

# Model 3100

## Portable Tritium in Air Monitor

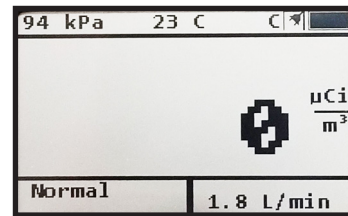


### Features

- No Zero Adjust Control Needed
- Easily Calibrated with  $^{137}\text{Cs}$  Gamma Range
- Temperature and Altitude Compensation
- "Check Mode" Self-Test Feature Determines Instrument State of Health
- Digital Backlit Display with Status, Airflow Readout, and Diagnostic Information
- Internal Heater Element Purge Mode to Dry Ion Chamber
- Internal Chamber with Replaceable Desiccant
- Passed USA Military Tests Including: MIL-STD-810G, MIL-STD-461G, MIL-STD-901D, MIL-STD-1399-300B
- Readout in  $\mu\text{Ci}/\text{m}^3$  or  $\text{MBq}/\text{m}^3$



Part Number: 48-4282-1



Backlit Transflective Display

### Introduction

The Model 3100 Tritium in Air Monitor features ruggedized and flexible operation. It may be powered by either 110 - 240 VAC, 50/60 Hz or by rechargeable internal NiMH batteries. It features a maintenance-free diaphragm air pump to pull air through the 250 cc tritium chamber, and the air flow is measured internally with a mass-air flow sensor. A second 250 cc chamber is used to provide gamma compensation, allowing operation in higher gamma fields. Other internal sensors measure temperature and ambient pressure and provide compensation for these effects.

The heart of the tritium detection is the sealed electrometer chamber, using the latest low-noise electrometer chip. This electrometer can reliably measure the femtoamperes of current resulting from tritium within the chamber and does not require the user to adjust an offset or zero knob. The pixelated digital display provides feedback on the tritium concentration, as well as showing status on several important conditions: temperature, pressure, power, airflow, chamber bias, and alarm or failure status.

The Model 3100 is easy to use, having only a few simple controls, and can be used while wearing gloves. A clear window allows the user to see the condition of the desiccant in the integrated desiccant chamber. A toggle switch allows the user to put the desiccant chamber in-line to the incoming air. The instrument comes in a rugged hard-shell commercial case with wall-mounting brackets. The Model 3100 has passed USA military testing for RF susceptibility and emission, shock and vibration, temperature and blowing rain, as well as other tests.

Ludlum Measurements, Inc.

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Note: specifications subject to change without notification. We are not responsible for errors or omissions.

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## Portable Tritium in Air Monitor



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### Specifications

- EFFECTIVE RANGE OF MEASUREMENT:** displays up to 740 MBq/m<sup>3</sup> (20,000 µCi/m<sup>3</sup>)
- MINIMUM DETECTABLE ACTIVITY (MDA):** 0.074 MBq/m<sup>3</sup> (2 µCi/m<sup>3</sup>)
- GAMMA COMPENSATION:** allows for tritium monitoring in gamma fields up to 0.05 mSv/h (5 mR/hr)
- LCD DISPLAY:** 6.9 cm (2.7 in.) diagonal transfective backlit LCD housed inside the electronics case
- BACKLIGHT:** rotary control adjusts backlight intensity for maximum contrast
- MODE SWITCH:** rotates between CHECK, MEASURE, SAMPLE (PUMP ON), and PURGE modes
- ALARM POINT:** adjusts the tritium alarm threshold anywhere from OFF to 740 MBq/m<sup>3</sup> (20,000 µCi/m<sup>3</sup>)
- RESPONSE TIME:** less than 60 seconds
- ZERO STABILITY:** 60 second countdown on power-up to 1 µCi/m<sup>3</sup> or less
- AUDIO:** 75 ± 5 dB at a frequency of 2500 Hz on alarm or failure conditions
- TEMPERATURE RANGE:** 0 to 50 °C (32 to 122 °F)
- PUMP:** maintenance-free diaphragm pump, typical airflow 1.5 L/min
- OUTPUT:** sealed 9-pin D connector provides potential-free relay contacts for energized and activated pump status, also provides data out for streaming measurements
- POWER:** 110 - 240 VAC, 50/60 Hz input with 1.5A circuit breaker, or 8 NiMH AA cell batteries. Typical continuous battery life is 16 hours.
- CONSTRUCTION:** rugged, gasketed waterproof aluminum case
- AIR FILTER:** external user-replaceable 0.2 µm PTFE air filter
- DIMENSIONS:** Instrument: 20 x 16 x 30 cm (7.9 x 6.3 x 11.8 in.) (H x W x L)  
Case: 20 x 40 x 51cm (7.9 x 15.5 x 19.9 in.) (H x W x L)
- WEIGHT:** Instrument: 4 kg (9 lb) with attached cables and tubing  
Case: 9.5 kg (21 lb) with instrument, hose, power cord, and manual
- SOFTWARE:**
- P/N 4520-169-02: Includes calibration software and USB cable.
  - P/N 4293-676-01: Includes calibration software, pressure calibration kit, and USB cable.

### Type Testing

This is a partial listing of the tests performed on the Model 3100.  
(Tests per ANSI N42.30, MIL-STD-810G, MIL-STD-461G, MIL-STD-901D, MIL-STD-1399-300B)

- BLOWING RAIN:** > 64 kph (40 mph) wind blown rain, < 0.5 mL accumulation inside instrument
- TEMPERATURE:** 10 day high heat +40°C (+104°F) storage, then operation; -25°C (-13°F) storage, then 0°C (+32°F) operation
- HUMIDITY:** several days at 95% RH, instrument must work after being dried out
- SALT FOG:** 48 hours exposure to 35°C (95°F) salt fog with at least 5% salinity, no excessive corrosion
- PRESSURE:** ±1200 meter altitude change does not cause readings to change
- ACCURACY:** within 10%, proved to tritium gas and gamma equivalency
- DRIFT:** 8 hour test at background levels, no reading drift
- COEFFICIENT OF VARIATION:** 10 readings taken at least 1 minute apart, verified < 10% COV
- VIBRATION:** 4 to 33 Hz vibrations at amplitudes of up to 1.5 mm (0.06 in.), no change in readings
- TRANSPORT SHOCK:** dropped in case 27 times from 1.2 m (4 ft.) in different geometries, no effect
- SHOCK:** instrument mounted to bulkhead, six blows, instrument shall not become hazard
- RF SUSCEPTIBILITY:** at up to 50 V/m from 2 MHz to 18 GHz, no change in readings
- CONDUCTED SUSCEPTIBILITY:** on all cables, instrument will not respond to surges, spikes, noise
- SMOKE/AEROSOL:** does not respond to 1 µg/L of aerosols 0.5 µm in size

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