

ORTEC[®]

Detective-200™

Ruggedized, Ultra-High-Sensitivity, Transportable
HPGe Radionuclide Identification System



“No other radiation instrument has more standoff nuclide identification performance in a small rugged package.”

AMETEK[®]

Detective-200™

- Greatly increased sensitivity, (3x more sensitive than Detective and Micro-Detective models).
- Much faster to identify.
- More rugged, compact, IP67 standard stackable package.
- “Gold Standard” identification performance.
- Detective-Remote™ software package; easy integration of multiple Detective-200s into highly sensitive systems, for use in a variety of security situations:
 - On the ocean (maritime interdiction at sea)
 - On land (vehicle mounted search)
 - In the air (aerial search)
 - Static applications on highways, public events, incident triage
- The high flexibility of the many possible configurations allows matched response to changing security needs.
- Wireless Mobile MCB Server software.



Introduction

The Detective-200 is a member of the ORTEC Detective product family, whose members represent the “Gold Standard” of gamma-ray-emitting radionuclide identifiers, and are deployed to prevent the illicit trafficking of nuclear materials by security authorities globally.

With the Detective-200, the range of applicability of these instruments is greatly broadened by increased sensitivity and ruggedness. Key features and benefits include:

- Large Area HPGe Detector (~5675 sq mm) gives definitive identification of illicit nuclear materials (SNM) in seconds.
- 10 times faster to identify HEU than a "conventional" NaI based identifier.
- Built-in removable 120° collimator reduces background interference in field of view.
- IP67 waterproof, dustproof, and shock resistant packaging. It actually floats in water.

Detective-200 in Wide Area Search applications (Land and Air)

In these non-maritime applications, Detective-200s are easily installed into unmodified vehicles, cars, vans, and aircraft for mobile detection applications at higher speeds and larger distances. Additional Detective-200s are easily added into the system for increased sensitivity. The data can be combined by the Detective-Remote software utility. Multiple Detective-200s are easily stacked vertically.

In another class of application the instrument system is stationary and the potential source is moving, such as traffic choke point monitors (toll booths, bridges, tunnels), monitoring entry to a public event, monitoring road traffic or ships passing beneath a bridge structure. The measurement is essentially the same.

The configurability of the Detective-200 solution in both mobile and static applications is a practical benefit which cannot be over-emphasized as requirements constantly change.



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Detective-200 in Maritime applications

- “Slow Pass” Materials interdiction

Detective-200 is very well suited for mounting on naval vessels. The IP67 packaging is immune to salt spray. The tough fold-flat handles make it easy to lift and mount aboard a vessel, or transport from vessel to vessel.

A ship-borne Detective-200 system consisting of one or more instruments, controlled through wired or wireless networking via Detective-Remote, is capable of reliably detecting illicit materials on a nearby vessel in a slow “sail by” measurement. Figure 1 shows an example of sensitivity for unshielded HEU at representative speeds and distances for multiple units of Detective-200s.

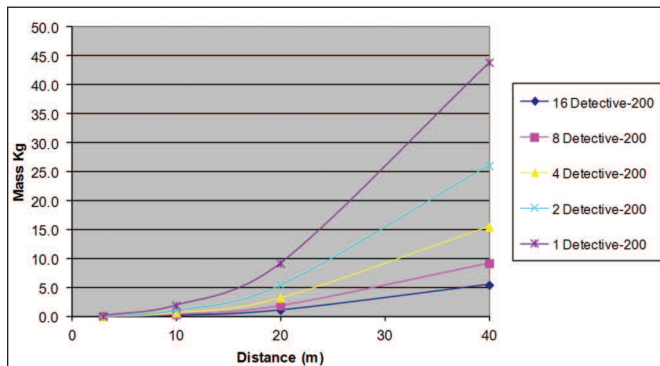


Figure 1 Marine Bare HEU detection limit (kg) >95% detection possibility, false alarm rate <1/20 hrs, 5 MPH speed.

Choke Point Monitoring

Because of the lack of 100% coverage with fixed traffic portal monitors, it is desirable to be able to quickly setup and configure temporary or "ad-hoc" portal systems capable of monitoring for nuclear devices, dirty bombs, or contaminated materials in pass-through traffic. One or more Detective-200s can be placed inconspicuously at a roadside, pedestrian entryway, vendor services entrance, warehouse dock, or parking garage. The Detective-200 internal battery power and “Auto Identification” reporting provides simple deployment and operation.

Figure 2 provides estimated performance of multiple units of land-based Detective-200s at 10 MPH and distances, up to 40 meters with the same alarm conditions as figure 1.

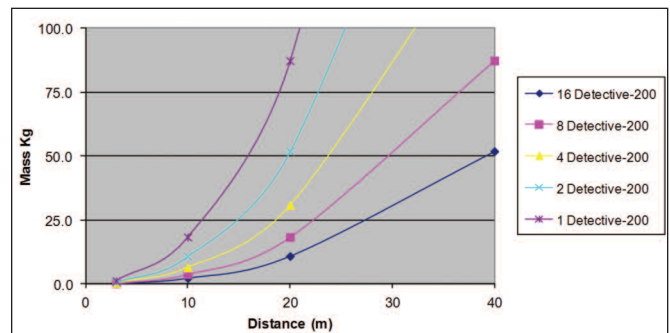


Figure 2 Bare HEU detection limit (kg) >95% detection possibility, false alarm rate <1/20 hrs, 10 MPH speed.



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Standoff Detection

Standoff detection is the problem of correctly identifying a distant stationary or near stationary radioactive source. The standoff detection limit is essentially a question of signal-to-noise ratio in the detection system. As distance increases, gamma rays are attenuated by air and a fixed field of view means at further distances more background is in the field of view of the source. Both of these affects reduce the signal-to-noise ratio. As with other applications in low resolution systems, background variation is problematic. The high resolution of the Detective-200 and its large area detector make it an ideal standoff tool either alone or in an array. Figure 3 shows the time to identify 2.5 kg of Bare HEU with a >95% probability of detection and <1 false alarm per 20 hrs. (Note that a critical mass of HEU is approximately 50 kg.)

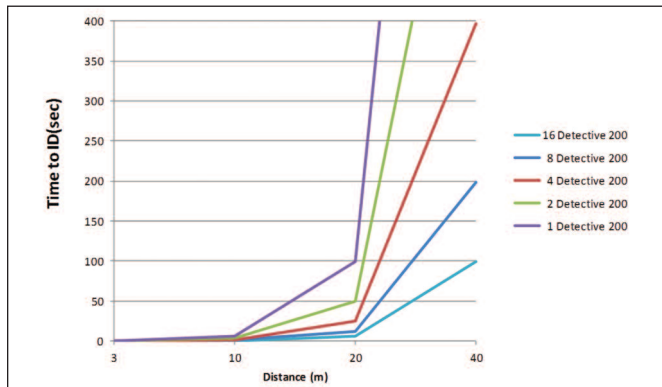


Figure 3 Time to identify and detect 2.5 kg of HEU as a function of distance: marine.

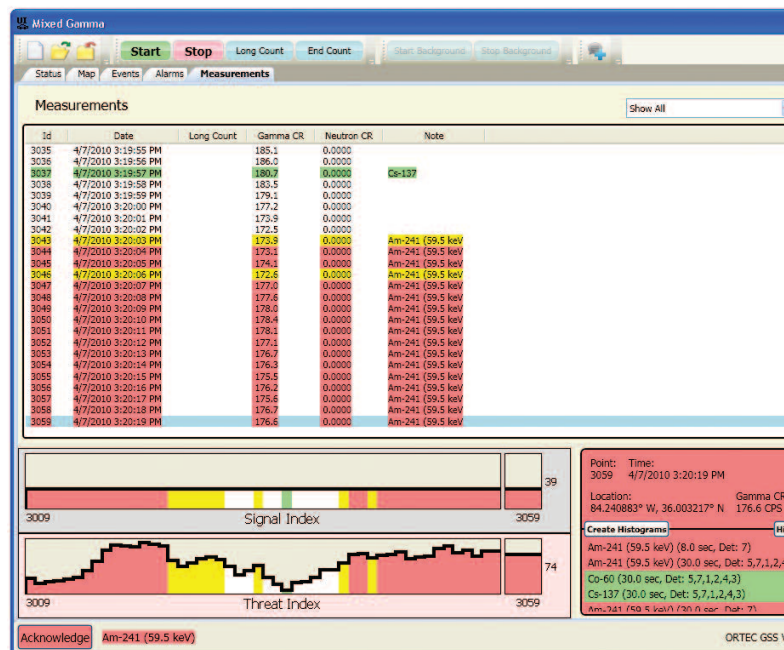
IMPORTANT NOTE: The effect of Collimation on System Performance

In all of the applications discussed, the time-to-detect or limit-of-identification may be adversely affected by radiation background, which degrades counting statistics and therefore degrades (raises) the minimum detectable (identifiable) nuclide activity. Background can be reduced by restricting the field-of-view (FOV) of the detection system by the use of a shielding collimator. The example data presented in figures 1, 2 and 3 above assume a collimated FOV of 120°. The optimum collimation depends on the measurement speed, distance and then radioactivity of the environment to be encountered. The overall effectiveness of the system depends on the number of Detective-200s and the choice of collimation. ORTEC scientists are happy to provide advice on the most effective configurations.

Detective-Remote Software

Detective-200 is fully supported by the latest versions of the Detective-Remote software. Detective-Remote is a Windows-based application which “combines” the identification capabilities of multiple Detective-200s and controls them remotely over direct-connect USB or remotely over wireless LAN. Detective-Remote supports one or more Detectives as participants in a multi-detector system, providing the ability to combine multiple instruments into a composite system, based on multiple “nodes.” By sophisticated techniques (NOT simple spectral summing) the composite system can operate as if it was a single large detector with some positional sensitivity. In contrast to an actual single large detector, contributing Detective-200s which “see” no nuclide ID signal can be temporarily ignored, along with their background contribution, thereby enhancing signal-to-noise in the composite signal compared to a single large detector (as is the case in the NaI “LOGS” often deployed in scintillation detector mobile systems). Detective-Remote software also supports not just Detective-200s, but Detectives of any size or model, and any combination can be used. Data are gathered by Detective-Remote in LIST mode and individual spectra are stored in the localized database and can be exported into other applications such as spreadsheets, GIS applications, or reporting software.

“No other nuclide identification instrument provides such sensitivity and accuracy in such a rugged and flexible package.”

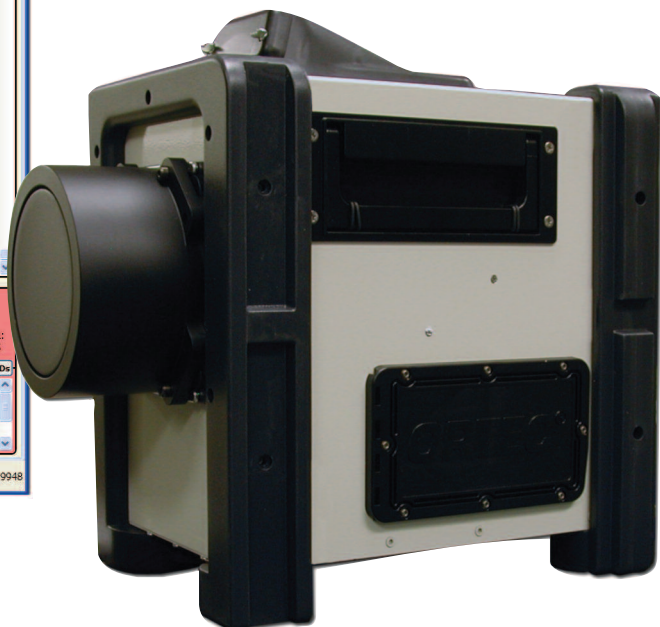


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Detective-200 Hardware Features

Since the first model was introduced in 2004, all ORTEC Detective identifiers have incorporated the same principle technologies and features, namely:

- High-resolution, high-purity germanium (HPGe) detector.
- Mechanically cooled by miniature Stirling-cycle refrigerator.
- Internal high range GM tube provides gamma dose rate.
- Fast, Simple and ULTRA-Reliable Classification of NORM, Medical, Industrial, SNM and Natural Isotopes, shielded and unshielded.
- Touch Screen or Remote Software Operation.
- ANSI N42.34 and ANSI N42.42 compliant.
- Battery/AC/DC powered, highly stable digital electronics.
- Wired USB, 802.11 wireless communications.
- Local storage of spectra.
- Advanced analysis algorithms developed over thousands of real-world identification situations:
 - Low levels of false alarms in the presence of NORM
 - High-fidelity identification of mixture constituents
 - Resistance to “spoofing” by masking sources
 - Immunity to variation in background radiation
- Easy-to-use through intuitive, touch-sensitive screen GUI with operational modes configurable according to individual CONOPS, including long count mode for weak/distant sources.
- Neutron detecting models.



Detective-200 Operational Capabilities

SEARCH MODES: Gamma count rates are presented as a time tracking strip chart.

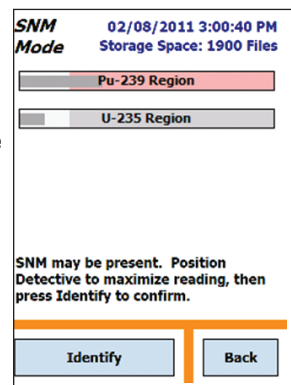
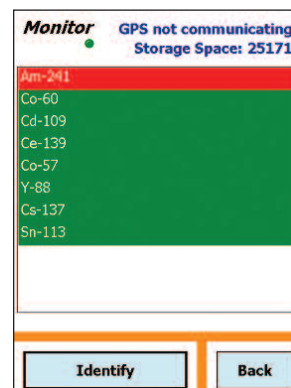
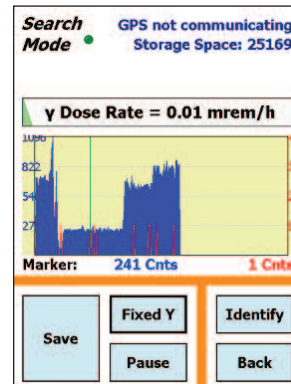
MONITOR MODE: Detective collects one spectrum per second and runs the ID algorithm against an eight second sliding average. More sensitive to sources which move relative to the instrument. Monitor mode is a valuable search method, but is also useful in ad-hoc portal monitoring applications.

SNM Search Mode: SNM Search mode is designed to help avoid false negatives when determining SNM. It helps in finding the point of maximum count rate which COULD be consistent with SNM.

Key regions of the spectrum are monitored which are critical to the determination of both U-235 (the key constituent of HEU) and Pu-239. The peak region confidence level is displayed in the form of a bar graph. A high and steady reading indicates that "something" is present which is worthy of more investigation. Once the maximum reading has been located, the "confirm" key initiates the full identification algorithm.

SNM Search mode is an INDICATOR of SNM but should always be followed by the confirmatory ID to avoid false positives. In combination, SNM Search and ID modes minimize BOTH false negatives and false positives.

GAMMA DOSE RATE: Gamma Dose Rate is monitored by the HPGe detector and by an internal compensated GM tube. The dose rate is displayed at all times. Dose rate units may be chosen as $\mu\text{Sv/hr}$ or mR/hr .



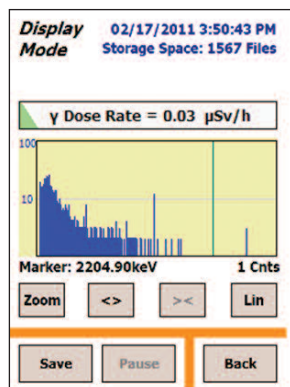
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GPS Position Information: An internal GPS receiver displays GPS coordinates which may be saved along with spectrum data for future use.

Storage of Data (spectrum, search data, ID results): To internal RAM and removable SD card.

Computer Interfacing: USB connection to laptop. Spectral transfer by Microsoft® ActiveSync. Remote control via Microsoft "remotedsp.exe" (supplied). WiFi (802.11) communication. Wireless Mobile MCB Server software.

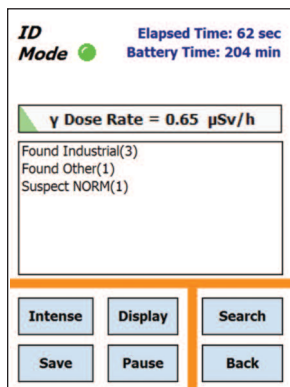
Display: Features a large, bright and clear LCD display with touch-sensitive screen. Gamma count rate and gamma dose rate are displayed continuously both numerically and in bar graph form. Menu navigation is highly intuitive. The radionuclide gamma-ray spectrum may be displayed and manipulated (e.g., vertical scale, zoom) like a conventional multichannel analyzer. Y-axis units are now displayed.



Operating Modes

In response to customer requests, Detective instruments can now operate in two modes "Classify" and "ANSI".

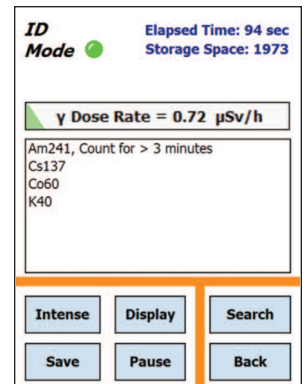
Classify Mode: The user presses the Identify button and the instrument gathers data until manually stopped, without preset. During the acquisition, suspected nuclide classification messages appear, such as "Suspect Industrial 1", meaning the presence of one industrial nuclide is suspected. As the count continues and confidence levels increase, this might change to "Found Industrial 1" or disappear as better statistics determine the previously suspected nuclide was not, in fact, present. Clicking on the "Found" or "Suspect" message gives a listing of which nuclides were actually found (or suspected) by name.



ANSI Mode: This mode is similar to classify mode, but dispenses with the classification, and presents nuclide names directly, both suspect and found.

Preset Time: This is to allow for CONOPS in which it is required to count for a preset time, for example 60 seconds. At the end of the preset period, only what has been found is reported, no suspects are reported. The operator can request a count time extension, if desired, adding multiples of the original preset period.

LCX (Low-Confidence Expert) ID Mode: LCX mode is password protected. LCX denotes "Low Confidence-Expert," and is intended for expert users. This identification mode displays suspected threat alarms and identifications at a lower confidence level than the normal mode. This results in more hits on suspected threat nuclides.



Instrument Calibration: The instrument is calibrated prior to shipment from the factory. The energy calibration may be checked and adjusted with any known source with a clean gamma ray between 0 and 3 MeV. A higher energy is recommended. Cs-137 is often used. Calibration can be manual or automatic. Background collection is now a required part of calibration. By allowing for activities already in the background, the system will no longer report nuclides detected in the background. These IDs on former versions sometimes lead to user-confusion. The background must be updated on a schedule which is chosen by the privileged user.

SMART Stabilizer: The "smart stabilizer" stabilizes the gain very precisely on the 1460 keV peak of K-40, if present. The smart part is that if there is no K-40 present or if Eu-152 is detected, which could interfere with the K-40 peak, the stabilizer setting is held but not adjusted until "normal" conditions return. Even though the Detective is a highly stable instrument, the smart stabilizer allows accurate determination of more complicated mixed spectra.

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Classify Mode Messages

The following explains the criteria for selected Classify ID Display Mode messages.

HEU (highly enriched uranium): This message is displayed if the major lines of uranium are detected and the ratios of the intensities of the lines indicates the U-235 content to be above about 70%.

Am241 (unshielded) in the "Industrial" category: This message is displayed if the 59 keV peak is located. It could mean that an Am-241 source such as a smoke detector is present. Move closer to the source and/or count longer. This will allow the higher-energy gamma rays to accumulate in the spectrum, in case plutonium is also present.

Unknown Peak and **Unknown/Beta Emitter**: This indicates the gamma count rate is higher than can be accounted for based on the peaks in the library. The implication is that either an unexpected nuclide or a beta emitter is present (beta emitters typically producing counts over a broad range of energies). Move closer to the source and count longer to determine the nature of the suspect item. If another ID is found, then the Unknown Peak or the Unknown/Beta Emitter ID are suppressed.

"Found Nuclide" Screen Messages

RDD Detected: This message is posted when estimated activity is >100 mCi, whether the activity is from threat or innocent nuclides. The gamma count-rate and dose-rate meters on the Survey Mode and ID Mode screens display a flashing red background and extremely high count and dose rates.

Classify Mode Primary ID Message Format

The form of the primary ID messages is:

"Found CLASS(#)" or "Suspect CLASS(#)"

where "CLASS" is

- Medical
- Industrial
- NORM
- Bremsstrahlung
- Other
- Nuclear Uranium
- Nuclear Plutonium
- Nuclear Neptunium

And "#" is the number of nuclides of that class identified.

Detective Library V8.5 radionuclides according to their categories in the "Classify" ID mode.

Medical	Be-7	Bremsstrahlung
F-18	Bi-212 (Th-232/U-232 daughter)	Beta emitter
I-125	Br-77	Other
Lu-177	Ca-47	Cr-51
Lu-177m	Cd-115	Cu-64
Mo-99	Ce-144	Eu-152
Pd-103	Cm-242	Gd-159
Se-75	Cm-243	La-140
Sm-153	Cm-244	Mn-54
Sm-153 (shielded)	Co-55	Neutrons on Fe
Tc-99m	Co-57	Neutrons on Hydrogen
Xe-133	Co-57 (shielded)	Unknown Peak
Ac-225	Co-60	Unknown/Beta emitter
As-74	Cs-134	Xe-131m
Ce-139	Hf-181	At-211
Ce-141	Hg-203	Bi-207
Co-58	I-126	Br-76
Ga-67	I-126 (shielded)	Br-76 (heavily shielded)
Ga-67 (shielded)	I-132	Br-76 (shielded)
Ge-68/Ga-68	I-133	Cd-109
I-123	I-134	Co-56
I-123 (shielded)	I-135	Co-56 (shielded)
I-124	Kr-87	Eu-154
I-131	Kr-88	Eu-155
I-131 (shielded)	Kr-88 (shielded)	Eu-156
In-111	Mn-52	Fe-59
Lu-172	Mn-56	Ga-64
Na-24	Nb-92m	Ga-64 (shielded)
Rb-83	Nb-94	Gd-153
Rb-86	Nb-95	Ho-166
Ru-106/Rh-106	Nb-96	Ir-194 (shielded)
Sc-46	Nb-96 (shielded)	Na-22
Sr-82/Rb-82	Nd-147	Neutrons
Sr-89	Pa-231	Os-194/Ir-194
Tl-201	Pb-203	Po-210
Tl-204	Pr-144	Sn-113
Tm-170	Ra-223	Ta-182
V-48	Rh-105	Tl-200
Xe-133m	Ru-103	Tl-202
Yb-169	Ru-97	Xe-135
Zn-62	Sb-124	Y-88
Zn-65	Sb-124 (shielded)	Nuclear Uranium
Zr-95	Sb-125	Enriched Uranium
Industrial	Sb-127	HEU
Am-241	Sr-85/Kr-85	U-232
Am-241 (unshielded)	Tc-96	U-233
Cs-137	Te-132	U-235
Ho-166m	Th-229	U-238
Ho-166m (shielded)	Th-230	186 keV peak present
Ir-192	Tm-171	2614 keV peak present
Ir-192 (shielded)	W-188/Re-188	Nuclear Plutonium
W-187	NORM	Pu-239
Ac-227	La-138	Pu-238
Ag-110m	Ra-226	375/414 peak present
Ar-41	Bi-214 (Ra-226 daughter)	Am-241 (shielded)
As-72	K-40	Nuclear Neptunium
Au-198	Lu-176	Np-237
Ba-133	Th-232	
Ba-140		

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ANSI Mode Messages

The table is divided according to the threat category used to determine ID background color in Monitor Mode and on the Found and Suspect Nuclide reports, e.g., green for innocent IDs, yellow for LCX-mode suspects, and red for threats. NB: if desired and under password protection, the color coding, and therefore the threat classification can be disabled.

ANSI Mode Messages Table							
Identification	Classification	Identification	Classification	Identification	Classification	Identification	Classification
Innocent		Eu-156Industrial	Na-24Medical	V-48Medical			
Ac-225Medical	F-18Medical	Na-92mIndustrial	W-187Industrial				
Ac-227Industrial	Fe-59Medical	Nb-94Industrial	W-188/Re-188.....Industrial				
Ag-110m.....Industrial	Ga-64Industrial	Nb-95Industrial	Xe-127Industrial				
Am-241 (unshielded)Industrial	Ga-64 (shielded)Industrial	Nb-96Industrial	Xe-131mMedical				
Ar-41Medical	Ga-67Medical	Nb-96 (shielded)Industrial	Xe-133Medical				
As-72Industrial	Ga-67 (shielded)Medical	Nd-147Industrial	Xe-133mMedical				
As-74Medical	Gd-153Medical	Os-194/Ir-194.....Industrial	Xe-135Industrial				
At-211Medical	Gd-159Industrial	Pa-231Industrial	Y-88Medical				
Au-198Medical	Gd-159Industrial	Pb-203Industrial	Y-91Industrial				
Ba-133Industrial	Ge-68/Ga-68Medical	Pd-103Medical	Yb-169Medical				
Ba-140Industrial	Hf-181Industrial	Po-210Industrial	Zn-62Medical				
Be-7Industrial	Hg-203Industrial	Pr-144Industrial	Zn-65Medical				
Beta emitterIndustrial	Ho-166Industrial	Ra-223Industrial	Zr-95Medical				
Bi-207Industrial	Ho-166mIndustrial	Ra-226NORM					
Bi-212 (Th-232/U-232 daughter)Industrial	Ho-166m (shielded)Industrial	Rb-83Medical	Suspect (LCX Mode only)				
Bi-214 (Ra-226 daughter)NORM	I-123Medical	Rb-86Medical	186 keV Peak PresentSNM				
Br-76Industrial	I-123 (shielded)Medical	Rh-105Industrial	2614 keV peak present—				
Br-76 (heavily shielded)Industrial	I-124Medical	Ru-103Industrial	375/414 Peak PresentSNM				
Br-76 (shielded)Industrial	I-125Medical	Ru-106/Rh-106Medical	375/414 Peak PresentSNM				
Br-77Industrial	I-126Industrial	Ru-97Industrial	Threat				
Ca-47Industrial	I-126 (shielded)Industrial	Sb-124Industrial	Am-241Weapon				
Cd-109Industrial	I-131Medical	Sb-124 (shielded)IndustrialIndicating				
Cd-115Industrial	I-131 (shielded)Medical	Sb-125Industrial	Am-241 (shielded)Weapon				
Ce-139Medical	I-132Industrial	Sb-127IndustrialIndicating				
Ce-141Medical	I-133Industrial	Sc-46Medical	Enriched UraniumSNM				
Ce-144Industrial	I-134Industrial	Se-75Medical	HEUSNM				
Cm-242Industrial	I-135Industrial	Sm-153Medical	NeutronsWeapon				
Cm-243Industrial	In-111Medical	Sm-153 (shielded)MedicalIndicating				
Cm-244Industrial	Ir-192Industrial	Sn-113.....Industrial	Neutrons CRWeapon				
Co-55Industrial	Ir-192 (shielded).....Industrial	Sr-82/Rb-82MedicalIndicating				
Co-56Industrial	Ir-194 (shielded).....Industrial	Sr-85/Kr-85Industrial	Neutrons on FeWeapon				
Co-56 (shielded)Industrial	K-40NORM	Sr-89MedicalIndicating				
Co-57Industrial	Kr-87Industrial	Ta-182Industrial	Neutrons on Hydrogen.....Weapon				
Co-57 (shielded)Industrial	Kr-87Industrial	Tc-96IndustrialIndicating				
Co-58Medical	Kr-88Industrial	Tc-99mMedical	Np-237SNM				
Co-60Industrial	Kr-88 (shielded)Industrial	Te-132Industrial	Pu-238SNM				
Cr-51Medical	La-138NORM	Th-229Industrial	Pu-239SNM				
Cs-131Medical	La-140Industrial	Th-230Industrial	U-232Weapon				
Cs-134Industrial	Lu-172Industrial	Th-232NORMIndicating				
Cs-137Industrial	Lu-176NORM	Ti-200Industrial	U-233SNM				
Cu-64Medical	Lu-177Medical	Ti-201Medical	U-235SNM				
Cu-67/Ga-67Medical	Lu-177mMedical	Ti-202Medical	U-238Weapon				
Eu-152Medical	Mn-52Industrial	Ti-204IndustrialIndicating				
Eu-154Medical	Mn-54Industrial	Tm-170Medical					
Eu-155Industrial	Mn-56Industrial	Tm-171Industrial					
	Mo-99Medical	Unknown Peak.....Unknown					
	Na-22Medical	Unknown/Beta emitterUnknown					

Detective-200™

Detective-200 Detailed Specifications Summary

OPERATION MODES

SEARCH Scanning mode for location of radioactive sources. Speed settings 0.1 to 50 seconds/point.

SNM Search Mode™ Nuclide-specific search mode for U-235, Pu-239 and neutron counts. Ba-133 surrogate detection may be turned on for training purposes. Bar graph display of nuclide confidence level. Aid to Identify mode.

MONITOR Mode The instrument collects one spectrum per second and runs the ID algorithm against an 8 second sliding average. This mode is more sensitive to sources which move relative to the instrument.

LCX "Low confidence Expert" Mode.

IDENTIFY Gamma Proprietary scheme for identification and classification of radionuclides. Background subtraction.

ANSI Mode: See nuclide list above.

Classify Mode:

Nuclides classified according to:

- Industrial**
- Medical**
- Natural (NORM)**
- Nuclear**

These classifications are based on an internal, fixed library according to ANSI N42.34. Customized libraries for specific applications can be supplied by special order.

Remote Mode Detective V3 instruments can participate as nodes within the Detective Mobile search system.

Dose Rate Visual over range indication and continuous audible alarm, user settable. Over-ride alarm at dose rates >10,000 $\mu\text{Sv/hr}$.

DETECTORS

Internal HPGe Detector

Crystal Nominal Dimensions: 85 mm diameter x 30 mm deep.

P-type high-purity germanium. Coaxial construction.

Cooler: High reliability, low power Stirling cooler. Cooler design life >5 years continuous running. Dual piston design, 1 W nominal lift at 100 K.

Digital Noise Suppression: "LFR Filter," ORTEC Patent Pending.

Gamma Dose Rate Detector Two detectors determine the gamma dose rate over a wide range from <0.05 $\mu\text{Sv/h}$ to >10000 $\mu\text{Sv/h}$, a dose-rate range of around six decades. For low dose rates, below ~20 $\mu\text{Sv/h}$, the dose rate is determined from the Ge detector spectrum. For dose rates above this value, the internal compensated GM tube is used. Instrument switches between the two automatically.

Dose rate uncertainty <(-50% to +100%); continuous audible alarm at dose rates >10,000 $\mu\text{Sv/h}$ (fixed maximum threshold), user settable threshold below this.

DIGITAL MCA AND DATA PROCESSOR

Display VGA 640 x 480 TFT sunlight readable, touchscreen, operate with finger or stylus.

Data Processor Marvel 806 MHz XScale.

Data Storage (Spectrum, Search Data, ID Results) To internal RAM and removable SD card.

Computer Interfacing USB connection to laptop. Spectral transfer by Microsoft® ActiveSync. Remote control via Microsoft "remotedsp.exe" (supplied). Wi-fi (802.11) communication software. Wireless Mobile MCB Server software.

GPS Internal NMEA compliant WAAS capable.

Digital MCA with Internal Storage of Multiple Spectral Data. "Smart" digital spectrum gain stabilizer.

Digital Noise Suppression LFR Filter.

Conversion Gain 8k channel.

Maximum Number of Stored Spectra Unlimited on removable media.

DISPLAYS AND MENUS

Main Screen

Gamma Count Rate Bar Graph 20 kcps full scale.

Dose Rate Bar Graph 10 mSv/hr full scale, flashes on over range.

Status Lines:

WARNING!! High Dose Rate — Displayed when Dose rate exceeds 10 mSv/hr.

Detector is Warm — Displayed when crystal temperature is above working limit.

Bias Supply Error — Displayed if any power supply is bad.

WARNING!! Low Battery.

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Search Mode (Gamma/Neutron) Dwell times 0.1–50 seconds per point. Over-range warning.

SNM Search Mode™ Nuclide-specific search mode for U-235 and Pu-239. Bar graph display of nuclide confidence level.

Identify Nuclide ID and classification.

"Intense" shows the most intense lines list, which is a continuously updating list of the 12 best peaks currently detected. The nuclides and energies are based on the internal nuclide library. The rank is based on the confidence value for the peak.

"Save" Saves the spectrum. Format choices: ORTEC ".CHN", ORTEC ".SPC" and ANSI N42.42.

"Display" brings up the spectral display. The spectrum may be manipulated via the arrow keys and various accelerator keys for cursor movement. Energy and channel contents are displayed with the spectrum.

Advanced Setup Password protected.

Calibration Check Manual or Automatic Calibration Check. Automatic may be triggered by interval or time of day. Instrument is supplied calibrated from factory.

View Data Acquisition Parameters Reports instrument status.

PHYSICAL SPECIFICATIONS

Maximum Overall Dimensions (including Ge detector end cap and shock absorbers) 42.72 cm L x 24.13 cm W x 38.7 cm H (16.82" L x 9.5" W x 15.24" H)

Weight 47 lb (21.32 kg).

Internal Battery Life Approximately 3 hours at 25°C when HPGe detector is cold, depending on battery condition. Battery lifetime may be extended indefinitely by the use of external battery packs which are available in "battery belt" formats.

Input Power 10 to 17 V DC from battery or DC power supply (universal mains supply included). Battery charger circuit is inside instrument.

Power Usage Greatest during cool down: <100 W. While charging battery: 5 A nominal. Cold with fully charged battery: <2 A.

External Power DC In and battery Charge In. MS3112E12-10-s or Bendix PT02E-12-10S connector.

Temperature

Operation Range: -10°C to 50°C.

Relative Humidity: 100% at 50°C.

Communications Ports

External Connectivity to System

- 1 SD (Secure Digital) card slot (3.3 V).
- 1 USB connection for "ActiveSync" capability or MCA operation with external computer (ActiveSync and remote display software included).
- WiFi 802.11 communication software.
- Wireless Mobile MCB Server software.

Cool Down Time The high reliability cooler is designed for continuous operation. Between making measurements the unit is powered from a DC supply, car battery or other high capacity device.

Mobile MCB Server

The Mobile MCB Server software application enables any ORTEC portable instrument installed with a PDA to communicate wirelessly with ORTEC software applications such as MAESTRO, GammaVision, Detective-Remote, and the included MAESTRO-PRO. The Mobile MCB Server acts like a wireless version of the USB connection, allowing users to control and monitor any portable spectrometer through a wireless network.

Users can develop their own applications through the use of the optional A11 tool kit.

Detective-200™

Detective-200 Mobile Detection System Rack Kit

The rack kit provides a simple, transportable solution for creating “Ad-Hoc” mobile detection systems without the need for permanent vehicle installation.

- Supports up to four Detective-200s in varying configurations.
- Portable, light weight, and collapsible.
- Easy to install and remove.
- Rugged frame for mobile applications.
- Can be configured for multiple vehicle types.
- Transportable case for rack and two Detective-200s.
- Vehicle laptop mounting kit.



Detective-200™

Ordering Information

DETDX-200

Ultra-High-Sensitivity, Ruggedized, Transportable HPGe Radioisotope Identifier (Gamma Only) with AC/DC power adapter charger, automobile power cable, external battery kit, wheeled transport case, and MAESTRO-PRO software.

DETDX-200-2

Includes 2 each DETDX-200 Ultra-High-Sensitivity, Ruggedized, Transportable HPGe Radioisotope Identifiers (Gamma Only) with AC/DC power adapter charger, automobile power cable, external battery kit, and wheeled transport case, and 1 each Detective-Remote software with Laptop computer, external GPS, and MAESTRO-PRO software.

DETDX-200-4

Includes 4 each DETDX-200 Ultra-High-Sensitivity, Ruggedized, Transportable HPGe Radioisotope Identifiers (Gamma Only) with AC/DC power adapter charger, automobile power cable, external battery kit, and wheeled transport case, and 1 each Detective-Remote software with Laptop computer, external GPS, and MAESTRO-PRO software.

DETEX-200

Ultra-High-Sensitivity, Ruggedized, Transportable HPGe Radioisotope Identifier (Gamma and Neutron) with AC/DC power adapter charger, automobile power cable, external battery kit, wheeled transport case, and MAESTRO-PRO software.

DETEX-200-2

Includes 2 each DETEX-200 Ultra-High-Sensitivity, Ruggedized, Transportable HPGe Radioisotope Identifiers (Gamma and Neutron) with AC/DC power adapter charger, automobile power cable, external battery kit, and wheeled transport case, and 1 each Detective-Remote software with Laptop computer, external GPS, and MAESTRO-PRO software.

DETEX-200-4

Includes 4 each DETEX-200 Ultra-High-Sensitivity, Ruggedized, Transportable HPGe Radioisotope Identifiers (Gamma and Neutron) with AC/DC power adapter charger, automobile power cable, external battery kit, and wheeled transport case, and 1 each Detective-Remote software with Laptop computer, external GPS, and MAESTRO-PRO software.

DETECTIVE-REMOTE-MOB-SYS

Detective-Remote software with Detective software update, Laptop computer, external GPS, and MAESTRO-PRO software.

For price and delivery, email ortec.info@ametek.com.

Specifications subject to change
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ORTEC®

www.ortec-online.com

Tel. (865) 482-4411 • Fax (865) 483-0396 • ortec.info@ametek.com
801 South Illinois Ave., Oak Ridge, TN 37830 U.S.A.
For International Office Locations, Visit Our Website

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