

**LUDLUM MODELS 44-40, 44-40-1 & 44-40-2
GM DETECTOR**

March 2014

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GM DETECTOR**

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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**



Shown above is the Model 44-40. At right is the 44-40-2. The 44-40-1 is similar to the 44-40.



Model 44-40 Series GM Detectors

TABLE OF CONTENTS

- 1. GENERAL 1
- 2. SPECIFICATIONS..... 2
- 3. TUBE INSTALLATION..... 2
- 4. PARTS LIST 3
 - Model 44-40 GM Detector 3
 - Model 44-40-1 GM Detector 3
 - Model 44-40-2 GM Detector 4

1. GENERAL

The Model 44-40 series of GM (Geiger-Mueller) detectors are capable of detecting alpha, beta, or gamma radiation. The Model 44-40-1 and 44-40-2 are modified versions of the 44-40.

Both the **44-40** and **44-40-2** are lead shielded. The lead shield attenuates the background and unwanted radiations, which allow for greater sensitivity in counting wipes, filters, or slides.

What makes the Model 44-40-2 different from the 44-40 is that it has painted aluminum housing over the lead shielding, and the connector is closer to the body on the back of the instrument. The connector for the 44-40 extends slightly off the bottom.

The Model **44-40-1** is a modified version of the 44-40 with two differences:

1. The Model 44-40-1 is tungsten shielded instead of lead shielded. This difference results in the detector being lighter (approximately 2 kg {4.5 lb} in weight, as opposed to 2.5 kg {5.5 lb}). The thickness of the tungsten shield varies from 3.05 cm (1.2 in.) on sides to 4.06 cm (1.6 in.) on back on back.
2. The detector housing for the Model 44-40-1 is not designed to be removable from the shield.

Three nylon feet hold the unit for the 44-40 series off the surface to protect the window and holder from contamination. The nylon feet are secured by screws, which can be easily replaced if they become contaminated.

The GM detector is contained in a housing that can be removed from the lead shield. Removing the three screws fastening the nylon feet to the lead base allows the detector to be removed from the shield. The stainless steel protective screen, protecting the GM tube window, may also be removed.

The GM detector operates at 850-1000 volts. The tube manufacturer recommends operation

at 900 V. The recommended instrument input sensitivity is approximately 30 mV or higher to keep the detector from double-pulsing. The double-pulse is caused by the size of the after-pulse exceeding the instrument threshold.

The GM tube face is also susceptible to rupture above 8000 feet altitude pressure. Consequently, detectors carried in unpresurized aircraft above this altitude would be subject to failure.

The Model 44-40 series of detectors will operate with any of the Ludlum instruments or equivalent instruments that provide 900 V and an input sensitivity of approximately 30 mV or higher.

Model 44-40 Series GM Detectors

2. SPECIFICATIONS

DETECTOR OPERATING RANGE: 850-1000 V, (nominally 900 V)

WINDOW THICKNESS: 1.7 ±0.3 mg/cm²
mica

WINDOW ACTIVE AREA: 15.51 cm²

WINDOW OPEN AREA: 12.26 cm²

PROTECTIVE SCREEN: stainless steel,
79% open

EFFICIENCY (4π) (approximate):

5% for ¹⁴C; 22% for ⁹⁰Sr/⁹⁰Y; 19% for ⁹⁰Tc;
32% for ³²P; 15% for ²³⁹Pu

WEIGHT: **44-40:** 2.5 kg (5.5 lb)

44-40-1: 2.0 kg (4.5 lb)

44-40-2: 2.4 kg (5.2 lb)

GAMMA FRONT TO BACK RATIO: 4:1

SHIELD THICKNESS:

44-40: 1.3 cm (0.5 in.)

44-40-1: 3.05 cm (1.2 in.) on side;

4.06 cm (1.6 in.) on back

44-40-2: 1.3 cm (0.5 in.) on side;

3.6 cm (1.4 in.) on back

3. TUBE INSTALLATION

NOTE: In most cases, the Model 44-40 is shipped completely assembled. However, when shipping it by air, it is necessary to ship the tube in a sealed container to avoid sudden atmospheric changes.

To install the tube:

- Remove three metal-core screws on the front panel.
- Loosen the Allen screws in the lead shield.
- Remove the pancake tube.

- Remove the three screws and then the back plate.
- Loosen the three set screws.
- Push clip into anode housing. Do not flex wire when installing clip.
- Carefully install tube with window facedown in housing and tighten set screws evenly. Tube should be flush against the screen.
- Replace back plate.

CAUTION: Mica window is extremely thin and will easily break. Do not touch.

Model 44-40 Series GM Detectors

4. PARTS LIST

Ref. No.	Description	Part No.
Model 44-40		
UNIT	Completely Assembled Model 44-40 GM Detector	47-1538
*	GM TUBE (LND 7311)	01-5008
*	TUBE CLIP	01-5237
*	HANDLE	7283-003
*	LEAD SHIELD	7283-002
*	TUBE HOLDER	2283-005
*	RESISTOR-3.3Meg, 1/4W	10-7044
*	CONNECTOR- RECPT/UG706/U "C"	4478-011
*	SCREW-10-32 X 1/4 SOC SET	17-8560
*	SCREW-10-32 X 3/8 SOC SET	17-8723
*	SCREW 6-32 X 1/4 METAL CORE	17-8506
*	E-Z LOCK 6-32 X 1/4-20	20-9066
*	HV WIRE Teflon Red #22	21-8988
*	ACCESSORY-PROTECTIVE SCREEN	21-9586
Model 44-40-1		
UNIT	Completely Assembled Model 44-40-1 GM Detector	47-2124
*	GM Tube (LND 7311)	01-5008
*	TUBE CLIP	01-5237
*	MODEL 44-40-1 HANDLE	7283-018
*	TUNGSTEN SHIELD	7283-017
*	MODEL 44-40-1 DETECTOR BODY ALUMINUM	2283-020
*	RESISTOR-3.3Meg, 1/4W	10-7044
*	CONNECTOR-RECPT/UG1094/U SCREW BNC	13-7753
*	SCREW 6-32 X 5/16 BH	17-8519
*	SCREW 8-32 X 5/8 SOC SET	17-8765
*	HV WIRE Teflon Red #22	21-8988
*	PROTECTIVE SCREEN	21-9586

Model 44-40 Series GM Detectors

Model 44-40-2

UNIT	Completely Assembled	
	Model 44-40-2 GM Detector	47-2758
*	GM TUBE (LND 7311)	01-5008
*	TUBE CLIP	01-5237
*	MODEL 44-40-2 HANDLE	7371-011
*	LEAD SHIELD	2283-026
*	MODEL 44-40-2 DETECTOR BODY	2283-029
*	RESISTOR-3.3 MEG, 1/4W	10-7044
*	CONNECTOR-UG-706/U "C"	4478-011
*	SCREW 4-40 X 1/4 BH	17-8510
*	SCREW 6-32 X 1/4 BH	17-8518
*	SCREW 4-40 X 7/8 FH	17-8573
*	SCREW 4-40 X 7/16 FH	17-8591
*	NUT 4-40 REG PATTERN	20-9002
*	WASHER #4 ITLW	20-9008
*	WASHER SPRING F1830-016	20-9132
*	HV WIRE TEFLON #22	21-8988
*	CONNECTOR CAP	7283-030
*	WEAR PLATE	7295-629