

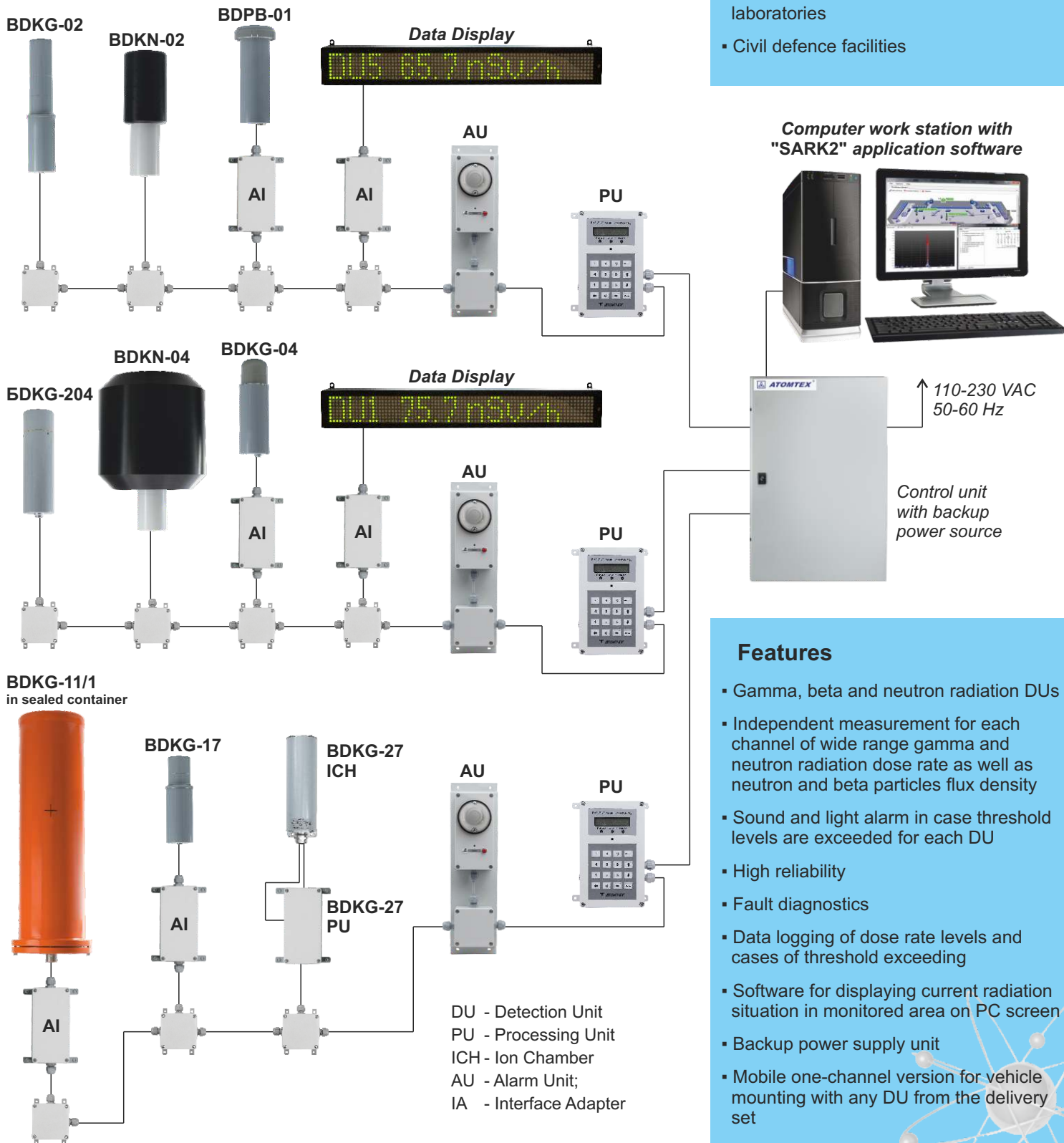
AT2327 Alarm Dosimeter

Purpose

AT2327 Alarm Dosimeter can be used for constructing a flexible and multichannel stationary system for radiation monitoring of radiation-sensitive and radiation-dangerous sites, areas and facilities, as well as for radiation monitoring of environment.

Applications

- Nuclear industry facilities
- Radiological health care facilities
- Manufacturing facilities
- Radiation detection and dosimetric laboratories
- Civil defence facilities



Features

- Gamma, beta and neutron radiation DUs
- Independent measurement for each channel of wide range gamma and neutron radiation dose rate as well as neutron and beta particles flux density
- Sound and light alarm in case threshold levels are exceeded for each DU
- High reliability
- Fault diagnostics
- Data logging of dose rate levels and cases of threshold exceeding
- Software for displaying current radiation situation in monitored area on PC screen
- Backup power supply unit
- Mobile one-channel version for vehicle mounting with any DU from the delivery set



ATOMTEX[®]

INSTRUMENTS AND TECHNOLOGIES FOR NUCLEAR MEASUREMENTS AND RADIATION MONITORING

AT2327 Alarm Dosimeter

OPERATING PRINCIPLE

Alarm dosimeter is based on detection units measuring:

- gamma radiation: BDKG-02, BDKG-04, BDKG-11/1, BDKG-17, BDKG-27, BDKG-204
- beta radiation: BDPB-01
- neutron radiation: BDKN-02, BDKN-04

Detection units (DUs) are fully independent units for measuring gamma and neutron radiation dose rate as well as beta particles and neutron flux density with 2-second interval. DUs control sound and light alarms designed to alert staff about radiation hazards. DU sends information to Processing Unit (PU) and/or PC via RS485 interface. Data is further communicated to PC by adapter, where it is converted from RS485 to USB, RS232 or Ethernet.

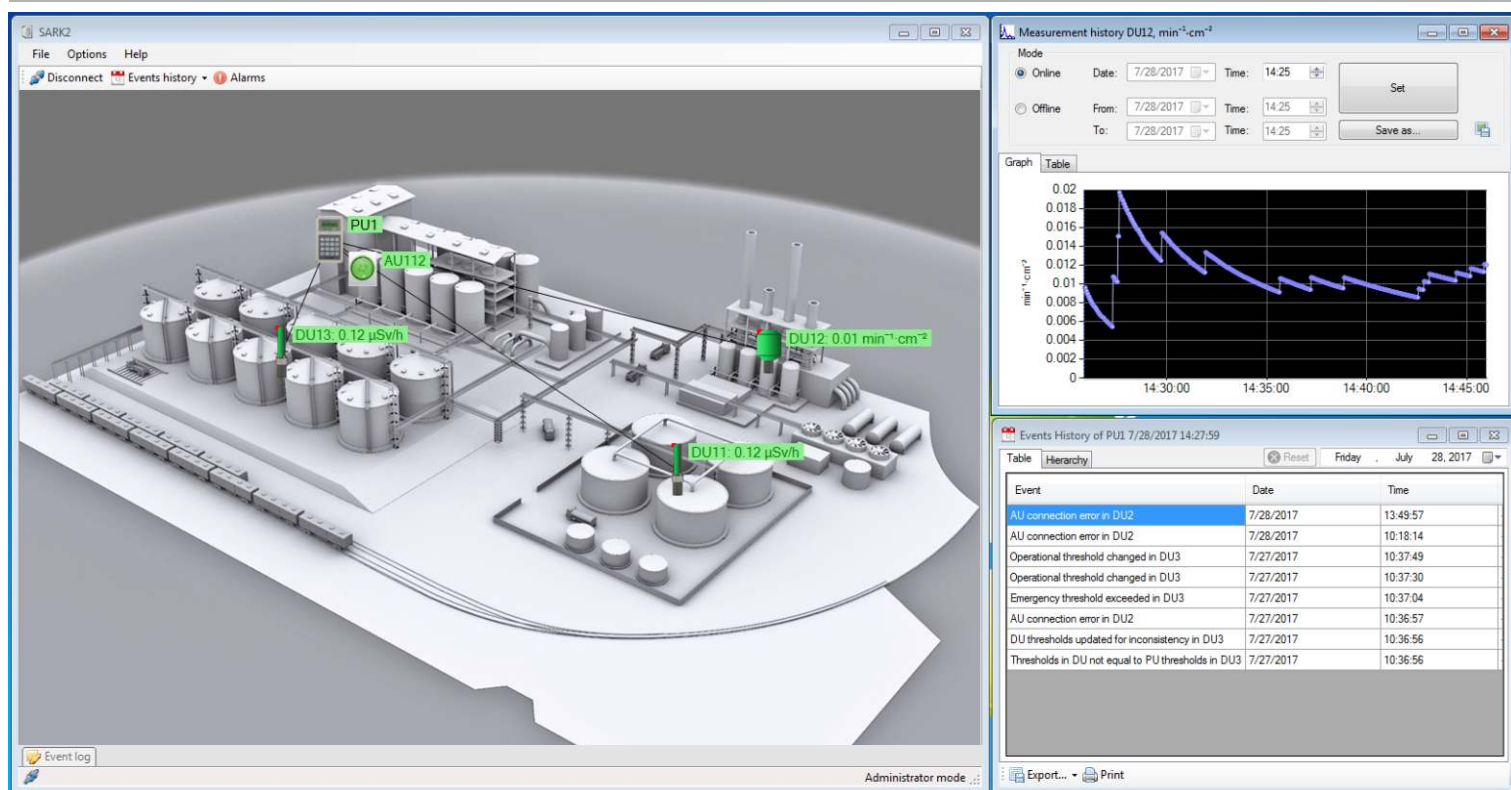
PU displays the measured value at the point location of any selected DU in real time. When threshold level is exceeded or in case of failure of any system component sound and light alarm is actuated and emergency area is indicated on the PU screen. PU is used for setting thresholds for each DU, controlling DU state, correcting real-time clock, password protection of selected functions, viewing dose rate fluctuation history and threshold levels exceeding in each reference point.

Each DU can be connected to a data display for measurement results, alert messages, current time and temperature display.

When the system is based on a PC the software allows generating and changing the configuration of the system reading as well as analyzing the data. PC screen is used for displaying the plan of the site under control. Reference points show measurement values presented as charts and tables.

AT2331 Emergency alarm dosimeter and AT2327 Alarm dosimeter can be interconnected to create an Alarm systems for detection of self-sustaining chain reaction.

"SARK2" SOFTWARE



Purpose:

Visualisation of operation of a single or multiple AT2327 Alarm dosimeters joined into automated radiation control system on PC screen.

Functions:

- Display and edit the controlled network in the site plan
- Display and save monitoring data as diagrams
- Generate visual and sound notifications to system operator when threshold levels are exceeded or any component of the system fails
- Data on operation start and end time, software and hardware errors and history of exceeded threshold levels are recorded into "Radiation Monitoring" log
- Images from surveillance camera are captured when alarm situation occurs, with possibility to tie the camera to specific DUs
- Control of SQL server connection status.

Features:

Users can be divided into two groups "SARK2 Administrators" and "SARK2 Users".

A user in "SARK2 Administrators" group has full rights to set up and edit the SARK network.

A user in "SARK2 Users" group has no rights to change any settings. This user can browse event history and system network polling period only.

AT2327 Alarm Dosimeter

SPECIFICATION

Measurement range

- Ambient gamma radiation dose equivalent rate	
BDKG-02	0.1 $\mu\text{Sv/h}$ – 10 Sv/h
BDKG-04, BDKG-204	0.05 $\mu\text{Sv/h}$ – 10 Sv/h
BDKG-11/1	0.01 $\mu\text{Sv/h}$ – 100 $\mu\text{Sv/h}$
BDKG-17	1 mSv/h – 100 Sv/h
BDKG-27	50 mSv/h – 4000 Sv/h
- Ambient neutron radiation dose equivalent rate	
BDKN-02 (from Pu-Be sources)	0.1 $\mu\text{Sv/h}$ – 10 mSv/h
BDKN-04	0.1 $\mu\text{Sv/h}$ – 10 mSv/h
- Neutron flux density	
BDKN-02, BDKN-04	0.1 – $1 \cdot 10^4$ neutron $\cdot\text{s}^{-1}\cdot\text{cm}^{-2}$
- Beta particles flux density	
BDPB-01	$1 - 5 \cdot 10^5$ particles $\cdot\text{min}^{-1}\cdot\text{cm}^{-2}$

Limit of intrinsic relative measurement error

- Ambient gamma radiation dose equivalent rate	$\pm 20\%$ $\pm 15\%$ (BDKG-02)
- Ambient neutron radiation dose equivalent rate	$\pm 35\%$ (BDKN-02) $\pm 20\%$ (BDKN-04)
- Neutron flux density	$\pm 20\%$ (BDKN-02) $\pm 35\%$ (BDKN-04)
- Beta particles flux density	$\pm 20\%$ (BDPB-01)

Sensitivity

- ^{137}Cs gamma radiation	
BDKG-02	4.0 cps/ $\mu\text{Sv}\cdot\text{h}^{-1}$
BDKG-04, BDKG-204	70.0 cps/ $\mu\text{Sv}\cdot\text{h}^{-1}$
BDKG-11/1 in sealed container	1970.0 cps/ $\mu\text{Sv}\cdot\text{h}^{-1}$
BDKG-17	0.005 cps/ $\mu\text{Sv}\cdot\text{h}^{-1}$
BDKG-27	2.1 $\mu\text{C/Sv}$
- Pu-Be source neutron radiation	
BDKN-02, BDKN-04	
<i>In dose rate measurement mode</i>	0.355 cps/ $\mu\text{Sv}\cdot\text{h}^{-1}$
<i>In flux density measurement mode</i>	0.5 cps/neutron $\cdot\text{s}^{-1}\cdot\text{cm}^{-2}$
- $^{90}\text{Sr} + ^{90}\text{Y}$ beta radiation	
BDPB-01	0.3 cps/particle $\cdot\text{min}^{-1}\cdot\text{cm}^{-2}$

Energy range

- Gamma radiation	
BDKG-02, BDKG-17	60 keV – 3 MeV
BDKG-04	15 keV – 10 MeV
BDKG-11/1	50 keV – 3 MeV
BDKG-27	60 keV – 1.5 MeV
BDKG-204	20 keV – 10 MeV
- Beta radiation	
BDPB-01	155 keV – 3.5 MeV
- Neutron radiation	
BDKN-02, BDKN-04	0.025 eV – 14 MeV

Energy dependence relative to 662 keV (^{137}Cs)

BDKG-02	-20% to +35%
BDKG-04	$\pm 25\%$ (15 keV – 3 MeV) $\pm 40\%$ (3 MeV – 10 MeV)
BDKG-11/1	-20% to +20%
BDKG-17	-25% to +35%
BDKG-27	$\pm 30\%$
BDKG-204	-45% to +35% (20 – 60 keV) $\pm 25\%$ (60 keV – 3 MeV) $\pm 50\%$ (3 – 10 MeV)

Power supply

Mains: 110-230 VAC, 50-60 Hz;
Reserve battery in case of emergency power off (optional)

Alarm

3-stage light alarm and sound alarm

Number of detection units in one alarm dosimeter

1...10

Number of alarm dosimeters in the system for PC configuration

32 max.

Burn-up life

≥ 100 Sv
 $\geq 10^8$ Sv (BDKG-27)

Distance between detection unit and processing unit/PC when interface cable is used

1000 m max.

Interface

BDKG-02, BDKG-27, BDKG-204	RS485
BDKG-04, BDKG-11/1, BDKG-17	RS232
BDPB-01	RS232
BDKN-02, BDKN-02, Alarm Unit	RS485
Processing Unit, Data Display	RS485

Protection class

BDKG-02	IP57
BDKG-11/1 in sealed container	IP65
BDKG-04, BDKG-17, BDPB-01	IP64
BDKG-27 PU	IP55
BDKG-27 ICH	IP21
BDKG-204	IP67
BDKN-02, BDKN-04	IP54
Processing Unit	IP55
Alarm Unit	IP65
Data Display	IP21

Working temperature range

Data Display	-5°C to +40°C
Processing Unit	-5°C to +40°C -40°C to +50°C (option)
Detection Units	-30°C to +50°C
BDKG-02, BDKG-04, Alarm Unit	-40°C to +50°C
BDKG-204	-40°C to +60°C

Relative air humidity with air

temperature $\leq 35^\circ\text{C}$ without condensation $\leq 95\%$
 $\leq 98\%$ (BDKG-204)

Overall dimensions, weight

BDKG-02	$\varnothing 55 \times 260$ mm, 0.5 kg
BDKG-04	$\varnothing 61 \times 205$ mm, 0.5 kg
BDKG-11/1 in sealed container	$\varnothing 141 \times 473$ mm, 6.5 kg
BDKG-17	$\varnothing 54 \times 167$ mm, 0.27 kg
BDKG-27 PU	206x82x56 mm, 0.45 kg
BDKG-27 ICH	190x58x65 mm, 0.7 kg
BDKG-204	$\varnothing 61 \times 210$ mm, 0.55 kg
BDPB-01	$\varnothing 80 \times 196$ mm, 0.55 kg
BDKN-02	$\varnothing 91 \times 260$ mm, 2.4 kg
BDKN-04	235x264x315 mm, 8.0 kg
Processing Unit	200x160x90 mm, 0.7 kg
Alarm Unit	185x85x95 mm, 0.4 kg
Data Display	644x98x67 mm, 4.0 kg

Alarm Dosimeter meets Safety standard requirements: IEC 61010-1:2001
EMC requirements: EN 55011:2009, IEC 61326-1:2006, IEC 61000-4-2:2008,
IEC 61000-4-3:2008, IEC 61000-4-4:2004+A1:2010, IEC 61000-4-5:2005,
IEC 61000-4-6:2008, IEC 61000-4-8:2009, IEC 61000-4-11:2004

Design and specifications are subject to change without notice



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