

**LUDLUM MODEL 44-89 and 44-94  
PANCAKE CLUSTER DETECTORS**

**June 2016**

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PANCAKE CLUSTER DETECTORS**

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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**

# Model 44-89 and 44-94 Cluster Pancake Detectors

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# Model 44-89 and 44-94 Cluster Pancake Detectors

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## 1. GENERAL

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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  $^{137}\text{Cs}$ .

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

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

**SENSITIVITY:** 13,200 cpm/mR/hr

**BACKGROUND:** 240 cpm

**WINDOW THICKNESS:**  $1.7 \pm 0.3$  mg/cm<sup>2</sup> mica

**WINDOW AREA:** open approximately 50 cm<sup>2</sup> (7.8 in<sup>2</sup>; active approximately 62 cm<sup>2</sup> (9.5 in<sup>2</sup>))

**WINDOW PROTECTIVE SCREEN:** 79%

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

**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)

## Model 44-89 and 44-94 Cluster Pancake Detectors

### 3. PARTS LIST

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Ref. No.	Description	Part No.
UNIT	Completely Assembled Model 44-89 50 cm <sup>2</sup> Pancake Array	47-2357
UNIT	Completely Assembled Model 44-94 Pancake Cluster Detector	47-2390
*	GM TUBE (LND 7311, TGM N1002)	01-5008
*	PANHEAD SCREWS (#4 X 1/2) (18 EACH)	17-8903
*	PENCIL CLIP	21-9405
*	RESISTOR, 3.3 MEGOHMS	10-7044
*	CONNECTOR, UG 706/U	13-7751
*	RED BELDEN 8525 (20 INCH)	21-9312
*	PROTECTIVE SCREEN	7241-008
*	MODEL 43-44 HANDLE	7316-005
*	MODEL 44-94 BODY	7401-001
*	MODEL 44-94 BACK	7401-002
*	MODEL 44-89 BODY	7401-004
*	MODEL 44-89 BACK	7401-005
*	6-32 BRASS KNURL NUT (4 EACH)	20-9074
*	SPRING WASHER (4 EACH)	20-9132
*	1/8 INCH CLEAR SHRINK GPF-135 (4 INCH)	27-9726

## Model 44-89 and 44-94 Cluster Pancake Detectors

### 4. DRAWINGS AND DIAGRAMS

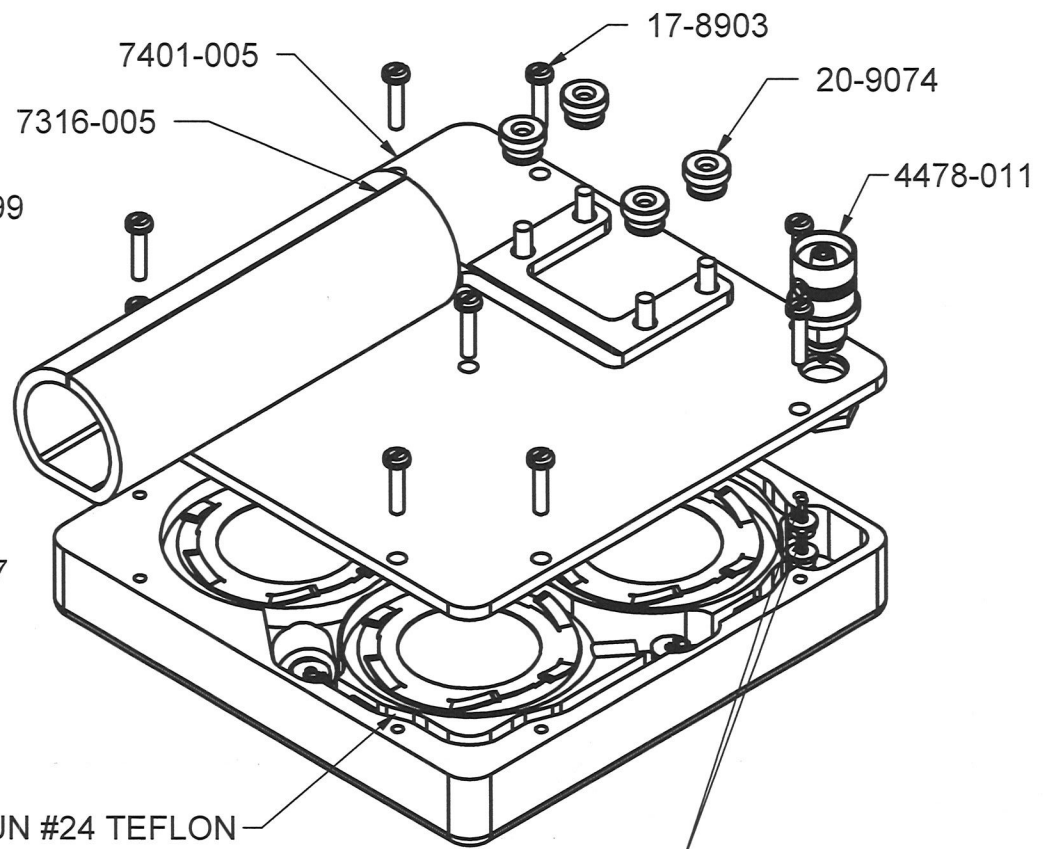
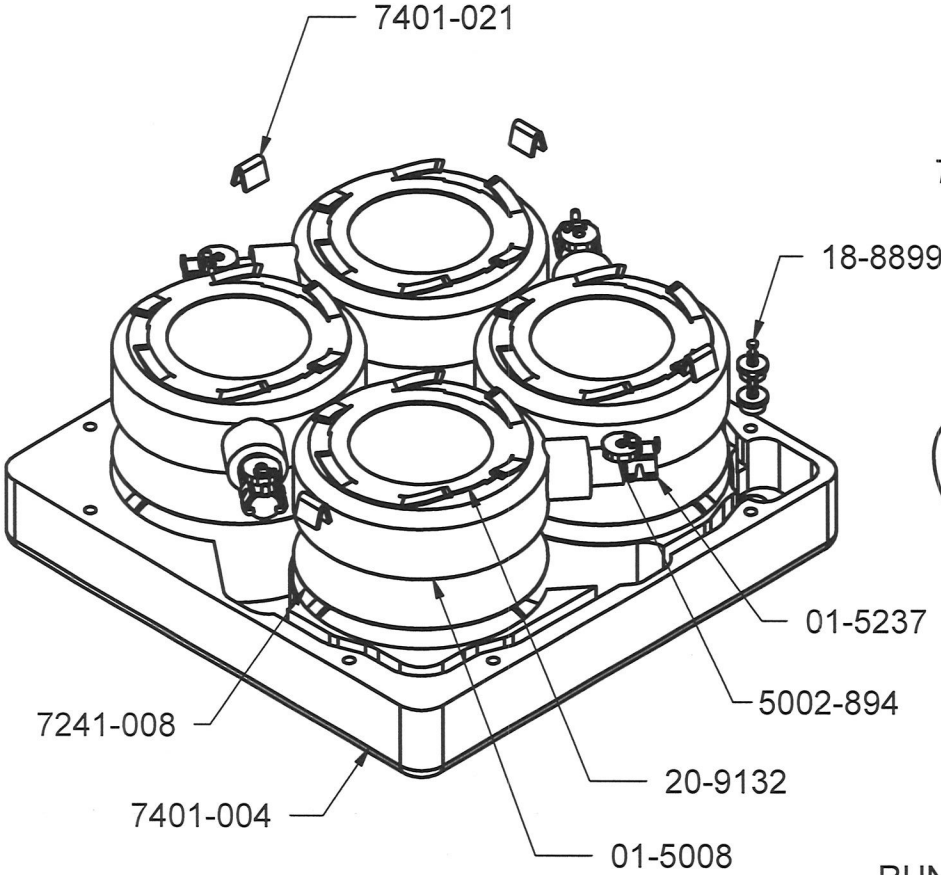
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Model 44-89 Assembly View, Drawing 401 x 5

Model 44-94 Assembly View, Drawing 401 x 2



REVISION HISTORY			
REV	DESCRIPTION	DATE	BY
1	VALID	11-6-92	CMC
2	ECF# 2835	10-14-14	CMC

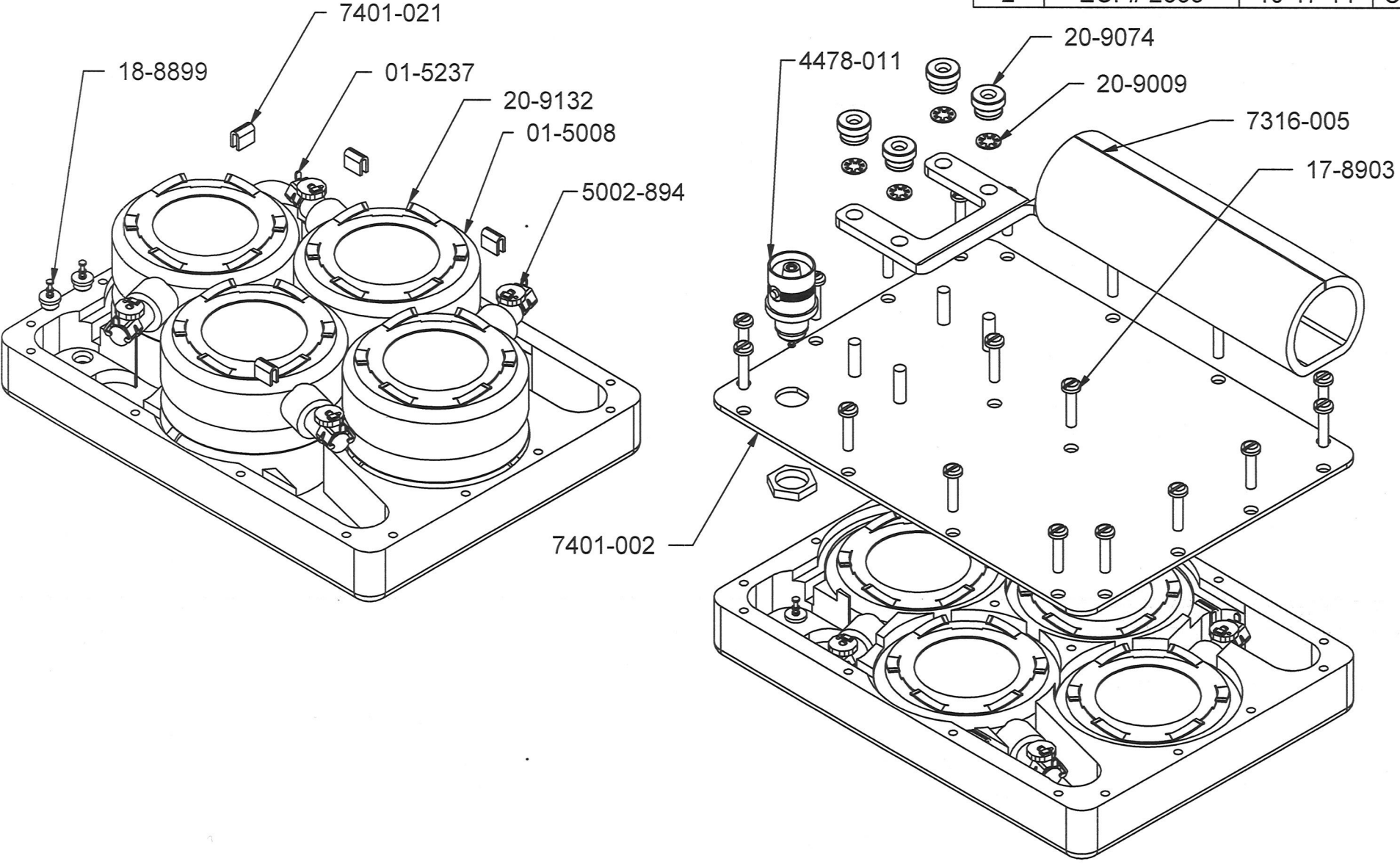


RUN #24 TEFLON WIRES FROM RESISTOR BOARDS IN GROOVE

SOLDER #24 BUSS WIRE TOGETHER ON STANDOFFS

DWN	DATE	CHK	DATE	APP	DATE
WJM	6/3/15			J6W	6-3-15
<b>DWG NUM: 4401-006</b>				SCALE: 5/8	
<b>TITLE M 44-89 ASSY</b>					
LUDLUM MEASUREMENTS, INC. 501 OAK STREET SWEETWATER, TEXAS 79556			SERIES	SHEET	
			401	5	

REVISION HISTORY			
REV	DESCRIPTION	DATE	BY
1	VALID	11-6-92	JGW
2	ECF# 2835	10-17-14	CMC



DWN	DATE	CHK	DATE	APP	DATE
CMC	10-17-14			<i>[Signature]</i>	10-14
<b>DWG NUM: 4401-003</b>				SCALE: 5/8	
<b>TITLE M 44-94 ASSY</b>					
LUDLUM MEASUREMENTS, INC. 501 OAK STREET SWEETWATER, TEXAS 79556				SERIES 401	SHEET 2