

SARA

SPECTROSCOPIC MONITORING STATION

FLEXIBILITY FOR DIFFERENT APPLICATIONS (IN AIR AND IN LIQUID)

RAPID DETECTION OF ARTIFICIAL ISOTOPES

SENSITIVE FOR EARLY WARNING AND REACTION

SPECIFIC FOR ISOTOPE IDENTIFICATION

RELIABLE OPERATION UNDER HARSH ENVIRONMENTAL CONDITIONS

RELIABLE MEASUREMENT RESULTS ENSURED BY AUTOMATIC TEST ALGORITHM

Offering the latest technology for high resolution spectroscopic gamma analysis and dose-rate measurement, the SARA is an environmental monitoring system for deployment in or around a nuclear site or across a complete region.

The SARA is a self-contained spectroscopic in-situ gamma detector designed to measure and analyse gamma spectra and dose-rate under environmental conditions.

The SARA is able to detect even minor changes of the composition of the nuclear spectra in the environment, and provide extremely accurate dose-rate measurements down to 3 nSv/h. The system is designed to offer fast recognition of artificial isotopes, which is very important for a radiation early warning system.

The SARA is designed for outdoor use, in extremely harsh environments and for continuous operation without any maintenance. The hermetically sealed detector unit guarantees optimal protection for the detector and the electronics against environmental conditions.

For spectroscopic analysis, the SARA is equipped with an MCA connected to either a NaI(tl) or LaBr₃(Ce) scintillator, providing high energy resolution under ambient temperature operation conditions. An integrated embedded Linux-PC enables online isotope identification and versatile data exchange through several interface options. A standardised ANSI N42.42 protocol enables the use of many spectra evaluation software programs and an integrated web server facilitates data access using a web browser.

In order to offer high-dose rate measurement capability, the SARA can be optionally equipped with a GM detector to provide an extended range measurement up to 100 mSv/h.

The SARA is fully flexible, allowing optimal configuration for the application requirement. Options include:

- Fixed or Mobile
- Mains, Battery or Solar Powered
- Four spectroscopic detector options - NaI(tl) 3" x 3", NaI(tl) 1.5" x 1.5", LaBr₃(Ce) 1.5" x 1.5", LaBr₃(Ce) 2" x 2"
- Extended range dose measurement with GM sensor
- Cable or GPRS communications
- GPS positioning
- Rain sensor

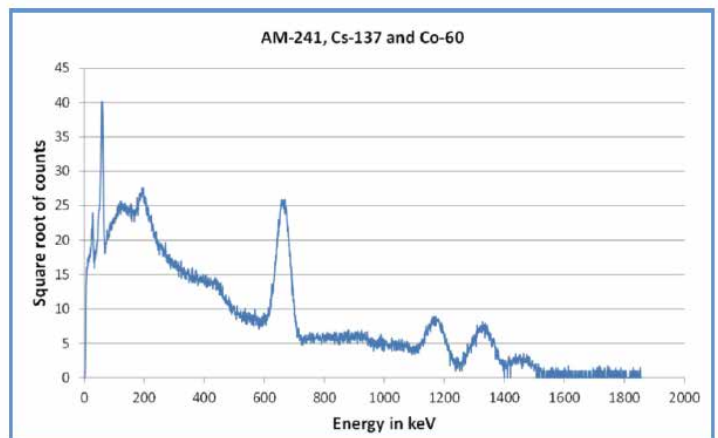


OVERVIEW SARA PRODUCT FAMILY

COMPLETE SPECTROSCOPIC ANALYSIS

The SARA uses 2048 MCA channels to acquire gamma spectra. Features include:

- Acquisition of the gamma spectra every 5 or 10 minutes (storage of 144 values = 0.5 resp. 1 day)
- In-situ isotope identification every 5 or 10 minutes
- Calculation of 1 h average spectra (storage of 96 values = 4 days)
- Calculation of 24 h average spectra (storage of 32 values = 32 days)
- Detection of gamma dose rate every 5 or 10 minutes (storage of 1024 values = 3.5 resp. 7 days)
- Calculation of 1h average of gamma dose rate (storage of 1024 values = 42 days)
- Extended dose rate range with additional GM detector
- Free configurable isotope library
- Isotope based alarm management
- Integrated detector accuracy test
- Overview SARA Product Family
- Temperature stabilisation of energy spectra based on K40
- Supervision of detectors and electronic devices
- Overload protection of detector
- Precipitation detection (with optional rain sensor)
- Data access and parameter setting with web browser



CONFIGURATION OPTIONS

FIXED, MAINS POWERED

Fixed monitoring stations can be installed on a pole or wall and can be directly connected to the power line and network.

To prevent data losses due to black outs, a 72 hour backup battery is installed. Additionally a solar panel with a charger is available to increase the life time if should mains power fail.

For data communication, standard LAN, optional GPRS and/or others such as WiFi or radio communication are possible as a primary or redundant means of communication.

FIXED, SOLAR POWERED

This stationary station is used for permanent installation if no infrastructure like mains power is available. The system can be installed directly on a flat surface without need of special constructions. The power supply for the station is a combination of solar (optionally wind energy) with battery backup.

For mobile applications, the SARA is packaged for fast deployment. It is equipped with a battery as primary power supply and can be additionally equipped with optional solar or wind generator.

For automatic localisation of the station a GPS module is installed.

Four adjustable legs allow stable installation on uneven surface. With the hand grip it is comfortable to transport the station.



"THE SARA SYSTEM IS A FLEXIBLE AND SCALEABLE SOLUTION WITH OVER 4,000 CHANNELS AROUND THE WORLD"

SARA COMMUNICATION

The communication with the SARA system is possible through various means. A common method is via a LAN interface or wireless communication over GPRS. Additionally other communication channels like DSL or WiFi are possible.

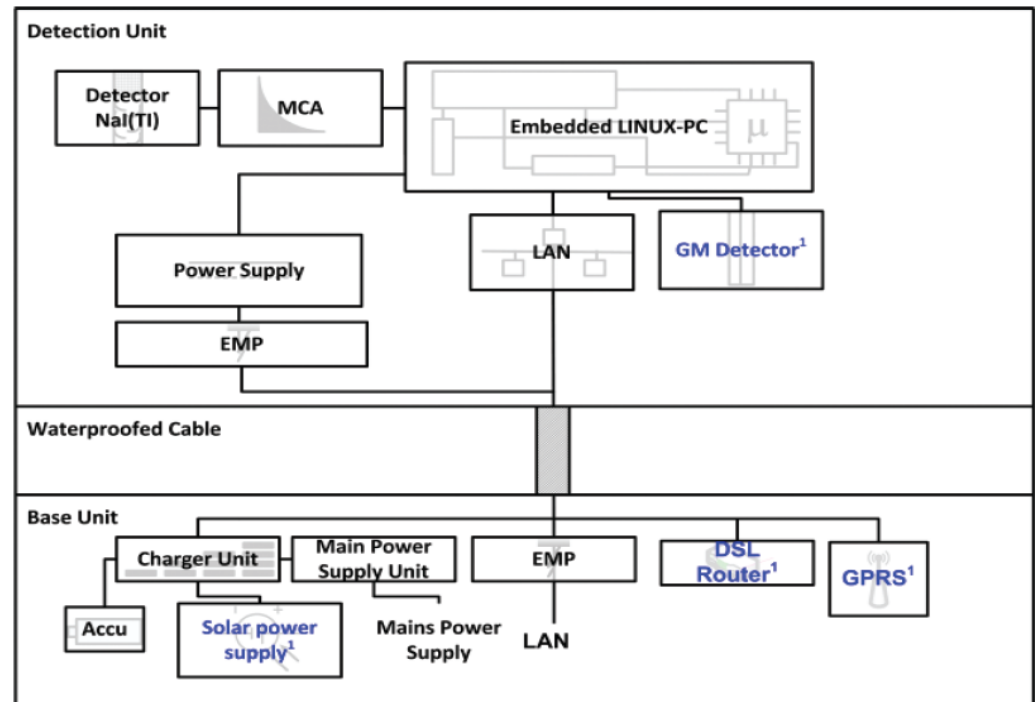
Using the ANSI 42.42 standard as data format, it is easy to integrate the SARA system into data management systems such as the Lab Impex Systems NMC software package or other management systems.

Alternatively, the SARA detector incorporates an integrated web server for maintenance and configuration, which can be accessed from any PC/ Laptop by means of the integrated Ethernet interface.

The web server provides data and functionality, including:

- Data access and parameter setting with web browser
- Plot of the actual 5 or 10 minute spectrum
- Output the result of the spectrum analysis (peak identification)
- Status information
- Possibility to change the system settings
- Nuclide library and threshold configuration.

FUNCTIONAL DIAGRAM OF SARA MONITORING STATION



Electromagnetic pulse protection (EMP)

¹ optional

Specification summary of the SARA spectroscopic gamma detector (x=0 no Geiger-Mueller detector (GM), x=1 with Geiger-Mueller detector)

Type	Unit	IGS71x	IGS81x	IGS91x	IGs92x
Specification scintillator					
Detector type			Scintillator		
Crystal type		Nal(tl)	Nal(tl)	LaBr3(Ce)	LaBr3(Ce)
Crystal size	in	1.5 x 1.5	3.0 x 3.0	1.5 x 1.5	2.0 x 2.0
Dose rate range	$\mu\text{Sv/h}$ mrem/h	0.001-100 0.0001-10	0.001-80 0.0001-8	0.001-360 0.0001-36	0.001-180 0.0001-18
Extended with Geiger-Mueller detector (x=1)	$\mu\text{Sv/h}$ mrem/h	0.001-100,000 0.0001-10,000	0.001-100,000 0.0001-10,000	0.001-100,000 0.0001-10,000	0.001-100,000 0.0001-10,000
Energy resolution ¹	% (FWHM)	<7	<7	<3	<3.5
Energy range	MeV	0.03-3	0.03-3	0.03-3	0.03-3
Number of channels		8192 (2048 used)	8192 (2048 used)	8192 (2048 used)	8192 (2048 used)
Total efficiency ¹	counts min ⁻¹ / $\mu\text{Sv/h}$	61,200	270,000	62,500	150000
Photopeak efficiency ¹	counts min ⁻¹ / $\mu\text{Sv/h}$	9,900	70,600	11,300	25000
Intrinsic background	nSv/h	<5	<5	100	230
Geiger-Mueller detector (x=1, optional)					
Detector				70 017 A	
Range	$\mu\text{Sv/h}$ mrem/h			0.01-100,000 0.001-10,000	
Sensitivity	counts min ⁻¹ / $\mu\text{Sv/h}$			36	
Sensitivity	nSv/h			<140	
Sensitivity	MeV			0.05-1.3	
Specification MCA					
Total channel size		8k (24 bit)	8k (24 bit)	16k (24 bit)	16k (24 bit)
Analog to digital converter	bit	12	12	12	12
Clock speed	MHz	8	8	8	8
Peaking time	μs	0.75 (0.375 optional)	0.75 (0.375 optional)	0.375	0.375
Filtering	digital	digital	digital	digital	digital
Environmental Specification					
Operating temperature	$^{\circ}\text{C}$ $^{\circ}\text{F}$	-40 - +60 -40 - +140			
Protection class		IP68			
Humidity	%	0-100			
Electric Specification					
Power consumption	W (average)	1.8			
Supply voltage	V	8-17			
EMC-proofed				EN55022:2006 + A1:2007 + A2:2010 Class B EN55024:1998 + A1:2001 + A2:2003	
Size and Weight Specification					
Diameter	mm (in)	80/120 (3.15/4.72)	94/134 (3.70/5.28)	80/120 (3.15/4.72)	80/120 (3.15/4.72)
Height	mm (in)	455 (17.91)	502 (19.76)	455 (17.91)	455 (17.91)
Weight	kg (lb)	2.65 (5.83)	4.4 (9.7)	2.65 (5.83)	2.85 (6.28)

¹ Cs-137@662 keV



making a difference

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