MODEL RS400-HTO
PORTABLE TRITIUM IN AIR MONITOR FOR HTO ONLY

The **Model RS400-HTO** lightweight portable tritium in air monitor is designed to measure tritium oxide (HTO) only, even in the presence of other radioactive gases, such as noble gases, as well as background gamma. Four 200cc ionization chambers arranged in a cruciform geometry provide nearly perfect gamma compensation regardless of photon energy, flux, gradient, or flux direction. Two ionization chambers are used for measurement (400cc total) and two for gamma compensation (400cc total). Includes RS-232 data output.

Featuring an upgraded electrometer, the 400 series offers excellent sensitivity and high stability. Thermally induced zero shifts of the electrometer have been eliminated, showing zero drift from 0 – 50 °C.

SENSITIVITY

The **RS400-HTO** is useful for measurements as low as 3 $\mu Ci/m^3$ (0.1 MBq/m^3). The Overhoff electrometer, which measures to below 10^{-16} amperes, combines low noise and high zero stability.

HTO DISCRIMINATION (NOBLE GAS COMPENSATION)

The Model RS400-HTO includes 6 hose connections which can be adjusted for two operating modes to measure either:

1) Total Tritium (HT, HTO, including any other radioactive gases), or
2) Tritium Oxide (HTO) only, ignoring all other airborne radionuclides and gamma fields

For HTO measurement, an external desiccant column is interposed between the measurement and compensation chambers which absorbs and removes the HTO to provide a differential measurement that is proportional to HTO only.

[HTO + other radionuclide – (other radionuclide) = HTO]

RADON INTERFERENCE, NOISE RESPONSE

For an unambiguous measurement of very low tritium a monitor must be able to ignore response to ambient radon. The RS400-HTO incorporates this capability and therefore produces accurate, fast and drift free measurements to nearly ± 1 $\mu Ci/m^3$.

TOTAL GAMMA COMPENSATION

Cruciform ionization chamber geometry provides nearly perfect gamma compensation regardless of photon energy, flux gradient or flux direction. Gamma compensation of the RS400-HTO is typically three orders of magnitude better than instruments using nested or side by side ionization chambers.

FAST RESPONSE

Its exceptionally rapid response is primarily due to its abiltiy to ignore radon. The electronic time constant is only 10 seconds, the pneumatic time constant of about 12 seconds, for an overall time constant of only 15 seconds. Meter readings will reach 90% of final value within 30 seconds to a step response of aspirated tritium.

FAST WARM UP, NO ZERO DRIFT

After applying power, the initial transient “warm up” drift effects take less than a minute. Long term drifts have been eliminated and manual zero adjustments are no longer required.

High Sensitivity	to 3 $\mu Ci/m^3$ (0.1 MBq/m^3)
Fast Response	15 second time constant
Gamma Compensated	virtually no offset in 10 mR/h fields
Response To Radon	suppression circuit ensures noise free operation
No Zero Drift	long term zero stability to better than 1$\mu Ci/m^3$
Rapid Warm Up	less than 30 seconds

The Overhoff Technology Model **RS400-HTO** portable tritium monitor is an instrument with unequaled performance in sensitivity, stability, speed of response, and gamma compensation. HTO discrimination allows the user to precisely measure only tritium even in the presence of other radioactive gases and external gamma fields.

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TECHNICAL SPECIFICATIONS

MEASUREMENT RANGE	Available in the following ranges: i) 1 to 19,999 $\mu Ci/m^3$ ii) 0.1 to 1,999.9 MBq/m^3 or DAC iii) 1 to 19,999 µSv/h
SENSITIVITY	3 $\mu Ci/m^3$ (0.1 MBq/m^3)
DISPLAY	0 – 19,999 digits, LCD panel meter
ACCURACY, SPAN	±10 % of reading, ±2 $\mu Ci/m^3$, whichever is greater
NOISE LEVEL	± 1$\mu Ci/m^3$, 1 S.D. (10 second electronic time constant)
ZERO STABILITY	after 30 seconds (or less) warm up, zero drift less than ± 1$\mu Ci/m^3$
GAMMA COMPENSATION	chambers in a side by side pattern reduce errors due to external gamma radiation.
ALPHA PULSE SUPPRESSION	a circuit provides recognition and cancellation of undesirable noise spikes attributed to airborne radon
RESPONSE RATE	30 seconds to reach 90% of final reading
ALARM (ACOUSTIC)	1. Ten position stepped attenuator set point for signal alarm 2 - 1,000 $\mu Ci/m^3$, steady tone. OFF position is included. 2. Low flow produces an intermittent tone 3. Mute switch silences audible tone
ALARM (VISUAL)	signal level: red LED, when tritium exceeds setpoint low flow: yellow LED, flashing, low pump flow low battery: red LED HVPS Failure: red LED illuminates to indicate a malfunction of the high voltage power supply used to bias the ionization chambers
EXTERNAL CONNECTIONS	RS-232 Data Output
IONIZATION CHAMBER VOLUME	effective volume: 400 cm^3 port to port volume: 440 cm^3
DUST FILTER	HEPA, external in-line disposable cartridge type
PUMP	internal rotary vane pump
FLOW RATE	nominally 1.5 - 2 LPM
ENVIRONMENTAL	0° C to +40° C, 10 - 95 % relative humidity non-condensing
BATTERIES	two “D” size NiMH or Alkaline batteries external jack for supplementary power input and charging
POWER CONVERTER	100-240 VAC, 50/60 Hz, .25 A to 3.3 Vdc @ 1.2 A 5.5 mm O.D. x 2.1 mm I.D. Plug, center pin is positive
SIZE AND WEIGHT	7.6" [193mm] L x 5.2" [132mm] W x 6.9" [175mm] H excluding handle, 6.5 lbs (3 kg)

Accessories included:

- 2 “D” Size NiMH or Alkaline Batteries
- Sniffer hose
- Dust filter
- Two desiccant cartridges (filled with desiccant) for HTO only measurement
- AC Power converter
- Carrying case *(optional)*

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