LUDLUM MODEL 239-1F

FLOOR MONITOR

Revised December 2010

LUDLUM MEASUREMENTS, INC.
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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

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Model 239-1F Floor Monitor shown with
Ludlum Model 2221

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1. GENERAL

The Model 239-1F Floor Monitor is a gas proportional floor monitor detector mounted on a roll-around cart. The instrument features a flow system, quick-connects, a gas bottle mount, and a means to adjust the height of the detector from the floor for optimum performance. A nuclear counting gas bottle, gas regulator, and a survey instrument are required for the operation of the floor monitor.

The survey instrument should be capable of supplying up to 2500 volts to the detector.

The floor monitor utilizes quick-connect fittings on the supply side of the input flow meter and the external outlet line of the output flow meter for flow operation. An input line to the flow meter with quick-connect is attached from the portable gas bottle mounted on the frame of the cart.

2. SPECIFICATIONS

- **DETECTOR SIZE**: 2 x 16 x 46.5 cm (0.8 x 6.3 x 18.3 inch) (H x W x L)
- **DETECTOR ACTIVE AREA**: 584 cm^2
- **ADJUSTABLE HEIGHT**: Detector adjusts from 0 inches to 1½ inches from floor
- **WINDOW MATERIAL**: (a) 0.4 or 0.8 mg/cm^2 (one or two layers metalized mylar) alpha, beta/gamma; (b) 3.9 mg/cm^2 (one layer metalized mylar, one layer 3.5 mg/cm^2 mylar) beta/gamma; (c) 7.9 mg/cm^2 (one layer metalized mylar, one layer 7.5 mg/cm^2 mylar) gamma
- **EFFICIENCY (4π):** 17%-^{239}Pu; 25%-^{90}Sr/^{90}Y; gamma <1%. Efficiencies are expressed in 4pi geometry and calculated with a probe using the 0.8 mg/cm^2 Mylar window at a fixed height of 3/16 inches distance from the floor
- **COUNTER**: Any instrument suitable for use with proportional detectors and capable of 2500V operation.
- **CONNECTOR**: Series "C" type
- **QUICK-CONNECTS**: Swagelock (brand) 1/8 mpt to 1/4 O. D. tubing.
- **GAS CONSUMPTION**: approximately 35 cc/min.
- **FLOW METERS**: Both IN and OUT 0-100 cc/min.
- **FLOW RATE**: 35 cc/min after purging
- **MAXIMUM GAS CYLINDER SIZE**: Size is 9 inch diameter x 26 inches; 0.60 cu. ft. capacity
- **WIRE**: 0.001 inches diameter platinum (8 % Tungsten alloy)
- **STANDOFFS**: Concord 1102-23 - 0019
- **CART:**
  - Handle Height: 3.5 ft.
  - Length: 66.04cm (26 inch), including wheels, but excluding handle.
  - Width: 46.36 cm (18.25 inch)
  - Wheel Size: Rear 8 inches, front 3 inches swivel.
  - Finish: Computer Beige powder coat paint.

- **WEIGHT:** 20 lbs. without gas cylinder and counting instrument.

✓ See instrument manual for specifications and instructions for the counting instrument.

3. GAS BOTTLE INSTALLATION

1. The instrument typically comes with a regulator, a valve, a brass fitting, two white plastic compression nuts, and some vinyl tubing. The valve is in the box with the regulator, the other parts may be in a separate bag.
2. Screw the valve into the output of the regulator. If there is an arrow on the valve, it should point away from the regulator. Screw the fitting onto the valve. Use Teflon tape or sealant on the connections.
3. Set the gas bottle onto the cart and secure with the provided strap. To adjust the strap, open the buckle completely, extend or retract the strap through the latch as necessary then close the buckle. Attach the regulator onto the bottle.
4. Remove the existing nut from the fitting on the regulator. Insert one end of the vinyl tubing into one of the plastic nuts and screw the nut onto the fitting. Finger tight is sufficient.
5. Cut the subbing to the desired length to reach the top of the box on the handle of the cart that has the flowmeters. Remove the existing nut from the fitting on the quick disconnect above the "IN" flowmeter. Insert the other end of the vinyl tubing into one of the plastic nuts and screw the nut onto the fitting. Finger tight is sufficient.
6. Proceed to the operating procedures section of this manual.

4. OPERATING PROCEDURES

✓CAUTION: If the output has a quick-connect fitting, insert a male quick-connect prior to applying the gas supply.

o Turn the flow control valve off. ✓CAUTION: Do not overtighten.

o Turn valve on gas supply bottle to the OPEN position. The high pressure regulator should show the supply pressure from the gas bottle.

o Turn outlet regulator valve clockwise to register between 3-5 psi.

o Open the flowmeter valve on the cart's input flowmeter. Adjust the input flowmeter to 100 cc/min to flush the air out of the detector. After flush, flow may be reduced to 35 cc/min. Allow 10 minutes to purge the system.

✓ NOTE: The outlet flow indicator on the flowmeter box will not immediately indicate flow when system is first turned ON. The primary purpose of the outlet flowmeter on the flowmeter box is to check for system leaks. This process is addressed in the Maintenance Section to follow.

o Connect the detector to the counting instrument

(1) HV is preset at the factory to read alpha, beta, and gamma.

(2) Background count will read approximately 1000-1400 cpm.

(3) If only alpha detection is required, the HV may be adjusted to where the background will read 0-5 cpm.

o Adjust the height of the detector for optimum performance.

5. MAINTENANCE

Periodic maintenance consists of checking the general condition of the detector, gas tubing/fittings, signal/HV cable, and the window. Malfunction of the detector could be caused by a gas leak or a broken HV wire inside the detector.

In case of low count, the detector should be checked for gas leaks. Check the input and output flowmeter on the cart. A reduced or no output flow compared to the input would indicate a gas leak in the system. Any holes in the window will allow counting gas to escape causing degradation of detector efficiency. If the window needs replacing in the detector, the detector should be checked both for gas leaks and HV shorts before replacing detector on the cart.

Indication of a broken wire is low or erratic HV reading. Foreign particles, wire tails on the standoff posts, or solder peaks can cause excessive counts. Loose wires can cause reduced count.

To replace a broken or loose wire, remove the window, being careful not to tear or puncture the window material. Replace the wire and clean the chamber thoroughly. Inspect the gasket for proper condition before replacing the window. Check for gas leaks and proper operation before installing the detector on the cart.

6. REPLACEMENT PARTS LIST

QTY.	DESCRIPTION	PART NO.
MODEL 239-1F FLOOR MONITOR CART		**48-1427**
1 EA	2 Stage-Regulator 8L-350	310017
1 EA	Tie Down Assembly	2310124
1 EA	M 239-1F Welded Cart Assy.	4404-027
2 EA	Shoulder Bushing	7175-010-01
2 EA	Brass Washer	7175-010-02
2 EA	Hand Knob	7175-010-03
2 EA	Stud	7175-010-04
1 EA	Manifold Blocks	7175-014-01
1 EA	Box Side	7175-014-03
1 EA	Box Back	7175-015-01
2 EA	Probe Holder Bracket	7304-013
2 EA	Side Bracket	7404-021
1 EA	Main Box Screened	9175-014
1 EA	5 Ft. "C" Cable	8303-022
10 EA	PLT2M Cable Tie	03-5410
4 EA	Stem Fit-B-OC4-D-400	13-7912
2 EA	M Pipe Fit-B-QC4-B-2PM	13-7920
2 EA	Grommet-2170	18-8774
1 EA	Flowmeter-RMA-150-SSV	21-9547
1 EA	Flowmeter-RMA-150	21-9548
15 FT.	Vinyl Tubing 59002	22-9514
12 FT.	Swaglok-B-400-1-2	22-9522
10 EA	Swaglok-Insert B-405-2	22-9639
28 IN.	Edge Trim 8451A53	22-9828
REGULATOR		**2310017**
SMALL CAN ASSEMBLY		**4175-096**
LARGE CAN ASSEMBLY		**4175-062**
MODEL 43-37 GAS PROPROTIONAL DETECTOR		**47-1143**
1 EA	Face Assembly	4304-017
1 EA	Hex Screen	7304-011
1 EA	Holding Ring	7304-012
1 EA	Screw-In "C" Connector	4478-011
2 EA	Pipe Fitting	13-7920
10 EA	Standoff	18-8807
9.3 FT	Silicone Cord	22-9631