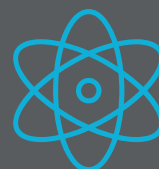


2023

**SMART-SOLUTIONS**  
**INNOVATIVE**  
**EQUIPMENT &**  
**SOFTWARE**  
**SYSTEMS**



Resource metering automation, telemetry systems, energy-efficient electrical equipment, uninterruptible and autonomous power supply systems for the domestic sector and industrial telemetry systems.

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## 1 About COMPANY

“Rustechnology” LLC is a leading Russian developer of household automation software systems and a manufacturer of energy-efficient equipment (intelligent telemetry units for resource metering systems).

Also, we carry out the design and implementation of integrated systems for monitoring and managing housing facilities.

Using the developed top-level software, the engineers of our company integrate systems into a single remote monitoring and control of geographically distributed objects of resource supply networks.

The whole range of solutions we offer has been tested at a number of large energy and utilities enterprises for over 10 years and are successfully operated by industrial customers.





## 2 Our PRODUCTS

Today our company is actively working in various fields of industry and utilities, and offers the latest developments in the field of metering automation, remote monitoring of technological parameters, uninterrupted and autonomous power supply for the household sector and industrial telemetry systems.

Our solutions can reduce operating costs, quickly obtain reliable information, keep current records and settlements for resources between the supplier and the consumer, as well as increase the security and operational reliability of the housing system.



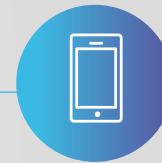
### Telemetry Systems

Autonomous telemetry systems for household and industrial sector based on BBT units.



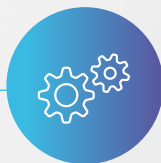
### Data Server

Russian secure IoT platform for collecting and processing telemetry data based on Astra Linux Special Edition for household and industrial energy metering units.



### Smart Abonent

A system of control and accounting of energy resources and a mobile application for managing household engineering systems and paying for utilities.



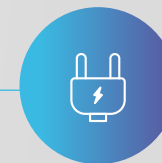
### Industrial Automation

Automation of gas distribution points, systems and services for monitoring parameters (monitoring, leaflet, schedules, events), a collection server from resource metering units.



### Telemetry Power Systems

Telemetry autonomous power systems, solar power, LiFe4Pol and LTO power supply modules.



### High Precision Electrical Equipment

High precision voltage regulators and uninterruptible power supplies (mobile monitoring, telemetry module, USB port).

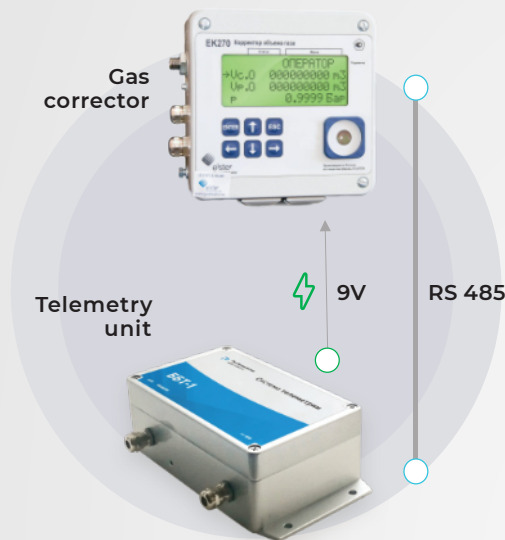
## 2.1 Industrial TELEMETRY

### 2.1.1 Telemetry units for industrial gas metering units

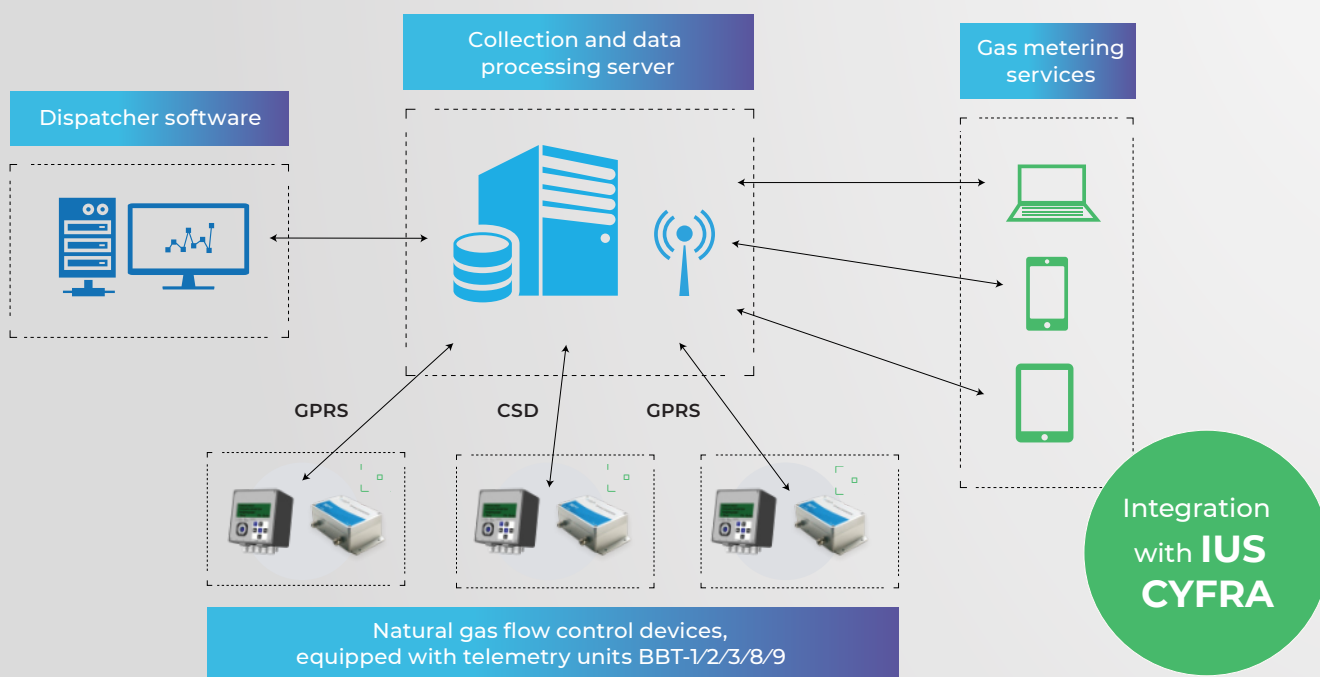
A telemetry system based on the BBT-1/2/3 units collects and transfers data from natural gas volume correctors located in the hazardous area to a server for collecting, processing and storing information via a GSM / GPRS network of 1800/900 MHz.

#### Telemetry unit provides:

- transfer to the gas supplier's server via GPRS channel data on consumption for closed and unclosed days from gas meters;
- the schedule of data transfer to the server can be quickly changed and determined by the gas supplier;
- work with existing polling programs on the CSD channel;
- support for various data transfer protocols with gas volume correctors;
- online monitoring of gas consumption parameters by SMS request.



#### Scheme of using a telemetry system based on BBT-1/2/3/8/9





**BBT-1/3**  
Telemetry units  
with external power  
supply

Frequency range, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, CSD up to 14.4 Kbps,  
built-in TCP / IP protocol

Degree of protection  
IP52



**BBT-2**  
Telemetry unit  
with uninterrupted  
power supply

Frequency range, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, CSD up to 14.4 Kbps,  
built-in TCP / IP protocol

Degree of protection  
IP52



**BBT-8**  
Telemetry unit  
with autonomous  
power supply

Frequency range, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, CSD up to 14.4 Kbps,  
built-in TCP / IP protocol

Battery life up to 3 years,  
rechargeable batteries



The possibility of autonomous operation of BBT telemetry units using autonomous / uninterruptible power supply modules with a built-in solar charge controller in the 12/24 V version is implemented.



**BBT-9-PP**  
Telemetry unit  
for gas meters  
Prince-M

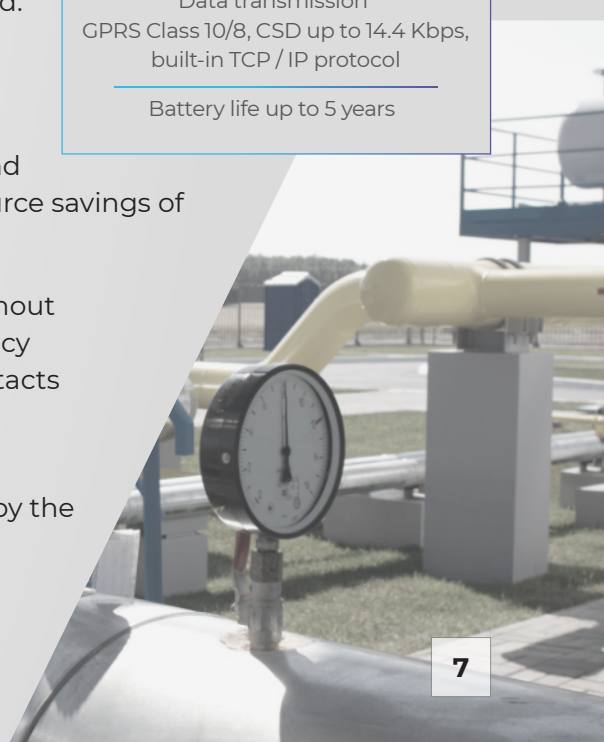
Frequency range, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, CSD up to 14.4 Kbps,  
built-in TCP / IP protocol

Battery life up to 5 years

**Преимущества промышленных блоков телеметрии:**

- A universal device for various types of correctors: Flowgas, Irvis, EK-260/270/280/290, TC-220, VKG-3T, VK, SPG, Goboy, Turboflow, Prince-M, UVP-280B, etc.
- Allows you to update internal software at the server command. When modifying exchange protocols, a service company engineer can give a command to automatically update the software of all units.
- It is a source of additional power for gas volume correctors and the RS-485 interface, which allows you to maximize the resource savings of the internal batteries of the corrector.
- The block polls the corrector according to a set schedule, without contacting the server, and analyzes the presence of emergency situations; if they appear in the corrector, it unscheduled contacts the server and/or sends an SMS to the number specified in the settings.
- Possibility of flashing gas parameters (density, CO, nitrogen) by the server in automatic mode for all correctors connected via BBT-1/2/3/8/9.





## 2.1.2 Broadcasting telemetry module

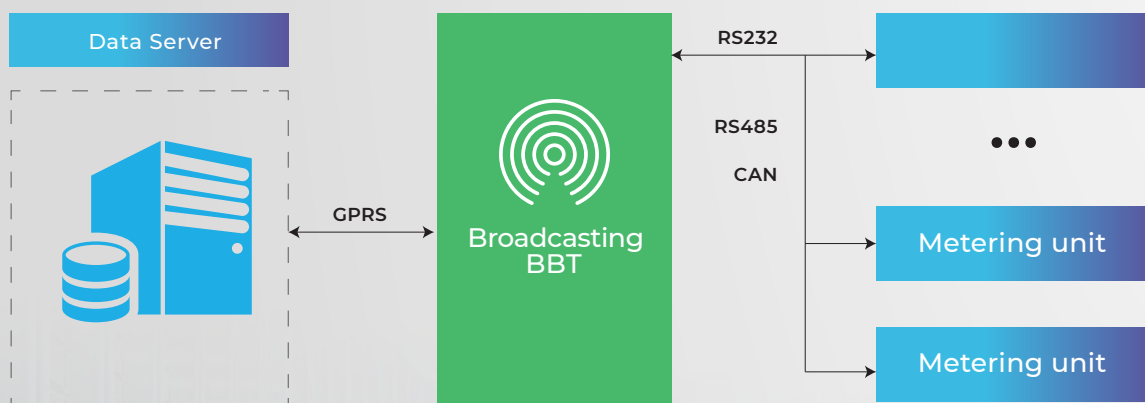
Our company has developed a universal approach to building a data collection system for any type of energy metering devices with digital output.

### Main advantages:

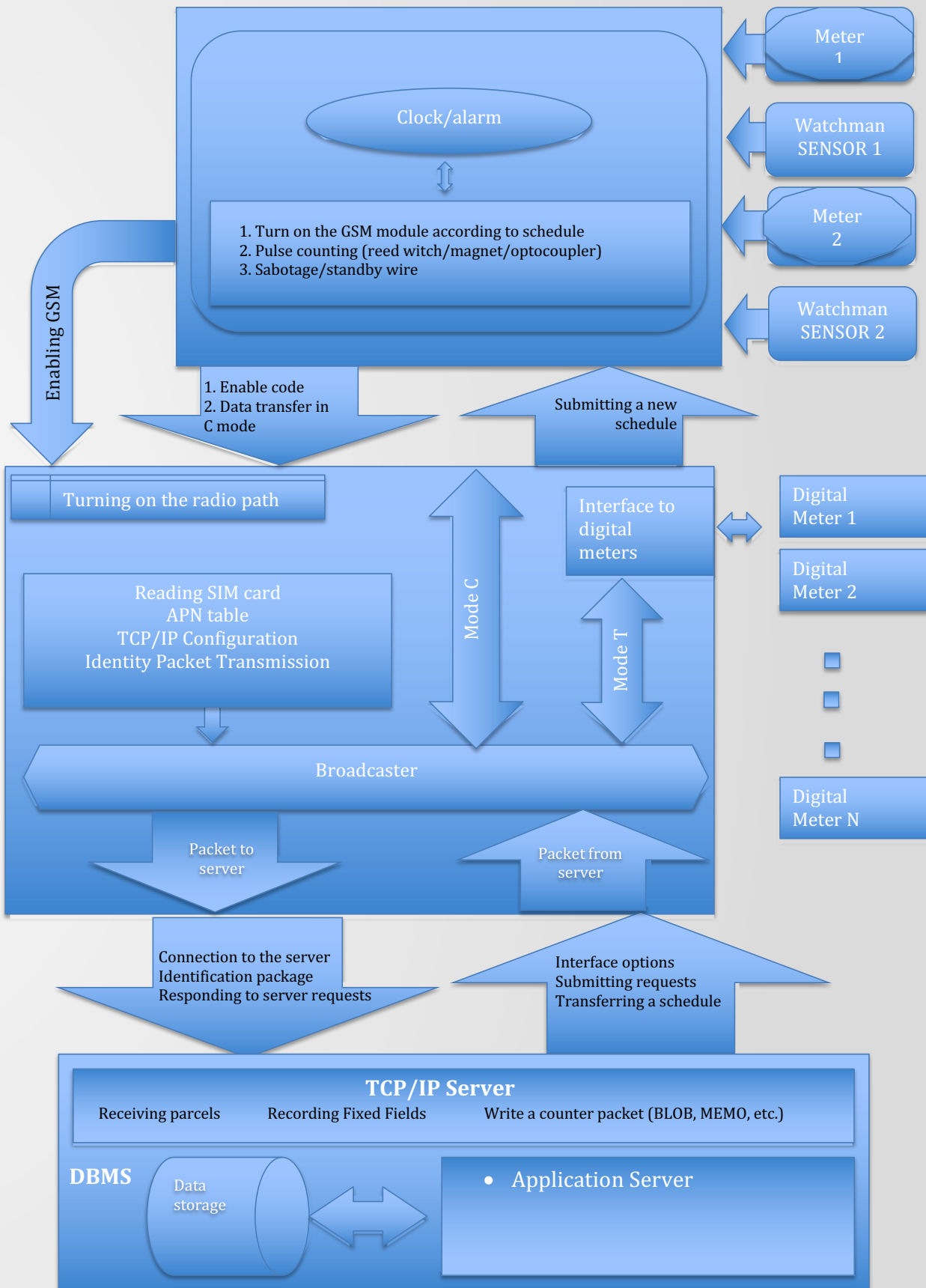
- A universal solution for industrial energy metering units equipped with a digital interface.
- A single type of telemetry module for all types of energy metering devices.
- All operating logic - functions of reading and processing data transmitted from metering devices - is performed on a secure collection server.
- Convenient and quick addition of support for new types of devices and data exchange protocols to the server.
- Universal module for scheduling communication sessions.



### Scheme of the system operation based on the broadcasting telemetry module:



### Функциональная схема работы транслирующего модуля телеметрии:



## 2.1.3 Universal programmable measuring module UMIP

The UPMP 12.4-A8 / 8 module has 8 analog inputs that provide the connection of sensors with an analog 4..20 mA interface (pressure, temperature, gas, etc. sensors). Also, in this module 8 discrete channels programmable for input / output are implemented.

Signals received via discrete channels are processed on / off (state of doors, limit switches, etc.).



Installation of a universal module UPMP 12.4-A8 / 8 performed on a DIN rail.

### The principle of operation and scope

- The module is universal and can be used to build various systems for dispatching and monitoring engineering systems, including gas supply, heating, water and electricity.
- The universal programmable module UPMP 12.4-A8 / 8 provides digital data transmission to the BBT telemetry unit.
- The transmitted data packets are transmitted through the BBT telemetry module to the monitoring system, where they are automatically processed and displayed on the dispatcher's monitor screen (inlet and outlet pressure, gas level, indoor temperature, door open or close signal).
- All received information from the objects of control and management is stored and archived in the database, which allows it to be used in the future for reporting, construction of various parametric graphs of any objects.





## 2.1.4 Autonomous pressure and temperature sensors BBT-DDT

Pressure sensors are designed for monitoring systems for operating parameters in industry: gas facilities, hydraulic and pneumatic systems, water treatment and heat supply systems, boiler automation, water supply automation, heating points, etc., where increased accuracy of pressure measurement is required.

### Specifications:

- Gauge and absolute pressure sensors.
- Battery life is up to 5 years (depending on the frequency of measurements and data transfer).
- The guaranteed number of data transmission sessions to the information collection server is 5000, 7500, 10000.
- GPRS/NB-IoT.
- Continuous mode.
- Rechargeable batteries
- Pressure measurement of media neutral to stainless steel AISI 316L (AISI 304S) (gases, steam, water).
- Permissible overload 1.5 Rmax.
- The degree of protection of the converter housing is IP65.
- Controlled parameters:
  - pressure, measurement accuracy 1%;
  - temperature, measurement accuracy  $\pm 1$  °C.
- Customizable parameters:
  - measurement frequency;
  - schedule of data transfer to the server;
  - limit values for out-of-order data transmission.
- Operating temperature range from -40 °C to + 85 °C
- OPC UA/DA
- Optional:
  - external temperature sensor -100 °C ... +1000 °C;
  - limit switch.



### Measuring ranges:



- Gauge pressure:
  - 0 - 5 кPa
  - 0 - 40 кPa
- Absolute pressure:
  - 0 - 160 кPa
  - 0 - 400 кPa
  - 0 - 600 кPa
  - 0 - 1.0 MPa
  - 0 - 1.6 MPa
  - 0 - 2.5 MPa
  - 0 - 4.0 MPa
  - 0 - 60 MPa
- Temperature:
  - 40 °C...+ 85 °C

**Ex**

Tested and approved by  
**Gazprom**  
**Mezhregiongaz**  
LLC



Is a measuring tool.  
State registry number SI 88158-23

<https://fgis.gost.ru/fundmetrology/registry/4/items/1405676>

## 2.1.5 Automation and dispatching

The system provides increased safety of gas supply, reliability of equipment operation, reduced risk of accidents and anticipation of critical situations dangerous to human life and health.

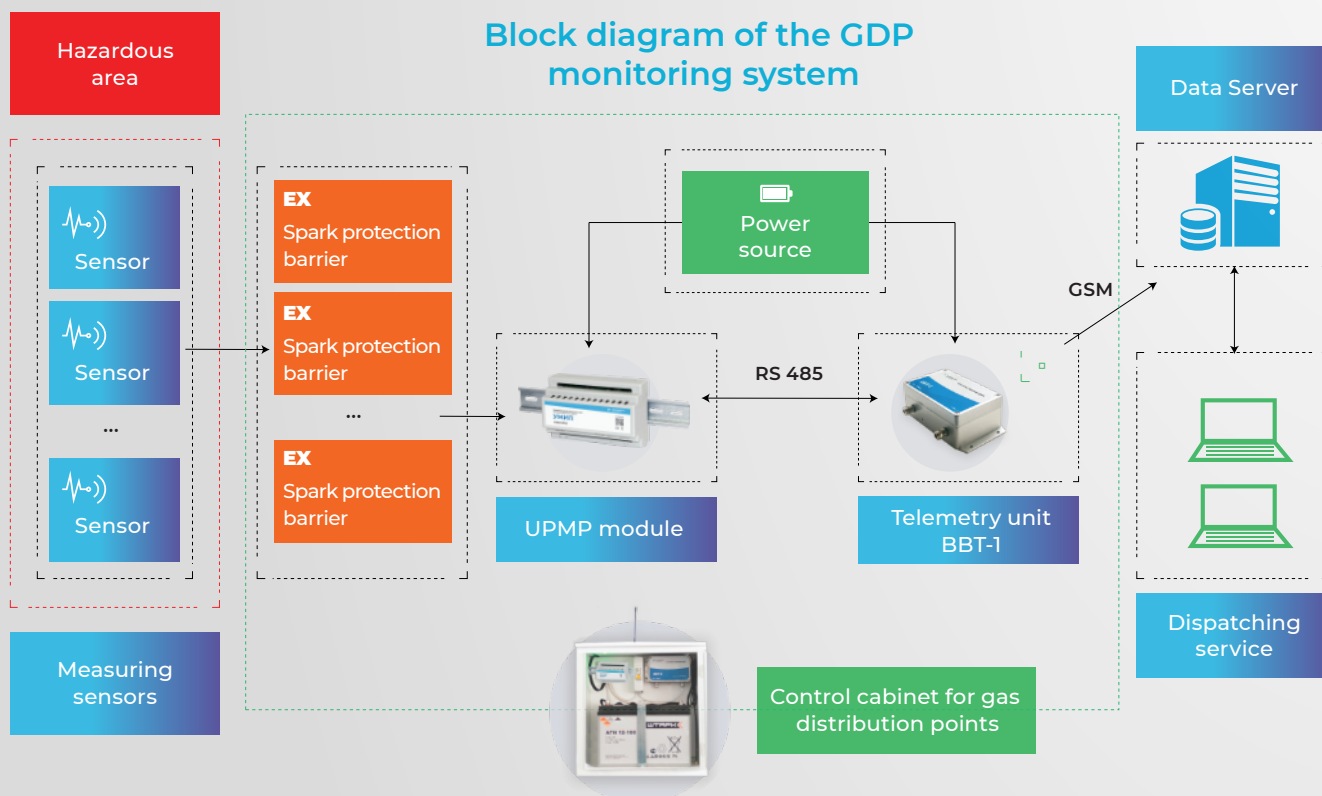
The specialists of the service and technical support department in real time monitor the readings and parameters of gas metering stations, gas distribution points, stations equipped with gas correctors of various manufacturers.

More than 20 years of experience in building autonomous power supply systems has been used by our specialists to draw up options for automating gas distribution points using batteries:

- gas distribution telemetry supply with redundancy from 1 to 2 months using an AGM Gel battery (low cost, poor frost resistance, high weight, charge 10 hours);
- gas distribution telemetry supply from 1 to 12 months using LiFePo4 battery (high cost, frost resistance, fast charge 3 hours);
- autonomous power supply of gas distribution points from solar panels with backup energy in the battery.



The developed dispatch system has been in commercial operation for more than **15 years.**



### Advantages and scope:

The system of automation and telemetry of gas distribution points is designed to control the operation parameters of gas distribution points and to respond quickly in case of emergency (parameters go beyond the set values).

AGRP-2.120 telemetry system allows monitoring parameters with data accumulation with various time intervals, up to the on-line mode.

- The use of special frost-resistant LiFePO4 batteries allows you to operate the system at temperatures below -30 °C, without significantly reducing (degrading) the battery capacity.
- The LiFePO4 battery charge takes no more than 3 hours (routine maintenance work at the gas distribution point).
- The low weight of the battery makes it easy to replace; 1 person can do the job.



### GDP controlled parameters:

- inlet / outlet pressure
- gas temperature
- GDP room temperature (hazardous area)
- temperature in the auxiliary room
- valve position
- door opening
- CH concentration (gas hazard detector in hazardous area)
- mains voltage
- battery voltage

### GDP Automation Systems Parameters

NAME	AGDP-1.31	AGDP-1.31	AGDP-2.31	AGDP-2.60	AGDP-1.60	AGDP-2.60 LiFePO4	AGDP-1.5B LiFePO4	AGDP-2.5B LiFePO4	AGDP-2.120 LiFePO4	AGDP-2.120 LiFePO4	AGDP-2.60 LTI	AGDP-2.60 LTI
Gas reduction lines	1	1	2	2	1	2	1	2	2	2	2	2
Pressure meter Ex	2 (input/output)	2 input/output	3 (1-input/2-output)	3 (1-input/2-output)	2 input/output	3 (1-input/2-output)	2 input/output	3 (1-input/2-output)	3 (1-input/2-output)	3 (1-input/2-output)	3 (1-input/2-output)	3 (1-input/2-output)
Differential pressure sensor on the filter	by order	by order	by order	by order	by order	by order	yes	by order	by order	yes	by order	by order
Temperature sensor Ex	2	2	2	2	2	2	2	2	2	2	2	2
Valve sensor	1	1	2	1	1	1	1	1	1	1	1	1
Door sensor	2	2	2	2	2	2	2	2	2	2	2	2
Gas sensor CH4	1	1	1	1	1	1	1	1	1	1	1	1
Battery capacity and type	AGM 2 pcs 12V 40Ah	AGM 2 pcs 12V 100Ah	AGM 2 pcs 12V 40Ah	AGM 2 pcs 12V 100Ah	LiFePO4 1 pcs 24V 100Ah frost resist.	1 pcs 24V 100Ah	LiFePO4 1 pcs 24V 100Ah	LiFePO4 1 pcs 24V 100Ah	1 pcs 24V 200Ah	1 pcs 24V 200Ah	LTI 24V 65Ah	LTI 48V 65Ah
Battery life	31 days	60 days	31 days	60 days	60 days	60 days	10 years, battery repl.	10 years, battery repl.	120 days	120 days	90 days	180 days
Integrated solar panel	no	no	no	no	no	no	yes	yes	no	no	no	no
Battery charging time	8 hours	8 hours	8 hours	8 hours	3 hours	3 hours	3 hours	3 hours	3 hours	3 hours	10 min	10 min
Battery Operating Temperature	-10..+30 °C (insulation required)	-10..+30 °C (insulation required)	-10..+30 °C (insulation required)	-10..+30 °C (insulation required)	-20..+35 °C	-20..+35 °C	-20..+35 °C	-20..+35 °C	-20..+35 °C	-20..+35 °C	-50..+60 °C	-50..+60 °C
Battery Life	up to 5 years*	up to 5 years*	up to 5 years*	up to 5 years*	5-8 years	5-8 years	5-8 years	5-8 years	5-8 years	5-8 years	25 years	25 years



## 2.2 Household TELEMETRY

The BBT-4/5/6/9 telemetry units, designed for household gas, electricity, cold and hot water meters, do not need additional settings and programming, the internal software is adapted to work in all regions of Russia and neighboring countries.

### Benefits and new features:

- Telemetry units do not require additional power, physical communication lines and wiring.
- Internal data archive:  
Storage of daily archives - 3 months.  
Storage of hourly archives - 1 month.
- The archives contain the measured volume of consumption for the period, the values of the ambient temperature, as well as data on the operation of the sabotage sensor (exposure to an external magnetic field).
- All devices undergo pre-sale testing and do not require service for the entire period of operation.
- Unified data collection software.
- User's personal account.

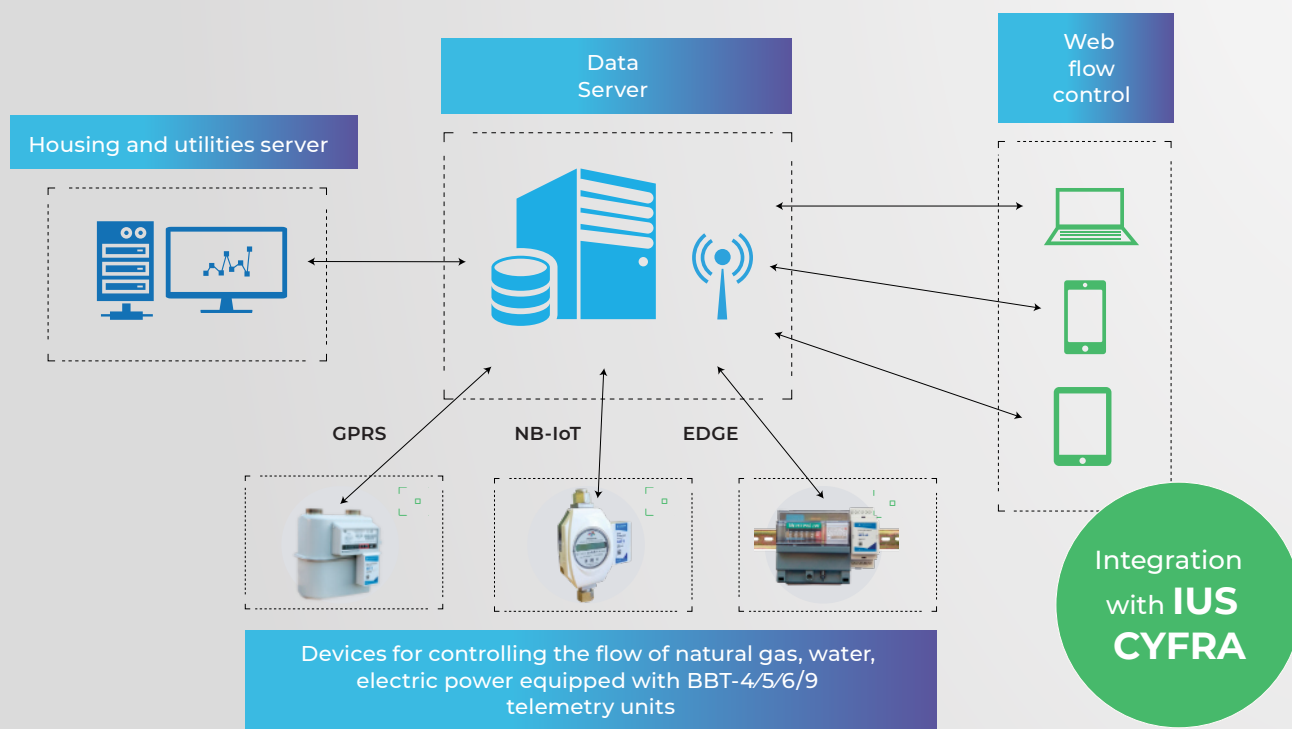
### Guaranteed battery life

The service life of the unit with autonomous power supply BBT-4/5/6/9 is up to 10 years.

### Ready-made solution

for gas meters Elster, Itron, Vector, RusBelGaz, Berestyie, Gazdevice, Schetpribor, Grand, Prince, etc.

### Scheme of using a telemetry system based on BBT-4/5/6/9





**BBT-4**

for gas meters  
with pulse output  
type "dry contact"

Frequency ranges, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, built-in  
TCP / IP protocol

Suitable for counters  
GSN, SGBET



**BBT-5**

with magnetic  
sensor

Frequency ranges, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, built-in  
TCP / IP protocol

Suitable for counters  
Itron, Vector-M, Elster,  
Berestye



**BBT-6**

for gas meters  
with digital  
output

Frequency ranges, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, built-in  
TCP / IP protocol

Suitable for counters  
Rubin, RusBelGas



**BBT-9-PB**

for gas meters  
with digital output  
Prince

Frequency ranges, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, built-in  
TCP / IP protocol

Suitable for Prince-M  
series meters



**BBT-4-2**

for household  
cold and hot water  
meters

Frequency ranges, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, built-in  
TCP / IP protocol

2 counting channels  
(hot and cold water)



**BBT-6-M**

for household  
electricity meters

Frequency ranges, MHz  
GSM-GPRS 850/900/1800/1900

Data transmission  
GPRS Class 10/8, built-in  
TCP / IP protocol

For multi-tariff  
meters with  
digital output



In household BBT telemetry units, LTE Cat-NB1 (NB-IoT), GPRS, ZigBee data transfer technologies are implemented.

## 2.2.1 Telemetry unit with controlled valve

Transmission of data on consumed gas via GSM or NB-IoT, as well as remote control of the valve depending on the status of the personal account of the subscriber.



Data is transmitted to the collection server using **NB-IoT** or **GPRS** technology

### Main advantages:

- Supports digital protocol for transmitting gas meter data and the ability to count pulses.
- The use of a controlled valve increases the percentage of timely payments for gas consumed.
- The battery life is up to 10 years (depending on the frequency of data transfer and the number of valve open / close cycles).
- Determination and indication of valve position by pressing the control button.
- Closing the valve on command from the server, request for opening by a long press of the control button.
- Valve opening / closing time is not more than 1 s.



### Customizable options:

- Schedule of data transfer to the server.
- Remote valve position control.





## 2.2.2 Telemetry units for household energy meters

DEVICE SERIES	SUPPORTED METERS			
<p><b>Pulse input telemetry units</b> BBT-4 series</p> <ul style="list-style-type: none"> <li>■ NB-IoT/GPRS version</li> <li>■ battery life 5/10 years</li> <li>■ free data collection server</li> <li>■ billing systems integration</li> <li>■ user account</li> </ul>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Gas meter <b>GRAND</b></p> </div> <div style="text-align: center;">  <p>Gas meter <b>GSN</b></p> </div> <div style="text-align: center;">  <p>Gas meter <b>GGBET "Sigma"</b></p> </div> </div>			
<p><b>Telemetry units with magnetic sensor</b> BBT-5 series</p> <ul style="list-style-type: none"> <li>■ NB-IoT/GPRS version</li> <li>■ battery life 5/10 years</li> <li>■ free data collection server</li> <li>■ billing systems integration</li> <li>■ user account</li> </ul>	<div style="display: grid; grid-template-columns: repeat(4, 1fr); gap: 10px;"> <div style="text-align: center;">  <p>Gas meters <b>BK, BERESTJE</b></p> </div> <div style="text-align: center;">  <p>Gas meter <b>ITRON</b></p> </div> <div style="text-align: center;">  <p>Gas meter <b>VECTOR-MT</b></p> </div> <div style="text-align: center;">  <p>Gas meter <b>SGD</b></p> </div> </div>			
<p><b>Telemetry units with digital input</b> BBT-6 series</p> <ul style="list-style-type: none"> <li>■ NB-IoT/GPRS version</li> <li>■ battery life 5/10 years</li> <li>■ free data collection server</li> <li>■ billing systems integration</li> <li>■ user account</li> </ul>	<div style="display: grid; grid-template-columns: repeat(4, 1fr); gap: 10px;"> <div style="text-align: center;">  <p>Gas meter <b>Omega ETK</b></p> </div> <div style="text-align: center;">  <p>Gas meter <b>VECTOR-T</b></p> </div> <div style="text-align: center;">  <p>Gas meter <b>RusBelGas</b></p> </div> <div style="text-align: center;">  <p>Gas meter <b>SGMB</b></p> </div> </div>			
<p><b>Telemetry units for cold / hot water meters</b></p> <ul style="list-style-type: none"> <li>■ NB-IoT/GPRS version</li> <li>■ battery life 5/10 years</li> <li>■ 1 or 2 counting channels of impulses</li> <li>■ billing systems integration</li> <li>■ user account</li> </ul>	<div style="text-align: center;">  <p>For water meters <b>SINGLE CHANNEL</b></p> </div>		<div style="text-align: center;">  <p>For water meters <b>TWO-CHANNEL</b></p> </div>	
<p><b>Telemetry units for electricity meters</b></p> <ul style="list-style-type: none"> <li>■ NB-IoT/GPRS version</li> <li>■ multi-tariff meter support</li> <li>■ DIN rail mounting</li> <li>■ backup power</li> </ul>	<div style="text-align: center;">  <p>For single tariff electricity meters</p> </div>		<div style="text-align: center;">  <p>For multi-tariff electricity meters</p> </div>	

## 2.2.3 Electronic counting device with telemetry module

Automatic transmission of readings to the collection server, remote control of the shut-off valve, monitoring of leaks and exceeding the maximum flow rate.

Meters equipped with the electronic counting mechanism of Rustekhnologiya LLC fully comply with **the standard technical requirements of Gazprom Mezhhregiongaz LLC** for household gas meters, approved by the order of Gazprom Mezhhregiongaz LLC dated January 24, 2020 No. 81-R/4.

### Main characteristics:

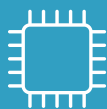
- Alphanumeric LCD display.
- High quality PCB antenna.
- Resistance to ultraviolet radiation.
- Extended temperature range from -40 to +60 °C.
- Proprietary data transfer protocol, low load on the GSM network.
- Two independent power supplies - for the metrological and telemetric parts of the board.
- Reduced power consumption, telemetry power supply LiPo 2000mAh 4.2 - 3.4V.
- Digital thermal correction.
- Possibility of setting excess pressure constant.
- Session diversity module - increases transmission reliability in "difficult" areas significantly, since sessions are separated by time.

### Benefits for meter manufacturers:

- 100% ready solution.
- Verification and calibration software.
- Production process software.
- Package of documents for certification.
- Full support.



It is possible to adapt the board to any type of membrane natural gas meter.



### GPRS or NB-IoT version

The GSM GPRS/NB-IoT controller supports internal firmware and fast data exchange with the server.



DEVICE SERIES	SUPPORTED METERS		
<p><b>Membrane natural gas meters with electronic counting device</b></p> <ul style="list-style-type: none"> <li>Controlled parameters: archives of meter readings, emergency situations, events, interventions, impacts, in accordance with the standard technical requirements of Gazprom Mezhtregiongaz LLC for household gas meters.</li> <li>battery life up to 5 years</li> <li>unified data collection software</li> <li>integration with billing systems</li> <li>user's personal account</li> <li>mobile app</li> </ul> <div data-bbox="193 792 440 1037" style="background-color: #28a745; color: white; border-radius: 50%; width: 150px; height: 100px; display: flex; align-items: center; justify-content: center; margin: 20px auto;"> <p style="text-align: center; margin: 0;">Integration with IUS CYFRA</p> </div>	 <p style="background-color: #0056b3; color: white; padding: 5px; margin-top: 10px;">Gas meter <b>OMEGA ETK GSM</b></p>	 <p style="background-color: #0056b3; color: white; padding: 5px; margin-top: 10px;">Gas meter <b>SCHETPRIBOR SGD GSM</b></p>	 <p style="background-color: #0056b3; color: white; padding: 5px; margin-top: 10px;">Gas meter <b>VECTOR SGV GSM</b></p>
	 <p style="background-color: #0056b3; color: white; padding: 5px; margin-top: 10px;">Gas meter <b>METEKO MK-ETK</b></p>	 <p style="background-color: #0056b3; color: white; padding: 5px; margin-top: 10px;">Gas meter <b>PROGRESS GSP-02</b></p>	 <p style="background-color: #0056b3; color: white; padding: 5px; margin-top: 10px;">Gas meter <b>PIETRO FIORENTINI</b></p>

### Display modes:

- measured volume of gas (m<sup>3</sup>), reduced to a standard value at a temperature of +20 °C;
- instantaneous gas flow (m<sup>3</sup>/h), reduced to the standard value at a temperature of +20°C;
- gas temperature (°C);
- supply voltage values for metrological and telemetric batteries;
- set value of absolute gas pressure (kPa);
- current date and time;
- next communication session;
- serial number;
- emergency situations and events;
- stages of data transfer to the server.

### Shut-off valve control:

- Remote control of the shut-off valve can be performed from the server by the system operator.
- Automatic closure of the valve occurs when consumption > 1.25Q<sub>max</sub> or when the housing is opened.
- Leakage control when the valve is open.

### Storing and transferring archives to the server:

- Accumulated volume reduced to standard conditions.
- Consumption and temperature values averaged over an hour.
- Archives of accidents, emergency situations, events.



## 2.3 Industry SOFTWARE

### 2.3.1 IoT secure telemetry data collection platform

A unified server data collection system for industrial and household energy metering units, which is designed to create on its basis automated systems in a secure design that process information up to the “top secret” level.

Due to the use of the Astra Linux Special Edition OS and the BREST virtualization management software package, the system has a high degree of scalability, fault tolerance and availability.



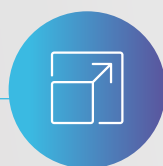
#### Technical capabilities:

- Maximum system performance and reliability.
- The TCP-IP transport protocol and the MQTT data exchange protocol are used.
- The amount of traffic is minimized by transmitting only incremental data.
- The telemetry modules operate in a single subnet of IP addresses (for GPRS, 3G) and via the UDP protocol for NB-IoT networks.
- Convenient and quick addition of support for new types of devices and data exchange protocols to the server without the participation of developers.



#### Security

The core of the operating system of the data collection and processing server is implemented on the basis of the domestic platform Astra Linux Special Edition (the OS is certified in accordance with the information security requirements of the Federal Service for Technical and Export Control of Russia).



#### Scalability

The domestic database management system PostgrePro is used (the DBMS is certified according to the security requirements of information security tools of the FSTEC of Russia), which makes it possible to easily scale the server system.



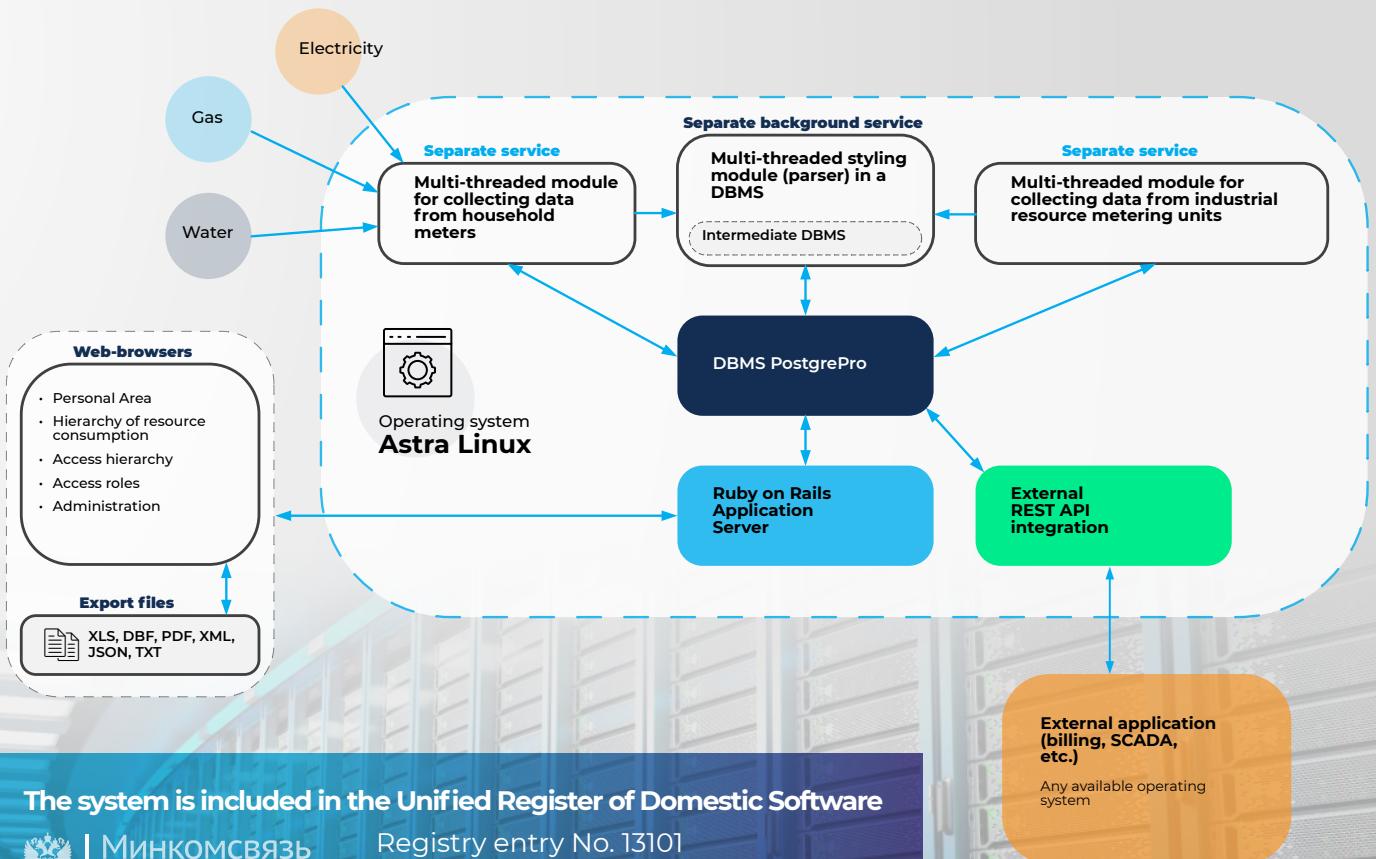
#### Efficiency

The server software comes with open source OpenSource. It can be installed on existing server platforms as a virtual server, without purchasing new server hardware.

### Software architecture:



### Block diagram of a secure data collection server:



The system is included in the Unified Register of Domestic Software



Минкомсвязь  
России

Registry entry No. 13101  
from 03/25/2022

## 2.3.2 User's personal account

- “Personal Account” is a personal interactive user page that displays information about registered telemetry devices.
- Owners of telemetry blocks registered on the site can get access to the “Personal Account”. Creating an account does not require a lot of time, it is enough to enter personal data (name for contact), specify an email address (to duplicate notifications), come up with a username and password.
- An authorized user can remotely receive individual information and monitor meter readings, monitor changes in tariffs, maintain interactive communication with management companies and much more.
- When you go to the device's page, the user can see the last transmitted readings, the accumulated volume, flow rate and the date of taking the readings in the form of a table, as well as view the monthly gas consumption volumes for the selected period in graphical form.
- Connecting and viewing data is possible from anywhere with access to the Internet.
- The official mobile app for smartphones running Apple iOS and Google Android.



### Safety guarantee

- Используемый протокол HTTPS обеспечивает шифрование данных и делает их недоступными для просмотра посторонними.

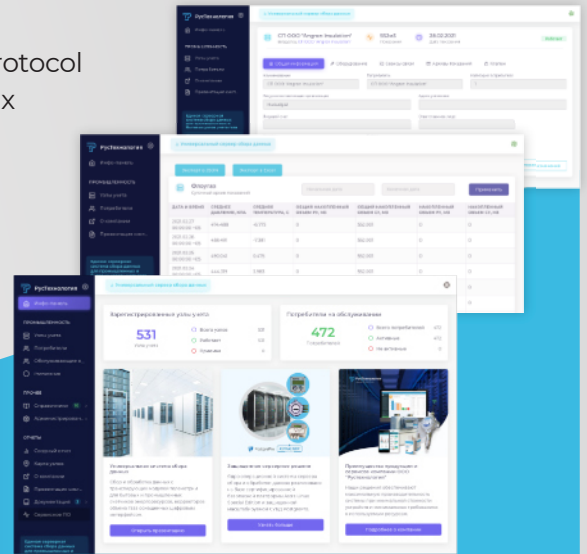




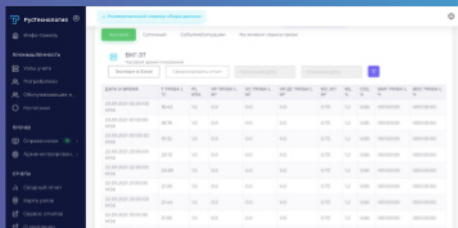
### 2.3.3 WEB administration

System administration is carried out using a secure HTTPS protocol via a browser. Authorization is implemented using Astra Linux Special Edition.

User administration is built on the principles of role-based access control (RBAC), in which each user is assigned a specific set of rights and authorities. At the head is a company administrator who can manage users within his enterprise.



#### Data archives

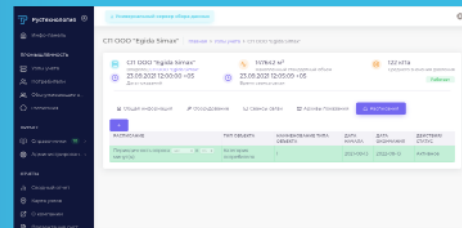


In the metering unit card, depending on the model of the gas volume corrector or metering device, the system user has the opportunity to view various types of archives (hourly, daily, monthly, interval, archives of events and emergency situations).

Implemented automatic export of data to the IMUS and AIS "Regiongas" systems, as well as export to CSV, DBF, XLS, PDF formats.



#### Schedule module



The communication session time of the telemetry unit for each of the available categories of consumers is determined in accordance with the schedule specified on the server.

Monthly, weekly, daily and one-time types of communication sessions are available, which can be combined as desired.

## 2.3.4 Predictive analytics module: “Probabilistic analysis of gas consumption patterns and data visualization”

**The predictive analytics module** “Probabilistic analysis of gas consumption patterns and data visualization” is an important part of the “IoT-secured telemetry data collection platform.” It provides the ability to collect, analyze and visualize data related to gas consumption and plays a key role in optimizing resource management.

The main goal of the predictive analytics module is to identify patterns and trends in gas consumption, as well as provide information necessary for making more effective decisions in gas supply management. The module uses probabilistic analysis methods to identify hidden patterns in gas consumption data, including searching for seasonal patterns, analyzing dependencies on external factors, and predicting future gas consumption.

The module provides the ability to **visualize gas consumption data** using color tables. Data visualization using color tables allows you to clearly present information about gas consumption. In tables, each cell contains flow/pressure/temperature or other selected parameter and takes on a specific color depending on the degree to which the value deviates from the average, expected, or time-based value. For example, you could use a green to red palette, where cells with low variance would appear in green and cells with high variance would appear in red.

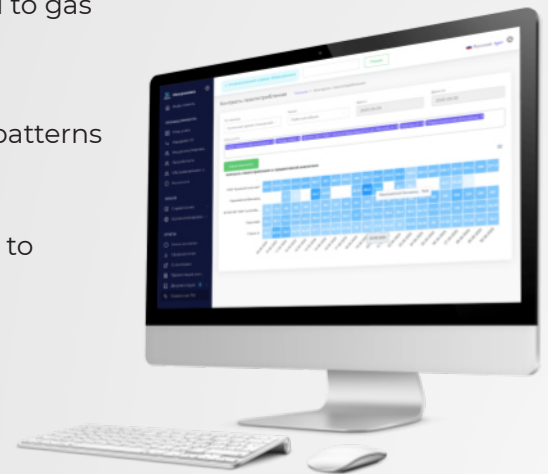
Colored tables and grouping by gas consumption categories allow dispatchers and metrologists to **quickly visualize and analyze gas consumption data**. They can easily notice high or low values, anomalies or patterns in consumption just by looking at the table. Additionally, color visualization allows you to quickly compare values across cells and discover patterns or trends.

The module is also equipped with artificial intelligence algorithms that allow you to generate behavioral signs of data sets or deviations. Artificial intelligence is capable of identifying complex patterns and dependencies, which helps predict future gas consumption and detect anomalies in the gas consumption system on the fly. This allows you to quickly respond to problems and effectively plan gas supply.

The predictive analytics module makes a significant economic contribution to gas supply and resource management.

### **This is ensured by the following factors:**

- Optimizing the use of resources.
- Prevention and early detection of problems.
- Accurate resource planning.
- Improved decision making.
- Automatic processing of large volumes of data.

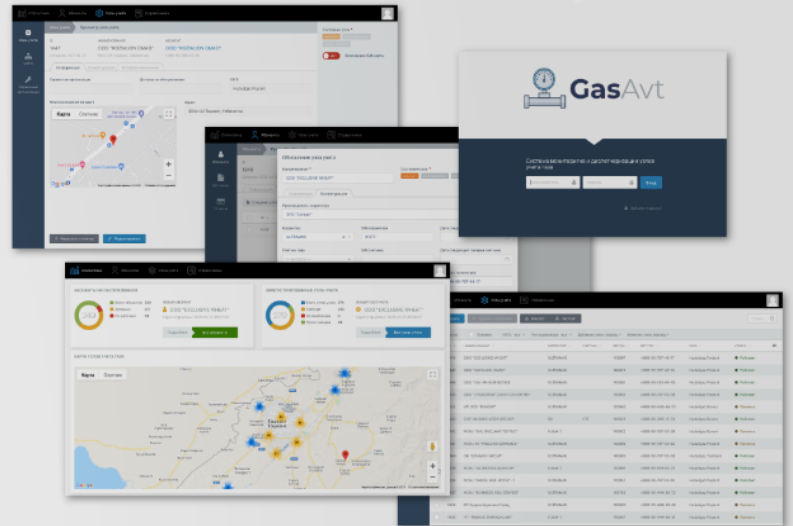


## 2.3.5 Metering units maintenance system

The GasAvt system is a ready-made solution for organizing a centralized system for servicing metering units and monitoring contractual relations with industrial consumers of natural gas.

The solution is the basis for building a single control panel for metering units and is connected to the “Universal Data Collection Server” software platform via Web API.

The system is built on the Laravel framework and is easily scalable and customizable according to the requirements of end customers.



Laravel  open source

### System capabilities:

- Dispatching of gas metering units.
- Managing consumers, resource providers and service organizations.
- Setting up and managing the hierarchy of gas supply companies.
- Adding and monitoring the execution of service contracts.
- Monitoring and control of scheduled equipment checks.
- Directory management (correctors, gas meters, telemetry, standard sizes, manufacturers, etc.)
- Data export and logging of user actions.
- Interactive map of metering nodes with dynamic clustering by region (using Google Maps API).
- Linking objects to locations on the map, address directory with auto-completion (using Google Maps API).
- Automatic completion of data and verification of details of consumers and service organizations (using Dadata API).
- Dynamic statistics widgets and notification system about current and upcoming events.
- Administration of roles and access levels of operators, administrators and other system users.

## 2.3.6 Dispatch of pressure and temperature sensors for gas distribution facilities

The system provides on-line monitoring of operating parameters at gas facilities, in hydraulic and pneumatic systems, water treatment and heat supply systems, boiler automation, water supply automation and heating points where increased accuracy of pressure measurement is required.

Graphic display of pressure and temperature of resources by objects allows for constant monitoring of changes in pressure and loads depending on the distance of the object from the main distribution lines, as well as determining peak load conditions.

### Extensive customization options and convenient data analysis

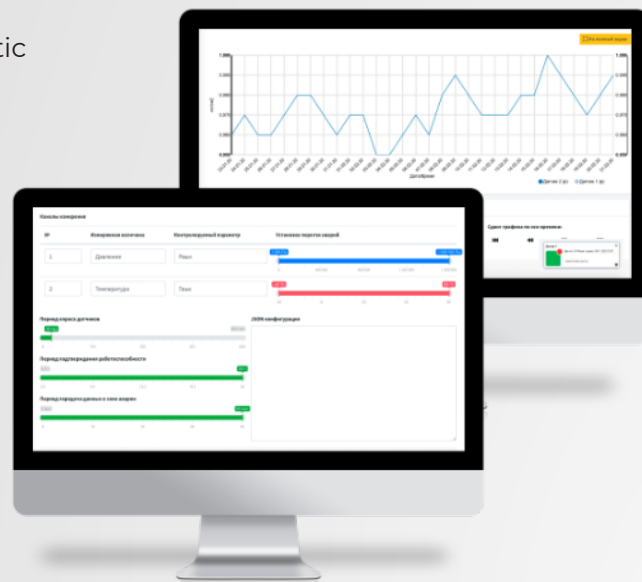
The manager configures for each device the frequency of measurements, the schedule for data transfer to the server, and the limit values for unscheduled data transfer.

For each channel you can set the minimum and maximum alarm threshold.

Access to the automated system is carried out via the HTTPS protocol.

### Adjustable and controllable parameters:

- The sensor polling period is 5-600 s.
- The performance confirmation period is 0.5-24 hours.
- The period of data transmission in the accident zone is 5-60 minutes.
- Setting alarm thresholds
  - minimum
  - maximum
- Transfer of accumulated archives during the next communication session.
- Archiving period 10-60 minutes.



Наименование	Время	Состояние	Давление	Единицы измерения	Температура, °C	Состояние батареи, %	Количество сеансов связи	Уровень сигнала, %	IMEI
ГРУТ Криве Рок	22.09.2021 09:20	Норма	↓ 104.81	кПа	↓ 16.61	97	4256	83	86123004631746
ГРУТ Марино Рок	22.09.2021 07:48	Норма	↓ 102.85	кПа	↓ 7.45	65	4877	50	86123004633734
ГРУТ Арениск Рок	22.09.2021 06:23	Норма	↓ 102.23	кПа	↓ 15.95	72	4530	53	86123004633858
ГРУТ Еленгеря Рок	22.09.2021 04:28	Норма	↓ 101.52	кПа	↓ 13.55	73	5072	56	86123004632185
ГРУТ Криве Рок	22.09.2021 12:11	Норма	↓ 105.91	кПа	↓ 19.96	74	5818	80	86123004633940
ГРУТ Еленгеря Рок	22.09.2021 11:27	Норма	↓ 103.63	кПа	↓ 14.80	79	5641	85	86123004633858
ГРУТ Арениск Рок	22.09.2021 11:24	Норма	↓ 102.84	кПа	↓ 12.51	74	5388	60	86123004633862
ГРУТ Марино Рок	22.09.2021 11:09	Норма	↓ 103.23	кПа	↓ 13.80	82	3994	59	86123004633731



### 2.3.7 Universal OPC UA server and SCADA client

Our clients have the opportunity to receive data through a cross-platform OPC UA server of their own design using a SCADA client.

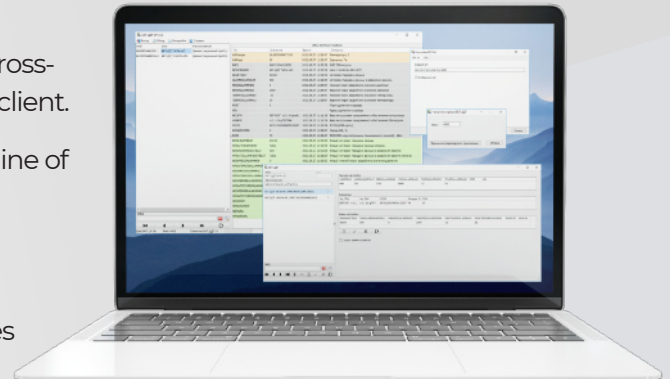
The developed universal OPC UA server supports the entire line of manufactured pressure and temperature sensors with autonomous power supply BBT-DDT.

OPC UA (Unified Architecture) is a modern standard that describes data transmission in industrial networks. It provides secure and reliable communication between devices, while being hardware and platform independent, which allows for data exchange between devices with different operating systems.

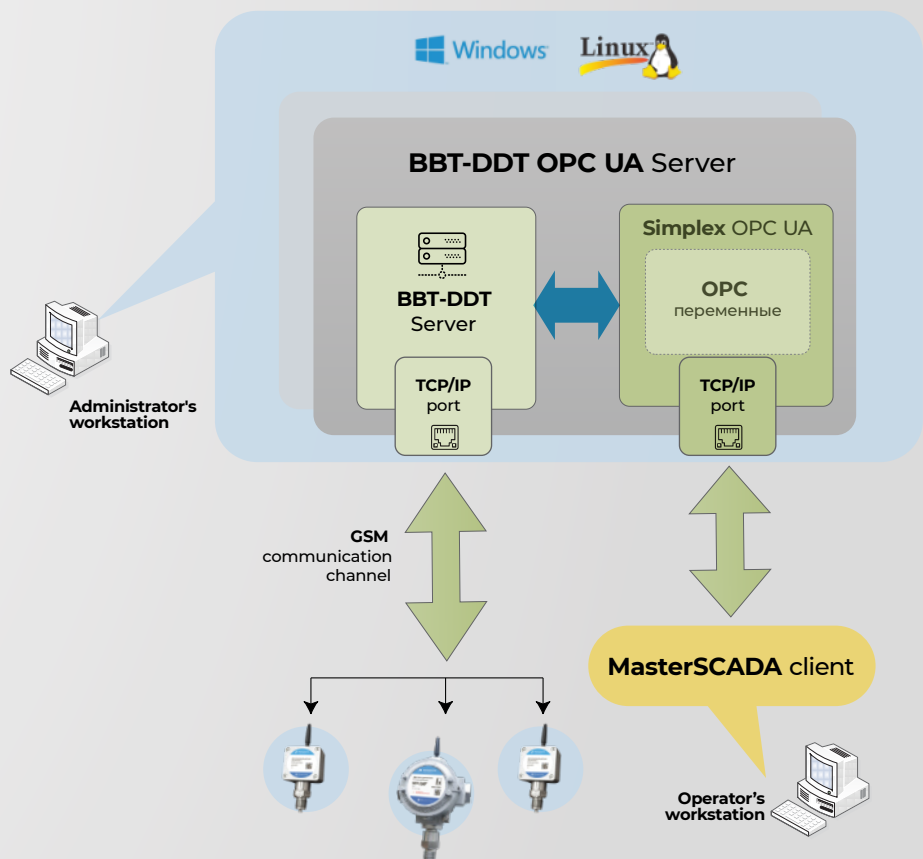
Data exchange occurs through binary structures and XML documents. In addition to the client/server model, a publisher/subscriber model is also available. In addition, the standard defines a mechanism to support redundancy (if one client becomes unavailable, another will replace it) and rapid restoration of communication in the event of failure.

Data transfer occurs via the transport protocol TCP, HTTP/ SOAP or HTTPS. Instead of access rights control mechanisms, OPC UA implements support for digital certificates and the ability to encrypt transmitted data.

Using the SCADA client via the OPC UA server, the system operator manages the configurable parameters (alarm thresholds, polling period, performance confirmation period, data transmission period in the emergency zone) of pressure and temperature sensors with autonomous power supply BBT-DDT.



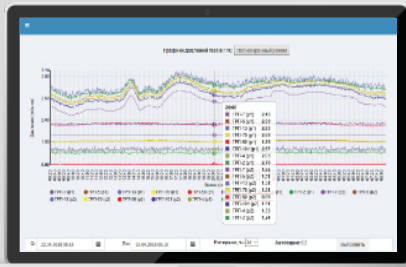
### Block diagram of the operation of OPC-UA server components



## 2.3.8 Software systems for the oil and gas sector



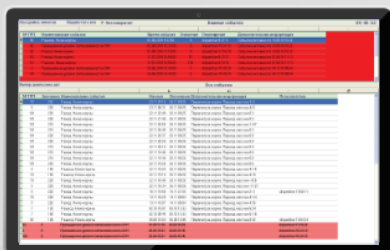
### Monitoring parameters of gas distribution points



- Timely submission to the dispatcher of reliable and sufficient information on the progress of technological processes, the condition of equipment and technical means in digital and graphic form.
- Rapid warning of emergency situations of gas distribution points equipment, as a result of reducing the frequency of gas distribution points detours in order to monitor their condition.



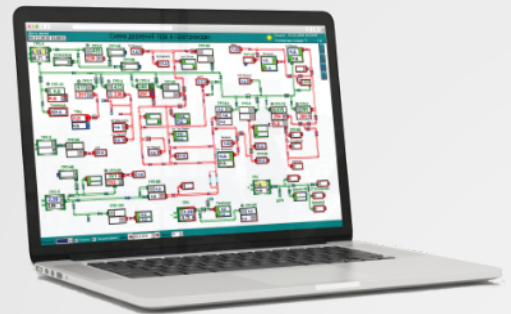
### Real-time parameter monitoring and logging service



- Automated statistics accumulation, analysis and forecasting of parameters in gas distribution networks.
- The system automatically controls the output of parameters beyond the settings and informs the dispatcher.



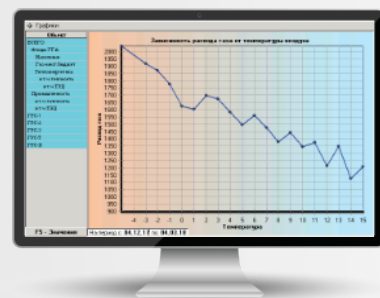
### Gas supply scheme



- Real-time visual control of gas consumption parameters.



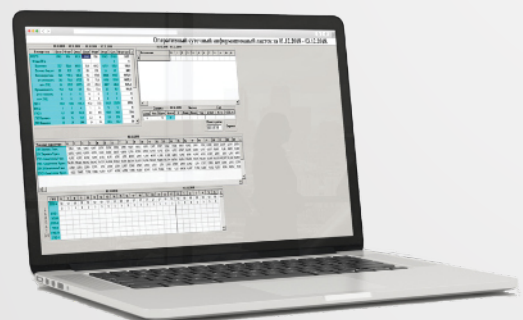
### Graphs of dependence and forecast of gas flow



- By consumer categories depending on  $t^{\circ}C$  environment.



### Operational Gas Consumption Sheet



- Limit discipline control 24/7.
- Gas balance in the gas supply system.
- Monitoring deviations of gas consumption from planned values.

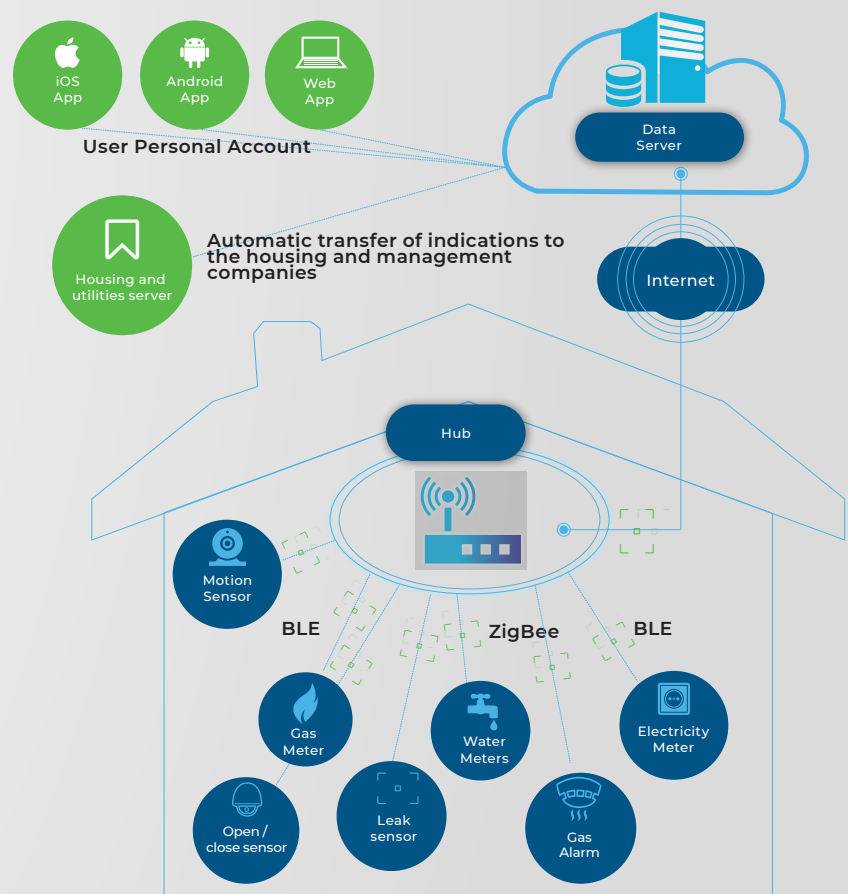
## 2.4 Software and hardware complex SMART ABONENT

The “Smart Abonent” hardware and software complex provides integrated management of home automation and energy resources, guarantees the safety of living and ensures the automatic transmission of meter readings to energy supplying companies.

### Features and Benefits:

- The system controls the flow of gas, electricity, cold and hot water, heat energy, controls the microclimate (air conditioning, heating, ventilation), and also protects against leaks of natural and liquefied gas, smoke and power surges, signals flooding and water leakage.
- The owner is notified of the events occurring in the house (triggering of a security or fire alarm, etc.). Residents and management companies are always aware of emergency situations in the apartment.
- The exclusion of inaccurate data exempts subscribers from visiting controllers to take readings and reconciliations with the supplying companies for recalculations or tariff changes.
- Communication and direct line with utilities, monitoring of repair requests, sealing and other additional services.
- The system works on the basis of a web server built on a stack of open source technologies (Linux, Apache, PostgreSQL) and the user interface is a web application, so you can access the control from any device that has a web browser.

The system **automatically transfers** the readings of electricity, gas, cold and hot water meters to the data collection server of resource-supplying companies.



## 2.4.1 Mobile application

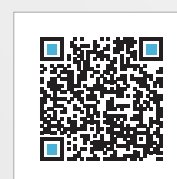
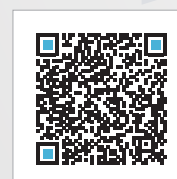
We offer a modern, functional application for the Google Android and Apple iOS mobile systems with a convenient, intuitive user interface.



### Smartphone Control

- 1 **Smart home** system.
- 2 Monitoring and analysis of all resource costs, and as a result, **optimization of energy consumption up to 20%**.
- 3 **Service orders** to the service and resource supply companies directly from the application.
- 4 **Improving housing safety**, intrusion control, natural and carbon monoxide control.
- 5 **Mobile notifications**.
- 6 **Tariff management** and payment (all according to the actual cost of resources).
- 7 **No need to travel to recalculations** (tariff changes, accrual on average).
- 8 **Monitoring and accounting of several objects** (help pay for the resources of parents / children / rent, etc.)
- 9 **Available statistics** on consumption and expenses monthly / daily / hourly.
- 10 **Connection of additional sensors** (leakage, smoke, valves and others).

Complete integration of data with the accounting systems of resource supply companies has been implemented





## 2.4.2 Wireless sensors and gas alarms

The Smart Abonent system can connect wireless sensors, sensors (leakage sensors, door opening sensors, smoke sensors, etc. with wireless communication GPRS, ZigBee, BLE), as well as household gas alarms for protection against natural leaks and monitoring carbon monoxide with LCD/LED display and further control via a mobile application for iOS and Android.

If an event is triggered (gas leak, door opening, water leak, etc.), the device transmits a message to the server, which in turn generates a PUSH notification to a mobile phone or dispatch system.



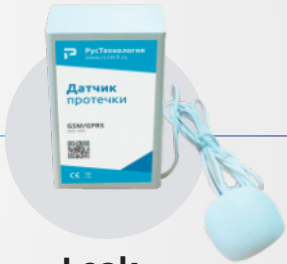
It is possible to use an unlimited number of sensors of the same type; in this case, sensors can be grouped by objects.



To use sensors in conditions of limited GSM coverage, a modification is provided with the ability to connect an external antenna.



It is possible to place sensors in different geographical regions, and they will all be combined in one personal account.




**Leak sensor**  
for the  
"Smart Abonent"

---

Frequency ranges, MHz  
GSM-GPRS 850/900/1800/1900

---

Data transmission  
GPRS Class 10/8, built-in  
TCP / IP protocol




**Door sensor**  
for the  
"Smart Abonent"

---

Frequency ranges, MHz  
GSM-GPRS 850/900/1800/1900

---

Data transmission  
GPRS Class 10/8, built-in  
TCP / IP protocol



**Gas alarms**  
"SMARTGAS" 018

---

LCD/LED display  
Microprocessor control  
Backup battery  
Housing made of non-flammable ABS plastic

---

When a gas level is detected above a threshold value, the alarm gives sound and light signals with the gas level indicated on the display and issues a command to close the valve.

Parameter	SMARTGAS-018-1	SMARTGAS-018-2
Sensor type	CH4 - catalytic	CH4 - catalytic CO - electrochemical
Measurement range	Volume fraction of CH4, %: 0.2 – 1.0	Volume fraction of CH4, %: 0.2 – 1.0 Volume fraction of CO, ppm: 50 – 120
Telemetry Module Type*	GSM, Wi-Fi (2.4 ГГц), ZigBee, Bluetooth Low Energy (2.4 ГГц)	GSM, Wi-Fi (2.4 ГГц), ZigBee, Bluetooth Low Energy (2.4 ГГц)
Possibility of connecting a backup signaling device (siren)	Using the control unit actuators	Using the control unit actuators

\* optional

## 2.4.3 Surge Protectors

Our company has extensive experience in designing and manufacturing high-precision modern electrical equipment and offers electronic voltage stabilizers of the Classic, Ultra and Ultra-M series.

### Main advantages:

- Remote control and visual monitoring of stabilization parameters is carried out through the Web-interface, or through a mobile application.
- Automatic operation in emergency cases, protection against short circuit, protection against overload and surge currents.
- A wide range of operating voltages from 110 to 300 V.
- Operation at ambient temperature from -10 to + 40 °C.
- Ability to connect devices via USB-port.
- The use of high-quality thyristors in the switching circuit of the stabilizer windings allows you to start equipment with a peak current excess of up to 70%.

New models of Ultra-M voltage stabilizers are equipped with unique silent autotransformers having a triple power reserve with the minimum possible, for this type of device, own consumption.



### Classic series

12 steps of stabilization

Power: 5 to 20 kVA

Operating input voltage range: 127-256 V

Input voltage limit: 60-265 V

Stabilization Accuracy: 5 %



### Ultra series

16 steps of stabilization

Power: 5 to 20 kVA

Operating input voltage range: 127-256 V

Input voltage limit: 60-265 V

Stabilization Accuracy: 3 %



NEW

### Ultra-M series

25 steps of stabilization

Power: 5 to 20 kVA

Operating input voltage range: 110-300 V

Input voltage limit: 65-310 V

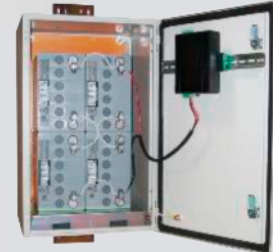
Stabilization Accuracy: 2.5 %

## 2.5 Autonomous power systems for AUTOMATION AND TELEMETRY

Rustechnology LLC develops and manufactures guaranteed backup and autonomous power supply units for telemetry and automation systems.

### Technological features:

- Battery power systems have a high degree of reliability, they are resistant to all weather conditions and ultraviolet radiation.
- High-quality valves allow you to automatically adjust the level of battery sealing (for AGM batteries).
- Integrated safety controller (for LiFe4 battery).
- Photovoltaic modules of category I (maximum efficiency).
- Microprocessor-controlled battery level.
- A 3-stage charge algorithm allows you to use the battery as long as possible.
- Monitoring the current coming from solar panels, monitoring the minimum battery drain.



### Series and types of power supply units:

- **SmartMicro-RF RF050, RF010** self-contained microblocks for sensors and devices with a consumption current of less than 5 (10) mA, capacitor-type batteries.
- **SmartMini-W AGM(Li-Po) A005W-4.5, A005W-10, A010W-10** compact self-contained / backup power supply from solar energy, for devices with low power consumption up to 3W (I max <1A).
- **Smart-W-12/24 AGM(LiFe) A005W, A010W, A020W, A050W** blocks of long-term backup power from solar energy are intended for power supply to automation systems, remote control and telemetry during the guaranteed time interval from 1 hour to 3 days.
- **SmartPro AGM(LiFe) 0100W, A0200W, A0300W, A0400W, A0500W** blocks of long-term autonomous power supply from rechargeable batteries - 2, 4, 6, 8, 12, 24 months.
- **SmartPro-W AGM(LiFe) 0100W, A0200W, A0300W, A0400W, A0500W** autonomous power supply units from solar energy are designed for guaranteed autonomous power supply of automation systems, remote control and telemetry with a photoelectric battery power of up to 500W.



### 3 Main ADVANTAGES



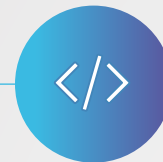
#### OpenSource

Open source,  
upgradable



#### All Inclusive

All payments are included  
in the BBT price. All  
software is free



#### 100% RuSoft

Operating system, DBMS,  
software



#### Certification FSB, FSTEC

Automated system



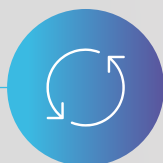
#### Stability

No third-party libraries  
and modules (100%  
independence)



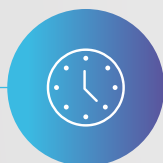
#### Safety

Astra Linux operating  
system, down to state  
secrets



#### Full cycle from development to production

Minimal cost



#### Quick start

No setup required, devices  
are 100% ready for use



#### Result:

- Very minimal resource requirements
- Maximum performance

#### Resource security

Prompt and reliable information on energy consumption, the ability for subscribers to self-monitor through a mobile application.

#### Full automation of accounting

Absence of false data and additional services in customer service rooms.

Automated consumption control, viewing consumption graphs, notifications.

#### Integration with used billing systems and IC

The system allows you to control consumption and generate up-to-date invoices for payment for actually consumed energy resources based on the received data.

#### Cost optimization

Minimizing maintenance costs and optimizing equipment operation through intelligent control algorithms.



## Implementation of digitalization and energy efficiency programs

The company's software and hardware systems implement the main decrees of the President of the Russian Federation V.V. Putin. on the implementation of digitalization and energy efficiency programs:

- Digitalization Decree of the President of the Russian Federation dated May 9, 2017 No. 203 "On the Strategy for the Development of the Information Society in the Russian Federation for 2017 - 2030."
- Federal Law of November 23, 2009 N 261-FZ (as amended on July 26, 2019) "On energy saving and increasing energy efficiency, and on introducing amendments to certain legislative acts of the Russian Federation."
- Decree of the President of the Russian Federation of May 7, 2018 No. 204. "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024." "ensuring information security based on domestic developments in the transmission, processing and storage of data, guaranteeing the protection of the interests of the individual, business and state." ... "On establishing a ban on the admission of software originating from foreign countries for the purposes of procurement to meet state and municipal needs."
- Federal Law of December 27, 2018 N 522-FZ "On amendments to certain legislative acts of the Russian Federation in connection with the development of electrical energy (power) metering systems in the Russian Federation."



Every month, readings are automatically transmitted to the server for collecting and processing information.

To import data into the billing system, no more than 5 minutes of computer operator work is required.

**100 000+**  
telemetry  
modules  
installed

# COMPANY DIPLOMAS

Automated systems, equipment and software products of RusTechnology LLC were awarded a number of awards in the nominations “Best Automated Systems”, “Advanced Solutions for Automated Control Systems”, “Energy Efficiency” and “Best Technical Solution” at the international exhibitions “Ros-Gas-Expo ”and“ Tatarstan Petrochemical Forum ”.



**1st degree diploma**  
 “Advanced Solutions for Automated Control Systems - Telemetry System for the Utility Sector”  
 ROS-GAS-EXPO-2017



**2nd degree diploma**  
 “Best Implemented Project - Telemetry System for the Household Sector”  
 ROS-GAS-EXPO-2017



**1st degree diploma**  
 “The best complex solution in the field of energy - A secure system for collecting, storing, analyzing data”  
 ROS-GAS-EXPO-2018



**1st degree diploma**  
 “For successful software development - Software and hardware complex Smart Abonent”  
 ROS-GAS-EXPO-2018



**3rd degree diploma**  
 “Energy-saving technologies and equipment - The best technical solution - Production of an autonomous pressure and temperature sensor”  
 TOF-2019



**1st degree diploma**  
 “Energy-saving technologies and equipment - The best technical solution - Production of an autonomous pressure and temperature sensor”  
 ROS-GAS-EXPO-2019



**1st degree diploma**  
 “Integration of pressure and temperature sensors with autonomous power supply BBT-DDT into the SCADA system of Gazprom Mezhrefiongaz LLC”  
 ROS-GAS-EXPO-2021



**1st degree diploma**  
 “The best promising development in the field of commercial accounting in housing and communal services - Electronic counting mechanism with a telemetry module”  
 ROS-GAS-EXPO-2022



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