

**LUDLUM MODEL 44-9
ALPHA, BETA, GAMMA DETECTOR**

**March 2024
Serial Number 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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Introduction

The Ludlum Model 44-9 GM (Geiger-Mueller) Detector detects alpha, beta, and gamma radiation. Its size and shape (pancake) provide easy handling for surveying or personnel monitoring. The detector is energy dependant, over-responding by a factor of 6 in the 60 keV to 100 keV range when normalized to ^{137}Cs .

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

This detector operates between 850-1000 volts, with a recommendation from the tube manufacturer of approximately 900 Vdc. Recommended instrument input sensitivity is approximately 30 mV or higher to prevent the detector from double pulsing (where the detector “counts” a single pulse from the instrument multiple times.)

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.

The Ludlum Model 44-9 will operate with any Ludlum instruments or equivalent instruments that provide 900 Vdc and an input sensitivity of approximately 30 mV or higher.

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 44-9 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.

Specifications

Efficiency (4π geometry): typically 5% for ^{14}C ; 22% for $^{90}\text{Sr}/^{90}\text{Y}$; 19% for ^{99}Tc ; 32% for ^{32}P ; 15% for ^{239}Pu ; $\leq 1\%$ for $^{99\text{m}}\text{Tc}$

Sensitivity: typically 3300 cpm per mR/hr (^{137}Cs gamma)

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

Background: 60 cpm

Dead Time: typically 80 μs

Window: $1.7 \pm 0.3 \text{ mg/cm}^2$ mica

Window Area: active is 15.51 cm²; open is 12.26 cm²

Detector: pancake-type halogen quenched GM

Detector Operating Voltage: 900 Vdc

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

Connector: series "C" (others available)

Construction: aluminum housing with beige powder-coat finish; stainless steel protective screen (79% open)

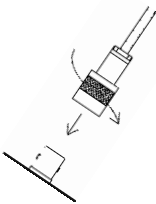
Temperature Range: -15 to 50 °C (5 to 122 °F); may be certified for -40 to 65 °C (-40 to 150 °F)

Size: 4.6 x 6.9 x 27.2 cm (1.8 x 2.7 x 10.7 in.) (H x W 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.

Tube Replacement

Refer to drawing 2 \times 206 located on page 7 of this manual to assist with replacement.

1. Remove the back plate by removing the three screws.
2. Loosen the three set screws on the side of the tube housing.
3. Remove the old tube from the detector housing.
4. Remove the anode clip from the old tube.
5. Push the clip onto the anode housing.

Note:

Do not over-flex the wire when installing the clip, as damage may occur.

Caution!

The mica window of this tube is extremely thin and fragile. There is also a thin layer of material to prevent UV interference. This material may come off if touched, causing the detector to malfunction. DO NOT TOUCH!

6. Carefully install the tube with the window facing down in the housing.
7. Ensure the tube is flush against the screen and tighten the set screws.
8. Replace the back plate and retaining screws.
9. Recalibrate the instrument and detector before use.

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 44-9 Alpha-Beta-Gamma Detector

<u>Reference</u>	<u>Description</u>	<u>Part Number</u>
UNIT	Completely Assembled Model 44-9 Alpha-Beta-Gamma Detector	47-1539
*	DETECTOR BODY	2002-109
*	HANDLE GRIP	7002-426
*	GM TUBE (LND 7311, TGM N1002)	01-5008
3 EA	SOCKET SET SCREWS (10-34 × ¼)	17-8560
*	PENCIL CLIP	01-5237
*	RESISTOR 3.3M	10-7044
*	CONNECTOR, UG706/U	4478-011
*	HV RED SILICONE WIRE	21-8550
*	PROTECTIVE SCREEN	21-9586
*	SNAP-IN FRONT COVER	7002-1037

Drawings and Diagrams

