



HXS

Hyperspectral X-ray Spectrometer



HXS-8
EIGHT CHANNELS
DIGITAL SPECTROMETER UNIT



HXS-2
TWO CHANNELS
DIGITAL SPECTROMETER UNIT

Description

HXS spectrometer is a high-performance X-ray spectroscopic instrument for X and γ rays detection based on Cadmium-Zinc-Telluride (CZT) semiconductor material. The system is designed for optimal X-ray spectroscopy at room temperature.

HXS system consists of a Digital Spectrometer Unit equipped with two or eight input channels and one or more detector units (up to eight), that combines a CZT semiconductor sensor with its relevant front-end electronics.

The HXS module sends the processed spectra to User's PC through an Ethernet interface and it is supplied with a dedicated software (HXSpectro-Panel).

With HXS spectrometer, anyone can rapidly obtain high quality X-ray and γ -ray spectra.

The HXS unit contains a real-time signal acquisition and processing system, based on a very high performance FPGA processor, capable of running elaboration algorithms for pulse height single-photon count measurements.

The **CdZnTe detector** is designed for achieving optimal energy resolution in the 5 keV- 2 MeV energy range. It can stand photon flux up to 1 MCps and works at room temperature (no cooling is needed).

The detector is designed to keep the CZT light-sensitive sensor in complete dark.

All the critical connections between the CZT sensor and preamplifier are checked and characterized to ensure reliable measurements.

The detector is equipped with a cable set with std lenght of 2 m and has the mating connector already installed, ready for plug-in.

The HXS module is provided with power cables and signal coaxial cables.



Features and benefits

- High performance spectroscopic sensor
- Works at room temperature with no cooling needs
- Detection of X and γ rays
- Energy range 5 keV - 2 MeV
- Photon flux up to 1 Mcps
- Absolute density and elemental material detection in real time
- DPP Unit can be equipped with up to 8 sensors channels.
- HXS is supplied with all interconnecting cables
- Plug and play design
- PC software included

MADE IN ITALY



Contattaci

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W W W . D U E 2 L A B . C O M

CZT Sensor theory of operation

X-rays and γ -rays interact with CdZnTe atoms to create an average of one electron/hole pair for every 4.4 eV of energy deposited in the CdZnTe. By counting the total number of electron/hole pairs generated inside the CdZnTe sensor, it's possible to determine the energy of the incident

X or γ photon. In order to collect electron/hole pairs formed in the CZT sensor, a negative potential is applied to the cathode electrode. This voltage is kept constant during operation at room temperature, without any stability problem. Dark leakage current (electron/hole pairs generated in absence of radiation) has been minimized, thus permitting this high bias sensor polarization, which ensures fast detection. Proprietary design and construction know-how reduce the electronic noise and minimizes parasitic capacitance at the input.



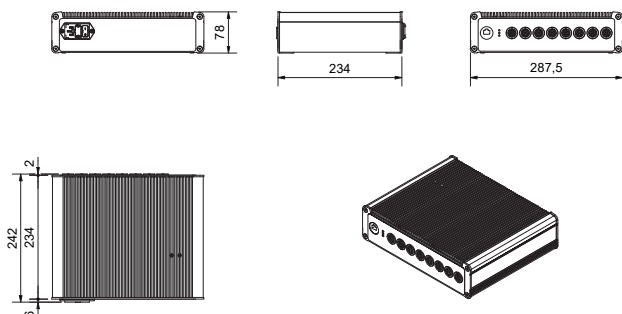
REAR VIEW of
SPECTROMETER UNIT



DETECTOR UNIT with CABLE
SET and CONNECTOR

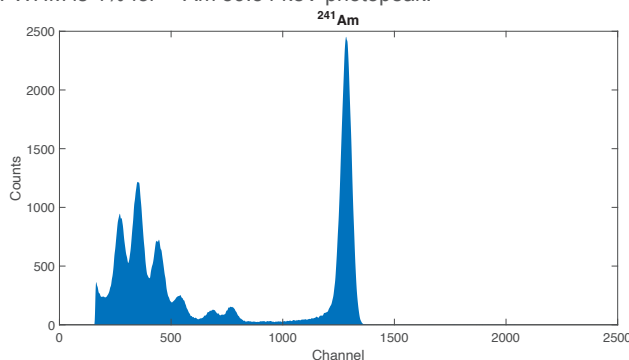
MODEL	p/n
Spectrometer Unit 8 Channels	9250 HXS-8
Spectrometer Unit 2 Channels	9250 HXS-2
Detector Unit with cable set 2m	9020.012

Dimensions HXS-8 and HXS-2 unit:

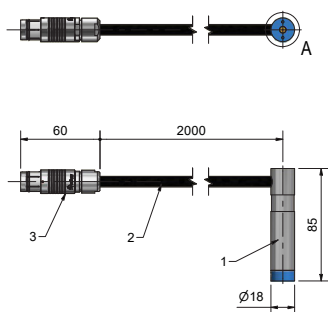


Spectroscopic performance

We have designed this instrument in order to achieve optimal energy resolution in a wide range of energy and be compatible with high X-ray photon flux (up to 1 MCps total events on the sensor). See below ^{241}Am spectrum of radioactive low flux uncollimated source. FWHM is 4% for ^{241}Am 59.54 keV photopeak.



Dimensions Detector unit with cable:



Technical data

Sensor material/type: CdZnTe/ single pixel
Active area: 2 x 2 mm
Crystal dim (total): 4 x 4 x 2.8 mm
Pixel dark current: < 1 nA (@ 25°C)
Typical energy resolution: < 4% @ 59.54 keV (^{241}Am)

CZT Detector unit size: diam. 18 mm x 85 mm. Std cable length 2 mt
Detector efficiency: > 80% @ 122 keV ^{57}Co
HXS Unit size: mm 242 x 288 x 78 (h)
Input power: V 230, +/-10% - 50/60 Hz
HXS Unit output: Ethernet port
Interface software: SpectrumPanel D2L (included)

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