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Innovating Radiation Detection Technologies Since 1992

PORTABLE RADIATION MONITOR PM1402M

The monitor with the alpha and beta detector BD-05

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

General

Environmental: temperature range	-30 to + 50 °C (LCD: -10 to + 50 °C)
humidity at 25 °C	up to 98 %
Power	five 'AA' size NiCd rechargeable batteries
Battery discharge warning	Pictogramon LCD
Weight of the processing unit	350 g
Dimensions of the processing unit	32 x 85 x 107 mm
Weight of the vibration alarm device	50 g
Dimensions of the vibration alarm device	Ø10 x 46 mm
Protection degree	IP67

Design and specifications of the device can be changed without further notice.

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The PM1402M is a multipurpose device designed for field use to measure parameters of all types ionizing radiation and to detect, locate and identify in real time radioactive and special nuclear materials.

A

Alpha, beta, gamma and neutron detectors

D

Detection, location and real time identification of radioactive and special nuclear materials

512

512-channel analyzer for gamma-spectrometry, storage of 110 spectra

RS

RS-232 port for data output to PC

1m

1m extension tube carrying the detectors (longer by request)

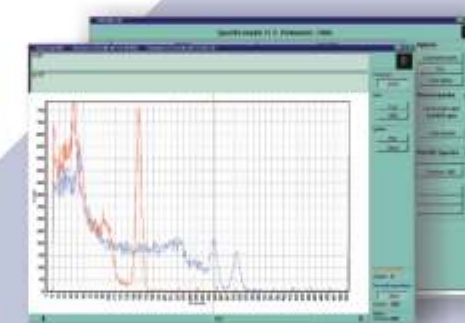
H

Hermetic shockproof housing, light weight and small dimensions

The PM1402M incorporates a 512-channel analyzer and non-volatile memory, which allows the accumulation and storage of up to 110 measured spectra. RS-232 port and special software provides spectra transmission to a PC for review and study.



The device is intended for use under severe conditions. It meets the drop test (0.7 m, concrete surface) and sea fog test.



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In search mode the PM1402M can be used for detection and location of radiation sources, including mixed gamma-neutron fields. If the source of radiation exceeds the preset threshold value of the device, the audio alarm will sound.

The rate at which the audio tone repeats will increase when the detector moves closer to a source. When detecting radiation sources under conditions which are inappropriate to audible alarms, the vibrating alarm device may be used.

In this case audible signals will not sound, but mechanical pulses will occur inside of the vibration alarm device. The rate of the pulses will also increase when the detector moves closer to a source.



APPLICATIONS OF THE MONITOR WITH DIFFERENT DETECTORS CONNECTED



- 1

Gamma radiation detector BD-01
Searches for photon radiation sources. Measurement of the dose rate of collimated photon radiation.
- 2

Gamma radiation detector BD-02
Accumulation, storage and transmission of scintillation gamma-spectra to PC. Searches for photon radiation sources. Measurement of the dose rate of collimated photon radiation.
- 3

Gamma radiation detector BD-03
Measurement of the dose rate of photon radiation. Searches for photon radiation sources.
- 3-1

Gamma radiation detector BD-03-01
Measurement of the dose rate of photon radiation.
- 4

Neutron radiation detector BD-04
Measurement of the dose rate of neutron radiation. Searches for neutron radiation sources.
- 5

Alpha and beta radiation detector BD-05
Measurement of the flux of alpha and beta radiation. Searches for alpha and beta radiation sources.

The PM1402M consists of processing unit and external detectors; necessary set of detectors is available for selection.

The monitor with the gamma detectors
BD-01, BD-02, BD-03, BD-03-01

	BD-01	BD-02	BD-03	BD-03-01
Detector	14 x 14 x 50 mm CsI(Tl) scintillator with a photodiode	10 x 10 x 10 mm CsI(Tl) scintillator with a photodiode	Geiger-Mueller tube	Geiger-Mueller tube
Measurement range of the dose equivalent rate (DER)	0.05 - 40 μSv/h*	0.1 - 200 μSv/h*	0.15 - 10 ⁵ μSv/h	10 - 10 ⁷ μSv/h
Sensitivity *, at least	200 cps/ (μSv/h)	30 cps/ (μSv/h)	0.15 cps/ (μSv/h)	0.034 cps/ (μSv/h)
Count rate indication	1 - 14000 cps	1 - 8000 cps	1 – 28000 cps	–
Energy range	0.06 - 1.5 MeV	0.06 - 1.5 MeV	0.02 - 1.5 MeV	0.08 - 1.5 MeV
DER threshold range	0.1 - 40 μSv/h * step of 0.01 μSv/h	0.1 - 200 μSv/h * step is the least significant digit	0.1 - 10 ⁵ μSv/h step is the least significant digit	10 - 10 ⁷ μSv/h step is the least significant digit
Accuracy of DER measurement (Ḣ is the dose rate, μSv/h)	± (20 + 1/ Ḣ) % *	± (20 + 2/ Ḣ) % *	± (20 + 3/ Ḣ) %	± (20+10 ² /Ḣ) % * + (20*10 ⁻⁶ /Ḣ) %
Maximum allowable DER value within 5 minutes	4 mSv/h	20 mSv/h	10 Sv/h	100Sv/h
Number of spectra stored in non-volatile memory, at least	-	110	-	-
Energy resolution for ¹³⁷ Cs (0.662 MeV), no more than	-	10 %	-	-
Number of channels	-	512	-	-
Capacity of a channel	-	65 535 counts	-	-
Battery lifetime (on a full battery charge) at DER up to 0.3 μSv/h, temperature from 0 to 50 °C, without audio and vibration alarms, no less than	100 h	100 h	100 h	100 h
Weight	300 g	280 g	100 g	1500g with a cable of 30 meters
Dimensions	Ø 45 x 188 mm	Ø 45 x 131 mm	Ø 21 x 113.5 mm	Ø 21 x 100 mm
Protection degree	IP67	IP67	IP67	IP67

* at collimated ¹³⁷Cs radiation (662 keV).

The monitor with the neutron detector BD-04

Detector	Moderated neutron counter
Measurement range of the dose equivalent rate * (DER)	1 - 5000 μSv/h
Energy range	thermal - 14 MeV
Sensitivity *, at least	0.45 cps/ (μSv/h)
Count rate indication	1 - 3000 cps
DER * threshold range (step is the least significant digit)	1 - 5000 μSv/h
Accuracy of DER measurement * (Ḣ is the dose rate, μSv/h)	± (30 + 10/ Ḣ) %
Battery lifetime (on a full battery charge) at DER up to 1 μSv/h, temperature from 0 to 50 °C, without audio and vibration alarms, no less than	24 h
Weight	490 g
Dimensions	Ø 59 x 207 mm
Protection degree	IP67

* for Pu-α-Be source.