kromek®
safer and healthier world

GR1 and GR1-A

GR1-A® and GR1®
the World's Smallest
and Highest Resolution
Room Temperature
Gamma-Ray
Spectrometers

GR1 and GR1-A

COMPACT
HIGH-RESOLUTION
GAMMA RAY
DETECTION
AND NUCLIDE
IDENTIFICATION

Now with flexible functionality to meet specialist requirements

Applications Include:
InSitu Monitoring
Health Physics

GR1 and GR1-A

The GR1® and GR1-A® high-performance gamma-ray spectrometers utilize a 1 cm³ CZT solid state detector and offer world-leading specification in a compact form.

Both are completely self-contained, with a built-in preamplifier, shaping amplifier, baseline restorer, pulse height digitizer, and HV supply. The digitized pulse heights of detected gamma-ray signals are sent to a PC via the mini-USB which also powers the unit, so no external power supply is required.

The GR1® comes with K-Spect®, Kromek's entry-level Windows® 10-based software, built for detailed sample and spectral analysis. K-Spect, which is available to download, free of charge, via the Kromek website, provides the spectrum acquisition, display, analysis, and storage functions.

Applications Include:
Nuclear Industry
Nuclear Spectroscopy

Main Features

Common to GR1 & GR1-A

- High spectral resolution
- High efficiency
- Compact
- Simple to use
- CZT solid state detector
- USB Powered
- Low power consumption

GR1-A specific

- Operational flexibility
- MCX connectors
- Analogue energy output
- Timing output
- MCA gate input

GR1-A

The advanced model of the GR1, the GR1-A contains auxiliary input/outputs that greatly increase operational flexibility. These allow the GR1-A® to be tailored for specific applications in nuclear research and academia. Three MCX connectors provide energy and timing outputs and gate inputs.

The GR1-A® is supplied with a licence for MultiSpect Analysis® software, a unique application that allows connection of multiple GR1-As to a PC, and has the ability to display multiple spectra; both live and saved, from previous measurements. It provides the spectrum acquisition, display and storage functions, and the export of data for further analysis as well as match spectra to a pre-loaded library of over 400 radionuclides.

Timing — T
Energy — E
USB
Gate — G
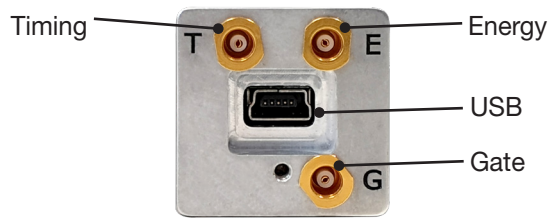
Energy Output: shaped and buffered detector output pulses with amplitude proportional to energy suitable as input to an external multichannel analyser (MCA)

Timing Output: A logic pulse triggered by each detected event and coincident with each output pulse

Gate Input: used to suppress pulse height output via the USB interface to K-Spect for anticoincidence. Energy and timing outputs are unaffected.

Checking radiation levels at Everest base camp

Gamma Spectrometry Software

MultiSpect Analysis® software is written specifically for Kromek's GR1 and GR1-A for use with Windows® 10-based PCs or tablets.

The GR1® comes with **K-Spect®**, Kromek's entry-level software which is free of charge to download. Go to: https://tinyurl.com/KSPECT

Kromek's feature-rich MultiSpect Analysis Software

Filter by critical limit, relative intensity of the emission lines, energy windows and half life.

Colour coded results showing which lines are above the critical limit of the information.

- Scroll down and click on the '*Download Now*' button under K-Spect
- A form will appear, please enter your details
- Kromek will send you an email with the download instructions

K-Spect® receives the data and performs the spectrum acquisition, display, analysis and storage functions. Signals from the CZT solid-state detector are processed and digitized, and the pulse height data is transferred to the computer via the mini-USB.

K-Spect® users can upgrade to MultiSpect Analysis® or MultiSpect Analysis Premium®. To upgrade, simply contact our commercial team via the Kromek website.

MultiSpect Analysis® is Kromek's feature-rich software and a licence is included with each GR1-A®. To download go to: https://tinyurl.com/4esa7kv6

- Scroll down and click on the '*Download Now*' button under MutliSpect Analysis
- A form will appear, please enter your details
- Kromek will send you an email with the download instructions.

In addition to all the K-Spect® functionality, MultiSpect Analysis® allows users to acquire and display live spectra from multiple devices simultaneously alongside saved spectra from previous measurements. Data is transferred to the computer via USB. It also enables grouping and summing of individual spectra plus the ability to match spectra to an on-board library of over 400 nuclides.

MultiSpect Analysis Premium® provides the added benefit of efficiency calibration to enable quantitative analysis ideally suited to data collected in any fixed geometry such as marinelli beakers.

Manual Efficiency Calibration
Where the detector and radioactive sources are used in a fixed geometry, an efficiency calibration of the system can be used, together with the measured count rates in spectrum peaks, to calculate source activity. Tools are provided allowing the user to determine the efficiency of their system using a calibration source of known activity.

Feature	K-Spect	MultiSpect Analysis	MultiSpect Premium
Spectral acquisition from single GR1, GR1-A, SIGMA or TN15	✔	✔	✔
Spectral acquisition from multiple detectors of the same type simultaneously	✗	✔	✔
Energy calibration facility	✔	✔	✔
Efficiency calibration	✗	✗	✔
Display multiple detector information and more than 5 saved Spectra	✗	✔	✔
Display calibrated spectra at the same energy scales to allow comparison	✗	✔	✔
Compatible with K102 Multichannel Analyser	✔	✔	✔
Thumbnail indication of loaded spectra	✔	✔	✔
Ability to save spectra in SPE, CSV or N42.42 formats	✔	✔	✔
Ability to export data	✔	✔	✔
Ability to save detector calibration information	✔	✔	✔
Association of calibration data with particular detectors by serial number	✔	✔	✔
Aggregation of multiple spectra into one spectrum	✗	✔	✔
Built in library of 416 isotopes	✗	✔	✔
Industry standard categorisation of isotopes	✗	✔	✔
MonitorTraces	✗	✔	✔
Multiple regions of interest with Spectra	✔	✔	✔
Automated peak analysis of Spectra	✗	✔	✔
Quantitative analysis	✗	✗	✔

Drivers are available for both Windows®10 and Linux® operating systems

GR1 Family Variants

Model	Detector size mm	Resolution at 662 keV	USB	Gate input	Timing output	Energy output	Software included
GR1	10x10x10	<2.5%	✔	-	-	-	
GR1+	10x10x10	<2.0%	✔	-	-	-	
GR1-A	10x10x10	<2.5%	✔	✔	✔	✔	MultiSpect Analysis
GR1-A+	10x10x10	<2.0%	✔	✔	✔	✔	MultiSpect Analysis
GR05	5x5x5	<2.5%	✔	-	-	-	
GR05+	5x5x5	<2.0%	✔	-	-	-	

K-Spect is compatible with all products and is available to download free of charge from the Kromek website

The GR1 is available with Linux® driver and can be interfaced with other software packages; driver information can be provided as part of the project deliverables for selected partners.

3x MCX to BNC adaptors included with GR1-A products

Example GR1 / GR1-A applications

- **Radionuclide identification:** The GR1 and MultiSpect Analysis provide a powerful platform to perform radionuclide identification in a variety of industrial and health physics applications such as environmental monitoring and sample analysis.

- **Classroom teaching:** The GR1 module is an ideal and portable tool that can be utilised for educational purposes in teaching concepts of radiation as well as for training in the use of radiation sensors.

Example GR1-A research applications

- **Particle-gamma coincidence measurements:** The high resolution of the GR1-A allows it to be paired with charged-particle or neutron detectors in order to observe coincidence particle decays with gamma-ray emission.

- **Gamma-gamma coincidence measurements:** Multiple GR1-As can be used in unison in order to identify multiple gamma rays that are emitted in coincidence; because of this, the GR1-A can be used as a tool in studies of nuclear structure.

- **Pulse-shape analysis:** The analogue energy output can be used for studies of charge collection pulse-shapes, which can yield information on interaction points, scattering and charge mobility within the detector crystal. The timing output can also employed as an input for time-to-analogue converters.

ISO 9001

SYSTEM
CERTIFIED

C E

TÜV
SUD
C   US

kromek

safer and healthier world