

# AT1117M Radiation Monitor (Transportable dosimetric monitoring stations)



## Operating principle

Operating principle is based on highly sensible scintillation measurement method with lead-filled plastic detector of Ø50x40 mm size. PU2 / PU4 Processing unit can be used for control and indication depending on selected type of instrument.

Operation algorithm provides measurement continuity and real time statistical processing of measurement results.

### 1) PU2 Processing unit (Version 1)

Detection unit sends data over cable to PU2 processing unit, where it is displayed on LCD screen.

PU2 has recording and memory option for up to 99 measurement results, which can further be uploaded to a personal computer via dedicated application software.

Sound, light and visual alarms activate when user-adjustable threshold levels are exceeded.

### 2) PU4 Processing unit (Version 2, 3)

PU4 is a hand-held PC (HPC) with integrated detection module, providing in situ measurement of gamma radiation dose and dose rate.

Data from detection unit into PU4 can transferred in two ways:

- Bluetooth interface by BT-DU4 adapter
- Direct cable connection to PU4

PU4 has the following functions:

- Processing and display of measurement data
- GPS referencing of measurement results
- Automatic recording and storing over 10,000 measurements with GPS referencing
- Sound and visual alarm when threshold level are exceeded
- Indication of battery charge level in PU4 and BT-DU4 adapter
- Loading data to PC for further analysis and processing in professional "GARM" software (Option)
- Automatic data transfer to a remote server by "ARMS" software [over FTP server; integrated 3G modem or connection to a Wi-Fi network shall be available] (Option).

## Radiation monitors can be used to:

- With BDKG-24: For measurement of gamma and X radiation ambient dose equivalent and ambient dose equivalent rate
- With BDKG-30: For measurement of air kerma and air kerma rate.

It can be used both in transportable and portable configuration.

In transportable configuration detection and control units are attached to a bracket mounted on a tripod, and can be easily extracted without special tools to be used as a portable variant.



Version 1

Version 2

Version 3

## Application

- Radiation monitoring of environment
- Monitoring of radiation environment on nuclear power plants and facilities
- Radiation monitoring of premises adjacent to X-ray and gamma-ray units

## Features

- High sensitivity
- Quick response to changes in radiation environment
- Wide measurement range
- Wide energy range
- Perfect anisotropy in full energy range
- Integrated stabilisation and performance monitoring systems
- Sound and visual alarm for exceeded threshold levels
- Operation in harsh weather conditions
- Wireless connection of detection unit to PU4 at distances up to 10 m (Version 2)



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# AT1117M Radiation Monitor

## (Transportable dosimetric monitoring stations)

	Version 1	Version 2	Version 3
<b>Components</b>	<ul style="list-style-type: none"> <li>Detection units BDKG-24 or BDKG-30</li> <li>PU2 Processing unit</li> <li>Cable</li> <li>Tripod with a bracket</li> </ul>	<ul style="list-style-type: none"> <li>Detection units BDKG-24 or BDKG-30</li> <li>PU4</li> <li>BT-DU4 Adapter</li> <li>Cable</li> <li>Tripod with a bracket</li> </ul>	<ul style="list-style-type: none"> <li>Detection units BDKG-24 or BDKG-30</li> <li>PU4</li> <li>Cable</li> <li>Tripod with a bracket</li> </ul>

Controls and indicators	PU2 [Version 1]	PU4 [Version 2, 3]
Registered radiation	Gamma radiation	Gamma radiation
Detector	Geiger-Muller counter tube	Geiger-Muller counter tube
Energy range	60 keV – 3 MeV	60 keV – 3 MeV
Measurement range of ambient radiation dose rate equivalent	1 $\mu$ Sv/h – 100 mSv/h	1 $\mu$ Sv/h – 100 mSv/h
Measurement range of ambient radiation dose equivalent	1 $\mu$ Sv – 1 Sv	1 $\mu$ Sv – 100 Sv
Energy dependence relative to 662 keV ( $^{137}\text{Cs}$ )	-25% to +35% (For energy range from 60 keV to 3 MeV)	-25% to +35% (For energy range from 60 keV to 3 MeV)
Typical sensitivity to $^{137}\text{Cs}$ gamma radiation	1.0 cps/( $\mu$ Sv·h <sup>-1</sup> )	0.33 cps/( $\mu$ Sv·h <sup>-1</sup> )
Response time for dose rate change	$\leq 2$ s (For dose rate change from 10 to 100 $\mu$ Sv/h)	$\leq 7$ s (For dose rate change from 10 to 100 $\mu$ Sv/h)
Limits of tolerable intrinsic relative error	$\pm 20\%$	$\pm 20\%$
Protection class	IP64	IP67
Overall dimensions, weight	210x88x36 mm, 0.6 kg	265x90x40 mm, 0.6 kg

Detection unit*	BDKG-24	BDKG-30
Registered radiation	Gamma radiation	
Detect	Scintillation plastic, Ø50x40 mm	
Energy range	25 keV – 10 MeV	50 keV – 10 MeV
Measurement range of ambient radiation dose rate equivalent	30 nSv/h – 1 Sv/h	–
Measurement range of ambient radiation dose equivalent	0.1 nSv – 100 Sv	–
Air kerma rate measurement range	–	30 nGy/h – 1 Gy/h
Air kerma measurement range	–	0.1 nGy – 100 Gy
Limits of tolerable intrinsic relative error	$\pm 20\%$	
Energy dependence relative to 662 keV ( $^{137}\text{Cs}$ )	$\pm 25\%$ (25 keV – 3 MeV) $\pm 40\%$ (3 – 10 MeV)	$\pm 25\%$ (50 keV – 3 MeV) $\pm 40\%$ (3 – 10 MeV)
Maximum anisotropy $^{241}\text{Am}$ (59.5 keV) for angles $\pm 120^\circ$ $^{137}\text{Cs}$ (662 keV) for angles $\pm 150^\circ$	$\pm 20\%$	
Typical sensitivity to gamma radiation $^{241}\text{Am}$ $^{137}\text{Cs}$ $^{60}\text{Co}$	cps/( $\mu$ Sv·h <sup>-1</sup> ) 3200 530 270	cps/( $\mu$ Gy·h <sup>-1</sup> ) 2800 600 290
Response time for dose rate change from 0.1 to 1 $\mu$ Sv/h ( $\mu$ Gy/h)	$\leq 3$ s	
Protection class	IP64	
Overall dimensions, weight	Ø60x205 mm, 0.5 kg	Ø60x207 mm, 0.6 kg

\* BDKG-24 (BDKG-30) detection units can be replaced by any detection unit from AT1117M radiation monitor set (except BDKN-03, BDKN-05)

### AT1117M Radiation monitor: General characteristics

<b>Power supply</b> - Detection unit - PU2, HPC, BT-DU4  <b>Continuous operation time</b> in case of rechargeable battery supply	1) By PU2 / PU4 2) By BT-DU4 adapter  1) By integrated rechargeable batteries 2) By +12 VDC power source 3) By 230 VAC 50 Hz power source  $\geq 24$ h (PU2) $\geq 8$ h (PU4)	<b>Interface</b> - Connection of detection unit to PU2 - Connection of detection unit to PU4  <b>Operation temperature range</b> <b>Relative air humidity</b> with temperature $\leq 35^\circ\text{C}$ without condensation	RS232 Bluetooth (via BT-DU4 adapter), RS232  $-40^\circ\text{C}$ to $+50^\circ\text{C}$ $-30^\circ\text{C}$ to $+50^\circ\text{C}$ (PU4)  $\leq 95\%$
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The radiation monitor complies with: GOST 27451-87, Safety requirements of IEC 61010-1:2010, EMC requirements of EN 55011:2009, IEC 61000-4-2:2008, IEC 61000-4-3:2008

Design and specifications are subject to change without notice



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Zievert, Inc.  
 6 Huron Dr. Suite 1B  
 Natick, MA 01760 | +1 (508) 653-7100  
[www.zievert.com](http://www.zievert.com) | [sales@zievert.com](mailto:sales@zievert.com)  
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