



SPC DOZA

FREGAT

RADIATION
MONITORING
SYSTEM

FREGAT

Radiation Monitoring System

Reliable, low-cost, fast deployed, easily configurable and easily commissioned system for monitoring the radiation environment in non-critical nuclear facilities such as: radio nuclide isotope storages, research and calibration laboratories, positron-emission tomography, nuclear medicine clinics, objects of Nuclear Power Plants outside of the critical reactor zone, other objects where continuous radiation monitoring is a mandatory requirement according to local standards and regulations.



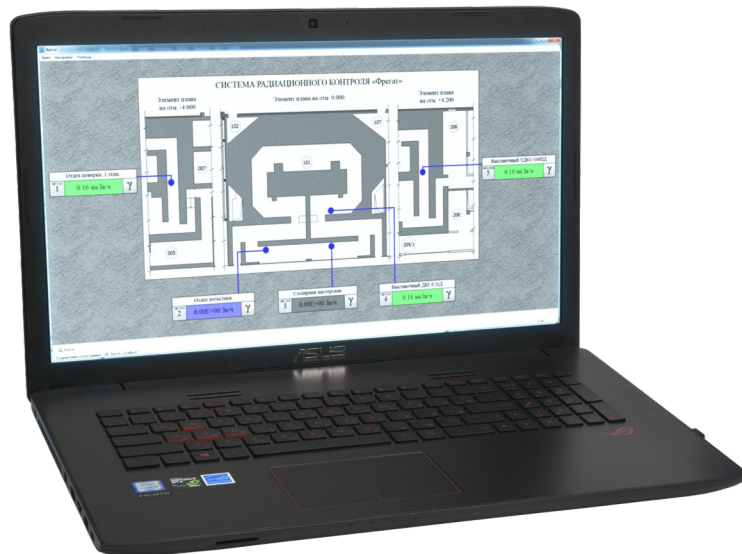
DIAGRAM OF RMS FREGAT





FREGAT Workstation

- located in a control room, office or any other place of the monitored facility;
- form factors: laptop, table-top PC, wall-mount panel or rigid industrial console;
- for use with FREGAT software;
- communication with BPI-1D module via RS-485 interface;
- up to 600m cable length to BPI-1D module (up to 1200m with IP-1 signal amplifier);
- user access control;
- configurable parameters according to customer's specifics and requirements.

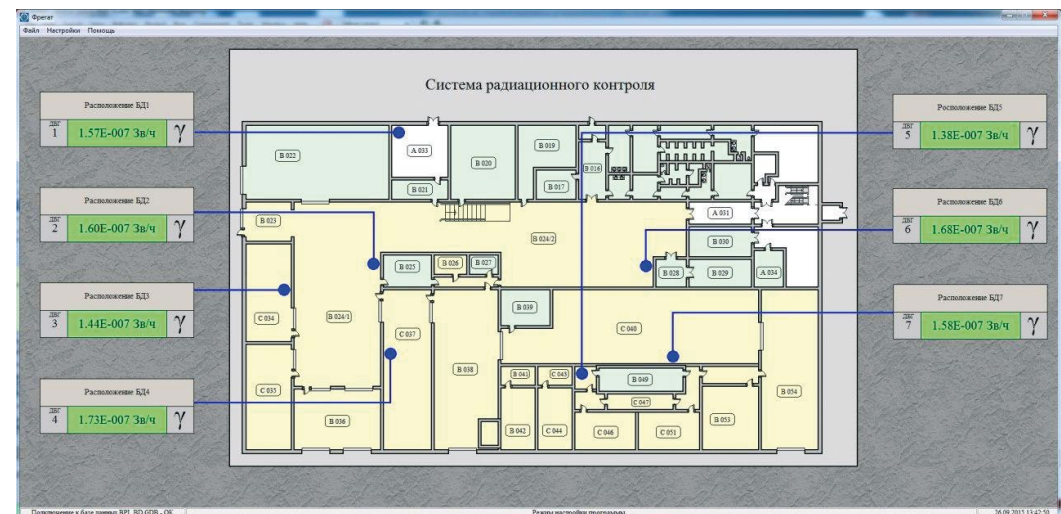
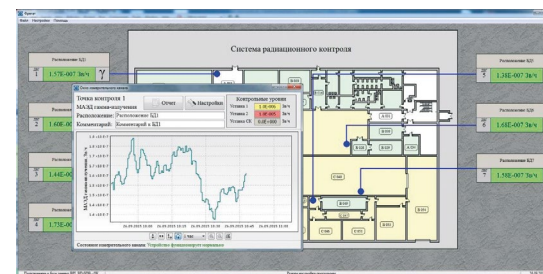
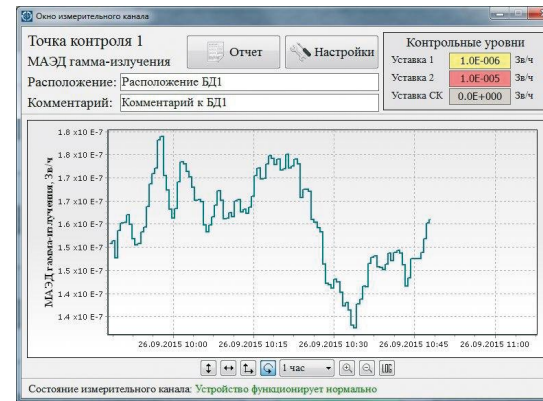


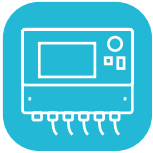
FREGAT SOFTWARE

Automated acquisition, processing and storage of the radiation parameters data received from FREGAT hardware.

SOFTWARE PROVIDES

- online data acquisition, processing, storage and displaying of monitored parameters at the operator's workplace;
- configurable HMI screens with the radiation monitoring system layout (floorplan), location and current condition of the connected detectors;
- alarms and triggers set up;
- Green – Yellow – Red bar graphs for easy indication of the current radiation environment in the monitored areas;
- live values and historical archives;
- trends and graphs of the measuring channels parameters;
- event list;
- self-check of the system health, channel failure, communication failure with indication to operator;
- reports preparation and printing.





BPI-1D

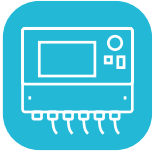
local display unit

Serves as a free-standing local system or in a complete set with Fregat Software and Workstation.

PURPOSE

- Data acquisition from the connected radiation detectors.
- Processing and display of the data on the built-in information panel.
- Data transfer to Fregat Software (if Fregat Software and Workstation are in the scope of supply).
- Configuration of alarm levels and triggers via Configuration Software (included in the complete set of BPI-1D).
- Alarms activation in case the radiation alarm levels are exceeded (on local display, on Workstation HMI screens, on external relays, warning lights, warning signs and sound signals).





BPI-1D

local display unit

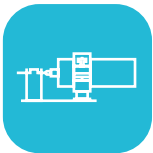
FEATURES

- 5.6" built-in display.
- Operates automatically without personnel attention (unattended mode).
- Self-check of the system health and the current status of the connected detectors.
- Local display represents:
 - current parameters of the measuring channels;
 - Green – Yellow – Red bar graphs for each channel;
 - historical trends for each channel;
 - current date and time;
 - event list;
 - measuring channels' status.

OTHER CHARACTERISTICS

- Communication interface RS-485.
- Number of connected devices: up to 15 for detectors; up to 15 for external relays, signals and warning lights.
- Power input: 220 V, 50 Hz; Power output: 12 ÷ 24 V DC (to external detectors, lights and relays).
- Operating temperature range: 0 °C ÷ +50 °C.
- Overall dimensions: 304×242×159 mm, weight: 6 kg.
- IP54 Wall-mount design.





DBG-S11D

wide range gamma area monitor

Continuous measurement of ambient dose equivalent rate $H^*(10)$ for gamma radiation. Transfer of the measured values and self-check information to BPI-1D local display unit.

MEASURING RANGE:

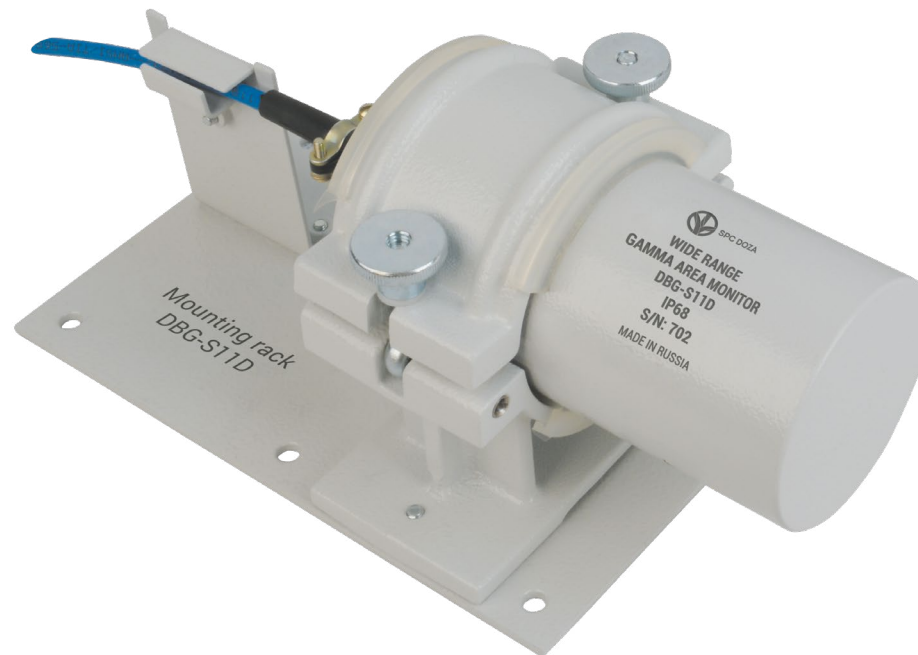
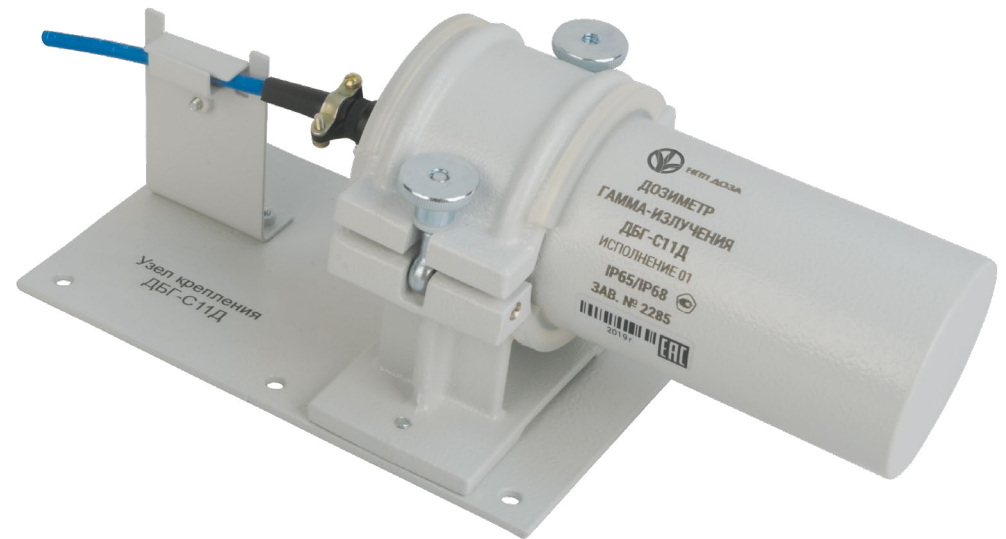
- Basic version: $0.1 \mu\text{Sv/h} \div 10 \text{ mSv/h}$
- Version 01: $0.1 \mu\text{Sv/h} \div 10 \text{ Sv/h}$
- Version 02: $0.1 \mu\text{Sv/h} \div 100 \text{ Sv/h}$

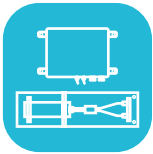
OTHER CHARACTERISTICS

- Energy range: $0.05 \div 3.0 \text{ MeV}$
- Temperature range: $-60 \text{ }^\circ\text{C} \div +80 \text{ }^\circ\text{C}$
- IP68 enclosure

OVERALL DIMENSIONS AND WEIGHT:

- Basic version: $\varnothing 68 \times 141 \text{ mm}$, 0.65 kg
- Version 01 and 02: $\varnothing 68 \times 179 \text{ mm}$, 0.7 kg
- Wall-mount bracket: $200 \times 122 \times 117 \text{ mm}$, 2.24 kg





DBG-S101D

High range gamma and X-Ray monitor

Continuous measurement of ambient dose equivalent rate (ADER) for X-Ray and gamma radiation.

Consists of ionization chamber module and electrometric interface unit.

- Measuring range:
 $1 \cdot 10^{-5} \text{ Sv/h} \div 10^4 \text{ Sv/h}$
- Energy range: $0.05 \div 3.0 \text{ MeV}$

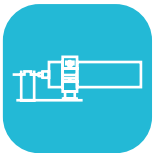
MIC-101D IONIZATION CHAMBER MODULE:

- Temperature range:
 $-40 \text{ }^\circ\text{C} \div +80 \text{ }^\circ\text{C}$
- IP67 enclosure
- Overall dimensions and weight:
 $500 \times 140 \times 160 \text{ mm}$, 2.6 kg

BSE-101D ELECTROMETRIC INTERFACE UNIT:

- Temperature range:
 $-40 \text{ }^\circ\text{C} \div +55 \text{ }^\circ\text{C}$
- IP65 enclosure
- Overall dimensions and weight:
 $350 \times 260 \times 120 \text{ mm}$, 5.5 kg



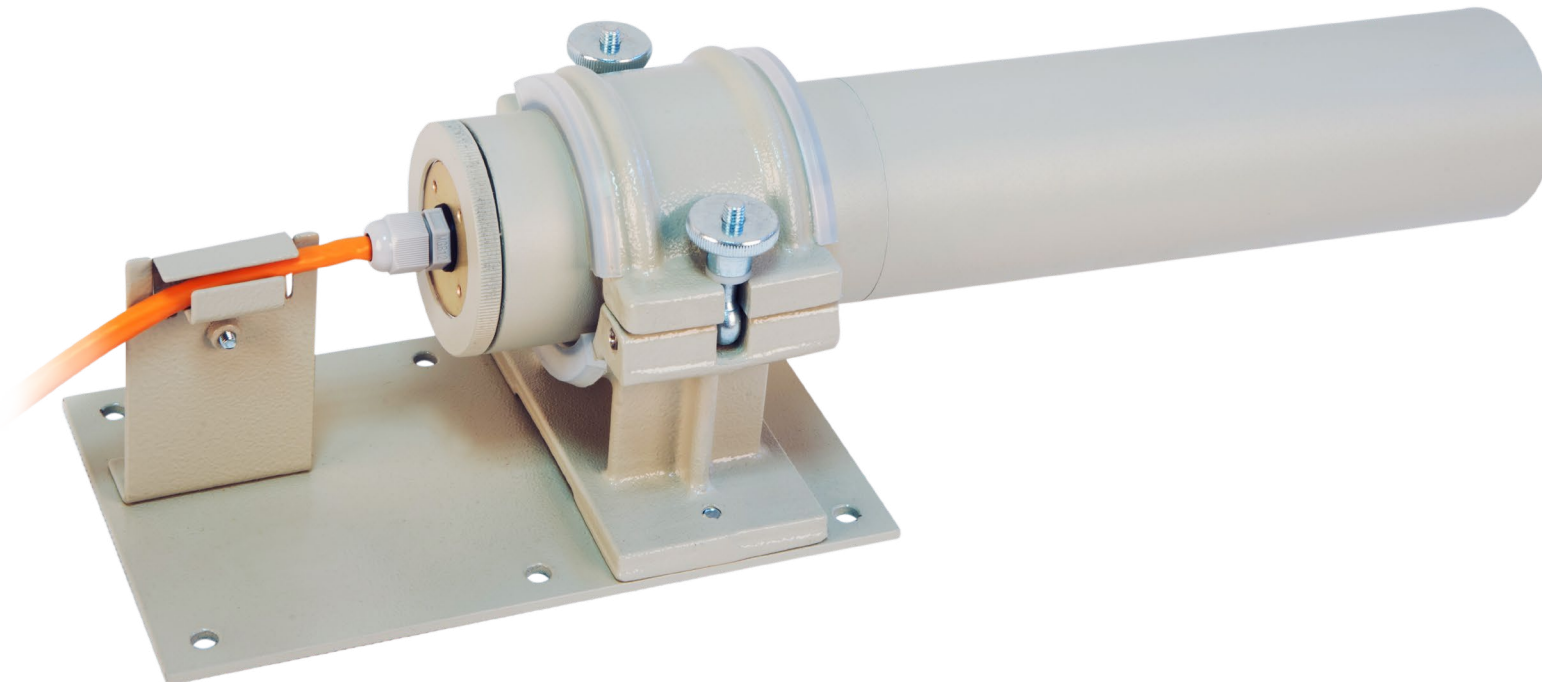


BDEG-03

High sensitivity gamma area monitor

Continuous measurement of ambient dose equivalent rate (ADER) for low rate gamma radiation with high sensitivity. Perfect for detection of gamma-radiation sources, checking scrap metals, general and industrial wastes, vehicles, luggage and other cargoes.

- Measuring range: $0.1 \mu\text{Sv/h} \div 0.1 \text{ mSv/h}$
- Energy range:
 - $0.05 \div 3.0 \text{ MeV}$ for detector size $\varnothing 40 \times 60 \text{ mm}$
 - $0.1 \div 7.5 \text{ MeV}$ for detector size $\varnothing 40 \times 100 \text{ mm}$
- Sensitivity (Cs-137 radionuclide), no less: $3000 \text{ pulses/sec}/\mu\text{Sv/h}$
- Temperature range: $-10 \text{ }^\circ\text{C} \div +60 \text{ }^\circ\text{C}$
- IP65 enclosure
- Overall dimensions and weight: $\varnothing 62 \times 315 \text{ mm}$, 1.4 kg (for detector size $\varnothing 40 \times 60 \text{ mm}$)





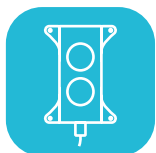
UDMN-100

Neutron area monitor

Continuous measurement of ambient dose equivalent rate (ADER) for neutron radiation.

- Spherical polyethylene moderator \varnothing 239 mm
- Measuring range: $0.1 \mu\text{Sv/h} \div 0.1 \text{Sv/h}$
- Energy range: $0.025 \text{eV} \div 10.0 \text{MeV}$
- Temperature range: $-45 \text{ }^\circ\text{C} \div +50 \text{ }^\circ\text{C}$
- IP65 enclosure
- Overall dimensions and weight: $428 \times 347 \times 258 \text{ mm}$, 13.8 kg





BZS-02D "MICRO"

external sound signal

Provides sound alert in case alarm or trigger is activated. Connected to BPI-1D local display unit via BAS-2 "MICRO" warning light. Sound alert deactivation with button.

PHYSICAL CHARACTERISTIC

- Communication cable length: up to 1200 m;
- Operating temperature range: 0°C ÷ +50°C;
- Sound power: 80 ÷ 100 dB at a distance of 1 m;
- Power supply: +12 V DC (supplied by BPI-1D local display unit);
- Wall-mount IP23 enclosure;
- Overall dimensions: 140×84×57 mm;
- Weight: 550 g.





REMOTE DISPLAY UNIT

Indication of current radiation parameters.

PHYSICAL CHARACTERISTIC

- Communication cable length to BPI-1D local display unit: up to 1200 m;
- Character height 100, 150 or 270 mm;
- Operating temperature range: $-40^{\circ}\text{C} \div +50^{\circ}\text{C}$;
- Power supply: +220 V, 50Hz;
- Wall-mount IP44 or IP65 design;
- Overall dimensions: 400×160×60, 815×250×80 or 1250×330×80 mm;
- Weight: 3 – 5 kg.





BAS-1S

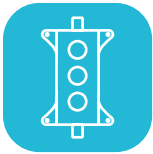
External warning light and sound signal

Provides visual and sound alerts of radiation hazard when the preconfigured alarm or trigger is activated.

PHYSICAL CHARACTERISTIC

- Communication cable length to BPI-1D local display unit: up to 1200 m;
- Green – Yellow – Red signal tower light to visual notification of the current status of radiation level;
- Sound signal power: $85 \div 100$ dB at a distance of 1 m;
- Operating temperature range: $10^{\circ}\text{C} \div +50^{\circ}\text{C}$;
- Power supply: 220 V, 50Hz;
- Wall-mount IP65 design;
- Overall dimensions: $160 \times 108 \times 472$ mm;
- Weight: 2 kg.





BAS-2 "MICRO"

External warning light.

PHYSICAL CHARACTERISTIC

- Communication cable length to BPI-1D local display unit: up to 1200 m;
- Green – Yellow – Red warning light to visual notification of the current status of radiation level;
- Relay output to BZS-02D "MICRO" external sound signal;
- Operating temperature range: 0°C ÷ +50°C;
- Power supply: 12 V DC;
- Wall-mount IP23 enclosure;
- Overall dimensions: 160×84×44 mm;
- Weight: 270 g.





ILLUMINATED WARNING SIGN

Indication of warning signs: “Do not enter”, “Monitor on”, “Blocked”, etc. when the preconfigured alarm or trigger is activated.

Connected to BPI-1D local display unit.

PHYSICAL CHARACTERISTIC

- Operating temperature range: $-10^{\circ}\text{C} \div +50^{\circ}\text{C}$;
- Wall-mount IP23 enclosure;
- Overall dimensions: $330 \times 110 \times 20$ mm;
- Weight: 500 g.



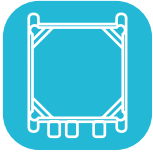
BDV-02D “MICRO” Relay output unit

Control of external devices, machinery, other mechanisms such as door locks, ventilation valves, special signals, etc.

PHYSICAL CHARACTERISTIC

- Communication cable length to BPI-1D local display unit: up to 1200 m;
- Number of relay outputs: 3;
- Operating temperature range: $0^{\circ}\text{C} \div +50^{\circ}\text{C}$;
- Power supply: 12 V DC;
- Wall-mount IP23 enclosure;
- Overall dimensions: $161 \times 85 \times 53$ mm;
- Weight: 270 g.





IP-1

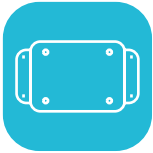
RS-485 signal amplifier (repeater)

Provides additional power to extend RS-485 communication channel between BPI-1D local display unit and the connected devices (workstation, radiation detectors, external relays, warning lights, warning signs and sound signals).

PHYSICAL CHARACTERISTIC

- Input power: 176-264 V;
- Power consumption: 160 VA;
- Output voltage: (18 ± 0.5) V;
- Maximum output current: 1 A;
- IP65 enclosure;
- Operating temperature range: $-40^{\circ}\text{C} \div +50^{\circ}\text{C}$;
- Operating relative air humidity: up to 98% at $+35^{\circ}\text{C}$;
- Overall dimensions: 200×252×132 mm;
- Weight: 2 kg.





KK-5

Junction box

Provides cable connections between BPI-1D local display unit and the external devices. Protects cable connectors from mechanical damage and environmental impact.

PHYSICAL CHARACTERISTIC

- Cable core size: 0.08 – 2.5 mm²;
- Cable maximum diameter: 13.5 mm;
- 7 cable inputs per box (with cable glands), 4 clip connectors per cable;
- IP54 enclosure;
- Overall dimensions: 180×119×50 mm;
- Weight: 400 g.



RMS FREGAT INSTALLED BASE





SPC DOZA

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COMPANY "DOZA"



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