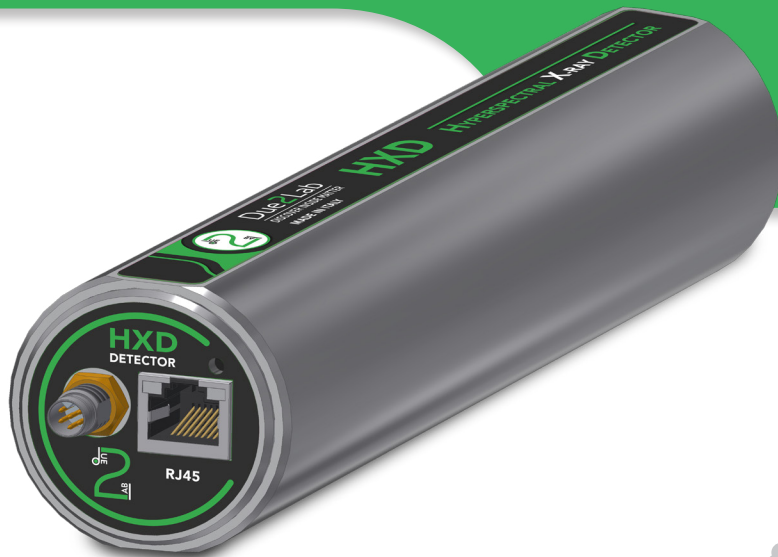# HXD
Hyperspectral X-ray Detector

Description

HXD is a detector to measure X-ray radiation through a crystal sensor placed behind a protective, thin, aluminum cover. The HXD can be supplied with two different sensor size: a standard square type ("P" type) and a special rectangular type ("L" type).

The P type is suitable for a well collimated photons beam (sensing area 2x2 mm), the L type is designed for applications where the photons may arrive as a fan beam, arranged on a line and not on a point (sensing area 19x2 mm).

HXD has been designed for industrial application and the small dimension make it the ideal alternative to scintillator detector.

Must be powered with 24 Vdc, the output is analog (0-10V) and digital over EtherCAT bus.

The sensor consists of a Cadmium-Zinc-Telluride (CZT) semiconductor element and a high-speed electronics for single photon counting, capable of measuring both the photons flux and photons energy.

The analog output represents the integral of the energy read, the data supplied over the bus contains spectroscopic information and allow further elaboration by the user.

The embedded artificial intelligence algorithms allows to optimize the spectrum even at high flux.

The detector is supplied with a specific bus protocol.

Features and Benefit

- High resolution detection of incident radiation
- Hyperspectral sensor of the latest generation (CZT)
- Sensor protected with an aluminum window
- The analog signal outputs the integral of the spectrum read
- EtherCAT bus allows the transmission of the spectrum
- Certificate of calibration with isotope
- Multi-colour LED to visualize detector status
- Supplied with an easy software GUI
- Robust aluminum case, light weight, dust proof

MADE IN ITALY

Functional description

HXD detector can work either with analog output mode or hyperspectral mode. The analog output mode is readily available once the detector is powered. The analog signal output is the integral of the spectra with refresh time of 100 msec by default.

The hyperspectral mode is achieved only when the EtherCAT communication is used. All controls of the detector can be done through the commands of the protocol. As an example, it's feasible settings of measuring parameters, such as refresh time, energy thresholds. The total spectra can be downloaded at interval of time defined by user.
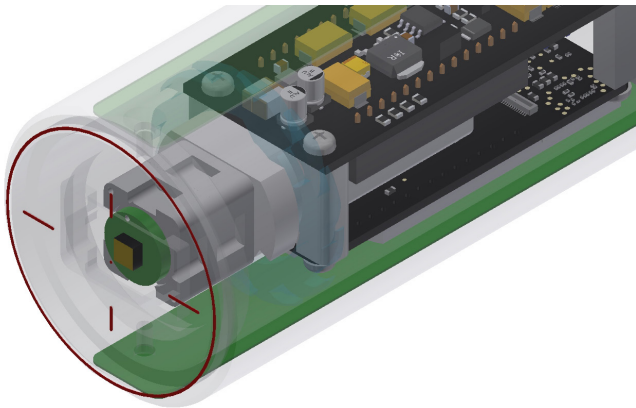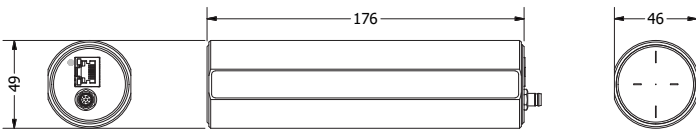

HXD version with "P" type sensor
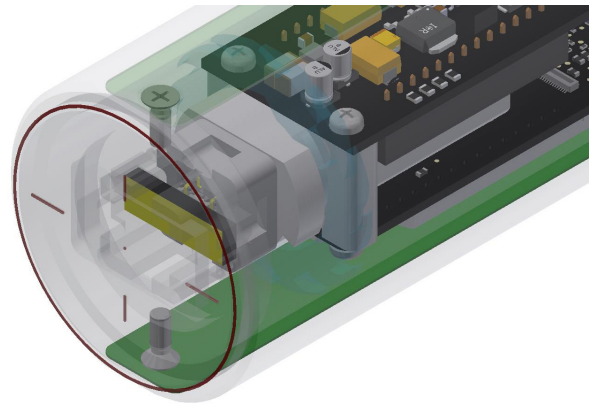
HXD version with "L" type sensor

Dimension

Diameter:	49 mm max
Length:	176 mm (without connectors)

Technical specifications

Sensor type:	CdZnTe Planar (P)
	Linear Stripe (L)
Dimension CdZnTe:	mm 4x4 (P) or 20x5 (L)
Reading area:	mm 2x2 (P) or 18x0.5 (L)
Energy resolution:	<5% FWHM ^{241}Am (59 keV)
Optimum energy range:	5 keV - 250 keV
Max count rate:	up to 500 kcps
Detector window:	Aluminum 0.5 mm
Overall dimension:	diam 49 mm x 171 mm
Body case:	Aluminum
Protection degree:	IP5X
Cooling:	ambient air
Working temperature:	max 40°C ambient
Power supply:	24V dc 0.5A