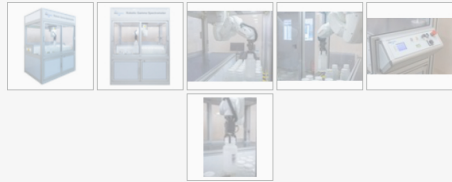
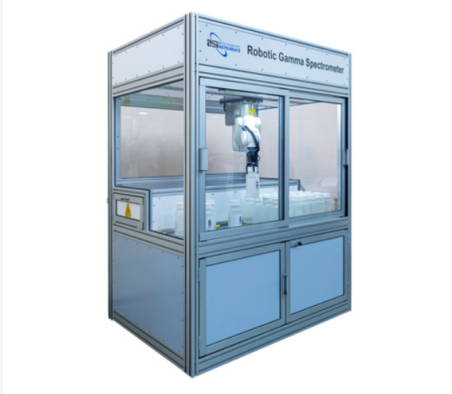


Robotic Gamma Spectrometer with sample changer



Application

The Automated Spectrometer is intended for the detection and analysis of radio nuclides from various types of environmental objects such as rocks, minerals, sludge, slag, soil, plant, sediment and particulate matter in air and water. The spectrometric system is able to determine the composition of a sample based on the photon energy and the activity based on the photon flux. The low-background lead shielding together with the highly pure germanium (HPGe) p-type detector gives precise results even for low activity materials. The fully automated sample changer enables the user to measure more than 40 samples, without having to interact with the Robotic Gamma Spectrometer. This reliable robotic sample changer increases the productivity and reduces the possibility of health risks for the operator.

COMPLETE SET

- Gamma-ray detector based on HPGe detector in U-style cryostat with remote preamplifier (PA) and 30L Dewar vessel
- Lead shield
- Multichannel analyzer
- Software for spectra processing, identification of radionuclides and calculation of their activities
- Spectra analysis software Nuclide Master Plus
- Software for efficiency calibration of arbitrary shaped objects EffMaker
- Automatic sample changer based on robot arm with compact controller
- Table with sample holders and safe cabinet
- Barcode reader together with barcode printer
- Control software for robotic arm
- Master controller with process managing software
- Liquid nitrogen sensor and monitor
- Cable set of 3m length

DESCRIPTION

The Automated Spectrometer is intended for the detection and analysis of radio nuclides from various types of environmental objects such as rocks, minerals, sludge, slag, soil, plant, sediment and particulate matter in air and water. The spectrometric system is able to determine the composition of a sample based on the photon energy and the activity based on the photon flux. The low-background lead shielding together with the highly pure germanium (HPGe) p-type detector gives precise results even for low activity materials.

The fully automated sample changer enables the user to measure more than 40 samples, without having to interact with the Robotic Gamma Spectrometer. This reliable robotic sample changer increases the productivity and reduces the possibility of health risks for the operator.

Automatic Sample Changer

The seven-axis robot handles a payload of up to 3kg and with, practically, unlimited reach, the robot is able to carry out a series of operations using flexible rather than hard automated solutions. In addition to a horizontal reach, the robot has the ability to reach below its base. Furthermore, the robot has a very compact turning radius, which is enabled by the robots symmetric architecture, without offset on axis 2. This ensures the robot can be mounted close to other equipment.

Basic characteristics of Robot arm:

- Seven-axis manipulator
- Machine vision
- Payload: 3 kg
- Reach: per request
- Fastest 7-axis robot
- Accuracy: +0.01 mm
- Weight: 25 kg
- IP30 protected
- All meters and cables enclosed

- All motors and cabins enclosed
- Compact controller
- Sample holder tool for vessels with diameter in range 40 – 110 mm.
- Barcode Reader and Writer

To assure the correct processing of all data during the measurement and analysis process, the samples are marked by using a barcode printer that is connected to the workstation. Here all necessary information about the sample is stored in a database. Using the bar code reader, the information stored in the database is retrieved for each sample before the measurement process is started. This fully automated process delivers all necessary information for the measurement and analysis process.

Samples

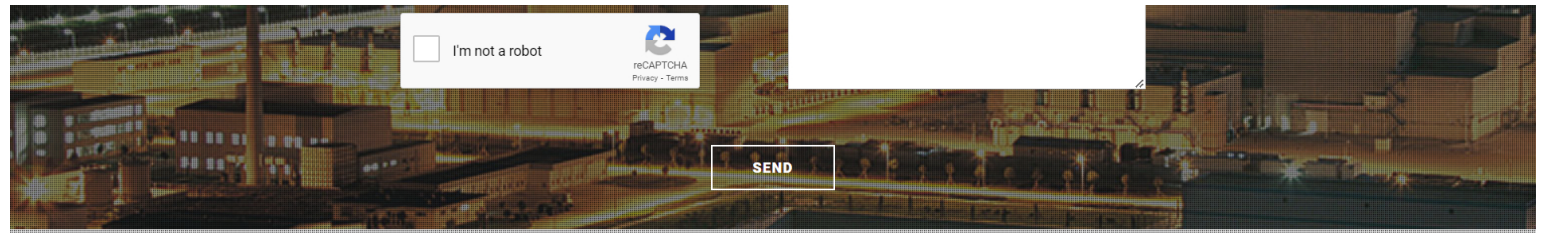
Measurement geometries are: Bottle 500ml, Bottle 250ml, Denta 60ml, Denta 30ml, Matinelli, petri, etc. Given numbers are applicable to a specific model but it is not a limitation. The system is flexible enough to be adjusted in accordance to specific requirements.



SPECIFICATION

Parameter	Value
Detection limit for Cs-137 radionuclide specific activity, measurement time 1 hour, Bq/kg	0.5
Absolute sensitivity to gamma flux for 30%* efficient detector, pulse/quantum	4.5×10^{-3}
Instrumental background intensity for energy range from 40 KeV to 3 MeV, pulse/KeV x sec	5×10^{-4}
Cs-137 radionuclide specific activity measurement error for measurement time 1 hour, %	20
Shield thickness:	
Lead wall, mm	100
Copper wall, mm	10
AC power supply:	
Voltage, V	230
Frequency, Hz	50
* 10% - 160% efficient HPGe detectors are available by separate order.	
Lead shield	
Thickness of lead walls, mm	100
Internal dimensions, mm	Ø 202 x 332
Liners	Tin, thickness 1 mm Copper, thickness 9 mm
Outer jacket	1.5 mm low carbon steel

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