ORTEC®

ISO-CART®-II Mobile Assay System

Assembly Guide

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Manual Revision E

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AMETEK®
ADVANCED MEASUREMENT TECHNOLOGY

Advanced Measurement Technology, Inc.
("AMT")

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Repair Service

If it becomes necessary to return this instrument for repair, it is essential that Customer Services be contacted in advance of its return so that a Return Authorization Number can be assigned to the unit. Also, AMT must be informed, either in writing, by telephone [(865) 482-4411] or by facsimile transmission [(865) 483-2133], of the nature of the fault of the instrument being returned and of the model, serial, and revision ("Rev" on rear panel) numbers. Failure to do so may cause unnecessary delays in getting the unit repaired. The AMT standard procedure requires that instruments returned for repair pass the same quality control tests that are used for new-production instruments. Instruments that are returned should be packed so that they will withstand normal transit handling and must be shipped PREPAID via Air Parcel Post or United Parcel Service to the designated AMT repair center. The address label and the package should include the Return Authorization Number assigned. Instruments being returned that are damaged in transit due to inadequate packing will be repaired at the sender's expense, and it will be the sender's responsibility to make claim with the shipper. Instruments not in warranty should follow the same procedure and AMT will provide a quotation.

Damage in Transit

Shipments should be examined immediately upon receipt for evidence of external or concealed damage. The carrier making delivery should be notified immediately of any such damage, since the carrier is normally liable for damage in shipment. Packing materials, waybills, and other such documentation should be preserved in order to establish claims. After such notification to the carrier, please notify AMT of the circumstances so that assistance can be provided in making damage claims and in providing replacement equipment, if necessary.

1. Introduction

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

- Lightweight design supports our newer, mechanically cooled spectrometry hardware, as well as conventional detector-dewar systems. Easy assembly and disassembly for transport.
- Large wheels for easy movement over rough surfaces.
- Adjustable front and rear track for extra stability even in tight spaces.
- Continuously adjustable detector height. The detector support cradle can be positioned at heights from 0.38 m (15 in.) to 0.91 m (36 in.).
- Variable detector tilt from 0° to 180°, with unrestricted detector view of ground for soil assays.
- New modular collimator and bottle counting options for the ISO-CART-85.
- Collimator can be easily removed for infinite-plane soil measurements.

The ISO-CART-II carries all the components required for *in situ* gamma-ray measurements: HPGe detector, shield and collimator, multichannel analyzer system, and computer. The wheelbase is adjustable for easy maneuverability and lateral stability, and the steerable casters have brakes. If the spectrometry system must be moved to a location where it is impractical to move the cart itself, the spectroscopy components and computer can be easily removed and carried.

A complete ISO-CART-II system can be energy and efficiency calibrated at the factory, ready for immediate use. All you have to do is cool the detector to operating temperature, develop a sample library using the ISOTOPIC Supervisor program, and recheck the energy calibration. (If the factory calibration option is not ordered, the detector must be calibrated for both energy and efficiency.)

Figure 1. The ISO-CART-II.

2. Assembling the ISO-CART-II

The ISO-CART-II assembles with detent pins, bolts, and knurled knobs; tools are provided. All pins are captured on durable stainless steel lanyards so they can't be lost.

1) Slide the fixed and steering casters into the cart frame, as shown in Figure 2. Adjust the wheelbase to the desired width and secure each wheel with its detent pin. ***For maximum stability, we recommend using the widest wheelbase practicable for your application.***
2) The handle/shelf assembly can be positioned on either end of the cart for front or rear steering. Position it as desired and secure each side with its pin.
3) Finally, secure the horizontal brace between the handle/ shelf assembly and the worm drive housing, tightening the knurled knobs to finger-tight (do not overtighten).
4) To disassemble, simply reverse these steps.

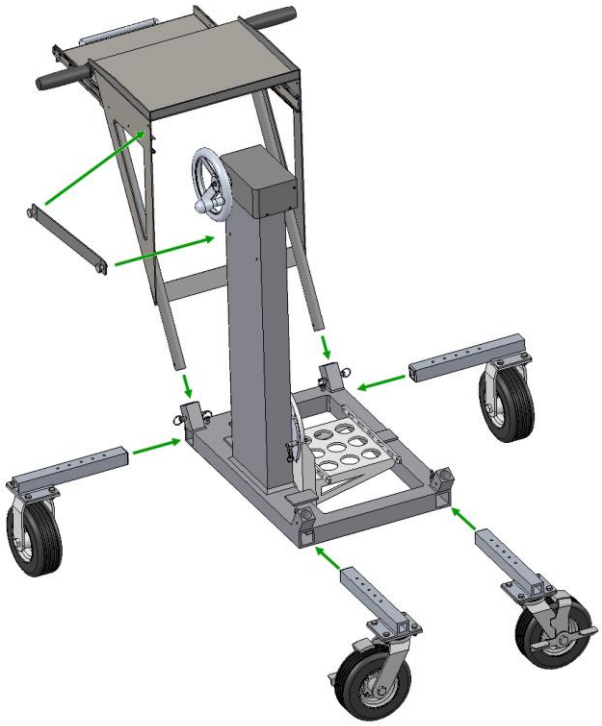


Figure 2. Quick Assembly, Tools are provided.

3. Attaching the IDM-200-V to the ISO-CART-II

Figure 3 shows the IDM-200-V-ISO-2-DCC detector-collimator carrier for the IDM-200-V.

1) Position the carrier on the ISO-CART so the detector or detector-collimator will be well-balanced on the cradle. *This will make changing the detector angle easier.*
2) Use the four bolts to attach the carrier to the cradle. (Figure 4).

Figure 3. IDM-200-V-ISO-2-DCC Carrier.

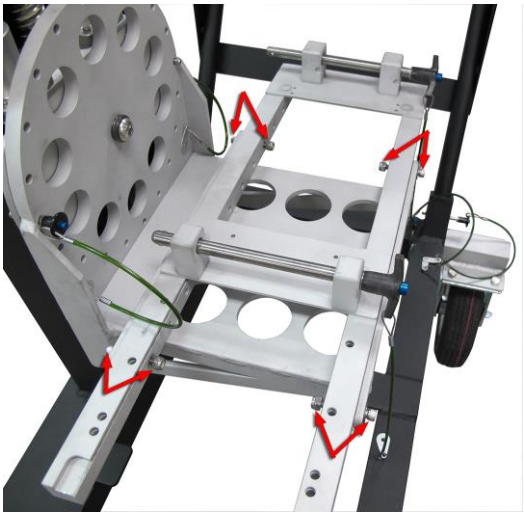


Figure 4. Attach the Carrier to the ISO-CART Cradle.

3) Align the IDM's mounting brackets with the lugs on the carrier, then slide the mounting pins through the lugs and brackets as shown in Figure 5 and Figure 6. *Hint: Lift the front of the IDM slightly while inserting the front pin.*

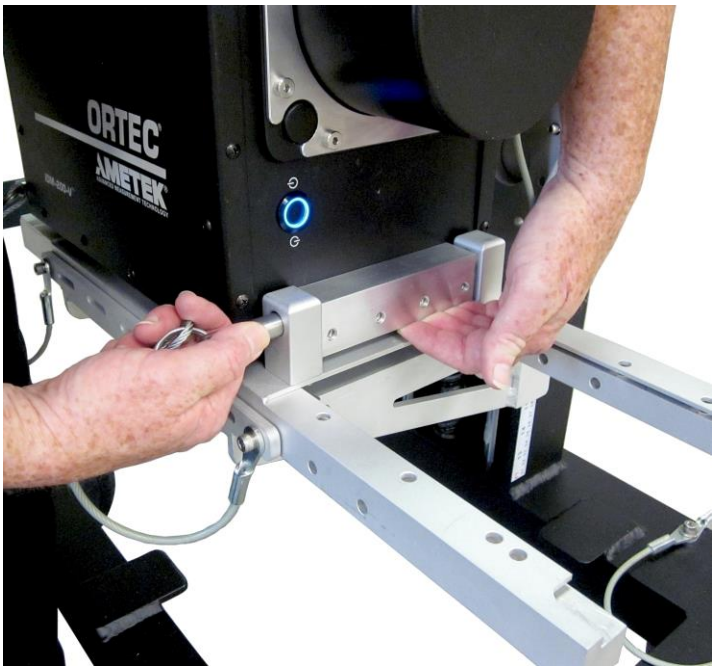


Figure 5. Lift the Front of the IDM and Insert the Front Pin.

Figure 6. Insert the Rear Pin.

General ISO-CART-II Operating Tips and Cautions

- Save the shipping container for the IDM-200-V or HPGe detector. We strongly recommend using this container when shipping or driving the detector from site to site.
- Before moving an ISO-CART system, we strongly recommend that you crank the detector to the lowest position, with the cradle resting on the cart frame.
- When the ISO-CART is in measurement position, *lock the front wheels*.

4. Changing the Detector Angle and Height

The angle of the cradle is fixed by two quick-release ball-lock pins, and adjusts in 18° increments (Figure 7, Figure 8).

The worm drive is geared at 4 turns/cm (10 turns/in.).

CAUTION

The IDM-200-V is significantly *nose-heavy.* Before removing the quick-release pins to change detector angle, *be sure to maintain a good grip on the carrier and control the speed and force with which the cradle rotates.* ***This is especially important when a collimator is attached.***

BOTTLE COUNTING SHIELD USERS: ALWAYS REMOVE THE SHIELD BEFORE ATTEMPTING TO CHANGE THE DETECTOR ANGLE FROM THE VERTICAL.

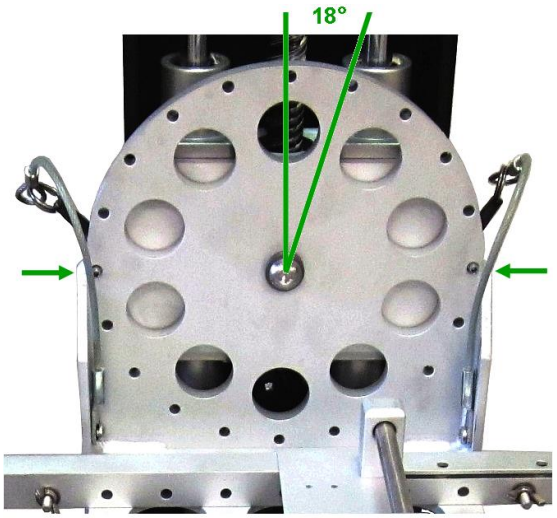


Figure 7. Angle Adjustment Pins (arrows).

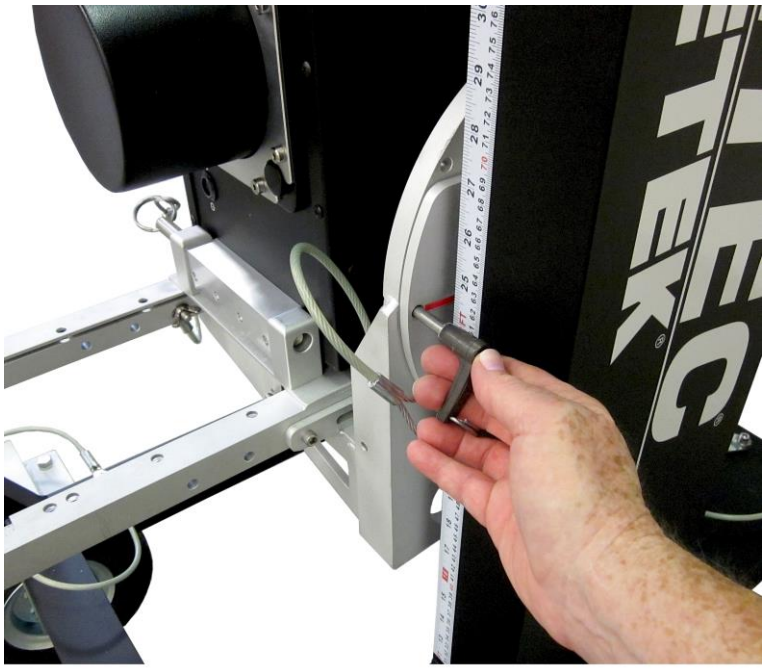


Figure 8. Angle Adjustment Pins and Cradle Height Indicator.

4.1. Adjusting the Detector Height with a Power Drill

The ISO-CART-II is supplied with a keyed 1/4-in.-drive socket that allows you to raise and lower the cradle with a power drill.

1) Loosen the handwheel set screw several turns with a 7/64 in. hex key, and remove the handwheel from the shaft (Figure 9).
2) Mount the socket on the drill and key it into the slot on the shaft (Figure 10).
3) To replace the handwheel, adjust the set screw until it intrudes approximately 1.5–2 mm (Figure Figure 1111), align the set screw with the slot on the shaft, press the wheel onto the shaft, and tighten the set screw into the slot to finger-tight (do not overtighten).

Figure 9. Remove Handwheel.

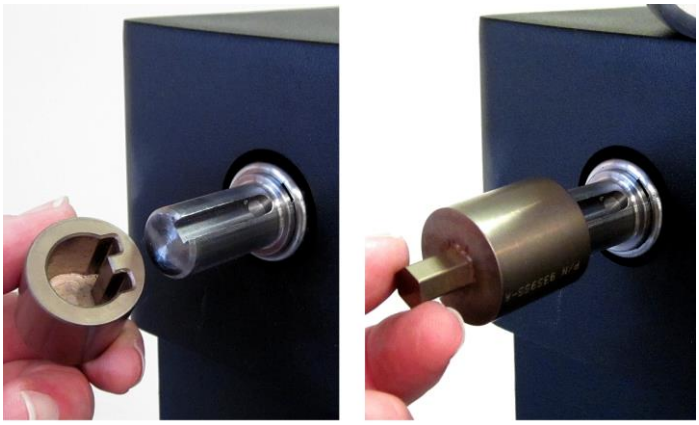


Figure 10. Keyed Height Adjustment Bit.

Figure 11. Inset for Easy Alignment on Shaft.

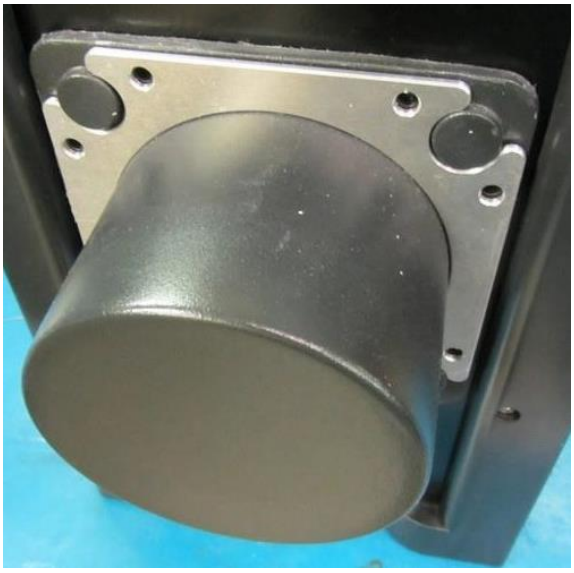
5. Collimators and Lead Shields

5.1. Modular Collimator

Figure12 shows the major components of the ISO-2-IDM-SHD modular collimator, e.g., the 2 in., 4 in., and 6 in. thin-walled field-of-view collimators and the nested three-piece lead shield. Install the desired FOV collimator on the IDM-200-V, then slide the appropriate combination of lead shields into the open end of the detector carrier and secure them with the accompanying locking pins.

Figure 12. Thin-Walled FOV Collimators and Sectional Lead Shields.

5.2. Attaching Collimator



Remove screws

Place Collimator over rubber endcap

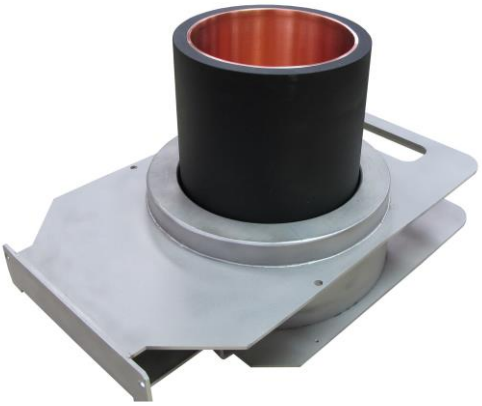
Use longer screws (provided with collimator)

Tighten screws carefully

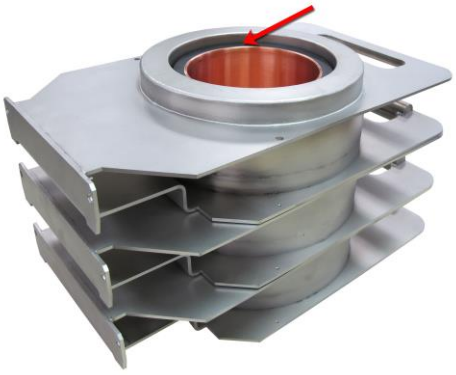
5.3. Bottle Counting Shield

The bottle counting shield is used with the 6 in. field-of-view collimator and the nested three-piece lead shield. Figure 17 shows construction of the bottle-counting shield. ***Use the bottle counting shield in the lowest vertical position with the cradle sitting on the frame tabs.*** This can be done with the handle in either configuration.

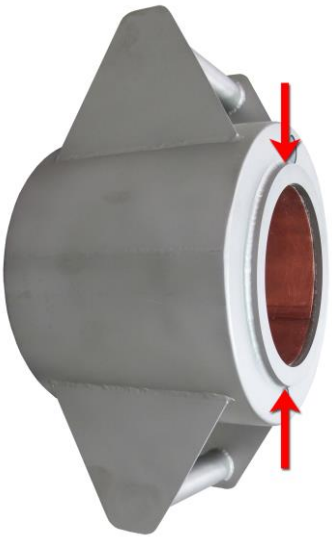
6 inch collimator



Place lead shields over collimator



The collimator is shorter than the shield stack



There is a lip on the bottom side of the bottle shield

The lip on the bottom side of the bottle shield sits into the gap between the top of the collimator and the lead shield stack

Figure 17. Bottle Counting Shield.

5.4. SHD-3 Heavy-Duty Collimator

Installation of the SHD-3 heavy-duty collimator is simple, but care must be taken if the system is going to be tilted.

CAUTION	Due to its weight, the assembled collimator is rated by OSHA as a two-person lift.

1) Mount the ISO-DCC carrier so the detector/collimator assembly will be reasonably balanced on the cradle. This will make it easier to change the detector angle.
2) Insert the outside section of the collimator into the carrier and fix it in place with the locking pins (Figure 13).
3) Remove the two hold-down bolts from the inner sleeve, and position the sleeve in the outside section using the temporary handle (Figure 1Figure 4).
4) Attach the inner sleeve to the outside portion with the two hold-down bolts removed in Step (3). See Figure 15.
5) Remove the temporary handle used to position the inner sleeve. Figure 16 shows the front view of an assembled collimator.
6) To remove the heavy-duty collimator, reverse the preceding steps.

Figure 13.

Figure 14.

Figure 15.

Figure 16.

6. Mounting Other Spectroscopy Hardware

6.1. trans-SPEC®-Series or Detective®-EX/DX-Series Identifiers

The TSP-ISO-DCC carrier and mounting hardware are required.

6.2. Micro-trans-SPEC®-Series or micro-Detective®-Series Identifiers

The ISO-DCC carrier and ISO-ADAPT-MICRO adapter are required.

6.3. Dewar-Detector Combinations

The ISO-CART-II is fully backward-compatible with the Gamma Gage II. The ISO-DCC carrier is required.

Figure 18. TSP-ISO-DCC carrier and mounting hardware.

1) Using the provided four 1/4-20×3/4 truss-head screws, affix the base plate of the portable HPGe detector (Figure 19) to the carrier. The base plate has holes in 1.3 cm (0.5 in.) increments for adjusting the detector recess within the collimator.
2) Position the carrier on the ISO-CART cradle with the collimator end facing forward (i.e., away from the handle/tray), and secure it with the four locking pins.
3) Slide the detector into the front (open end) of the carrier and connect it with the two locking pins.
4) Slide the collimator into the front of the carrier and secure it with the two locking pins attached to the collimator. (The front of the collimator must face out.)

Figure 19. Dewar-Detector Base Plate.

7. Laser Meter

The laser meter is designed to accurately establish the distance from the face of the collimator to the surface of the item being measured. It addition, its bright red beam can be used to help center the detector on the item being measured. The meter mounts above the detector on the heavy-duty collimator (Figure 20), thus the laser is vertically offset a few inches above the center of the detector.

For ISOTOPIC modeling, it is not important to position the detector exactly on the center of activity, especially because the center of activity is seldom known. It is important, however, to establish the correct standoff (the distance from the face of the collimator to the face of the item) and the correct detector recess within the collimator.

Two parameters must be set on the meter (Figure 21):

1) **Units** Press this button, then choose between feet and meters.

2) **Offset** Press this button, then select the offset so that the distance recorded is the distance from the face of the laser meter (thus the collimator face) to the item being measured.

Figure 20. The Laser Meter.

Figure 21. Laser Meter Controls.