Dose Capture
Gamma-rays spectroscopic detection system

Description

DoseCapture is a spectroscopic radiation detection system dedicated to real-time measurement of gamma rays.
It is equipped with four independent Cadmium-Zinc-Telluride (CZT) virtual Frisch-grid detectors, arranged in a row to form a 4-pixel array.
A 20 mm thick parallel-holes Pb collimator is placed in front of the four sensors, both square and circular geometry are available.

Thanks to the combination of CZT semiconductor sensors and advanced digital pulse processing signal readout, DoseCapture module guarantees good spectroscopy even in presence of a high flux radiation (i.e. background radiation).

For each detector, the anode and cathode signals are acquired synchronously and elaborated by the Digital pulse processing algorithm embedded in the FPGA to further improve spectral resolution and the signal-to-noise ratio.
DoseCapture is a modular component and can be assembled in linear arrays to form a multiple-heads imaging system for imaging application such as BNCT-SPECT or SPECT.

Features and Benefit

- Excellent energy resolution detection of gamma-rays
- State-of-the art Virtual Frisch-grid sensors
- Optimal spectroscopy even with background radiation
- High radiation absorption efficency
- Possibility of incorporating neutrons shield
- Certificate of calibration with different isotopes
- Syncronization of all readout channels (10 ns)
- Data transmission with Ethernet protocol
- Supplied with an easy software GUI
- Robust aluminum case, dust proof

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Functional description

DoseCapture is a stand-alone module that continuously measures the incoming radiation when powered.
The transmission of data, the measurement parameters and the log file can be transmitted from/to the DoseCapture by using a PC and a Gigabit ethernet connection.

Each Module is provided with a unique IP address and a multiple modules configuration can be implemented by using a single PC and an ethernet switch connected to the DoseCapture modules.
Must be powered through the specific power line adaptor.
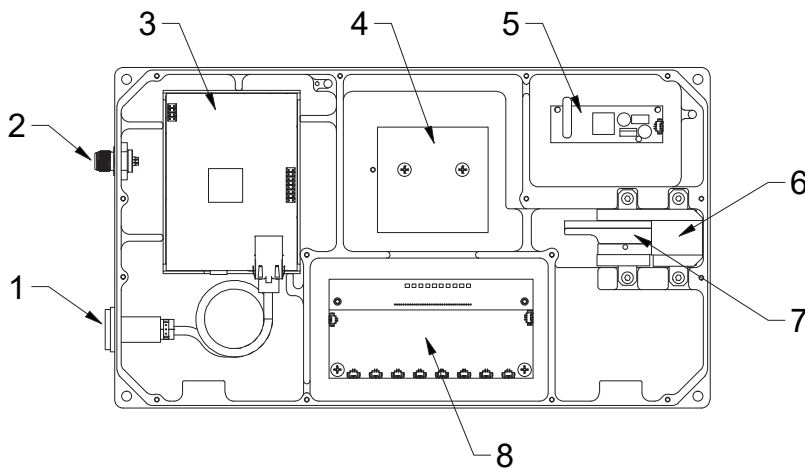
Pos	Description
1	Ethernet connection
2	Power IN socket
3	Processor unit FPGA
4	Decoupling filter board
5	HV Power Supply board
6	Pb Collimator
7	PTFE sensor housing
8	8 Channels pre-amplifier board

Dimension

Base: 350 x 41 mm max
Heigth: 200 mm (without connectors)
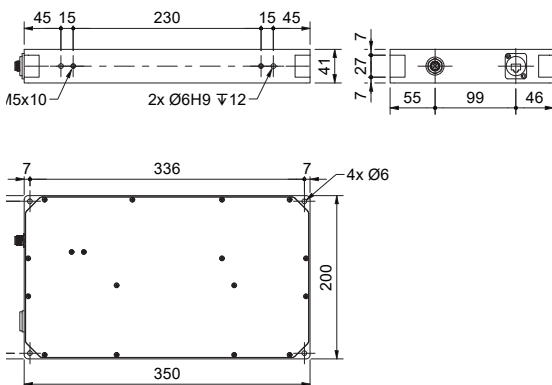
Technical specifications

Sensor type:	Virtual Frisch-grid Cd-Zn-Te
Total sensor dimension:	mm 24 x 6 x 20
Dimension single detector:	mm 20 x 6 x 6
Maximum pixel area:	mm 6 x 6
Energy resolution:	<3% FWHM ^{137}Cs (662 keV)
Optimum energy range:	30 keV - 1.5 MeV
Number of pixel:	4
Overall dimension:	mm 350 x 41 x 200
Body case:	Aluminum
Protection degree:	IP5X
Cooling:	ambient air
Working temperature:	max 40°C ambient