LUDLUM MEASUREMENTS, INC.

Model 3102 Series
Portable Tritium in Air Monitor

Features

- No Zero Adjust Control Needed
- Easily Calibrated with ^{137}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 (with 12 V Input)
- Readout in µCi/m^3 or MBq/m^3

Backlit Transflective Display

Introduction

The Model 3102 Series Tritium in Air Monitors feature ruggedized and flexible operation. Two versions are available: the Model 3102/O (orange label), which has a faster response time and a resolution of 10 µCi/m^3, and the Model 3102/B (blue label), which has a threshold and resolution down to 1 µCi/m^3 but a slower response time. Each monitor features a maintenance-free diaphragm air pump to pull air through the 250 cc tritium chamber; 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 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 3102 Series are easy to use, having only a few simple controls, and can be used while wearing gloves. Both have a large, easy-to-read display with a backlight control for increasing contrast in low-light conditions. In addition to the tritium level, the display simultaneously shows the user the battery/power condition, the temperature, the pressure, the status condition, and the airflow through the chamber. Power is provided via alkaline AA batteries or a +12 Vdc power supply.

The Model 3102 Series are built for ruggedness and reliability. Two airflow pumps were tested and shown to last over 10,000 hours of continuous use. The Model 3102 Series share many of the characteristics and design of the Model 3100, which was built and tested for the U.S. military. Testing was done in accordance with ANSI N42.30, MIL-STD-810G, MIL-STD-461G, MIL-STD-901D, and MIL-STD-1399-300B standards which test instrument operation under various conditions including temperature, blowing rain, salt fog, vibration, mechanical shock, RF susceptibility, and RF emissions. The commercial user of the Model 3102 Series benefits from this design and testing history.

Ludlum Measurements, Inc. P.O. Box 810, Sweetwater, Texas 79556
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Versions

Model	3102/O	3102/B
Part Number	48-4432	48-4433
Features	• Threshold and resolution of 10 µCi/m³ • Fast response time of 12 seconds • Orange front panel label	• Threshold and resolution of 1 µCi/m³ • Slower response time of 60 seconds • Blue front panel label

Specifications

EFFECTIVE RANGE OF MEASUREMENT: displays up to 740 MBq/m³ (20,000 µCi/m³)
GAMMA COMPENSATION: allows for tritium monitoring in gamma fields up to 0.05 mSv/h (5 mR/hr)
DISPLAY: 6.9 cm (2.7 in.) diagonal transflective backlit LCD housed inside the electronics case
CONTROLS:

- MODE SWITCH: rotates between CHECK, MEASURE, SAMPLE (PUMP ON), and PURGE modes
- BACKLIGHT: rotary control adjusts backlight intensity for maximum contrast
- ALARM POINT: adjusts the tritium alarm threshold anywhere from OFF to 740 MBq/m³ (20,000 µCi/m³)
- ACK/RESET: push-button to silence and reset alarm

RESPONSE TIME: 12 or 60 seconds (see above)
ZERO STABILITY: 60 second countdown on power-up to 1 µCi/m³ 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
AIR FILTER: external user-replaceable glass-fiber air filter, 2.5 mm dim., GF/F grade, 0.7 µm retention
POWER: 8 alkaline AA cell batteries or +12 Vdc power supply (included). Typical continuous battery life is 16 hours.
RELAYS: two dry-contact relays signal ALARM and PUMP ON status
CONSTRUCTION: rugged, gasketed waterproof aluminum case
SIZE (H x W x L):
Instrument: 20 x 16 x 30 cm (7.9 x 6.3 x 11.8 in.)
Optional Case: 20 x 40 x 51 cm (7.9 x 15.5 x 19.9 in.)
WEIGHT: 4 kg (8 lb) with attached cables and tubing

Software

- **Calibration Software Kit** (PN: 4520-169-02)
  Includes calibration software, 1.8 m (6 ft) RS-232 to USB cable, and battery slug (for gamma calibrations).
- **Calibration Software Kit with Pressure** (PN: 4293-676-01)
  Includes calibration software, pressure calibration kit, and 1.8 m (6 ft) RS-232 to USB cable.

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