

LUDLUM MODEL 44-7

Alpha, Beta, Gamma Detector

May 2019

Serial No. PR090405

and succeeding Serial Numbers

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LUDLUM MEASUREMENTS, INC.

501 OAK STREET, P.O. BOX 810

SWEETWATER, TEXAS 79556

325-235-5494, FAX: 325-235-4672

STATEMENT OF WARRANTY

Ludlum Measurements, Inc. warrants the products covered in this manual to be free of defects due to workmanship, material, and design for a period of twelve months from the date of delivery. The calibration of a product is warranted to be within its specified accuracy limits at the time of shipment. In the event of instrument failure, notify Ludlum Measurements to determine if repair, recalibration, or replacement is required.

This warranty excludes the replacement of photomultiplier tubes, G-M and proportional tubes, and scintillation crystals which are broken due to excessive physical abuse or used for purposes other than intended.

There are no warranties, express or implied, including without limitation any implied warranty of merchantability or fitness, which extend beyond the description of the face there of. If the product does not perform as warranted herein, purchaser's sole remedy shall be repair or replacement, at the option of Ludlum Measurements. In no event will Ludlum Measurements be liable for damages, lost revenue, lost wages, or any other incidental or consequential damages, arising from the purchase, use, or inability to use product.

RETURN OF GOODS TO MANUFACTURER

If equipment needs to be returned to Ludlum Measurements, Inc. for repair or calibration, please send to the address below. All shipments should include documentation containing return shipping address, customer name, telephone number, description of service requested, and all other necessary information. Your cooperation will expedite the return of your equipment.

**LUDLUM MEASUREMENTS, INC.
ATTN: REPAIR DEPARTMENT
501 OAK STREET
SWEETWATER, TX 79556
800-622-0828 325-235-5494
FAX 325-235-4672**

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General

The Model 44-7 GM (end window) Detector will detect alpha, beta, and gamma radiation. Its configuration allows for easy surveys or leak wipe testing setup. The detector is energy dependent, over-responding by a factor of 6 in the 60-100 keV range when normalized to ^{137}Cs .

The thin mica window is protected by a 79% open, stainless steel screen that can be removed. The GM tube can be easily replaced if necessary.

The GM detector operates between 850 and 1000 V. The tube manufacturer recommends operation at approximately 900 V. The recommended instrument input sensitivity is approximately 30 mV or higher to prevent the detector from double pulsing.

Caution!

The GM tube face can rupture above 8000 feet in altitude. When transporting this detector by air, use an airtight container in order to avoid sudden atmospheric changes resulting in tube failure.

Unpacking and Repacking

Remove the calibration certificate or detector functional check certificate and place it in a secure location. Remove the detector(s) and accessories (if applicable) and ensure that all items listed on the packing list are in the carton. If multiple detectors are included, refer to the calibration certificates for serial number (SN) matches. The Model 44-7 serial number is located on the detectors' bottom plate.

To return an instrument or detector for repair or calibration, provide sufficient packing material to prevent damage during shipment (see "Caution!" in Introduction section) and affix appropriate warning labels to promote careful handling.

Every returned instrument must be accompanied by an **Instrument Return Form**, which can be downloaded from the Ludlum website at www.ludlums.com. Find the form by clicking the "Support" tab and selecting "Repair and Calibration" from the drop-down menu. Then choose the appropriate Repair and Calibration division where you will find a link to the form.

NOTE:

When shipping a Model 44-7 by air, it is necessary to ship the tube in a sealed container to avoid sudden atmospheric changes, which could rupture the tube.

Specifications

Efficiency (4 π geometry): 2% for ^{14}C ; 10% for $^{90}\text{Sr}/^{90}\text{Y}$; 7% for ^{99}Tc ; 7% for ^{239}Pu ; 0.1% for ^{125}I

Sensitivity: typically 2100 cpm/mR/hr

Energy Response: energy dependent (please see graphs on page 8)

Background: 40 cpm

Dead Time: typically 200 μs

Window: $2.0 \pm 0.3 \text{ mg/cm}^2$ mica

Window Area: active is 6 cm^2 (0.93 in^2); open is 5 cm^2 (0.78 in^2)

Detector: end window halogen quenched GM

Detector Operating Voltage: 900 Vdc

Compatible Instruments: general purpose survey meters, ratemeters, and scalers.

Connector: series "C" (others available)

Construction: anodized aluminum housing

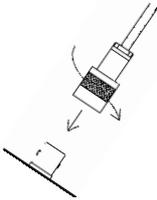
Temperature Range: -15 to $50 \text{ }^\circ\text{C}$ (5 to $122 \text{ }^\circ\text{F}$); may be certified for -40 to $65 \text{ }^\circ\text{C}$ (-40 to $150 \text{ }^\circ\text{F}$)

Size: $4.6 \times 14.7 \text{ cm}$ ($1.8 \times 5.8 \text{ in.}$) (Dia x L)

Weight: 0.5 kg (1 lb)

Operating Procedures

CONNECTING TO AN INSTRUMENT



Connect one end of the cable provided to the detector by firmly pushing the connector together while twisting clockwise a quarter of a turn until latched. Repeat the process in the same manner with the other end of the cable and the instrument.

TESTING THE DETECTOR

1. Ensure that the instrument high voltage (HV) is at the proper setting for the detector (900 volts).
2. Connect the detector to the instrument and check for a proper background reading (typically 25-50 cpm at 8-15 $\mu\text{R/hr}$).
3. Expose the detector to a check source and verify that the instrument indicates within 20% of the check source reading from the last calibration. Alternatively, expose the detector to a source of known value and verify that the detector detects greater than or equal to the efficiency listed in the specification section of this manual.
4. Instruments and detectors that meet these criteria are ready for use. Failure to meet these criteria may indicate a malfunction in the detector.

Cleaning Instructions and Precautions

The detector may be cleaned externally with a damp cloth, using only water as the wetting agent. Do not immerse the instrument in any liquid. Observe the following precautions when cleaning:

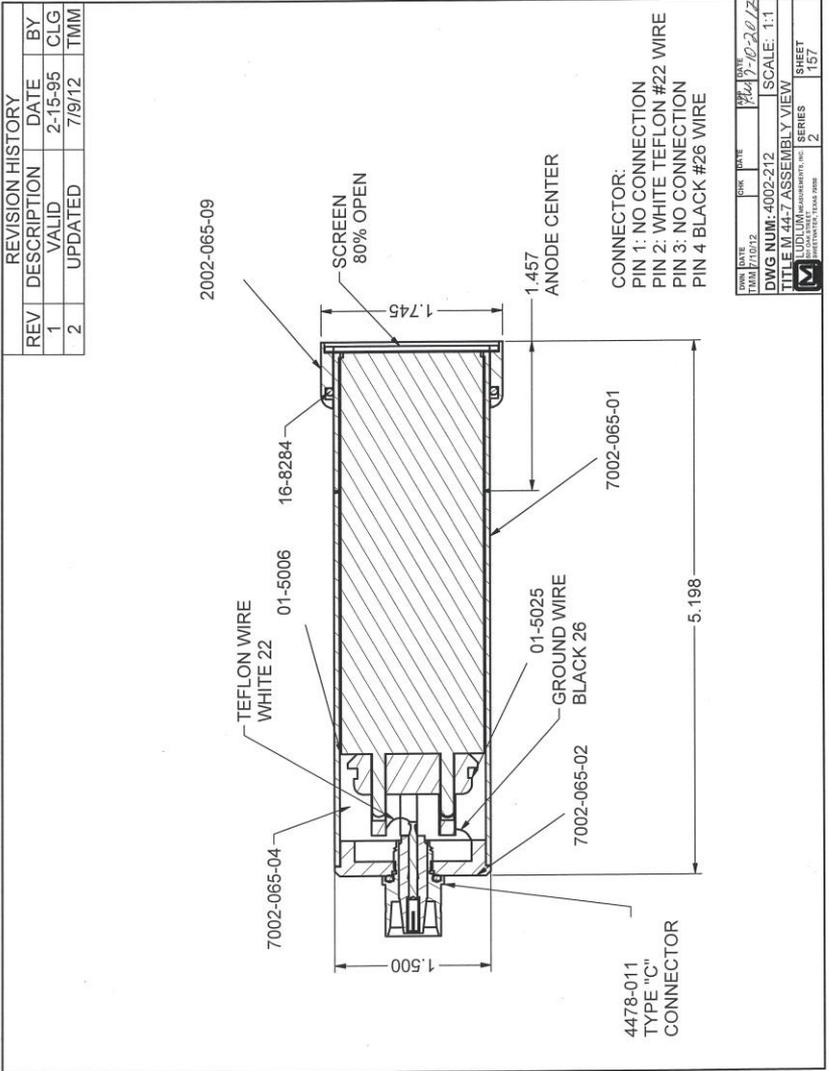
1. Turn the instrument electronics OFF.
2. Allow the instrument to sit for one minute.
3. Disconnect the detector cable before cleaning the detector.

Parts List

Model 44-7 Alpha-Beta-Gamma Detector

<u>Reference</u>	<u>Description</u>	<u>Part Number</u>
UNIT	Completely Assembled Model 44-7 alpha-beta-gamma detector	47-1536
1 ea.	Detector Body	7002-065-01
1 ea.	End Cap	7002-065-02
1 ea.	GM Tube (LND 723, TGM N210)	01-5006
2 ea.	Sponge	7002-065-04
1ea.	Socket	01-5025
1 ea.	Connector, UG 706/U	4478-011
1 ea.	O-Ring 2-128	16-8284
3 ea.	Screws, 4-40 x 3/16 FH	17-8811
1 ea.	Red Protective Cap	03-5474
1 ea.	Cap Model 44-7 Grid (MFG) x25	2002-065-09

Drawings and Diagrams



Ludlum Model 44-7 (Side-on Calibration)

