AT2327 Alarm Dosimeter (Pedestrian Radiation Monitors)

Applications

- Radiation screening of passing-by pedestrians:
  - Public places and institutions
  - Airports, bus terminals and railway stations, underground stations
  - Access control points on nuclear industry objects
  - Border control and customs clearance points

Stationary two-channel pedestrian radiation monitor is designed to detect gamma and neutron radiation sources continuously and automatically in a stream of people crossing borders of secure facilities.

Pedestrian radiation monitor can be delivered without neutron channel at request.

Operating principle

Operating principle of Pedestrian radiation monitor is based on gamma and neutron smart probes (BDKG and BDKN respectively).

The monitor powers on and BDKG starts count rate measurement of natural gamma radiation background. Smart probe controller uses this measured value to calculate and set the threshold gamma radiation level – alarm level. Default alarm level value for neutron radiation is *5 counts·cm^2/neutron*.

When a pedestrian crosses control zone line he or she triggers the proximity sensor and it activates BDKG continuous gamma radiation measurement mode with count rate calculation and further comparison of measured value to alarm threshold level, and switches BDKN into neutron radiation presence/absence testing mode. When a set alarm threshold level is exceeded corresponding smart probe activates the audio and light (red) alarm to inform staff (security) about gamma or neutron radiation source detection.

This feature allows creating radiation monitoring network from multiple pedestrian radiation monitors (up to 32 monitors) controlled by personal computer with bundled dedicated software installed. Then personal computer displays status of each connected pedestrian radiation monitor, its location on monitored site plan, keeps alarm records and logs. Video recorder allows logging of monitored site video frames.

Features

- 2-second triggering when the threshold level is exceeded by 0.05 μSv/h (BDKG-11/1) and 0.03 μSv/h (BDKG-19)
- Rapid accommodation to radiation background change
- Activation of sound and light alarm by detected gamma and/or neutron radiation
- Multiple pedestrian radiation monitors can be joined into a network controlled by dedicated software on personal computer
- Mobility and passage formation capability
- Component self-testing during operation
- Continuous and occasional radiation monitoring
- 230V-50Hz mains/integrated battery operation

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Versions of Pedestrian radiation monitors	*Smart probes*			
	BDKG11/1 (γ)	**BDKG-19 (γ)**	**BDKN-01 (n)**	**BDKN-05 (n)**
Version 1	■	–	■	–
Version 2	–	■	–	■
Version 3	■	–	–	–
Version 4	–	■	–	–

Specification

Alarm	Sound and light
Initialisation time	≤5 min
Power supply	1) от сети переменного тока 230В, 50Гц; 2) от аккумуляторной батареи, в случае аварийного отключения сети
Continuous operation time with fully charged battery	≥6 h
False response quantity	≤1 for 8 h of continuous operation
PC interface	RS485
Number of monitors connected to a single PC	From 1 to 32
Operation temperature range	-30°C ... +50°C (-20°C ... +50°C for BDKG-19)
Relative humidity with air temperature ≤35°C without condensation	≤95%
Protection class	IP57
Dimensions	746x500x220 mm

AT2327 Alarm dosimeter meets requirements of IEC 61017-1:1991 & EN 50371:2002 standards and the following safety standards: IEC 61010-1:2001, and Electromagnetic compatibility requirements of: IEC 61000-4-2:2006, IEC 61000-4-3:2008, IEC 61000-4-4:2004, IEC 61000-4-5:2005, IEC 61000-4-11:2004, EN 55022:1998+A1:2000+A2:2003.
AT2327 Alarm dosimeter is listed in national registries of measurement instruments of Republic of Belarus, Russian Federation, Ukraine and Kazakhstan.

Specifications of Pedestrian radiation monitor smart probes

Gamma radiation smart probes	**BDKG-11/1**	**BDKG-19**
Detector	Scintillator, NaI(Tl) Ø63x63 mm	Scintillator, NaI(Tl) Ø63x160 mm
Energy range	50 keV ... 3 MeV	
Sensitivity to gamma radiation, not less ^{241}Am ^{137}Cs ^{60}Co	 2360 cps/μSv·h^{-1} 1810 cps/μSv·h^{-1} 1030 cps/μSv·h^{-1}	 7070 cps/μSv·h^{-1} 4430 cps/μSv·h^{-1} 2340 cps/μSv·h^{-1}
Triggering threshold (Minimal detectable gamma radiation dose rate level above background value (0.10 ± 0.05) μSv/h for ≤2 s period):	0.05 μSv/h	0.03 μSv/h
Detection threshold (Minimal detectable 137Cs radionuclide activity in a non-screened source at 1 m distance from detector for ≤2 s period):	0.5 MBq	0.3 MBq

Neutron radiation smart probes	**BDKN-01**	**BDKN-05**
Detector	^{3}He proportional counter in polyethylene moderator	Two ^{3}He proportional counters in polyethylene moderator
Energy range	0.025 eV ... 14 MeV	
Sensitivity to neutron radiation, not less *Pu-Be* ^{252}Cf	 0.5 impulse·cm^{2}/neutron 0.8 impulse·cm^{2}/neutron	 8 impulse·cm^{2}/neutron 12.5 impulse·cm^{2}/neutron
Static sensitivity, not less (Static efficiency of neutron ^{252}Cf source detection at 1 m distance from detector)	1.3 impulse·cm^{2}/neutron	20 impulse·cm^{2}/neutron
Detection time of Pu-Be source (at 1 m distance) with 0.9 probability and neutron yield: (5±1.25)·10^{5}neutron/s [for BDKN-01], (5±1.25)·10^{4} neutron/s [for BDKN-05]	≤3 s	

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