for external power supply, end connections of the flow sensor.

Marking of Flow sensors

There are following information on the flow sensor:

Arrow for indication of a flow direction on flow sensor brass body.

Additional metal label is attached to the steel body of the meter flow sensors DN65/DN80/DN100. On the label is the following information: Nominal diameter DN; serial number; year of manufacture; manufacturer's trade mark and arrow for indication of a flow direction.

4.2. Security seals

Sealing of Calculator

The following water meter calculator sealing is provided:

- Manufacturer's adhesive seal-sticker on the access to the adjustment activation jumper (see Annex C, Fig.C1, pos.1).
- Manufacturer's adhesive seal-sticker on the fixer of the cover protecting electronic module (see Annex C, Fig.C1, pos.2).
- After installation the cover of the calculator are sealed with 2 hanged mounting seals (see Annex C, Fig.C1, pos.3)

Sealing of flow sensors

The following water meter flow sensor sealing is provided:

- Manufacturer's adhesive seal-sticker on the bolts of the cover (see Annex C, Fig.C2,a; b; c and d)
- Manufacturer's hanged seals on ultrasonic transducers by steel body (see Annex C, Fig.C2,e)

The meter must be sealed to ensure that after the installation, it is not possibility of dismantle, remove or altering the meter without evident damage on the meter or the seal.

5. INSTALLATION

5.1. Basic requirements

Before installing the device:

- check if all parts listed in the documentation are available,
- check if there are no visible mechanical defects,
- check if there are valid labels of manufacturer and certification authority.

Only qualified personnel may install the equipment, following the requirements listed in this document, in technical documentation of other system components and in water meter installation project

It is forbidden to wire signal cables nearby (less than 5 cm) with power cables or cables of other devices. It is forbidden to change length of a cable.

5.2.1. Electrical wiring

5.2.1. Connection of external power supply

If the meter is powered from the external power source, the meter's power cable must be connected to the power source, as shown in Annex A, Figure A1

5.2.2. Connection of additional communication modules and pulse input / output devices

Communication modules or pulse input / output cables are permanently connected to the meter. For connecting cables to the secondary equipments see Annex A, Figure A1 and Table A1.

It is forbidden to wire signal cables nearby (less than 5 cm) with power cables or cables of other devices.

5.3 Mounting

Water meter may be installed in heated premises, working ambient temperature shall be not more than 70 ° C.

Sizes and mounting dimensions of flow sensors are provided in Annex B.

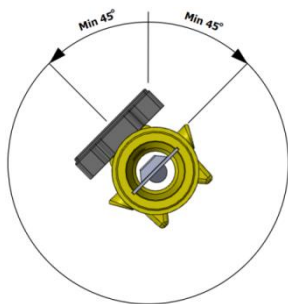
Requirements for flow sensor installation in pipeline:

For flow sensors of the heat meter with nominal diameter DN65 to DN100 necessary straight pipeline length in upstream direction are $\geq 5 \times DN$ and in downstream direction - $\geq 3 \times DN$. For flow sensors of other sizes the straight pipelines installation in upstream and downstream are not necessary.

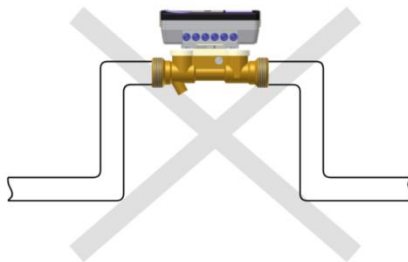
Avoid the flow sensor installation near after the pumps which can cause cavitations.

Flow sensor can be mounted in horizontal, vertical or inclined positions in return or flow. Necessary condition in normal working mode: pipeline must be under pressure and fully filled with heat conveying liquid.

The location and position of the flow sensor must be selected in such a way as to reduce the risk of accumulation of air bubbles in the zone of ultrasonic sensors (Fig. 5.1).



a) Permissible installation position



b) The installation position is prohibited.
(the air bubbles may accumulate)

Fig.5.1. Mounting Position of the flow sensors qp 3,5 m³/h... qp 60 m³/h


The direction of the sensor installation (is indicated with the arrow on the label of flow sensor) must match with the flow direction in pipeline.

Before installing the flow sensor, rinse the pipe well; mount the spacer for this purpose.

The flange gaskets must match with the pipe diameter. During the installation gasket must be exactly centered with the center of the pipe cross-section to avoid sticking out gaskets inside the pipe.

6. OPERATION

6.1. Control

The LCD information can be displayed and controlled by magnetic button, located at the top of the calculator (placing and removing the magnet on the area, marked with symbol )



Control button (magnetic)

6.2. Display function

The calculator of water meter is equipped with 8-digits LCD (Liquid Crystal Display) with special symbols to display parameters, measurement units and operation modes.



Destination of the special symbols:

- - the flow is flowing forward (right direction)
- ← - the flow is flowing backwards
- arrow is not displayed - the flow does not flow

Destination of the other symbols are described in sections 6.3.1...6.3.3

The following information can be displayed:

- integral and instantaneous measured parameters,
- archive data and set day data,
- device configuration information,

6.3. Menu structure

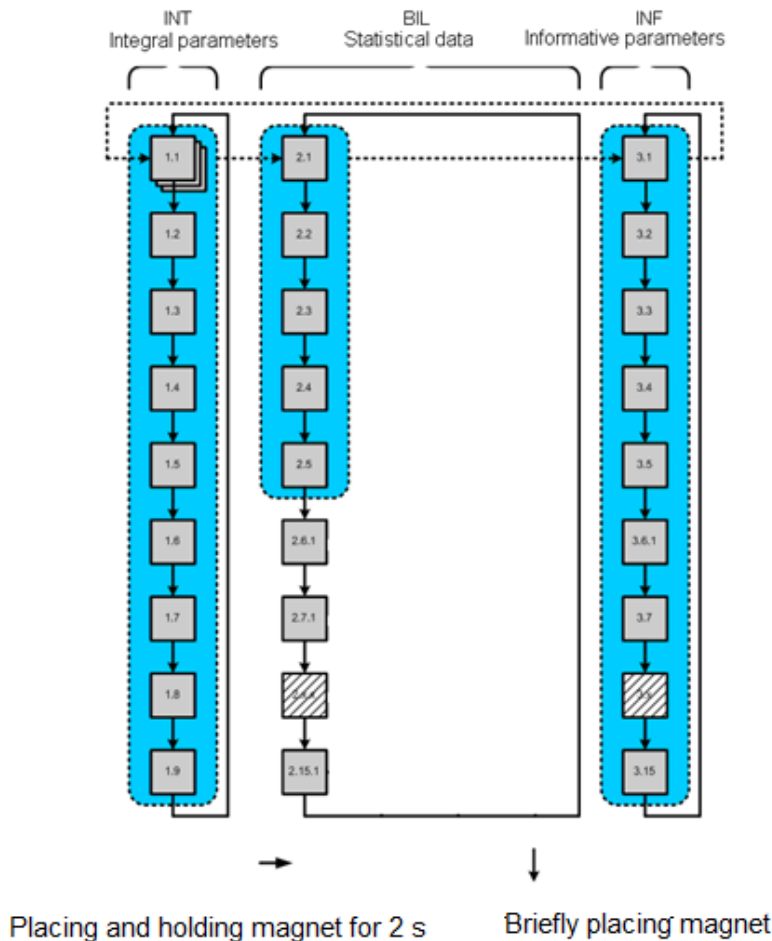
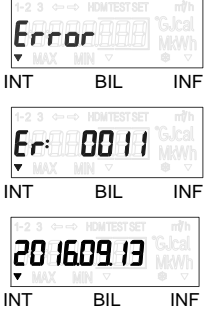


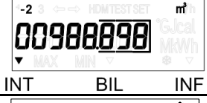
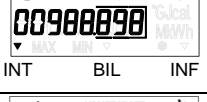

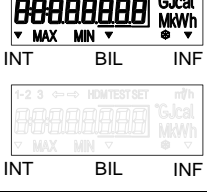









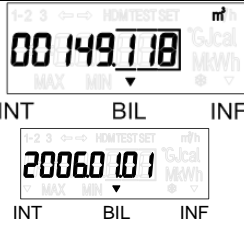
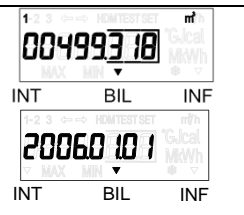
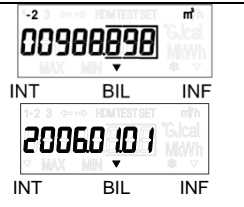
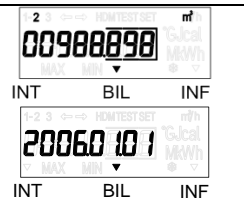
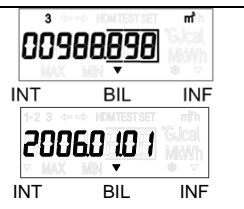
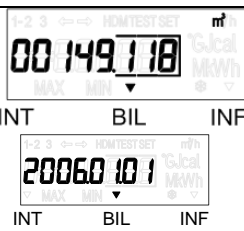
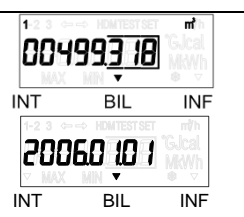
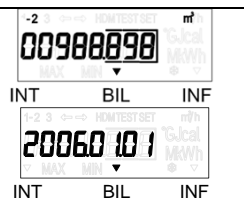
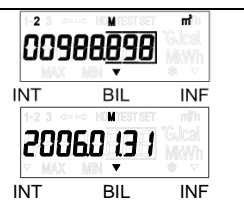
Fig. 6.1. The menu structure.



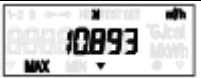












The menu structure in a normal operating mode is presented in the Fig 6.1. Integral parameters values (1.2) or– if at least one error has been detected – error codes (1.1) are displayed if the button has not been activated for more than 60 seconds. After 60 seconds past the LCD is automatically switching to permanent display mode (p. 6.3.1).









6.3.1. Viewing the readings in normal mode (Users menu)

Remark: Here the full list of shown parameters is represented. For the specific meter it can be reduced

ID	Parameter	Value	Description
1.1	Error code with data stamp of starting of error <i>Displayed only when an error occurs in meter work</i>	 INT BIL INF	All three displays, will be displayed in turns in one second interval . Description of Error codes is presented in p. 6.3.3
1.2	Volume	 INT BIL INF	Total volume – if revers volume mode is activ
1.3	Forward volume	 INT BIL INF	If revers volume mode is activ
1.4	Revers volume	 INT BIL INF	Possibility for special ordering
1.5	Volume of 1-st additional pulse input	 INT BIL INF	
1.6	Volume of 2-nd additional pulse input	 INT BIL INF	
1.7	Segment test	 INT BIL INF	Changes each 1 second
1.8	Working hours without error	 INT BIL INF	
1.9	Customer number	 INT BIL INF	Corresponds to a wire transmission via MBus protocol
1.10	Control number	 INT BIL INF	
1.11	Error code	 INT BIL INF	If parameter 1.1 not indicated
1.12	Flow rate	 INT BIL INF	
1.13	Next replacement date of the battery	 INT BIL INF	
1.14	Temperature of water (if used)	 INT BIL INF	

2.1	Volume on set day with date stamp		Total volume on set day – if revers volume mode is activ. Changing with date stamp every 1 second
2.2	Forward volume on set day with date stamp		If revers volume mode is activ. Changing with date stamp every 1 second
2.3	Revers volume on set day with date stamp		Possibility for special ordering. Changing with date stamp every 1 second
2.4	Volume of 1-st additional pulse input on set day with date stamp		Changing with date stamp every 1 second
2.5	Volume of 2-nd additional pulse input on set day with date stamp		Changing with date stamp every 1 second
2.6	Volume of previous month with date stamp		The same as in p 2.6. Changing with date stamp every 1 second
2.7	Forward volume of previous month with date stamp		Total volume of previous month – if revers volume mode is activ. Changing with date stamp every 1 second
2.8	Revers volume of previous month with date stamp		If revers volume mode is activ. Changing with date stamp every 1 second
2.9	Volume of 1-st additional pulse input of previous month with date stamp		Possibility for special ordering. Changing with date stamp every 1 second

2.10	Volume of 2-nd additional pulse input of previous month with date stamp	 	The same as in p 2.6. Changing with date stamp every 1 second
2.11	Maximum flow rate of previous month with date stamp	 	Changing with date stamp every 1 second
2.12	Maximum temperature of previous month with date stamp (if used)	 	Changing with date stamp every 1 second
2.13	Minimum temperature of previous month with date stamp (if used)	 	Changing with date stamp every 1 second
2.14... 2.294	The data of previous months with date stamp (up to 36 previous months)	By analogy ID 2.6 ... 2.13	During installation of the meter, it is possible to choose: to display the data of the previous month only, to display the data of the last two months or to display the data of all 36 previous months *
3.1	Flow rate		
3.2	Temperature (if used)		
3.3*	Next replacement date of the battery		
3.4*	Real time calendar		
3.5*	Real time clock		
3.6*	Yearly set day		
3.7*	Monthly set day		
3.8*	1st pulse input/output configuration	Input:	Inputs/outputs: Can be configured for a quantity of water (m ³) only. Maximum pulse

		 Output: 	resolution is displayed 0.00001 m ³ .
3.9*	2nd pulse input/output configuration	Similarly to 3.8, only „1“, changes in the „2“	
3.10*	Customer number		Are transferred on telegram Mbus
3.11	Software version number		
3.12	Serial number		
3.13*	Mbus adress		
3.14	Working hours without error		
3.15*	Battery operation time		

* Configuration is possible via optical interface and in conjunction with the special configuration programme in a test mode.
In the same way it is possible to switch off indication of irrelevant parameters.

6.3.2. Viewing the readings in TEST mode (Service menu)

The menu structure in a test mode is presented in the Fig 6.2

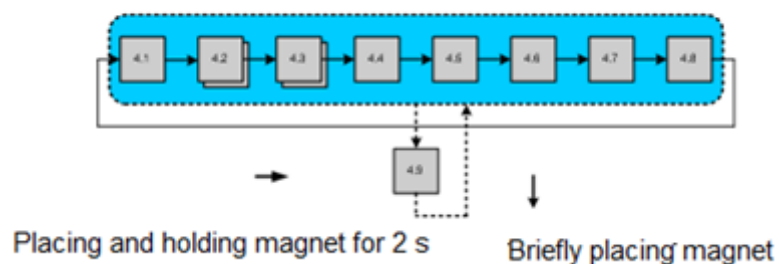

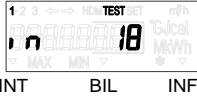




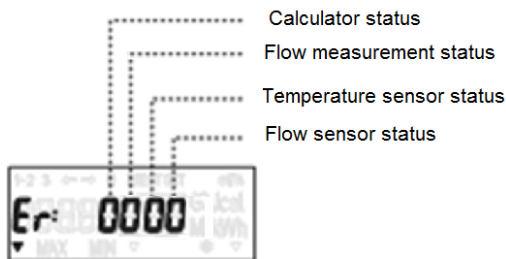
Fig. 6.2. Menu structure in a test mode

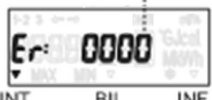
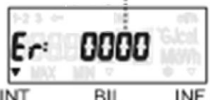
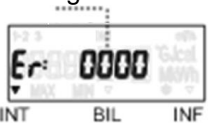
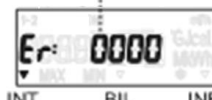
Viewing the readings in verification (test) mode (Service menu):

ID	Parameter	Value	Remark
4.1	High-resolution integrated volume	 00 149 118 INT BIL INF	
4.2	Number of pulses of 1st pulse input	 1 00000 18 INT BIL INF	
4.3	Number of pulses of 2nd pulse input	 448 INT BIL INF	
4.4	High-resolution flow rate	 10893 INT BIL INF	

6.3.3. Error codes

Error code may consist from up to 4 symbols.



Code	Description
1st digit 	0- no error, normal operation 1- air in the measuring section 2- flow flows in an reverse direction 4- flow rate greater than 1.2·Q ₄ (are displayed q=1,2 Q ₄)
2nd digit 	0- no error, normal operation 4- short circuit C- open circuit
3rd digit 	0 - normal operation 1 – leakage (q > 0 more then 24 h) 2 - burst (q > 0,2·Q ₃ more then > 0,5 h) 4- the battery was disconnected
4th digit 	0 - no error, normal operation 1 - warning – ending battery life (less than 6 months left) 8- electronics failure

Active error codes are added and simultaneously displayed, if it is detected more than one error

- 3 - corresponds errors 2 + 1
- 5 - corresponds errors 4 + 1
- 7 - corresponds errors 4 + 2 + 1
- 9 - corresponds errors 8 + 1
- A - corresponds errors 8 + 2

- B - corresponds errors 8 + 2 + 1
- C - corresponds errors 8 + 4
- D - corresponds errors 8 + 4 + 1
- E - corresponds errors 8 + 4 + 2
- F - corresponds errors 8 + 4 + 2 + 1

In a case when value at least one digit of error code is ≥ 8 - calculation of thermal energy and summation of volume of water and operation time without errors are stopping

In the case of the flow sensor error "4" - duration of time, "when the flow rate $q > 1.2 \cdot Q_4$ " is registered in addition.

6.4. Activation of test (verification) mode

In test mode it is possible to achieve precise results within short measuring time.

Using an optical head and QALCOSONIC HEAT 1 v01r150 software the meters verification mode (TEST) is activated. Optical head should be connected to the computer COM interface.

After opening the program startup window ("Actual") computer port number (to which optical head is connected) is entered in the field "Port". Click button "Open port". Briefly place the magnet on the meter calculator (on the area, marked with symbol " \blacktriangleleft "). The optical head is placed on the meter.

Select menu item "Testing" and click button "USER Test On/Off" in the new window. If the operation succeeded, the additional window on the computer display appears with note "Operation done" and inscription "TEST" appears on the meter display.

The calculation process is stopped and all integral parameter values are saved in the memory. After return to normal mode, the original values from before the test are displayed again.

The readings of meter in verification (test) mode are presented in p. 6.3.2

LCD resolution in verification mode „TEST“ is 00,000001 m³

Volume pulse values in verification mode „TEST“ are presented in Table 6.1

6.1 table

Permanent flow rate Q_3 , m ³ /h	Volume pulse value, l/pulse
1,6	0,002
2,5	0,004
4	0,005
6,3; 10	0,02
16; 25; 40	0,05
63; 100	0,2

Ending of verification mode

The test mode is disabled using an optical head and QALCOSONIC HEAT 1 v01r150 software (or automatically after 24 hours after the end of the communication via the optical interface).

After leaving test mode, previously recorded integral parameter values are displayed.

6.5. Remote data reading

6.5.1. For data transmission from meter it can be used optical interface (EN 62056-21). The optical head is placed on the calculator and is connected to interface of reading device.

In addition for remote reading of data can be used two pulse outputs, or one of the following communication modules:

- M-Bus
- CL (Current loop)
- RF-module 868 MHz
- LON
- MODBUS RS485
- MiniBus

All communication interfaces does not affect the measured parameters and their calculation, and therefore can be replaced by another type without removing of verification seal.

Data collection from meters can be realized via PC, via telephone modem, via GSM modem, via Internet, and so on.

7. VERIFICATION

Metrological control of meter parameters is performed according to requirements defined in EN 4064.

8. TRANSPORTATION AND STORAGE REQUIREMENTS

Packed meters may be transported in any type of covered vehicle. Equipment should be anchored reliably to avoid shock and possibility to shift inside vehicle.

Meters should be protected against mechanical damage and shock.

No aggressive chemical substances should be stored together because of corrosion hazard.

9. WARRANTY

Manufacturer gives the warranty that meter parameters will meet the technical requirements, listed in the paragraph 2 of this document, if transportation, storage and operation conditions will be followed.

Warranty period - 12 months from bringing into operation, but not more than 18 months from manufacturing date.

Manufacturer's address:

UAB "Axioma Metering", Kulautuvos g. 45a, Kaunas LT-47190, Lithuania
tel. +370 37 360234; fax. +370 37 360358.

Annex A

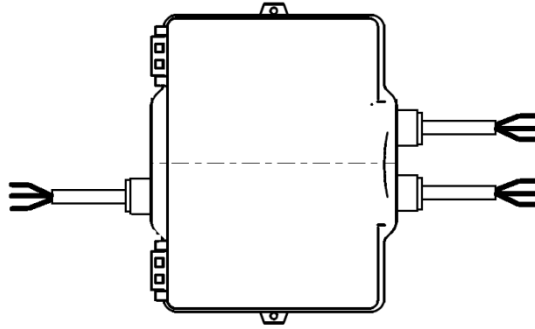


Fig.A1. Cables connection of QALCOSONIC F1.
1, 2 or 3 cables (lenth 1,5m).

Color of cable wire	Destination
Mbus digital interface (2-wire cable)	
white	Mbus line
brown	Mbus line
CL digital interface (2-wire cable)	
white	CL line CL+
brown	CL line CL-
MODBUS RS485 digital interface (4-wire cable)	
white	RS485 digital line +
brown	RS485 digital line -
green	12-24 V AC/DC power supply for MODBUS RS485 interface
yellow	12-24 V AC/DC power supply for MODBUS RS485 interface
LON digital interface (4-wire cable)	
white	LON digital line A
brown	LON digital line B
green	12-24 V AC/DC power supply for LON interface
yellow	12-24 V AC/DC power supply for LON interface
MiniBus digital interface (2-wire cable)	
white	MiniBus line +
brown	MiniBus line -
Pulse inputs-outputs (4-wire cable)	
white	1st additionl pulse input/output (In/Out1) +
brown	1st additionl pulse input/output GND (-)
green	2nd additionl pulse input/output (In/Out1) +
yellow	2nd additionl pulse input/output GND (-)
Pulse inputs-outputs (2-wire cable)	
white	1st additionl pulse input/output (In/Out1) +
brown	1st additionl pulse input/output GND (-)
External power supply for meter (2-wire cable)	
white	External power supply (24 V AC/DC)
brown	External power supply (24 V AC/DC)

Fig.A2 . Cables destination of QALCOSONIC F1

Annex B

Sizes and dimensions of water meter (IP68)

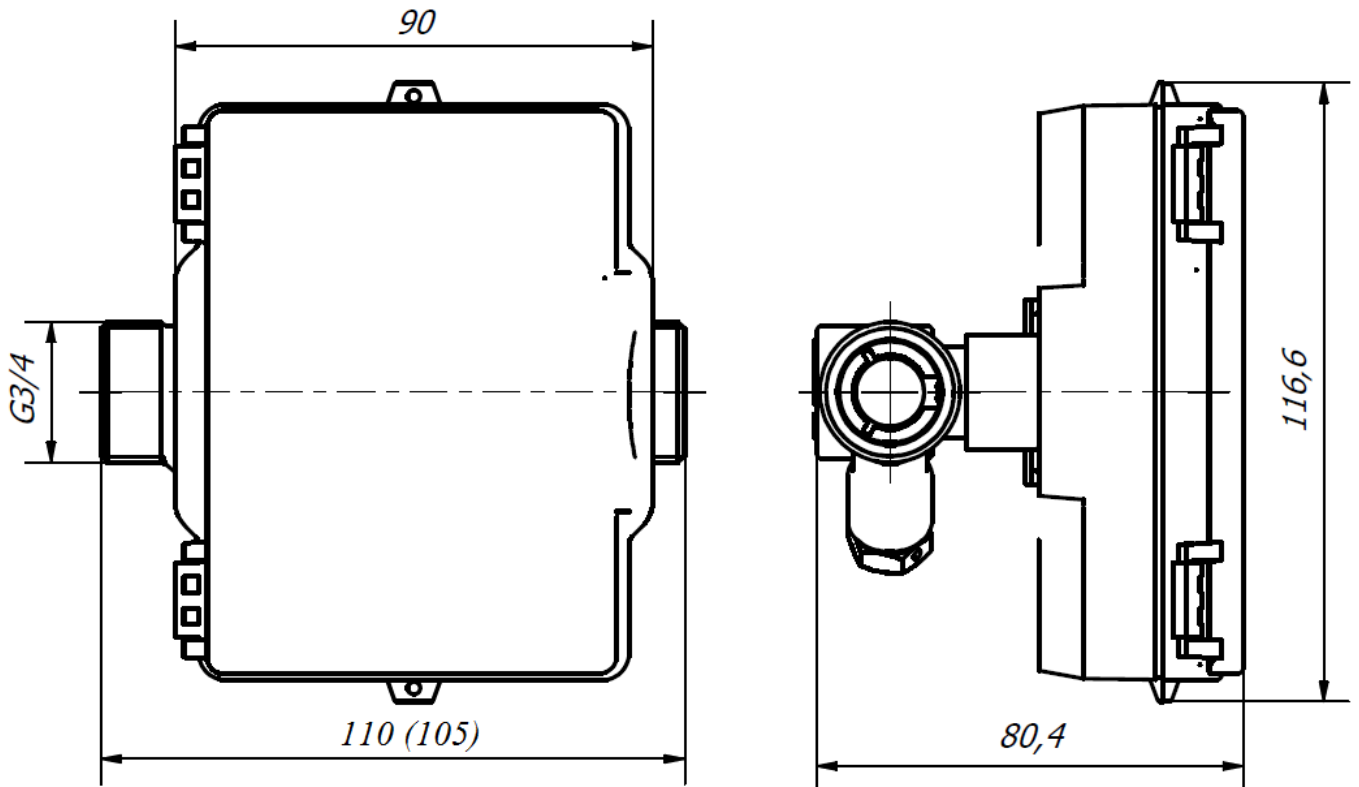


Fig.B1. Threaded end connections G3/4", mounting length L=110 mm (or L=105 mm)

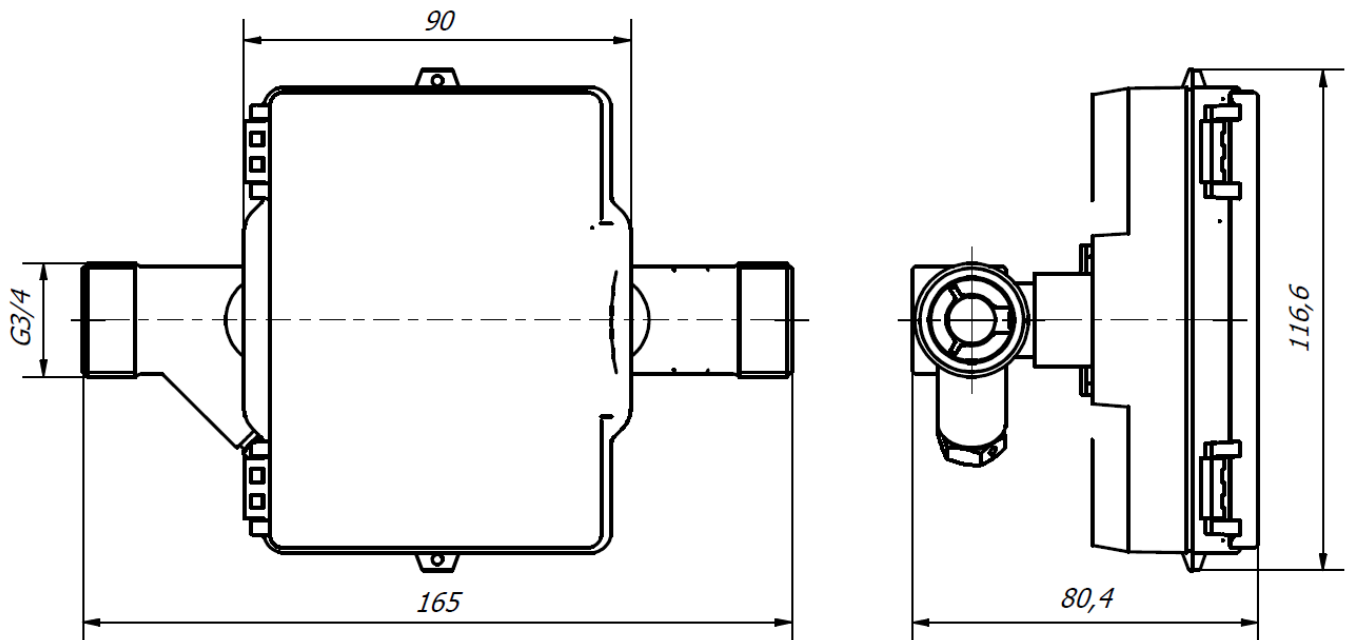


Fig.B2. Threaded end connections G3/4", mounting length L=165 mm.

Annex B (continued)

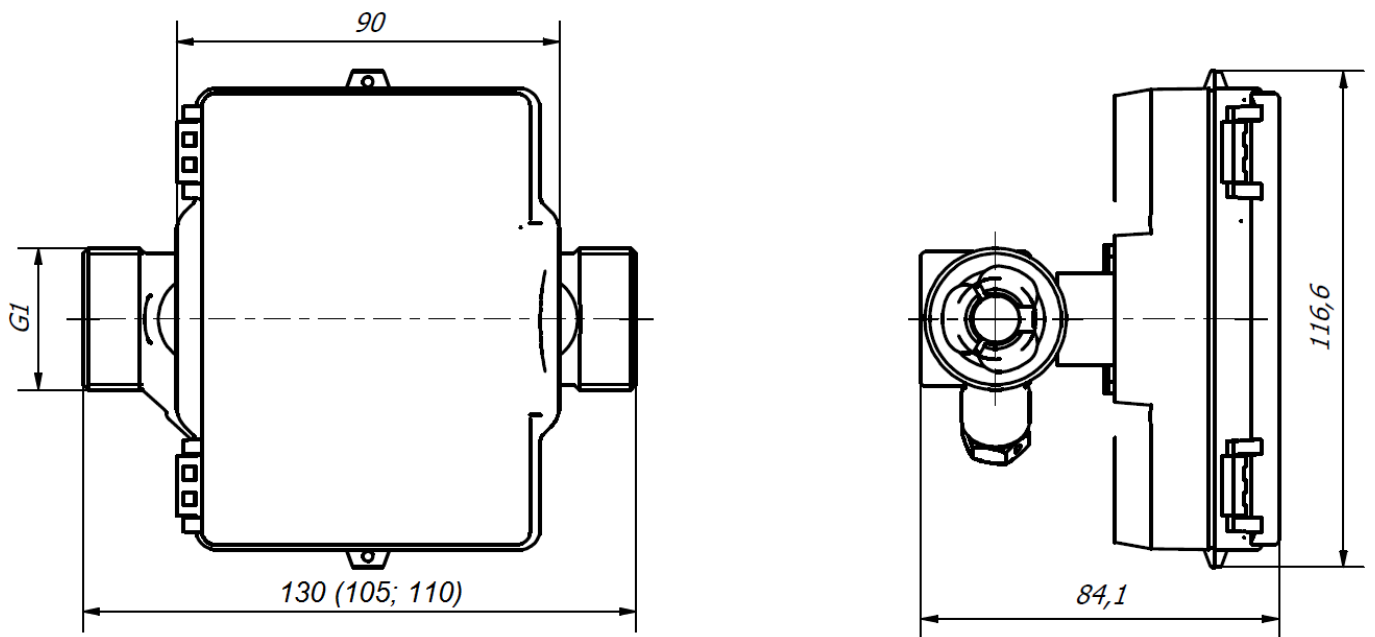


Fig.B3. Threaded end connections G1", mounting length L=130 mm (or L=105 mm, or L=110 mm).

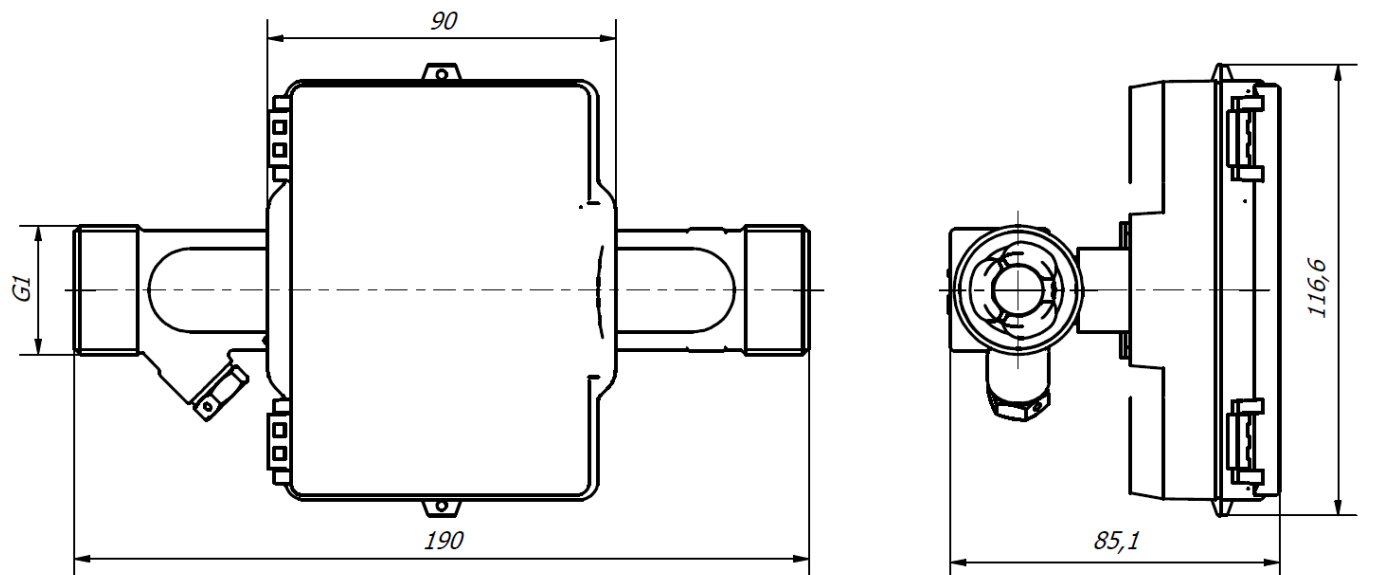


Fig.B4. Threaded end connections G1", mounting length L=190 mm.

Annex B (continued)

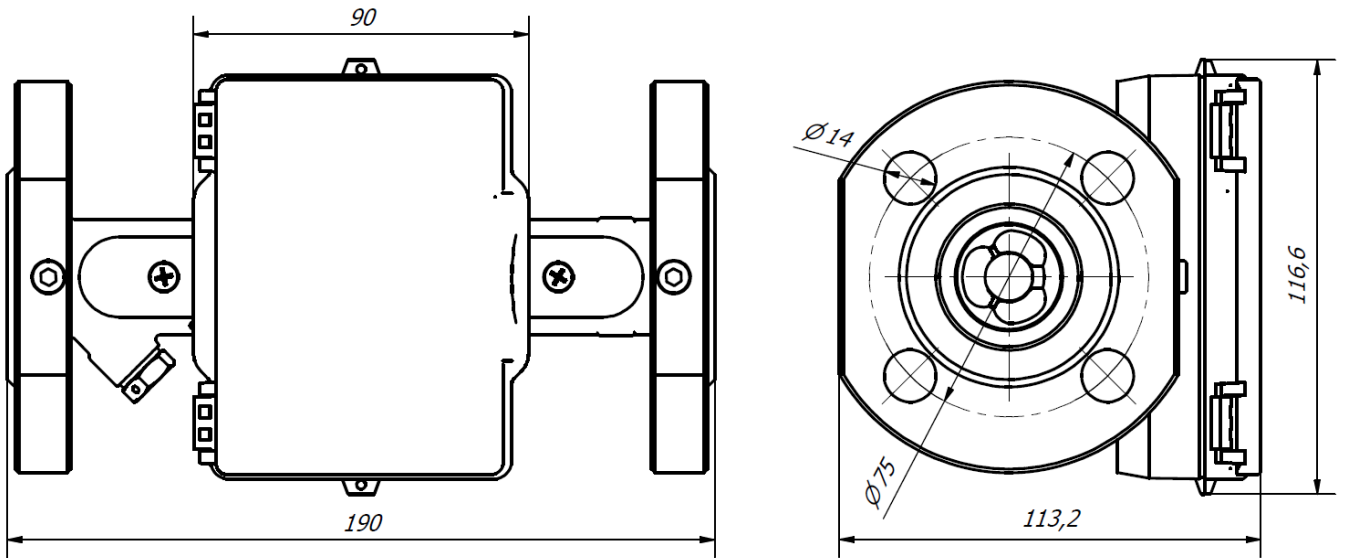


Fig.B5. Flanged end connections DN20, mounting length L=190 mm

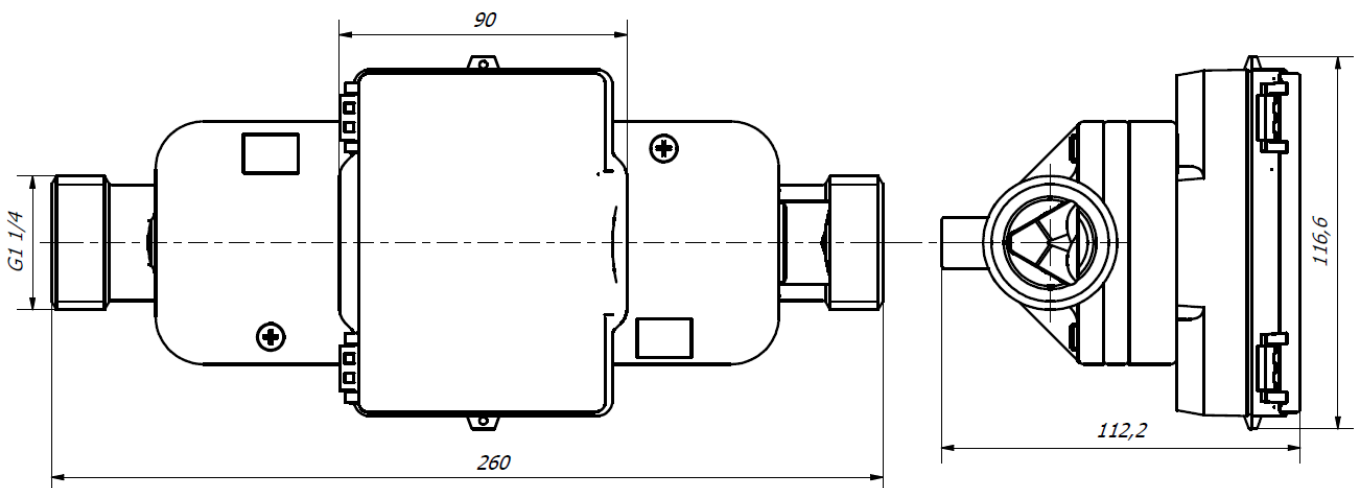


Fig.B6. Threaded end connections G1 1/4", mounting length L=260 mm.

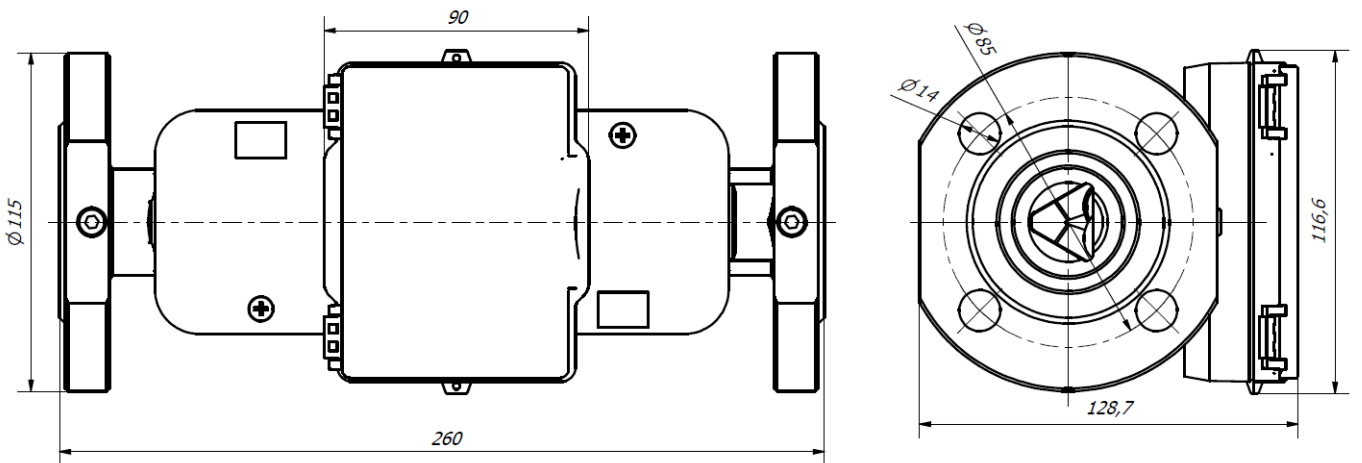


Fig.B7. Flanged end connections DN25, mounting length L=260 mm

Annex B (continued)

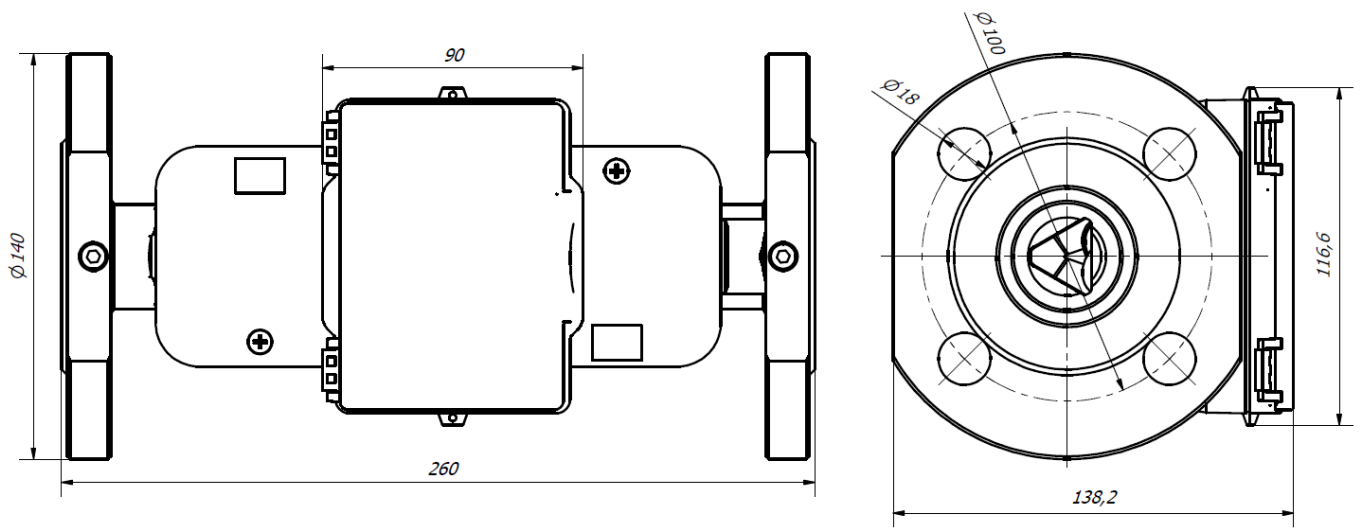


Fig.B8. Flanged end connections DN32, mounting length L=260 mm

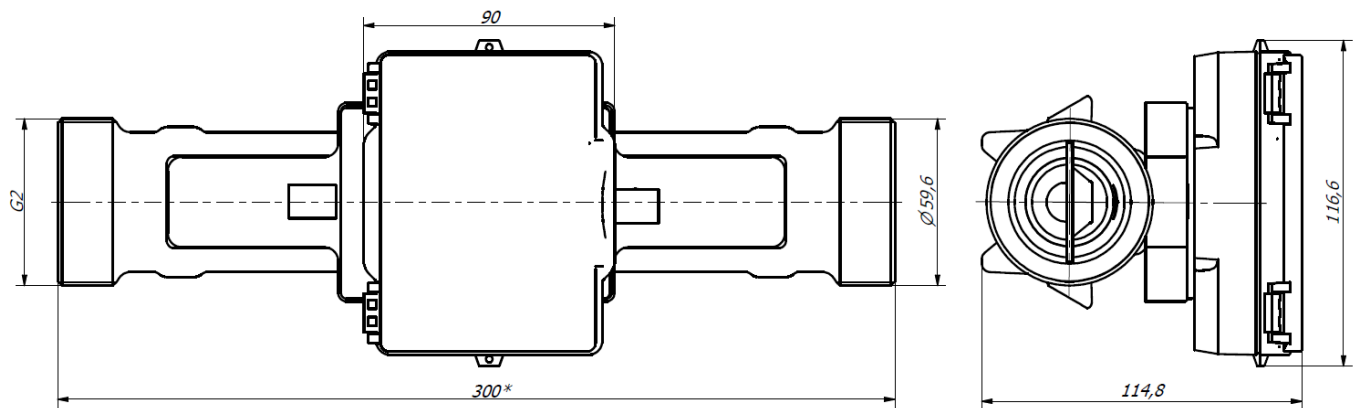
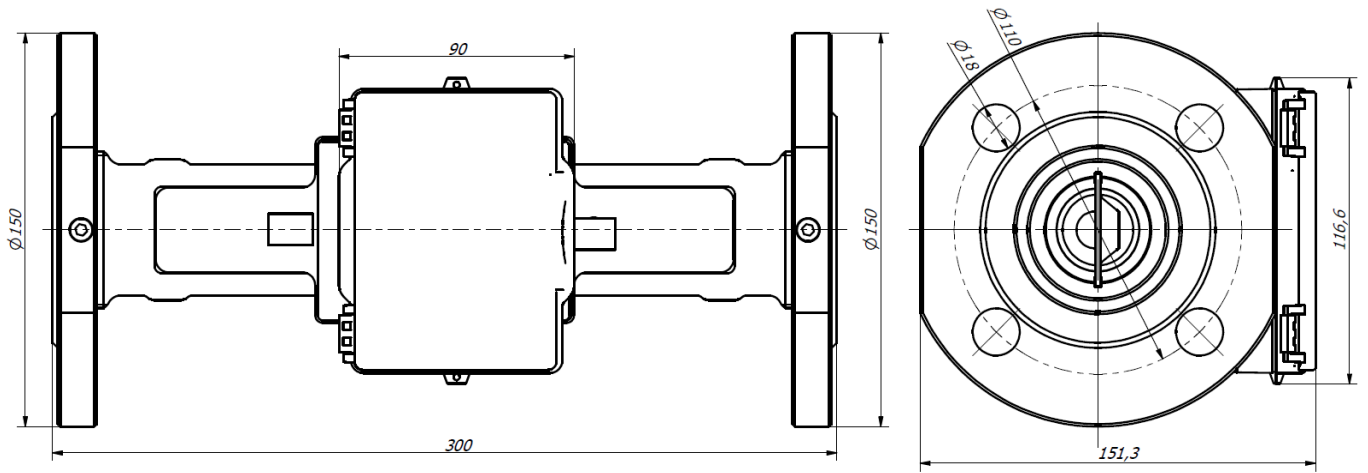
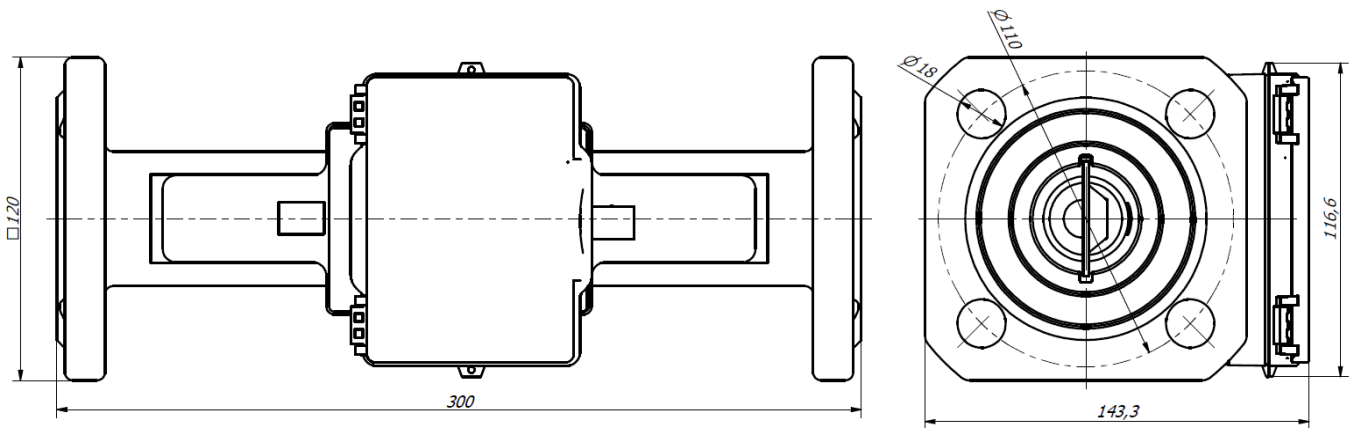


Fig.B9. Threaded end connections G2", mounting length L=300 mm.

Annex B (continued)



a)



b)

Fig.B10. Flanged end connections DN40, mounting length L=300 mm (two design options)

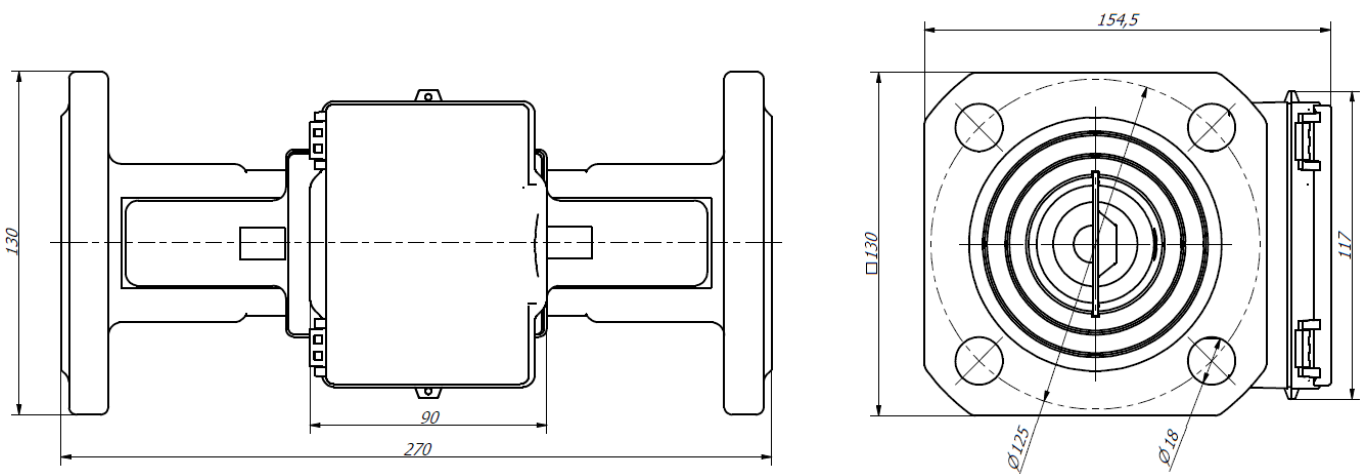


Fig.B11. Flanged end connections DN50, mounting length L=270 mm

Annex B (continued)

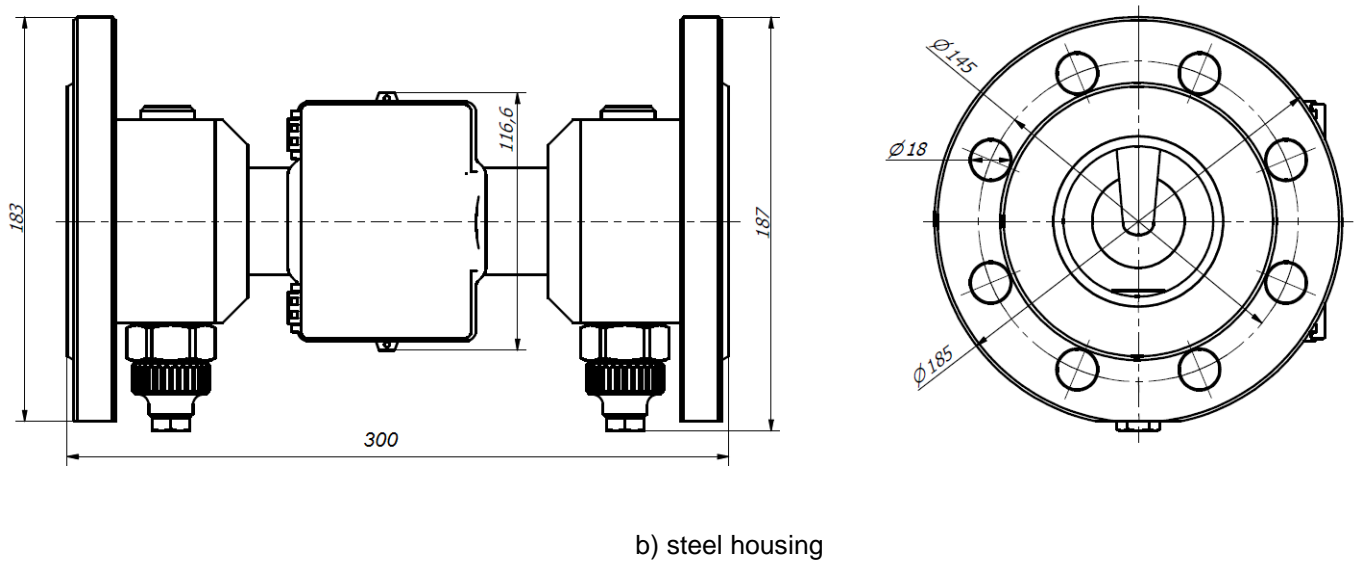
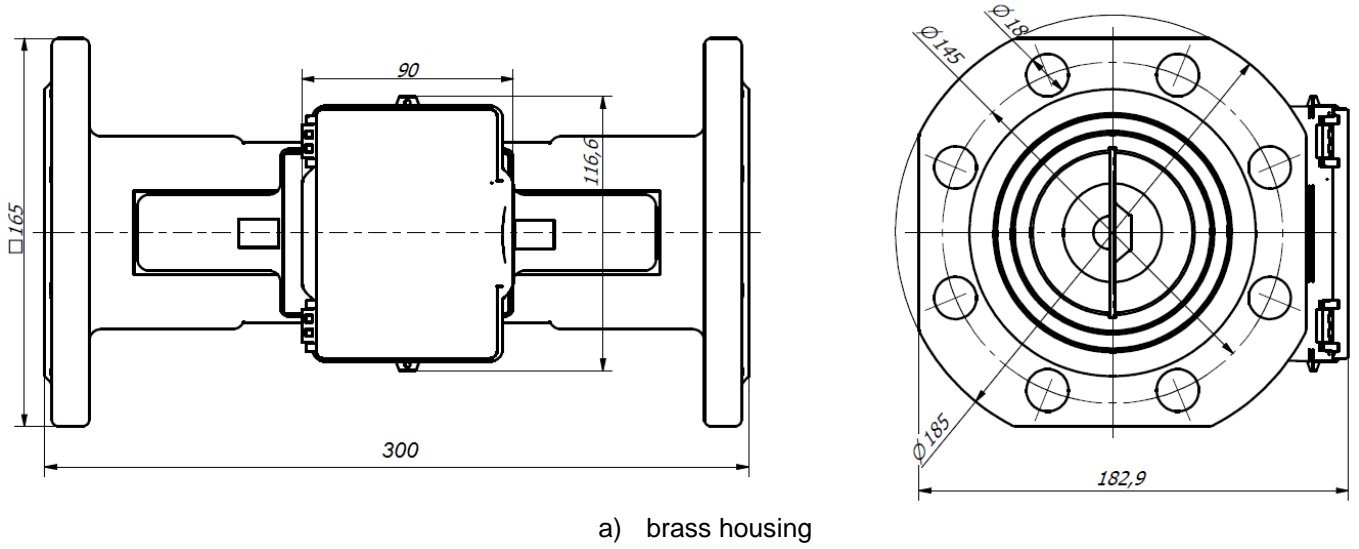
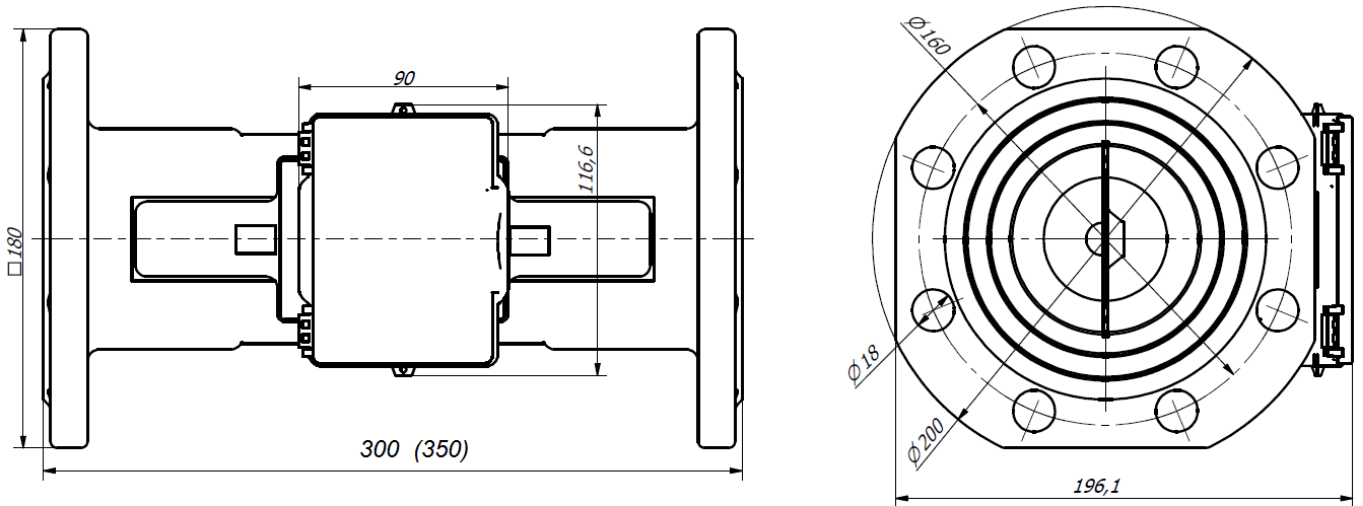
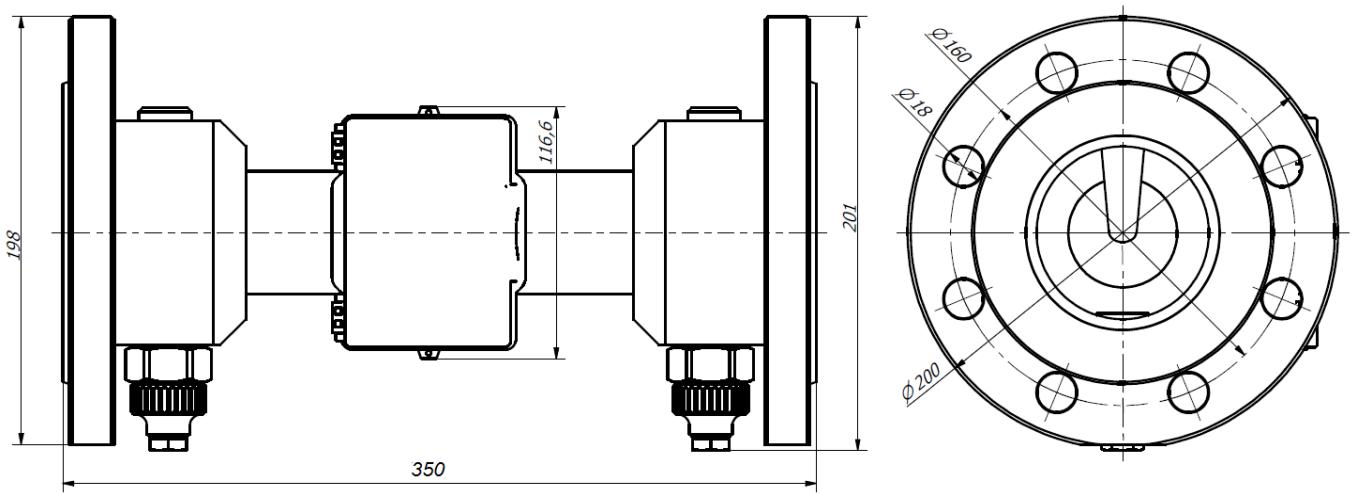


Fig.B12. Flanged end connections DN65, mounting length L=300 mm

Annex B (continued)



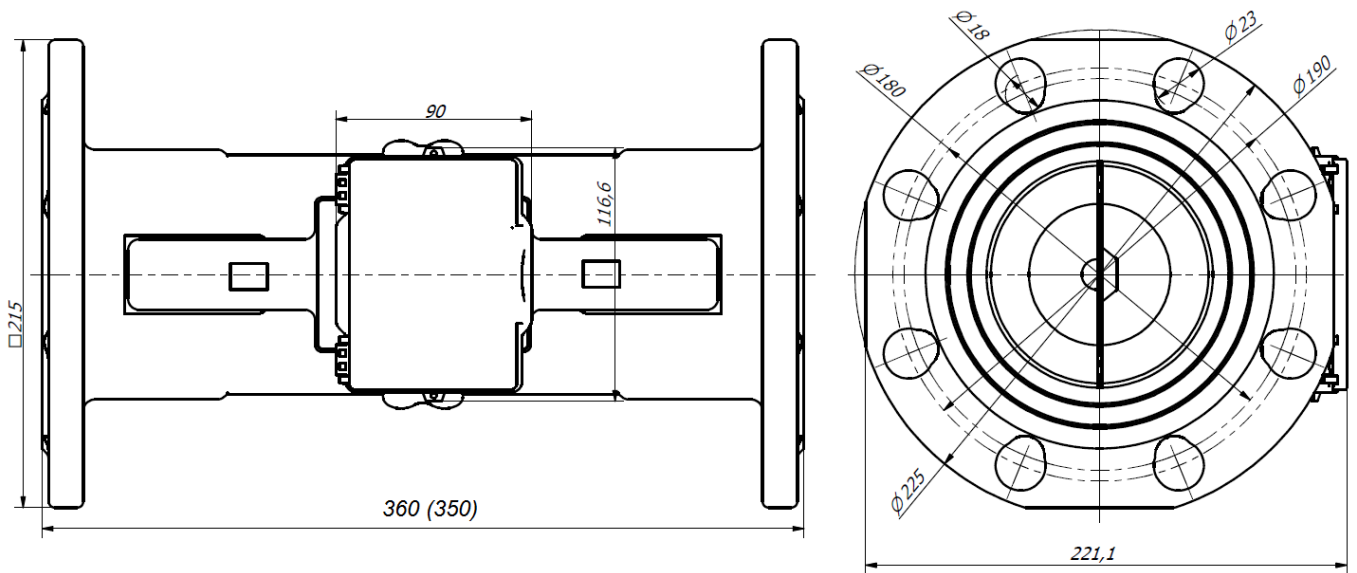
a) brass housing



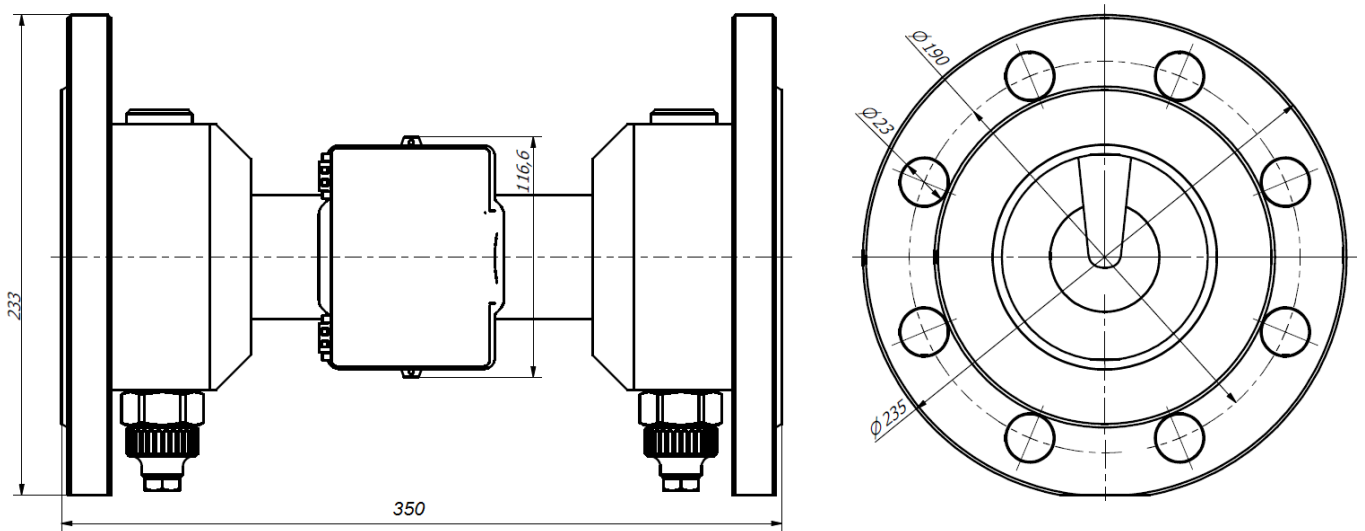
b) steel housing

Fig.B13. Flanged end connections DN80, mounting length L=350 mm (or L=300 mm – for brass housing only)

Annex B (continued)



a) brass housing



b) steel housing

Fig.B14. Flanged end connections DN100, mounting length L=350 mm (or L=360 mm – for brass housing only)

Annex C

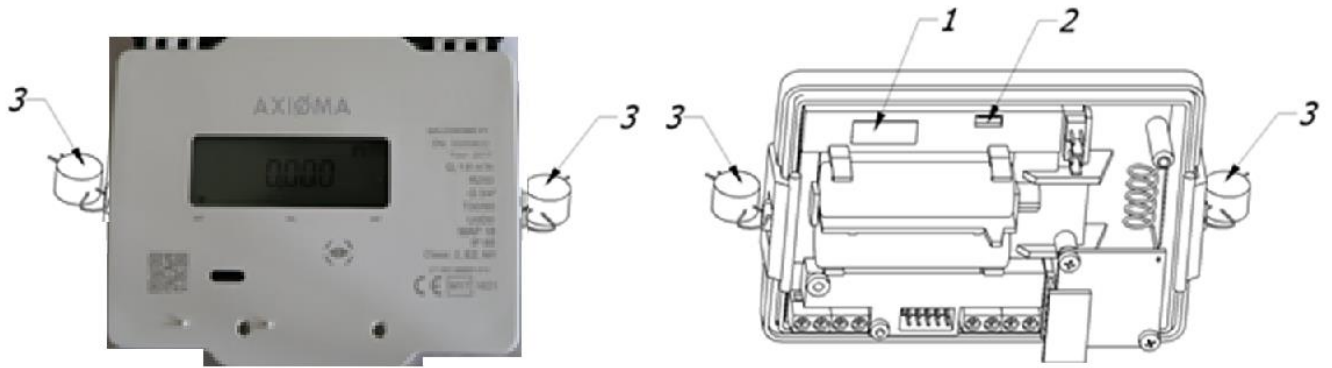
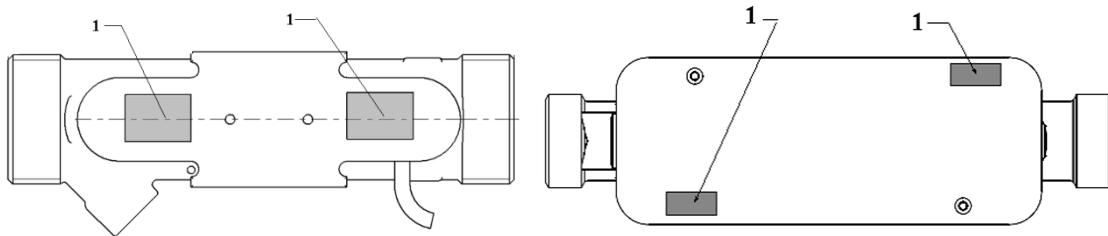


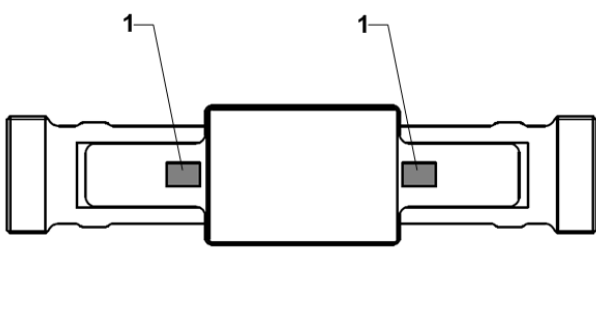
Fig.C1. Sealing of the water meter

Calculator general view: the cover is closed, and the cover is opened
 (1-manufacturer adhesive seal-sticker on the access to the adjustment activation jumper -verification seal,
 2-manufacturer adhesive seal-sticker on the fixer of the cover protecting electronic module - warranty seal,
 3 –mounting seal after installation)

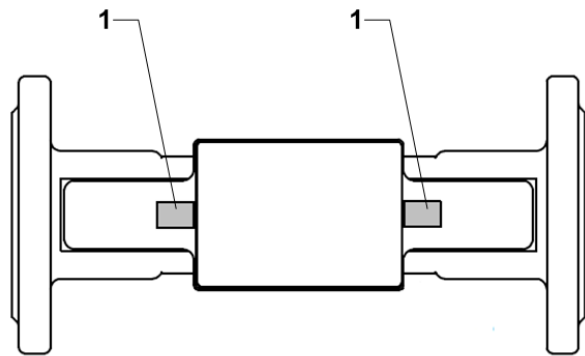


a) Sealing of flow sensor with end connections G³/₄, G1, DN20

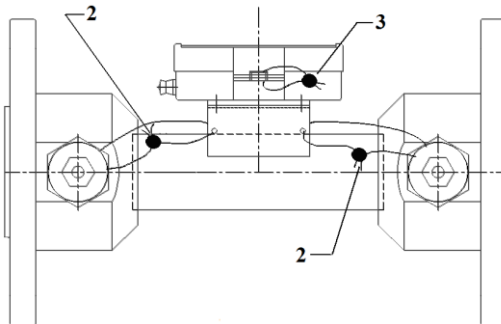
b) Sealing of flow sensor with end connections G1¹/₄, DN25, DN32



c) Sealing of flow sensor with end connections G2, DN40



d) Sealing of flow sensor (brass housing) with end connections DN50, DN65, DN80, DN100



e) Sealing of flow sensor (steel housing) DN65/DN80/DN100

Fig.C2. Sealing of the flow sensors of the water meter QALCOSONIC F 1

1- manufacturer's adhesive seal-sticker; 2- manufacturer's hanged seal; 3 –mounting seal after installation