LUDLUM MODEL 44-6
BETA - GAMMA DETECTOR

March 2016

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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 44-6 is a GM (Geiger-Mueller) beta gamma survey detector that can be used with any portable ratemeter or scaler instrument that provides 850-1000 volts with an input sensitivity of 30 ±10 mV.

The detector incorporates a rotary shield, which when opened, allows the detection of beta radiation for energies above approximately 200 keV. The beta contribution to a measurement can be determined by subtracting the reading with the rotary shield closed from the reading with the shield open. However, the standard meterface units used on a counter with the Model 44-6 detector are expressed in cpm and exposure rate. In this case, the beta contribution can be quantified only in units of cpm, as units of exposure rate do not apply to beta radiation. The shield should always be in the "closed" position when making exposure (mR/hr) measurements.

The gamma response of the Model 44-6 is nominally linear, (within 10%) up to 50mR/hr without instrument dead time correction, and up to 500 mR/hr with dead time correction. Dead time is typically 95 microseconds.

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 44-6 serial number is located on the side of the detector.

To return an instrument or detector for repair or calibration, provide sufficient packing material to prevent damage during shipment.

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

Indicated Use: beta gamma survey

Detector: 30 mg/cm^2 stainless steel wall halogen quenched GM

Gamma Sensitivity: typically 1200 cpm/mR/hr (^{137}Cs gamma)

Beta Cut Off: approximately 200 keV (*Window open*)

Gamma Energy Response: See the graph located at the end of this manual on page 6.

Dead Time: typically 95 microseconds

Compatible Instruments: general purpose survey meters, ratemeters and scalers

Connector: Series "C" (*others available*)

Construction: stainless steel with rotary beta window

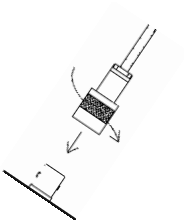
Temperature Range: -20 to 50 °C (-4° to 122 °F); may be certified for -40 to 65 °C (-40° to 150 °F)

Size: 3.2 x 15.2 cm (1.3 x 6 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 ¼ 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).

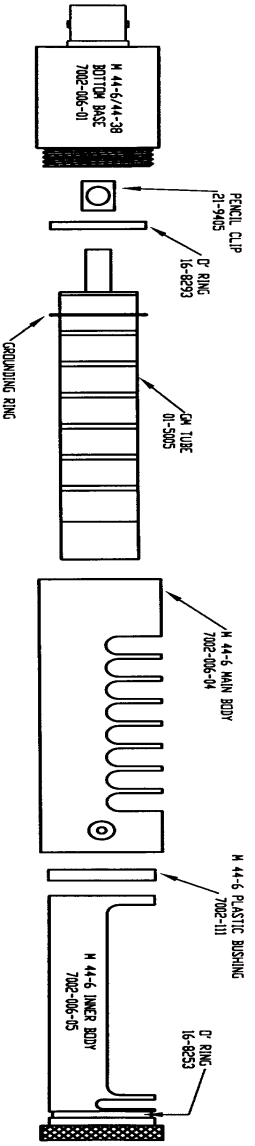
3. If a check source is available, expose the detector to the check source and verify that the instrument indicates within 20% of the check source reading from the last calibration. Alternatively, expose the detector to a source of known value and verify that the detector detects greater than or equal to the efficiency listed in the specification section of this manual.
4. Instruments and detectors, which meet these criteria, are ready for use. Failure to meet these criteria may indicate a malfunction in the detector.

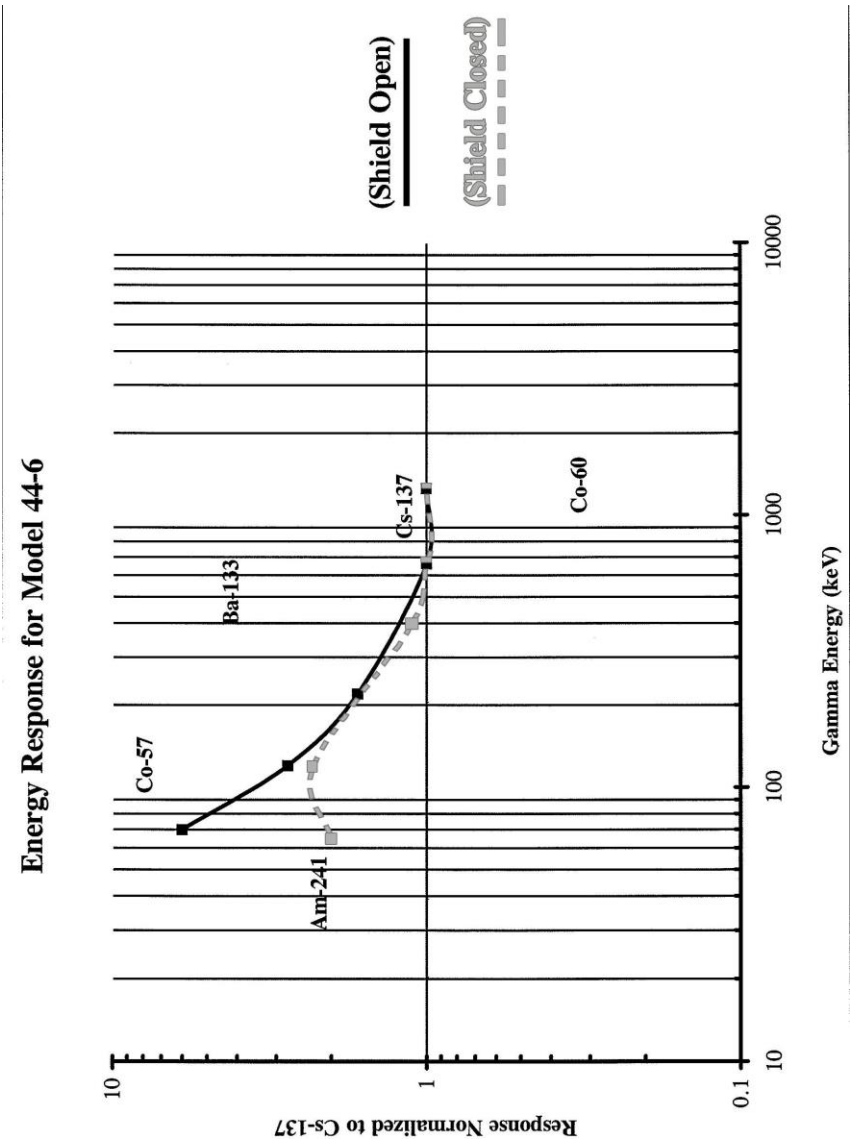
Parts List, Drawings and Diagrams

Model 44-6 Beta-Gamma Detector

Reference	Description	Part Number
UNIT	Completely Assembled Model 44-6 Beta-Gamma Detector	47-1535
*	GM TUBE (LND 725, TGM N112)	01-5005
*	O-RING	16-8253
*	TUBE CLIP	01-5237
*	BOTTOM BASE	7002-006-01
*	MAIN BODY	7002-006-04
*	INNER BODY	7002-006-05
*	O-RING FOR INNER BODY	16-8293
*	MAIN BUSHING	7002-111
	CONNECTOR SERIES "C"	4478-011

Model 44-6 Beta – Gamma Detector




Energy Response for Model 44-6
(Shield Open)
(Shield Closed)
Co-57
Ba-133
Am-241
Cs-137
Co-60
Response Normalized to Cs-137
Gamma Energy (keV)
10
1
0.1
10
100
1000
10000