GS-512i

Portable Gamma-Ray Spectrometer

SatisGeo
Instruments for Geophysics & Environment

Description:

The SatisGeo GS-512i is designed to measure gamma-ray spectra in the 0.1 - 3 MeV range and the concentration of natural isotopes and total radioactivity. It includes a spectrum stabilization function that accurately determines the reference peak position from the multichannel spectrum. This allows precise reference peak adjustment within channels 40 to 500, ensuring highly accurate measurements. This spectrometer provides concentration data:

- **Potassium (K)**: [% or nG/h]
- **Uranium (U)**: [ppm or nG/h]
- **Thorium (Th)**: [ppm or nG/h]
- **Total activity**: [ppm Ueq]

In addition, the GS-512i allows setting up to four user-defined ROIs (Region of Interest) for pulse measurements in user-defined energy ranges.

Technical specifications:

Amplifier	Semi-gaussian pulse shaping, 1 µs time constant with pole-zero cancellation, DC restoration, digitally controlled gain +/- 25 %
Analag/digital converter (ADC)	Successive Approximation ADC, 16Bit, 1.33MSPS, conversion time 0.8 µs
Channel width	5 mV, input voltage range: 50 mV to 2.5 V
Differential non-linearity	max. 1 % in the range 50 mV to 2.5 V
Integral non-linearity	max. 0.3 % in the range 50 mV to 2.5 V
Zero drift	2 mV/10 °C
Maximum input count rate	50 000 counts per second with a peak displacement, due to zero shift, inferior to 1 %
Channel Analyser	The 512 channels, max. $(32^2 - 1)$ counts per channel live time mode of collection setting in the range 5 s to 23:59:59
Digital Spectrum Stabiliser	Range of reference peak setting is 40 – 500 channel, control range is ± 25 %, stabilization sensitivity 0.5 %
Internal data memory	Memory for up to 7500 complete spectra
Interface	USB 2.0 or Bluetooth for data transfer and remote control, Bluetooth can be used to connect to Bluetooth GPS
Keyboard	20 push-buttons membrane-type, dust resistant, water-tight, weather-proof
Display	Graphical LCD 240 x 128 dots
Audio indication	1 kHz buzzer
Internal supply power	6 alkaline battery LR6 AA 1.5 V or 6 accumulators type HiMH 1.2 V
External supply power	8 – 15 V/400 mA
Size	228 x 83 x 110 mm
Weight	1.5 kg with batteries

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Measuring modes:

1. **SINGLE**
   - One-button manual start of measurement.
   - Measurement of individual spectra with adjustable measurement time (10 s to 24 h, 1 s step).
   - Allows setting of line and position with automatic position incrementation.
   - The GPS position is automatically stored if the GPS is active.
2. **MONITOR**
   - Automatic measurement of spectra at a predefined interval.
   - Set the measurement's start, interval, and end time and date.
   - The GPS position is automatically stored if the GPS is active.

Two variants of probes:

- **GSP-3**: Standard 3-inch NaTi scintillation crystal probe suitable for most applications.
- **GSP-4**: Optional 4-inch NaTi scintillation crystal probe, available on request.

GPS options:

The GS-512i gamma spectrometer allows communication with external devices using Bluetooth wireless technology. This enables the GS-512i to connect to an external GPS receiver that can send NMEA messages using the Bluetooth serial port protocol (SPP). The GPS position with the measured spectrum is stored when the GS-512i is connected to such a GPS receiver.

SgDataGS application for Transferring Data:

SgDataGS application provides data transfer and visualization to assess the data and exports for further processing. SgDataGS is also used to store and visualize measured data in REMOTE mode.

Applications:

- Standard field geophysical survey
- Laboratory gamma scintillation spectroscopy
- Mobile survey
- Drillhole measurements to a one-meter depth

Calibration:

The GS-512i is calibrated to measure concentrations of natural radionuclides at the base in **Stráž pod Ralskem**. The sensor's own radiation is calibrated in our facility, which shields external radiation.

Accessories:

- 1 x Console GS-512i
- 1 x Detection probe
- 1 x Cable for connecting GS-512i to the probe
- 1 x Reference sample EG1 ^{137}Cs
- 1 x USB cable
- 1 x Manual
- 1 x Screwdriver
- 1 x Shoulder straps
- 1 x Charger
- 1 x USB FLASH with operating program and calibration spectra
- 1 x Carrying case

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