TTT Environmental
Instruments and Supplies

The preferred source for instrument Rentals, Sales, Service and Supplies!

4201 B Street
Anchorage, AK 99503
(907) 770-9041

25420 74th Avenue S.
Kent, WA 98032
(253) 373-9041

www.tttenviro.com

info@tttenviro.com

LUDLUM MODEL 44-9
ALPHA, BETA, GAMMA DETECTOR

February 2010
Serial Number PR090405 and Succeeding Serial Numbers

LUDLUM MODEL 44-9
ALPHA, BETA, GAMMA DETECTOR

February 2010
Serial Number PR090405 and Succeeding Serial Numbers

LUDLUM MEASUREMENTS, INC.
501 OAK STREET, P.O. BOX 810
SWEETWATER, TEXAS 79556
325-235-5494, FAX: 325-235-4672

Table of Contents

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. The following items and information should also be included to ensure 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

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

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

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

Background: 60 cpm

Dead Time: typically 80 μs

Window: 1.7 ± 0.3 mg/cm^2 mica

Window Area: active is 15 cm^2; open is 12 cm^2

Detector: pancake-type halogen quenched GM

Detector Operating Voltage: 900 Vdc

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

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 μR/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 × 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!

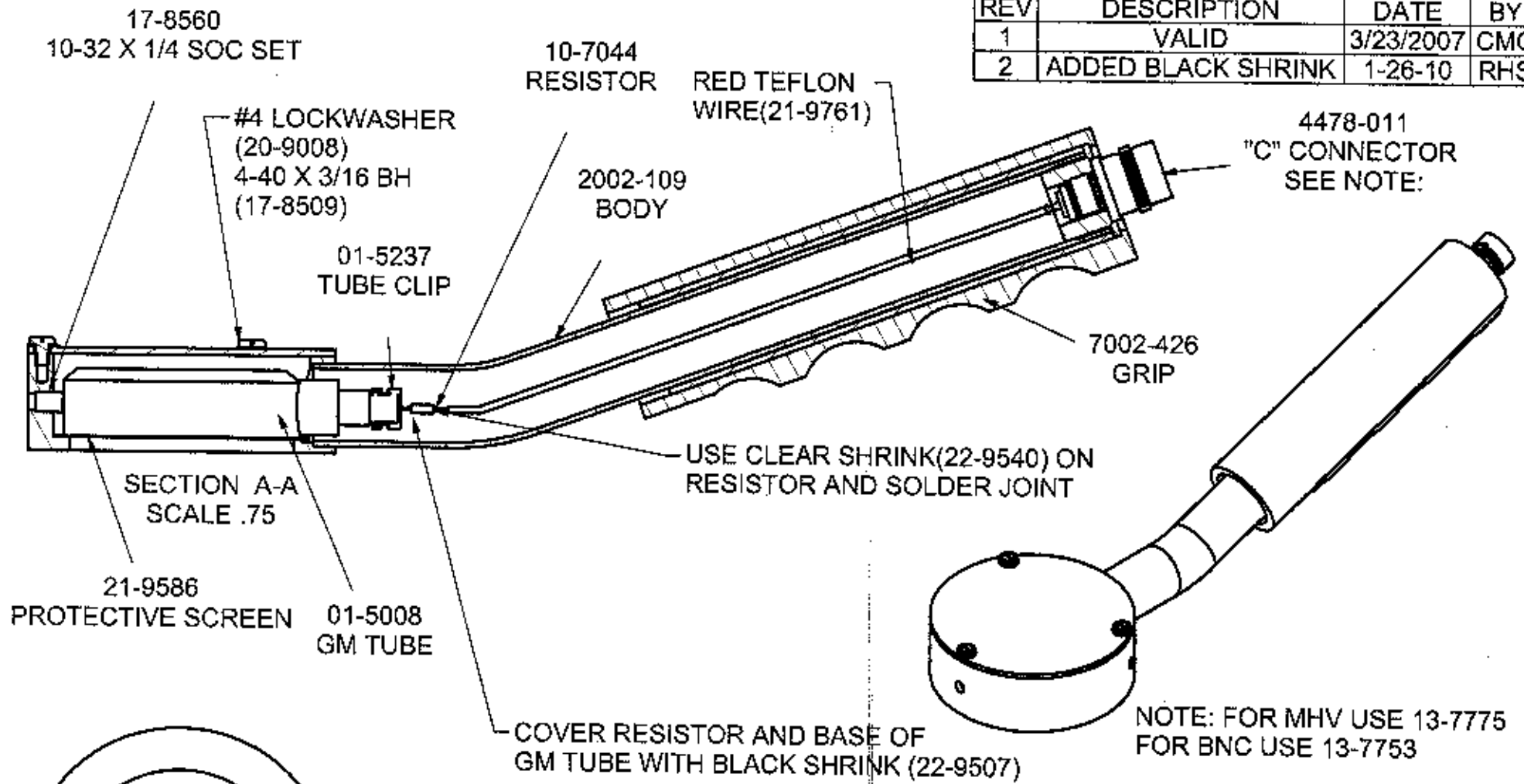
6. Carefully install the tube with the window facing down in the housing.
7. Ensure the tube is flush against the screen and tighten the set screws.
8. Replace the back plate and retaining screws.
9. Recalibrate the instrument and detector before use.

Parts List

Model 44-9 Alpha-Beta-Gamma Detector

Reference	Description	Part Number
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 TEFLON WIRE	21-9761
*	PROTECTIVE SCREEN	21-9586
*	SNAP-IN FRONT COVER	7002-1037

REVISION HISTORY			
REV	DESCRIPTION	DATE	BY
1	VALID	3/23/2007	CMC
2	ADDED BLACK SHRINK	1-26-10	RHS



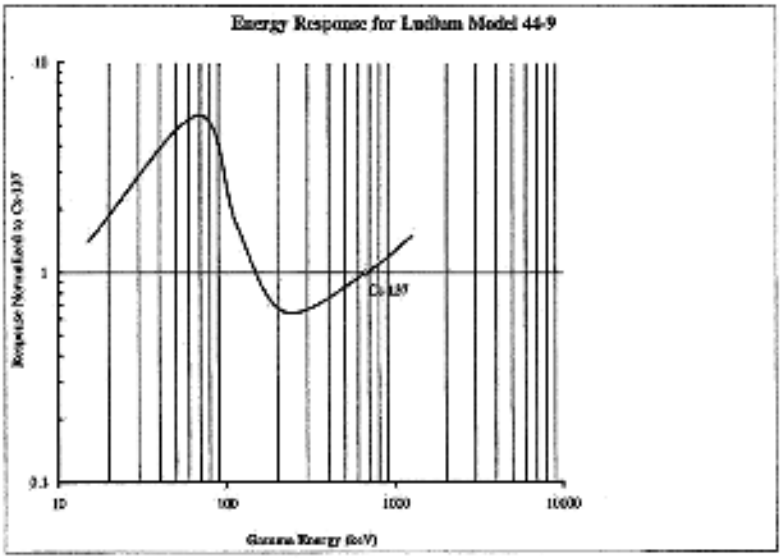
DWN	DATE	CHK	DATE	APP	DATE
TMM	8/20/2010			JGW	8-20-10

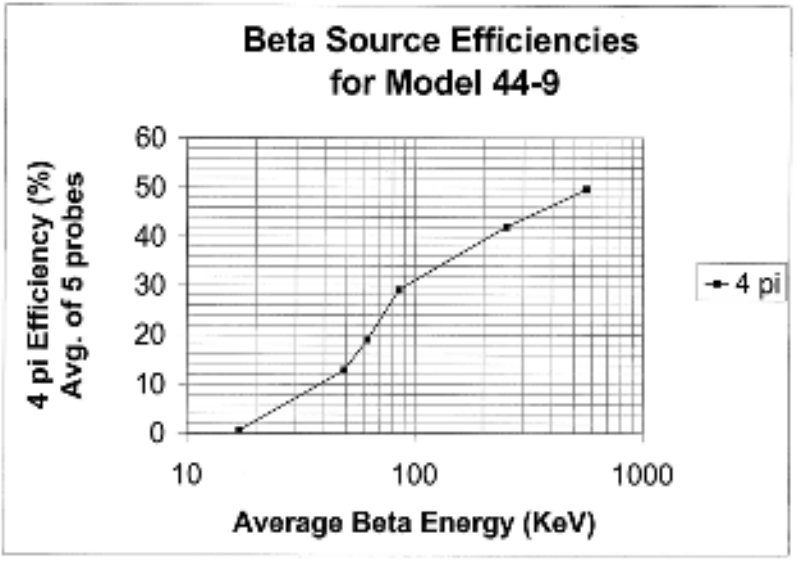
DWG NUM: 4002-280 SCALE: FULL ☐ OTHER

TITLE M 44-9 PANCAKE PROBE

LUDLUM MEASUREMENTS, INC. 501 OAK STREET SWEETWATER, TEXAS 79556

SERIES 2 SHEET 206


Energy Response for Ludlum Model 44-9
10
1
0.1
10
100
1000
10000
Cs-137


Beta Source Efficiencies
for Model 44-9
4 pi Efficiency (%)
Avg. of 5 probes
60
50
40
30
20
10
0
10
100
1000
Average Beta Energy (KeV)
4 pi