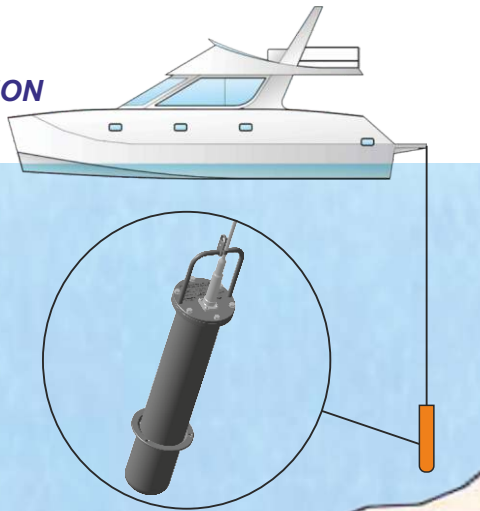


AT6104DM, AT6104DM1 Spectrometers

**WATER AND BED DEPOSITS
RADIOACTIVE CONTAMINATION
MONITORING**

at depths up to 500 meters

**RADIONUCLIDE
IDENTIFICATION**



Multifunction immersion spectrometers to monitor radiation levels in fresh and sea water, as well as in bottom sediments. Measurement at depths up to 500 m without prior sampling and sample preparation.

Operating principle

Detection device in a shock-resistant and watertight stainless steel container registers gamma radiation of controlled radionuclides.

Detection device sends spectrometric data to tablet PC (hand-held PC) for displaying on screen.



Instrumental spectra processing algorithms in dedicated software are used for displaying radioisotope composition data and certain radionuclide volume activity.

Ambient gamma radiation dose equivalent rate value in inspection point is determined by instrument spectrum analysis with "spectrum-dose" operational function.



Applications

- Monitoring radioactive contamination of water and bed deposits at depths up to 500 meters with data GPS-mapping
- Monitoring of industrial radioactivity in water bodies: seas, rivers, lakes, ponds and wells
- Radioecological monitoring of water bodies near NPPs and RAW repositories
- Radiation control of underground RAW repositories and other objects in case of flooding
- Operational monitoring of radioactive hazardous objects hoisting

Features

- Measurement results can be viewed as index maps of monitored radionuclide concentration allocation or gamma radiation dose rate
- Instant detection of near background dose rate level increase
- Built-in gyro transmitter
- Automatic LED stabilisation and measurement path temperature compensation
- Setting up procedure and parameter check using check sample that contains KCl salt with naturally occurring radionuclide ^{40}K
- Expert mode for detailed instrument spectrum analysis with automatic sample radionuclide content identification
- Records and stores in non-volatile memory up to 140,000 measured instrument spectra with subsequent reading option
- Measurement data can be transmitted to PC for further detailed processing in dedicated software "GARM"

Spectrometer parts

- Detection device
- Cable spool with slip ring
- Dedicated deep-sea cable
- Tablet PC (Hand-held PC)
- Software
- Acoustic sounder, etc.



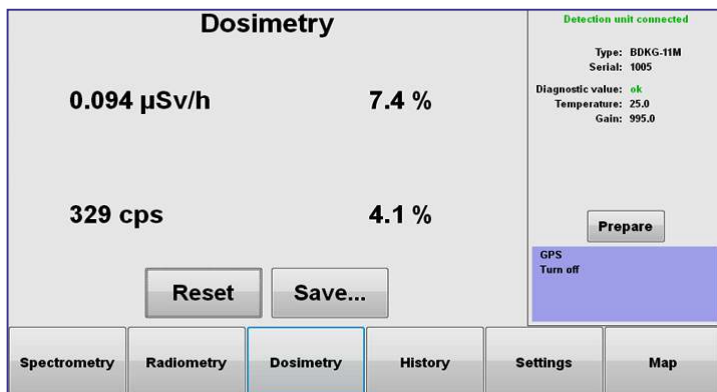
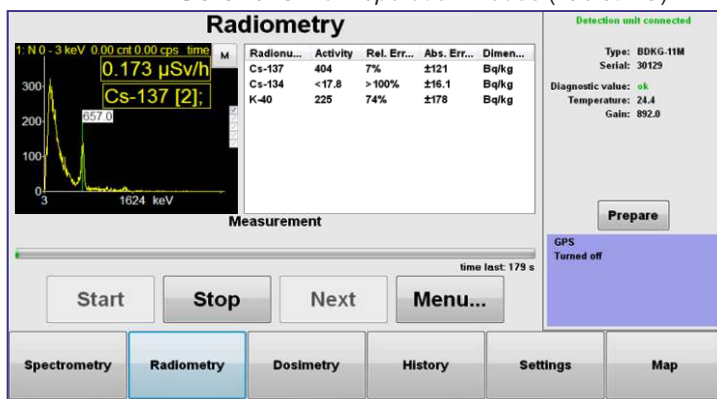
ATOMTEX[®]

INSTRUMENTS AND TECHNOLOGIES FOR NUCLEAR
MEASUREMENTS AND RADIATION MONITORING

AT6104DM, AT6104DM1 Spectrometers

Specification	AT6104DM	AT6101DM1
Gamma radiation detector	Nal(Tl) scintillator, Ø63x63 mm	Nal(Tl) scintillator, Ø63x160 mm
Registered gamma radiation energy range	70 keV ... 3 MeV	
Identified radionuclides	¹³⁷ Cs, ¹³⁴ Cs, ¹³¹ I, ⁴⁰ K, ²²⁶ Ra, ²³² Th, ⁶⁰ Co, ²⁴ Na, ⁵⁴ Mn, ⁶⁵ Zn, etc.	
Measurement range of specific activity in water for 4π measurement geometry: ¹³⁴ Cs, ¹³⁷ Cs, ¹³¹ I, ⁶⁰ Co, ⁴⁰ K	3 – 1·10 ⁶ Bq/kg 250 – 2·10 ⁴ Bq/kg	1 – 1·10 ⁶ Bq/kg 100 – 2·10 ⁴ Bq/kg
Measurement range of bottom sediments specific activity for 2π measurement geometry: ¹³⁴ Cs, ¹³⁷ Cs, ⁴⁰ K	100 – 1·10 ⁶ Bq/kg 250 – 2·10 ⁴ Bq/kg	–
Limits of specific activity measurement error (P=0.95)	±(20 – 50)%	
Measurement range of ambient radiation dose rate equivalent	0.01 – 130 μSv/h	0.01 – 50 μSv/h
Intrinsic relative error of ambient dose equivalent rate measurement	±20% max.	
Energy dependence relative to 662 keV (¹³⁷ Cs)	±20% max.	
Anisotropy in angular spacing ±120° relative to vertical axis	±30% (100 keV – 3 MeV energy range)	
Sensitivity to gamma radiation	≥2350 cps/μSv·h ⁻¹ (¹³⁷ Cs) ≥1300 cps/μSv·h ⁻¹ (⁶⁰ Co)	≥5100 cps/μSv·h ⁻¹ (¹³⁷ Cs) ≥2900 cps/μSv·h ⁻¹ (⁶⁰ Co)
Response time for dose rate change from 0.1 to 1 μSv/h	<2 s (accuracy error ≤±10%)	
Typical resolution at 662 keV (¹³⁷ Cs)	8%	9%
Maximum input statistical load	≥10 ⁵ s ⁻¹	≥5·10 ⁴ s ⁻¹
Number of ADC channels	1024	
Operation mode setup time	2 min	
Integral nonlinearity	≤1%	
Continuous run time in normal conditions	≥9 h	
Measurement instability during continuous service	≤5%	
Working temperature range	-20°C to +50°C	
Burn-up life	≥100 Sv	
Protection class of the detection device	IP68 (Withstands static hydraulic pressure up to 5 MPa for not less than 24 h)	
GPS	GPS receiver is integrated into PC. Positioning accuracy ≥3 m	
Connection to PC	RS422	
Overall dimensions and weight of the detection device	Ø130x510 mm, 4.5 kg	Ø130x633 mm, 6.5 kg

“ATDM” Software Main operation modes (Tablet PC)



“ATDM mobile” Software Main operation modes (HPC)



Spectrometers meet Safety standard requirements: IEC 61010-1:2001
EMC requirements: 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 61000-4-11:2004

Design and specifications are subject to change without notice



ATOMTEX®
<http://www.atomtex.com>

5, Gikalo st., 220005 Minsk,
Republic of Belarus
Tel./fax: +375 17 2928142
E-mail: info@atomtex.com



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