

## Multipurpose radiation monitor PM1402M

Portable radiation detection and measurement laboratory

### Main features:

- **central processing unit + external sensor set**
- **2 scintillator sensors**
- **Geiger sensor**
- **HE3 neutron sensor**
- **proportional counter**
- **pc communication**
- **external alarm option**
- **telescopic extension option**



A portable radiation detection laboratory incorporating a central processing unit and 5 external radiation sensors, housed in a robust carrying case together with cables and accessories. Designed for a wide range of radiation detection applications with measurement capability for alpha, beta, gamma, and neutron radiation; detectors consist of two CsI(Tl) scintillators for search, measurement and spectroscopy of photon sources (BD-01 and BD-02); a Geiger-Müller counter for search and dose rate measurement (BD-03); a He-3 neutron detector (BD-04); and a gas proportional counter for alpha and beta detection and measurement (BD-05). Each detector may be fixed onto a telescopic extension of 1 m length. The processing unit features a 512 multichannel analyser with storage capacity for 110 spectra, which can be downloaded to a PC for analysis via an RS-232 data port. An external audible and vibrating alarm unit is also available.

### Specifications:

#### with gamma sensor BD-01

Detector	14 x 14 x 50 mm CsI(Tl) scintillator with a photodiode
Measurement range of DER	0.05 - 40* $\mu$ Sv/h
Sensitivity*, at least	200 cps/( $\mu$ Sv/h)
Count rate indication	1 - 14000 cps

Energy range	0.06 - 1.5 MeV
DER threshold range, [step]	0.1 - 40* $\mu\text{Sv/h}$ [0.01 $\mu\text{Sv/h}$ ]
Accuracy of DER measurement (H is the dose rate, $\mu\text{Sv/h}$ )	$\pm (20 + 1/H) \% *$
Maximum allowable DER value within 5 minutes	4 mSv/h
Battery lifetime at DER up to 0.3 $\mu\text{Sv/h}$ , temperature from 0 to 50 °C, without audio and vibration alarms, no less than	100 h
Sensor housing	IP67
Weight (sensor)	300 g
Dimensions (sensor)	$\varnothing$ 45 x 188 mm

*\*collimated 0.662 MeV radiation*

### with gamma sensor BD-02

Detector	10 x 10 x 10 mm CsI(Tl) scintillator with photodiode
Measurement range of DER	0.1 - 200* $\mu\text{Sv/h}$
Sensitivity*, at least	30 cps/( $\mu\text{Sv/h}$ )
Count rate indication	1 - 8000 cps
Energy range	0.06 - 1.5 MeV
DER threshold range, [step]	0.1 - 200* $\mu\text{Sv/h}$ [0.01 $\mu\text{Sv/h}$ ]
Accuracy of DER measurement (H is the dose rate, $\mu\text{Sv/h}$ )	$\pm (20 + 2/H) \% *$
Maximum allowable DER value within 5 minutes	20 mSv/h
Spectra storage capacity, at least	110
Energy resolution at 0.662 MeV ( $^{137}\text{Cs}$ )	< 10 %
Number of channels	512
Channel capacity	65 535 counts
Battery lifetime at DER up to 0.3 $\mu\text{Sv/h}$ , temperature from 0 to 50 °C, without audio and vibration alarms, no less than	100 h
Sensor housing	IP67
Weight (sensor)	280 g
Dimensions (sensor)	$\varnothing$ 45 x 131 mm

*\*collimated 0.662 MeV radiation*

**with gamma sensor BD-03**

Detector	Geiger-Müller tube
Measurement range of DER	0.15 - 10 <sup>5</sup> µSv/h
Sensitivity*, at least	0.15 cps/(µSv/h)
Count rate indication	1 - 28000 cps
Energy range	0.02 - 1.5 MeV
DER threshold range, [step]	0.15 - 10 <sup>5</sup> µSv/h [0.01 µSv/h]
Accuracy of DER measurement (H is the dose rate, µSv/h)	± (20 + 3/H) % *
Maximum allowable DER value within 5 minutes	10 mSv/h
Battery lifetime at DER up to 0.3 µSv/h, temperature from 0 to 50 °C, without audio and vibration alarms, no less than	100 h
Sensor housing	IP67
Weight (sensor)	100 g
Dimensions (sensor)	Ø 21 x 113.5 mm

*\*collimated 0.662 MeV radiation*

**with neutron sensor BD-04**

Detector	He-3 moderated neutron counter
Measurement range of the dose equivalent rate* (DER)	1 - 5000 µSv/h
Sensitivity*, at least	0.45 cps/(µSv/h)
Count rate indication	1 - 3000 cps
Energy range	thermal - 14 MeV
DER threshold range, [step]	1 - 5000 µSv/h [0.01 µSv/h]
Accuracy of DER measurement (H is the dose rate, µSv/h)	± (30 + 10/H) %
Battery lifetime at DER up to 0.3 µSv/h, temperature from 0 to 50 °C, without audio and vibration alarms, no less than	24 h
Weight (sensor)	490 g
Dimensions (sensor)	Ø 59 x 207 mm

*\* for Pu - α - Be source*

## with alpha/beta sensor BD-05

Detector	Proportional counter with mica end window
Flux ( $\phi$ ) measurement range - alpha radiation - beta radiation	1 - 5·10 <sup>5</sup> cm <sup>-2</sup> min <sup>-1</sup> 10 - 10 <sup>6</sup> cm <sup>-2</sup> min <sup>-1</sup>
Cut-off energy range of beta radiation	0.15 - 3.5 MeV
Sensitivity, at least: - for alpha radiation ( <sup>239</sup> Pu) - for beta radiation ( <sup>90</sup> Sr + <sup>90</sup> Y)	2 counts cm <sup>2</sup> 0.5 counts cm <sup>2</sup>
Count rate indication: - alpha radiation - beta radiation	1 – 25000 cps 1 – 14000 cps
Flux threshold range (step is the least significant digit) - alpha radiation - beta radiation	1 - 5·10 <sup>5</sup> cm <sup>-2</sup> min <sup>-1</sup> 10 - 10 <sup>6</sup> cm <sup>-2</sup> min <sup>-1</sup>
Accuracy of $\phi$ measurement: - alpha radiation at energy 5.15 MeV ( <sup>239</sup> Pu) - beta radiation ( <sup>90</sup> Sr + <sup>90</sup> Y)	± (20 + 10/ $\phi$ ) % ± (20 + 100/ $\phi$ ) %
Battery lifetime (on a full battery charge) at alpha-particles flux no more than 10 cm <sup>-2</sup> min <sup>-1</sup> , beta-particles flux no more than 50 cm <sup>-2</sup> min <sup>-1</sup> , temperature from 0 to 50 °C, without audio and vibration alarms, no less than	20 h
Weight (sensor)	310 g
Dimensions (sensor)	64 x 40 x 118 mm

## General

Environmental: - Temperature range - Humidity at 25 °C	-30 ... + 50 °C (LCD: -10 ... + 50 °C) up to 98 %
Power	five AA size NiCd rechargeable batteries
Battery discharge warning	pictogram on LCD
Weight of processing unit	350 g
Dimensions of processing unit	32 x 85 x 107 mm
Weight of vibration alarm device	50 g
Dimensions of vibration alarm device	Ø 10 x 46 mm