LUDLUM MODEL 44-89 and 44-94

PANCAKE CLUSTER DETECTORS

June 2016
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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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Model 44-89 and 44-94 Cluster Pancake Detectors
1. GENERAL

The Model 44-89 and 44-94 GM (Pancake) Cluster Detectors will detect alpha, beta, and gamma radiation. Their size and shape provides easy handling for surveying or personnel monitoring. The detectors are energy dependent, over-responding by a factor of 6 in the 60 to 100 keV range when normalized to $^{137}$Cs.

Their thin windows are protected by a 79% open stainless steel screen. Their GM tubes can easily be removed for repair.

The GM detectors operate at 850-1000 V. The tube manufacturer recommends operation at 900 V. The recommended instrument input sensitivity is approximately 80 mV or higher to keep the detectors from double pulsing. The double pulse is caused by the size of the after pulse, exceeding the instrument’s threshold.

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

The Model 44-89 and 44-94 will operate with any of the Ludlum instruments or equivalent instruments that provide 900 V and an input sensitivity of approximately 80 mV or higher.

2. SPECIFICATIONS

OPERATING VOLTAGE: 850-1000 V (typically 900 V)

SENSITIVITY: 13,200 cpm/mR/hr

BACKGROUND: 240 cpm

WINDOW THICKNESS: 1.7 ±0.3 mg/cm$^2$ mica

WINDOW AREA: open approximately 50 cm$^2$ (7.8 in$^2$); active approximately 62 cm$^2$ (9.5 in$^2$)

WINDOW PROTECTIVE SCREEN: 79%

EFFICIENCY: 5% for $^{14}$C; 22% for $^{90}$Sr/$^{90}$Y; 19% for $^{99}$Tc; 32% for $^{32}$P; 15% for $^{239}$Pu

CONSTRUCTION: aluminum back and reversible handle with ABS plastic main body

WEIGHT: 0.86 kg (1.9 lb)

SIZE FOR MODEL 44-89:
2.3 x 12.9 x 12.9 cm (0.9 x 5.1 x 5.1 in.) (H x W x L)

SIZE FOR MODEL 44-94:
2.3 x 11.4 x 15.5 cm (0.9 x 4.5 x 6.1 in.) (H x W x L)
### 3. PARTS LIST

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Description</th>
<th>Part No.</th>
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</thead>
<tbody>
<tr>
<td>UNIT</td>
<td>Completely Assembled Model 44-89 50 cm² Pancake Array</td>
<td>47-2357</td>
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<tr>
<td>UNIT</td>
<td>Completely Assembled Model 44-94 Pancake Cluster Detector</td>
<td>47-2390</td>
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<tr>
<td></td>
<td>GM TUBE (LND 7311, TGM N1002)</td>
<td>01-5008</td>
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<tr>
<td></td>
<td>PANHEAD SCREWS (#4 X 1/2) (18 EACH)</td>
<td>17-8903</td>
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<tr>
<td></td>
<td>PENCIL CLIP</td>
<td>21-9405</td>
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<td></td>
<td>RESISTOR, 3.3 MEGOHMS</td>
<td>10-7044</td>
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<td>CONNECTOR, UG 706/U</td>
<td>13-7751</td>
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<td>RED BELDEN 8525 (20 INCH)</td>
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<td>PROTECTIVE SCREEN</td>
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<td>MODEL 43-44 HANDLE</td>
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<td>MODEL 44-94 BODY</td>
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<td>MODEL 44-94 BACK</td>
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<td>MODEL 44-89 BODY</td>
<td>7401-004</td>
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<td>MODEL 44-89 BACK</td>
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<tr>
<td></td>
<td>6-32 BRASS KNURL NUT (4 EACH)</td>
<td>20-9074</td>
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<td>SPRING WASHER (4 EACH)</td>
<td>20-9132</td>
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<tr>
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<td>1/8 INCH CLEAR SHRINK GPF-135 (4 INCH)</td>
<td>27-9726</td>
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4. DRAWINGS AND DIAGRAMS

Model 44-89 Assembly View, Drawing 401 x 5
Model 44-94 Assembly View, Drawing 401 x 2
RUN #24 TEFLOM WIRES FROM RESISTOR BOARDS IN GROOVE
SOLDER #24 BUSS WIRE TOGETHER ON STANDOFFS