

# Helium-3 ( $^3\text{He}$ ) proportional counter

(RS-P4-0203-201)

**Neutron time-of-flight spectroscopy and  
small-angle scattering measurements**

## Versatile detector

This proportional counter is a versatile detector in a small envelope - ideal for applications requiring excellent angular resolution. With its high sensitivity, temperature capabilities and fast response time, the detector is suited for a wide range of applications from research to industrial.

## High neutron sensitivity

With a standard fill pressure of 40 atmospheres of  $^3\text{He}$ , the counter provides high neutron sensitivity despite its small size.

## Small diameter

Detector diameter of 0.64 cm is a significant advantage in the  $\Delta t$  of the flight path length and angular resolution for neutron time-of-flight spectroscopy. The small diameter also provides short pulse risetime and jitter time.

## High temperature rating

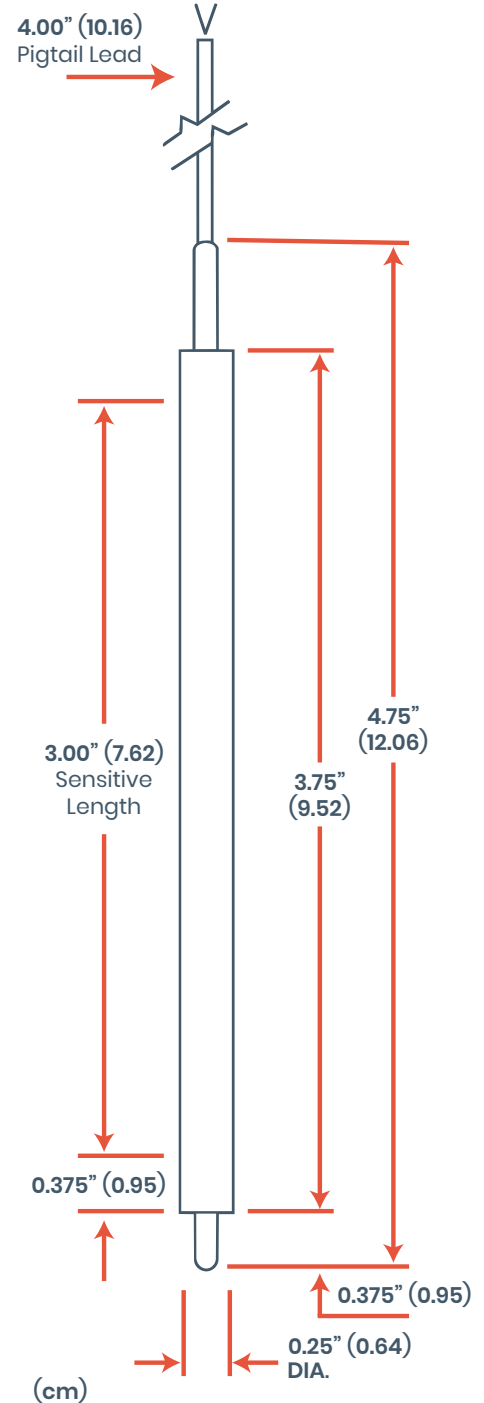
Maximum temperature rating of 150°C (302°F) meets many of the requirements for geophysical and industrial applications.

## Precision performance

Helium-3 purification techniques and manufacturing process control were developed to ensure precise matching of operating characteristics among large batches of counters. This permits parallel operation of large numbers of detectors without need for separate power supplies or gain matching.

## Product configurations

Detectors are available in active lengths from 2.54 cm to 20.30 cm with stainless steel cathode material. Detectors also come with a 10 cm pigtail lead and polystyrene caps to protect end seals. Pigtail leads of other lengths or connection types are available for special order.

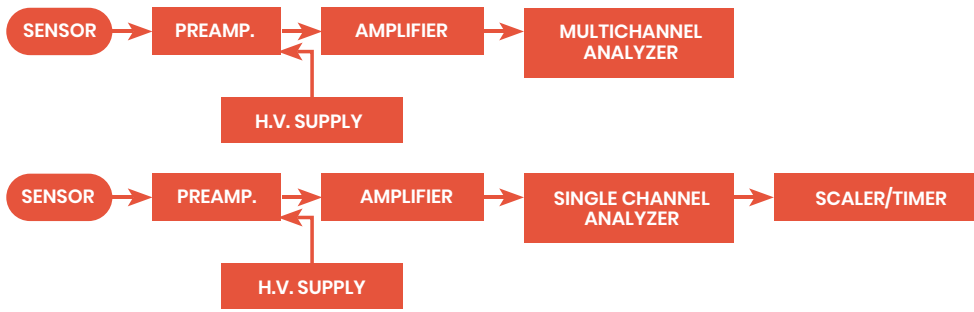


**This proportional counter is a sample of one of over 10,000  
neutron counter designs we have manufactured.**

**To find the detector that best meets your project's  
specifications, visit [reuter-stokes.com/helium-3](https://reuter-stokes.com/helium-3)**



## Typical counting arrangement



## Specifications

### Mechanical

- **Maximum diameter:** 0.68 cm.
- **Maximum overall length:** 12.4 cm.
- **Connector type:** 10.2 cm pigtail lead
- **Net weight:** 0.01 kg.

### Material

- **Outer shell:** 304 stainless steel
- **Insulation:** Alumina ceramic
- **Neutron sensitive material:**  $^3\text{He}$
- **Fill pressure:** 40 atm

### Capacitance

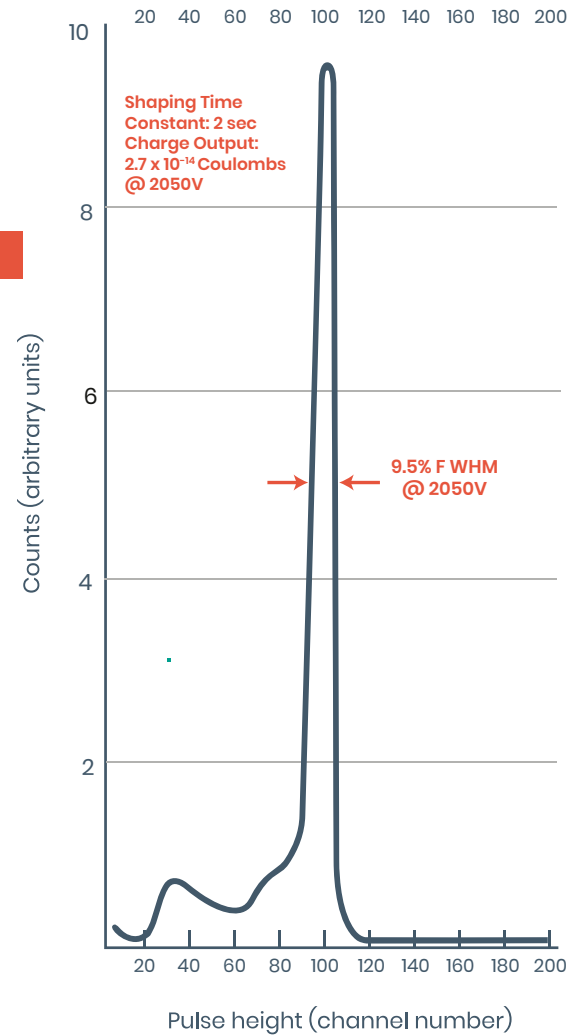
- **9 pf** (detector only)

### Maximum ratings

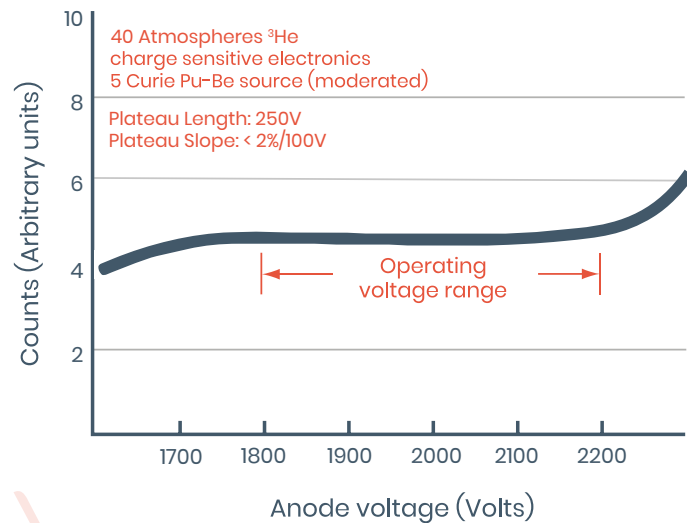
- **Voltage:** 3000 V
- **Temperature (note 1):** 150°C (302°F)

### Operating characteristics

- **Thermal neutron sensitivity (unperturbed):** 2.6 cps/nv in 0 R/hr
- **Thermal neutron flux range:** to  $5 \times 10^4$  nv
- **Voltage range:** see [plateau curve](#)
- **Resolution (FWHM):** see spectrum
- **Output pulse characteristics (average):**  
- Charge output:  $2.7 \times 10^{-14}$  coulombs @ 2050 V



### Typical plateau curve



**Note 1:** Available with 200°C rating on special order

**Note 2:** Approximate values may vary with gamma background and associated electronics