GAMMA SURVEYOR VARIO

2048-channel geophysical gamma-ray spectrometer for field exploration, borehole logging, carborne survey and laboratory use

K, U, Th assay, dose rate and search modes

Manual or continuous measurements with built-in or external GPS

Exchangeable probes with BGO and NaI(Tl) detectors

Vertical or horizontal instrument assembly

Attachable lead collimator for logging of slim layers

Precise spectrum stabilization using natural isotopes or artificial gamma source

10 ROIs, isotope library, possibility of user calibration

Rugged design, submersible probe to 100 m

Rechargeable Li-Ion cells (for 24 hours) or 6 AA cells, 12 V car battery, AC/DC adapter

Easy control system (internet upgrade) with joy-stick, graphical display (colour or LCD) with backlight, acoustic pitch response, microphone and large memory

Data download via USB port or flash disk, data processing and spectrum view support

Bluetooth communication with external GPS and earphones

Applications:

determination of K, U, Th concentrations and natural gamma dose rate, spectral measurements with identification of radiation sources for mineral and raw material (uranium) prospecting, environmental monitoring, geological mapping, laboratory assays, industrial and health care purposes.

GF Instruments

Gamma Surveyor Vario

as a 2048-channel geophysical gamma ray spectrometer, includes all needed features and accessories for field, borehole and carborne survey with K, U, Th assays and dose rate measurement. Its easy operated control unit with attachable wirelessly coupled compact probe allows to create a cost effective assembly regarding required accuracy and speed of measurement. The instrument works with either natural or artificial isotope spectrum stabilization, which is useful especially for quick and reliable measurement at very low gamma activities.

Technical Specifications:

Measuring Modes:

Spectrum & Assay - spectral measurements with determination of concentrations of K, U, Th (%, ppm, ppm) and of natural gamma dose rate (nGy/h or nSv/h) with spectrum view (isotope library) and with selectable measuring time (IAEA conformity)

Dose Rate - measurement of natural gamma dose rate (nGy/h or nSv/h) with selectable measuring time (IAEA conformity)

Search - quick search with cps histogram and loud pitch audio indication (typ. 90 dB at loudspeaker) with adjustable cps range and threshold

Spectrum & Assay and Dose Rate modes can be performed as point, profile, borehole and continuous readings accompanied with GPS coordinates.

Detector:

Scintillation Bismuth Germanate Oxide (BGO) detectors and Sodium Iodide NaI(Tl) detectors in stainless steel housing - see next page.

Spectral Analyzer:

2048 channels, 3 MeV linearized energy range.

Measuring Time

Selectable from 10 s to 2 h according to required accuracy of results and to estimated concentration levels of K, U, Th.

Calibration:

Factory calibration is done on high-volume K, U, Th and background standards according to IAEA recommendation (International Atomic Energy Agency). Two user calibrations (e.g. for measurement on samples or for collimator) can be created.

Control System:

Joy-stick user-friendly operation

Display - colour transreflective or black and white LCD with backlight

Acoustic output - built-in loudspeaker (typ. 90 dB) or external Bluetooth earphones

Memory - more than half of million full spectrum and assay readings with text and voice remarks

GPS - built-in or external (NMEA protocol) connected by Bluetooth or RS232

Firmware is upgradeable via internet.

Data Management and Export:

Each measured file identified with file number, time of measurement, instrument serial number and complete headline is stored in memory of Gamma Surveyor Vario. This information serves for reliable data management (storage and processing) after data download from instrument. ASCII lines with MS Excel compatible structure consist of columns with results, GPS coordinates and remarks. Enclosed PC software provides data export of chosen results for processing by e.g. Surfer or Geosoft SW with either latitude / longitude or UTM coordinates.

PC Connectivity:

Gamma Surveyor Vario PC software for Windows based PCs provides data download, export of measured files and visualization of spectra. The system contains complete support for data transfer using USB port or USB flash disk.

Power Supply:

Rechargeable exchangeable Li-Ion battery, immediately ready to use, provides 24 working time from one charging with minimum capacity loss at low temperature.
Alternative power supply provided from 6 AA cells (single use or NiMh), external 12 V car battery or AC/DC adapter can be used when needed.

Dimensions and Weight:

Handheld assembly with VN6 probe - 138 x 100 x 290 mm, 2.4 kg (with Li-Ion battery).

Ambient Operating Conditions:

Temperature range - from -10 to +50 °C.

Protection - water and shock proof assembly, probe on borehole cable submersible to 100 m.

Standard Accessories:

- Probe
- Control unit
- Transport plastic case
- 5 m borehole cable
- Carrying belt
- AC-adapter for 100 – 240 V AC, 50-60 Hz
- Cable for 12 V car socket supply
- Internal battery holder for 6 AA cells
- Cable for data download to PC and to flash disk
- CD with software
- Operation manual

Optional accessories:

- 100 m borehole cable (on reel with Bluetooth adapter)
- Borehole clamp
- Lead collimator
- Cs-137 stabilization source (9 kBq)
- Spare battery pack

With reservations for changes

Probe VB1
BGO 1”x 1.5”

Probe VN6
NaI(Tl) 2”x 2”

Probe VB6
BGO 2”x 2”

Probe VN21
NaI(Tl) 3”x 3”

Probe VB21
BGO 3”x 3”

Probe	Detector material	Detector volume	Probe dimensions (Diameter, Lenght)	Probe weight
VB1	BGO	1.2 in^3 (19 cm^3)	45 mm, 301 mm	0.9 kg
VN6	NaI(Tl)	6.3 in^3 (103 cm^3)	70 mm, 265 mm	1.5 kg
VB6	BGO	6.3 in^3 (103 cm^3)	70 mm, 290 mm	2.0 kg
VN21	NaI(Tl)	21.2 in^3 (347 cm^3)	102 mm, 345 mm	3.1 kg
VB21	BGO	21.2 in^3 (347 cm^3)	102 mm, 328 mm	4.3 kg
GS CAR	NaI(Tl)	244 in^3 (4000 cm^3)	205x205mm, 790 mm	33 kg

Probe GS CAR
NaI(Tl) 4”x 4”x 16”

Control unit

5 m borehole cable

Lead collimator

100 m borehole cable

Borehole clamp

Transport case with Gamma Surveyor Vario and standard accessories

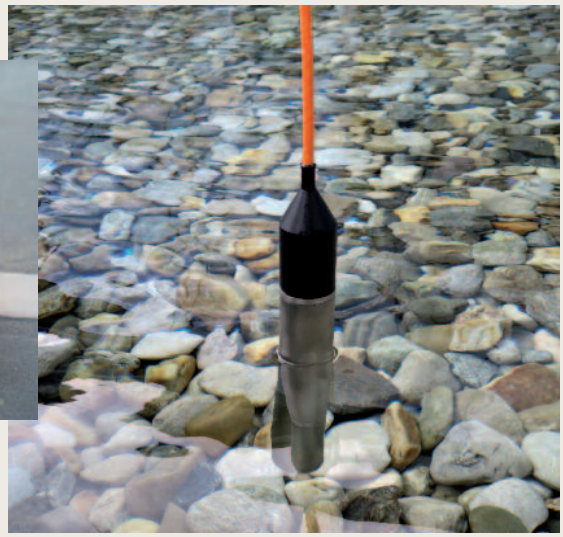

Photo courtesy of Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany

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