Liquid level gauge LGB installation and operating manual

265152120.93067824.РЭ-LGB

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This operation manual is used to describe operation principles, constriction, operation, safe operation of all modifications of LGB liquid level gauges (hereinafter - LGB) and supplementary hitch attachments (LLS level switches, LLT level transmitters), their installation procedures, maintenance and replacement.

Please consider that the level gauges can be used under high pressure, temperature, in aggressive, toxic and explosive media. All personnel in charge of installation and maintenance of the level gauges shall read and understand this manual.

LGBs are manufactured as per technical specifications TU 4214 - 001 - 93067824 - 2013.

RivalCom is committed to improvement of properties, design and structure of the level gauges and, therefore, reserves the right to make any changes without any notice.

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Level gauge LGB – order code:

LGB - ___ - ____ - ____ - ____ - ____ - ___ - ___ - ___ - ___ - ___ - ___
1 2 3 4 5 6 7 8 9 10 11

1 Variants compositions of process connection (see article 1.d)

SS – «side- side»
TS – «top- side»
SB – «side -bottom»
TB – «top-bottom»

Note: variants can be extended e.g.:
SSS – three connecting branch pipe: « side - side - side»
TSS – three connecting branch pipe: «top – side - side»

2 Type of connecting elements / Process connection (see article 1.c)

A – flange according to ANSI/ASME B16.5
D – flange according to DIN 2526
E – flange according to EN1092-1
G – flange according to GOST 12815-80
R – flange according to GOST R 54432-2011 / GOST 33259-2015
| nominal diameter DN
| | nominal pressure PN
| | | the shape of the sealing surface
| | | | **/LF** – loose plate flange
| | | | |
__ ___/___/___ /___

MR – Hygienic Union DIN 11851
CP – Flange-clamp DIN 32676
| nominal diameter DN
| | nominal pressure PN
| | | Material of seal gasket
| | | |
__ ___/___/___

W – welding branch pipes
| outside diameter (mm)
| | wall thickness
| | | length of branch pipe from the wall of the chamber (indicated when L≠100)
| | | |
__ ___x___/(/___)

T – threaded branch pipes
| Type and size of thread (mm)
| | **F** - female, **M** - male
| | | length of branch pipe from the wall of the chamber (indicated when L≠100)
| | | |
__ ___ ___(/___)

LGB - SS - E25/40/B1 - M... - V60x2 - RI - F2V51/190/N4/40 - Ex - N - N - N - N
1 - 2 - 3 - 4 5 - 6 - 7 - 8 - 9 - 10 - 11

X – as agreed with the Customer

For example:

G25/40/1– flange according to GOST 12815-80 DN25 PN40 form 1;
D15/64/V13 - flange п according to DIN 2526 DN15 PN64 form V13
A3/4''/600/RTJ - flange по ANSI/ASME B16.5 ¾'' Class 600 Form RTJ.
TM27x2/F – threaded branch pipes with female thread M27x2
TG11/2''/M – threaded branch pipes with male thread G 1 ½''
TN1/2''/F – threaded branch pipes with female thread NPT ½''
MR40/40/M – Hygienic Union DN40 PN40, material of seal gasket is MVQ

3 Distance L / The range of indications (measurements) M

For LGB (see article 1.d):

L___ – the distance between the axes of the connecting pipes, for option *SS* - «side-side»;

L___ – the distance between the axis of the lower connecting branch pipe and the sealing surface of the upper flange for option TS - «top-side»;

L___ – the distance between the sealing surface of the bottom flange and the axis of the upper pipe connections, for option SB - «side-down»;

L___ – the distance between the sealing surfaces of the upper and lower flanges, for option TB - «top-down»

/**M___** – the range of indications / measurements. **If L = M, then L is not indicated in the ordering code.**

For LGB-…-BC (see data sheet 1.13):

L___ – chambers full length (T+M+U);

/**M___** – the distance between the axes of the connecting pipes, for variant SS – «side-side»;

4 The material, diameter and wall thickness of the external chamber (lining material)

V	–	Stainless steel: 10Cr17Ni13Mo2Ti, 316Ti, 1.4571
L	–	Stainless steel: 03Cr17Ni14Mo3, 316L, 1.4404, 1.4435
S	–	Stainless steel: (08)12Cr18Ni10Ti, 321/321H, 1.4541/1.4878
T	–	Titanium
M	–	Monel: 2.4360, 2.4361
H	–	Alloy: CrNi65MoB, Hastelloy C-276, 2.4819
N	–	Carbon steel: 20, 1.0405
C	–	Carbon steel: 09Г2С, 13Mn6, 9MnSi5
D	–	Polyvinylidene fluoride PVDF
P	–	Polypropylene PP
B	–	Polyvinylchloride PVC
F	–	Polytetrafluoroethylene PTFE (only for lining)
E	–	Ethylene-Trifluorochloroethylene ECTFE (only for lining)
X	–	Material on the agreement with the Customer

| outside diameter
| | wall thickness
| | | lining and/or outside diameter steam-jacket, see data sheet 1.20
| | | |
__ __x__ /___

Note: pos. 4 of order code can be used several times with additional chambers, see data sheet 1.14

LGB	-	SS	-	E25/40/B1	-	M...	-	V60x2	-	RI	-	F2V51/190/N4/40	-	Ex	-	N	-	N	-	N	-	N
		1	-	2	-	3	-	4		5	-	6	-	7	-	8	-	9	-	10	-	11

5 Magnetic Indicator / acrylic cover / Scale (see article 1.f и 1.g)

RI – roller indicator
FI – high temperature flag indicator
CI – high temperature ceramic indicator
| **AG xx** – Acrylic glass cover thickness **xx** mm
| | **SM** – Scale stainless steel. Engraved in mm
| | **SC** – Scale stainless steel. Engraved in cm
| | **SP** – Scale stainless steel. Engraved in percent
| | **SX** – Scale stainless steel. Engraved on the agreement with the Customer
| | |
__/___/___

N – without magnetic indicator

For Example:

RI/SM – Roller indicator scale stainless steel engraved in mm;
RI/SX - Roller indicator scale stainless steel engraved on the agreement with the Customer, for example: from -200 to +1100 mm;
RI/AG60/SC - Roller indicator scale stainless steel engraved in cm with acrylic cover 60 mm thickness

6 Float (see article 1.a)

F...
constructive construction:
1 – cylindrical corrugated
2 – cylindrical
3 – ball-segment
| material:
| **V** – Stainless steel: 10Cr17Ni13Mo2Ti, 316Ti, 1.4571
| **L** – Stainless steel: 03Cr17Ni14Mo3, 316L, 1.4404, 1.4435
| **S** – Stainless steel: (08)12Cr18Ni10Ti, 321/321H, 1.4541/1.4878
| **D** – Polyvinylidenfluoride PVDF
| **P** – Polypropylene PP
| **B** – Polyvinylchloride PVC
| **F** – PTFE (lining material is listed after of the float material, see data sheet 1.9)
| **E** – ECTFE (lining material is listed after of the float material, see data sheet 1.9)
| **T** – Titanium
| **M** – Monel: 2.4360, 2.4361
| **G** – Microcellular glass
| **X** – Material on the agreement with the Customer
| | outside diameter (in mm)
| | | length (in mm)
| | | | magnetic system
| | | | | maximum pressure (bar) at a temperature of 20 ° C (Nominal pressure)
| | | | | | minimum density of the upper medium (kg/m³), indicated in the case measure of media interface
| | | | | | | minimum density of the lower medium (kg/m³), indicated in the case measure of media interface
| | | | | | | | **B** – balanced on the media interface *
| | | | | | | | |
F _ _ _/ _/__/__/__/__/__/__/

* The minimum difference between the density of the upper and lower medium 50 kg/m³.

Floats are selected on the basis of density, temperature, pressure and corrosiveness of the liquid.

LGB	-	SS	-	E25/40/B1	-	M...	-	V60x2	-	RI	-	F2V51/190/N4/40	-	Ex	-	N	-	N	-	N	-	N
		1	-	2	-	3	-	4		5	-	6	-	7	-	8	-	9	-	10	-	11

By agreement with the customer can be made floats for liquid level gauges from other manufacturers.

Marking of special design floats
F…
S – Special application conditions
| material: (see pos. 4 of order code level gauge LGB, except for ferromagnetic steels)
| | diameter (in mm)
| | | length (in mm)
| | | | magnetic system
| | | | | the greatest pressure (bar) at a given operating conditions (working pressure)
| | | | | | maximum operating temperature in the normal mode of operation (°C)
| | | | | | | minimum density of the upper medium (kg/m³), indicated in the case measure of media interface
| | | | | | | | minimum density of the lower medium (kg/m³)
| | | | | | | | | **B** – balanced on the media interface *
| | | | | | | | | |
F S _ _/ _/__/__/__/__/__/__/

The minimum difference between the density of the upper and lower medium 50 kg/m³.

N – without float

For Example:

F2V51/350/N4/40 – Cylindrical float from stainless steel 316Ti, diameter 51 mm, length 350 mm, magnetic system N4, design pressure 40 bar;
F2T51/205/S1/25 – Cylindrical float from titanium, diameter 51 mm, length 205 mm, magnetic system S1, design pressure 25 bar;
F2V51/250/N2/25/850/997/B – Cylindrical float from stainless steel 316Ti, diameter 51 mm, length 250 mm, magnetic system N2, design pressure 25 bar, upper medium density 850 kg/m³, lower medium density 997 kg/m³, balanced for medium separation border.
FST59/560/N7/124/60/492 – special design Cylindrical float from titanium, diameter 59 mm, length 560 mm, magnetic system N7, working pressure 124 bar, working temperature 60°C, density 492 kg/m³.
F6V52/250/K5/16 – Cylindrical float for LBG-OT from stainless steel 316Ti, diameter 52 mm, length 250 mm, magnetic system K5, design pressure 16 bar.

7 Approvals and certificates

Ex – Explosion-proof version, Ex-marking GOST R ISO 60079-0-2011, GOST R EN 13463-1-09 : **II Gb c**
NC – level gauge is made of materials that comply with the recommendations of NACE: MR0175 and MR0103, ISO Standard 15156
MD – level gauge for sea and river applications. Type approval of products of the Russian Marine Register of Shipping
HD – level gauge for hygienic application
N – common industrial construction

8 Level sensor included with LGB (see partition 4)

RS – reed level sensor
MS – magnetostrictive level sensor
RR – reflex radar (microwave, GWR) level sensor
XX – other sensors
N – without level sensors

LGB	-	SS	-	E25/40/B1	-	M…	-	V60x2	-	RI	-	F2V51/190/N4/40	-	Ex	-	N	-	N	-	N	-	N
		1	-	2	-	3	-	4		5	-	6	-	7	-	8	-	9	-	10	-	11

9 Level switch included with LGB (see data sheet 5.1)

1 / LLS
|
Quantity of switches

N – without switches

10 Heater and temperature insulation (see partition 3)

IC – temperature insulation cover
SC – steam-jacket
SCC – steam-jacket with temperature insulation cover
ST – steam tube
STC – steam tube with temperature insulation cover
EH – electric heat
EHC – electric heat with temperature insulation cover
N – without heater and temperature insulation

11 Special design of level gauge LGB

BC – Bypass external chamber (for buoyancy or GWR/TDR sensors). Data sheet 1.13
PD – Design for differential pressure transmitter. Data sheet 1.7
DC – Design with additional external chamber for mounting GWR/TDR or other level sensors. Data sheet 1.14
CC – Design with combined design for mounting GWR/TDR level sensor. Data sheet 1.15
VS – Design for mounting limit level switch(-es) (vibration, ultrasonic, optical and etc.). Data sheet 1.17
DK – Design with additional chamber for float weight compensator. Data sheet 1.21
WV – Design with with integrated shutoff valves. Data sheet 1.22
DA – Design for high-power steam boilers. Data sheet 1.23
FX – Design with flexible connection branch.
CD xx… – Custom design (construction unusual sizes, designs and materials, including the mounting buoy, microwave, ultrasonic, capacitive, vibration, and other instruments), where **xx…** – drawing number
N – Typical design

Examples of complete order code:
LGB-SS-G50/40/2-M1000-V60x2-RI/SM-F2V51/200/N4/40-Ex-MS-2/LLS-N-N
LGB-SS-TG1"/M/150-M1000-V60x2-RI/AG60/SM-F2V51/200/N4/25-Ex-N-1/LLS-N-N
LGB-SS-W35x4/150-M1000-V60x2-CI/SM-F1V51/200/S1/40-Ex-RS-N-IC-N
LGB-OT-D100/16/V13-L1500/M1000-V42x2-RI/SX-F6V65/200/K5/6-Ex-N-N-N-N
LGB-SS-W35x4/175-L1100/M1000-V60x2-RI-F1V51/200/B1/40-N-N-N-N-N
LGB-SS-E50/16/B1-M1350-V114x5-N-N-Ex-N-N-N-CD300115-1477-001
LGB-SS-E80/40/B1-L1800/M1500-V88x2-N-N-N-N-N-EHC-BC

LGB	-	SS	-	E25/40/B1	-	M…	-	V60x2	-	RI	-	F2V51/190/N4/40	-	Ex	-	N	-	N	-	N	-	N
		1	-	2	-	3	-	4		5	-	6	-	7	-	8	-	9	-	10	-	11

Description of LGB Level Gauge

1.1. Operation principle:

Level gauge LGB consists of chamber with connection elements (branch pipes, flanges) used to install the chamber at the vessel. Connection elements can be located at the side, top or bottom of the chamber. Design option also include connection flanges threaded or welded branch pipes.

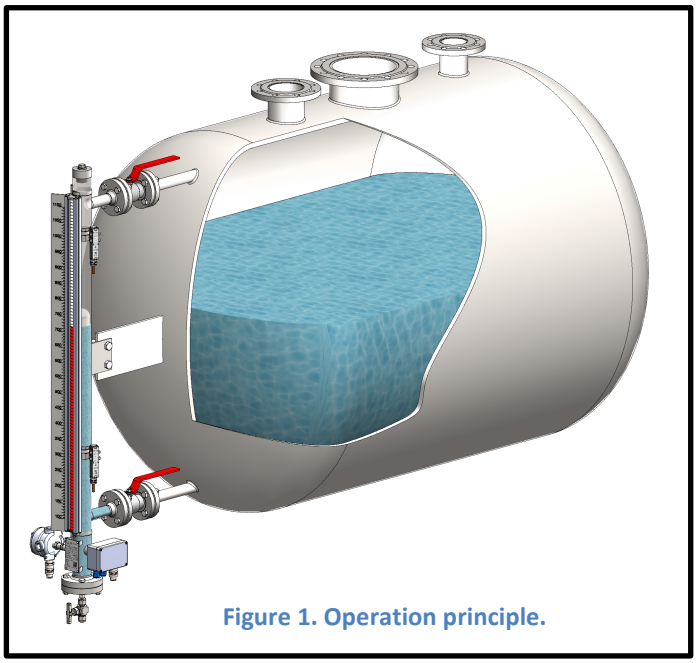


Figure 1. Operation principle.

Thus, the chamber and the vessel create communicating vessels. In accordance with principles of the communicating vessels, the level of the liquid in the vessel and the chamber will be the same, hence, the level of the liquid in the vessel can be measured by the level of the chamber.

Float with integrated permanent magnet shall be installed inside the chamber. Float position in height of the chamber changes proportionally to the level of measured media in the vessel or appliance under control. Material and dimensions of the chamber shall be chosen so that the magnetic field of the float concentrated perpendicular to the chamber axis has contactless impact on the externally installed magnetic indicator, switch and/or level transmitter

Design position of the measured medium level corresponds to the notch at the top of the float indicating the magnetic field concentration line.

Magnetic indicator

is a construction made of metal section, roller element, safety glass and fasteners. The composite element consists of two contrast color halves fixed inside the magnet. The composite elements are located in the metal section 10 mm far from each other.

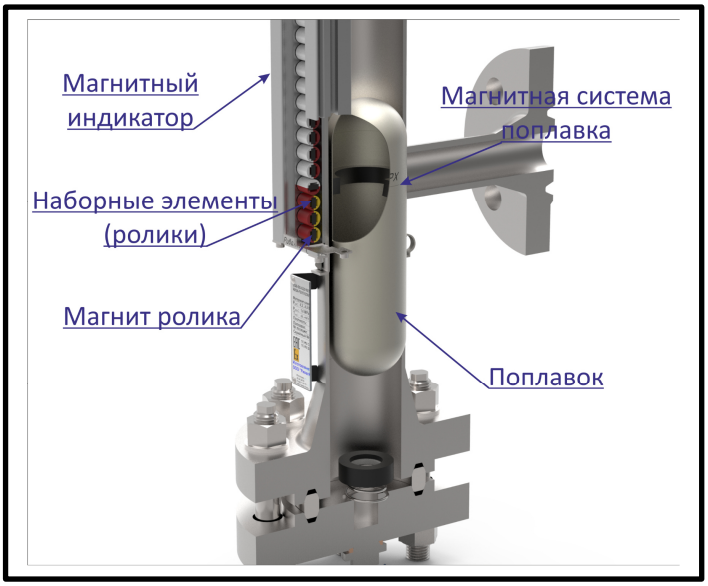


Figure 2. Magnetic indicator

When the float moves, the created perpendicular magnetic field impacts the magnetic field inside the magnetic indicator and produces rotary moment which turns the composite elements at 180°. Thus, the colored composite elements produce continuous

sequence of one color below the filling level of the vessel and the other color above the level. **The magnetic indicator does not require additional power.**

Acrylic glass cover glass 40 to 200 mm thickness is intended to prevent fogging and frost formation at the magnetic indicator.

The chamber may be equipped with the following elements used for connection, ventilation and drainage: plugs, valves, flanges, flanges or connecting thread. It is recommended to coordinate design and necessity to attach fittings with representatives of the manufacturer.

1.2 Application:

The level gauge is intended to measure upper level and interface of liquid media, including food and explosive media.

Application areas: visual and/or automatic process monitoring, regulation and control systems in refinery, food, chemical and other industries.

LGB can be used both inside the buildings and outside in the wide range of climate conditions. They are intended for installation at fixed and movable facilities, production and marine conditions, including vibration and other negative conditions. The devices do not require periodic adjustment and require minimum maintenance during operation.

The level gauges can be used in conventional and explosion-hazard areas in compliance with regulatory documents specifying application of the equipment in explosion hazard zones.

Explosion-proof design of the level gauges feature "Construction Safety" type of protection. These designs of the level gauges have Ex II Gb c T6...T1 explosion safety marks. Such level gauges include additional design elements preventing sparking.

1.3 Technical specifications:

Operating medium density: 320...2000 kg/m^3;

Temperature range of the measured medium: -196...+500 °C;

Ambient temperature range: -60...+85 °C;

Operating gauge pressure: -0.1...42 MPa;

Chamber length: up to 6 m;[(2)]

Chamber explosion proof (option): II Gb c;[(3)]

Notes:

[(1)] LGB can measure the boundary layer of separating liquid media (with density difference exceeding 50 kg/m^3).

[(2)] It is possible to manufacture a bypass composite chamber consisting of several sections with one section up to 6 m long.

[(3)] This type of explosion protection refers to the level gauge only. Level switches and transmitters supplied with the level gauge have other explosion safety marks.

1.3.1 Corrosion resistance:

All level gauge details contacting with measured media and environment can be made of corrosion resistant and oxidation resistant materials, 316Ti, 316L stainless steels. However, even

more resistant materials (Titanium 3.7045, Hastelloy C, Monel) can be used to operate in highly corrosive products, when the corrosion resistance of the aforementioned grades is insufficient. These materials are used to manufacture the parts which shall contact the product or its vapor, and sometimes to manufacture the whole level gauge. Sometimes, application of protective coating to the parts of the level gauge contacting with the measured medium can be sufficient.

Moreover, it is possible to produce the chamber made of non-conventional materials (09Г2С steel, steel 20, etc.), polymer materials (polyvinylidenfluoride/PVDF, polypropylene/PP, polyethylene/PE, polyvinylchloride/PVC-U/PVC-C and etc.).

2. Operation

2.1 Safety precautions:

Failure to comply with maximum values of stated process parameters may result in the damage of the level gauge and entail emergency situation and hazard to the health and life of the maintenance personnel, contamination of environment and property damage. Personnel performing works on installation, disassembly, operation and maintenance of the level gauges shall read and understand this operation manual and trained on safety.

When LGBs are used for explosion-hazard areas, installation and operation shall be performed by trained specialists duly certified and approved to operate in accordance with regulations and rules acting at the territory of the state and the enterprise.

Recomendations:

- the LGB level gauge shall be used for the vessel pressure test when the vessel test pressure does not exceed test pressure stated in the LGB passport;
- in case of process changes (new abrasive particles/crystallizing medium/polymerizing medium) during operation of the level gauge not intended for use under such new factors, please, consult manufacturer's specialists;
- if LGB level gauge is installed inside the explosion-hazard zone, check that attached devices (LLT, LLS) the LGB level gauge may be equipped with are duly connected to protected electrical circuits.

Prohibited:

- to install the level gauge in the proximity (closer than 1 m) of strong electromagnetic field sources;
- to repair or replace the parts of the level gauge without notice of the manufacturer.
- to use the level gauge showing signs of leakage, mechanical damage until elimination of their causes.
- to use magnetic materials in the close proximity of the level gauge chamber (including installation of magnet metal hoses, clamps, brackets, etc. along the level gauge chamber)

Caution! Failure to comply with requirements of this manual during installation/ start-up/ operation of the LGB level gauges / chambers shall enable the manufacturer to waive the guarantee.

The manufacturer may not guarantee compliance with the stated data sheet specifications if certain elements of the LGB level gauge are replaced by persons other than representatives of the manufacturer.

2.2 Installation and Disassembly of the LGB Level Gauge

Figure 3 shows conventional installation of level gauge The prevailing connection option is "side-to-side": the connection elements are positioned perpendicular to the level indicator axis. This option is optimal to measure the level and minimize dimensions of the level gauge. This option suits to measure upper liquid level and the boundary layer of separating liquid media. During the installation of the level gauge it is necessary to consider the float chamber and ensure double distance from the axis of the bottom connection port and other structural elements and surfaces which can hinder installation of the float into the chamber. For more information, please, contact the manufacturer.

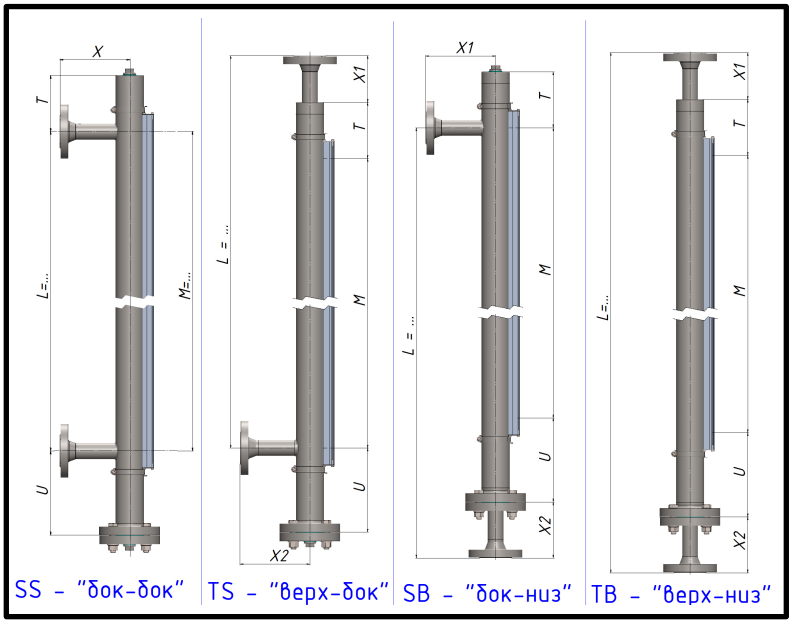


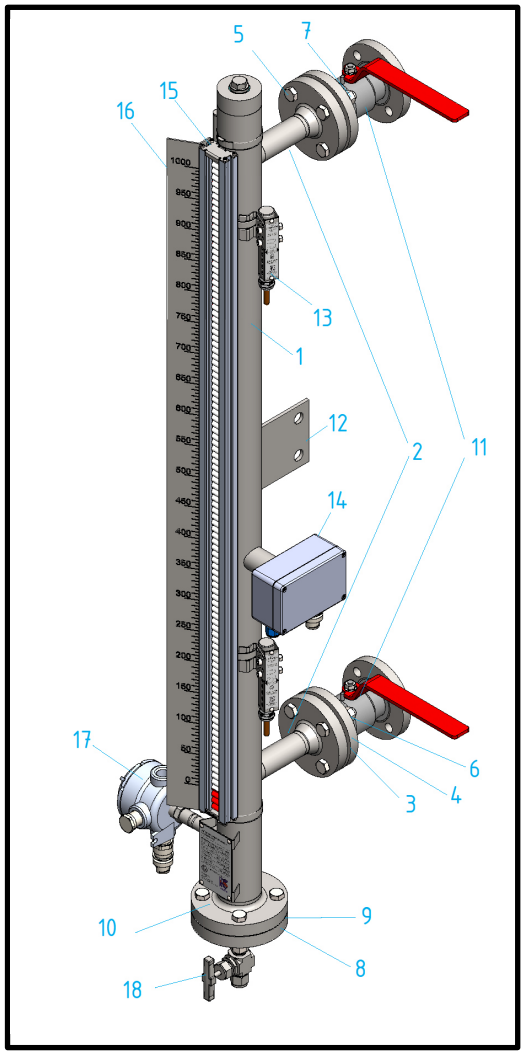
Figure 3. Variants compositions of process connection

"Top-to-side", "side-to-bottom", "top-to-bottom" options as well as "side-to-side" option with larger number of connection pieces are often due to limitations of arrangement of existing process connections or process needs.

Caution! Before installation/disassembly of the LGB level gauge it is recommended to check the vessel for residues of aggressive and toxic substances, check shut-off fittings for leakages, check temperature of the machine/vessel outer walls to prevent mechanic, thermal burns and other harm to personnel in charge of installation. Personnel shall use special clothes and personal protective equipment during installation/disassembly.

Installation:

To maintain fragile elements of the magnetic float it shall be transported outside the LGB level gauge (1) in the protective cover. Level gauge shall be installed without the float. Magnet roller indicator (15) and graduation scale (16), level transmitter (17) and switches (13) are installed and tested by the manufacturer and do not require additional checks before installation. During transportation, the level gauge mounting flanges are covered by protective sealing; remove it before the installation.



To mount the LGB level gauge on the vessel/tank using structural connection elements (thread/flanges/weld necks), align axis of the level gauge mounting flanges (2) with axis of the tank connection elements. Then fix the level gauge safely and install the gasket (4) between flanges, then tighten the flanged connection with bolts (5), washers (6) and nuts (7). Nut tightening torque shall comply with regulatory documents.

With the mounting bracket(s) (12), align the chamber bracket holes and vessel bracket holes and fix the device with bolt connection.

All nuts, washers, bolts and gaskets shall comply with regulatory documents. Choice of the gaskets shall be determined by chemical and thermal resistance of the gasket material.

Level gauges with other types of connections shall be mounted in a similar way.

After installation remove the bolts (10) and bottom process flange (8) together with the gasket (9). Then insert the float inside the chamber (1) in accordance with the sign "TOP/ВЕРХ" on the float body. Install the bottom process flange (10) to its place.

If the level gauge is supplied with several level LLS-B level switches (13), it can include terminal box (14) for cable switching.

After installation and commissioning, it is possible that the level gauge elements change its color due to impact of temperature and environmental factors.

Disassembly:

Check that the chamber is empty, or residues of the measured medium are not dangerous for the personnel and/or environment. Drain the chamber with drainage fitting (18), if necessary.

Follow installation instructions in the reverse order.

Start-up and Commissioning:

To commission the level gauge at the tank operating under the gauge pressure/underpressure, first level the underpressure of the level gauge chamber and the tank before liquid medium enters the level gauge chamber. To do this, open the top shut-off valve (3).

To commission the level gauge at the empty tank, follow instructions for commissioning of the tank/machine.

2.3 2.3. Maintenance

The LGB level gauges operate for a long time without any wear under regular operation. Visually inspect the float, chamber and other structural elements for signs of corrosion, oxidation during inspections and planned maintenance of the vessel/tank. If necessary, clean the structural elements of the level gauge. To remove and assemble the float, please, follow instructions of section 2.2 "Installation and Disassembly" of the manual.

Maintenance of the LLS level switches and LLT level transmitters shall be carried out as described in the corresponding operation manuals.

2.4 2.4. Float operation monitoring system

The magnetic indicator includes float operation monitoring system. It consists of three additional roller elements installed in the bottom side of the magnetic indicator with color coding:

The main colors of the roller elements	Color code of the roller elements
White-Red	Yellow
Yellow-Black	Red

Alarm actuation:

- Float break and filling with liquid
- Measured liquid density below the minimum density of the float operation
- Increase of the float mass due to sedimentation of foreign particles
- Sticking of the float in the bottom part of the level gauge
- Empty level gauge chamber

If the alarm actuates, the float is below the level of alarm composite elements and rotates them to the viewer to see the signal color.

2.5 2.5. Change of the angle of view of the magnetic indicator and change of position of other attached devices.

LGB level gauges are equipped with radial magnetic systems allowing to change position of the attached devices, including around the chamber axis.

LLT level transmitter of standard models is installed on special plates with fixing brackets. In this case tension clamps made of non-magnetic stainless steel shall be used to change the transmitter position.

If notified about need to change the transmitter position, the manufacturer will mount the transmitter with tension clamps.

With the change of position of the level transmitter electronic unit (vertical turn at 180°), the secondary transducer shall be adjusted (change values of the measurement minimum and maximum).

LLS-B level switches may be of two types:

1. for installation to magnetic indicator (rotates with the magnetic indicator);
2. for installation on the chamber with the bracket (rotates independently of the magnetic indicator).

Technological process may require change of the switch vertical position (change of alarm actuation point).

To change the LLS-B level switch position:

1. Loose the fixing screw(s).
2. Move the switch in accordance with the alarm actuation point at the machine nameplate.
3. Tighten the fixing screw(s).

2.6 Operation of the level gauges with microwave level transmitter

LLCproduces LGB level gauges to be used with microwave (reflex-radar, micropulse) level transmitters. These level gauge names include RR indication.

LGB-...-RR level gauges can be of two main designs:

a) Combined level gauge chamber, LGB-...-CC

b) LGB level gauge with additional chamber, LGB-...-DC

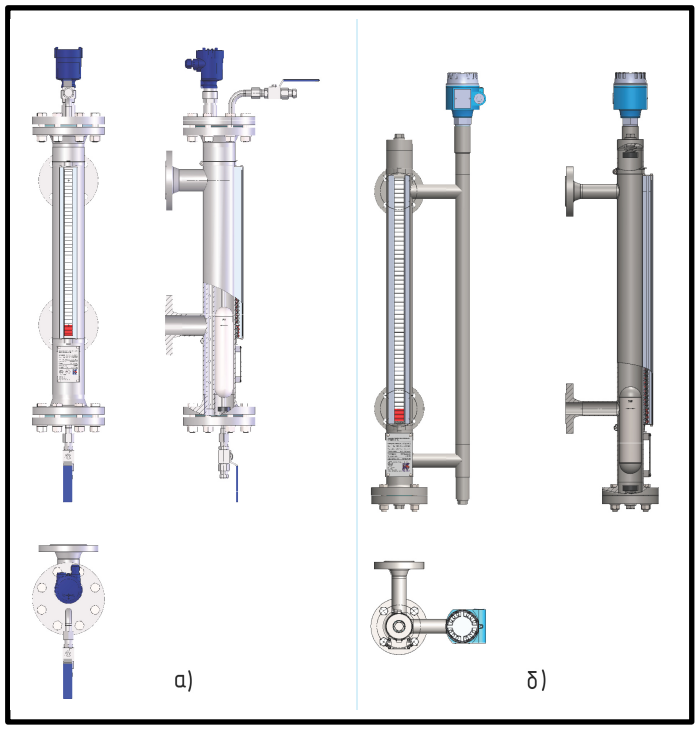


Рисунок 5. Special design for mounting GWR/TDR level sensor

Design of the combined level gauge chamber features a wider LGB level gauge chamber comprising the float as well as guide elements to ensure movement of the float along the magnetic indicator. To reduce impact of the float and magnetic field on readings of the level transmitter the level gauge chamber includes mounting tube used as coaxial probe.

After disassembly of the coaxial probe from the LGB level gauge chamber, it is important to carefully re-assemble the coaxial probe into the level gauge chamber. Wrong assembly of the coaxial probe can lead to float sticking or incorrect operation of the level transmitter..

To install microwave transmitter with coaxial probe into the combined design chamber, first, remove the top flange, install microwave transmitter into the threaded stub or corresponding flange, then insert the structure into the level gauge chamber paying attention to orientation of the top flange.

To ensure correct installation, when mounting the top flanged connection the corresponding mounting elements (stud and groove). Then insert the float into the level gauge chamber and install the bottom flanged connection. After that, fix the coaxial probe in the stub.

This will ensure rigidity and functionality of the structure.

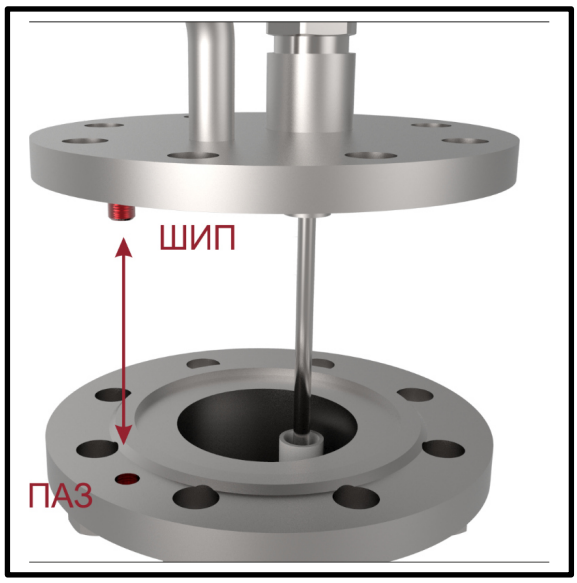


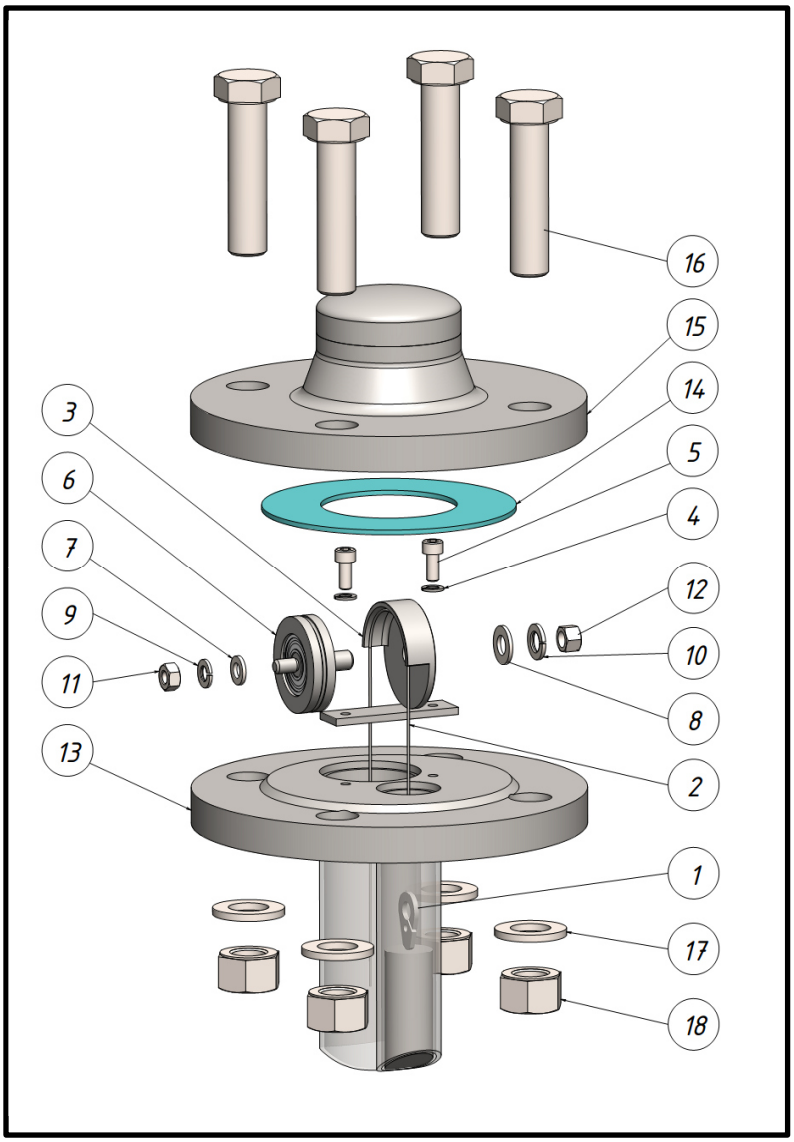
Figure 6. Fixing coaxial tube in chamber

Design of the LGB level gauge with the chamber features level gauge chamber connected with separate chamber intended to install microwave level transmitter. The transmitter settings in this case are similar to the settings of installation into a separate chamber.

If the level gauge of а) or б) design and microwave level transmitter is supplied, the transmitter shall be calibrated in the level gauge chamber by the manufacturer to decrease all false reflections at the echo-curve.

If the microwave level transmitter is installed into the level gauge chamber by the Customer, echo-signal shall be removed after the installation in the empty tank to reduce false reflections. The procedure is described in the level transmitter manual.

2.7 Installation of the level gauges with float weight compensator (balance weight).



Float weight compensation system serves to solve multiple tasks which cannot be solved by standard design of the top-mounted level gauge. With the balance weight, the float needs smaller buoyancy force to emerge, hence, smaller float may be used and the level gauges may be used to measure liquids with low density (below 350 kg/m3).

Float weight compensation system elements include:

1. Balance weight (load)
2. Cable
3. Roller bracket
4. Washer
5. Screw
6. Roller
7. Washer
8. Washer

9. Spring-washer
10. Spring-washer
11. Nut
12. Nut
13. Top chamber flange
14. Flange gasket
15. Flange cover
16. Bolts
17. Washers
18. Nuts

The float weight compensation system is supplied disassembled to ensure integrity of all its elements during transportation. The float weight compensation system shall be assembled immediately before the level gauge installation into the tank as follows:

1. Place the cable loop into the retainer located on the float, clamp the cable in the retainer with pliers. Clamp the retainer horizontally.
2. Place the float inside the float chamber and pass the free end of the cable through the hole in the top of the brittle with hooked wire.
3. Place the remaining cable loop into the retainer located on the balance weight, clamp the cable in the retainer with pliers.
4. Place the load (1) into the balance weight chamber.
5. Install roller bracket (3) on the top flange (13) with screws (4) and washers (5).
6. Fit the cable into the roller groove (6), insert the roller into the bracket (3) and fix it with washers (7) (8), split washers (9) (10) and nuts (11) (12).
7. Ensure cable tension by moving the float into the bottom position with any rod of corresponding length.
8. Install the gasket (14) onto the chamber flange (13) and fix the flange cover (15) with bolts (16), washers (17) and nuts (18).

Prohibited:

- To install and operate the float weight compensation system with damaged or deformed cable: loose or unstressed cable, bends, etc;
- To move, transport and store the level gauge with float weight compensation system assembled except for cases of direct installation in the vessel/tank;
- To use wire, rope, chain or cable outside the supply scope purchased from any manufacturer other than the level gauge manufacturer.

Appendix 1. Correction of indications based on the medium density

The LGBs may be supplied with the function of indication correction depending on measured medium density. LGBs featuring this function include additional calibration scale along with the main scale of measured range. Indications of the main scale reflect position of the level in the tank and the calibration scale allows correction of the indications.

Correction shall be made in accordance with this Appendix to the manual and float operation deviation diagram attached to each level gauge featuring the indication correction function.

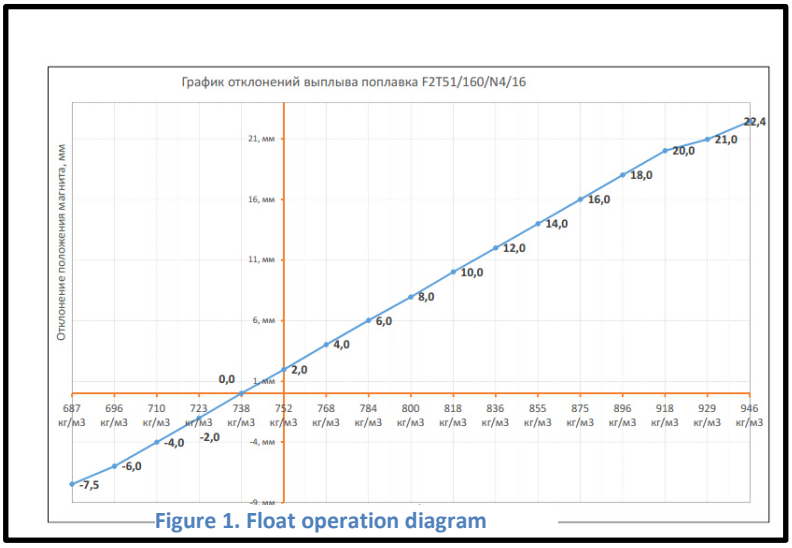


Figure 1. Float operation diagram

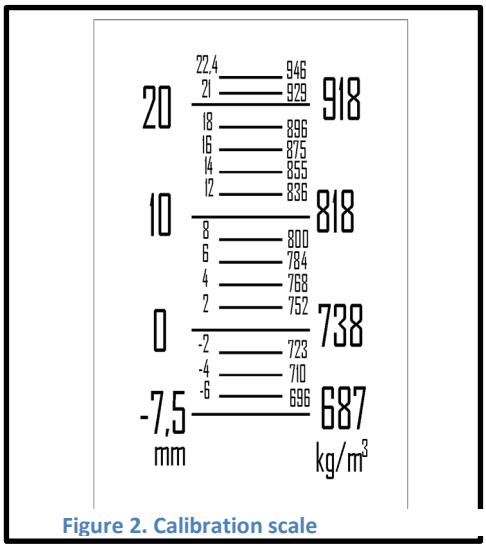


Figure 2. Calibration scale

To correct the indications:

1. Determine the density of measured liquid
2. Define the required displacement using the diagram
3. Loosen the fixation of the main scale
4. Align zero mark of the main scale and mark of the calibration scale corresponding to the required displacement
5. Fix the main scale

Appendix 2. Certificates and approval documentation

Certificate of conformity TR CU 012/2011, № ЕАЭС RU C-RU.HA65.B.00697/20, series RU № 0249359. Valid through 16.08.2025г.

Declaration conformity TR CU 032/2013: ЕАЭС N RU Д-RU.АЖ58.B.00089/20. Valid through 05.03.2025г.

Declaration conformity TR CU 010/2011: ЕАЭС N RU Д-RU.АЖ49.B.10785/20. Valid through 27.07.2025г.

Certificate of conformity GOST R № РОСС RU.HB61.H06800. Valid through 19.05.2023г.

Certificate of conformity GOST R № РОСС RU.АД07.H01048. Valid through 13.10.2022г.

Certificate of conformity № РОСС RU.ТЖС000045. Valid through 04.08.2024г