

radHUNTER®

Enhanced Hand-Held Radionuclide Identification Device



The radHUNTER™ is an extremely sensitive and accurate digital hand-held gamma radionuclide identification device (RID). It is the culmination of over eight years of development of micro-miniature, digital signal processing electronics; operating power conservation; and advancements in the scintillation detector, radionuclide template matching identification algorithm. The radHUNTER development was supported in part by the U.S. Department of Homeland Security (DHS) / Domestic Nuclear Detection Office (DNDO), Human Portable Radiation Detection System (HPRDS) program.

Available in two configurations (NaI and LaBr), the radHUNTER is able to quickly detect, rapidly locate, accurately measure and precisely identify sources of contamination from their gamma radiation signature. The radHUNTER NGH ultra 3n uses a 0.75" thick by 4" diameter NaI(Tl) detector while the radHUNTER LGH ultra 3n uses a 1.5" by 1.5" LaBr₃:(Ce) detector. Both instruments come with a GM tube for high gamma dose rate measurements and a sealed He₃ detector with moderator for neutron detection. Each instrument is supplied in a carrying case with recharging unit, communication cables, synchronization and analysis software.

Variations in normal operating conditions can affect the performance of RID with scintillation detectors such as NaI(Tl) and LaBr₃:(Ce). Dramatic temperature variations can affect the scintillation detector and/or the PMT and can also cause instabilities and non-linearities in the electronics. In addition, high count rates can impact the peak position in a spectrum. The radHUNTER instruments have been developed to correct all these circumstances through automatic calibration and continuous LED stabilization.

- Rapidly determine the primary location of the radiation
- Determine the nuclide identification in as little as a few seconds
- Alarms on doserate changes above background
- Continually stabilizes for temperature and other conditional changes
- Real time visual, audible and tactile alarm annunciators
- Reach-back via Ethernet with event data
- Easy operation with hazmat gloves
- Radionuclide-specific indicators
 - Personal Hazard: All 4 LEDs blinking
 - Threat: Blinking red LED, tactile & audio
 - Innocent: Green LED on
 - Suspicious: Blinking yellow LED, tactile & audio
- Radionuclides are labeled as NORM, industrial, medical or SNM
- Expert mode
 - Gamma spectrometer functions
 - Change settings and operational parameters

SPECIFICATIONS

Product Variants

- *A radHUNTER ULCS-NG
- *B radHUNTER ULCS-NGH
- *C radHUNTER ULMN-NG
- *D radHUNTER ULMN-NGH
- *E radHUNTER UL-LGH

Detectors

Gamma NaI *(A, B, C, D)	Crystal size 102 mm (4.02 in) × 19 mm (0.75 in)
Gamma LaBr ₃ *(E)	Crystal size 38 mm (1.50 in) × 38 mm (1.50 in)
Neutron ³ He Proportional Counter Tube *(B, D, E)	19 mm (0.75 in) × 106.7 mm (4.20 in); net: 18 mm (0.71 in) × 75.7 mm (2.98 in); 8 atm (8.106 bar)
Gamma (High Dose Rate)	Geiger-Müller detector
GPS	12-channel SiRF III receiver

Calibration

Internal Source *(A, B)	¹³⁷ Cs; 25 nCi (925 Bq)
Internal Source *(C, D)	⁵⁴ Mn; 80 nCi (2960 Bq)

Performance

Energy Range (Gamma)	20 keV – 3 MeV
Throughput	200 kcps
Max. Input Count Rate	300 kcps
Sensitivity (¹³⁷ Cs)	>2900 cps per μSv/h
Corrections	Real-time linearization of gamma spectrum
Gamma Spectrum	1024 channels; 3 MeV
Dose Rate Range	0.000 μSv/h – 10.00 mSv/h
dto. Scintillator	0.000 μSv/h – 50 μSv/h
dto. Geiger-Müller Detector	10 μSv/h – 10.00 mSv/h
dto. Overload	10 mSv/h – 100 mSv/h
Dose Range	0.000 μSv – 1 Sv
Neutron Sensitivity *(B, D, E)	9 cps/nv ±15 %
Stabilization	Calibration source; LED; ±1 % for temperature change rate of
Nuclide Identification	According to ANSI N42.34
Typical Resolution *(A, B, C, D)	8 % FWHM at 662 keV at 20 °C (68 °F) ambient temperature
Typical Resolution *(E)	3.5 % FWHM at 662 keV at 20 °C (68 °F) ambient temperature

Service

Recommended Interval	Annual
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Physical

Dimensions (W × D × H)	129 mm (5.08 in) × 212 mm (8.35 in) × 323 mm (12.72 in)
Weight *(A, B, C, D)	2900 g (102.29 oz) including batteries
Weight *(E)	2460 g (86.77 oz) including batteries
Housing Material	Aluminium

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Environmental

Operating Temperature	-20 °C – +55 °C (-4 °F – +131 °F)
Storage Temperature	+10 °C – +35 °C (+50 °F – +95 °F)
Temperature Change	Sudden temperature change must not exceed 30.0 °C (54.0 °F) in order to avoid damage to the detector crystal
Relative Humidity	10 % – 80 %, non condensing
Shock Resistance	According to ANSI N42.34
Protection Rating	IP54 according to IEC 60529

Battery

Type	FLIR powerPACK ultra 2 (LSD NiMH, rechargeable)
Capacity	2500 mAh; 4.8 V
Operating Duration	≥8 h at 20 °C (68 °F) in dose rate mode with dimmed display back light and GPS switched off
Charging Duration	≤4 h at 20 °C (68 °F) when instrument off and connected to DC power charger and >4 h when powered via USB.
Quiescent Current	16.5 µA typically

Display

Type	Transflective color LCD
Size	68.4 mm (2.69 in); 320 pixel x 240 pixel
Central Luminance	400 cd/m ² typically

Annunciators

Blue LED *(B, D, E)	Neutron detection and alarm
Red LED	Gamma alarm
Orange LED	Charging batteries
Green LED	External power
Vibrator	Alarm reporting
Beeper	Keyboard feedback and alarm reporting

Memory

Data Storage Capacity	2 GB internal memory; 1800 MB available for the user
Identifications incl. Spectrum	≈600000
Data Logging Every 5 s *(A, C)	≈5 years
Data Logging Every 5 s *(B, D)	≈2.5 years
Screenshots	≈2500
Alarms	≈1000000

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Input/Output

USB	USB 2.0; mini-B socket
Bluetooth	Class 2.0; ≤10 m (32.81 ft) range

Software

Embedded Software	Microsoft Windows CE Operating System
Web Interface	TCP/IP emulated via USB
Download File Formats	ANSI N42.42 and spc files compatible with third-party analysis software applications such as GADRAS, Cambio, or PeakEasy
Reachback	ANSI N42.42 data via Bluetooth to DUN compatible cell phone
STRIDE Data Protocol	STRIDE Data Protocol for network integration

Accessories

DC Power Adapter, Charger	AC in: 110 V – 230 V; 50 Hz – 60 Hz; DC out: 5 V; 2 A
Carrying Case	Included
Replacement Battery	FLIR powerPACK 2 for 4 AA batteries
Connection Cable	Mini USB-B – USB-A

Standards

ANSI N42.34	Performance Criteria for Hand-Held Instruments for the Detection and Identification of Radionuclides
IEC 62327	Radiation Protection Instrumentation - Hand-Held instruments for the detection and identification of Radionuclides and for the indication of ambient dose equivalent rate from Photon Radiation
IEC 60529	Degrees of Protection Provided by Enclosures (IP Code)
UL 61010-1, Part 1	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, 2005
EMC - Directive 2004/108/EC	Regulations concerning electromagnetic compatibility
ANSI N42.42 2006	Data format standard for radiation detectors used for Homeland Security

