

SPECTROSCOPIC RADIATION MEASUREMENT AND UHF RFID TAGGING HANDHELD INSTRUMENT

RADHAND 600 PRO

MAIN FEATURES

- Spectroscopic radiation measurement and UHF RFID tagging combined in a single instrument
- High dose rate capability with a single detector
- Rugged IP65 rated case
- Easy system integration and remote operation and configuration with standard web browser
- Embedded UHF RFID reader for storage of information in selected rad tolerant UHF RFID tags
- Embedded 1D-2D barcode scanner for backward compatibility with previous tagging systems
- Embedded camera and voice notes for unambiguous description of the measured items
- Optional external smart probes for additional capabilities such as high-resolution gamma spectroscopy, neutron and alpha/beta detection

DESCRIPTION

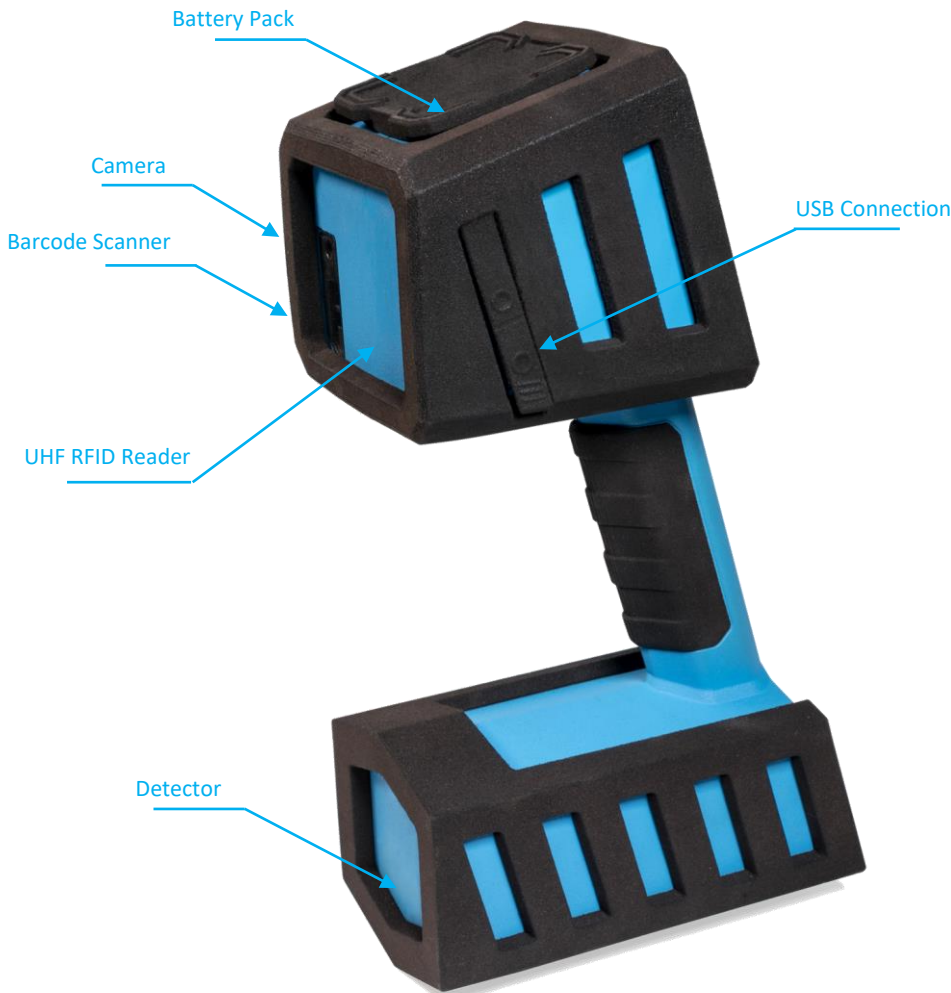
RadHAND 600 PRO is a novel handheld instrument able to combine, for the first time, state-of-the-art spectroscopic radiation measurements with scintillation detectors and UHF RFID technology for easy tracking of the measured items.

Specifically designed for operating in applications such as Nuclear Power Plants, Decommissioning & Dismantling, Nuclear Fuel Cycle, Nuclear Waste Management and Radioprotection, the **RadHAND 600 PRO** helps the operator fully characterize and track objects, surfaces, radioactive waste bags, drums, large boxes and any type of item that could be produced and measured in these activities.



Being part of the CAENSYS **DigiWaste** platform, the device can insert measured data and sample information into a central database and, at the same time, write the main information in the memory of selected rad tolerant RFID tags that are part the CAENSYS **RadRFID** family.

The **RadHAND 600 PRO** enables the operator to detect and identify the gamma and optionally neutron radiation on a specific item for waste analysis and radioprotection applications. As soon as the acquisition is completed, the device stores the data in its internal memory together with the object description and detailed sample information including an image and a operator voice note. It also writes the most important data into rad tolerant, UHF RFID tags able to sustain a radiation dose up to 100 Gy. In addition, the tag's permanent ID allows for an easy and reliable identification of the tagged items, being objects, surfaces to be cleaned up, waste bags, boxes or drums.



All of the information can also be stored in a central management database that operators can access both locally with CAENSYS RadREAD devices or remotely via dedicated web service at any time.

Date	Operator	D.P. (s/n)	Prod Time (s)	Live Time (s)	CPS	Radlevel	GPS
06/01/2020	240	117,263	111,837	34,800	80643,672010162	2200 (d2) 2200 (d2) 2200 (d2) 40K (d0)	47,70086 2,011460
06/01/2020	250	91,237	209,958	191,477	12964,676024247	100 (d0)	47,70086 2,020200
06/01/2020	248	11,986	137,29	38,400	27262,220000000	2200 (d2)	47,70086 2,016800
06/01/2020	231	248,243	320,79	207,764	3428,4088177221	2200 (d2) 40K (d1) 2200 (d2) 100 (d1)	47,70444 2,016807
06/01/2020	188	218,643	104,160	31,274	15360,807746607	1000 (d0) 2200 (d0)	47,70444 2,011461
06/01/2020	303	733,880	274,910	191,746	2508,401008000	2200 (d2) 2200 (d2) 2200 (d2)	47,70444 2,024200
06/01/2020	221	111,395	103,216	105,452	30020,380013504	1000 (d0) 100 (d1) 100 (d1) 100 (d1)	47,70444 2,012000
06/01/2020	170	205,188	150,802	30,301	6016,800776420	100 (d0) 2200 (d2)	47,70444 2,016803
06/01/2020	303	12,274	17,12	0,273	17,15410161173	100 (d0)	47,70444 2,014100
06/01/2020	250	488,428	188,094	91,128	1676,800467710	800 (d1)	47,70444 2,016807
06/01/2020	248	208,211	105,544	105,206	674,4712020002	2200 (d2) 40K (d1)	47,70286 2,023700
06/01/2020	67	118,838	120,968	114,213	2267,70200795	750 (d0)	47,70286 2,020901
06/01/2020	188	806,028	111,685	18,031	6006,200004713	2200 (d2) 2200 (d2)	47,70286 2,024807
06/01/2020	170	70,478	120,000	110,506	40238,710020000	750 (d0) 100 (d1)	47,70286 2,026807
06/01/2020	250	650,809	268,307	219,190	1504,300015020	1000 (d0) 2200 (d2)	47,70444 2,016804
06/01/2020	248	219,462	48,89	38,289	28018,10072001	2200 (d2) 2200 (d2) 100 (d1) 100 (d1) 100 (d1)	47,70286 2,020901
06/01/2020	67	68,483	105,384	138,28	28018,10072001	2200 (d2) 40K (d1) 750 (d0) 100 (d1) 100 (d1) 100 (d1)	47,70286 2,016809
06/01/2020	248	62,109	108,663	118,033	6231,200401010	800 (d1) 2200 (d2) 2200 (d2) 1000 (d0) 100 (d1)	47,70286 2,020901
06/01/2020	221	712,281	244,4	194,204	41488,021010401	100 (d0) 2200 (d2) 2200 (d2)	47,70286 2,020210
06/01/2020	170	601,264	327,998	208,115	22612,200001995	100 (d0) 2200 (d2) 2200 (d2)	47,70286 2,020901
06/01/2020	170	448,017	148,807	138,802	6205,600077102	100 (d0) 100 (d1) 100 (d1) 100 (d1) 100 (d1)	47,70286 2,016809
06/01/2020	221	442,288	224,752	203,40	34662,07010117	100 (d0)	47,70286 2,024215
06/01/2020	248	418,818	311,130	276,767	59662,401070010	2200 (d2) 2200 (d2)	47,70444 2,016809
06/01/2020	188	206,746	308,464	278,207	31010,200004007	1000 (d0)	47,70286 2,020901
06/01/2020	188	38,407	374,037	201,876	1217,010070042	1000 (d0)	47,70286 2,016804
06/01/2020	170	417,016	117,136	100,802	47327,01010071	2200 (d2) 100 (d1)	47,70286 2,020907
06/01/2020	67	60,114	100,170	90,206	60464,000100000	2200 (d2) 2200 (d2) 800 (d1)	47,70286 2,024214
06/01/2020	248	120,620	294,452	218,016	6208,200000040	100 (d0) 800 (d1) 2200 (d2)	47,70444 2,012002
06/01/2020	67	208,207	222,618	208,403	34611,110000010	2200 (d2) 100 (d1) 100 (d1) 100 (d1) 2200 (d2)	47,70286 2,016802
06/01/2020	170	119,037	208,428	167,031	4641,201011100	100 (d0) 2200 (d2) 800 (d1) 800 (d1)	47,70286 2,026801
06/01/2020	188	908,9	200,207	130,904	17103,000000010	750 (d0) 100 (d1) 100 (d1) 100 (d1) 40K (d1)	47,70286 2,024215
06/01/2020	170	218,012	112,009	130,902	12057,000100000	2200 (d2) 750 (d0) 40K (d1) 2200 (d2) 2200 (d2)	47,70286 2,016803
06/01/2020	248	41,302	178,007	102,23	9807,201010000	40K (d0) 100 (d1)	47,70444 2,024211
06/01/2020	170	174,408	101,147	100,808	7704,000000000	2200 (d2) 100 (d1) 100 (d1)	47,70444 2,024214
06/01/2020	221	80,12	226,207	221,763	11084,000000010	40K (d0) 2200 (d2) 800 (d1)	47,70286 2,024214
06/01/2020	67	501,101	95,752	75,943	13727,01000107	100 (d0)	47,70286 2,016800
06/01/2020	67	107,947	108,208	174,408	28861,000000000	750 (d0) 40K (d1) 800 (d1)	47,70286 2,020900
06/01/2020	221	60,162	208,107	101,888	6001,100017476	2200 (d2) 40K (d1) 2200 (d2) 100 (d1) 100 (d1)	47,70286 2,016805
06/01/2020	188	44,808	101,827	100,902	14461,000022000	100 (d0) 40K (d1) 40K (d1) 100 (d1) 100 (d1)	47,70286 2,020901
06/01/2020	67	412,883	105,869	201,448	12128,0767000	2200 (d2) 800 (d1) 800 (d1)	47,70286 2,011200
06/01/2020	67	611,766	103,001	104,704	63101,200004000	100 (d0) 100 (d1)	47,70286 2,020901
06/01/2020	188	173,64	106,79	106,001	10142,701010000	800 (d0) 40K (d1) 100 (d1) 2200 (d2) 2200 (d2)	47,70286 2,016800

Central Management Database containing all the information produced by the operators

OPERATING SCENARIOS

Waste Digitization

- Dose Rate meter
- Identification of radioactive sources, contaminated objects and hotspots for waste analysis and radioprotection in dismantling and decommissioning applications
- Possibility for quantitative analysis in predefined geometries
- UHF RFID tagging of the measured items and storage of most sensitive data in RFID tag
- Full description of measured items and transmission of data to remote database

Waste Storage

- Survey and tracking of waste until final disposal

Radiological Mapping

- Combination of radiometric measurements and GPS information for geo-referenced mapping

Radioprotection patrols

- Periodic control of spots and check points and update of measurements

Nuclear transportation

- Measurement and tracking of medical and industrial radioactive items from production site to end user

Large Surface Measurement

- Characterization of large surfaces and deployment of RFID tags according to user defined surface meshing

CAENSYS DIGIWASTE PLATFORM

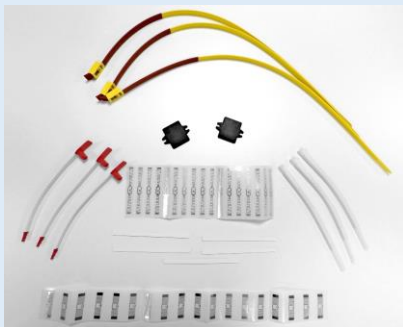
RadHAND 600 PRO: Spectroscopic radiation measurement and UHF RFID tagging handheld instrument



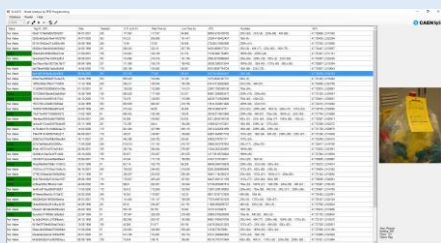
RadREAD: Stand alone, ruggedized portable UHF RFID reader family



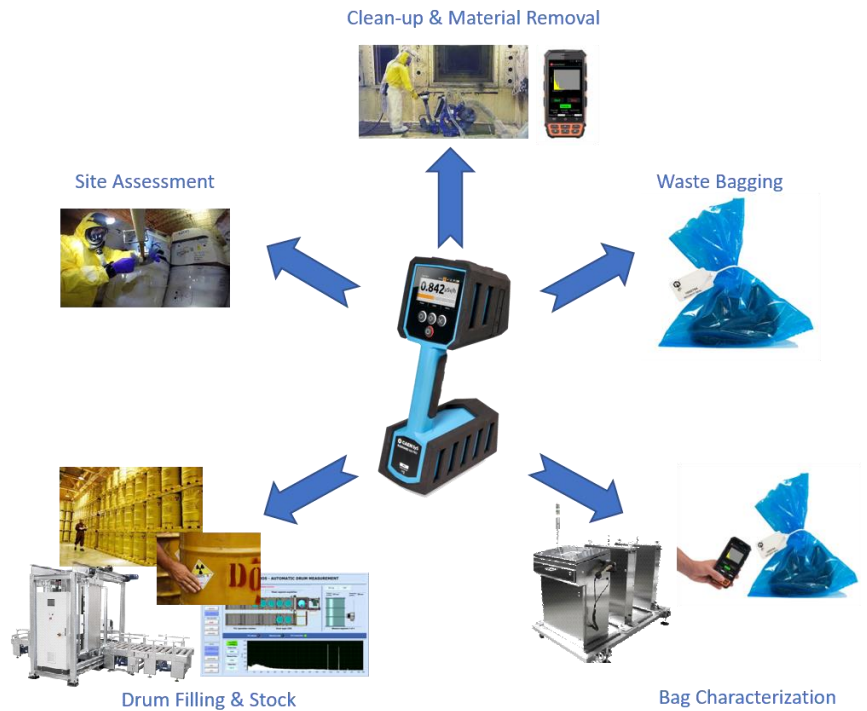
RadRFID: Rad tolerant UHF RFID tag family



RadBASE: Easily customizable management database framework



By analyzing the data stored in the database, it is easy to retrieve all the information and create on-the-fly reports, track and inventory the RFID-tagged items all along the operational process, assign specific instructions and tasks to specific operators, select and group waste containers according to their properties and measured activities, continuously monitor the waste and update the related data, issue early warnings in case of leaks, fully characterize a new site and create interactive mapping of the identified sources and much more.



RadHAND 600 PRO is designed to operate in all the steps of D&D and waste management processes

A suite of additional external probes able to be controlled by **RadHAND 600 PRO** via USB will also be available. The probes include: CZT for high-resolution gamma spectroscopy, neutron detectors and ZnS for alpha/beta detection.



RadHAND 600 PRO mounted on tripod for fixed measurements can be remotely controlled via web interface

TECHNICAL SPECIFICATIONS

Gamma Detectors

- Gamma: 51 x 51 mm (2"x2") NaI(Tl)
- Gamma: 76 x 25 mm (3"x1") NaI(Tl)

Radiation Measurement Performance

- Energy range (Gamma): 10 keV - 10 MeV (2"x2" NaI(Tl))
- Linearization: Real-time linearization of gamma energy
- Dose rate range: 0.01 - 1,000 $\mu\text{Sv/h}$ (0.001 - 100 mrem/h)
- Dose rate overload range: 1,000 - 1,000,000 $\mu\text{Sv/h}$ (0.1 - 100 rem/h)
- Maximum exposure rate: 500 mSv/h (50 rem/h)
- Stabilization: Sourceless gain stabilization (patent pending)
- Identification: Detection and nuclide identification performance exceeds all requirements
- Nuclide library: per customer requirements
- Library categories: SNM, IND, MED, NORM
- Typical resolution: 6.5 % FWHM at 662 keV with 2"x2" NaI(Tl) detector at 20 °C
- Maximum input count rate in identification mode: 1 million cps (Cs-137)
- Gamma sensitivity: 1,850 cps/ $\mu\text{Sv/h}$ (Cs-137)

Physical

- Dimensions (W x L x H):
310 x 168 x 108 mm³ (2"x2" NaI(Tl))
335 x 175 x 117 mm³ (2"x2" NaI(Tl))
- Weight: <2 kg (2"x2" NaI(Tl))
- Housing material: plastic

UHF RFID Reader

- Multi-Regional Support
- ETSI or FCC compliant versions
- EPC C1 G2, ISO 18000-6C Compliant
- Output power up to 500mW (27dBm)
- Read Range 1.5m (typical)

Barcode Scanner

- 1D-2D imager

Color Camera

Environmental

- Operating temperature: -10 °C to 50 °C (14°F to 122°F)
- Relative humidity 85% at 20°C and non-condensing conditions
- Protection rating: IP65
- Tests according IEC 62706: Drop, vibration, mechanical shock, electrostatic discharge, radio

frequency immunity, RFID ETSI EN 302 208 v. 1.4.1. (EU) FCC part 15.247 (US)

Battery

- Type: Secure Li-Ion battery pack
- Operation time: 8h in dose rate mode with dimmed back light and GPS switched off at 20°C

Display

- Type: Blanview TFT-LCD
- Size: 69 mm x 41 mm (2.72" x 1.61")
- Resolution: 800 pixels x 480 pixels

Input/Output

- 2x USB 2.0; micro-AB socket
- Bluetooth Class 4.0
- WLAN WiFi 802.11 g/n

Software

- Functions: dose rate, identification, RFID read/write, barcode read, record audio description, take color pictures
- Remote operation via web-interface
- File Formats: ANSI N42.42 compatible with third-party analysis software applications such as GADRAS, Cambio, or PeakEasy
- Internal Data Storage: 32 GB
- Data sharing: Synchronization with external database

Position

- GPS for outdoor positioning

RFID Tags

- CAENSYS RadRFID: Up 100 Gy rad tolerant UHF RFID tag family

Accessories

- Rugged carrying case
- Lanyard carrying strap
- USB charger
- Micro-B socket USB cable
- Battery adapter
- Tripod for fixed measurements

External Probes

- USB connectable external probes: CZT for high resolution gamma spectroscopy, Neutron detectors, ZnS for alpha/beta

Ordering Codes

RadHAND600PRO-22-NaI RadHAND 600 PRO with 2"x2" NaI(Tl) scintillation detector
RadHAND600PRO-31-NaI RadHAND 600 PRO with 3"x1" NaI(Tl) scintillation detector



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