

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

**May 2007  
Serial Number PR090405 and Succeeding  
Serial Numbers**

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## **Introduction**

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The Ludlum Model 44-9 G-M (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 six in the 60 keV to 100 keV range when normalized to <sup>137</sup>Cs.

The thin mica window is protected by a 79% open stainless steel screen. The G-M 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 G-M 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 30mV or higher.

## **Unpacking and Repacking**

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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. The following items and information should also be included to insure quick turnaround time of your equipment.

- instrument(s) and related cable(s)
- brief description as to the reason for return
- description of service requested
- return shipping address
- customer name and telephone number

## **Specifications**

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**Detector:** pancake-type halogen quenched G-M

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

**Window Area:** Active –  $15 \text{ cm}^2$ ; Open –  $12 \text{ cm}^2$

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

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

**Energy Response:** energy dependant (please see graphs on page 7)

**Dead Time:** typically 80  $\mu\text{s}$

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

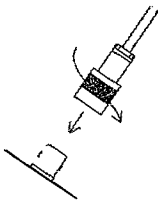
**Size:** 1.8" (4.6 cm) H × 2.7" (6.9 cm) W × 10.7" (27.2 cm) L

**Weight:** 1 lb (0.5 kg)

## Operating Procedures

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### CONNECTING TO AN INSTRUMENT



Connect one end of the cable provided to the detector by firmly pushing the connector together while twisting clockwise  $\frac{1}{4}$  turn until latched. Repeat the process in the same manner with the other end of the cable and the instrument.

### TESTING THE DETECTOR

1. Insure 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

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Refer to drawing 2 × 206 located on page 6 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.

## Model 44-9 Alpha, Beta and Gamma Detector

8. Replace the back plate and retaining screws.
9. Recalibrate the instrument and detector before use.

## **Parts List**

### **Model 44-9 Alpha-Beta-Gamma Detector**

| <u>Reference</u> | <u>Description</u>  | <u>Part Number</u> |
|------------------|---|--------------------|
| UNIT             | Completely Assembled<br>Model 44-9 Alpha-Beta-Gamma<br>Detector | 47-1539            |
| *                | DETECTOR BODY   | 2002-109           |
| *                | HANDLE GRIP   | 7002-426           |
| *                | G-M TUBE (LND 7311,<br>TGM N1002)                               | 01-5008            |
| 3 EA             | SOCKET SET SCREWS<br>(10-34 × 1/4)                              | 17-8560            |
| *                | PENCIL CLIP   | 01-5237            |
| *                | RESISTOR 3.3M   | 10-7044            |
| *                | CONNECTOR, UG706/U  | 4478-011           |
| *                | HV RED TEFLON WIRE  | 21-9761            |
| *                | PROTECTIVE SCREEN   | 21-9586            |
| *                | RED PROTECTIVE CAP  | 03-5476            |

Drawings and Diagrams

