

**MODEL 43-37 AND MODEL 43-37-1
GAS PROPORTIONAL DETECTORS**

**December 2016
Serial No. 086152 and Succeeding
Serial Numbers**

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LUDLUM MEASUREMENTS, INC
501 OAK STREET, P.O. BOX 810
SWEETWATER, TEXAS 79556
325-235-5494, FAX: 325-235-4672

WARRANTY CERTIFICATE

Ludlum Measurements, Inc. warrants the products covered in this instruction manual to be free of defects due to workmanship, materials, 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 those intended.

There are no warranties, expressed or implied, including without limitation any implied warranty of merchantability or fitness, which extend beyond the description of the face thereof. 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 the product.

RECEIVING CONDITION EXAMINATION

Be sure to verify that the shipping carton is received in good condition with no visible damage. Should the instrument be received in a damaged condition, save the shipping container and the packing material and request an immediate inspection by the carrier.

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
915-235-5494
FAX 915-235-4672**

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1. GENERAL

The Ludlum Model 43-37 and Model 43-37-1 are large-area gas proportional detectors, designed to be used with the Ludlum Model 239-1 Floor Monitor. They are designed for alpha and beta survey and are compatible with a number of counting instruments.

Although similar in many performance specifications, the Model 43-37-1 is 7 inches longer than the Model 43-37. (Refer to assembly drawings at the end of this manual.) Instructions and procedures for the Model 43-37 also apply to the Model 43-37-1, except where noted.

2. SPECIFICATIONS

WINDOW THICKNESS:

Alpha only: 0.8 mg/cm² (2 layers of aluminized mylar)

Beta-gamma: 3.4 mg/cm² (1 layer of aluminized mylar and 1 layer of clear mylar)

Gamma: 11.8 mg/cm² (1 layer of aluminized mylar and 1 layer of drafting mylar)

plateau region

Beta-Gamma - Model 43-37: Typically 800-1300 cpm (in 10µR/hr field)

Model 43-37-1: Typically 1000 - 1800 cpm (in 10µR/hr field)

WINDOW AREA:

Model 43-37: 584 cm² active
434 cm² open

Model 43-37-1: 821 cm² active
609 cm² open

EFFICIENCY (4 pi geometry): Typical values for gross counting -

20% ²³⁹Pu (alpha only);

30% ⁹⁹Tc (beta only)

30% ⁹⁰Sr/⁹⁰Y

less than 1% gamma

or for alpha-beta counting -

17.5% ²³⁹Pu

20% ⁹⁹Tc

20% ⁹⁰Sr/⁹⁰Y

less than 1% gamma

COUNTING GAS: P-10 (10% methane, 90% argon) is recommended. Other counting gasses are also acceptable.

GAS RECHARGE: Expected time of operation on static charge with 39-inch cable:

Gross counting mode - 15 hours or longer

Alpha-beta mode - 5 hours or longer

SIZE: Model 43-37:

2.5 x 15.9 x 46.4 cm (1 x 6.25 x 18.25 in.) (H x W x L) (not including fittings)

Model 43-37-1:

2.5 x 15.9 x 64.1 cm (1 x 6.25 x 25.25 in.) (H x W x L) (not including fittings)

OPERATING VOLTAGE:

Alpha - Typically 1100 - 1400 volts

Beta-Gamma -Typically 1700 - 1800 volts

WEIGHT:

Model 43-37: 1.9 kg (4.1 lb)

Model 43-37-1: 2.4 kg (5.4 lb)

COUNTER THRESHOLD SETTING:

Typically 4 mV for scaler or gross counting instrument

GAS CONNECTORS: Double-end quick disconnects

BACKGROUND:

Alpha - less than 10 counts per minute (cpm), when operating at alpha-only

SIGNAL CONNECTORS: Series "C," unless specified

3. PRELIMINARY INSTRUCTIONS

UNPACKING AND REACKING

Remove the calibration certificate or detector functional check certificate and place it in a secure location. Remove the detector and accessories (cable, etc.) and ensure that all of the items listed on the packing list are in the carton. If more than one detector is in the carton, refer to the calibration certificate(s) for serial number match. The Model 43-37 and 43-37-1 serial number is located on the side of the detector near the connector.

To return the instrument for repair or calibration, provide sufficient packing

material to prevent damage during shipment and appropriate warning labels to ensure careful handling.

Every returned instrument must be accompanied by an **Instrument Return Form**, which can be downloaded from the Ludlum website at www.ludlums.com. Find the form by clicking the "Support" tab and selecting "Repair and Calibration" from the drop-down menu. Then choose the appropriate Repair and Calibration division where you will find a link to the form.

4. HOOK-UP

NOTE: Plastic dust caps should **always** be in place on detector gas connectors when gas lines are disconnected, except during a fast flush. Dust caps prevent dust and other materials from interfering with the function of the check valves and should be in place when the detector is operating on a static charge.

Proper hook-up procedure requires connecting the counting gas and input lines together.

RECOMMENDED EQUIPMENT:

- **DUAL-STAGE REGULATOR:** One stage to show supply pressure; second stage to reduce supply pressure to 1-2 psi.
- **NEEDLE VALVE** between second regulator stage and flowmeter for easier flow adjustment.
- **FLOW METERS:** Range of 0-100 cubic centimeters/minute (cc/min).

5. FLUSH

CAUTION: The Models 43-37 and 43-37-1 use double-ended quick connects. Both the male and female quick connects have to be connected to allow counting gas to flow through the detector.

- Connect output gas line from detector to output flowmeter.

- Connect input and gas lines from main supply through the regulator and input flow meter.
- Turn main supply on and flush detector as follows:
Model 43-37 – 100 cc/min for 30 minutes

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Model 43-37-1 – 100 cc/min for 45 minutes

reconnected.

A faster flush time can be achieved by increasing the flow rate. (In general, if the flow rate is doubled, the flush time can be cut in half.)

CAUTION:

The main supply should be reduced to less than 50 cc/min before the output gas line is

- After flush is complete, set flow to 30-50 cc/min.
- Check output flowmeter. Determine detector leakage to be less than 5 cc/min.

6. DETECTOR PERFORMANCE

ALPHA PLATEAU: Determine the plateau region of the background and alpha source counting curves for the applied voltage range of 1100-1400 volts. Use 50-volt increments and set the counting instrument input sensitivity at 4 mV. The operating voltage should be approximately 1250 volts. The background count should be 10 cpm or less. The operating voltage will increase with a higher input sensitivity. Check each section of the detector face for statistically uniform response, that is, ensure that each section reading is within $\pm 10\%$ of the average of the readings. If the count is not statistically uniform, check for light leaks in the window and repeat flush procedures.

BETA-GAMMA PLATEAU: Determine the plateau region in the background and beta-gamma source counting curves for the applied voltage range of 1500 volts to 1900 volts or from 1500 volts to when either the source or background count rate increases dramatically. Use 50-volt increments and leave the input sensitivity at 4 mV. The operating voltage should be approximately 1700-1800 volts, with the background count as stated in Section 2 Specifications. Setting instrument input sensitivity greater than 4 mV will increase the operating voltage.

7. STATIC OPERATION

- Check detector for proper operation, for appropriate source count, and gas leakage.
- Disconnect output and input male quick connects.
- Turn main supply to OFF.
- Check source count before and after

static operation. A decrease in detector efficiency should be less than 10% in 15 hours from when the detector is disconnected from main gas supply.

NOTE: There is expected performance degradation along the sides of the probe and within an inch of the standoffs.

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8. RECHARGE

- Connect output and input quick connects.
- Turn main supply to ON at 30-50 cc/min for routine recharge, or refer to flush procedures for faster flush time.

9. PARTS LIST

Ref. No.	Description	Part No.
	Completely Assembled Model 43-37 Gas Probe	47-1143
	Completely Assembled Model 43-37-1 Gas Probe	47-2243
	Body – Model 43-37	7304-007
	Body – Model 43-3-1	7304-036
1 EA.	Detector Cover (Face) Model 43-37	7304-010
1 EA.	Detector Cover (Face) Model 43-37-1	7304-028
1 EA.	Hex Screen – Model 43-37	7304-011
1 EA.	Hex Screen – Model 43-37-1	7304-025
1 EA.	Holding Ring – Model 43-37	7304-012
1 EA.	Holding Ring – Model 43-37-1	7304-030
1 EA.	Series "C" Connector	13-7751
2 EA.	Quick Disconnect Fitting Stem	13-7912
2 EA.	Quick Disconnect Fitting Pipe	13-7920
10 EA.	Standoff	18-8807
9.26 FT.	Silicone Cord - Model 43-37	22-9631
12 FT	Silicone Cord - Model 43-37-1	22-9631
2 EA	Dust Cap	22-9785

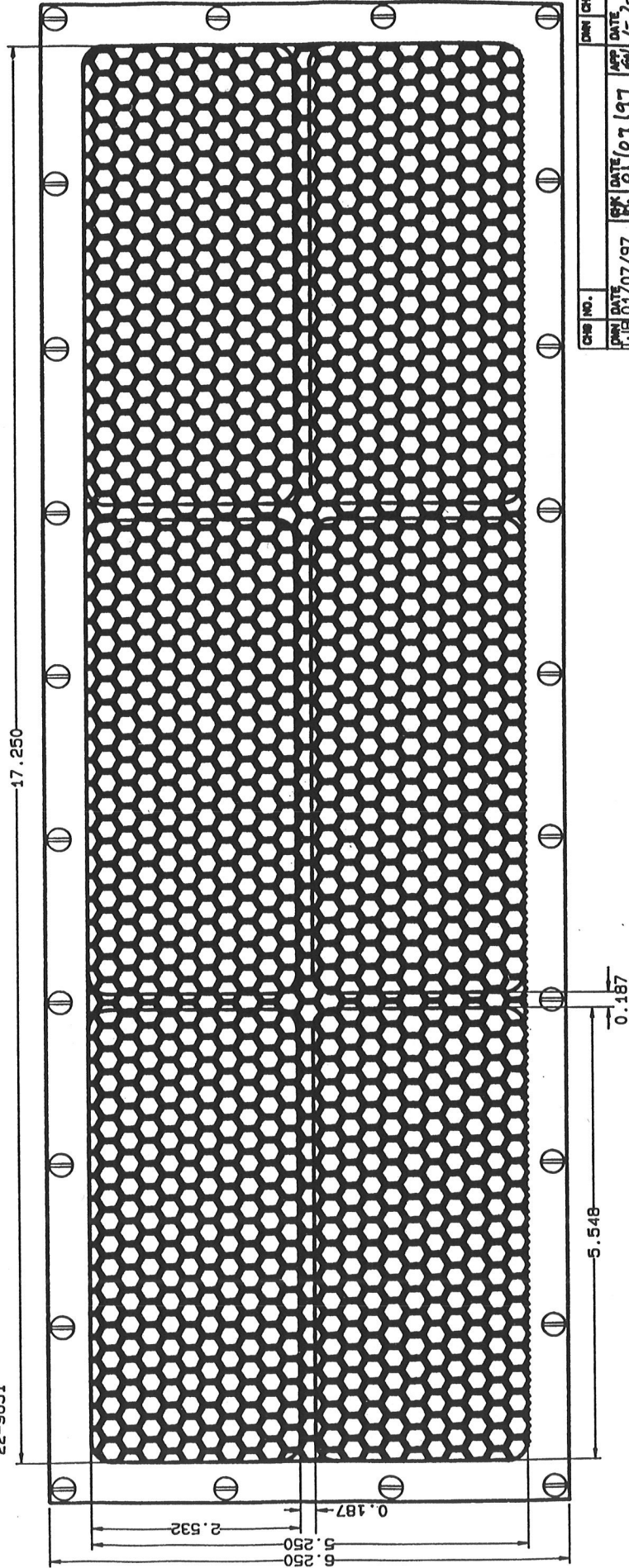
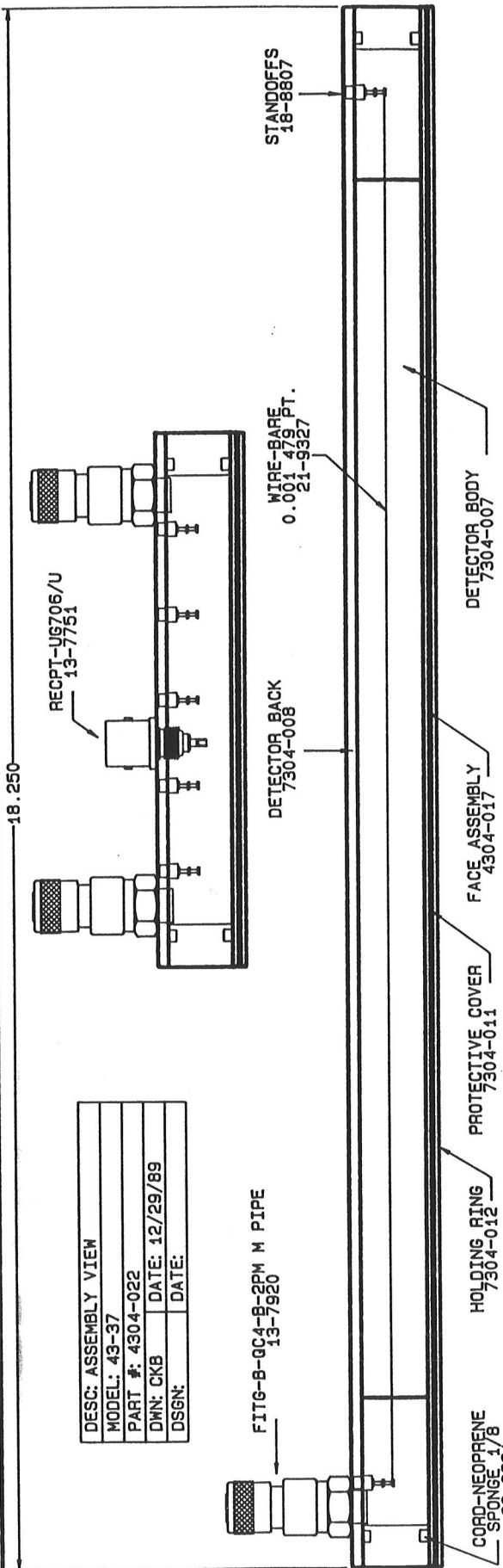
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DRAWINGS & DIAGRAMS

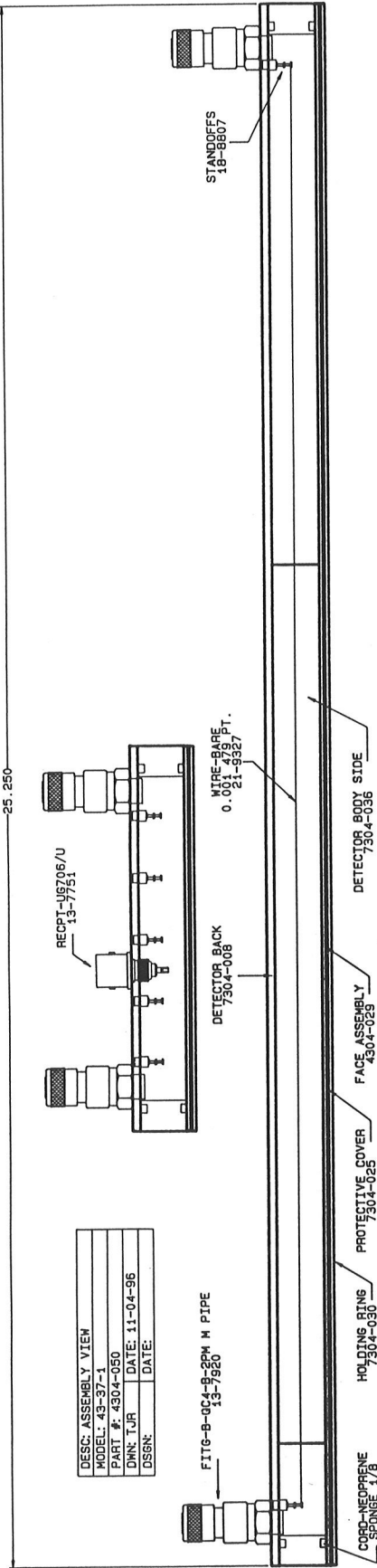
Assembly View (Model 43-37), Drawing 304 x 18

Assembly View (Model 43-37-1), Drawing 304 x 41

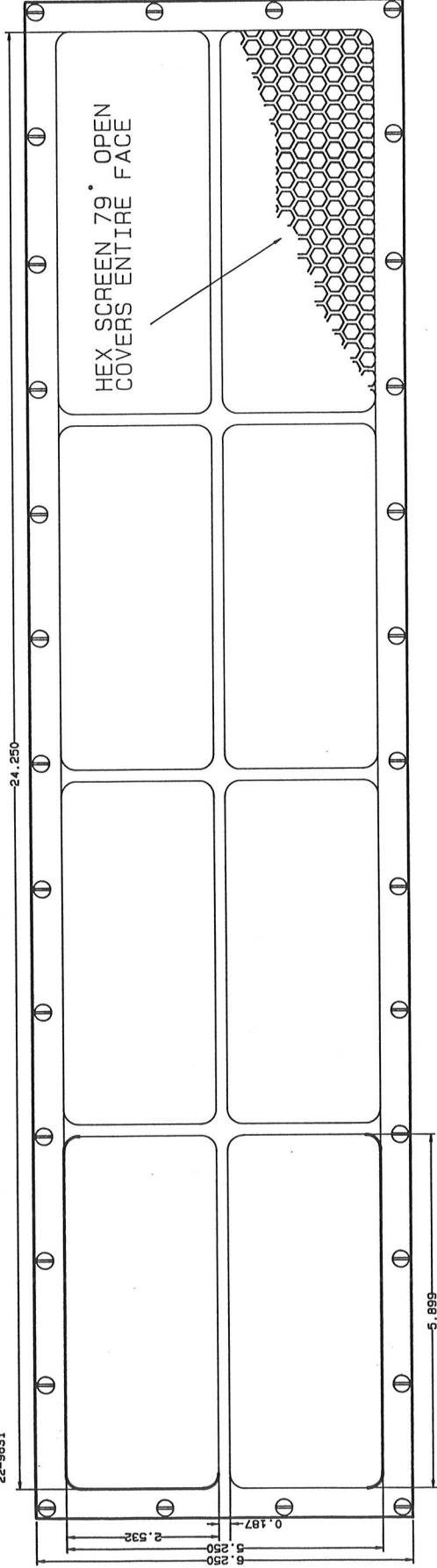
DESC: ASSEMBLY VIEW	
MODEL: 43-37	
PART #: 4304-022	
DMN: CKB	DATE: 12/29/89
DSGN:	DATE:



CRG NO.	DMN	CRK	APP
DMN DATE 12/29/89	CRK DATE 12/29/89	APP DATE 12/29/89	
TOL: SHIP STD OTHER	SCALE: FULL OTHER	SCALE: 1=1.9	
TITLE MODEL 43-37 LARGE GAS PROBE			
LUDLUM MEASUREMENTS, INC. 501 W. STREETS DALLAS, TEXAS 75208			304
SERIES			SHEET
			18



DESC: ASSEMBLY VIEW	
MODEL: 43-37-1	
PART #: 4304-050	
DWN: TJR	DATE: 11-04-96
DSGN:	DATE:



HEX SCREEN 79° OPEN
COVERS ENTIRE FACE

CHK NO.	DWN	CHK	APP
DWN DATE	CHK DATE	APP DATE	
TJR 11-4-96	11/18/96	11/19/96	
TOL: SHOP STD	OTHER	SCALE: FULL	OTHER
TITLE: MODEL 43-37-1 GAS PROBE			
LUDLUM MEASUREMENTS, INC. SERIES			
SHEET NO. 304			
SHEET TOTAL 41			