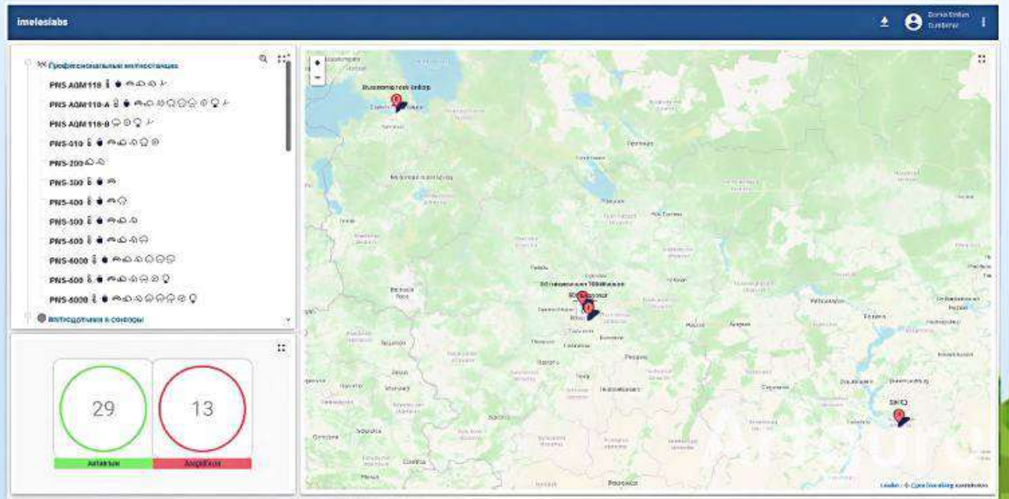
Smart weather station in ECOMETEOMONITORING systems

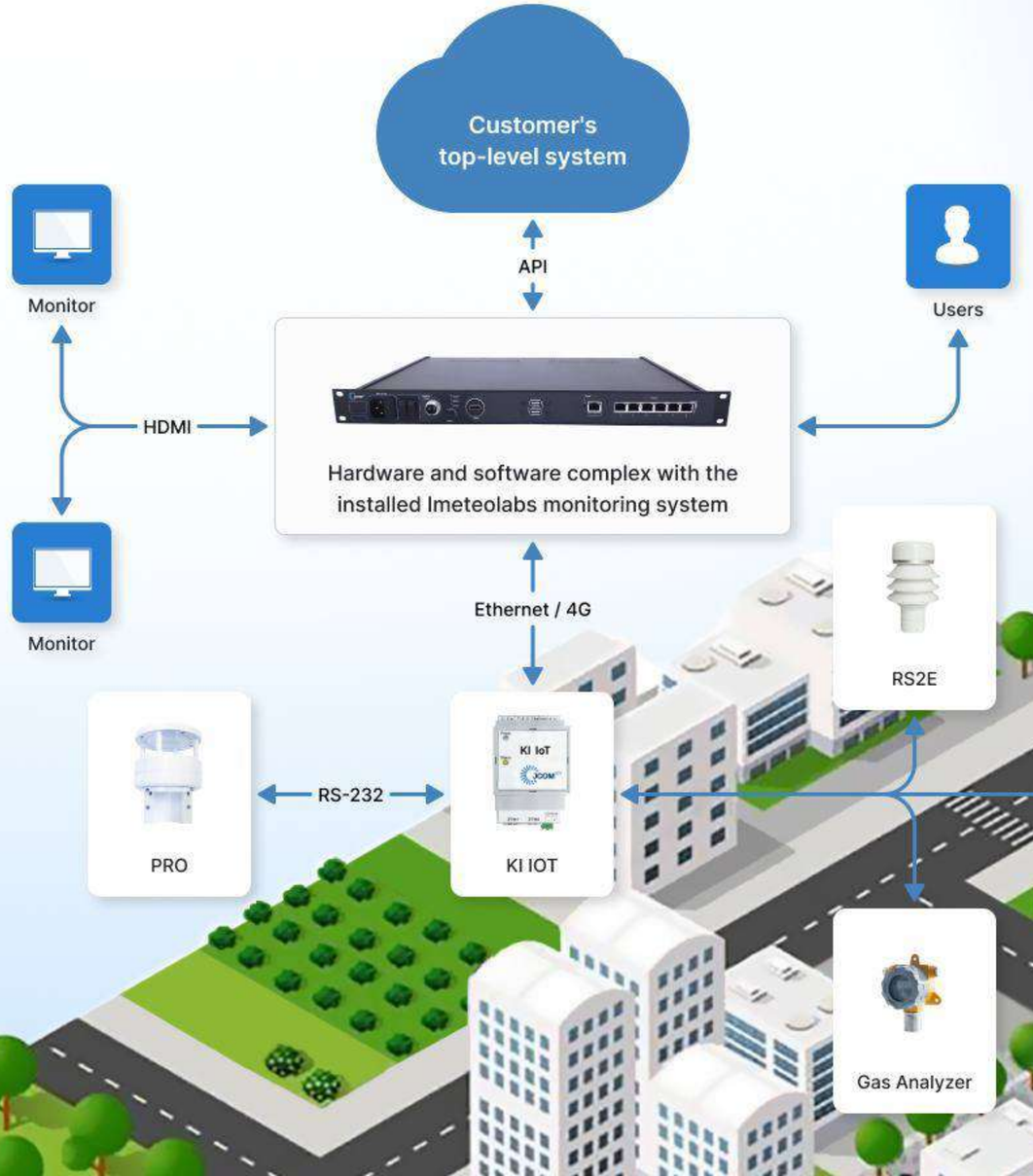
JCOM IOT

FUNCTIONAL DIAGRAMS OF THE ECOMETEOMONITORING SYSTEM

PRO - professional weather station

IMETEOLABS Personal Account





FUNCTIONAL PURPOSE OF THE ECOMETEOMONITORING SYSTEM

IMETEOLABS – ECOMETEOLOGICAL MONITORING SYSTEM

FOR REMOTE AUTOMATED MONITORING OF ECOLOGICAL AND METEOROLOGICAL SITUATIONS.

TASKS PERFORMED BY THE SYSTEM:

- Collection of meteorological data
- Monitoring the environmental situation
- Reducing response time in an emergency
- Long-term general studies of environmental parameters

The Imeteolabs system from jcom helps determine **EXACT CLIMATE CONDITIONS**, which in turn allows for prompt action and intervention in each of the following areas:

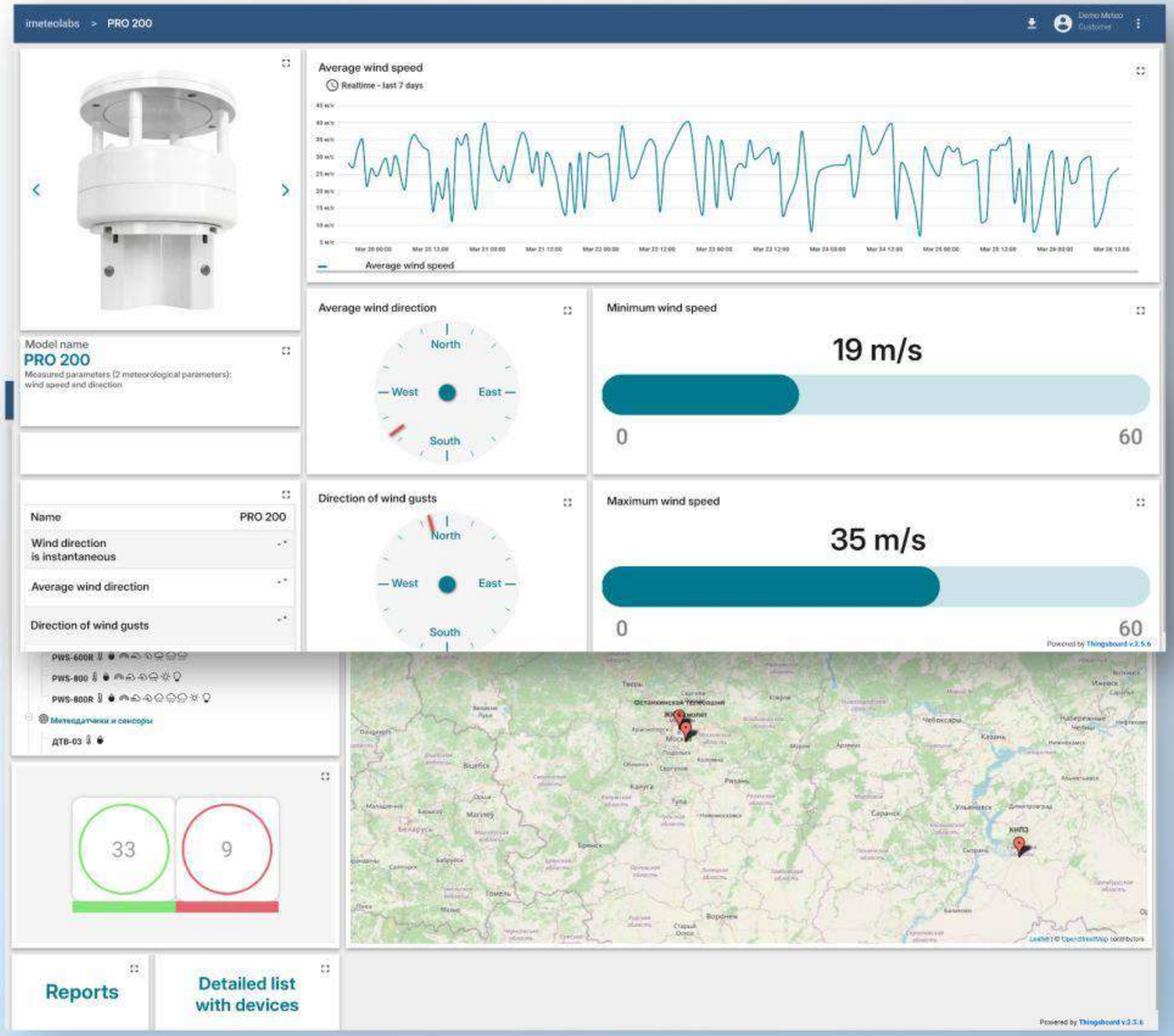
- METEOROLOGY, HYDROMETERALOGICAL CENTERS
- RESEARCH INSTITUTES
- EDUCATIONAL INSTITUTIONS
- CONSTRUCTION AND INDUSTRY
- ROAD SERVICES
- AGRICULTURE AND FARMING
- AVIATION – AIRFIELDS AND AIRPORTS
- SEA AND RIVER PORTS
- RESCUE SERVICE
- RESORTS, HOLIDAY HOMES, TOURIST CENTERS

IOT PLATFORM FOR ECOMETEOMONITORING SYSTEM

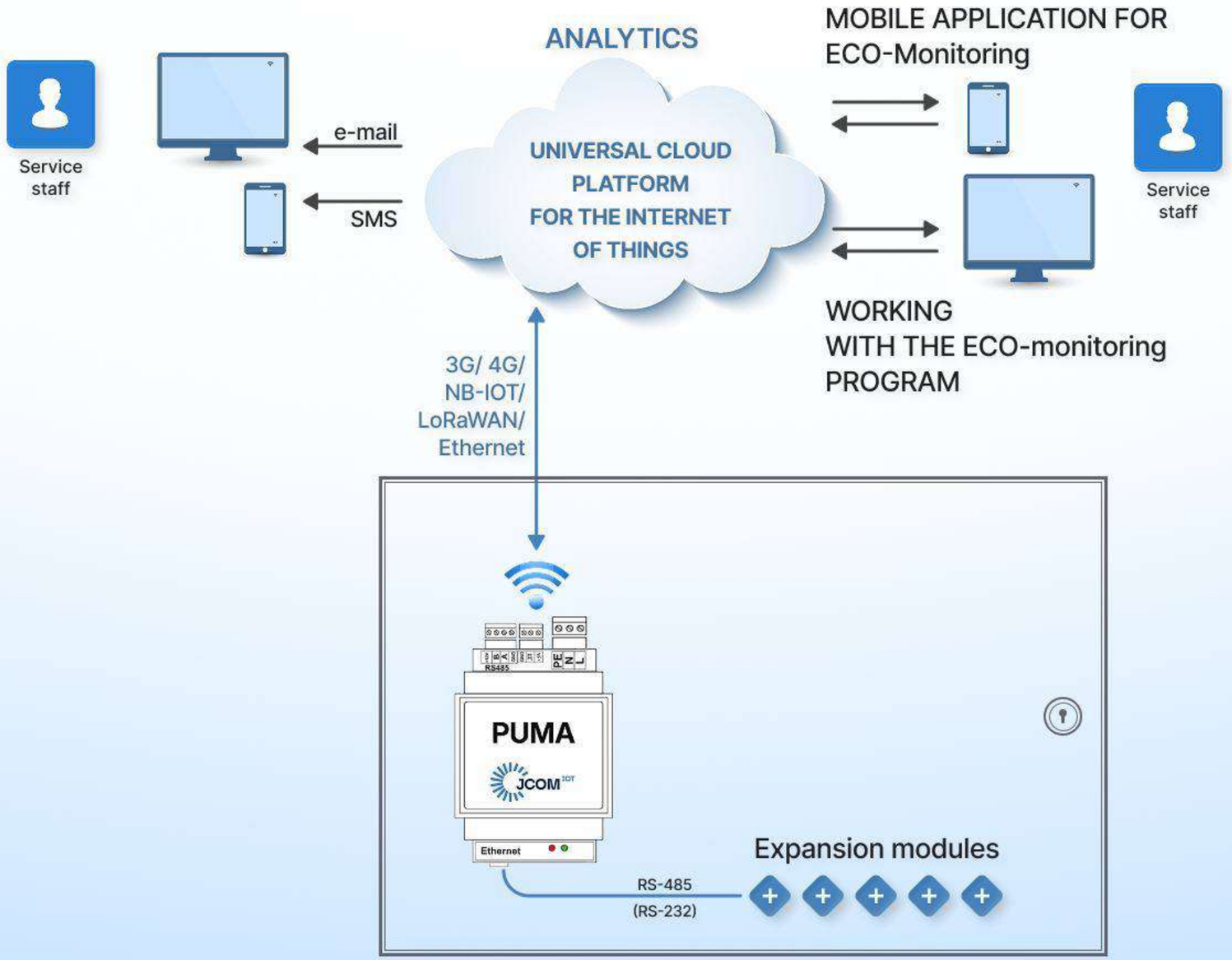
The ECOMETEOMONITORING IOT PLATFORM operates using open Internet of Things protocols – MQTT/HTTPS – and is designed to collect, store, process, and visualize data from weather stations and sensors from various manufacturers.

THE FUNCTIONALITY OF THE ECOMETEOMONITORING PLATFORM ALLOWS YOU TO:

- Monitor air and soil pollution levels around the clock in controlled areas
- Determine the location of pollution sources and assess their impact on the environmental situation
- To create a geographical map of air pollution, soil cover of controlled areas
- Serve as a tool for monitoring emergency situations accompanied by exceeding maximum permissible concentrations of pollutants in real time



STRUCTURAL DIAGRAM OF OPERATION OF THE ECOMETEOMONITORING SYSTEM



ECOMETEOMONITORING SYSTEM EQUIPMENT - WEATHER STATION

METEOLABS

Professional weather station

The IMETEOLABS PRO professional weather station is designed to record various environmental parameters. The IMETEOLABS PRO weather station is available in various models.

Depending on the model, each device has a different set of sensors and number of recorded parameters.

The table below shows possible modifications of weather stations.

MEASURED PARAMETERS	Modifications of the IMETEOLABS weather station									
	PRO 200 и PRO 200M*	PRO 300	PRO 400	PRO 500 и PRO 500M*	PRO 600 и PRO 600M*	PRO 800 и PRO 800M*	AQM 300	AQM 800	AQM 900 и AQM 900M*	AQM 918 и AQM 918M*
Air temperature		•	•	•	•	•	•	•	•	•
Relative humidity		•	•	•	•	•	•	•	•	•
Wind direction	•			•	•	•			•	•
Wind speed	•			•	•	•			•	•
Atmospheric pressure		•	•	•	•	•			•	•
Precipitation intensity			•		•	•				•
Solar radiation, UV index						•				•
Measured gases							Volatile organic compounds (VOCs)	Carbon monoxide CO Nitrogen dioxide NO2 Sulfur dioxide SO2 Ozone O3 Suspended particles PM2.5 Suspended particles PM10	Carbon monoxide CO Nitrogen dioxide NO2 Sulfur dioxide SO2 Ozone O3 Suspended particles PM2.5 Suspended particles PM10	Carbon monoxide CO Nitrogen oxide NO Nitrogen dioxide NO2 Sulfur dioxide SO2 Ozone O3 Hydrogen sulfide H25 Volatile organic compounds (VOCs) Suspended particles PM2.5 Suspended particles PM10

Professional mobile weather station with GPS module*

LINE OF MOBILE WEATHER STATIONS

Professional mobile weather station

— this compact device evaluates and processes environmental information. Depending on the version, it can measure the following parameters: temperature, humidity, wind speed and direction, illumination, pressure, and many others. This weather station is equipped with a GPS module, allowing it to be used on various mobile objects and is easy to transport and install.

Areas of use

- Environmental monitoring at facilities
- Weather monitoring systems for agriculture
- Environmental monitoring at industrial facilities
- Can be installed on sea and river vessels
- Tourism, resort areas, and vacation homes
- Education
- Construction sites

Equipment is selected based on customer requirements and the required measurement parameters. Installation of autonomous kits, such as a solar panel and wind generator, is also possible.

SOLUTION IMETEOLABS PRO AQM 918

Weather station METEOLABS PRO AQM-918
records meteorological parameters and air quality.

The solution can be used in the following areas:

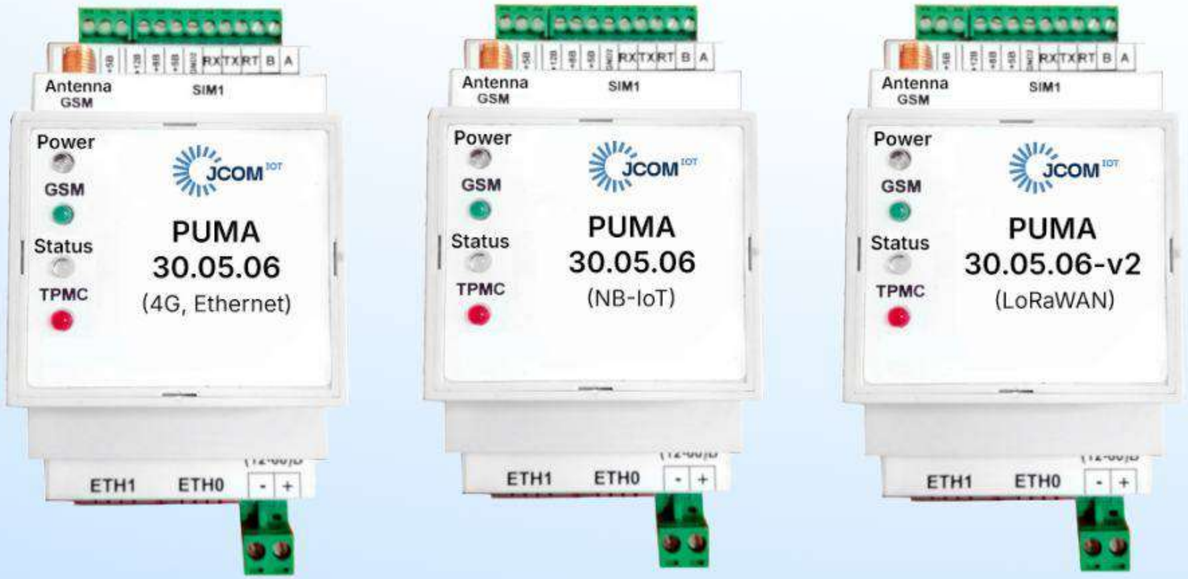
- meteorology
- transportation
- electric power
- agricultural industry
- intelligent street lighting

NAME OF CHARACTERISTICS	MEANING
WIND SPEED	Range: 0 m/s ... 60 m/s Accuracy: ±0.3 m/s or ±3% (0 ... 35 m/s)
WIND DIRECTION	Range: 0°C ... 360°C Accuracy: ±3%
ATMOSPHERIC PRESSURE	Range: 300 kPa... 1200 hPa Accuracy: ±1 hPa
RELATIVE HUMIDITY	Range: 0% ... 100% Accuracy: ±2%
AIR TEMPERATURE	Range: -50°C ... +60°C Accuracy: ±0.1°C
CARBON MONOXIDE (CO) CONCENTRATION	Range: 0 ppm ... 1000 ppm Accuracy: 2.17%
NITRIC OXIDE (NO) CONCENTRATION	Range: 0 ppm ... 20 ppm Accuracy: 15%
NITROGEN DIOXIDE (NO_2) CONCENTRATION	Range: 0 ppm to 20 ppm Accuracy: 7.8%
SULFUR DIOXIDE (SO_2) CONCENTRATION	Range: 0 ppm ... 100 ppm Accuracy: 14.5%
OZONE CONCENTRATION (O_3)	Range: 0 ppm to 20 ppm Accuracy: 16.3%
HYDROGEN SULFIDE (H_2S) CONCENTRATION	Range: 0 ppm ... 100 ppm Accuracy: 15%
CONCENTRATION OF VOLATILE ORGANIC COMPOUNDS (VOCs)	Range: 0 ppm ... 100 ppm Accuracy: 5%
MICROPARTICLE CONCENTRATION (PM2.5)	Range: 0 ppm ... 1000 ppm Accuracy: 15%
MICROPARTICLE CONCENTRATION (PM10)	Range: 0 ppm ... 1000 ppm Accuracy: 15%
DIGITAL DATA OUTPUT	RS-485 / RS-232
WEIGHT, NO MORE	1.5 kg

EXTERIOR APPEARANCE OF PRO 600 WEATHER STATION

EQUIPMENT FOR THE ECOMETEOMONITORING SYSTEM – PUMA CONTROLLERS

The controller is designed for building systems for monitoring, dispatching, monitoring the status and controlling the modes of equipment at a remote facility.



Name of the characteristic	
GENERAL	
Power supply of the device	8-60 VDC
User interface for customization	Web interface
Ethernet interface	2 ports
Number of SIM cards and type	1, Mini SIM
Support for temperature sensor with 1-wire digital interface	+
Indication (LEDs)	power, statuses
Operating temperature range	-40 до + 80°C
Built-in hardware watchdog circuit	+
Antenna connector type on the controller unit	SMA (F)
Mounting	on a 35 mm DIN rail
Overall dimensions	105x51x65
NB-IoT	
Built-in modem type	LTE-Cat-NB1 (NB-IoT)
Modem: - Modification 1 –SARA-N211-02B (uBlox) - Modification 2 –SARA-N200-02B (uBlox) - Modification 3 –BC95-B8 (Quectel)	 LTE- b8, b20 (900MHz, 800MHz) LTE- b8 (900MHz) LTE- b8 (900MHz)
LoRaWAN	
Built-in radio modem type	LoraWAN
LoRaWAN device class	C
Number of LoRaWAN channels	8
Radio communication range in rural areas	up to 15 km
Radio communication range in dense urban areas	up to 5 km

EQUIPMENT - EXPANSIONS OF THE ECOMETEOMONITORING SYSTEM

Remote carbon monoxide detector CO

designed for continuous automatic measurement of carbon monoxide (CO) concentrations in the atmosphere of industrial enterprises, generating an analog 4-20 mA current signal to the control panel.

Stationary explosion-proof SO_2 gas sensor

designed for continuous automatic measurement of sulfur dioxide (SO_2) concentrations in the atmosphere of industrial facilities, generating a 4-20 mA analog current signal to the control panel.

Particle Concentration Monitor

used to measure and continuously monitor the smallest concentrations of particles in ambient air (fine dust).

Stationary gas sensor explosion-proof

designed for continuous automatic measurement of CH_2 hydrocarbon concentrations in the work area atmosphere, generating an analog 4-20 mA current signal to the control panel.

Stationary explosion-proof gas analyzer with replaceable sensors

designed for continuous automatic measurements of the volume fraction of oxygen, carbon dioxide, the volume fraction or mass concentration of harmful gases, as well as pre-explosive concentrations or volume fraction of flammable gases and vapors of flammable liquids (including petroleum vapors) in the air of the work area.

WEATHER STATION SENSORS

PMD200
Dust Concentration Sensor

The JC PMD200 dust sensor, based on the principle of laser scattering, determines dust concentrations in the air. It is used to monitor ambient air dust levels. It can monitor suspended particles of the PM2.5 and PM10 indices. The device is used for intensive industrial dust monitoring at construction sites.

Radiation
pyranometer TBQ

The pyranometer is based on the principle of photoelectric induction and can accurately measure total solar radiation, reflected radiation, scattered radiation, infrared radiation, visible light, ultraviolet radiation, and wavelength. It is widely used in solar energy utilization, meteorology, agriculture, architecture, materials aging, air pollution, and environmental research, among other fields.

RCS01
Road Condition Sensor

The JC RCS01 road surface condition sensor is a direct analogue of contactless sensors from LUFFT and VAISALA. It monitors changes in the road surface and thus prevents traffic disruptions.

SL-31
Illuminance sensor

It is designed to measure illumination levels and transmit data to a device connected to the sensor via an RS-485 interface using the Modbus RTU protocol. The sensor is housed in a plastic housing that provides adequate protection against moisture and dust while still allowing light to reach the transducer.

SENSORS AND DETECTORS

AVS01
Visibility sensor

This is a new generation of meteorological visibility monitoring equipment. The sensor can be used in meteorological applications, at airports, on highways, and on large vessels.

Features:

- Compact, lightweight, and easy to install
- Design prevents dust, rain, snow, and sunlight from penetrating
- The transmitter and receiver are coated to protect against dust and mold
- Built-in monitoring circuit
- The communication and power interfaces are lightning-protected

DTV-03
Temperature and humidity sensor

The DTV-03 temperature and humidity sensor is designed for use in monitoring systems.

The device is designed for continuous operation.

The device is designed to poll a temperature and humidity sensor, combined with data transmission (temperature and humidity) to the RS-485 network at the request of another device.

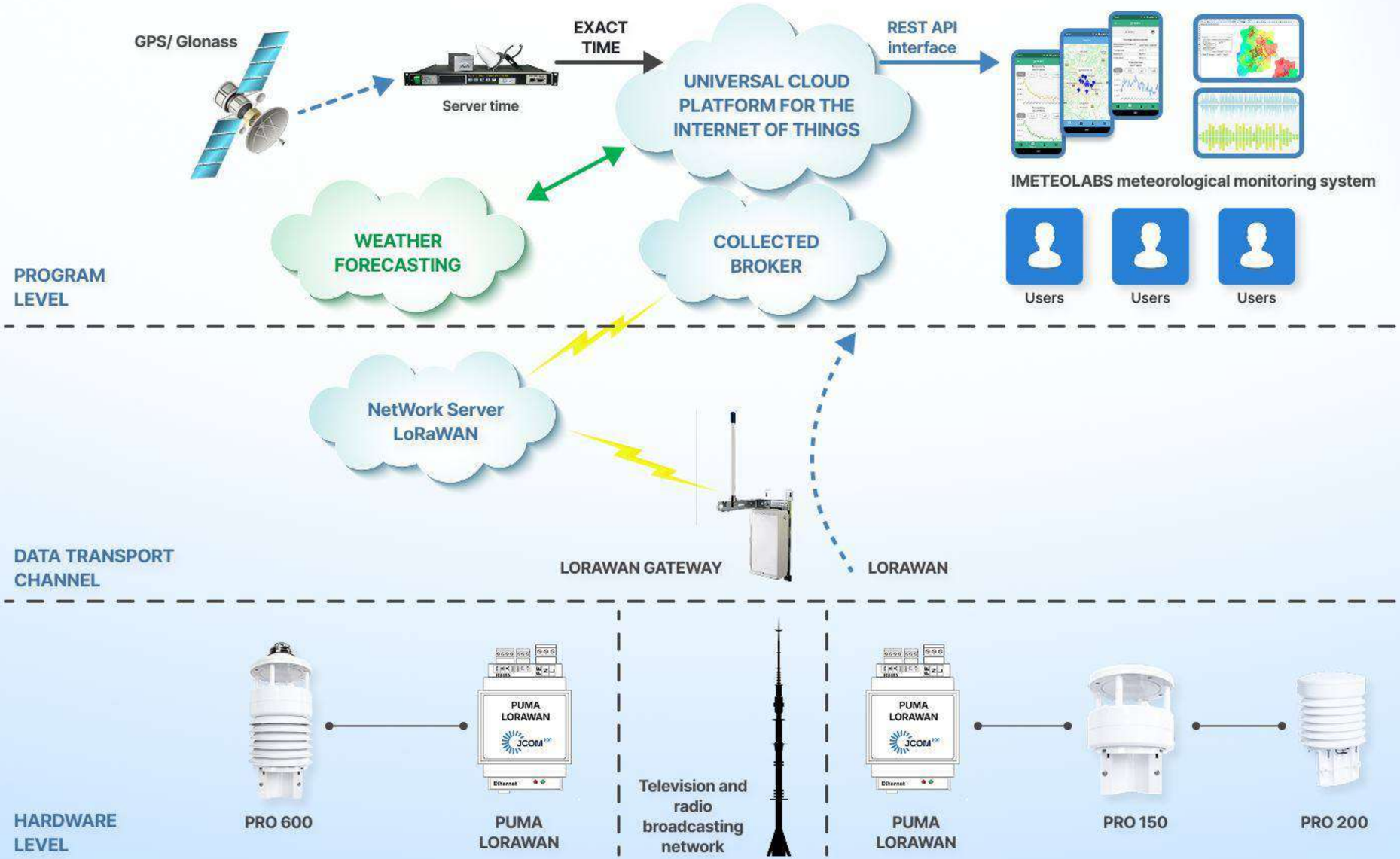
WSHTCO2
Wireless universal office sensor 5 in 1

The universal WSHTCO2 sensor contains several sensors:

- Air temperature monitoring
- Air humidity monitoring
- Carbon dioxide (CO2) concentration monitoring
- Noise level monitoring
- Light level monitoring
- Battery voltage monitoring

PHOTO OF THE IMPLEMENTATION FROM THE SITE

FEDERAL ECOMETEOMONITORING PROJECT

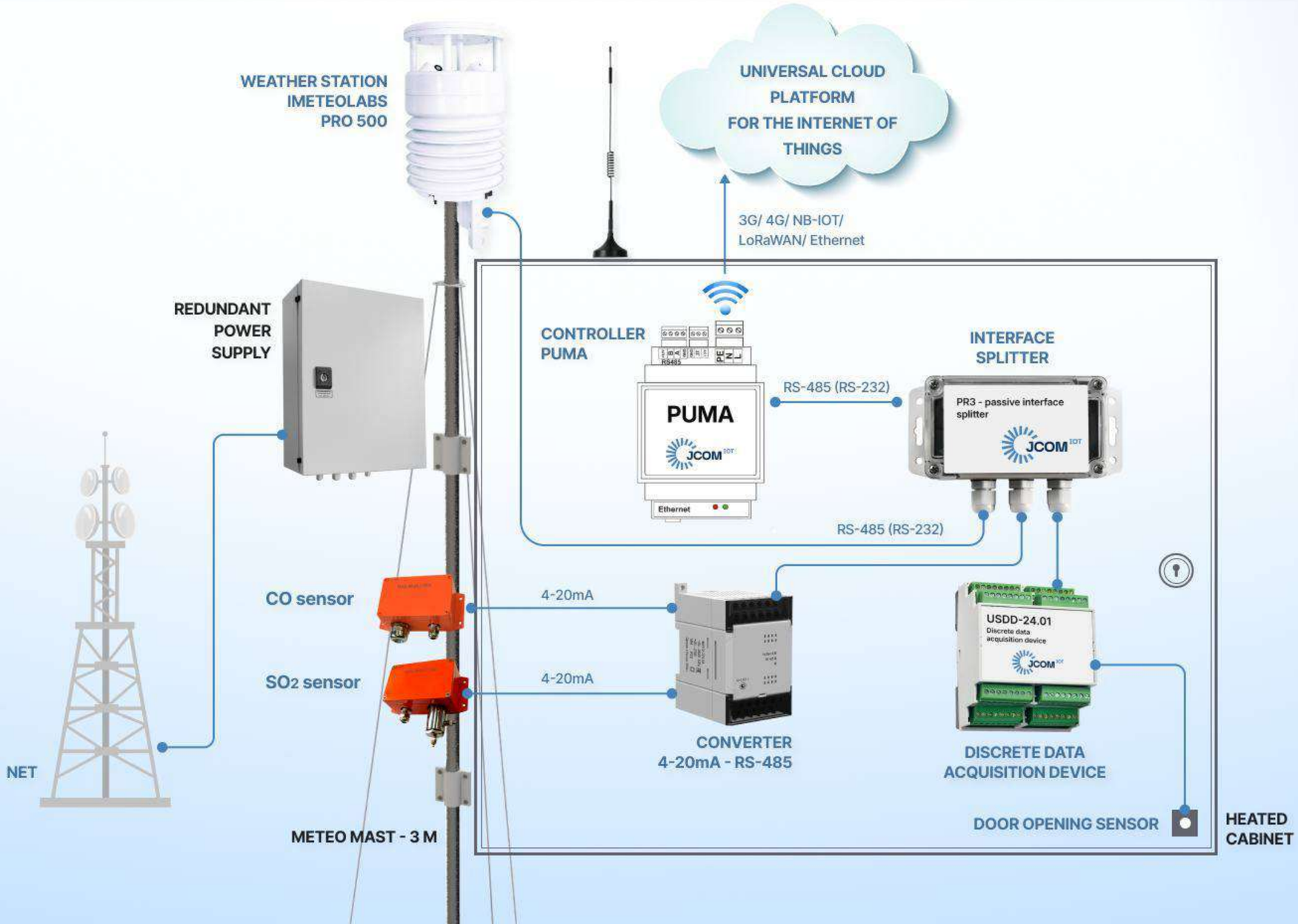


COMPREHENSIVE ECO-METEOROLOGICAL MONITORING SOLUTION

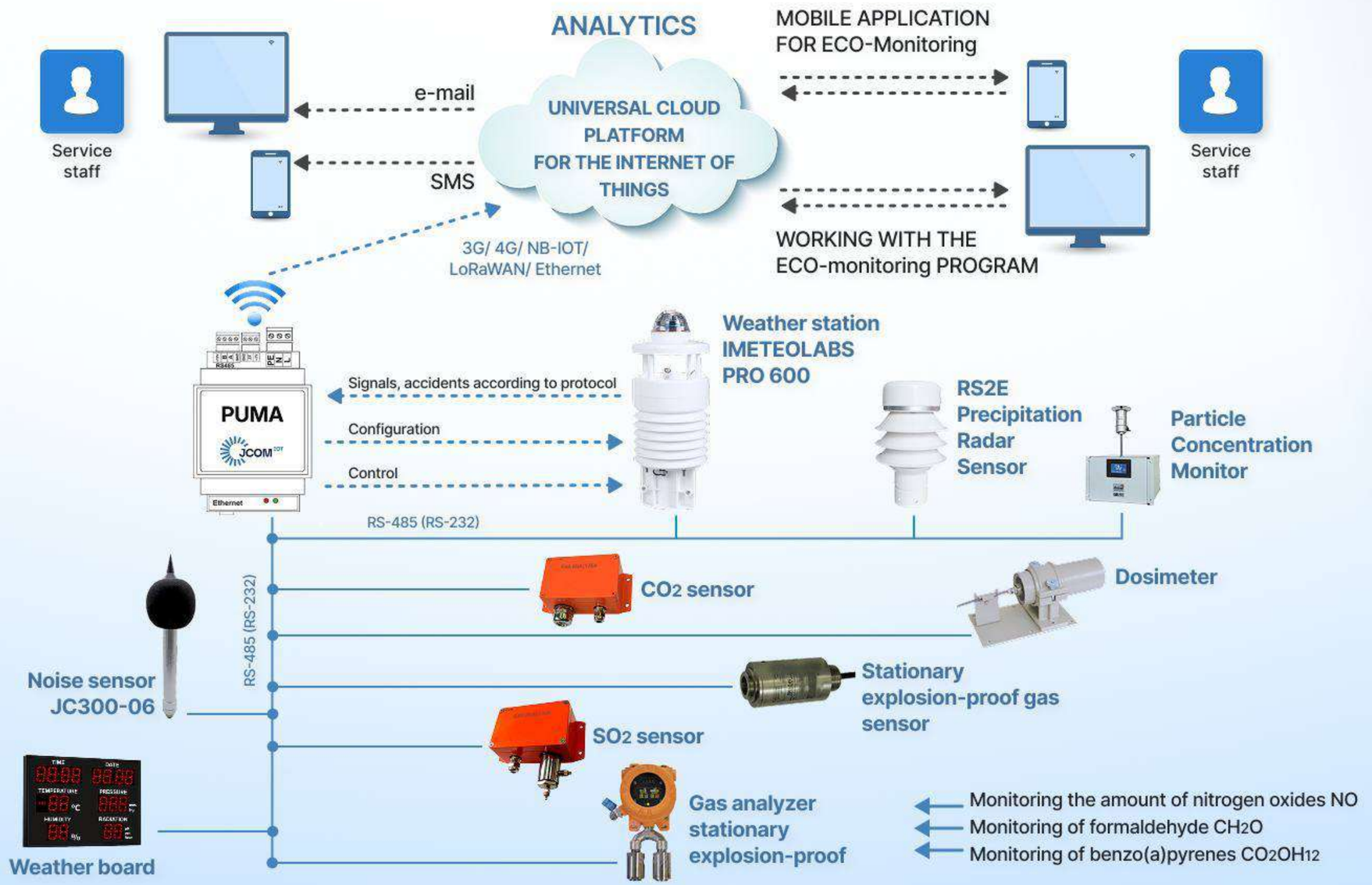
ADVANTAGES OF THE IMETEOLABS SOLUTION:

- Measurements of gas concentrations in atmospheric air: O_3, NO_2, CO, SO_2, H_2S in mg/m3
- Measurement range for each gas from 0.8 to 10 MAC
- Relative measurement error no more than 25%

ECOMETEOMONITORING PROJECT FOR THE COPPER COMPANY



ECOMETEOMONITORING SOLUTION FOR THE OIL PRODUCTION COMPANY



ECOMETEOMONITORING PROJECT FOR THE MEDIA FACADE COMPANY

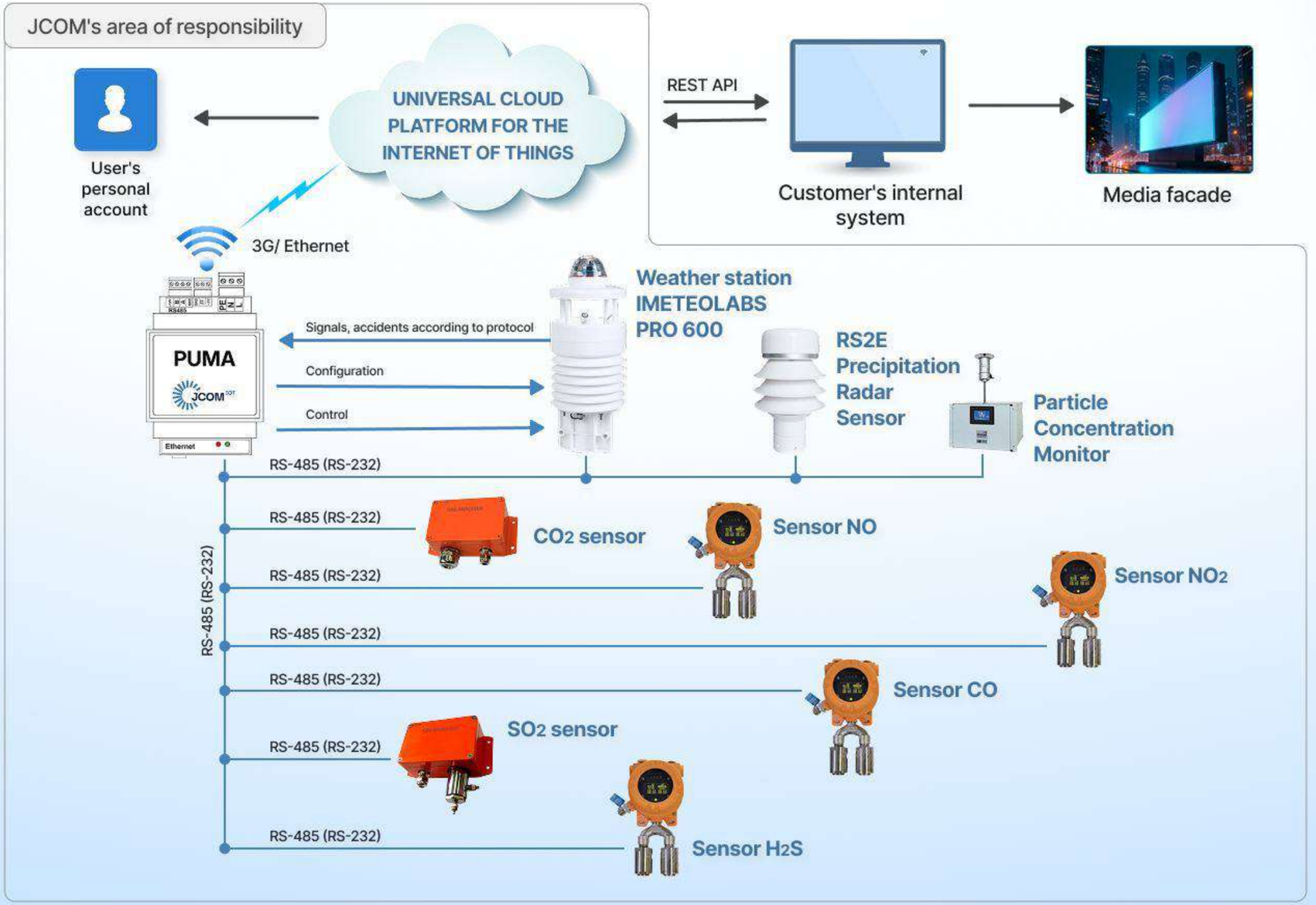
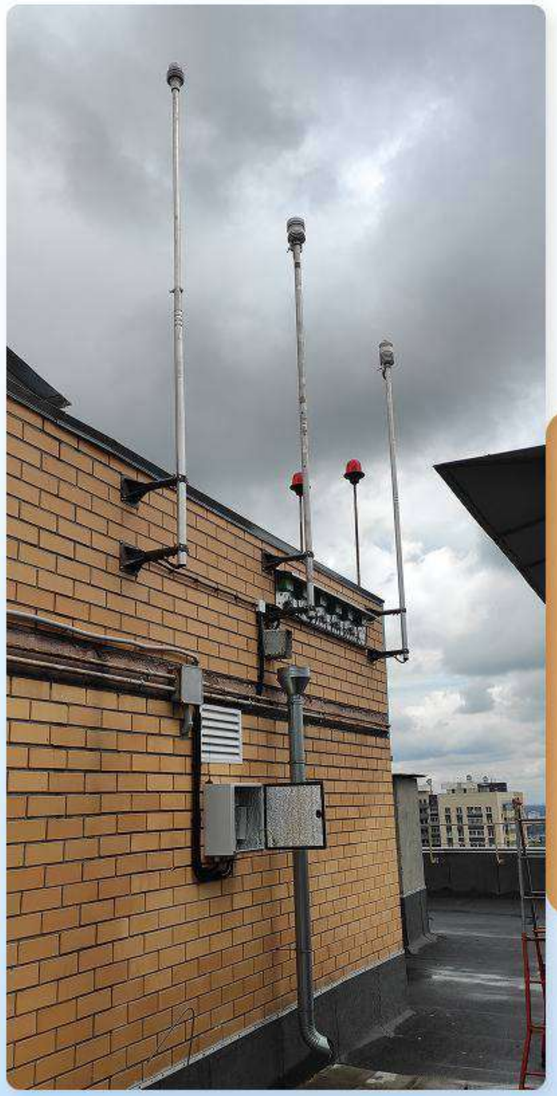


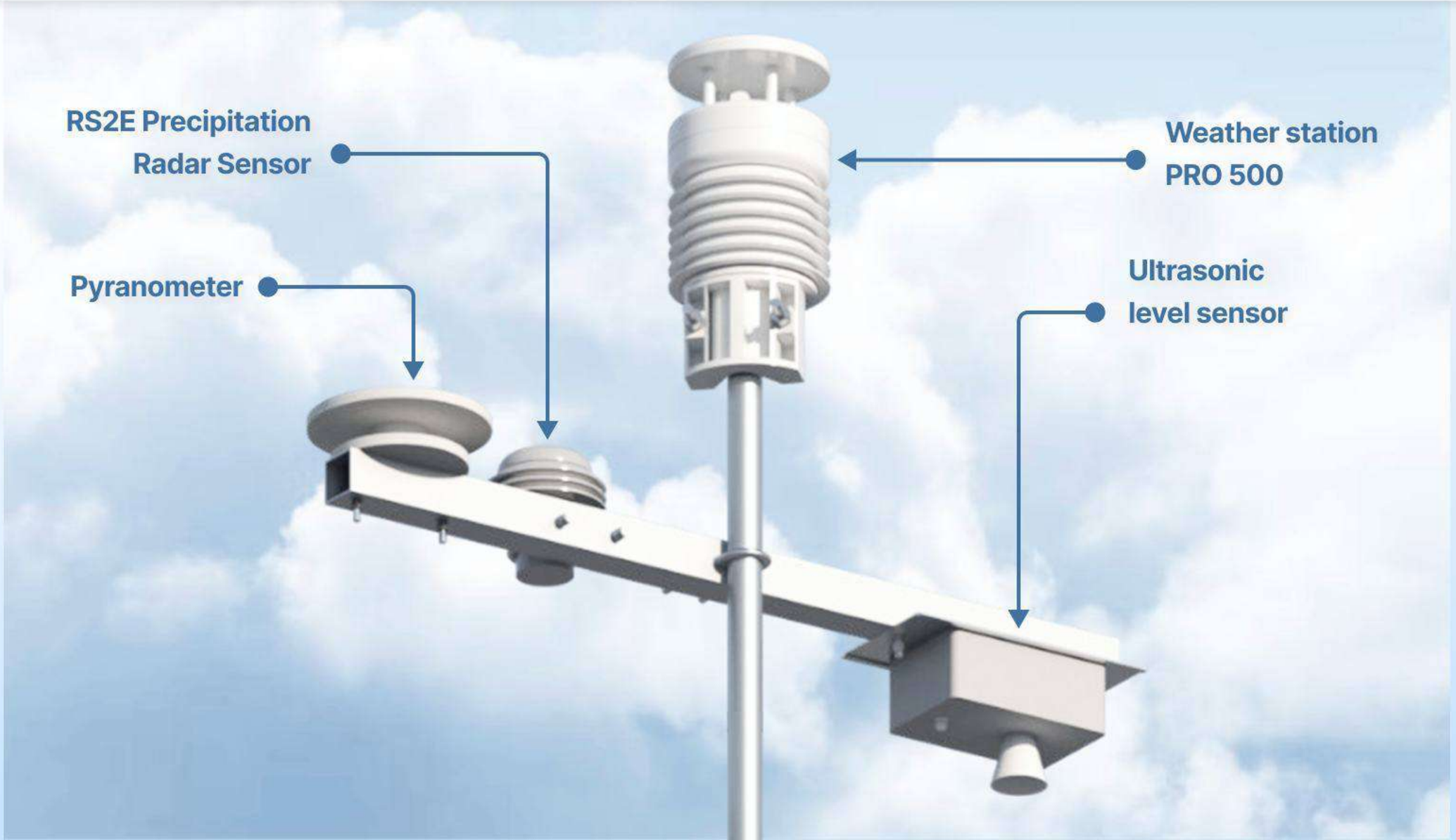
PHOTO OF THE IMPLEMENTATION OF THE ECOMETEOMONITORING SYSTEM OF THE FACILITY OF THE MEDIA FACADES COMPANY



MONITORING cabinet

Installation of a weather station, sensors and gas analyzers

COMPREHENSIVE ENVIRONMENTAL AND WEATHER MONITORING SOLUTION FOR CONSTRUCTION COMPANY



DESCRIPTION OF THE HYDROLOGICAL MONITORING SYSTEM

The proposed hydrological monitoring system is designed for remote automated monitoring of the hydrological conditions of reservoirs.
One simple yet highly effective method of flood forecasting is continuous monitoring of water levels at key locations along river sections or reservoirs.

The monitoring system equipment is configured for the required polling interval, then all data is transmitted to the database server.

ECOMETEOMONITORING SOLUTION FOR THE MODERN WASTE PROCESSING COMPLEX

JCOM IOT

GPS / Glonass

Time server

UNIVERSAL CLOUD PLATFORM FOR THE INTERNET OF THINGS

Users

Weather station (General monitoring)

- Airflow velocity
- Airflow direction
- Air temperature
- Relative humidity
- Atmospheric pressure
- Precipitation
- Irradiance
- Ultraviolet index

2G / 3G / 4G / NB-IoT / Ethernet / MQTT / HTTP / CoAP

Environmental meteorological monitoring of sites

Cesspool for domestic wastewater

- Nitrogen dioxide
- Hydrogen sulfide
- Methane
- Saturated hydrocarbons C6-C10
- Ammonia and others

Storage capacity for household wastewater

- Nitrogen dioxide
- Hydrogen sulfide
- Methane
- Saturated carbons C6-C10
- Phenol and others

Parking for special equipment

- Nitrogen dioxide
- Carbon
- Carbon dioxide
- Sulfur dioxide
- Kerosene

Parking for tracked vehicles

- Nitrogen dioxide
- Nitrogen oxide
- Soot
- Carbon dioxide
- Sulfur dioxide
- Kerosene

Administrative and household complex

- Nitrogen dioxide
- Soot
- Sulfur dioxide
- Carbon monoxide
- Kerosene Gasoline

Secondary raw materials warehouse

- Nitrogen dioxide
- Nitrogen oxide
- Soot
- Carbon oxide
- Sulfur dioxide
- Kerosene

Waste sorting complex

- Nitrogen dioxide
- Carbon
- Carbon monoxide
- Sulfur dioxide
- Kerosene

Parking for passenger vehicles

- Nitrogen dioxide
- Carbon dioxide
- Sulfur dioxide
- Gasoline

Gas station

- Hydrogen sulfide
- Saturated hydrocarbons C12-C19

Heating station

- Nitrogen dioxide
- Nitrogen oxide
- Carbon oxide
- Benzopyrene

Reagent warehouse

- Nitrogen dioxide
- Carbon oxide
- Hydrochloride
- Sulfuric acid

Gas Regulator Cabinet Point

- Methane
- Odorant

Gas piston unit

- Nitrogen dioxide
- Carbon oxide
- Benzopyrene

DGU

- Nitrogen dioxide
- Soot
- Sulfur dioxide
- Carbon oxide
- Formaldehyde
- Kerosene

Soil storage area

- Nitrogen dioxide
- Soot
- Sulfur dioxide
- Carbon oxide
- Kerosene, etc.

Solid waste disposal site

- Nitrogen dioxide
- Soot
- Sulfur dioxide
- Carbon oxide
- Kerosene, etc.

Leachate treatment facilities

- Ammonia
- Hydrogen sulfide
- Nitrogen dioxide
- Methane, etc.

Large waste disposal site

- Suspended solids

Treatment facilities for household and domestic wastewater

- Nitrogen dioxide
- Hydrogen sulfide
- Methane
- Saturated hydrocarbons C6-C10
- Ammonia
- Phenol
- Formaldehyde, etc.

Local stormwater treatment facilities

- Nitrogen dioxide
- Nitrogen oxide
- Soot
- Methane
- Saturated hydrocarbons C12-C19
- Hydrogen sulfide, etc.

Leachate storage pond

- Nitrogen dioxide
- Hydrogen sulfide
- Methane
- Saturated hydrocarbons C6-C10
- Ammonia
- Formaldehyde
- Phenol, etc.

HARDWARE AND SOFTWARE COMPLEX

Hardware and Software Complex

Characteristics	
Form factor	rack-mounted device, 1 unit, depth 300 mm
Power supply	2 PSUs: PSU1:AC, PSU2:AC PSU1:DC, PSU2:DC
Local network	5 ports 10/100/1000 Mbps
Port for providing redundancy of connection channels of the device	2xWAN ETH ports + 1 Wireless (WiFi)
RAM memory	16 GB DDR4
Storage memory	256 GB (NVMe SSD drive in M.2 PCIe2.0 slot.)
Video output (Ability to connect an external monitor)	HDMI
Interface outputs	256 GB (NVMe SSD drive in M.2 PCIe2.0 slot.)
Additional memory	MicroSD card or USB 2.0/3.0 drive
Possibility of connecting 4G modem No. 1 to provide remote access to the device (option 2*)	Yes
Possibility of connecting 4G modem No. 2 to ensure traffic routing to the VU System (option 3*)	Yes
Possibility of installing additional SDD memory (option 4*)	Yes
Possibility of embedding a ZigBee coordinator (option 5*)	Yes
Providing the function of logging incoming and outgoing packets (possibly with their filtering) on the capacious memory inside the Controller (for example, SD, USB FLASH or SSD disk)	Yes
Availability of the Watchdog Timer function	Yes
Hardware access control function to the Device (option 6*)	Yes
Storing information in the PAK database	Up to 36 months, then rewriting occurs

ECONOMIC EFFICIENCY OF IMETEOLABS SOLUTION

COMPARATIVE PARAMETERS	IMETEOLABS PRO 600 	VAISALA WXT536 	LUFFT WS600-UMB 	THIESCLIMACLIMA SENSOR US 
WIND SPEED	Range: 0 m/s...60 m/s Accuracy: ±0.3 m/s or ±3% (0...35 m/s)	Range: 0 m/s ... 60 m/s Accuracy: ±0.3 m/s or ±3%	Range: 0 m/s...75 m/s Accuracy: ±0.3 m/s or ±3% (0...35 m/s)	Range: 1.1 m/s ... 60 m/s Accuracy: ≤ 5 m/s: ±0.3 m/s, 5...60 m/s: ±3%
WIND DIRECTION	Range: 0° ...360° Accuracy: ±3%	Range: 0° ...360° Accuracy: ±3%	Range: 0 m/s...75 m/s Accuracy: ±0.3 m/s or 3% (0...35 m/s); ±5% (>35 m/s) standard deviation	Range: 0°...360° Accuracy: ±2.0 at speed >2 m/s
ATMOSPHERIC PRESSURE	Range: 300 kPa... 1200 hPa Accuracy: ±1 hPa	Range: 600 hPa ... 1100 hPa Accuracy: ±0.5 hPa at 0°C... +30°C ±1 hPa at -52°C ... +60°C	Range: 300 hPa...1200 hPa Accuracy: ±0.5 hPa	Range: 300 hPa...1100 hPa Accuracy: ±0.25 hPa at +10°C...+35°C, ±1 hPa at -20°C...+60°C
RELATIVE HUMIDITY	Range: 0%...100% Accuracy: ±2%	Range: 0%...100% Accuracy: ±3%	Range: 0%...100%	Range: 0%...100% Accuracy: ± 3%
AIR TEMPERATURE	Range: -50°C ... +60°C Accuracy: ±0.1°C	Range: -52°C ... +60°C (-60°F ... +140°F) Accuracy: ±0.3°C (±0.5°F)	Range: -52°C ... +60°C	Range: -40°C ... +80°C Accuracy: ±0.3 K at 25°C, ±1.0 K at -40°C ... +80°C
PRECIPITATION	Range: 0.1 mm/min...2.4 mm/min	Range: 0.01 mm, 0.001 in	Range: 0.3 mm...5 mm	Range: 0.001 ... 100 mm
SOLAR RADIATION, UV INDEX	Solar measurement range: 0~2000W/m2 UV index range: 0-15	No	No	No
DIGITAL DATA OUTPUT	RS-485 / RS-232	RS-485 / RS-422 / RS-232	RS-485, half-duplex, two-wire	RS-485 / RS-422
WEIGHT, NO MORE	1,5 kg	0,65 kg	1,5 kg	1,5 kg
CERTIFICATE SI	Yes	Yes	Yes	No

We are ready to help from the idea to serial production

Types of electronic equipment development:

1. Device hardware development:

   Changing the number of ports, adding new interfaces, connectors, channels, electrical characteristics, changing dimensions, and materials.

2. Firmware development:

   Changing or adding new software features to the device's firmware.

Additional device protection for harsh operating conditions:

- Design of an enclosure with the required IP rating;
- External and internal connectors with locking mechanism for use in high-vibration environments;
- Various types of enclosure mechanical modifications for installation in hard-to-reach locations;
- Additional testing and vibration resistance and electromagnetic compatibility testing according to customer-specified conditions in a climatic chamber.

JCOM IOT

How we work:

1. You send us the technical specifications for the product you need.
2. Dentification of development requirements, quantity of equipment in the batch and project deadlines.
3. Preparation of a commercial proposal.
4. The process of developing customization or new equipment.
5. Verification. Testing and trialing of the equipment according to the customer's specifications.
6. The process of selling and shipping the developed equipment to the end customer.

Contacts

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from 9:00 a.m. to 6:00 p.m.