









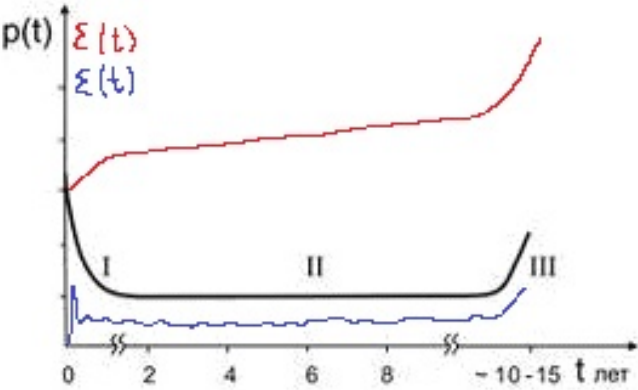


Protection against manipulations with diaphragm gas meters

By the example of the BALANCE remote metering system with gas loss detection analytics.

"The diaphragm gas meter is subject to regular inspection and verification of the accuracy of its readings by the gas industry"

Sample Photos	Types of impact	Possible protection measures	Notes	effect / easy / reaction
	The seal Damage and fake seals allows you to rewind meter readings. Use seals with a high level of protection against fake.	<ol style="list-style-type: none"> Additional casing BALANCE + system balance counters Balance Counters without system 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	+ / - / - + / + / + + / - / -
	Counting mechanism Damage and incapacitation of the counting mechanism. There are traces of deformation of the case, scratched or melted digital wheels, their displacement.	<ol style="list-style-type: none"> Additional casing BALANCE + system balance counters Balance Counters without system 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	+ / - / - + / + / + + / - / -
	Incorrect meter installation Turning the counter to a horizontal position leads to its complete inoperability (stop). Installation of the meter must not allow its rotation from vertical to horizontal position.	<ol style="list-style-type: none"> Additional casing BALANCE + system balance counters Balance Counters without system 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	+ / - / - + / + / + + / - / -
	Gland Gland must be made of non-magnetic materials. The presence of magnetic materials makes it possible to slow down the counter by the action of a strong magnet, distorting the readings of the recorded gas.	<ol style="list-style-type: none"> Additional casing BALANCE + system balance counters Balance Counters without system Magnetic sensor of field Magnetic seal 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics Using with BALANCE Visual inspection	+ / - / - + / + / + + / - / - + / + / + + / - / -
	Magnetic coupling The magnetic coupling allows the counter to be braked with a strong magnet, distorting the readings. And the ingress of rust and scale leads to inhibition or complete jamming of the counting mechanism.	<ol style="list-style-type: none"> Additional casing Installing filters Exclusion of counters with magnetic clutch. BALANCE system with magnetic sensor. Magnetic seal 	Visual inspection Recommended Recommended Remote collection + network imbalance Visual inspection	- / - / - + / - / - + / + / + + / + / + + / - / -
	Counter leakage This is a burn through the plastic case. And often, such holes can be seen only after opening the counter. When the meter is installed, burns are observed before the end of the welding work, or a rubber seal is melted at the outlet pipe and an internal leak is formed.	<ol style="list-style-type: none"> Additional casing BALANCE + system balance counters Balance Counters without system Mandatory check counter at the minimum flow 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / - + / + / +
	Outlet Manipulation A punctured hole in the pipe or the dismantling of the rubber o-ring. This allows you to use part of the gas, bypassing the measuring mechanism. When burning one burner on the stove at the lowest possible rate, the meter does not count the rate.	<ol style="list-style-type: none"> Additional casing BALANCE + system balance counters Balance Counters without system Mandatory check counter at the minimum flow 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / - + / - / -
	Water at the meter When installing the meter in the open air or in an unheated room, the water in the meter freezes in the winter, and ice blocks the movement of the membranes. This leads to damage to the membranes or to jamming of the drive levers and to a complete irreparable loss of efficiency of the meter.	<ol style="list-style-type: none"> Additional casing BALANCE + system balance counters Balance Counters without system 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / -
	Air blow It is unacceptable to pressure test the system with a high pressure meter installed. In this case, gas either does not pass through the meter or gas passes directly, while the metering mechanism does not work.	<ol style="list-style-type: none"> Additional casing BALANCE + system balance counters Balance Counters without system Check counter at the minimum flow 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / - + / + / +

	Data distortion transmitted by the user or meter about real gas consumption. Without a remote accounting system, it is almost impossible to get real data.	<ol style="list-style-type: none"> 1. Additional casing 2. BALANCE + system balance counters 3. Balance Counters without system 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / -
	Installation of additional elements in the counter , allowing to engage in theft of gas, without explicitly affecting the meter. This can only be seen after opening the counter.	<ol style="list-style-type: none"> 1. Additional casing 2. BALANCE + system balance counters 3. Balance Counters without system 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / -
	Magnet exposure It is produced on the magnetic parts of the meter - the sleeve / magnetic coupling, the magnetic elements of the chamber. Exposure to a strong magnet, distorting the recorded volume of gas consumed.	<ol style="list-style-type: none"> 1. Additional casing 2. BALANCE system with magnetic sensor. 3. Sensor of magnetic field 4. Magnetic seal 5. Check of magnetization 	Visual inspection Remote collection + magnetic accidents Visual inspection Visual inspection Manual measurement	+ / - / - + / + / + - / - / - - / - / - - / - / -
	Manipulations before installing the meter The owner complains to the gas service about incorrect meter readings. The counter is left to the owner for presentation in reality. Having received a trusted meter, the owner usually violates the tightness of the outlet pipe.	<ol style="list-style-type: none"> 1. Additional casing 2. BALANCE + system balance counters 3. Balance Counters without system 4. Check counter at the minimum flow 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / - + / + / +
	Workaround Dangerous way - unauthorized insertion into the gas pipeline. This is most inconspicuous with an underground gas pipeline, but a workaround is also possible with an air gas pipeline, for example, through a hollow support.	<ol style="list-style-type: none"> 1. Additional casing 2. BALANCE + system balance counters 3. Balance Counters without system 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / -
	"Help" from the installers Sometimes manipulations are performed during commissioning: either in collusion with the owner or involuntarily, using the meter as a template during welding and not checking the gas meter for low flow rates.	<ol style="list-style-type: none"> 1. Additional casing 2. BALANCE + system balance counters 3. Balance Counters without system 4. Mandatory check counter at the minimum flow 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / - + / + / +
	Dirt from the pipe in the measuring mechanism. The ingress of dust and dirt into the meter may distort its readings and lead to accelerated wear. And rust and scale ingress can lead to jamming of the meter.	<ol style="list-style-type: none"> 1. Additional casing 2. BALANCE + system balance counters 3. Balance Counters without system 4. Setting filters 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics Recommended	- / - / - + / + / + + / - / - + / - / -
	Time delay from the beginning of inaccurate accounting to its discovery. Gas losses due to delayed detection per week, month or year can be very significant.	<ol style="list-style-type: none"> 1. Additional casing 2. BALANCE + system balance counters 3. Balance Counters without system 	Visual inspection Remote collection + network imbalance Visual reading, lack of analytics	- / - / - + / + / + + / - / -
	On the picture - red color shows typical gas losses from the operating time of metering devices without a remote metering system, black color shows a typical distribution of the failure rate of gas metering devices, purple - gas loss of metering devices with the installed BALANCE system and common metering devices. Three areas can be distinguished in this graph: I - losses due to failure of unreliable elements, production defects, manifestation of assembly defects, interference with the operation of metering devices at the stage of installation of metering devices, unauthorized connections; II - losses during operation: braking by a magnet, wear of the mechanical parts of meters, ingress of dirt and dust, interference with the operation of metering devices; III - losses due to product failures as a result of aging, increased gas leaks due to wear of mechanical elements, exit from the accuracy class.			

Conclusion: A universal means of protection against manipulations with diaphragm gas meters is the BALANCE remote metering system in combination with installed common metering devices. The BALANCE system allows you to identify any manipulations and malfunctions of both apartment and general metering devices. You will receive a message about the imbalance on the network the very next day. Developed analytics of the BALANCE accounting system allows you to determine the most likely consumer engaged in manipulation or using a faulty meter.

In addition, the concept of "interesting interval" acquires a new meaning - removal, verification and replacement of equipment is done after a time when gas losses from the operation of faulty equipment become equal to the costs of its verification and replacement. It becomes possible to operate gas metering devices for 10 and 15 years, if the imbalance is normal, and if it's already out of the norm after half a year, urgent measures are taken, and the time of expiration of the "verification interval" is not expected.

The article used materials from the site www.djv-com.net and www.gaselectro.ru