

Room Tritium-in-Air Monitor

Model: 7045



Application

Tyne Engineering's new Model 7045 Room Tritium-In-Air Monitor is a rack mounted or wall mounted, more sensitive version of our popular Model 7043 Portable Tritium Monitor. The 7045 is intended for room monitoring for both tritium and gamma.

- Decontamination by purging of all 4 ion chambers can be achieved with use of the centrally installed cartridge heater.

Features

- Simple to use, uses only one operating switch with four settings: Off, Sample, Pump, Set Up.
- Gamma Compensation with four large ion chambers arranged in a cruciform configuration. Two chambers are used for measuring the air sample, and two are for background compensation.
- Better than 90% accurate in 20 mR/hr field.
- High Sensitivity. The current amplification circuit employs ultra-low leakage technology. Each chamber has its individual amplifier, increasing the Signal-Noise Ratio of the analog circuit.
- Radon compensation is provided by an analog filter circuit designed to separate out the radon spike. The software can distinguish the radon spike from the tritium signal occurring as a slow-change signal.
- Ion-traps are built into each ion chamber.
- Noble gas compensation.
- Direct gamma measurement is provided using an installed GM tube.

Description

Compensation for Gamma background is crucial in tritium measurement, since a gamma field of 1mR/Hr will generate 500 times the ionization generated in $1\mu\text{Ci}/\text{m}^3$ of tritium. Tyne designed the four ion chambers in a cruciform with each chamber connected to an ultra sensitive electrometer amplifier and filter. All signals pass through the ADC converter, and the micro-processor calculates and displays the tritium value. To cover high ranges of tritium a separate small ion chamber is used. Measurements such as flow from the solid state flow meter and chamber temperature are also monitored by the micro-processor.

Instrument output includes analog (0-5V, 4-20mA); relay alarm contact (30VDC, 1A) for operation of external equipment; and communication (RS232/RS485) to enable downloading or recording of information onto a computer. The TFT full color LCD display mounted on the surface plate clearly displays instrument readings in both digital and graphic format to show real time measurements and trends.

Description

The 7045 instrument is based on the platform of Tyne's very successful handheld tritium in-air monitor. The differences are that the wall mount version, which can also be put into a 19" rack cabinet, is larger. The four ion chambers are about 3 times as large as in the 7043 handheld instrument, increasing the sensitivity by a factor of three. Additionally, the wall mounted instrument has a more powerful, long life pump which is accessible for maintenance. The inlet filter and dryer media replacement can be replaced from the front of the unit. A 15 meter long sniffer probe can also be attached at the front.

The larger ion chambers used in the 7045 monitor enable a sensitivity that precludes the need for P-10 gas, which is a nuisance to operators as it must be continuously supplied. The ion chambers also avoid the need for a less reliable flow proportional counting system. The 7045 ion chambers are robust and reliable. If they do become contaminated they can be purged by application of a heater mounted inside the units while continuous flow through the chambers is initiated.

The diaphragm pump for the unit uses an EPDM diaphragm, found to be most reliable and long lasting in the field. The pump is quiet and diaphragm replacement is simple and takes only a few minutes.

A sniffer probe can be mounted on the front of the 7045. This is used in the event that the instrument detects a tritium leak, and the operator wishes to determine the source of the leak. The probe permits sniffing around a seal or other process equipment to help trace where the leakage is coming from. The sniffer probe is supplied with up to 15 meters of tubing.

The unit has a touch sensitive screen through which settings can be changed and alarm levels set. The instrument has both visual and audible alarm annunciation. The audible alarm can be cancelled without canceling the visual annunciation.

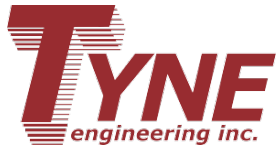
The touch screen panel is actuated by a cascading password hierarchy, one giving access to Health Physics personnel only and another to enable operators to adjust settings or alarms.

Although the touch screen is ideal for the purposes indicated above, it may not be bright enough to see from across a room, and for that reason a large digital read-out is also provided for better visibility. Unlike the handheld version, which uses batteries, the wall mounted version uses power supplies that ensure long term, reliable operation.

An additional feature of the Tyne 7045 instrument is that it is also equipped with a colour-changing dryer cartridge that indicates when renewal is necessary. The dryer enables the operator to evaluate if the tritium measurement is elemental or HTO. In the case of a signal in a moist environment where all tritium will be HTO, the dryer also enables the operator to isolate and measure an alpha signal.

Specifications

Measuring chamber effective volume	1.5 L, (2 X 0.75L)
Pump	Positive displacement gas pump: 12 VDC, flow rate can be up to 11L/min, continuous pressure 8 psig.
Tritium measuring range	0.2 μ Ci/m ³ (7,400Bq/ m ³) to 1Ci/m ³
4 chambers	Cruciform configuration: two for measuring and two for compensation
Radiation measured	measuring total tritium, HTO, gamma and alpha
Sensitivity	0.2 μ Ci/m ³ (0.01 DAC)
Accuracy	0.4 μ Ci/m ³ from 0 to 100 μ Ci/m ³ ; \pm 10% from 100 μ Ci/m ³ to 1Ci/m ³ ;
Zero stability	\pm 0.4 μ Ci/m ³ ;
Gamma measurement	Dry NO contact, Contact rating 0.5/48VDC.
Radon compensation and tritium discrimination	Instrument can provide radon compensation and discriminate in a field of HTO and elemental H ₃ using the front mounted silica gel drier.
Gamma background compensation	less than \pm 10% or 5mCi/m ³ reading change whichever is greater response to 20mR/Hr;
Ion trap	built into each ion chamber;
Flow rate	0 to 11 L/min
Response time	2 to 5s with 0-15 m air hose, within 20s with hose from 100 to 150m at 90% of signal
Stability	: \pm 3% per 24 hours, \pm 10% per 30 days;
Analog Output	0-3V linear.
Alarms	Tritium, gamma, air flow, detector failure, micro processor alarms in field as well as on optional remote display system through analog output (4 to 20mA)
Alarm Response	< 30S with 2-150m hose;
Purge decontamination	Chambers can be heated by a cartridge heater controlled by the unit to assist in purging,
Condensation Prevention	With heater cartridge temperature can be raised above ambient to prevent condensation in instrument
Communication port	RS232 (short distance) and RS485-bus (long distance);
Data Logging frequency	The tritium value can be logged every minute and can be time and date stamped. (Gamma is not logged)



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Specifications

Displays	One (1) TFT LCD large touch screen display (size 2.8"), displays the values of tritium, gamma in both numerical and graphical format; one LED screen 3/4" letters, 7 letter screen.
Power supply	110 or 220VAC ($\pm 10\%$); Power consumption < 1A
Drier	silica gel cylinder is provided with the unit;
Temperature operation range	0 to 50°C degree;
Humidity operation range	0-90% Non-condensable
Size	Approx 9"High x 12"Deep x 19" Wide;
Weight	Approx.: 55lb;
Mounting	Unit is designed for table-top, 19" rack, or wall-mounting (bracket optional)

Agent Stamp / Business Card

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