SF
SMART FACTORY

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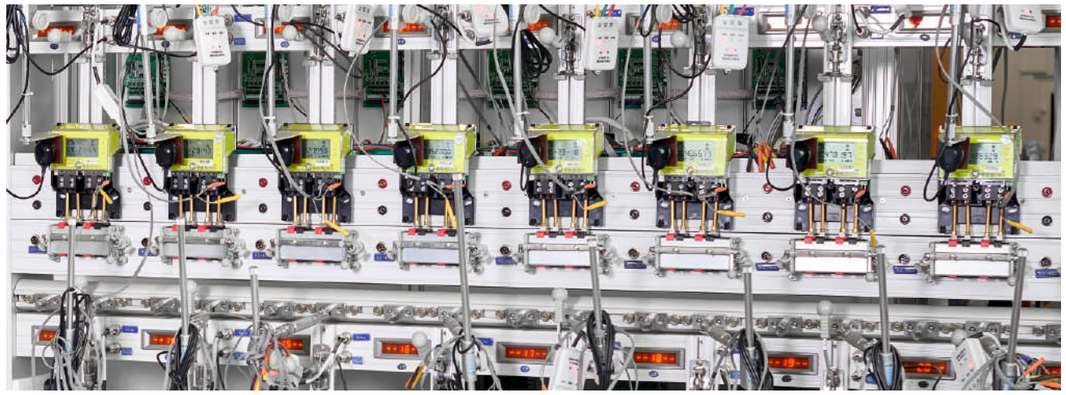
Smart metering. IoT Technologies

Product Catalogue

About us



We invent and produce systems and devices that enable digital transformation and optimization of the resource metering go easier and more cost-effective providing the best balance between functionality, quality standards, services and price.

What we do

01
Research & Development

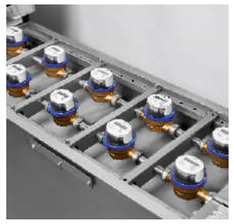
- Research Hardware and software development.
- Industrial design.
- Creation of automated fully-functional device testing benches.
- Pre-production.
- Launch of automated commercial metering systems.

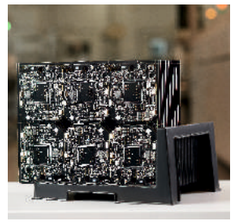
02
Manufactury

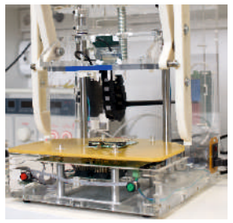
- High-tech equipment.
- Meeting the strict requirements of ESD protection.
- Components supplied by world leading manufacturers.
- Accurate and precise calibration.
- Efficient and modern production system.

03
Testing & Quality Control

- System of multi-stage quality control with use of profound inspecting equipment.
- Device programming and debugging.
- Functional testing with use of complex test-bench equipment.







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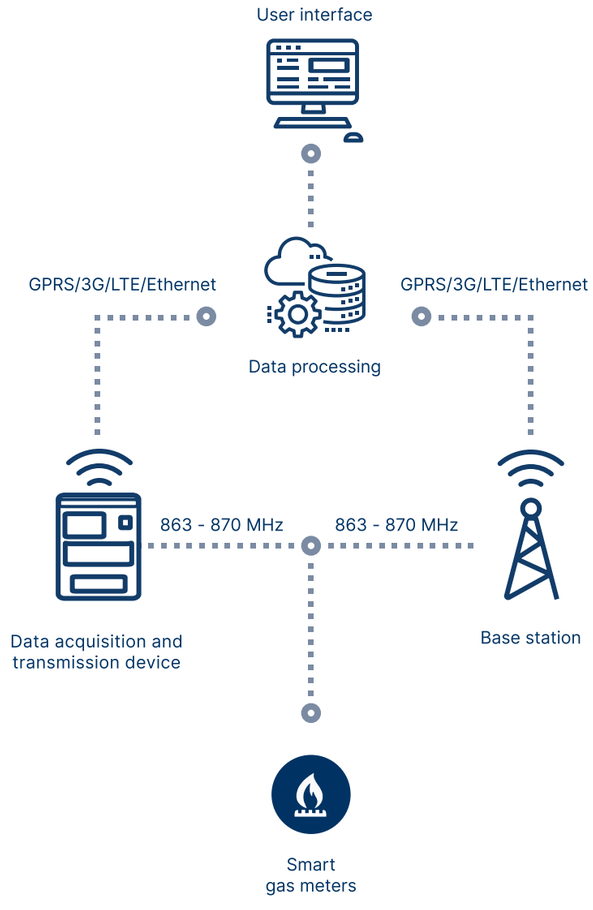
Smart Gas Metering

Manual meter readings and estimated calculations are inevitably replaced by cost-effective intellectual automatic remote reading.

For that purpose Smart Factory has developed a very compact and precise smart residential gas meter with a unique patented ultrasonic technology and popular embedded communication protocols which allow to integrate the meter in partners' existing systems.

But at the same time Smart Factory offers a complete and easily expandable system that includes smart meters, concentrators, a platform for data processing and visualization together with technical assistance in launch of the system.



Smart Ultrasonic Gas Meter

Electronic gas meter is based on an innovative ultrasonic technology. Thanks to it gas meter is compact and extremely precise. It immediately responds to flow changes and provides no pressure loss. The meter ensures stable measurement reliability over time and a long service life.

The readings are saved in a non-volatile meter memory and then the embedded communication module sends all the data to a utility platform using one of the popular LPWAN technologies: SigFox, LoraWAN, NB-IoT, NB-Fi, UNB.

Product features

- High precision ultrasonic measurement.
- Compact size.
- Data archive storage.
- Built-in monitoring and diagnostics system.
- Temperature and pressure correction.
- Maintenance-free, which reduces operating costs.
- High IP67 enclosure protection.

LoRa NB-IoT UNB sigfox

Automatic data collection

The communication module inside the meter transmits data to the personal account, providing remote collection of readings.

Personal account

Convenient personal account for analysis and statistics. The ability to export data to Excel and other software.

Temperature correction

Automatic adjustment to standard conditions by temperature correction function enables the meter's installation outdoors or in unheated rooms.

Ultrasonic technology

The main advantages of the technology are accurate measurements of low flow rates, as well as resistance to mechanical wear due to the absence of moving parts.

Resistance to magnetic fields

The meter will with stand the influence of magnetic fields and signal about the incident by indication on the screen and in a personal account of a gas supplier.

Parameter	G1,6	G2,5	G4	G6
Maximum flow rate Qmax	2,5 m3/hour	4,0 m3/hour	6,0 m3/hour	10,0 m3/hour
Minimum flow rate Qmin	0,016 m3/hour	0,025 m3/hour	0,04 m3/hour	0,06 m3/hour
Transient flow rate Qt	0,16 m3/hour	0,25 m3/hour	0,6 m3/hour	1,0 m3/hour
Relative error, not more than	±1,5 %			
Temperature range	from -40 to +55°C			
Sensitivity threshold	0,004 Qmax			
Counting mechanism capacity	99999,999 m3			
Thread on connecting pipes	G1/2 inch G3/4 inch			
Frequency range	863 - 870 MHz			
Data transmission power	25 mW			
Data encryption	+			
Power supply voltage	3,6 V			
Enclosure protection class	IP67			
Weight	from 0,55 to 0,65 kg			
Dimensions	176x80x35 mm			

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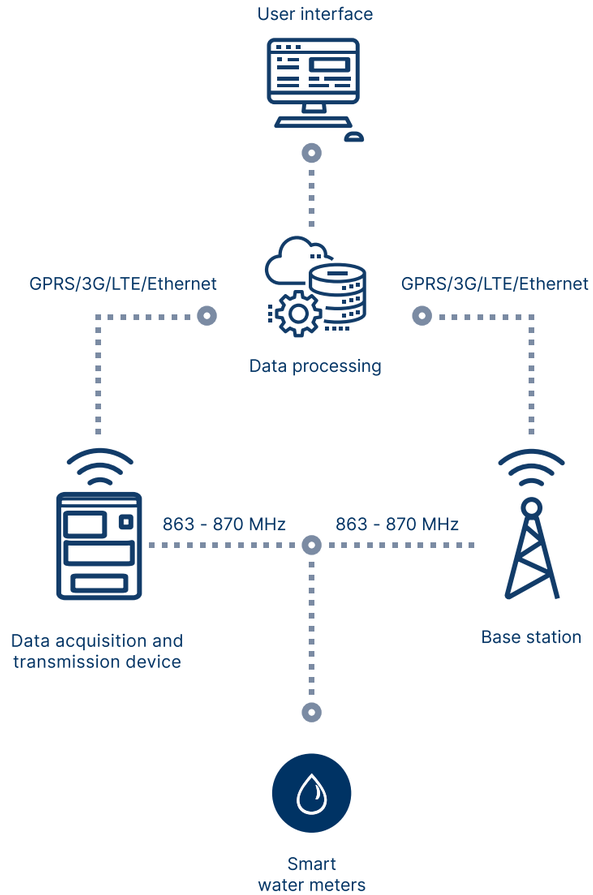
Smart Water Metering

Automation solution for water metering offered by Smart Factory includes not only smart residential meters with communication technologies, but also a complete and easily scalable turnkey system with concentrators, a platform for data processing and visualization, technical assistance in launch of the system.

Advantages:

- automatic data collection;
- popular LPWAN communication technologies;
- precision and stability in a wide dynamic range;
- reverse flow records;
- resistance to magnetic fields;
- alarms and notifications in a personal account;
- autonomous operation on the built-in battery for decades.



Smart Water Meter

Electronic vane water meters with built-in radio LPWAN module and autonomous power supply are designed for automatic wireless metering of cold and hot water in residential buildings, cottage settlements, and at enterprises. The built-in radio module enables data transfer to the personal account of a utility and other users.

LoRa NB-IoT UNB sigfox

Product features

- Up to R160 - wide measurement range.
- When a reverse flow occurs, the data is not subtracted from the main readings, but is counted in a separate register and displayed on the screen.
- Equipped with an electronic head with indicator rotating 360°.
- High IP67 enclosure protection.

Automatic data collection

The embedded communication module of the required technology transmits data to the personal account, providing remote collection of readings.

Reverse flow indication

In the event of a reverse flow, the data is not subtracted from the main readings, but is counted in a separate register and displayed on the screen.

Resistance to magnetic fields

The meter will with stand the influence of magnetic fields and signal about the incident by indication on the screen and in a personal account of a gas supplier.

Convenient installation

Both vertical and horizontal installation is possible. Electronic head with indicator, rotating 360°.

Parameter	Modification Q3=2,5 m3/h	Modification Q3=2,5 m3/h	Modification Q3=2,5 m3/h
Dynamic class R	80H	100H	160H
Minimum flow rate Q1	0,032 m3/hour	0,025 m3/hour	0,016 m3/hour
Transient flow rate Q2	0,051 m3/hour	0,04 m3/hour	0,026 m3/hour
Constant flow rate Q3	2,5 m3/hour	2,5 m3/hour	2,5 m3/hour
Maximum flow rate Q4	3,125 m3/hour	3,125 m3/hour	3,125 m3/hour
Temperature class	T30, T50, T70, T90	T30, T50, T70	T30, T50
Dimensions	110 x 80 x 67 mm	110 x 76 x 80 mm	110 x 76 x 80 mm
Connection diameter	DN15		
Water temperature range	from 0,1 to +70°C		
Metrological class of accuracy	2		
Frequency range	863 - 870 MHz		
Data transmission power	up to 25 mW		
Data encryption	+		
Frequency of sending data	once a day with standard factory setting		
Battery	battery 3,6 V		
Enclosure protection class	IP67		

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Radio Modem

Radio modem is used to allow the remote monitoring of the consumed resources in case they are measured by traditional meters without IoT capabilities. The data is transmitted by the modem to the utility servers using one of the popular LPWAN technologies: SigFox, LoraWAN, NB-IoT, NB-Fi, UNB.

LoRa NB-IoT UNB sigfox

Product features

- Reads and transmits data from any device with pulse outputs: water, heat, gas, electricity meters.
- Has two pulse inputs for connection to two metering devices.
- Conducts channel-by-channel accumulation and storage of data archives for a period of up to 6 years with saving once a day.
- In a personal account, one can control not only the readings, but also the charge level of the built-in battery, as well as the operating temperature of the radio modem.
- High IP68 enclosure protection.

Multipurpose

Reads and transfers to the user's personal account readings from different meters: water, heat, gas, electricity - by any manufacturer.

Economical

One radio modem can be used to transmit readings from two meters, for example, heat meters of two neighboring apartments.

Reliable

The data will not be lost: channel-by-channel accumulation (once a day) and storage of data archives for a period of up to 6 years is carried out.

Adaptive to national radio standards

The ability to set an arbitrary frequency plan depending on the requirements in the country of use. Sensitivity meets international standards in tenders: up to -138dBm.

Convenient to install

It can be placed in humid and hard-to-reach rooms due to autonomous battery power supply and the increased enclosure protection against moisture and dust IP68.

Parameter	Value
Pulse inputs	2
Sensitivity	up to -138 dBm
Frequency range	863 - 870 MHz
Data transmission power	up to 25 mW
Frequency of sending data	configurable during manufacture: once an hour; every 3 hours; every 6 hours; every 12 hours; every 24 hours
Data encryption	+
Battery	battery 3 V
Battery life	up to 10 years
Antenna type	internal
Enclosure protection	IP68
Fastening	ties to the support or wall
Weight	up to 0,3 kg
Dimensions	195x55x45 mm

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Base Station

Base station receives readings from individual meters (water, gas, electricity meters) and radio modems using UNB LPWAN technology and transmits them to utility servers via Ethernet or LTE connection.

A single base station is capable of supporting hundreds of thousands of end devices within a radius of several kilometers which reduces the cost of overall network and makes it the most costeffective solution for large projects.

Product features

- Provides a two-way communication and reception of readings from hundreds of thousands of metering devices within a radius of several kilometers.
- Carries out data exchange between subscribers and elements of the upper level of the system.
- Radio communication is carried out in the frequency range 863 - 870 MHz.
- The station is based on an anti-jamming panoramic receiver.
- The enclosure provides a high degree of protection against dust and moisture IP65 for outdoor installation.

Favorable cost

Building an automated metering system based on wired solutions can be too unprofitable in terms of connection and maintenance. The use of a base station for projects with a large number of metering points, on the contrary, reduces costs and is economically justified.

Unified metering system for different resources

The base station is a multipurpose device that will allow organizing the automation of water, gas, and heat metering.

Proven reliability and completeness of data collection

The base station is highly reliable due to the use of modern software and hardware solutions. For example, the base station has the ability to automatically recover software after critical failures.

Parameter	Value
Additional antennas included	GPS LTE: (GSM/3G/4G/Wi-Fi)
Frequency range	863 - 870 Mhz
Working frequency range	from 47,5 to 52,5 Hz
Interfaces	Ethernet 10/100 BASE-T, gnss GPS LTE, PoE (IEEE 802.3af)
Signal modulation	DBPSK BPSK
Radiated transmitter power	1-25 mW
Voltage supply (PoE technology)	50 V
Consumed current	not more than 0,95 A
RAM	1 GB
Electric shock protection class	III
Temperature range	from - 40 to + 70°C
Enclosure protection	IP65
Weight	up to 2 kg
Overall dimensions	222×146×82 mm

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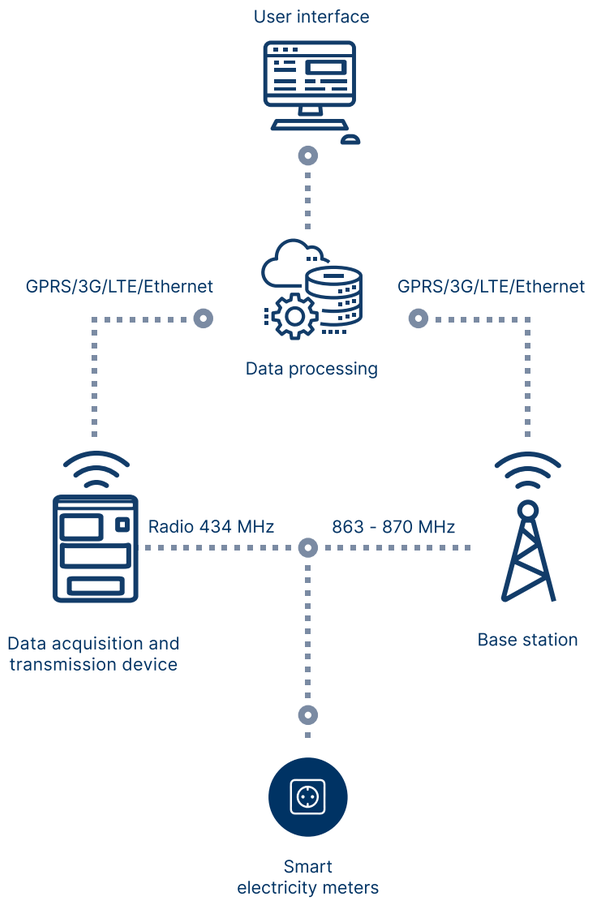
Smart Electricity Metering

Automated systems for smart electricity metering are often based on PLC technologies, e.g. G3-PLC. They are reliable and allow to receive the data without additional wiring when powerlines are correctly designed and implemented. But in some regions of the world powerline architecture is not flawless. Smart Factory suggests two ways of dealing with this challenge.

First solution is the system with combination of radio communication and PLC that allows meters to choose the optimal transmission path depending on the load in each channel and to guarantee collection of all readings.



Single Phase Smart Electricity Meter

The intelligent multi-tariff single phase electronic meter is designed for use in smart electricity metering systems with remote collection of readings.

The embedded IoT communication module allows utilities to receive information automatically about active and reactive energy, generation and consumption, voltage quality, tampering incidents, magnet exposure and etc. via radio (RF434 or RF868) LPWAN, GSM or RS-485 technology.

LoRa NB-IoT UNB sigfox

Product features

- Accuracy class for active and reactive energy 1.
- Choice of communication interfaces: Radio (RF434 or RF868), LTE / GPRS , RS-485.
- Circuit and network parameters measurement.
- Built-in relay for remote power control.
- Sensors detecting tampering with the housing cover and the terminal block clipses.
- Resistance to magnetic fields up to 500 mT, date and exposure time recording.
- Alert messages about unauthorized interventions or power failure.
- Multifunctional LCD with backlight.
- Mountable on a DIN-rail.

Resistant to magnetic influence

The meter withstands magnetic fields of 500 mIT, and also records the date and time of exposure.

Notifies the operator

The meter will promptly transmit to the operator information about opening the terminal cover or case, exposure to a magnet, electrical disturbance, attempts to handle an incorrect password, overheating.

Load control relay

Allows you to remotely disconnect bad payers. Relay triggering is configured depending on profile and certain events.

User's personal account

Electricity consumption and other indicators recorded by the meter can be monitored remotely in your personal account in any place where there is Internet.

Phase/zero current accounting

In addition to metering the current in the forward and reverse directions, the meter monitors and displays the network parameters, generation and consumption.

Autonomous functioning

In the event of a power outage, data will not be lost thanks to nonvolatile memory. The operation of the calendar and display is provided by a built-in battery with a long service life.

Parameter	Value
Accuracy class	active energy 1 reactive energy 1
Rated voltage	230V
Operating frequency	47,5-52,5 Hz
Base (maximum)	5 (80) A 5 (100) A
Starting current	10 mA
Pulse inputs	1
Number of tariffs	8: 24 schedule of daily tariff programs for 7 days of the week
Daily tariff programs	32 programs, 48 half-hour zones
Setting up essential event groups	64 events in one of 3 groups
Storage depth	at least 6144 values per interval
Meter constant	3600, 4800 imp./ (kWh), imp./ (kvarh)
Ambient temperature	from - 40 to +70°C
Weight	up to 0,6 kg
Overall dimensions	153x116,1x48,6 mm

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Three Phase Smart Electricity Meter

The multi-tariff three-phase electronic meter is designed for metering active and reactive energy in forward and reverse directions in three-phase four-wire AC circuits with a frequency of 50 Hz.

The meter is equipped with communication interfaces for operation in systems with remote sending of readings and possibility of simultaneous data collection using different communication technologies.

Product features

- Active energy accuracy class 0.5S / 1; for reactive energy: 0.5 / 1.
- Simultaneous collection of data via PLC and radio interfaces.
- Communication interfaces: Radio (RF434 or RF868), GSM / LTE, RS-485, PLC, G3-PLC.
- Removable GSM / LTE modem or DATD.
- Records the mains frequency, current and voltage in each phase, angles between the vectors of phase voltages and vectors of phase currents of voltages, power factor in each phase.
- Signals about tampering with the housing cover and the terminal block clipses, exceeding the energy and power limits.
- Can be mounted on a DIN rail.

The meter measures and displays:

- network frequency;
- current in each phase;
- voltage in each phase;
- angle between current and voltage in each phase;
- angle between phase voltages;
- power factor in each phase.

The meter controls:

- accounting for four energy profiles: active and reactive, forward and reverse directions with an interval of power integration of 1, 3, 5, 10, 15, 60 minutes;
- consumed active power direction with an interval power integration in 1, 3, 5, 10, 15, 60 minutes;
- instantaneous power consumption;
- active energy consumption limits;
- low current consumption;
- supply voltage;
- consumed currents;
- network frequencies;
- phase sequence;
- phase loss.

Parameter	Value
Accuracy class	active energy 0.5S / 1 reactive energy 0.5 / 1
Rated voltage	3x230/400 V
Working frequency range	from 47,5 to 52,5 Hz
Base (maximum)	5 (80) A 5 (100) A
Working range of input signals: - current strength - voltage - active power factor - reactive power factor	0,05·Ib...Imax (0,8...1,15) Unom 0,8(capacity)...1,0...0,5(ind) 0,25(capacity)...1,0...0,25(ind)
Starting current	20 mA
Impulse outputs	2
Number of tariffs	8 by active energy 4 by reactive energy
Storage depth	6144 readings
Meter constant	1600, 8000 imp./ (kWh), imp./ (kvarh)
Basic relative error when measuring rms values of phase voltages	1,0 from184 to 264, 5 V
Basic relative error when measuring rms current values in the phase circuit	1,0 from 0,25 to 100 A
Apparent active power consumed in each voltage circuit at rated voltage, normal temperature and rated frequency	4 V A
Apparent active power consumed in each voltage circuit at rated voltage, normal temperature and rated frequency	10 (2) V A
Optical and RS-485 exchange rate	9600 bit/s
Ambient temperature	from - 40 to +70°C
Weight	not more than 1,9 kg
Overall dimensions	241x176x77 mm

Data Acquisition and Transmission Device

The device is intended for acquisition, processing, storage of data from meters and transfer of information via information channels to the upper level in automated systems for comprehensive utility metering. It is installed as a part of a three phase smart electronic meter and functions together with it.

An important function of the device is time measuring and clock synchronization on the metering devices in automated systems for comprehensive utility metering.

Product features

- 2 GPRS/LTE modules, micro-USB, Wi-Fi module.
- Provides event log storage and information transfer on request.
- Multilevel protection against unauthorized access: mechanical seals, an eight-digit password for access, encryption of information during its transmission through the interfaces of the lower and upper levels of the device.
- Linux based operating system.
- Storage depth: 6144 readings per interval.

Data acquisition:

- active consumed and generated power;
- reactive consumed generated power;
- general power;
- amount of tariff storages (operated/all) for active consumed/generated power;
- tariff accumulations according to each tariff for active consumed/generated
- voltage (average value during the integration period);
- current intensity (average value during the integration period);
- frequency (average value during the integration period);
- event log.

Sends information to the upper level about the following events:

- overlimit of active power;
- current threshold crossing along neutral channel;
- consumer electrical installation deviation;
- network frequency deviation;
- voltage state – overlimit; failure;
- power overlimit 1/2/3;
- critical time deviation or forbidden time unsynchronization;
- low consumption for a long time;
- the device is open – terminal block /housing;
- magnet or reverse magnet interference (for meters including magnetic field sensors);
- radio field interference (for meters including radiofrequency electromagnetic field sensors);
- password blocking;
- low battery;
- data transfer via communication channel during the emergence the event was performed;
- flag of requirement of schedule group change;
- reason for the latest unscheduled automatic start.

Parameter	Value
Supply voltage	5 - 26 V
Current	no more than 1 A
Power consumption	no more than 6 W
Number of connected metering devices	up to 2048
Data transmission radio interfaces	- Wi-Fi standard IEEE 802.11b / g / n; - GSM: 900 / 1800MHz; - LTE: 2100MHz (B1) / 1800MHz (B3) / 2600MHz (B7) / 900MHz (B8) / 800MHz (B20)
The degree of protection	IP51
Electric shock protection class	III
Saving the clock and keeping the calendar when the supply voltage is cut off	at least 10 years
Saving data archive	at least 10 years
Ambient temperature	from -40 to + 70°C
Weight	no more than 0.5 kg
Overall dimensions	154×52,5×22 mm

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Integrated Smart Metering System

Have you ever thought of finding a comprehensive solution for metering automatization of all resources at once: electricity, water, heat and gas?

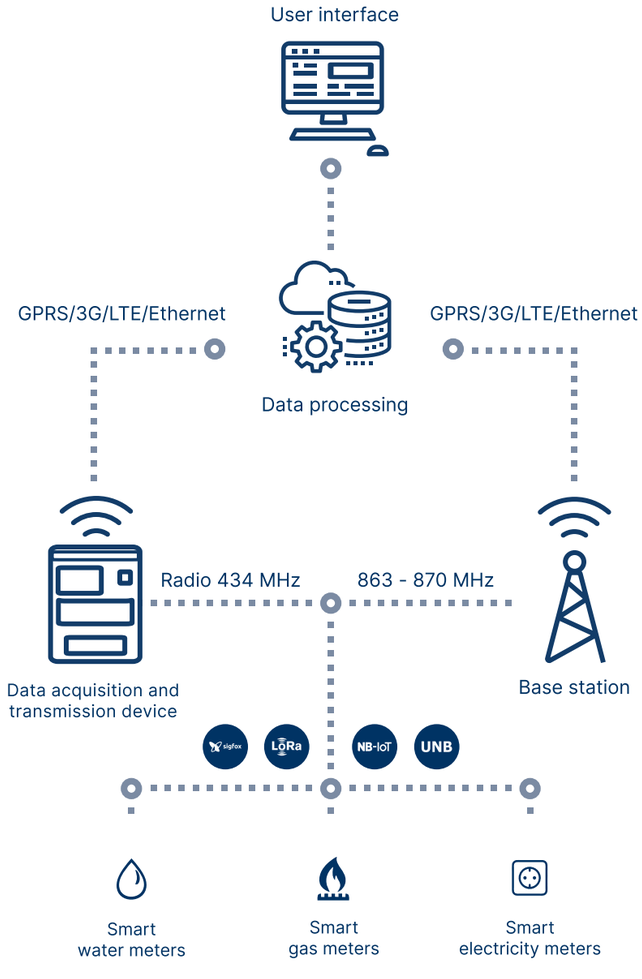
As developers and manufacturers of all system components, we provide everything to create and deploy such a complex system: meters, base stations, data acquisition and transmission devices and cloud-based software.

Being both scalable and flexible the integrated system will enable you to monitor and manage all kinds of metering data in one convenient platform.

Available LPWAN technologies for transferring data from meters to a base station.

LPWAN — the dominant IoT technology type with large coverage and low power consumption.

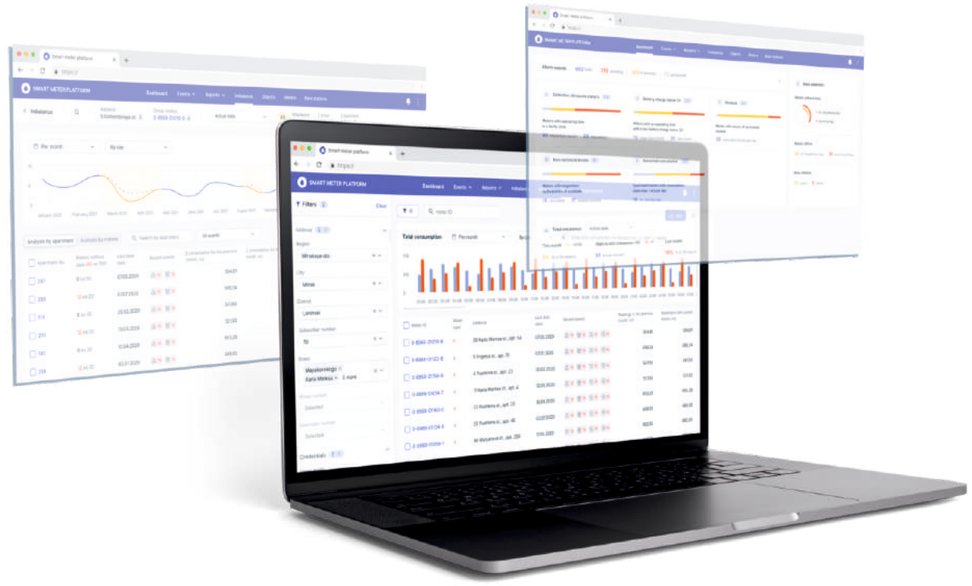
- UNB LPWAN: SigFox, UNB, etc.
- LoRaWAN
- GSM, GPRS, LTE
- NB-IoT



IoT Platform

A universal IoT platform for collecting, processing and displaying data received from smart meters provides convenient monitoring and analysis: failure warning, unauthorised access warning, performance deviation, etc.

It is compatible with our smart meters, base stations and radio modems, and is comprised of network layer, IoT cloud and software for effective management of received data. The platform can be integrated with other systems and is easily expandable with additional software interfaces to connect new device types.



Optimization of the staff

Allows to simplify your workflow. The solution has an intuitive user interface and requires no extra training.

Loss Prevention

You will be aware of the event that influenced the loss of data and will be able to prevent it. Track suspicious meter behavior and find scammers.

Persistence of profits

Don't lose money if the meter is out of order in the system. You will receive an immediate notification and the meter will automatically go into “rate-by-rate” mode.

Financial benefit

Use our platform and increase your profits up to 30% by tracking all resource flows.

Integrated manner

Connect any kind of meters to our system: water, heat, gas and electricity. Manage all meters from your personal account.

Responsive design and custom dashboard

Manage your data wherever you are: from your laptop, tablet or phone. Mark the indicators you need on an individual dashboard.

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Communication protocols and technologies

UNB Communication Standard

UNB is Smart Factory' wireless communication technology for long-distance remote automated data collection from hundreds of thousands of metering devices. This narrowband technology makes the most efficient use of available radio-frequency spectrum — one channel only takes 50 Hz of air band versus the broadband technology with channel width from 100 KHz and above.

UNB advantages

- Operation in the allowed frequency range of 863-870 MHz, meeting the requirements for maximum signal strength of 25 mW.
- Line-of-sight acquisition distance is up to 10 km and up to 5 km under restrained urban conditions.
- High energy potential of communication channels and cost-effective consumption of power supply charge in wireless meters.
- Maintenance of two-way communication with devices to ensure their control — time synchronization, tariff schedule and software updates, etc.
- Scalability and possibility to build a large network comprising millions metering devices.
- Encryption for protected data exchange between meters and cloud server.
- Efficient self-designed SMP data transmission protocol.
- Cost-efficient equipment including water, gas, electricity meters and radio modems; on-site technical implementation.

Wide-spread standards

Basic requirements of the market participants for communication technology openness leads to occurrence and development of such communication standards and protocols as G3-PLC, DLMS, SPODES, as well as LPWAN — class wireless radio technologies with long coverage range and low energy consumption, including Sigfox, LoRaWAN, NB-IoT, etc. Consequently, one of the company's priorities is to develop and produce metering devices with communication technologies popular and wide-spread on the market.