ORTEC®

AMETEK®

ISO-CART-III

Mobile Assay System

An Optimized Transport System for In-Situ Waste Measurements



ISO-CART-III

Mobile Assay System

Key Customer Benefits

ISO-CART-III represents a generational advancement over previous models, with improvements in several areas:

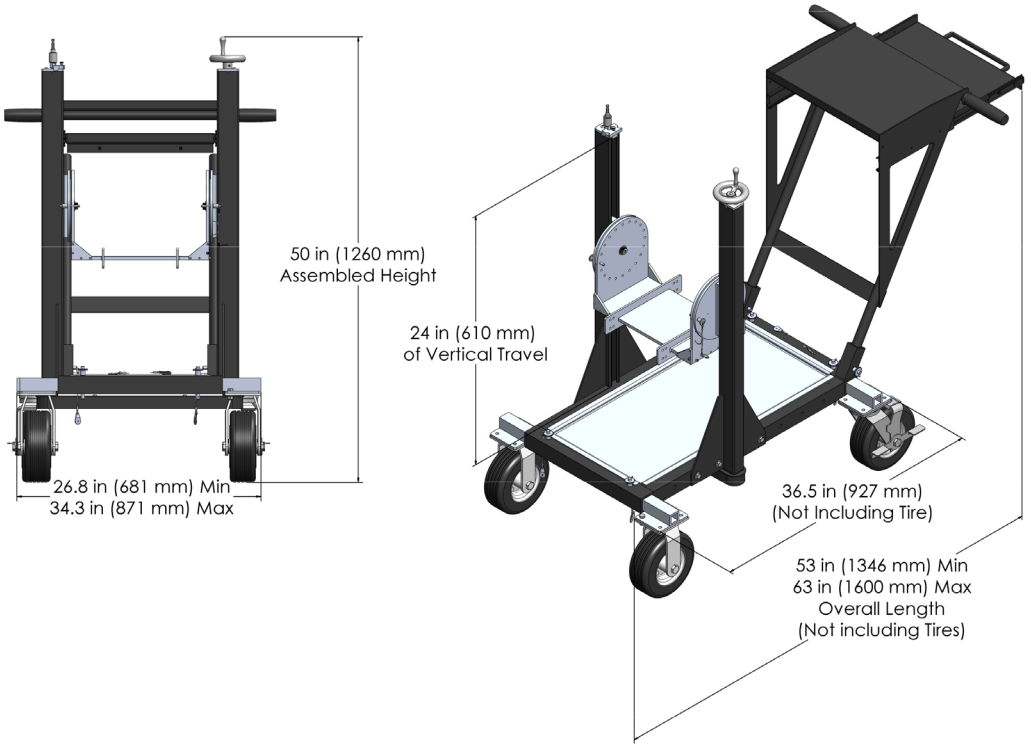
- Supports new and “legacy” spectrometry hardware.
- Lightweight materials used wherever feasible in the interests of maneuverability.
- Adjustable front and rear track for extra stability even in tight spaces.
- Easy assembled and disassembled for transportation.
- Continuously and easily adjustable detector height and variable tilt adjustment.
- Unrestricted direct detector view of ground for soil assays.
- New modular collimator system allows minimum weight configuration (ISO-CART-85).
- Bottle counting option (ISO-CART-85).

System Overview

ISO-CART-III Mobile NDA Systems are ideal solutions for a wide variety of in-situ gamma-ray measurement requirements. The specially designed cart hardware transport system carries all the components: HPGe detector, shield and collimator, multichannel analyzer system, and laptop computer. The ISO-CART-III is entirely compatible with the latest generation of ORTEC integrated spectroscopy hardware and with spectrometry hardware which has been used with previous generations of ISO-CART.

An ISO-CART-III system can provide everything necessary to produce quantitative results quickly and easily “right out of the box.” The ORTEC ISOTOPIC software can control and process spectra from multiple ISO-CART systems assaying a single item, or can process results from multiple sequential views of the same item. The system can be supplied pre-calibrated at the ORTEC factory, 100% ready for use.

With ISO-CART-III, the entire assay system is easily transported to any measurement location. The large wheels permit easy movement over rough surfaces. The detector support can be positioned at heights from 0.33 m (13 in.) to 0.91 m (36 in.). The pivot mechanism orients the detector at different angles from 0 to 180°. A sturdy adjustable shelf provides space for the notebook computer for convenient on cart operation. If the spectrometry system must be moved to a location where it is impractical to move the cart itself, it can be easily removed and carried. The collimator may be easily removed for infinite-plane soil measurements.



ISO-CART-85 System Configuration

ISO-CART-85 is a new mobile system for radioactive waste assay by high-resolution gamma spectroscopy. Through the use of a single very large-area high purity germanium (HPGe) detector, and a modular collimation system, ISO-CART-85 achieves, in many cases, free release levels in reasonable count times, for in-field measurements.



The HPGe detector is provided in the form of the ORTEC IDM-200-V, the revolutionary all-in-one integrated Gamma Spectrometer, cooled by a miniature Stirling cycle cryocooler. An internal battery powers the cooler and the highly stable digital signal processing electronics for up to 3 hours or longer with battery life extending options or battery hot swap.

The system is built around the ISO-CART-III system transport and also options the useful bottle-counting shield which allows it to be used as an "in-field counting room" to count bulk assay samples on the face of the HPGe detector. The tried-and-tested ISOPLUS software, in its latest version now offers 64-bit compatibility with the latest Windows operating systems. (A separate ISOPLUS brochure is available.)

ISO-CART-85 systems are provided "ready to go", traceably calibrated at our factory.

The standard configuration comprises:

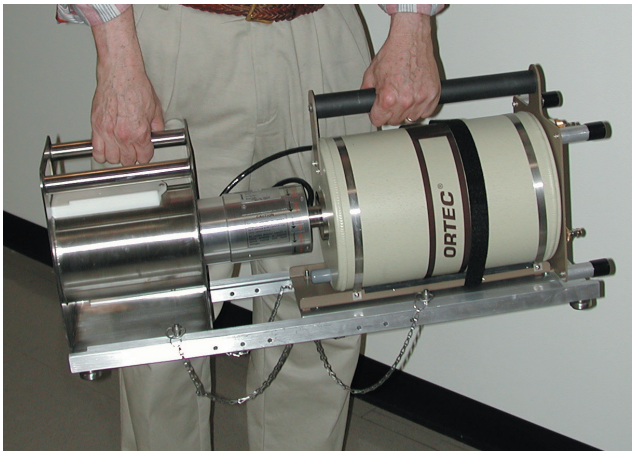
- ISO-CART-III.
- IDM-200-V large area, fully integrated HPGe spectrometer.
- ISO-2-IDM-SHD Modular Collimator Kit. Includes three field of view collimators (2", 4", and 6") and three 2" FOV collimator shields.
- Mounting hardware.
- ISOPLUS waste assay software.
- Laptop computer with software installed.
- Factory calibration.
- All necessary cables and connectors.

Separate brochures are available for the ISO-CART-85 system and ISOPLUS software from www.ortec-online.com.

ISO-CART-III

Mobile Assay System

ISO-CART-III Systems Based on Liquid Nitrogen Cooled HPGe Detectors and the digiDART MCA



ORTEC HPGe detectors are the industry standard in terms of quality and performance. ISO-CART-III systems may be configured with a wide variety of ORTEC HPGe detectors from which relative efficiencies of over 200% are available. The portable HPGe detector is mounted, along with the chosen collimator on the detector/collimator carrier or "DCC" which is easily removable from the cart as a unit.

If the detector must be moved to a location where it is impractical to move the cart, the detector/collimator unit can be removed and carried.

Dewar Options

A portable, all-attitude HPGe detector is available with a 3.0-liter Gamma Gage dewar. A 7.0-liter multi-orientation dewar (MOD) is also available. The MOD dewar allows near all attitude use while offering reduced size compared to the equivalent holding time Gamma Gage model. Typically, the HPGe detector chosen would be a large volume GEM (P-type) or GMX (N-type); however, a wide variety of detector choices are available. Standard systems may be ordered by model number located on the back of this brochure. Contact us to suggest a configuration according to your detection limit and count-time requirements.

For more information on ORTEC LN^2-cooled HPGe detectors, visit www.ortec-online.com.

Shield/Collimator Options

SHD-1 Shield/Collimator: The standard collimator is 1.6 cm (0.625 in.) thick and 20.3 cm (8 in.) long. It is composed of lead with a 2 mm (0.08 in.) copper liner. Complete shield dimensions: 26.42 cm (10.4 in.) H x 20 cm (8 in.) W x 77.5 cm (30.5 in.) D. Weight: 16.82 kg (37 lbs).

SHD-3 Shield/Collimator: The heavy-duty collimator is 4.6 cm (1.8 in.) thick and 20.3 cm (8 in.) long. It is composed of heavy duty lead for high radiation areas. Complete shield dimensions: 25 cm (9.75 in.) H x 20 cm (8 in.) W x 77.5 cm (30.5 in). D. Shield is split in two sections for assembly purposes. Weight: 68 kg (150 lbs).

Laser Meter: The Laser Meter accurately determines the distance from the detector endcap to the measurement point. A sighting laser mounted on the collimator is used to center the detector on the measurement point. The range finder can be set to display the distance in meters or feet. 18.8 x 7.0 x 4.7 cm (7.4 x 2.8 x 1.9 in.). Accuracy: 3 mm.



ISO-LASERMETER mounted on SHD-1.

digiDART™ Data Acquisition Hardware

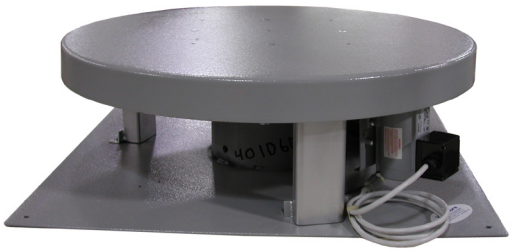


The digiDART is an ideal MCA for use with an in-situ assay system. It can acquire preliminary data in the field as a stand alone unit or perform a complete analysis on the spot with the use of a notebook computer.

- High-performance rugged HPGe grade spectrometer, 16k channels.
- Digitally stable: consistent answers for long counts, changing count rates and temperatures.
- Operates with or without an attached PC.
- Built-in backlit LCD display and control keypad — live display of acquiring data.
- Energy calibration using keypad.
- Nuclide ID and activity calculation for nine Regions of Interest (ROI).
- High throughput — over 100,000 processed pulses per second.
- Fits in the palm of your hand or attaches to your belt.
- Holds 23 16k spectra in internal memory (614 at 512 resolution).
- ~9 hour battery life, recharge internally.
- Only 860 grams, including batteries.
- Fast USB communications.
- SMART-1 detector technology ensures spectral data acquired is of the highest quality, via an internal state of health function which monitors the detectors performance parameters.
- Provides authentication of spectral data.

For more information on the digiDART, visit www.ortec-online.com.

ISO-TURNTABLE Rotate Your Drum to Reduce Your Measurement Bias



Most waste measurements are nonhomogeneous and measurement accuracy will be reduced if activity is not evenly distributed throughout the drum. Rotating the drum will make the item “appear” more homogeneous to the detector. When using Isotopic software, the uncertainty in matrix attenuation will be reduced. Thus, the reported answers will reflect an overall measurement uncertainty improvement (reduction).

Forklifts or handtrucks are needed to safely position the drum on the center of the platform. The height of the platform above the floor is 10 inches. No additional electronic noise is introduced into the HPGe detector signal processing.

- For 55 or 85 gallon drums
- 30-inch diameter turntable
- 30 x 30-inch support base
- 1000 lbs (454 kg) weight capacity
- 1 RPM rotation speed

ISO-CART-III

Mobile Assay System

ISO-CART-III Mobile Assay Systems Ordering Information

Model	Description
ISO-CART-85-PC	Complete ISO-CART-85 System, factory calibrated. Includes ISO-CART-III, IDM-200-V-ISO-2-DCC, ISO-2-IDM-SHD, IDM-200-V, ISOTOPIC software, ISO-CAL, and laptop computer.
ISO-CART-85-NOPC	Complete ISO-CART-85 System. Includes ISO-CART-III, IDM-200-V-ISO-2-DCC, ISO-2-IDM-SHD, IDM-200-V, and ISOTOPIC software.
ISO-GEMxx-DDD ISO-GMXxx-DDD	Complete system includes: ISO-CART-III, SHD-1, ISO-DCC, HPGe Detector with SMART-1 technology and bayonet pressure fill adaptor, digiDART, ISOTOPIC software, and Laptop Computer. System is integrated and tested and supplied with factory calibration. See GEM and GMX detector sections for specifications. NOTE: Contact factory for ISO-CART-III systems based on alternate detector types. Choice of cryostat and dewar "DDD" as follows: 3.0 = 3.0-liter Gamma Gage dewar; M7L = 7.0-liter MOD dewar.
ISOCART-GEM25-DDD	ISO-CART-III Mobile Assay System incorporating GEM25 detector
ISOCART-GEM40-DDD	ISO-CART-III Mobile Assay System incorporating GEM40 detector
ISOCART-GEM60-DDD	ISO-CART-III Mobile Assay System incorporating GEM60 detector
ISOCART-GEM80-DDD	ISO-CART-III Mobile Assay System incorporating GEM80 detector
ISOCART-GEM100-DDD	ISO-CART-III Mobile Assay System incorporating GEM100 detector
ISOCART-GEM120-DDD	ISO-CART-III Mobile Assay System incorporating GEM120 detector
ISOCART-GMX25-DDD	ISO-CART-III Mobile Assay System incorporating GMX25 detector
ISOCART-GMX40-DDD	ISO-CART-III Mobile Assay System incorporating GMX40 detector
ISOCART-GMX60-DDD	ISO-CART-III Mobile Assay System incorporating GMX60 detector
ISOCART-GMX80-DDD	ISO-CART-III Mobile Assay System incorporating GMX80 detector
Options and Accessories	
ISO-CART-III	ISO-CART-III only (Detector/Collimator Carrier (DCC) not included).
ISO-CAL	Point-source calibration at the factory. (If computer not ordered, files supplied on CD).
ISO-SCALE	Platform scale with indicator floor stand
ISO-TURNTABLE-110	Turntable for drum rotation. Capacity = 445 kg (1000 lb). 110 V, 60 Hz.
ISO-TURNTABLE-240	Turntable for drum rotation. Capacity = 445 kg (1000 lb). 240 V, 50 Hz.
ISO-TURNTABLE-OPT1-2	Increase in turntable RPM from 1 RPM to 2 RPM. Must be ordered with turntable.
ISO-TURNTABLE-OPT1-3	Increase in turntable RPM from 1 RPM to 3 RPM. Must be ordered with turntable.
ISO-TURNTABLE-OPT2	Wireless On/Off via hand-held remote. Must be ordered with turntable.
ISO-TURNTABLE-OPT3	Power Cord Extension from standard 6 ft. to a maximum of 75 ft. Price per foot. Must be ordered with turntable.
ISO-TURNTABLE-OPT4	Hardwired Switch Cable Extension up to 75 ft. Price per foot. Must be ordered with turntable.
ISO-CASE	Transportation case for digiDART, laser range finder, and laptop.
ISO-BOX	Airworthy "roll-in" system transportation box for complete ISO-CART (detector ships in its own crate), includes space for ISO-CASE.
for Detector/Dewar Only	
ISO-DCC	Detector/Collimator Carrier (slide and plate). Compatible with CFG-PG4-3 and CFG-PMOD4-7
SHD-1	5/8-inch Lead Shield/Collimator, copper lined
SHD-3	Heavy Duty Lead Shield (1.8" thick) for high backgrounds
ISO-BACKSHIELD	Removable Backshield for PopTop Detector
ISO-LASERMETER	Laser Range Finder
ISO-LSRMTR-ADAPT-1	Lasermeter adapter for SHD-1 shield
ISO-LSRMTR-ADAPT-3	Lasermeter adapter for SHD-3 shield
ISO-DEWAR	STD 50L dewar, WD-50 withdrawal device, and TL-6 6-ft. transfer lin

ISO-CART-III Mobile Assay Systems Ordering Information - continued

Model	Description
for IDM Only (for use with ISO-CART-III only)	
IDM-200-V-ISO-2-DCC	Detector/Collimator Carrier for IDM-200-V
ISO-2-IDM-FOV-2	2” Steel Field of View Collimator for use with IDM-200-V, Sn/Cu lined
ISO-2-IDM-FOV-4	4” Steel Field of View Collimator for use with IDM-200-V, Sn/Cu lined
ISO-2-IDM-FOV-6	6” Steel Field of View Collimator for use with IDM-200-V, Sn/Cu lined
ISO-2-IDM-SHD	Modular collimator kit for use with IDM-200-V. Includes 1 each ISO-2-IDM-FOV-2, ISO-2-IDM-FOV-4, ISO-2-IDM-FOV-6 and 3 each ISO-2-IDM-SHD-2.
ISO-2-IDM-SHD-EXT	Bottle counting shield extension for ISO-2-IDM-SHD. Includes 6 each 1-L bottles.
ISO-2-IDM-SHD-2	2” deep lead sectional shield for FOV collimator. 1” wall thickness.

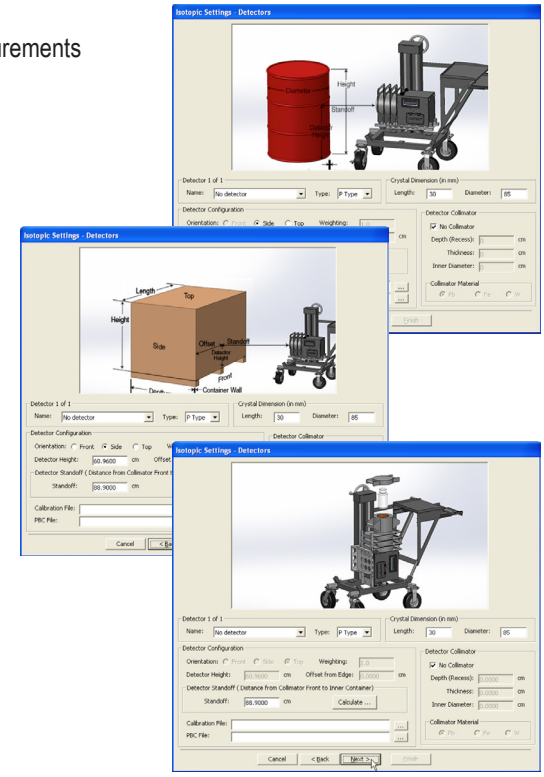
ISO-CART-III

Mobile Assay System

ISOTOPIC Software, the Analysis Heart of the ISO-CART-III System, Regardless of Hardware Configuration!

(download the full brochure at www.ortec-online.com)

A Practical, Flexible, and Defendable Solution for Gamma Spectrometry Waste Assay Measurements



Applications

- γ Boxes, Drums, Pipes or Surfaces (collimated detector)
- γ Close Geometry small containers (e.g. bottles on-endcap)
- γ Wide Area Assay of Soils and Surface (uncollimated detector: M-1 methodology)

Ordering Information for ISOTOPIC

Model	Description
ISOPLUS-BW	ISOTOPIC Advanced Gamma-Ray Waste Assay Analysis Software
ISOPLUS-GW	Documentation for ISOTOPIC
ISOPLUS-NW	ISOTOPIC Network Copies
ISOPLUS-UW	Update to ISOTOPIC
ISOPLUS-2YW	2 year update subscription for ISOTOPIC
ISOPLUS-3YW	3 year update subscription for ISOTOPIC
ISOPLUS-4YW	4 year update subscription for ISOTOPIC
ISOPLUS-5YW	5 year update subscription for ISOTOPIC

Why ISOTOPIC?

Practical

- Practical, easy-to-use solution to quantitative assay of gammaemitting waste samples in a variety of configurations.
- Ideal for applications using existing ORTEC ISO-CART-III, especially in combination with ORTEC IDM-200-V integrated HPGe detectors (ISO-CART-85 assay systems).
- Supports additional HPGe detectors and electronics or as part of an integrated measurement system.
- Calibrate ANY detector on site, TRACEABLY, in minutes.
- Easy system expansion.

Flexible

- Analyzes all types of gamma-emitting waste, fissile and non-fissile.
- Measures various container shapes and sizes, surfaces and even soils using independently verified analysis methods.
- CLOSE geometry measurements for “on-endcap” applications such as bottle counting.
- Easily combine multiple measurements on a single object.
- Expanded Report Writer with MS Access Data Storage and Crystal Reports for Custom Reports.
- Supports software integration into large, automated measurement systems.

Defendable

- Robust algorithms developed and refined by multiple US DOE sites as well as the US Energy Measurements Laboratory.
- Third party “round-robin” testing to validate results accuracy.
- Results traceability guaranteed via simple user- or factory calibration with traceable source.

Isotopic Averaged Report

General information

Measurement group: Isotopic- Average MDA, NBS 446-TopView 12 inches
Sample Description: NBS 446-TopView 12 inches
Report file1: C:\User\NBS 446-TopView 12 inches Buf00085-uTSP 7390.html
Report file2: C:\User\NBS 446-TopView 12 inches Buf00086-MT7390.html
Data acquisition: Data analysis: 4/18/2014 4:48:58PM
Library: C:\User\AAIsotopicTest\U-Np.lib Tolerance (FWHM): 0.50

Configuration

Container:
Container Type: Cylinder | Material ID: Al | Thickness (entered): 0.20 cm
Height: 1.98 cm | Fill Height: 1.58 cm
Diameter: 8.00 cm | Depth: 0.00 | Length: N/A
Tare weight: 0.000 kg | Container Density: 2.70 g/cc
Matrix:
Material: U3O8 | Density(initial): 3.400 g/cc
U Init. Fraction: 0.0000 | Pu Init. Fraction: 0.0000 | Thickness: 1.58 cm
Volume: 6.08E+001 cc | Gross Wt: 2.067E-001 kg | Net Wt: 2.067E-001 kg
Density (measured): 3.399 g/cc | Density(adjusted): 3.399 g/cc

Isotopic Results

Nuclide	Mass(g)	Activity(uCi)	Uncertainty (%)	MDA (g)	MDA (uCi)
U-235	3.750E+000	8.11E+000	10.94	1.55E-002	3.36E-002
U-238	8.553E+001	2.85E+001	8.19	5.34E-001	1.78E-001
U-234	0.000E+000	0.00E+000	35.87	1.51E-002	9.46E+001
Np-237	0.000E+000	0.00E+000	27.94	1.81E-005	1.28E-002

Total Activity: 3.659E+001 uCi | Total Alpha Activity: 3.66E+001 uCi

Uranium Analysis

Total grams of Uranium: 8.928E+001
U-235 enrichment in % (186 to 1001-kev region): 2.475 +/- 0.080
Ratio U-238/U-235: 137.37

Averaged MDA for the Measured Geometry

Nuclide	Gamma Ray (keV)	MDA (grams)	MDA (uCi)
U-235	185.85	1.55E-002	3.36E-002
U-238	1,001.45	5.34E-001	1.78E-001
U-234	120.91	1.51E-002	9.46E+001
Np-237	312.10	1.81E-005	1.28E-002

Analyzed By:_____

Approved By:_____

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Specifications subject to change
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