Handheld Isotope Identification Instrument RIID

RT-30 Mk2 series

The RT-30 Mk2 is the second generation of popular handheld gamma ray spectrometer RT-30. Strengths of the first generation were copied in the new model. There has to be highlighted a strong alloy body sealed against dust and water, protective removable rubber boot, comfortable grip and low weight. The Mk2 learned of the limitations of the first generation and features a large colored trans-reflective sun readable display, improved user's interface with five operation buttons, removable but well-sealed battery pack and clear and loud audio.



Applications

- Homeland Security and surveillance operations
- Customs and Border protection
- Hospitals and Health physics
- Nuclear facilities
- Waste Recycling and Incineration plants
- Scrap metal recycling
- Research laboratories
- Production facilities

The instrument is built as an open platform with potential of fast and simple implementation of special features required by customers. Wide fleet of detectors is supported. The Mk2 bridges traditional scintillation detection probes using common vacuum photomultiplier tube with up-to-date silicon photomultipliers technology. Saved significant volume of vacuum tubes is next occupied by **larger size of detector**.

- Excellent Sensitivity
- Highest ratio detector to unit volume
- Fast and Reliable Isotope Identification
- Lightweight, Rugged and Compact design
- Easy Operation
- Automatic Stabilisation on Natural background
- USB C and wireless connections
- Weather protected

A heart of gamma ray spectrometer is FPGA (programmable array) plus fast speed and low consumption ARM type processor. The combination of FPGA with ARM is taken of preceding larger instrument and has been tested for years. Beside gamma ray section the FPGA is capable to handle other sensors at the same time. A Geiger-Mueller counter and a Neutron detector make a standard offer.

Thanks to latest electronic the Mk2 opens a platform for supporting most modern existing communication standards. Sharing new and traditional communication standards is guaranteed wide compatibility with older as well as new communication devices. The existing USB was upgraded to level C and beside communication it is used also for unit's battery charging. GPS system is built in the front part of the instrument and is used for localization of the unit and also for time synchronization.

Quickly determining the location of lost radioactive sources in the environment or scrap, monitoring of waste in hospitals or waste incinerators, scanning people or baggage to disclose illicit trafficking of nuclear materials; all are typical applications for the RT-30 Mk2 series.

Features:

- Ergonomic, lightweight handheld well balanced, compact
- Comfortable grip with five buttons operable in glows
- Removable protective rubber boot
- Detectors fully build in the housing, protected by rubber foam
- Large, trans-reflective colored display - sharp and high contrast in sunlight, backlighted in dark
- Loudspeaker with plastic membrane watertight

- Four status indication LEDs – indication of alarms and health status
- USB standard C for data transfer and charging

- Wide fleet of scintillation detectors NaI/Tl, CsI/Tl, CsI/Eu, LaHalide, BGO, GAGG, SrI, Plastic scintillation detectors PVT
- Maximum detector size: Diameter 2” and height 2” with standard vacuum PMT or max 5” with Silicon PMT (SiPM or MPPC)



Gamma Ray spectrometer with full digital signal evaluation

- Fast sampling - 40 Mega sample/sec
- Pulse shape auto calibration - easy adaptation to different type of detectors
- Standard energy range 20 keV - 3 MeV in 1024 channels. Linear transition between energy and channel position. Linearization made on one million of micro-channels using a lookup table.
- Energy range extendable up to 10 MeV
- Progressive gain adjustment using NORM pattern with range overlap. Gain adjustment performed by a proportional backstage process regardless of working mode.
- Detailed and complex gain stabilization log for arbitrary reasons and long-term performance check.

Search Mode – Survey Meter

- Survey Meter
- Dose Rate Meter
- 1024 Ch Spectrometer
- Highly Sophisticated Algorithms
- Automatic Stabilisation on Natural background

- Used for a source of radiation localization. Indication of intensity by gamma rate total counts or counts within predefined energy windows, dose rate, accumulated dose and neutron flux
- Scanned profile recorded on histogram. Anomalies highlighted by colors. Browsing capability of recorder within one recording session
- Waterfall screen mode for indication of intensities within spectrum
- Adjustable alarm thresholds for gamma rate, dose and dose rate
- Neutron warning active within all modes since unit is on
- Measured values integration and averaging mode - running average
- Loud acoustic indication of radiation level
- Thresholds for acoustic indication and highlighting colors of recorder auto adjustable from actual background

Nuclide Identification Mode

- Sensitive Gaussian filtering, doublet recovery algorithm
- Default and user customable nuclide libraries, improved identification rules
- Found peaks listed with details about resolution, intensity and position
- Contribution power of Identified nuclides in blends rated by intensities
- Nuclide categories by their origin (Industrial, NORM, Medical, SNM)
- No limit on number of items in nuclide library

NORM Assay Mode

- Evaluation of concentrations of NORMs by least square fitting
- Two calibrations - default and user editable
- Results in form value and determined standard deviation
- Capable to determine concentrations (activities) of up 6 nuclides in a blend
- Information about quality of a measured spectrum
- Spectrum drift correction

Special Mode

- Extended Energy Range Mode
- Energy range of gamma spectrum expandable up to 10 MeV
- Pulse time capturing system
- Variable look up tables

Detector options:

- SiPM scintillation detector with silicon photo multiplier
- L1, L2, L3, L4, L5 customized height of detector (1, 2, 3, 4 and 5 “). L3 to L5 only with SiPM
- T telescopic extension for gamma and GM detector
- NaI, CsI and BGO as common, other types as GAGG, YAP, SrI, LaH, PVT customized







RT-30 Mk2 Product Range

The RT-30 Mk2 series has an IP65 dust- and water resistant, lightweight alloy milled housing and a detachable plastic boot for additional protection under harsh environments. The unit is powered by a removable Li-ION battery pack. A fully automatic charger is integrated in the unit. One plug in connector USB-C for data transfer and charging.

Standard Comparison Table		RT-30 Mk2	RT-30T Mk2	RT-30G M2	RT-30GT Mk2	RT-30N Mk2	GT-30 Mk2	GT-32 Mk2	RT-30 Mk2 **SiPM**	RT-30T Mk2 **SiPM**	RT-30N Mk2 **SiPM**	GT-30 Mk2 **SiPM**
Display	Numerical											
	Graphical	●	●	●	●	●	●	●	●	●	●	●
Data acquisition	Gross Counting	●	●	●	●	●	●	●	●	●	●	●
	Spectroscopy	●	●	●	●	●	●	●	●	●	●	●
Connectivity	USB C	●	●	●	●	●	●	●	●	●	●	●
	Bluetooth and Wi-Fi	●	●	●	●	●	●	●	●	●	●	●
	Large (32Gb)	●	●	●	●	●	●	●	●	●	●	●
Software	GeoView Package	●	●	●	●	●	●	●	●	●	●	●
	Isotope Identification	●	●	●	●	●			●	●	●	
	Assay mode						●	●				●
Detector type	NaI, 30 x 30mm											
	NaI, 51 x 51mm	●	●	●	●	●	●					
	NaI, 51 x max 120 mm								●	●	●	●
	BGO, 51 x 51mm							●				
	Alternative det. type								●	●	●	
	GM tube			●	●	●					●	
	Neutron Detector					●					●	
Mechanical	Handheld	●		●		●	●	●	●		●	●
	Telescopic arm		●		●					●		

Common Features

- Large scintillator, selectable type
- Advanced GUI operation
- Automatic Stabilisation on Natural background
- Selectable acoustic and visual alarm threshold, LED indication
- Sophisticated Nuclide Identification procedures
- Bluetooth and Wi-Fi communication, Ethernet connectivity
- Built in GPS, Glonass
- 32Gb internal memory
- Lightweight, robust design
- Optional Telescopic arm, Integrated GM tube or Neutron Detector
- LCD Graphic colour display trans-reflective
- Removable protecting boot
- Replaceable battery pack

Technical data

Detectors

Standard option

- NaI/(Tl), Φ51 x 51 mm (2“ x 2“), 104 cm^3 (6.3 in^3), all RT models
- BGO, Φ51 x 51 mm (2“ x 2“), 104 cm^3 (6.3 in^3), GT-32 Mk2 model
  Photomultiplier diameter 2”, bialkali

Associated detectors

- Energy compensated GM tube with RT-30G Mk2, RT-30GT Mk2 and RT-30N Mk2
- He-3 Neutron tube with RT-30N Mk2

Special option

- CsI/(Tl), CsI/Eu, LaH, SrI, GAGG, YAP , Φ51 x max 120 mm (2“ x max 5“), SiPM array

Spectrometer

1024 channel, 40 MHz DSP, Linear Energy corrected
Pile-up Rejector, 200 ns Resolution
Energy range 20 keV - 3,0 MeV, expandable up to 10 MeV

Scintillometer

Sampling period 20/second
Acoustic and video alarm, 4 LED indicators
Moving average and integration



Dose Meter

Energy corrected dose rate (air kerma, K_a) and
ambient equivalent dose H*(10) for NaI detector
Extended range with GM tube 100 mSv/h (10 R/hr)

Gamma ray sensitivity at 1m (NaI/Tl 2x2”)

160 cps/1MBq for Cs-137
75 cps/1MBq for Am-241
270 cps/1MBq for Co-60

Display

Colour LCD, 360 x 240 dots, 72 x 54 mm (3.5”), Sun readable
Automatic Backlight

Acoustic indication

Audio frequency is proportional to measured count rate
Speaker, dia. 28 mm + Built-in Microphone

Control

Illuminated Navigation Joystick, 5 positions

Data Storage and Transfer

32 GB memory for spectra, search profiles and dose, min. 8000 Samples with full Spectra, Data Position and Voice Message
USB-C, direct and Ethernet mode, Bluetooth 5.1 / Bluetooth Low Energy and Wi-Fi

GPS Support

Internal - GNSS engine for GPS/QZSS, GLONASS, 56-channels
NMEA 0183
External GPS connectable

Power

Rechargeable Li-ion 7.2 V / 6600 mAh (Panasonic CGR18650CG/2S3P) – min. 8 hours of operation at 20°C
External AC adapter USB-C 60W for charging or measurement

Environmental

IP-65 Dust and Water resistant
Operating temperature range -10°C to +50°C
RFI/EMF Shielding complies with FCC (47 CFR part 15) for Class A CE Certification



Size and weight

Size L x W x H 29 cm x 10 cm x 16 cm
Weight 3 kg

Standard accessories:

Carrying Durable Suitcase
Battery charger
GeoMon Software
USB cable
User's guide
Calibration protocol

Optional accessories:

Spare Battery Pack

Specifications are subject to change without notice

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Distribution:

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