

Internet Enabled Tritium Process Monitor (iTM)

❖ Features & Benefits



Integrated Device:	Ionization chamber, preamplifier and controller in one small package
Multi-Range:	Auto range across 6 decades of signal
Variety of Chambers:	Multiple chamber sizes and designs to fit the need. Custom sizes as well
Ethernet Enabled:	Single Ethernet connection provides power and signal
Pressure Vessel:	Registered to ASME Section VIII Div 1

❖ Typical Uses

- Flow through tritium transducer
- In-line Tritium in process measurement
- Low cost high activity process alarm

Overview

The internet enabled Tritium process monitor (iTM) are in-line registered pressure vessel ionization chambers with preamplifier, multi-range controller, and power all integrated into a single compact design.

The iTM has only one RJ-45 ethernet jack that provides all required voltages with the power over ethernet (POE) protocol and all communication over the ethernet. Connectivity to multiple iTM's only requires a POE switch or router connected to your data acquisition (DAQ) or computers local area network (LAN).

A variety of standard or custom-made ionization chambers with detection volumes from 1 cc to 1000 cc using both solid and wire walls allow for maximum flexibility when designing a tritium detector for your process needs.

The integrated four stage multi-ranging capability provides 6 decades of measurement range. The iTM can be operated in an auto ranging or manual ranging mode.

The integrated POE electronics do not have external controller which reduces glovebox penetration requirements. Multiple iTM's can operate off a single switch installed inside the glovebox with a single RJ-45 ethernet cable penetration.

Design Benefits

The iTM is designed for use as an in-line process monitor. All ionization chambers are registered pressure vessels to comply with the process pressure envelope. The units are helium leak tight to 1×10^{-9} scc/sec at the operating temperatures as high as 150°C. All units come standard with ½" VCR8 female fittings to provide leak tight installation.

❖ Specifications

Ionization Chamber	
Sizes	Standard: 1cc, 4cc, 10cc, 20cc, 500cc, 1L Custom: from 1cc to 2L per request
Types	Solid wall, virtual wall (wire cage inside)
Gas Conditioner	Electrostatic precipitator
Interior	Electro-polished
Operating Pressure	150 psig
Operating Temperature	-50 °C to 120 °C
Humidity	0% - 90% non condensing
Gas Flow Rate	1cc – 10cc: 2 SLPM 20cc – 1L: 10 SLPM
Max Bakeable Temperature	250 °C @ atm, electronics removed
Connection Fittings	20cc – 1L: VC8 Female 1cc – 10cc: VCR4 Female Custom upon request
Ionization Bias voltage	-100 VDC
Wetted Materials	316L Stainless Steel, High Density Ceramic
Tritium Measurement	
Range	Single Range: 1 – 2,500 units Auto Range: 1 – 2,500,000,000 units
Max Sensitivity	1 $\mu\text{Ci}/\text{m}^3$ with 1L Ionization Chamber
Max Signal	1 MCi/m^3 with 1 cc Ionization Chamber
Electrical	
Connection	Single RJ-45 connection
Cable	Cat 5e
Power Supply	Power over Ethernet (POE) switch or router
Power Requirement from POE switch	48 VDC, 100mA as POE protocol
Connectivity	Connect to Local Area Network (LAN), DAQ or computer
Communication	
Data Acquisition System (DAQ)	Connected to LAN via a POE switch REST API delivers HTTP over TCP/IP
Computer	Connected to LAN via a POE switch Web Configuration over HTTP protocol for setup REST API delivers HTTP over TCP/IP

Drawings

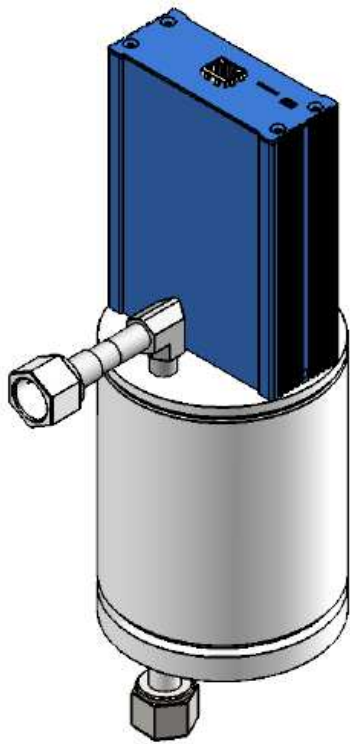


Figure 1: 1L Ionization Chamber 3-D Example

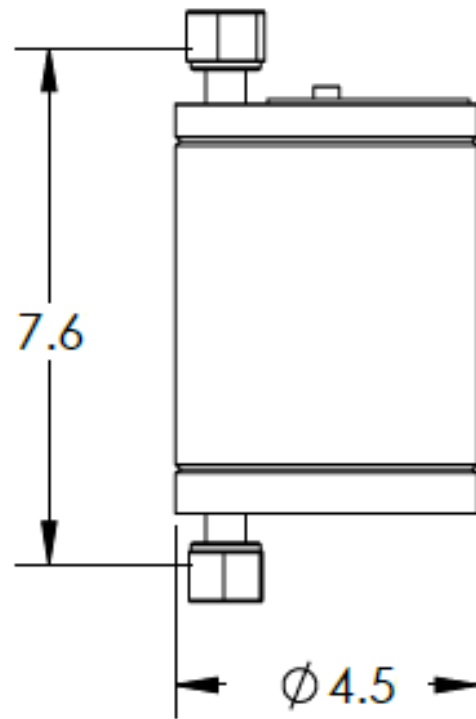


Figure 2: 1L Ionization Chamber Dimensions