

# Specifications for Vortex-ME4™ Multi-Element SDD X-ray Spectrometer (Model Number: 267-VTX-ME4)

## 1. General

Vortex-ME4™ is a four-element silicon drift detector (SDD) X-ray detection system with a total active area of 170 mm<sup>2</sup>.

The Vortex-ME4™ offers superior energy resolution and high throughput performance to enhance the total analytical performance of the X-ray spectrometry system.

The Vortex-ME4™ (Model number 267-VTX-ME4) is composed of the following components, which are supplied as a package:

Power supply:	Model number MMM-PS-1
Detector Cable	
Power Cable	
xMAP XIA 4-channel digital pulse processor (optional)	

## 2. Component Specifications

Detector material:	Silicon
Detector sensitive thickness:	350 +/- 30 μm
Detector total active area (for 4 SDDs):	170 mm <sup>2</sup>
Window material:	12.5 μm thick Beryllium
Preamplifiers (1 per SDD for a total of 4):	
Type:	Charge sensitive
Gain:	1.6 mV/ keV +/- 10 %
Signal polarity:	Positive
Reset	Electrical, synchronized for all channels, < 1 μs duration

Cooling: Air cooling. Sufficient airflow needed. Do not obstruct cooling fan vent.

## 3. Spectrometer Performance (each channel) using the xMAP

Energy resolution using <sup>55</sup>Fe isotope:

Peaking time	FWHM (eV) at 5.9 keV	
	Typical	Maximum
12 μs	<145	155
4 μs	<150	160
1 μs	<170	185
0.25 μs	<250	275

Output count rate (OCR) of each channel at 50% dead time, with optimum pileup rejection performance, measured with X-ray tube excitation of a Mn sample:

Peaking time	OCR (kcps) per Channel
12 μs	> 10
4 μs	> 30
1 μs	> 100
0.25 μs	> 250

Peak-to-background ratio (peak count at 5.9 keV divided by average counts between 1.6 keV and 3.2 keV background using <sup>55</sup>Fe): > 1000:1 at 12 μs peaking time

Counting efficiency stability for 8 hours using <sup>55</sup>Fe isotope: < +/- 0.5 % rms

Counting efficiency stability with temperature (+5 to +30 °C) using <sup>55</sup>Fe: < 200 ppm/°C

Peak position stability with temperature (+5 to +30 °C) using <sup>55</sup>Fe: < +/-100 ppm/°C

Peak position stability with counting rate (at 1 μs peaking time using MnO sample excitation): < 20 eV at 200 kcps ICR

**4. Operating Environment:**

Ambient temperature: +5 to +30 °C

Humidity: 20 to 80% RH (no condensation)

**5. Operating Position:**

Horizontal, or tilted from 0 – 90° with the detector end pointing down.

**6. Physical Specifications:**

Weight: 4.3 kg

Length x Height x Width: 425 mm x 165 mm 82 mm

Standard cable length: 3 m

**7. 4-channel digital pulse processor (xMAP from XIA):**

Digitization: 14 bit, 50 MHz

Gain: 16 bit Gain DAC control

Peaking time: 0.1 - 100 μs

Pileup rejection: Pulse pair resolution (PPR) better than 100 ns

ROIs: Up to 32 ROIs can be defined

Timing: Multiple spectra, or ROIs can be stored with continuous operation using dual memory bank configuration.

Integral non-linearity: <= 0.1% over the full scale output range

**Data output:**

Spectrum size: 1024, 2048, 4096, 8192

Channel size: 10 eV

**Software:** xManager (from XIA)

**8. Power Requirement and Consumption:**

Inlet line voltage (Inlet key selectable): 100 V ± 15 %, 115 V ± 15 %, 230 V ± 20 % single phase

Detector power consumption: < 40 W

xMAP unit power consumption: < 20 W

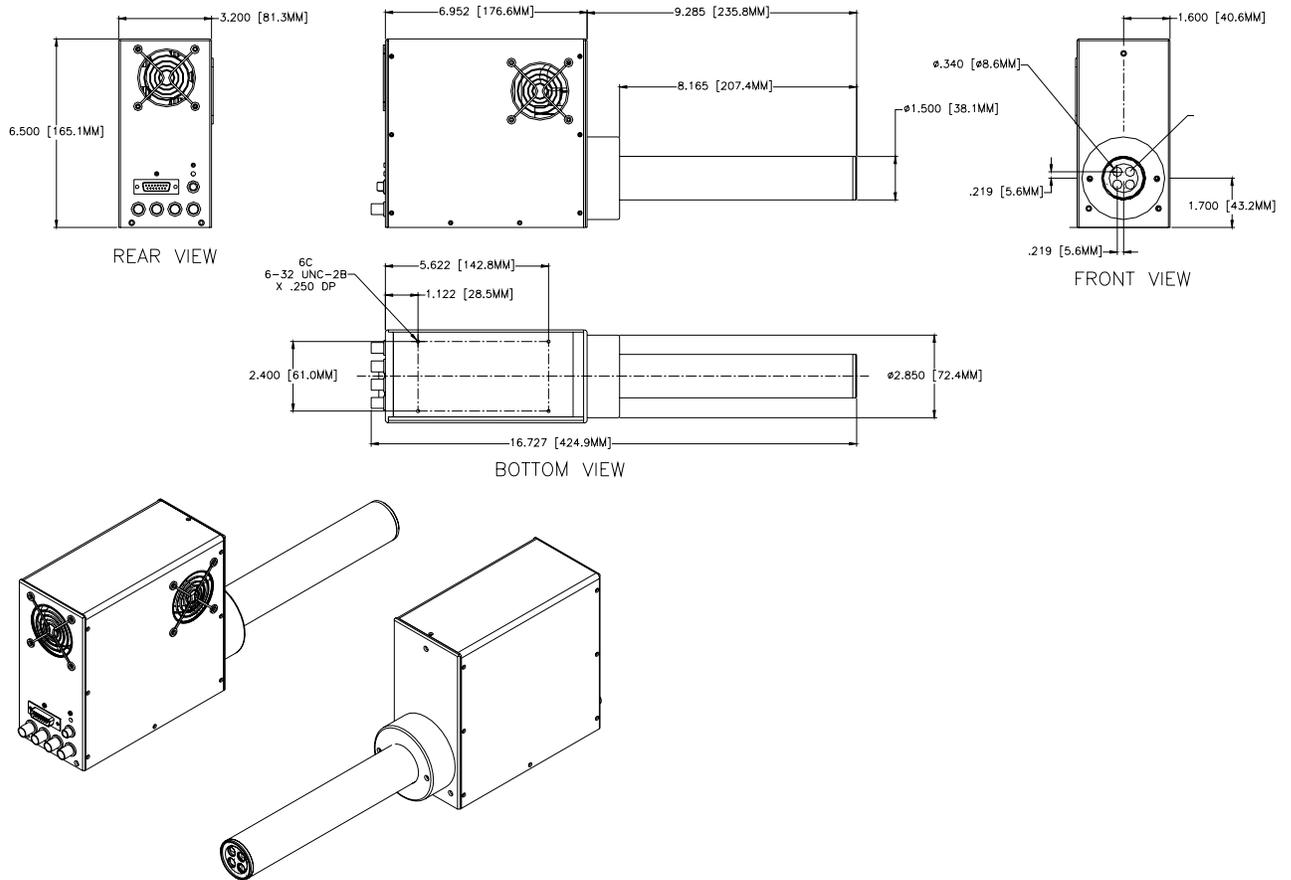


Fig. 1 Vortex-ME4™ SDD X-ray Spectrometer: Model Number 267-VTX-ME4 (dimensions in inches and mm).

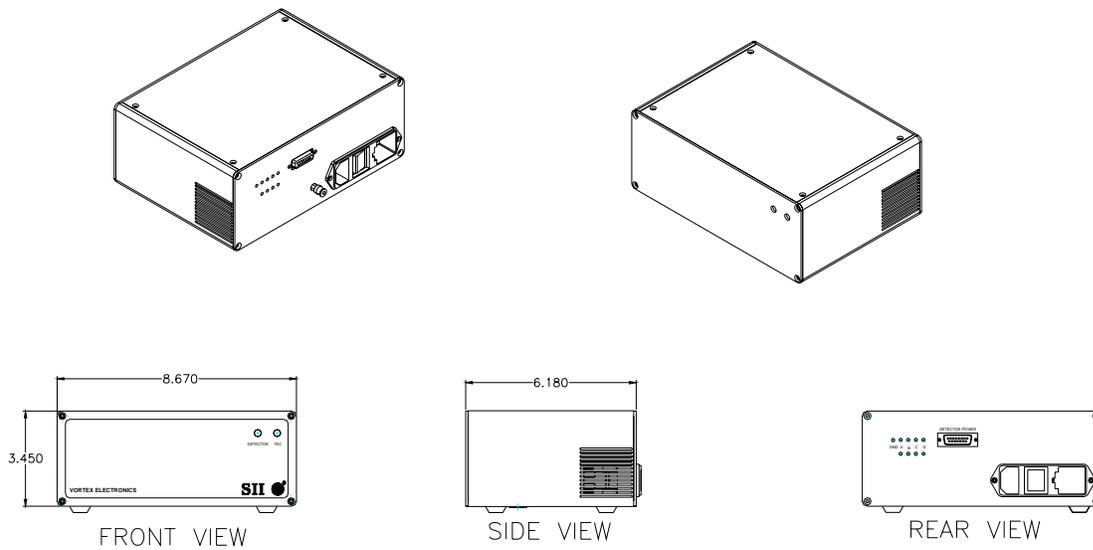


Fig. 2 Power Supply: Model Number MMM-PS-1 (dimensions in inches).