

AT6102, A6102A, AT6102B Spectrometers

Radionuclide Identification Device



Portable multifunctional radiation monitoring devices, primarily designed for search and detection of gamma radiation sources with automatic identification of radionuclide composition.

Can be used for area and land radiation monitoring with data GPS-referencing.

AT6102 model can detect neutron radiation and measure neutron count rate.

Application

- Unauthorized traffic control of radioactive sources and materials
- Radioactive waste control, recycling and disposal
- Radiation monitoring of ecological environment, areas and facilities
- Nuclear and radiation accidents management, radiation monitoring during decontamination operations
- Nuclear industry and Nuclear power plants
- Radiopharmaceuticals production and Nuclear medicine
- Geological survey
- Research activities

Features

- Detection of gamma, neutron, alpha and beta radiation
- Real-time spectra analysis and radionuclide identification
- Multiple functions
- Single-block design
- One-hand operation
- Automatic accommodation to change of radiation background level
- On-line and expert mode operation
- Automatic logging of scan data with GPS-referencing for further analysis
- Digital automatic LED stabilization and temperature compensation system
- Sound, visual and vibration notification
- Recording and storing measurement result and spectra in memory
- Field operation in a wide temperature range
- Instrument-to-PC data exchange over USB or Bluetooth interface
- External detection units can be connected

Operating principle

The spectrometer operates in continuous radiation environment scan mode: search, detection, localization and identification of gamma sources; detection of neutron radiation.

When radioactive source is detected the spectrometer activates alarm and identifies its radionuclide composition.

High-sensitivity scintillation NaI(Tl) gamma radiation detector is used in these devices. The spectrometer is equipped with Geiger-Muller counter with filter, which aligns energy dependence of appliance sensitivity to extend dose rate measurement range.

Two integrated proportional helium counters of slow neutrons in polyethylene moderator are used in AT6102 model.



The possibility of external detection unit connection allows measurement of alpha and beta particles flux density from contaminated surfaces (BDPA-01/BDPB-01) and neutron radiation dose rate (BDKN-03).

Storage and transportation bag for spectrometer and accessories



BDKN-03



n

BDPA-01
BDPB-01



α, β

Application software

- «SpectEx» Real time display of data measured by instrument with further ability to process and save it into PC, as well as instrument file system management
- «GARM» Processing and analysis of stored data with display on a base map



ATOMTEX

INSTRUMENTS AND TECHNOLOGIES FOR NUCLEAR
MEASUREMENTS AND RADIATION MONITORING

AT6102, A6102A, AT6102B Spectrometers

Specifications of spectrometers	AT6102 (γ, n)	AT6102A (γ)	AT6102B (γ)
Gamma radiation detector	Scintillator NaI(Tl), Ø40x40 mm; Geiger-Muller counter tube		Scintillator NaI(Tl), Ø40x80 mm; Geiger-Muller counter tube
Neutron radiation detector	Two ³ He proportional neutron counter	–	–
Gamma radiation energy range	20 keV...3 MeV		
Neutron radiation energy range	0.025 eV...14 MeV	–	–
Radionuclide identification	Medical, Industrial and Natural (Library of identified radionuclides can be modified)		
Typical resolution at 662 keV (¹³⁷ Cs)	7.5%		8%
Maximum input statistical load	≥1.5·10 ⁵ s ⁻¹		
Detection time of ¹³⁷ Cs source with 50 kBq activity at 20 cm distance	≤2 s		
Detection time of ²⁵² Cf source with 0.9 probability and neutron yield 1.8·10 ⁴ neutron/s at 20 cm distance	≤5 s	–	–
Measurement range of gamma radiation ambient dose equivalent rate	0.01...300 μSv/h [NaI(Tl)] 10 μSv/h...100 mSv/h [G-M]		0.01...150 μSv/h [NaI(Tl)] 10 μSv/h...100 mSv/h [G-M]
Limit of dose rate measurement intrinsic relative error	±20%		
Sensitivity to gamma radiation ²⁴¹ Am ¹³⁷ Cs ⁶⁰ Co	6600 cps/μSv·h ⁻¹ 850 cps/μSv·h ⁻¹ 430 cps/μSv·h ⁻¹		11600 cps/μSv·h ⁻¹ 1700 cps/μSv·h ⁻¹ 840 cps/μSv·h ⁻¹
Response time for dose rate change from 0.1 μSv/h to 1 μSv/h	<2 s (accuracy error ≤±10%)		
Energy dependence relative to 662 keV (¹³⁷ Cs)	±20% [NaI(Tl)] (in 50 keV...3 MeV energy range) ±25% [G-M] (in 60 keV...3 MeV energy range)		
Sensitivity to direct neutron radiation Pu-Be ²⁵² Cf	0.28 impulse·cm ² /neutron 0.5 impulse·cm ² /neutron	–	–
Number of ADC channels	1024		
Operation mode setup time	≤1 min		
Continuous run time With external smart probes connected	≥18 h ≥15 h	≥25 h ≥17 h	
Burn-up life	≥100 Sv		
Protection class	IP65		
Working temperature range	-20°C...+50°C		
Relative air humidity	≤95% (with air temperature ≤35°C without condensation)		
Connection to PC	USB, Bluetooth		
Overall dimensions, Weight	230x115x212 mm, 2.5 kg	230x115x177 mm, 1.9 kg	230x115x177 mm, 2.15 kg
Spectrometers meet Safety standard requirements: IEC 61010-1:2001, EMC requirements: EN 55011:2009, IEC 61000-4-2:2008, IEC 61000-4-3:2008 Spectrometers have the pattern approval certificates of Republic of Belarus, Russian Federation, Kazakhstan.			

Specifications of external detection units	BDPA-01 (α)	BDPB-01 (β)	BDKN-03 (n)
Detector	ZnS(Ag) scintillator, Ø60 mm	Scintillation plastic, Ø60 mm	^3He counter in polyethylene moderator
Measurement range	0.5 ... $1 \cdot 10^5$ part·min ⁻¹ ·cm ⁻² (Flux density)	3 ... $5 \cdot 10^5$ part·min ⁻¹ ·cm ⁻² (Flux density)	0.1 $\mu\text{Sv/h}$... 10 mSv/h (Dose rate)
Energy range	4 ... 7 MeV	155 keV ... 3.5 MeV	0.025 eV...14 MeV
Sensitivity	0.15 cps/(part·min ⁻¹ ·cm ⁻²) (^{239}Pu)	0.3 cps/(part·min ⁻¹ ·cm ⁻²) ($^{90}\text{Sr}+^{90}\text{Y}$)	0.355 cps/ $\mu\text{Sv} \cdot \text{h}^{-1}$ (Pu-Be)
Limit of intrinsic relative measurement error	$\pm 20\%$		
Protection class	IP54		
Overall dimensions, Weight	Ø87x205 mm, 0.55 kg	Ø87x205 mm, 0.65 kg	314x220x263 mm, 8 kg

Design and specifications are subject to change without notice



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