AT6101, AT6101B Spectrometers

Portable Radionuclide Identification Devices with external detection unit

Applications

- Monitoring of environment
- Radioactive waste control
- Radioactive sources and materials traffic control
- Scrap metal radiation monitoring on factories
- Nuclear industry
- Geological survey
- Nuclear medicine
- Research activities
- Emergency situations

AT6101 and AT6101B Portable multifunction scintillation gamma spectrometers can be used in laboratories as well as for working in field conditions. Main spectrometer function is radionuclide identification (natural, medical, industrial) without connection to a PC. Additional functionality: search and detection of radioactivity sources and dose rate measurement.

Operating principle

Spectrometers are composed of an external spectrometric gamma radiation detection unit and a processing unit.

Highly-sensible scintillation NaI(Tl) detectors are used for measurement of gamma radiation energy distribution, ambient gamma radiation dose rate equivalent, search and identification of radionuclides. Geiger-Muller counter tube, integrated into the processing unit, is used to extend the range of ambient gamma radiation dose rate measurement as well as to monitor radiation level around the operator.

External detection units can be connected to the spectrometer to measure alpha and beta particles flux density of contaminated surfaces.

Features

- Smart probes
- Spectrometric dose rate measurement method with "Spectrum-Dose" transformation operator
- Gamma radiation dose rate measurement and alpha and beta radiation flux density measurement with automatic background subtraction
- Automatic continuous LED stabilisation of the spectrometer energy scale
- Spectrometric path temperature compensation by integrated temperature probe
- Sound and LED alarm
- Recording and storing in memory up to 300 spectra

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Specification

Detector		
AT6101 (BDKG-05)		Scintillator, NaI(Tl) Ø40x40 mm
AT6101B (BDKG-11)		Scintillator, NaI(Tl) Ø63x63 mm
Processing unit		Geiger-Muller counter tube
Gamma radiation energy range		20 keV...3 MeV
Radionuclide identification		Industrial Natural Medical
Individual order:		Library of identified radionuclides can be corrected
Typical resolution at 662 keV (^{137}Cs)		7.5% (BDKG-05) 8% (BDKG-11)
Maximum input statistical load		≥$5 \cdot 10^4$ s^{-1}
Integral nonlinearity		±1% max.
Detectable activity of ^{137}Cs source, located at the distance of 20 cm in a time not longer than 2 s		50 kBq (BDKG-05) 30 kBq (BDKG-11)
Sensitivity to gamma radiation		
^{241}Am	BDKG-05	6000 cps/μSv·h^{-1}
	BDKG-11	13500 cps/μSv·h^{-1}
^{137}Cs	BDKG-05	760 cps/μSv·h^{-1}
	BDKG-11	2200 cps/μSv·h^{-1}
^{60}Co	BDKG-05	400 cps/μSv·h^{-1}
	BDKG-11	1200 cps/μSv·h^{-1}
Response time for dose rate change from 0.1 μSv/h to 1 μSv/h		<2 s (BDKG-05, BDKG-11) [accuracy error ≤±10%]
Measurement range of ambient radiation dose rate equivalent		0.01...300 μSv/h (BDKG-05) 0.01...100 μSv/h (BDKG-11) 1 μSv/h...10 mSv/h (Processing unit)
Energy dependence relative to 662 keV (^{137}Cs)		
BDKG-05, BDKG-11		±20% (in 50 keV...3 MeV energy range)
Processing unit		-25%...+35% (in 60 keV...3 MeV energy range)
Flux density measurement range		
Alpha particles from the surface (BDPA-01)		0.5...$1 \cdot 10^5$ particle/(min·cm^2) (in 4...7 MeV energy range)
Beta particles from the surface (BDPB-01)		3...$5 \cdot 10^5$ particle/(min·cm^2) (in 155 keV...3.5 MeV energy range)
Intrinsic relative error of gamma radiation dose rate and flux density measurement		±20% max.
Number of ADC channels		512
Continuous run time		≥12 h
Measurement instability during continuous service		±5% max.
Operation mode setup time		≤1 min
Burn-up life		≥100 Sv
Protection class		IP54
Power supply		Internal battery

Design and specifications are subject to change without notice

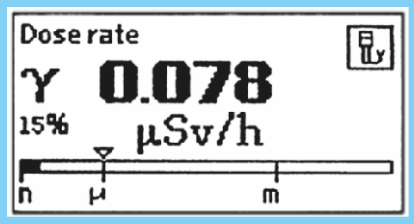
Working temperature range	-20°C...+50°C
Relative humidity with air temperature ≤35°C without condensation	≤95%

Overall dimensions, weight

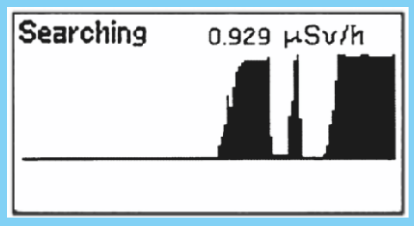
BDKG-05	Ø62x320 mm, 1.2 kg
BDKG-11	Ø78x350 mm, 1.9 kg
BDPA-01	Ø85x200 mm, 0.5 kg
BDPB-01	Ø85x205 mm, 0.55 kg
Processing unit	110x230x38 mm, 0.8 kg

Capabilities

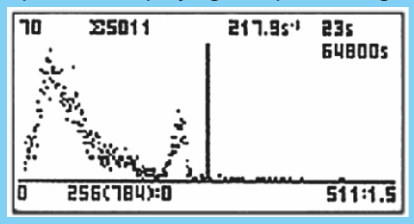
Gamma radiation dose rate measurement



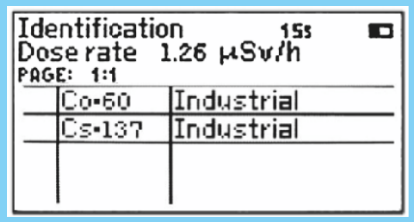
Detection and localization of gamma radiation sources



Spectrum displaying and processing



Radionuclide identification



AT6101, AT6101B Spectrometers meet Safety standard requirements:
IEC 61010-1:1990
EMC requirements:
EN 55011:2009
IEC 61000-4-2:2008
IEC 61000-4-3:2008
IEC 61000-4-6:2008

AT6101, AT6101B Spectrometers have the pattern approval certificates of Republic of Belarus, Russian Federation, Ukraine and Kazakhstan.

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