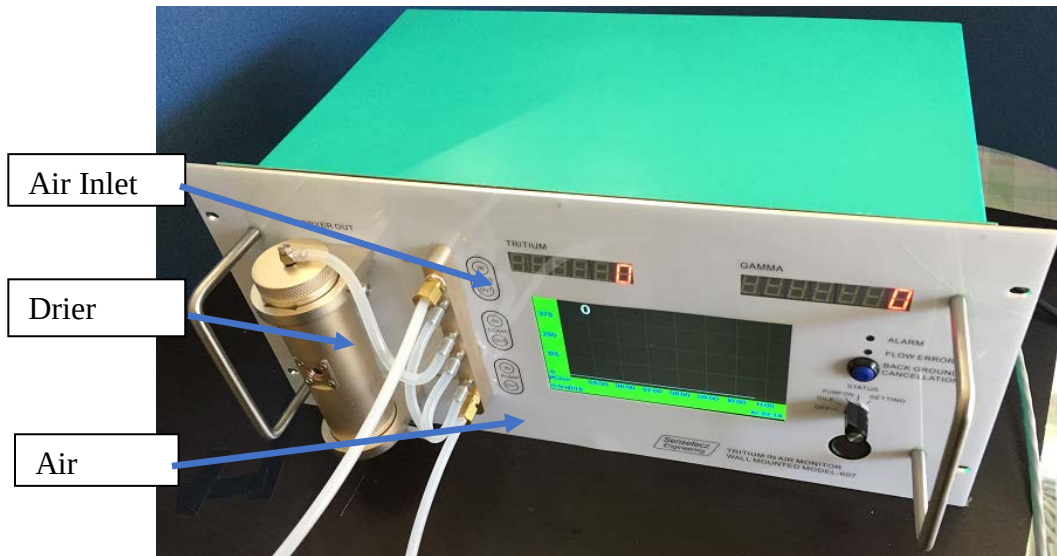


# Wall Mounted Tritium in Room Air Monitor

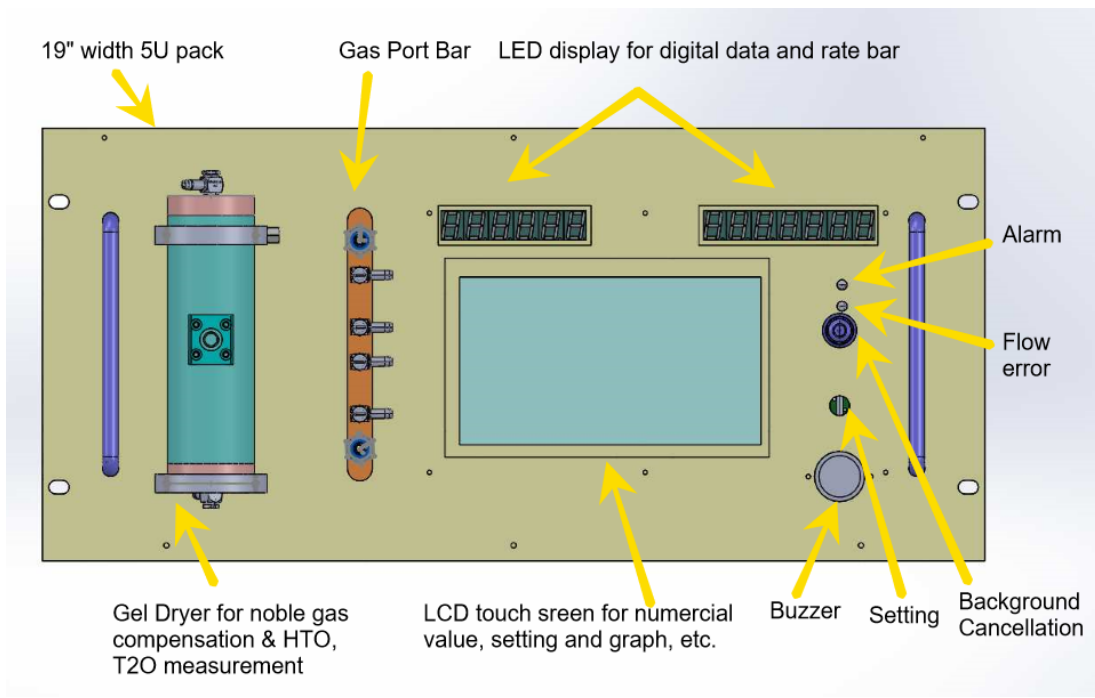
Model: 607



## Applications

607 - Sensetecz Engineering Tritium in Air Monitor is a 19" wall mounted or rack mounted instrument. It is designed to monitor either the total tritium, including HTO/HT together, or HTO-tritium water in Air. An Optional Remote Panel PC can be connected to 607 via an Ethernet MODBus. All the operation, including instrument operation, display, parameters setting, etc. can be accomplished either by 607 control system, or remote panel PC.

Sensetecz 607 uses the single body quadruple cylindrical ion chamber design (US patent No.:10725005) to achieve higher grade of gamma and noble gas compensation. An advanced electrometer circuit is used to measure the Tritium in Air from  $1\mu\text{Ci}/\text{m}^3$  to  $200,000\mu\text{Ci}/\text{m}^3$  reliably in nuclear power plant and labs, also a gamma survey circuit (a separated GM tube and counting circuit) is built into the unit. This unit monitors the Tritium and Gamma at the same time.



### 607 — Tritium in Air Monitor

The total tritium and tritium water HTO can be measured and the readings of the both will be provided.

### 607-652D—Tritium in Air Discriminating Monitor

Besides 607's default functions, with a catalyst converter tube 652D, the readings of the total tritium, HTO tritium water and pure elemental tritium  $^3\text{H}_2$  will be provided.

### 607WH— Wide Range High Sensitivity Tritium in Air Monitor

Besides 607's default functions, it can measure tritium in air from  $0.2\mu\text{ci}/\text{m}^3$  to  $1\text{ci}/\text{m}^3$  reliably with the sensitivity of  $0.2\mu\text{ci}/\text{m}^3$ . Accordingly, full range noble gas compensation to  $1\text{ci}/\text{m}^3$ .

### 607WH-652D— Wide Range High Sensitivity Tritium in Air Discriminating Monitor

Besides 607WH's functions, with a catalyst converter tube 652D, the readings of the total tritium, tritium water HTO and pure elemental tritium  $^3\text{H}_2$  will be provided.

## Advantages

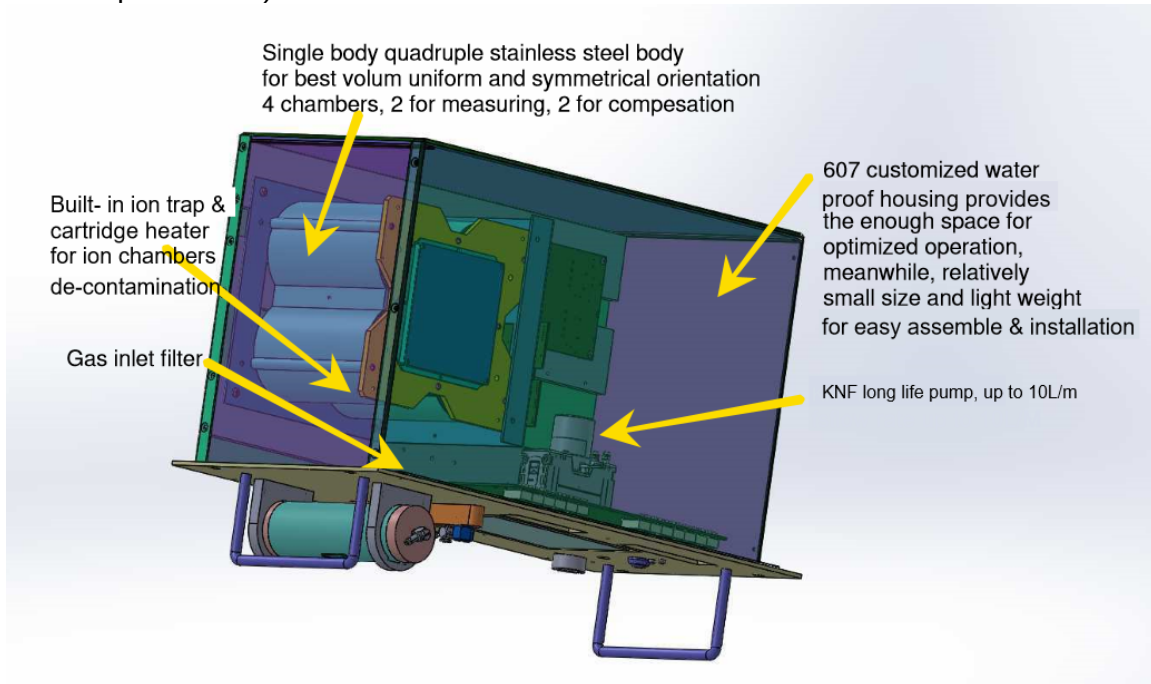
The most updated and advanced tritium & gamma monitoring system:

- **Single body quadruple cylindrical ion chamber design US Patent Number: 10725005**

One stainless block with 4 machined hollow cylinders, 2 for measuring, 2 for compensation, to obtain the best volume uniformity and symmetrical orientation, therefore a higher grade of gamma and noble gas compensation is realized. Also reduces the gas leakage and manual assembly errors during the construction.

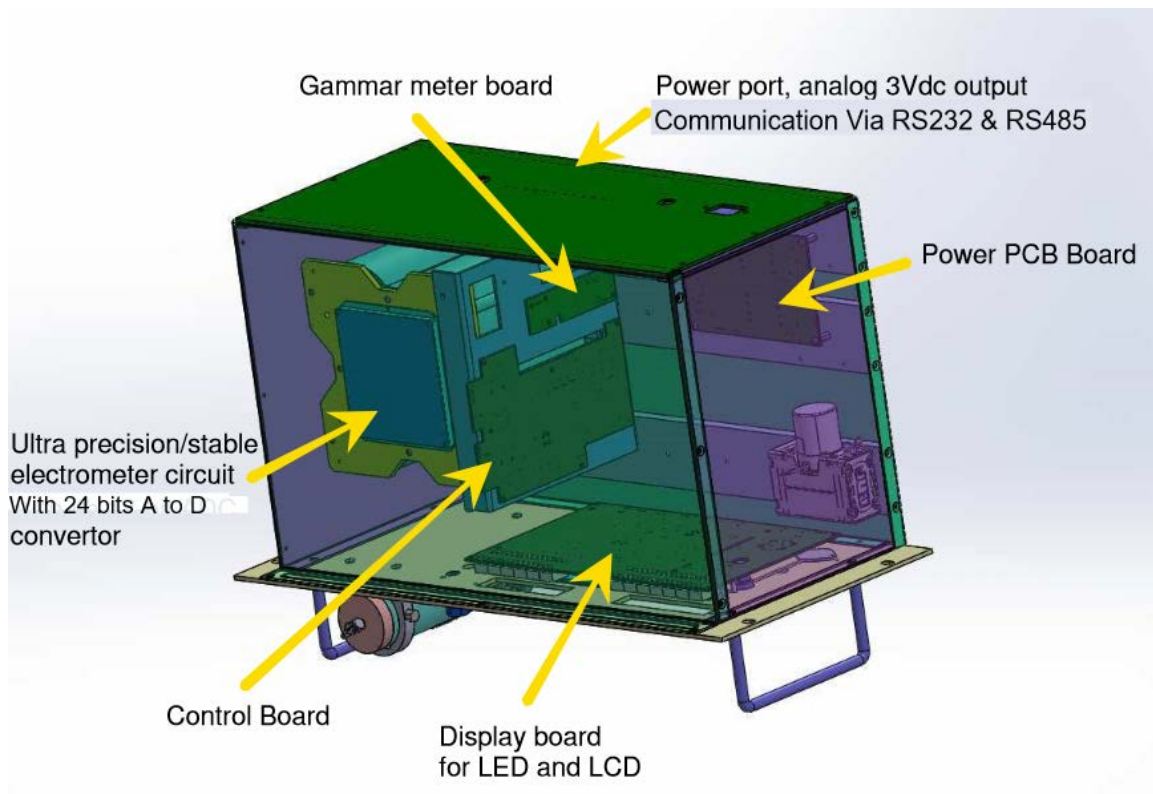
- **No range switching required, full range noble gas compensation, full range HTO measurement**

Ultra precision/stable electrometer circuit with 24-bit ADC convertor can achieve high & reliable sensitivity of  $1\mu\text{Ci}/\text{m}^3$  and wide measuring range from  $1\mu\text{Ci}/\text{m}^3$  to  $200,000\mu\text{Ci}/\text{m}^3$  without range switching. This fixed the saturation problem in high noble gas concentration. With 607's default gel drier, noble gas compensation within full range can be achieved. Further make 607 achieve HTO &  $\text{T}_2\text{O}$  reading within the whole measurement range (for 607WH and others, please see the specification).



### Software integrates all parts together

- **Drier Monitoring by a humidity sensor** A drier fault will be generated when the humidity of compensation chamber is higher than the setting. The fault will be sent out by RS232 at the position of Flow Alarm. This ensures safe noble gas compensation.
- **Measuring/Compensation chamber's pressure is monitored.** Since there is pressure drop on the air flow path, the computer will compensate the pressure difference between Measuring and Compensation chamber to improve the noble gas compensation.
- **Data logging**  
All the readings are Time-stamped and logged into the 512kbytes EEPROM.



## Performance enhancement

- High precision and stable current measurement circuit has been used to measure as low as 0.1fA current. Lab gas calibration and temperature stability test shows better than 1% accuracy of tritium measurement from temperature 0 °C to 40 °C.
- Measuring/Compensation chamber's pressure are monitored. Since there is pressure drop on the air flow path, the computer will compensate the pressure difference between Measuring and Compensation chamber to improve the noble gas compensation.
- Built-in ion trap into each ion chamber with high electrical field to reduce charge particle interference.
- Fast response, less than 10 seconds to reach 90% of reading.
- Radon compensation by electronic circuit and software filter.
- Environmental gamma reading by optional GM tube.

- Ion Chamber decontamination by cartridge heater.
- LEDs and LCD background to indicate the alarm and warning states.
- Ultra-low power consumption free-scale MKL25 microcontroller is used for the control/display.
- Data logging - all the readings are Time-stamped and logged into 512kbytes EEPROM.

## Specification – 607 wall mounted tritium in air monitor

### Performance:

- Sensitivity: Better than  $1\mu\text{Ci}/\text{m}^3$   
607WH: Better than  $0.2\mu\text{Ci}/\text{m}^3$
- Accuracy:  $1\mu\text{Ci}/\text{m}^3$  from 1 to  $100\mu\text{Ci}/\text{m}^3$ ,  
< 1% from 100 to  $200,000\mu\text{Ci}/\text{m}^3$   
607WH: < 1% from  $100\mu\text{Ci}/\text{m}^3$  to  $1\text{Ci}/\text{m}^3$
- Measuring range:  $1\mu\text{Ci}/\text{m}^3$  to  $200,000\mu\text{Ci}/\text{m}^3$   
607WH:  $0.2\mu\text{Ci}/\text{m}^3$  to  $1\text{Ci}/\text{m}^3$
- Compensation range:  $1\mu\text{Ci}/\text{m}^3$  to  $200,000\mu\text{Ci}/\text{m}^3$   
607WH:  $0.2\mu\text{Ci}/\text{m}^3$  to  $1\text{Ci}/\text{m}^3$
- Flow Rate: 1 to 10L/min,  
KNF positive displacement diaphragm pump,  
brushless, 10000hrs and up
- Response time: < 10S
- Gamma measurement: 0.1mR/Hour to 10R/Hour
- Zero stability: Better than  $2\mu\text{Ci}/\text{m}^3$  from 0 to 40 °C
- Stability with long term: <±3% per 30 days
- Gamma compensation: <10 $\mu\text{Ci}/\text{m}^3$  at 10mR; <10% within 20mR/HR
- Tritium discrimination: Elemental tritium, HTO & T<sub>2</sub>O discrimination  
via 651 Dryer, 652 catalyst converter and  
software computation
- Noble gas cancellation: Full Measuring range, Passive Silica gel drier  
Is placed on the front panel, flowing air samples  
between measuring chambers and compensation  
chambers

- Radon compensation: Software discrimination and elimination
- Background cancellation: Noble gas compensation ratio: > 150:1. Gamma compensation: <10 $\mu$ ci/m<sup>3</sup> at 10mR/Hr, <10% within 20mR/HR

## **Structure**

- Ion chambers: 4 ion chambers, 2 for measuring and 2 for compensation, 500mL for each chamber
- Ion chamber volume: Default, 1L: measuring, 1L: compensation
- Ion trap: Yes, built-in for each chamber
- Gas ports: 3/8" push to collect
- Air hose: Default, 3 feet for inlet and outlet
- Gas filter: Built-in, replaceable
- Ion chamber purging: Yes, via cartridge heater for ion chamber decontamination and condensation prevention
- Control panel display: 7 Inch TFT LCD touch screen for numerical, graphical model display and operation  
LED for digital data and rate bar graph display
- Digits display: 0.56" LED display both for tritium and Gamma

## **Output and communication:**

- Communication: RS232, RS485 and ethernet
- Analog output: 4-20mA and 0-3Vdc
- Audio and visual alarm: Low and high alarm within 30 seconds
- Data logging: Yes, frequency varies from 1s to 1hr, user settable

## **Power, operational conditions and dimension:**

- Power supply: 230VAC or 115VAC @50 or 60HZ
- Power consumption: < 1A
- Warm-up time: no need
- Operational humidity : 95%RH

- Operational temperature: 0 to 50°C,
- Dimension: 5U, W19"x H8.718" x D10.122"
- Weight: 20Kgs