

# HS-RAM v.3

The HS-RAM (Radiation Monitor) is a multitasking device designed for the detection and measurement of Gamma radiation in potentially exposed personnel.



It has 8 large-area plastic scintillation detectors distributed over walls, floor and ceiling, creating 8 sensitive areas (1 foot, 2 legs, 4 torso and 1 head) that work autonomously and independently, allowing simultaneous measurements with different levels of alarm.

Its management is fully automated. The equipment has sensors that detect when a person enters the portal, interrupting the

background reading and automatically initiating a thorough examination of the person.

While it is not being used, the equipment is continuously updating the background level information in order to compensate the values obtained when a real measurement is performed.

It has screens, lights and acoustic indicators that warn the user of the presence of radioactive particles in case of contamination, or of significant variations in the fund's activity rate where it is located.

It is made of aluminum and steel painted for an easy cleaning and decontamination.

## Detectors:

The type of detector that the HS-RAM v.3 equipment incorporates are plastic scintillators, with a sensitive surface of 500x500mm and a thickness of 50mm. Various tests carried out in our facilities confirm that larger detectors have a negative influence on the measurement results.

Each associated phototube has a BNC connector for the output and a SHV connector for the power supply.

The plastic (organic) scintillation detector consists of a shell of transparent material (plastic) doped with a sensitive organic molecule (POPOP: p-bis [2- (5-phenyloxazolyl)] benzene). The radiation is absorbed by the shell, mostly through the Compton effect, due to the low density and Z-value of the organic materials.

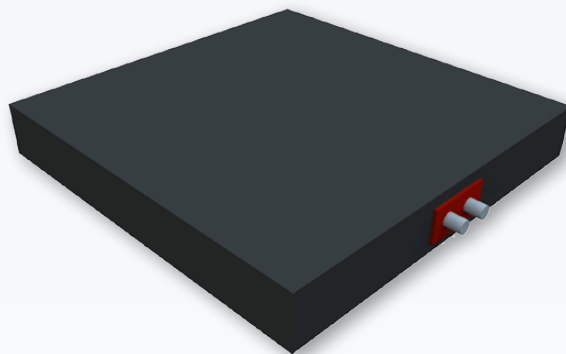
## Characteristics:

Fast, low density and Z-value. High output power.

## Applications:

Detection of particles. Gamma detection.

Each detector has its own HV source and electronics in order to separate the performance of each detector. This allows to disconnect a detector if malfunctioning is detected, keeping the rest of the equipment 100% functional. This is one of our competitive advantages that makes HSS stand out over the rest of our competitors.



## Electronics and control (software):

The equipment has a 12 "color TFT touch screen that shows, in real time, all the values of background, object, alarms, etc., warning the user of the presence of radioactive particles in case of contamination or variations significant in the activity rate of the background where they are located.

No peripheral connection is necessary

The management and control of HS-RAM v.3 equipment is carried out through the HS-RAD application, a powerful intuitive, flexible and scalable tool thanks to its modular structure.

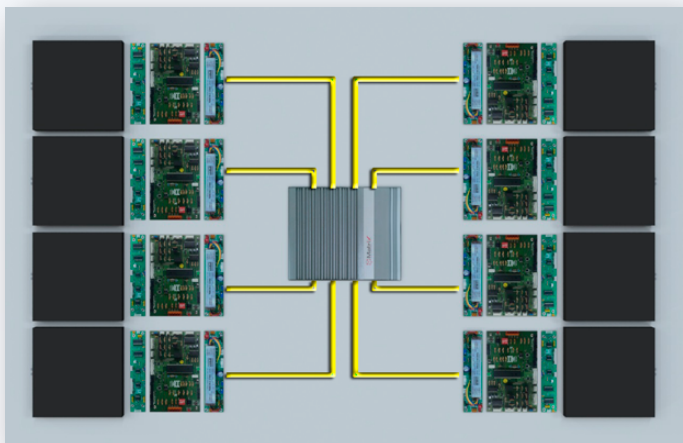
The control of the electronics is in charge of a rugged industrial computer Matrix series without fan, based on an Intel Core processor.

It has a temperature tolerance from -20 °C to 70 °C (SSD version) and resistance to vibrations up to 5G.



The computer centralizes communications with the controller cards associated with each detector. These manage the high voltage modules and pre-amplifiers and are responsible for the data acquisition task.

All the electronic adjustments, corresponding to the acquisition (thresholds, gain, high voltage, etc.), are made through the presence of digital potentiometers controlled from the tools available in the software itself.



### AJUSTE ELECTRONICO

	THRESHOLD	GANANCIA	HV	FACTOR HV	SENSOR HV	CPS	CLK
DET#1	2500	500	750	1	828	183	1
DET#2	2500	500	800	1	830	201	1
DET#3	2500	500	800	1	833	141	1
DET#4	2500	500	780	1	792	172	1
DET#5	2500	500	780	1	802	186	1
DET#6	2500	500	890	1	913	254	1
DET#7	2500	500	850	1	898	130	1
DET#8	2500	500	750	0.965	763	191	1

- + N° COL.: 100 NORMAL V MIN.: 100 V MAX.: 400 CPS HV

--- MEDIA: 170.22 --- V. MÁX: 306 --- V. MIN: 77 G: 42.17 A: 229

D1 D2 D3 D4 D5 D6 D7 D8 TODOS NINGUNO

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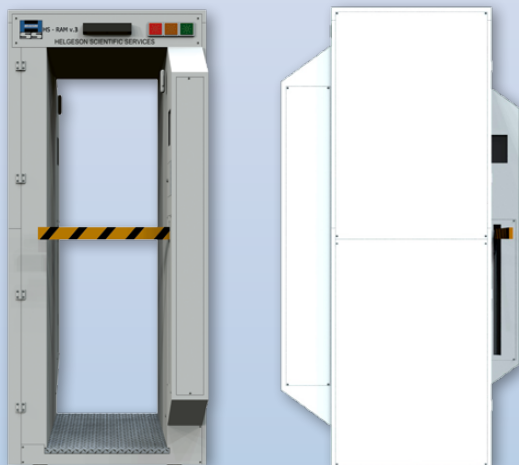
## Area integration:

A zone can be defined from one or more detectors. As many zones as necessary can be created.

Each zone, which groups several detectors, will be considered as a single detector whose surface will be the sum of all the areas that integrate it.

The final result will also be taken as the activity integral of all the detectors.

The user can then define alarm thresholds independently for each established zone.



## Calibrations:

The equipment can be calibrated to report activities. For this, a module is available to register patterns (calibration sources), which will be used in the calibration process.

Each zone is calibrated individually, and even different patterns can be used in each of them.

### PATRONES

PATRONES EXISTENTES

1235-42-2(Co60)

NOMBRE DEL PATRÓN: 1235-42-2(Co60)

FECHA DE EMISIÓN: 01/04/2007

ISÓTOPO: Co-60      NOMBRE:      PERÍODO (DÍAS): 1823.915

ACTIVIDAD A FECHA DE EMISIÓN: 35600

ACTIVIDAD A FECHA DE HOY: 18011.642

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## Features:

- 8 plastic scintillation detectors 50x50x5 cm each one
- AMD (Detectable Minimum Activity) per detector less than 1 Bq \* cm<sup>2</sup> in contact
- Efficiency per detector > 30% (Co-60), > 15% (Cs-137), > 6% (Ba-133)
- 20mm thick lead shield (adjustable depending on the existing background).
- 2 touch screens TFT-Color 8" of information and control
- 3 operation modes (free passage, stop and measure automatic, stop and measure requested)
- Dynamic automatic calculation of measurement duration.
- Sensors for automatic detection of people
- Bidirectional operation
- Record of events, funds, measures, alarms, failures of operation, etc.
- Digital parameter adjustment. (without potentiometers or mechanical actuators)
- Integrated industrial PC (without maintenance) with Windows 7 /10 operating system.
- Includes calibration routines, verification and configuration (alarms, levels, gain, etc).
- It has two standard USB ports for data and historical dump in any support.
- Customizable software in all its functions and languages. Allows its remote operation (TCP / IP)
- External USB (memory stick, disk, etc.), as well as signal output for remote indicators of alarm.
- All software and documentation in Spanish.
- Includes tools and tools for transportation and positioning.
- UPS (Uninterruptible Power System) optional, By-Pass type, pure sine wave, 1000va.
- Optimized design to facilitate maintenance.
- Fully adaptable according to each user's needs.
- Entirely designed and manufactured in Spain (100% guarantee of spare parts and maintenance)
- External dimensions of the equipment: 230cm x 99cm x 79cm (HxWxD).
- Inner dimensions of the measuring chamber: 200cm x 60cm x 76cm (HxWxD).
- Weight (including 20 mm of Lead shielding): 1.500 kg approx.
- Supply voltage: 230vac 50 Hz (can be adjusted depending on the end user requirements)

## Alarms thresholds:

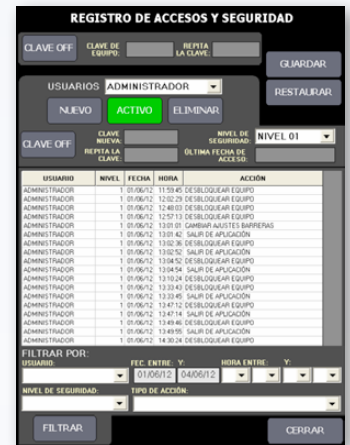
One of the most powerful tools that has the HS-RAD software is the configuration section of the alarm thresholds.



This module allows you to create as many alarms (rules) as you wish, individually for each defined zone (group of detectors).

## Access control:

The software includes access control routines to users, allowing to establish different levels of security to access certain sensitive options (calibrations, patterns, security options, electronic adjustments, templates, application closure, etc.).



In addition, it has a user control that stores the actions they perform next to the date and time.

### Barrier configuration:

Optionally, the system can be equipped with a barrier access control system.

## File management:

All the data collected and reports generated by the application are accessible and exportable thanks to the file manager that it incorporates. It has automatic PDF document generator.

This tool allows you to copy all the data to an external device (pendrive) that connects to the USB port of the device.