

The monitor with the alpha and beta detector BD-05

|   |   |
|---|---|
| <b>Detector</b>   | Proportional counter with a mica window   |
| <b>Measurement range</b> of the flux ( $\phi$ ) of :<br>- alpha radiation<br>- beta radiation   | 1 - 5 $10^5$ $\text{cm}^{-2}\text{min}^{-1}$<br>10 - $10^6$ $\text{cm}^{-2}\text{min}^{-1}$ |
| <b>Cutoff energy range</b> of beta radiation  | 0.15 - 3.5 MeV  |
| <b>Sensitivity</b> , at least:<br>- for alpha radiation ( $^{239}\text{Pu}$ )<br>- for beta radiation ( $^{90}\text{Sr} + ^{90}\text{Y}$ )  | 2 counts $\text{cm}^2$<br>0.5 counts $\text{cm}^2$  |
| <b>Count rate indication:</b><br>- for alpha radiation<br>- for beta radiation  | 1 - 25000 cps<br>1 - 14000 cps  |
| <b>Flux threshold range</b> (step is the least significant digit)<br>- alpha radiation<br>- beta radiation  | 1 - 5 $10^5$ $\text{cm}^{-2}\text{min}^{-1}$<br>10 - $10^6$ $\text{cm}^{-2}\text{min}^{-1}$ |
| <b>Accuracy</b> of $\phi$ measurement:<br>- alpha radiation at energy 5.15 MeV ( $^{239}\text{Pu}$ )<br>- beta radiation ( $^{90}\text{Sr} + ^{90}\text{Y}$ )   | $\pm (20 + 10/\phi) \%$<br>$\pm (20 + 100/\phi) \%$   |
| <b>Battery lifetime</b> (on a full battery charge)<br>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  |
| <b>Weight</b>   | 310 g   |
| <b>Dimensions</b>   | 64 x 40 x 118 mm  |

General

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

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

P O R T A B L E  
RADIATION MONITOR

PM1402M

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** lpha, beta, gamma and neutron detectors

**D** etection, location and real time identification of radioactive and special nuclear materials

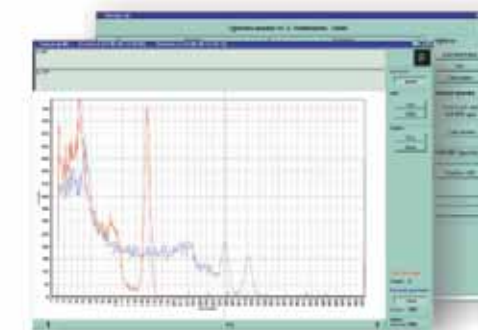
**512** -channel analyzer for gamma-spectrometry, storage of 110 spectra

**RS** -232 port for data output to computer

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

**H** ermetic 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.



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.

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.

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



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.

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

|  | BD-01   | BD-02  | BD-03  | BD-03-01  |
|--|---|--|--|---|
| <b>Detector</b>  | 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   |
| <b>Measurement range</b> of the dose equivalent rate (DER)   | 0.05 - 40 $\mu\text{Sv/h}^*$                              | 0.1 - 200 $\mu\text{Sv/h}^*$                                     | 0.15 - 10 <sup>5</sup> $\mu\text{Sv/h}$                                    | 10 - 10 <sup>7</sup> $\mu\text{Sv/h}$                                     |
| <b>Sensitivity</b> <sup>*</sup> , at least   | 200 cps/ ( $\mu\text{Sv/h}$ )                             | 30 cps/ ( $\mu\text{Sv/h}$ )                                     | 0.15 cps/ ( $\mu\text{Sv/h}$ )   | 0.034 cps/ ( $\mu\text{Sv/h}$ )   |
| <b>Count rate indication</b>   | 1 - 14000 cps   | 1 - 8000 cps   | 1 - 28000 cps  | -   |
| <b>Energy range</b>  | 0.06 - 1.5 MeV  | 0.06 - 1.5 MeV   | 0.02 - 1.5 MeV   | 0.08 - 1.5 MeV  |
| <b>DER threshold range</b>   | 0.1 - 40 $\mu\text{Sv/h}^*$ step of 0.01 $\mu\text{Sv/h}$ | 0.1 - 200 $\mu\text{Sv/h}^*$ step is the least significant digit | 0.1 - 10 <sup>5</sup> $\mu\text{Sv/h}$ step is the least significant digit | 10 - 10 <sup>7</sup> $\mu\text{Sv/h}$ step is the least significant digit |
| <b>Accuracy</b> of DER measurement<br>( $\dot{H}$ is the dose rate, $\mu\text{Sv/h}$ )   | $\pm (20 + 1/\dot{H}) \%^*$                               | $\pm (20 + 2/\dot{H}) \%^*$                                      | $\pm (20 + 3/\dot{H}) \%$  | $\pm (20 + 10^2/\dot{H}) \%^*$<br>$+ (20 \cdot 10^{-6}/\dot{H}) \%$       |
| <b>Maximum allowable DER value</b> within 5 minutes  | 4 mSv/h   | 20 mSv/h   | 10 Sv/h  | 100Sv/h   |
| <b>Number of spectra</b> stored in non-volatile memory, at least   | -   | 110  | -  | -   |
| <b>Energy resolution</b> for <sup>137</sup> Cs (0.662 MeV), no more than   | -   | 10 %   | -  | -   |
| <b>Number of channels</b>  | -   | 512  | -  | -   |
| <b>Capacity of a channel</b>   | -   | 65 535 counts  | -  | -   |
| <b>Battery lifetime</b> (on a full battery charge) 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   | 100 h  | 100 h  | 100 h   |
| <b>Weight</b>  | 300 g   | 280 g  | 100 g  | 1500g with a cable of 30 meters   |
| <b>Dimensions</b>  | ∅ 45 x 188 mm   | ∅ 45 x 131 mm  | ∅ 21 x 113.5 mm  | ∅ 21 x 100 mm   |
| <b>Protection degree</b>   | IP67  | IP67   | IP67   | IP67  |

\* at collimated <sup>137</sup>Cs radiation (662 keV).

## The monitor with the neutron detector BD-04

|  |                                |
|--|--------------------------------|
| <b>Detector</b>  | Moderated neutron counter      |
| <b>Measurement range</b> of the dose equivalent rate <sup>*</sup> (DER)  | 1 - 5000 $\mu\text{Sv/h}$      |
| <b>Energy range</b>  | thermal - 14 MeV               |
| <b>Sensitivity</b> <sup>*</sup> , at least   | 0.45 cps/ ( $\mu\text{Sv/h}$ ) |
| <b>Count rate indication</b>   | 1 - 3000 cps                   |
| <b>DER <sup>*</sup> threshold range</b> (step is the least significant digit)  | 1 - 5000 $\mu\text{Sv/h}$      |
| <b>Accuracy</b> of DER measurement <sup>*</sup> ( $\dot{H}$ is the dose rate, $\mu\text{Sv/h}$ )   | $\pm (30 + 10/\dot{H}) \%$     |
| <b>Battery lifetime</b> (on a full battery charge) at DER up to 1 $\mu\text{Sv/h}$ , temperature from 0 to 50 °C, without audio and vibration alarms, no less than | 24 h                           |
| <b>Weight</b>  | 490 g                          |
| <b>Dimensions</b>  | ∅ 59 x 207 mm                  |
| <b>Protection degree</b>   | IP67                           |

\* for Pu- $\alpha$ -Be 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.

