LU DLUM MODEL 44-1
BETA SCINTILLATOR

Serial Number PR134493
and Succeeding Serial Numbers
July 2015
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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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1. GENERAL

The Model 44-1 detector contains a cylindrical, 0.025 cm (0.010 in.) thick plastic scintillator for the detection of beta radiation with minimal contribution from background gamma radiation. The plastic scintillator is 4.3 cm (1.7 in.) in diameter with a window area of 11.6 cm$^2$. The window is covered by 1.2 mg/cm$^2$ metalized polyester to reduce light response. (Light response can cause excessive background counts.)

The Model 44-1 may be used with any of the Ludlum instruments or equivalent instruments with a voltage range of 500-1200 volts and an input sensitivity of 2-50 mV.

An adjustable gain control mounted on the connector cap provides a means to bring the operating voltage up to 900 volts and thus be compatible with most Geiger-Mueller (GM) tube operating voltages.

2. SPECIFICATIONS:

**Photomultiplier Tube:** 3.8 cm (1.5 in.) diameter, 10-stage, head-on type, magnetically shielded

**Scintillator:** plastic, 4.3 cm (1.7 in.) diameter, 0.03 cm (0.01 in.) thick

**Window:** 1.2 mg/cm$^2$ metalized polyester

**Window Area:** 9.7 cm$^2$ active and open

**Efficiency ($4\pi$):** 7% for $^{14}$C

**Background:** Exposed indoors and to a radiation field of 10 µR/hr, it is less than 100 cpm. Exposed to daylight, it is less than 150 cpm.

**Detector Operating Voltage:** 500-1200 V

**Connector:** standard series "C", other types available upon request

**Temperature Range:** -20 to 50 °C (-4 to 122 °F)

**Size:** 5.1 x 18.5 cm (2 x 7.3 in.) (Dia x L)

**Weight:** 0.3 kg (0.6 lb)

**Construction:** aluminum housing with beige powder coating
## REPLACEMENT PARTS LIST

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 44-1 Beta Scintillator</strong></td>
<td><strong>UNIT</strong> Completely Assembled Model 44-1 Beta Scintillator</td>
<td>47-1531</td>
</tr>
<tr>
<td><strong>Assembly View, Drawing 2 X 155</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>PM Tube/Socket Assembly</td>
<td>4002-510</td>
</tr>
<tr>
<td>*</td>
<td>Plastic Scintillator</td>
<td>01-5150</td>
</tr>
<tr>
<td>*</td>
<td>Adjustable Gain End Cap</td>
<td>40-4049</td>
</tr>
<tr>
<td>*</td>
<td>Connector, Series &quot;C&quot;</td>
<td>13-7751</td>
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<tr>
<td>*</td>
<td>Window Assembly</td>
<td>40-4375</td>
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<tr>
<td>*</td>
<td>Light Pipe</td>
<td>7002-321</td>
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<tr>
<td>*</td>
<td>Tube Shield</td>
<td>40-4006</td>
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<tr>
<td>2 EA.</td>
<td>Sponge</td>
<td>7002-029-05</td>
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<tr>
<td>(Optional)</td>
<td>End Cap - plain</td>
<td>7002-029-02</td>
</tr>
<tr>
<td></td>
<td><strong>3.8 cm (1.5 in.) Tube Socket Board, Drawing 2 x 317</strong></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>Assembled Tube Socket Board</td>
<td>5002-502</td>
</tr>
</tbody>
</table>

### CAPACITORS

| C1       | 0.01\(\mu\)F, 2kV, C                           | 04-5525  |

### RESISTORS

| R1       | 10 MEG, \(\frac{1}{4}\) W, 2%                  | 10-7106  |
| R2       | 1 MEG, \(\frac{1}{4}\) W, 1%                   | 12-7964  |
| R3-R6    | 10 MEG, \(\frac{1}{4}\) W, 2%                  | 10-7106  |
| R11      | 10 MEG, \(\frac{1}{4}\) W, 2%                  | 10-7106  |
| R101-R104| 10 MEG, \(\frac{1}{4}\) W, 2%                  | 10-7106  |
| R111     | 10 MEG, \(\frac{1}{4}\) W, 2%                  | 10-7106  |

### MISCELLANEOUS

| *        | CONTACT                                         | 18-9124  |
| *        | JACK-TEST                                       | 18-8806  |
| *        | CONN-640442-3 MTA100                            | 13-8135  |
### Adjustable Gain Circuit Board, Drawing 209 x 18

<table>
<thead>
<tr>
<th>UNIT</th>
<th>Assembled Adjustable Gain Board</th>
<th>5209-019</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAPACITORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>0.0047μF, 3kV, C</td>
<td>04-5547</td>
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<tr>
<td><strong>RESISTORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1</td>
<td>TRMR, 100k</td>
<td>09-6813</td>
</tr>
<tr>
<td><strong>MISCELLANEOUS</strong></td>
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<tr>
<td>*</td>
<td>CLOVERLEAF</td>
<td>18-8771</td>
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Assembly View, Drawing 2 x 155

3.8 cm (1.5 in.) Tube Socket Board, Drawing 2 x 317
3.8 cm (1.5 in.) Tube Socket Component Layout, Drawing 2 x 318

Adjustable Gain Board, Drawing 209 x 18
PLASTIC SCINTILLATOR
01-5150

BLACK PAPER
7002-064-011

MYLAR GLUED
TO PHENOLIC
7002-064-010

NEOPRENE GASKET
7002-064-012

ADJUSTABLE
GAIN BOARD
5209-019

ADJUSTABLE
GAIN CAP
40-4049

TUBE SHIELD
40-4006

PROBE BODY
2002-320

TUBE/ SOCKET ASSY
4002-510

Sponge Spacer
7002-029-05

VIEW A

LIGHT PIPE
7002-321

VIEW A

1.875

6.540