

**LUDLUM MODEL 43-135 & 43-135-1
WINDOWLESS GAS PROBE
MARCH 2019**

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WINDOWLESS GAS PROBE
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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 43-135 and 43-135-1 are large-area 2π proportional detectors designed for calibrating large-area alpha and beta sources. The windowless detector and gold-plated source tray are sealed together via heavy duty clamps, which permit operating at higher pressures (up to 0.2 MPa).

Specifications

Model 43-135: Part # 47-3466

Model 43-135-1: Part # 47-4117

Physical:

- **Size:** Approximately 18.3 x 43.2 x 53.3 cm (7.2 x 17 x 21 in.) (H x W x L)
- **Maximum Source Dimension:** 1.3 x 21 x 34.9 cm (0.5 x 8.25 x 13.75 in.) (H x W x L)
- **Weight:** Approximately 37.2 kg (82 lb)

Pressure Requirements:

- **Working Pressure:**
Model 43-135: 22.1 to 29.4 psi, 152 to 203 kPa
Model 43-135-1: 4 to 30 psi, 27-207 kPa
- **Maximum Pressure:** 45 psi (310.3 kPa)
- **Equipped with:**
 - ✓ Inlet and outlet for counting gas
 - ✓ Pressure relief valve for over pressure protection
 - ✓ Pressure gauge, 0-30 psi, 0-200 kPa, two-inch dial

Operational Requirements:

- Chamber is sealed by manually operated clamps.
- **Anode Wire:** 0.001 inch platinum on 1-inch spacing, mounted on Teflon insulated posts.
- **Distance from Sample to Anode Wire:**
Model 43-135: 25.4 mm (1 in.)
Model 43-135-1: 6 mm (0.25 in.)
- **Background:**
 - ✓ Alpha background: approximately 0.06 cps
 - ✓ Beta background: approximately 30 cps
- **Detector Uniform Response:** +/- 1% within the active area
- **Count Rate:** typically 10 to 2000 cps
- **Efficiencies (4π):**
 - ✓ ^{239}Pu is 42%
 - ✓ ^{230}Th is 33%
 - ✓ ^{99}Tc is 55%
 - ✓ ^{63}Ni is 37%
 - ✓ $^{90}\text{Sr/Y}$ is 55%
- **Operating Voltage:**
Model 43-135: typically 1200-2700 Vdc, less than 5000 Vdc
Model 43-135-1: less than 2500 Vdc

- **Plateau Length:** >200 volts with a slope of approximately 1%
- **Electronic Noise:** produces signals less than obtained by sources with energies 50 keV or greater
- **Counter Threshold:** typically -5 mV for gross counting instrument.
- The high voltage and signal is supplied to the unit with a hermetically sealed MHV connector.
- Detector assembly sealed to source base with Viton O-Ring.

Operating Procedures

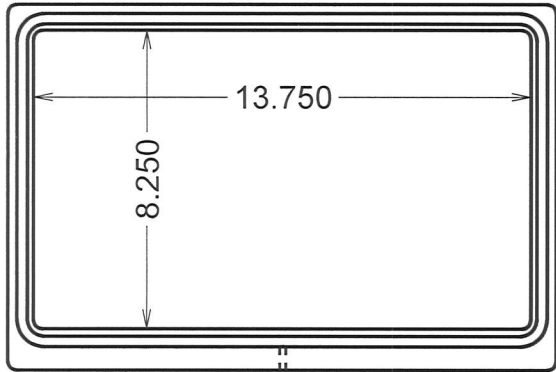
1. Attach P-10 gas source to the inlet valve on the probe body.
2. Use a series “MHV” cable and connect electronics to the probe.
3. Set the regulator to the desired operating pressure; not to exceed 45 psi.
4. Pull out the drawer and insert spacers (if necessary) to obtain the desired source height.
5. Place the source in the center of the drawer and push the drawer back under the probe body.
6. Engage clamps.
7. Flush the probe by turning on the outlet valve, allowing the gas to leave the probe for approximately 2 minutes, and then close the outlet valve.
8. Set the electronics to the desired threshold and high voltage.
9. Record readings.
10. Depressurize the chamber by opening the outlet valve. Release the clamps and pull out the drawer.

Drawings and Diagrams

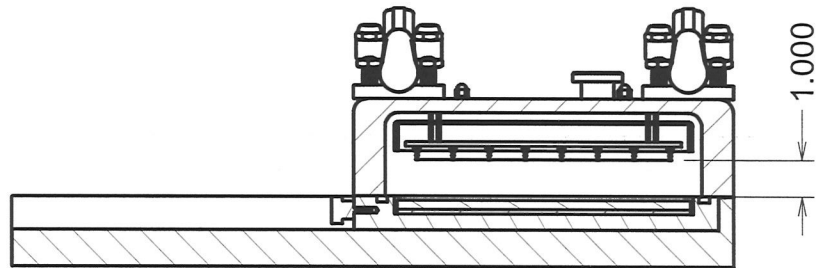
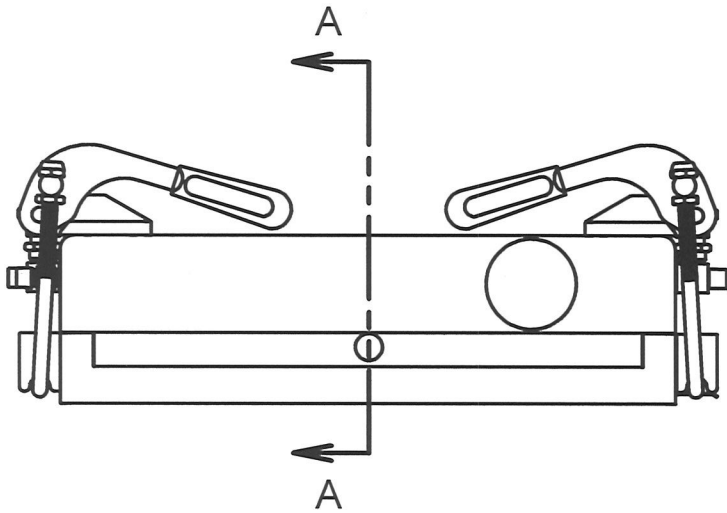
Model 43-135 DIMS, Drawing 304 x 167B

Model 43-135-1 DIMS, Drawing 304 x 268 & 304 x 268A

REVISION HISTORY			
REV	DESCRIPTION	DATE	BY
1	VALID	5/22/14	DDW



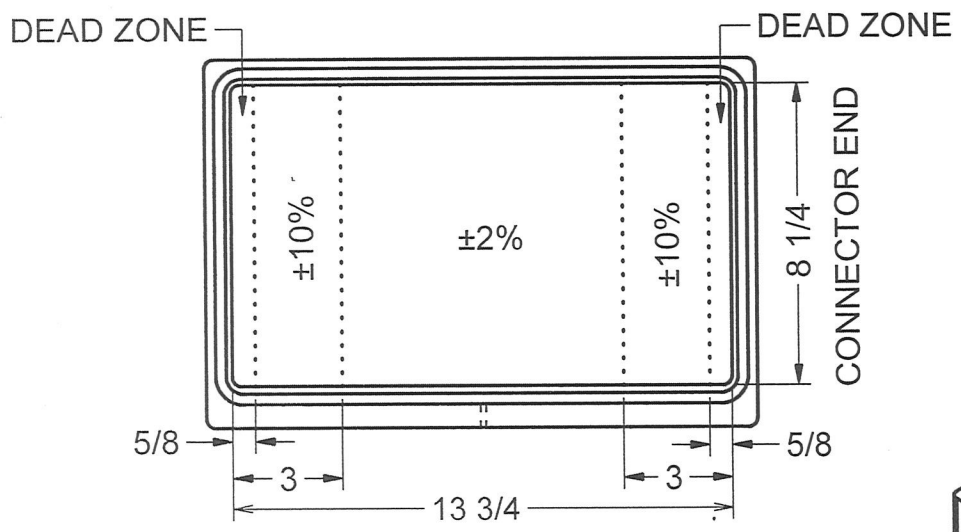
TRAY SIZE



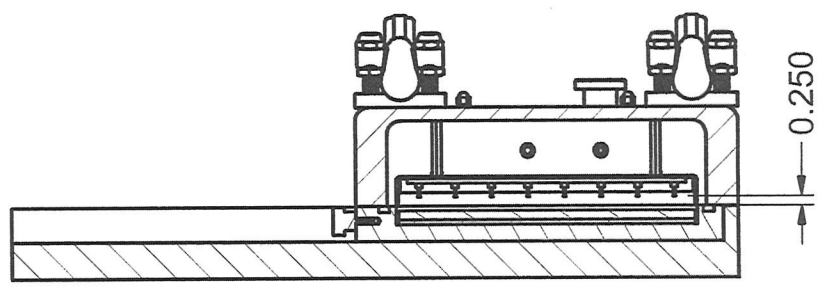
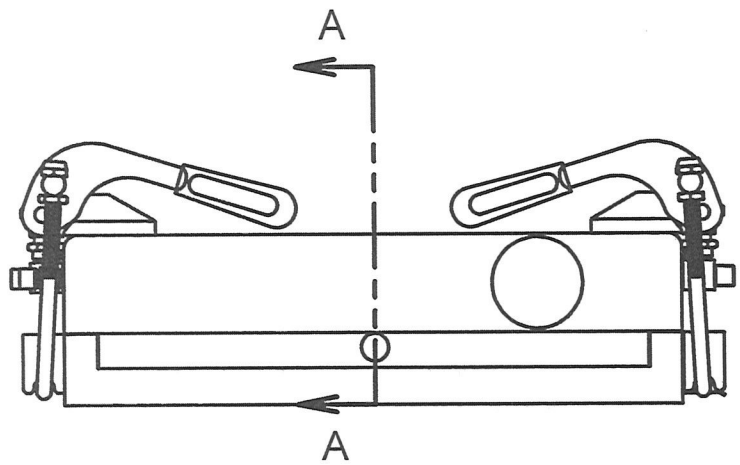
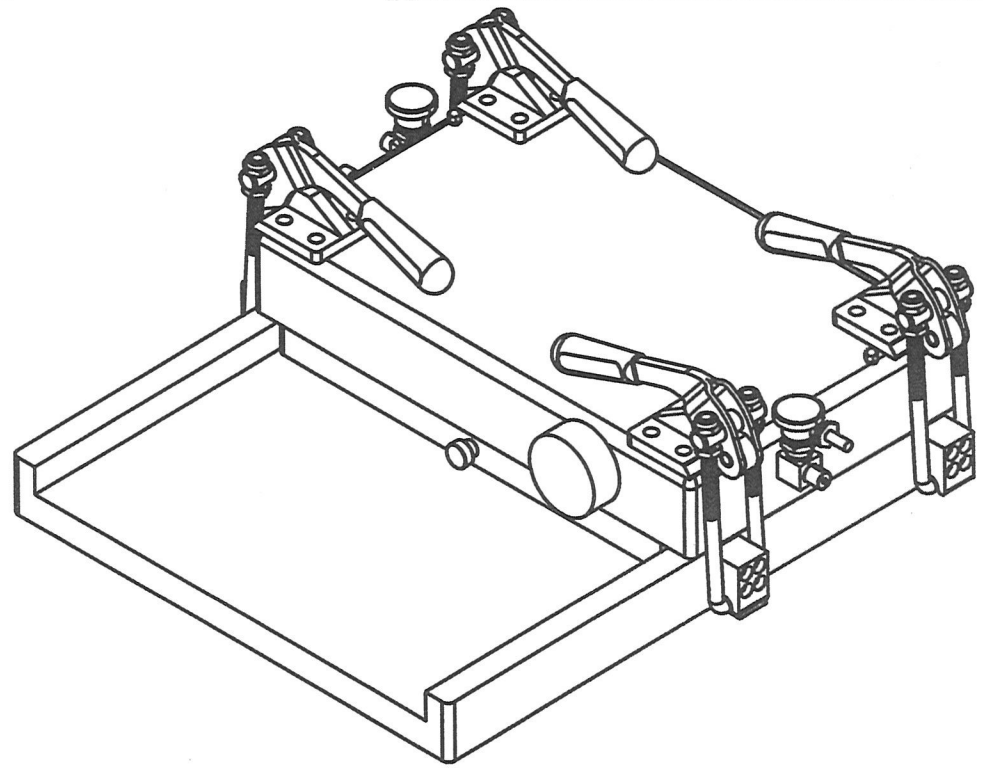
SECTION A-A
SCALE 3/16

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TITLE M 43-135 DIMS					
LUDLUM MEASUREMENTS, INC. 501 OAK STREET SWEETWATER, TEXAS 79556		SERIES 304	SHEET 167B		

REVISION HISTORY			
REV	DESCRIPTION	DATE	BY
1	VALID	10/10/14	DDW



TRAY SIZE AND UNIFORMITY

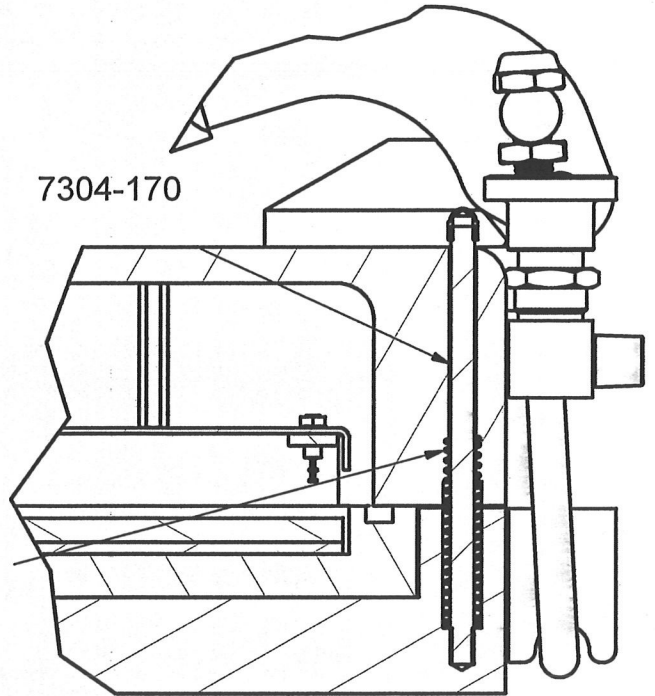
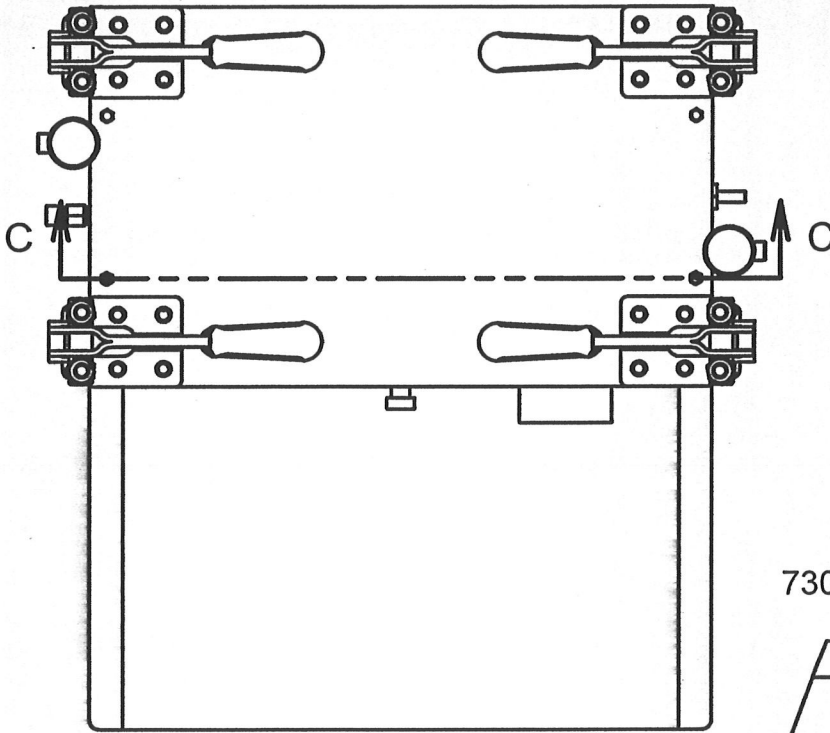


SECTION A-A
SCALE 3/16

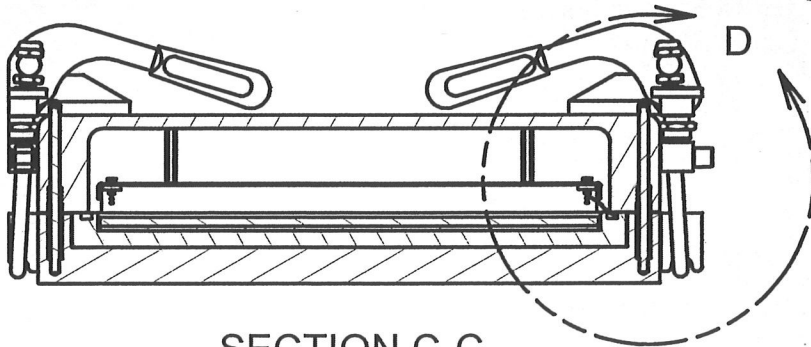
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TITLE M 43-135-1 DIMS					
LUDLUM MEASUREMENTS, INC. 501 OAK STREET SWEETWATER, TEXAS 79556		SERIES	SHEET		
		304	268		

REVISION HISTORY

REV	DESCRIPTION	DATE	BY
1	VALID	10/10/14	DDW



DETAIL D
SCALE 1 / 2



SECTION C-C
SCALE 3/16

DWN	DATE	CHK	DATE	APP	DATE
JGW	12-19-14			<i>Jaw</i>	12-19-14
DWG NUM: 4304-268				SCALE:	
TITLE M 43-135-1 DIMS					
LUDLUM MEASUREMENTS, INC. 501 OAK STREET SWEETWATER, TEXAS 79556			SERIES	SHEET	
			304	268A	