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Your Alternative
To The Obvious

Model 3101
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
- Readout in µCi/m^3 or MBq/m^3

Introduction

The Model 3101 Tritium in Air Monitor features ruggedized and flexible operation. It is powered by rechargeable internal NiMH batteries and/or an external +12 Vdc power supply. 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 3101 is easy to use, having only a few simple controls, and can be used while wearing gloves. It has 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.

The Model 3101 is built for ruggedness and reliability. Two airflow pumps were tested and shown to last over 10,000 hours of continuous use. The Model 3101 shares 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 3101 benefits from this design and testing history.

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Specification

EFFECTIVE RANGE OF MEASUREMENT: displays up to 740 MBq/m^3 (20,000 µCi/m^3)
MINIMUM DETECTABLE ACTIVITY (MDA): 0.074 MBq/m^3 (2 µCi/m^3)
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 transflective 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^3 (20,000 µCi/m^3)
RESPONSE TIME: less than 60 seconds
ZERO STABILITY: 60 second countdown on power-up to 1 µCi/m^3 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: +12 Vdc power supply, or 8 NiMH AA cell batteries. Typical continuous battery life is 16 hours.
CONSTRUCTION: rugged, gasketed waterproof aluminium case
AIR FILTER: External user-replaceable glass-fibre air filter, 2.5 mm dim., GF/F grade, 0.3 µm retention
DIMENSIONS: Instrument: 20 x 16 x 30 cm (7.9 x 6.3 x 11.8 in.) (H x W x L)
WEIGHT: Instrument: 4 kg (8 lb) with attached cables and tubing