

1. Product introduction



EPIC-APD8227 is a dual-channel low-background Alpha spectrometer featuring two independent measurement chambers. It supports PIPS detectors with effective areas ranging from 300 mm² to 1200 mm², and each measurement channel can be independently controlled via host computer software. The EPIC-APD8227 adopts fully digital high-precision multi-channel analysis technology, specifically developed for PIPS detectors, offering high resolution, high sensitivity, and low background noise. Each channel supports up to 16384 channels for energy spectrum measurement.

2. Functional indicators

- ▶ Plug-in modular design for quick disassembly and installation;
- ▶ Supports simultaneous alpha-spectrum measurement on dual channels; each channel can be started, stopped and controlled independently;
- ▶ System integrates high-resolution spectrometer and mechanical vacuum control module;
- ▶ Functions include spectrometer hardware control, acquisition and display of spectrometer status information, as well as readout and management of spectrometer data;
- ▶ Preamplifier type Charge sensitive preamplifier;
- ▶ Communication interface USB 3.0 or RJ45;
- ▶ Power supply and interface AC 220 V, 50 Hz.

3. Performance parameter

Detector indicators	
Detector	PIPS detector, two independent channels
Effective detector area range	300 mm ² ~ 1200 mm ²

Energy resolution

FWHM ≤ 17 keV @ 5.486 MeV (300 mm² detector, sample-detector distance equal to detector diameter);
FWHM ≤ 20 keV @ 5.486 MeV (450 mm² detector, sample-detector distance equal to detector diameter);
FWHM ≤ 24 keV @ 5.486 MeV (600 mm² detector, sample-detector distance equal to detector diameter);

Long-term Stability

Under constant-temperature conditions, relative peak-position drift of ²⁴¹Am is less than 0.03 % within 8 hours;

Under constant-temperature conditions, relative peak-position drift of ²⁴¹Am is less than 0.1 % within 24 hours;

Multi-channel Technical Specifications

Selectable energy channel numbers	256, 512, 1024, 2048, 4096, 8192, 16384;
Bias-voltage adjustment	0 ~ ± 200 V, digitally adjustable with 1 V step size;
Leakage-current monitoring range	0 ~ 5000 nA, resolution ≤ 2 nA;

Vacuum Chamber Specifications

Vacuum chamber design	Low-background integrated structure;
Sample-to-detector distance	1 ~ 45 mm, adjustable in 4-mm steps;
Background count rate	Average count rate ≤ 1 per hour for energies above 3 MeV;

Whole machine index

Operating voltage	AC 220 V, 50 Hz;
Communication interface	USB 3.0 or RJ45;
Operating temperature	0 $^{\circ}\text{C}$ ~ 45 $^{\circ}\text{C}$;
Relative humidity	10 % ~ 80 %, non-condensing.

4. Performance testing

● The Am-241 resolution test results are shown in the figure. For a 450 m-m² PIPS detector, this dual-channel low-background alpha spectrometer achieves a measured resolution of 15.278 keV @ 5485.56 keV.

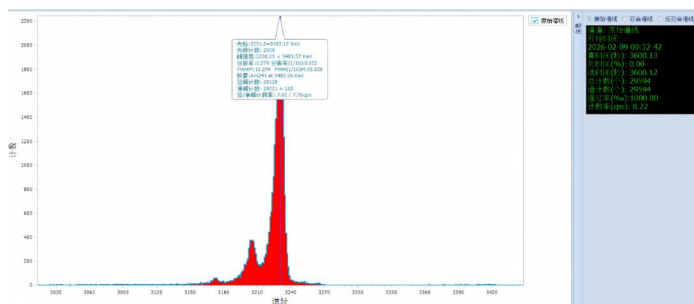


Fig. 1 Am-241 Resolution Test

● The EPIC-APD8227 dual-channel low-background alpha spectrometer provides independent measurement and control for both channels; test results are presented in the figure below.

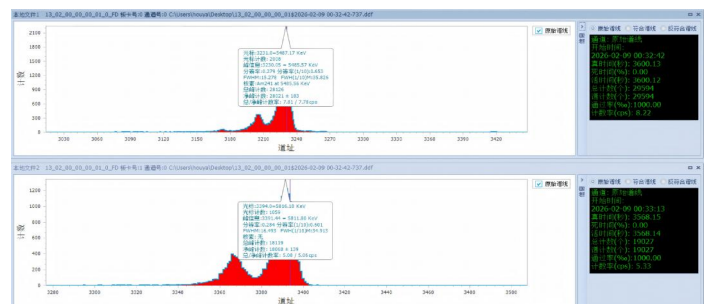


Fig. 2 Dual-channel Measurement