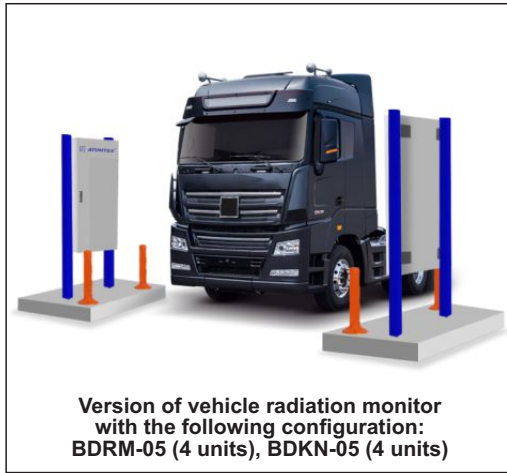


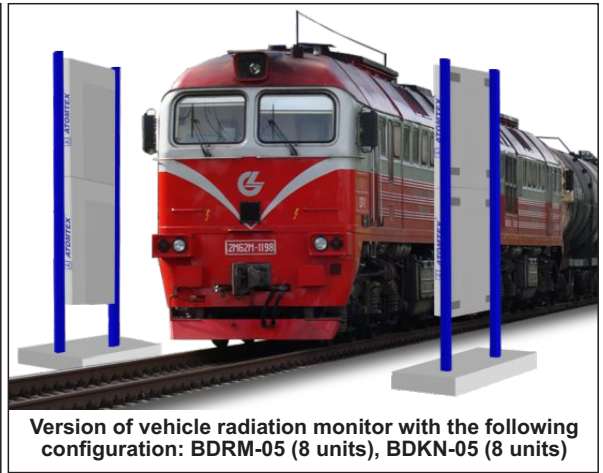
# AT2327 Alarm Dosimeter (Vehicle Radiation Monitor)



Version of vehicle radiation monitor with the following configuration: BDKG-19 (2 units), BDKN-05 (2 units)



Version of vehicle radiation monitor with the following configuration: BDRM-05 (4 units), BDKN-05 (4 units)



Version of vehicle radiation monitor with the following configuration: BDRM-05 (8 units), BDKN-05 (8 units)



Automatic stationary solution for continuous radiation monitoring designed to detect sources of gamma and neutron radiation in vehicles crossing access control points.

## Operating principle

Operating principle of vehicle radiation monitor is based on detection units, which detect gamma and neutron radiation. One or two detection units are located and wired inside a cabinet to form a measurement device. Measurement devices are mounted on posts arranged on both sides of vehicle passage lane. Two or one measurement device are mounted on each side of the passage depending on external dimensions of vehicles to control.

After initialization the alarm dosimeter switches to natural radiation background measurement mode. This procedure is indicated by a yellow light on Alarm unit. When this measurement procedure is over the count rate threshold levels is calculated and a green indicator lights when the alarm dosimeter is ready for operation.

When a moving vehicle crosses the control zone line, it breaks the beam from the IR emitter to the photoelectric detector IR receiver, and all detection units are automatically switched from the background measurement mode to the detection mode. Count rate data from each detection unit in detection mode is transferred through RS485 interface to a remote control panel, which is located in a control room.

When the set count rate threshold level is exceeded the audio and red light alarm is actuated on the Alarm unit to inform the staff about gamma or neutron radiation source detection.

In case of malfunction of one or multiple detection units the radiation monitor recalculates threshold levels for the rest detection units.

Control panel is used for setting threshold calculation parameters for each detection unit, controlling detection units state, correcting real-time clock, password protection of selected functions, viewing count rate fluctuation history and threshold levels crossing in each reference point.

## Application

- Access control points
- Public utility companies for solid domestic waste disposal
- Scrap metal salvage and reprocessing facilities and smelters
- Nuclear industry facilities

## Features

- Automatic switching from background radiation measurement to detection when a vehicle crosses the control zone line
- Rear side of gamma radiation detection unit is screened by lead plates
- Set threshold levels are automatically corrected according to changes of natural radiation background
- Sound and light alarm in case threshold levels are exceeded
- Self-monitoring of component parts
- Severe operating conditions
- Count rate levels and cases of threshold crossing are automatically recorded into the history log
- Backup power source is available: Continuous operation for up to 6 hours (4 detection units)



**ATOMTEX**<sup>®</sup>

INSTRUMENTS AND TECHNOLOGIES FOR NUCLEAR MEASUREMENTS AND RADIATION MONITORING

# AT2327 Alarm Dosimeter (Vehicle Radiation Monitor)

## Specification

Detection time per one vehicle	≤20 s
Alarm	3-stage light alarm and sound alarm
False response rate	≤1 per 1000 crossings
Initialisation time	≤5 min
Power supply	1) Mains: 110-230 VAC, 50-60 Hz 2) Rechargeable battery for emergency power
Continuous battery operation time	≥6 h
Burn-up life	≥100 Sv
Protection rating	IP65
Operation temperature range	-30°C to +50°C (-20°C to +50°C with BDKG-19) <i>Optional: From -50°C to +50°C, when located inside cabinets (For BDKG-19, BDKG-35, BDKN-05)</i>
Relative air humidity	≤95% (Air temperature ≤35°C without condensation)
The alarm dosimeter complies with: GOST 27451-87, GOST 29074-91, Safety requirements of IEC 61010-1:2010, EMC requirements of EN 55011:2009, IEC 61000-4-2:2008, IEC 61000-4-3:2008, IEC 61000-4-4:2004, IEC 61000-4-5:2005, IEC 61000-4-6:2008, IEC 61000-4-8:2009, IEC 61000-4-11:2004	

Gamma radiation detection units (DU)		BDKG-19	BDKG-35	BDRM-05
Scintillation detector		Nal(Tl) Ø63x160 mm	plastic Ø70x150 mm	plastic 1000x100x50 mm
Energy range		50 keV - 3 MeV	20 keV - 3 MeV	50 keV - 3 MeV
Typical sensitivity, cps/(µSv·h <sup>-1</sup> )	<sup>241</sup> Am	32500	10000	60000
	<sup>137</sup> Cs	4900	3600	31500
	<sup>60</sup> Co	2800	2300	16500
Response time		<2 s (For dose rate change from 0.1 to 1 µSv/h)		
Minimal detectable gamma radiation dose rate level above background value 0.1 µSv/h in a period not longer than 2 s		0.03 µSv/h	0.04 µSv/h	0.01 µSv/h

Neutron radiation detection unit (DU)		BDKN-05
Detector		Two He-3 proportional counters in polyethylene moderator
Energy range		0.025 eV – 14 MeV
Typical sensitivity to source radiation at the distance of 1 m	<sup>252</sup> Cf	20 cps/(neutron·s <sup>-1</sup> ·cm <sup>2</sup> )

**Detection threshold for unshielded source under natural radiation background conditions not more than 0.1 µSv/h**  
(Probability of source detection 80 % under confidence level P=0.95)

**Road vehicles.** Travel speed 8 km/h

	DU configuration (location and number)	BDKG-19	BDKG-35	BDRM-05	BDKN-05
Control zone width – 3 m, height – 2 m		1100 kBq [ <sup>241</sup> Am] 470 kBq [ <sup>137</sup> Cs] 220 kBq [ <sup>60</sup> Co]	2850 kBq [ <sup>241</sup> Am] 550 kBq [ <sup>137</sup> Cs] 230 kBq [ <sup>60</sup> Co]	1800 kBq [ <sup>241</sup> Am] 280 kBq [ <sup>137</sup> Cs] 120 kBq [ <sup>60</sup> Co]	4.1·10 <sup>4</sup> neutron/s [ <sup>252</sup> Cf]
		770 kBq [ <sup>241</sup> Am] 320 kBq [ <sup>137</sup> Cs] 160 kBq [ <sup>60</sup> Co]	1940 kBq [ <sup>241</sup> Am] 370 kBq [ <sup>137</sup> Cs] 150 kBq [ <sup>60</sup> Co]	1200 kBq [ <sup>241</sup> Am] 160 kBq [ <sup>137</sup> Cs] 90 kBq [ <sup>60</sup> Co]	2.5·10 <sup>4</sup> neutron/s [ <sup>252</sup> Cf]
Control zone width – 6 m, height – 4.5 m		2700 kBq [ <sup>241</sup> Am] 1190 kBq [ <sup>137</sup> Cs] 540 kBq [ <sup>60</sup> Co]	6900 kBq [ <sup>241</sup> Am] 1350 kBq [ <sup>137</sup> Cs] 550 kBq [ <sup>60</sup> Co]	4400 kBq [ <sup>241</sup> Am] 550 kBq [ <sup>137</sup> Cs] 270 kBq [ <sup>60</sup> Co]	4.4·10 <sup>4</sup> neutron/s [ <sup>252</sup> Cf]
		1860 kBq [ <sup>241</sup> Am] 800 kBq [ <sup>137</sup> Cs] 370 kBq [ <sup>60</sup> Co]	4950 kBq [ <sup>241</sup> Am] 890 kBq [ <sup>137</sup> Cs] 370 kBq [ <sup>60</sup> Co]	3000 kBq [ <sup>241</sup> Am] 400 kBq [ <sup>137</sup> Cs] 200 kBq [ <sup>60</sup> Co]	2.6·10 <sup>4</sup> neutron/s [ <sup>252</sup> Cf]

**Railway vehicles.** Travel speed 20 km/h

	DU configuration (location and number)	BDKG-19	BDKG-35	BDRM-05	BDKN-05
Control zone width – 6 m, height – 4.5 m		–	–	6900 kBq [ <sup>241</sup> Am] 880 kBq [ <sup>137</sup> Cs] 470 kBq [ <sup>60</sup> Co]	8.0·10 <sup>4</sup> neutron/s [ <sup>252</sup> Cf]
		–	–	5200 kBq [ <sup>241</sup> Am] 650 kBq [ <sup>137</sup> Cs] 310 kBq [ <sup>60</sup> Co]	4.9·10 <sup>4</sup> neutron/s [ <sup>252</sup> Cf]

Design and specifications are subject to change without notice