HXS

Multi-probe Hyperspectral X-ray Spectrometer

HXS is an X-ray spectrometer consisting of a digitizer unit to which up to 8 radiation probes can be connected simultaneously. The radiation probe is equipped with a solid-state sensor based on Cadmium-Zinc-Telluride (CdZnTe, CZT).

HXS is available in two models, with either 2 or 8 signal input channels to the digitizer unit: each channel is connected to a semiconductor radiation probe, allowing up to 8 transmission spectra to be acquired simultaneously.

The single-photon counting readout electronics make it possible to accurately measure both the radiation flux — the number of photons per unit of time — and the energy of each individual photon, with excellent energy resolution through 2048 readout bins. Signal analysis is performed using proprietary correction algorithms that ensure the reliability of the acquired spectrum. The signals are processed and sent as spectra to the Ethernet interface, which transfers them to the user's PC, where they are displayed using the dedicated HX Spectro software.

The operating life of CZT probes is significantly longer than that of traditional radiation measurement technologies, such as scintillators and ionization chambers. This makes it possible to reduce production downtime for sensor maintenance to almost zero, while also ensuring unmatched measurement reproducibility over time. The system can be easily integrated into existing production lines thanks to the compact size of the module and the geometry of the sensors themselves. The probes and the digitizer do not require any auxiliary cooling.

Originally developed as a benchtop working instrument, HXS can be easily adapted for installation along industrial production lines thanks to the physical separation between the probe and the digitizer. Among DUE2LAB's various solutions, it is therefore positioned as the highest-precision detector for NDT measurements.

In addition to being an essential tool for users who need to understand the spectral characteristics of radiation sources, HXS is currently used for densitometric measurement of post-pressed MDF wood panels and for compound classification in the rubber industry.

Key Features and Benefits

- High-performance, long-lasting CZT sensors
- High energy and time resolution
- High-speed electronics for photon fluxes up to 2 Mcps
- Real-time density and composition measurement across up to 8 channels
- Control software included

Fields of application

- Wood industry: particleboard, laminates, MDF, OSB
- Process control and NDT for rubber and plastic components
- Ceramics industry

Contacts

Tel: +39 0522 160 7010 - Fax: +39 0522 160 1375
E-mail: info@due2lab.com
D U E 2 L A B . C O M

MADE IN ITALY

X-rays as you've never seen before

Radiation detection technology based on CZT sensors (CdZnTe, cadmium zinc telluride) and single-photon counting represents a new paradigm in the field of in-line non-destructive testing. DUE2LAB is the only company in Italy that designs and manufactures industrial sensors and systems based on CZT single-photon counting detectors. DUE2LAB combines pioneering expertise developed through R&D projects in aerospace, the circular economy, and X-ray/gamma-ray sensing for synchrotrons and particle accelerators with more than ten years of experience in designing tailor-made industrial solutions for the wood, rubber, paper, and packaging industries.

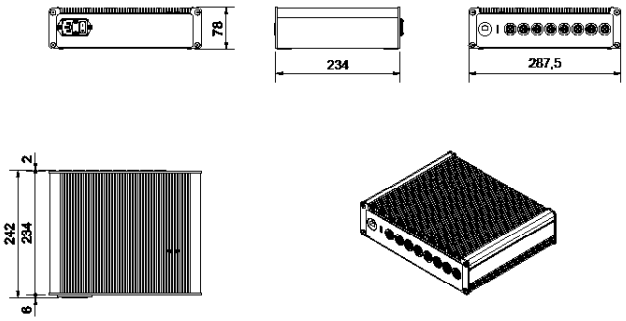
DUE2LAB solutions represent a true evolution of current X-ray systems in terms of performance, reliability, and service life, while also making it possible to measure in real time material properties that have so far been inaccessible.

REAR VIEW OF THE SPECTROMETRIC UNIT

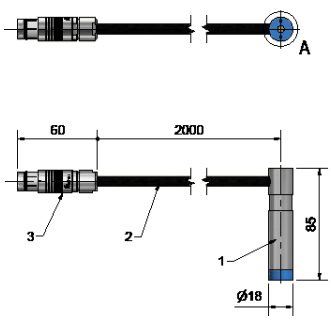
DETECTOR PROBE WITH CONNECTOR AND CABLE

MODELS
8-channel spectrometric unit
2-channel spectrometric unit
Detector probe with 2 m cable
Detector probe with 4 m cable

Spectrometric unit dimensions



Detector probe dimensions



Technical Specifications

Sensor:	CdZnTe, single pixel (0.032 cc) (up to 8 sensors)
X-ray energy range:	5 ÷ 250 keV
Energy resolution:	< 4% FWHM ^{241}Am (59keV)
Dark current:	< 1nA (@ 25°C)
Sensor efficiency:	> 99% ^{241}Am (59keV) > 70% ^{57}Co (122 keV)
Incident radiation flux:	Up to 2 Mcps per channel
Minimum integration time:	1 ms
Communication interface:	socket TCP/IP via Ethernet RJ45
Operating mode:	Single-photon counting
Sensor lifetime:	does not degrade (>> scintillator)
Power supply:	V 230, 50/60 Hz (FPGA 24 V; 0.5 A; 12 W. 600 mW each probe)
Power consumption:	Max 20 W
Dimensions:	Digitizer unit: 288x242x78 mm Probe: 85 mm x 18 mm Ø Probe plug: 60 mm x 18 mm Ø
Weight:	Digitizer unit: 4 kg, Probe + cable 0.25 kg
Housing structure:	Digitizer unit: anodized aluminum Probe: brass/metallized resin
Operating temperature:	max 40°C (environment)
Protection rating:	IP5X
Software control:	HXS Spectrum Panel

Due2Lab srl - Via Paolo Borsellino 2,
42019 Scandiano (RE) - Italy
E-mail: info@due2lab.com
Tel: +39 0522 160 7010
Fax: +39 0522 160 1375
Web: due2lab.com