LUDLUM MODEL 44-7 Alpha, Beta, Gamma Detector

July 2012
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 l37Cs.

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 G M 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.

The GM tube face can rupture above 2438 m (8000 ft) altitude pressure. Consequently, detectors carried in unpressurized aircraft above this altitude would be subject to failure.

SPECIFICATIONS

DETECTOR: end window halogen quenched GM
WINDOW: $1.7 \pm 0.3 mg/cm^2$ mica
WINDOW AREA: active is 6 cm^2 (0.93 in^2); open is 5 cm^2 (0.78 in^2)
EFFICIENCY(4π geometry): 2% for ^{14}C; 10% for $^{90}Sr/^{90}Y$; 7% for ^{99}Tc; 7% for ^{239}Pu; 0.1% for ^{125}I
SENSITIVITY: typically 2100 cpm/mR/hr
ENERGY RESPONSE: energy dependent
BACKGROUND: 40 cpm
DEAD TIME: typically 200 microseconds
COMPATIBLE INSTRUMENTS: general purpose survey meters, rate meters, and scalers
OPERATING VOLTAGE: 900 V

CONNECTOR: series "C" *(others available)*
CONSTRUCTION: anodized aluminum housing
TEMPERATURE RANGE: -15 to 50 °C (5 to 122 °F); may be certified to operate from -40 to 65 °C (-40 to 150 °F)
SIZE: 4.6 x 14.7 cm (1.8 x 5.8 in.) (Dia x L)
WEIGHT: 0.5 kg (1 lb)

PRELIMINARY INSTRUCTIONS

UNPACKING AND REPACKING

Remove calibration certificate or detector functional check certificate and place it in a secure location. Remove the detector and accessories (cable, etc.) and ensure that all of the items listed on the packing list are in the carton. If more than one detector is in the carton, refer to the calibration certificate(s) for serial number (S/N) match. The Model 44-7 S/N is located on the side of the detector near the connector. To return the instrument for repair or calibration, provide sufficient packing material to prevent damage during shipment and appropriate warning labels to ensure careful handling.

The following items and information should also be included to ensure a quick turn-around time on your repair calibration:

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

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.

OPERATING PROCEDURES

CONNECTING DETECTOR TO INSTRUMENT

Connect one end of the cable provided to the detector by firmly pushing the connectors together while twisting clockwise a quarter of a turn until it latches. 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 HV is at the proper setting for the detector.

2. Connect the detector to the instrument and check for a proper background reading (typically 25 to 50 cpm at a background level of 8 to15 µR/hr.

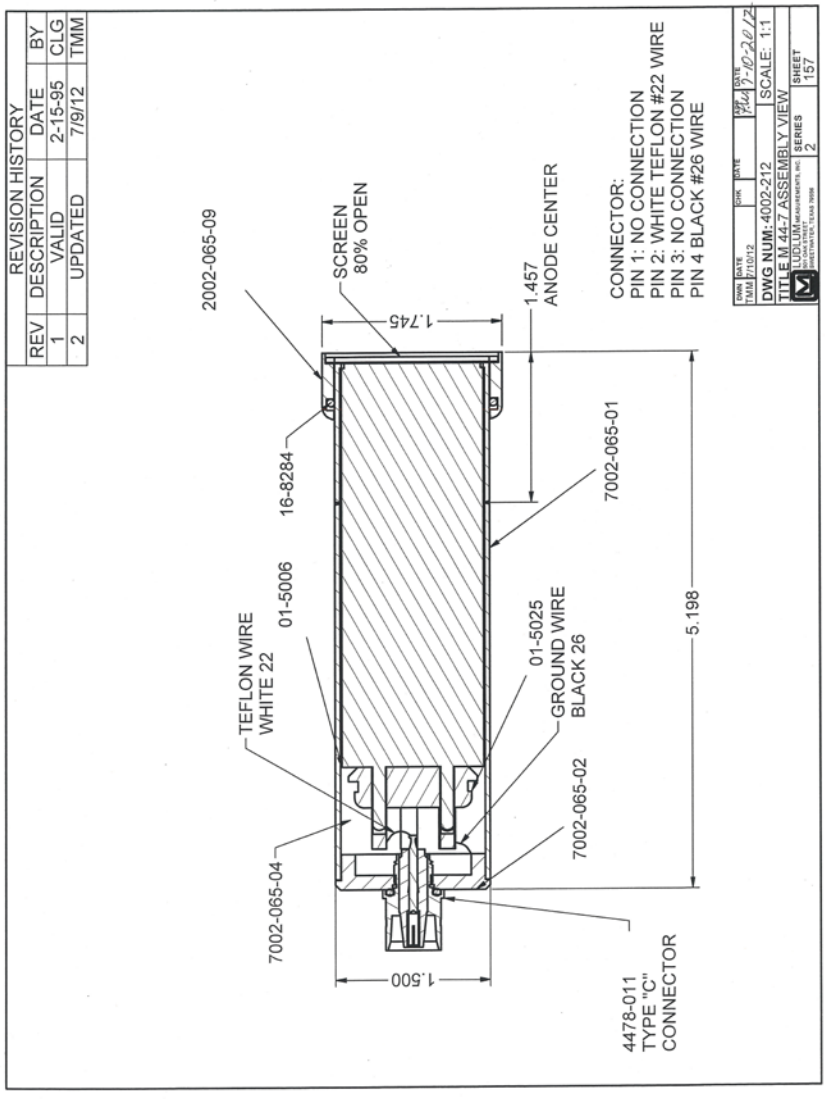
3. Expose the detector to a check source and verify that the instrument indicates within 20% of the check source reading obtained during the last calibration. Alternatively, expose the detector to a check source of a known value and verify that the detector gets greater than or equal to the efficiency listed in the specification section of this manual.

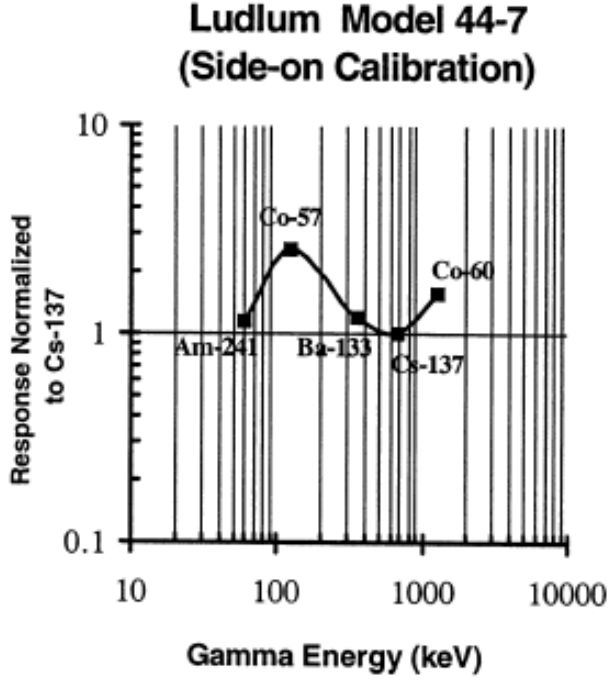
4. Instruments that meet these criteria are ready for use. Failure to meet these criteria may indicate a malfunction in the detector.

PARTS LIST

Model 44-7 Alpha-Beta-Gamma Detector

Ref. No.	Description	Part No.
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	13-7751
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 with O-Ring	4002-216


REVISION HISTORY
REV | DESCRIPTION | DATE | BY
1 | VALID | 2-15-95 | CLG
2 | UPDATED | 7/9/12 | TMM
2002-065-09
SCREEN
80% OPEN
1.745
1.457
ANODE CENTER
CONNECTOR:
PIN 1: NO CONNECTION
PIN 2: WHITE TEFLON #22 WIRE
PIN 3: NO CONNECTION
PIN 4 BLACK #26 WIRE
16-8284
7002-065-01
TEFLON WIRE
WHITE 22
01-5006
01-5025
GROUND WIRE
BLACK 26
5.198
7002-065-02
7002-065-04
1.500
4478-011
TYPE "C"
CONNECTOR
DWN TMM 7/10/12
CHK
APP
DATE 9-10-20/2
DWG NUM: 4002-212
SCALE: 1:1
TITLE M 44-7 ASSEMBLY VIEW
SERIES 2
SHEET 1 OF 1


Ludlum Model 44-7
(Side-on Calibration)
Response Normalized to Cs-137
10
1
0.1
Co-57
Co-60
Am-241
Ba-133
Cs-137
10
100
1000
10000
Gamma Energy (keV)