

# BOMO

The **BOMO** unit is a multitasking two-step device designed for the detection and measurement of radioactive contamination, BETA and GAMMA, on potentially exposed personnel. It has been specifically designed for controlled areas.



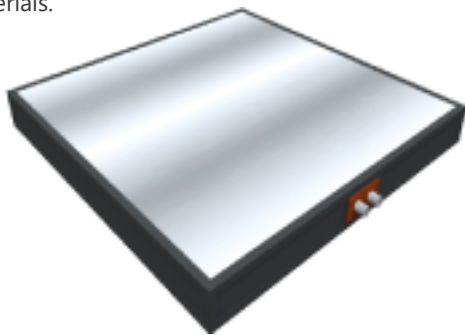
It includes 18 solid detectors (without gas) distributed as: 12 plastic scintillation detectors designed to measure beta particles and 6 plastic scintillation detectors designed to measure gamma radiation, which work autonomously and independently, allowing to perform simultaneous measurements with different alarm levels.

Its management is fully automated. The equipment has sensors that detect when a person enters the portal, interrupting the background reading and initiating automatically (when it detects that it is correctly positioned) a thorough examination of the subject.

## Detectors:

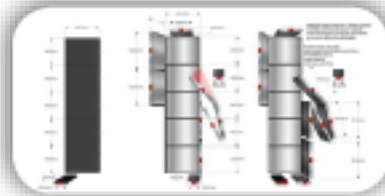
The type of detector that the BOMO incorporates is plastic scintillation for beta and gamma. The beta detector consists of a thin layer (0.5mm / 0.25mm) of transparent material (plastic) doped with a sensitive organic molecule (POPOP: p-bis [2- (5-phenyloxazolyl)] benzene). This layer is attached to a block of PMMA (Polymethylmethacrylate) that serves as a light guide to the photomultiplier (integrated inside). The entry window is aluminized with mylar (0.9mg / cm<sup>2</sup> or 2.7mg / cm<sup>2</sup>).

The gamma 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. Beta 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 outstand over the rest of our competitors.

## Voice notifications:

A voice synthesizer module has been incorporated to allow the user to personalize the messages that will be heard by the loudspeaker.

Through this tool user can write a voice message for each of the different events available in the application, and indicate how many times it should be played.

User can also set the dictation speed and choose between different voices available (male and female).density and Z-value of the organic materials.

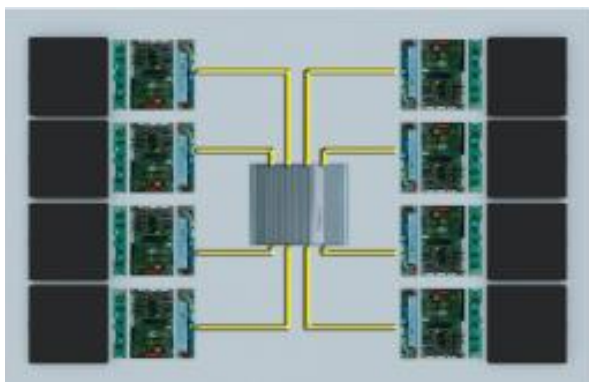
MENSAJES DE VOZ			
PÁGINA 1	PÁGINA 2		
EVENTO	TEXTO	REPETIR	
AL INICIAR LA APLICACIÓN	BIENVENIDOS	3	ESCUCHAR
ENCENDIDO DE COMBUSTIBLE	REALIZANDO CHEQUEO DE COMBUSTIBLE	3	ESCUCHAR
ENCENDIDO CONTROLADORA #	COMPROBANDO CONTROLADORA #	3	ESCUCHAR
ENCENDIDO SUPERMOTOR	TEST EN CONTROLADORA # COMPROBANDO	3	ESCUCHAR
ENCENDIDO NO SUPERMOTOR	ENCENDIDO CONTROLADORA #	3	ESCUCHAR
MODO DE OPERACIÓN SELECCIONADO	MODO # SELECCIONADO	3	ESCUCHAR
PREPARANDO FIBRAS	PREPARANDO MEDIDA DE FONDO	3	ESCUCHAR
ENCENDIDO FONDO	ENCENDIDO MEDIDA DE FONDO	3	ESCUCHAR
FONDO COMPLETADO	FUNDO COMPLETADO	3	ESCUCHAR
SUJETO APROXIMÁNDOSE	FAZEL PORTAFIBRA	3	ESCUCHAR
SUJETO EN EL INTERIOR	OPERANDO PORTAFIBRA	3	ESCUCHAR
PREPARANDO CONTINUA	DE VUELTA A OPERAR LA MEDIDA	3	ESCUCHAR
SUJETO APROXIMÁNDOSE	FAZEL PORTAFIBRA	3	ESCUCHAR
CUBIERTA ATRÁS	ERRANTE CONTINUA #	3	ESCUCHAR
CONTAR FIBRILLADO	SALIDA PORTAFIBRA	3	ESCUCHAR

VOZ SELECCIONADA:	VELOCIDAD:	
Carmon	VELOCIDAD 3	
GUARDAR	RESTAURAR	CERRAR

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.



## Calibrations:

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

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

**PATRONES**

PATRONES EXISTENTES

NÚMERO DEL PATRÓN:

FECHA DE ENTRADA:

INICIO:     FIN:

ACTIVIDAD A FECHA DE ENTRADA:

ULTIMO A FECHA DE ENTRADA:

## Special Features:

- Detectors totally independent for each type of radiation. 18 detectors (6 for gamma and 12 for beta detection).
- Beta efficiency: 10% for Tc99, 20% for Cl36. Gamma efficiency: 20% for Co60.
- Each detector is configurable via software by the operator to define its operating energy (beta or gamma), zones, alarms, cancellation of a specific detector, etc.
- TCP / IP and / or RS232 / RS485 communication between modules.
- Sensors for the automatic detection of people, both in proximity / access and in the counting position.
- Motorized head detector.
- Operation / measurement in two steps (front position and back position).
- LED lighting.
- To facilitate any technical intervention, all the equipment's electronics are located on the right side panel (in front of the detectors).
- Digital parameter adjustment. (without potentiometers or mechanical actuators).
- One 10" LCD touch screens for information and control. External keyboards are not required.
- Integrated industrial PC (without maintenance), with Windows 10 operating system.
- Includes calibration routines, verification and configuration (alarms, levels, gain, etc).
- Software, HS-RAD, customizable in all its functions and languages.
- Critical routines such as calibration, algorithms, etc., protected by password.
- Allows its remote operation (TCP / IP).
- It has a standard USB port for data and historical dump in any USB external support (memory stick, disk, etc) as well as TCP / IP connector.
- It has signal output for remote alarm indicators.
- Texts, tone and volume of voice messages configurable by the user.
- Record of events, backgrounds, measures, alarms, operation failures, etc.
- Dynamic automatic calculation of measurement duration.
- Indication, exterior and interior, optical and acoustic, status, alarms, etc.
- All software and documentation in English.
- Electronics and software used in multiple equipment installed in the Spanish's NPPs, interchangeable and standardized.

