

IRIS PET/CT Preclinical System

Product information - Technical specifications

Description

IRIS PET/CT is a state-of-the-art preclinical PET/CT scanner for in-vivo pre-clinical imaging.

IRIS PET/CT offers a number of key advantages including a good spatial resolution and excellent sensitivity as well as fast, low dose CT scanning ability. IRIS is optimised for studying mice and rats.

Large axial Field-of-View allows single scan of entire body of a mouse on both PET and CT modalities.

PET and CT images are intrinsically fused.

Attenuation correction of PET image can be performed automatically from the CT image.

Available in single modality. PET system only can be upgraded with CT after installation.

The IRIS PET/CT scanner includes the following components:

- Gantry, mechanical components and cover
- PET detector ring
- CT components
- Electronic components
- Electrical parts and circuitry
- Workstation
- Standard animal bed components
- Reconstruction software, firmware

Additional documents

IRIS PET/CT brochure

Floor plan for suggested room design and configuration to fit the IRIS PET/CT system

Acceptance report: delivered after commissioning of the scanner

PET Specifications

Section A1: Configuration - PET

System configuration	
Detector block configuration	LYSO pixels with Hamamatsu PMT 12700A
Blocks per full ring	16 detector blocks in two rings (octagon shape)
LYSO pixels	Pixel size = 1.6 x 1.6 x 12 mm ³ Pixel pitch = 1.68 mm Total number of pixels = 11232
Axial FOV (mm)	94 mm (single bed position) > 225 mm (multiple position)
Trans-axial FOV (mm)	> 80 mm
Bore diameter (mm)	100 mm
Electrical requirements	220V / 115V multi range support
Operating temperature	18C - 24C (recommended)
Operating RH	30% - 70% (recommended)

Section A2: PET performance

Performance parameters	
Sensitivity	> 9% (250-650 keV)
Resolution at CFOV (OSEM 3D)	< 1 mm
Resolution at 10mm off-centre (OSEM 3D)	1.1 mm FWHM
Energy Resolution (Average value)	< 13%
Recommended energy window keV	350-650 keV / 250-650 keV
Timing resolution	1.8 ns
Timing window (recommended)	5.2 ns

CT Specifications

Section B1: Configuration - CT

System configuration	
Detector	CsI+CMOS Active area: > 11.4 x 14.5 cm ² Pixel pitch: 75 µm Number of pixel elements: 1944 x 1536
Tube	35-80 kV, power = 80 W, max current = 1 mA Focal spot: 35 µm (Nominal value)
Axial FOV (mm)	> 90 mm (1 scan) > 200 mm (multiple position)
Trans-axial FOV (mm)	> 90 mm (rat) > 40 mm (mouse)
Bore diameter (mm)	100 mm
Scan mode	Step-and-shoot or continuous rotation (360°)
Rotating gantry	Range > 360° Max Speed > 25°/sec
Multiple bed position	200 mm max length
Safety	Fully shielded. Effective dose < 1 µSv/h at system surface
Electrical requirements	220V / 115V multi range

Section B2: Performance CT

Performance parameters	
Minimum voxel resolution (isotropic)	< 30 μm
Spatial resolution	~ 73 μm (Better than 6.9 lp/mm @ 10% MTF)
<u>Scan time protocols:</u> High resolution mode Standard mode High Speed mode	2 min (resolution ~ 73 μm) 20 s (resolution = 120 μm) < 8s
Reconstruction algorithm	Feldkamp-type FBP with misalignment compensation
Reconstruction time (single workstation)	< 30 sec (standard scan) < 10 min (high resolution scan)
Image corrections	Ring artifact, beam hardening, HU normalization
Image format	RAW, TIFF, DICOM
Dose	< 140 mGy for high resolution scan < 30 mGy for standard scan < 13 mGy for fast scan @ 1 mA (full tube current) < 6.5 mGy for fast scan @ 0.5 mA (half tube current)
Advanced imaging protocols	4D dynamic imaging with full mouse FOV (> 3.1 fpm) Image based cardiac and respiratory gating (without hardware sensors)