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## HM-4

# HAND CONTAMINATION MONITOR



## MAIN ADVANTAGES

- Gas-less smart scintillation detectors with internal processor carrying calibration constants, enabling quick change of detectors and easy calibration
- Excellent tight geometry for alpha contamination measurements with high efficiency
- Control electronics in separate compartment, minimising chance of contamination
- One or two channel monitor with choice of detectors for different radiation
- High throughput thanks to the advanced measurement time statistical algorithms
- User friendly graphic interface with touchscreen display
- Quick change of measurement parameters (for example alarm levels, nuclides, units) by selection from stored presets using the touchscreen display
- Voice messages in different languages
- Ethernet LAN connection as standard
- Export of measured data to USB flash disk
- Web interface for the remote display of status
- Volt-free relay I/O connections, e.g. for automatic door control, etc.

## PURPOSE

The HM-4 series hand contamination monitors are intended for the measurement of surface contamination by alpha, beta and gamma emitting radionuclides on hands.

Types HF-4A, HM-4B, and HM-4C have **suppressed sensitivity to gamma radiation** and thus low response to gamma background. This allows setting of lower alarm levels comparing to the HM-4D and HM-4E types.

- **A** measures only alpha contamination and is therefore designed especially for plants for the production and / or processing of nuclear fuel, uranium mining and / or processing.
- **B** measure alpha and beta contamination but cannot discriminate them. It has the highest sensitivity to beta contamination, especially low energies.

- **C** is a two-channel monitor, which can distinguish between alpha and beta contamination.

Types HM-4B and HM-4C are suitable for nuclear power plants, where the gamma background may be increased or variable.

Types HM-4D and HM-4E have **increased sensitivity to gamma radiation** and thus higher response to gamma background. This prevents them from setting as low alarm levels as can be set for the HM-4B and HM-4C types.

- **D** measures all types of radiation (alpha, beta, gamma) in one channel. It is suitable for nuclear medicine workplaces where Tc-99m radionuclide and possibly others pure gamma emitters are used.
- **E** measures all types of contamination and can discriminate alpha. It is suitable for training or experimental workplaces.

HM-4 monitors use four smart scintillation detectors, two for each hand, simultaneously checking both sides of the hand.

The monitor measures the background radiation when not being used, and subtracts this from the user measurements to allow operation in higher background areas. As soon as any sensor detects that a person is present, the background measurement is interrupted. Once the user has achieved the correct measurement position, the measuring process begins. Visual indicators and voice prompts help to achieve the correct position.

The monitor guides the workers during the measurement sequence and informs them of the results by voice and visual display.

Measurement results and events are stored and can be exported to a PC for records and analysis via Ethernet (Modbus, TCP/IP) or external USB flash disk.

Using the touchscreen, a predefined set of parameters can be selected, language changed and the monitor can be switched to the service mode (basic diagnostics and settings). A PC with service software is used for full diagnostics and settings.

## SPECIFICATION

Detector type	scintillators
Active hand area	4 × 286 cm <sup>2</sup>
Dimensions (W × H × D)	(794 × 252 × 375) mm
Weight	approx. 21 kg
Power supply	230 or 110 VAC
Units	cps, cpm, dpm, Bq, Bq/cm <sup>2</sup> , Ci, Ci/cm <sup>2</sup> , 1/(cm <sup>2</sup> .min)

## OPTIONAL ACCESSORIES

<b>59-A-0010115</b>	Fixture for calibration checks (for 120 x 200 mm sources)
<b>51-A-0000259</b>	Service cable, USB A – Fischer 5 pin

## OPTIONAL FEATURES

ID card/chip reader

Frisking probe with holder

## MODELS

Name	1. channel	2. channel
HM-4A	alpha	-
HM-4B	alpha + beta	-
HM-4C	beta	alpha
HM-4D	alpha + beta + gamma	-
HM-4E	beta + gamma	alpha

## RELATED PRODUCTS

<b>HF</b>	Hand and Foot Contamination Monitor with six detectors
<b>HF-4</b>	Hand and Foot Contamination Monitor with four detectors
<b>SFP-100</b>	Smart Frisking Probes
<b>FCM-11</b>	Frisking Contamination Monitor
<b>ExitScan-2</b>	Personnel Exit Monitor

## EXAMPLE OF RADIOMETRIC PARAMETERS

Model	Channel	Radionuclide	Efficiency [%]	Detection Threshold [Bq/cm <sup>2</sup> ]
HM-4A	α	<sup>241</sup> Am	42	0,01
HM-4B	α	<sup>241</sup> Am	45	0,03
	β	<sup>36</sup> Cl	50	0,02
HM-4C	α	<sup>241</sup> Am	42	0,01
	β	<sup>36</sup> Cl	31	0,03
HM-4D	α	<sup>241</sup> Am	38	0,07
	β	<sup>36</sup> Cl	46	0,05
	γ	<sup>137</sup> Cs	39	0,04
HM-4E	α	<sup>241</sup> Am	41	0,01
	β	<sup>36</sup> Cl	41	0,05
	γ	<sup>137</sup> Cs	34	0,06