

# X-ACT+



# X-ACT+

Digirad redefines nuclear imaging. Again.



## The future of nuclear imaging is clear.

Increased regulations, growing competition, and concerns about radiation exposure are just a sampling of the current challenges facing the nuclear medicine industry. At the same time, there's a clear, commanding call to raise quality, improve efficiencies, and reduce costs. X-ACT+ is the camera to help you meet the demands of the modern healthcare market.

Answer today's challenges and raise clinical performance in nuclear cardiology to an unprecedented level.

- Less space, less labor, and less power requirement
- No site modifications required
- No need to lead-line rooms
- Reduced costs per procedure
- Comfortably image bariatric, claustrophobic, or COPD patients
- Improved patient satisfaction
- Raised clinical confidence and accuracy
- Ability to perform stress-only imaging protocols

# The Cardius® **X-ACT+** Imaging System

Why settle for low specificity SPECT or the high costs of other imaging methods? **Now you have a choice.**

Digirad has taken the X-ACT camera to the next level with a complete redesign, new features and new benefits. X-ACT+ is a groundbreaking, SPECT/FAC camera that offers more accurate test results, less radiation dose to the patient, and does this while reducing the cost burden to the healthcare system.



**The X-ACT+ is the world's first and only solid-state SPECT system that features:**

- Solid-state detectors
- Rapid imaging detector geometry
- A fully integrated low dose fluorescence x-ray attenuation correction approach
- 3D-OSEM reconstruction techniques
- Upright imaging

With a high-speed, solid-state, triple-head design, the X-ACT+ can complete emission and transmission data acquisitions without repositioning the patient.





## Setting the standard for SPECT system performance.

With its breakthrough technology, unrivaled precision, and unmatched performance, the X-ACT+ imaging system is not only tackling the industry's challenges, it's leading the way into a new era of nuclear cardiac imaging.

### **Easy To Operate and Site**

With its compact, lightweight design of less than 1,000 lbs., the system can be installed in as small as an 8' x 9' room.

### **27" Wide-Beam Field of View**

With a wide 27" transverse beam and the use of a novel mono-energetic fluorescent X-ray line source, transmission images are free of truncation or beam hardening artifacts.

### **Modern Solid-State Detectors**

Digirad's proprietary solid state, high definition detectors offer superior clinical performance and reliability.

### **Rapid Imaging System**

The high efficiency, solid-state triple-head design with nSPEED™ 3D-OSEM reconstruction, and integrated attenuation correction reduces total imaging time.

## A new generation of imaging excellence.

Uniquely designed for the modern healthcare market, the Digirad X-ACT+ delivers a new level of SPECT imaging. Powered by Digirad's proprietary solid-state technology, X-ACT+ produces images with unparalleled clinical accuracy – all while lowering the radiation dose and improving patient ergonomics.



### HIGH SPECIFICITY

Without movement of the patient between emission and transmission acquisitions, the co-registration accuracy is substantially improved.



### LOW DOSE

The system affords high statistical precision with up to 1,000 times less patient radiation exposure than other commercially-available CT-based AC approaches.

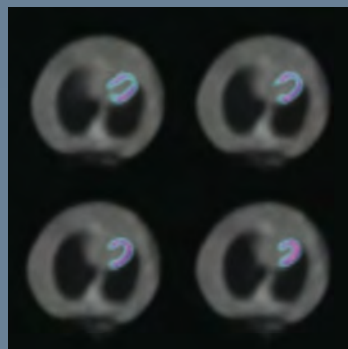


### IMPROVED PATIENT ERGONOMICS

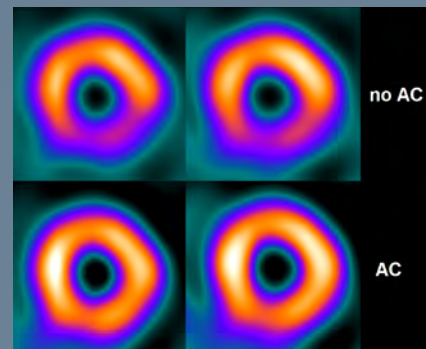
The X-ACT+ improves upon Digirad's revolutionary patient-friendly, open, and upright design. The new design makes imaging easy for patients weighing up to 500 lbs.

## Attenuation Correction

The Cardius X-ACT+ imaging system makes it possible to perform cardiac SPECT/FAC studies by employing new low dose fluorescence attenuation correction techniques.



Co-Registered Transmission/Emission



Short Axis Slices

Upgrade to X-ACT+ and take your imaging to the next level  
800.947.6134 | [www.digirad.com](http://www.digirad.com)

# Technical Specifications

## DETECTORS

detector technology	solid state, segmented CsI (TI)/ silicon photodiode
field-of-view (rectangular)	15.8 x 21.2 cm [6.2 x 8.3 in]
pixel size (voxel)	6.1 x 6.1 mm

### reconstructed spatial resolution

FWHM (typical value)	15.6 mm @ 20 cm orbit radius
energy resolution	< 10.5 %
energy range	50 - 170 keV
sensitivity	225 cpm/uCi

## GANTRY

type	upright chair
length	264 cm [104 in]
width	73 cm [29 in]
height (from floor to top of arm rest)	160 cm [63 in]
system weight	435 Kg [960 lbs]

## ACQUISITION/PROCESSING STATION [A/PS]

acquisition console	flexible positioning
height [work surface]	99 cm [39 in]
acquisition matrix	32 x 32
count rate (max.)	> 3.5 million counts / sec
multitasking	simultaneous acquisition & processing
isotopes imaged	Tl-201, Tc-99m, Co-57

## CARDIAC IMAGING

applications	MUGA, SPECT, Gated SPECT, Attenuation Correction
heart orientation	cardiocentric imaging, heart in axis of rotation
tomographic acquisition range	202.5°
start angle	-45 or -38° LAO
orbit radius	21 - 38 cm [8.3 - 15 in]
acquisition frames	30 or 60

## ENVIRONMENTAL/OPERATION REQUIREMENTS

minimum room size	2.7 m x 2.4 [9 x 8 ft]
recommended room size	3.0 m x 2.4 [10 x 8 ft]
power requirements	20A [dedicated line] @ 120 VAC, 60 Hz 10A [dedicated line] @ 240 VAC, 50/60 Hz
operating temperature	18 - 27°C [65-80°F]
relative humidity	30 - 75%
architectural modifications	not required
environmental storage	0 - 50°C [32 - 122°F]
patient weight limit	227 kg [500 lbs]

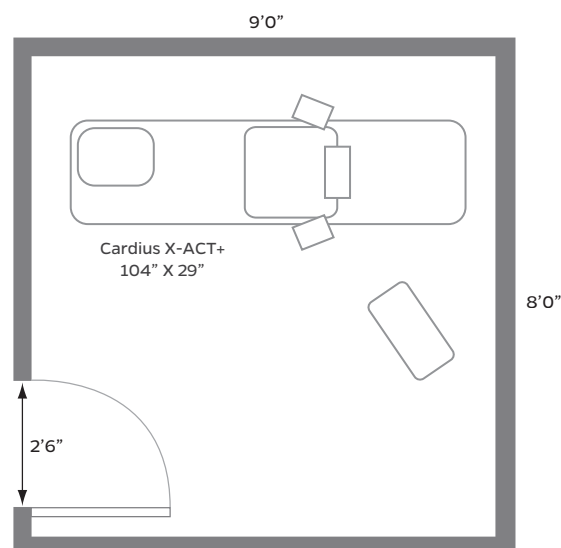
## X-RAY SPECIFICATIONS

scan time	60 seconds
X-ray beam energy	40 - 160 keV
(lead fluorescent x-ray)	avg 77.3 keV

## RADIATION EXPOSURE SURVEY

location description	operator's station
measured exposure rates	0.36 mR/hr
limit	≤ 0.50 mR/hr

Note: specifications are subject to change. All photos and images may vary slightly from actual product.



MINIMUM ROOM LAYOUT 8' X 9' [2.4 m x 2.7 m]



# Ergo™ Imaging System



# Unparalleled Clinical Flexibility and Imaging Quality

The Ergo™ Imaging System is Digirad's advanced solid-state large field-of-view (LFOV) general purpose nuclear medicine camera.

This single-head gamma camera is compact, lightweight, portable, and is designed to offer maximum clinical versatility. The Ergo is ideal for performing planar, gated, and dynamic nuclear medicine studies in imaging centers, outpatient service centers, and a variety of hospital settings.

## The new standard of care

Distinguished by a sleek patient-friendly open gantry, a portable base, and multiple compound detector motions, the Ergo provides a virtually unlimited range of imaging possibilities. It affords greater opportunities and advantages for nuclear imaging in:

**General Nuclear Medicine** – The large field-of-view solid-state detector design offers the superior flexibility needed to image patients on stretchers, sitting up, or even in wheelchairs.

**Pediatrics** – The Ergo's compact design makes it easy to maneuver and image in tight spaces like pediatric patient areas and neonatal intensive care units. Also, imaging at the patient's bedside improves care and saves cost (and time) by eliminating the need to bring infants and nursing staff to the nuclear imaging department.

**Surgery & Trauma** – The Ergo's portability offers the freedom to image patients in the ICU, CCU, ER, OR, trauma units, or regular patient floors. The Ergo supports a wide variety of clinical protocols, leading to improved clinical outcomes for many oncological, general, and surgical procedures.

**Women's Health** – The thin, large field-of-view, narrow edge detector, and Breast Imaging Accessory enable the performance of state of the art molecular breast imaging (MBI) protocols.





In addition to the Ergo's™ revolutionary large field-of-view solid-state detector and superior positional flexibility, it offers an array of conveniences that support the delivery of high-quality clinical results.

#### **Compact Open Gantry**

The small gantry footprint combined with a thinner, compact, and lighter detector create a less intimidating system, making it ideal for imaging claustrophobic and/or pediatric patients. The design's caudal and cephalic detector tilt capability further enhances the Ergo's imaging flexibility to easily image patients sitting up or lying down.



#### **Lightweight Portable Design**

The lightweight portable design and low profile wheelbase make it easy to maneuver. A narrow 27" width allows for easy entry into 30" doorways and simple movement through small hallways and around patient beds.

#### **Swivel Acquisition + Viewing Workstation**

A dedicated laptop acquisition workstation specially configured for Digirad imaging is mounted on a swivel base, allowing operation from either side of the camera. The operator control console provides comprehensive acquisition and viewing functionality and supports Modality Worklist compatibility. The user friendly interface also allows technologists to easily create and customize imaging protocols.

## Breast Imaging Accessory

Your imaging options are vastly expanded with the Ergo™ Breast Imaging Accessory. This modular add-on offers a non-dedicated, cost effective option for molecular breast imaging. The breast stabilization assembly and breast mode software provide the ability to obtain standard mammographic views for direct x-ray correlation, and the solid-state breast-optimized MBI collimator provides superior, high-contrast images.



### Other advantages include:

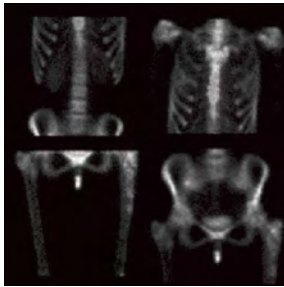
- Ergo's™ vertical range, which allows the seated patient to be positioned at a comfortable working height.
- The see-through shielded paddle, which reduces scatter while optimizing breast visualization.
- The oversized field-of-view, which eliminates tiling, reduces imaging time and improves diagnostic value.
- Foot controls, which allow for hands-free positioning and the ability to draw maximum breast tissue into the image.

## Collimator Options

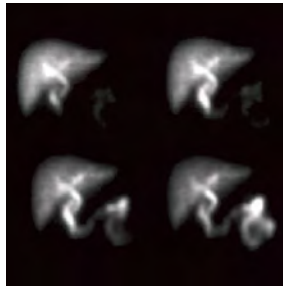
Six high performance collimator options (LEAP, LEHR, MEAP, PINHOLE, DIVERGING, MAMO) provide the capability for outstanding imaging quality for a wide range of procedures. Quick-release latch mechanisms and flip-up handles make changing collimators simple and fast. An optional collimator cart provides easy and convenient accessibility and storage for up to 5 collimators and one breast imaging accessory.



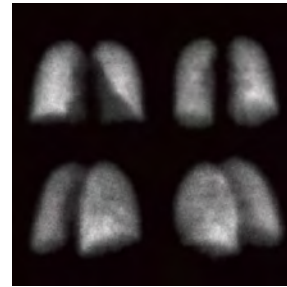
The heart of the Ergo™ is its large 12.25" x 15.5" field of view utilizing the most advanced solid-state detector technology in the industry. The system delivers unsurpassed performance specifications for general imaging with intrinsic spatial resolution of 3.25 mm, energy resolution of 7.9%, and count rate capabilities greater than 5 Mcps. The versatility of the Ergo is unmatched by other general imaging systems. It has six collimator options for use in various nuclear medicine applications including:



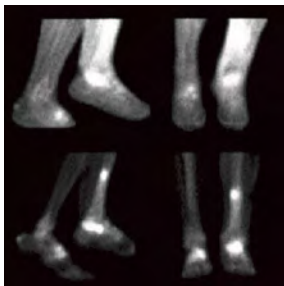
Bone Spot



Gallbladder



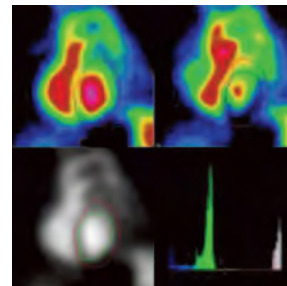
Lung Perfusion



3 Phase Bone (2 of 3 Phases)



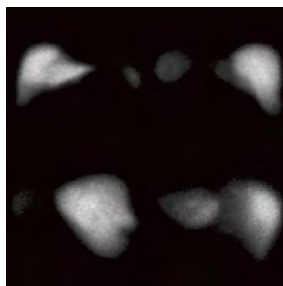
Thyroid



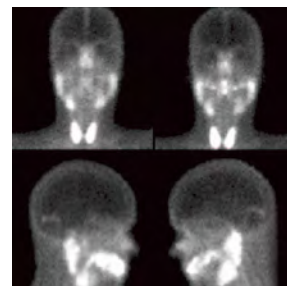
Planar Gated



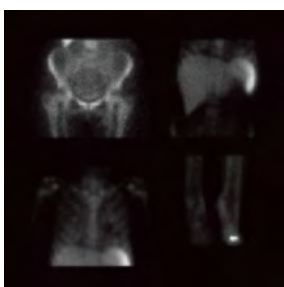
Molecular Breast Imaging



Liver



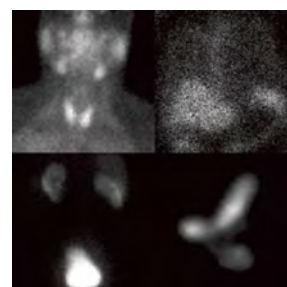
Salivary Gland



White Blood Cell



Brain Flow  
(Flow and Static Images)



Miscellaneous Studies:  
Parathyroid, Renal, Gastric  
Emptying, Indium, Gallium

# Technical Specifications

## DETECTOR SPECIFICATIONS

detector technology	solid state, segmented CsI (TI) / silicon photodiode
exterior dimensions	42.1 x 38.4 x 10.2 cm [16.6 x 15.1 x 4.0 in]
useful FOV	39.6 x 31.1 cm [15.6 x 12.2 in]
detector element size	3 x 3 mm
energy range	50-350 keV
collimator options	LEAP, LEHR, MEAP, PINHOLE, DIVERGING, MBI

## SYSTEM PERFORMANCE

simultaneous dual isotope acquisition	yes
acquisition matrix	64 x 64, 128 x 128, 256 x 256, 512 x 512
maximum emission count rate, cps <sup>1</sup>	> 5M
intrinsic spatial resolution	3.3 mm
intrinsic energy resolution, FWHM, 140 keV	7.9%
intrinsic spatial linearity	0.3 mm (absolute)

<sup>1</sup> The maximum count rate reached with 34mCi Tc-99m source in the open window was 5M cps. The fold-over point was not yet reached.

## DETECTOR/YOKE MOTION

### rotation

detector	180°
yoke	360°
arm rotation	390°

### vertical position

maximum	152.4 cm [60 in]
minimum	45.7cm [18 in]

### maximum reach

parallel to the floor (looking up/down)	92.2 cm [36.3 in]
perpendicular to the floor (looking back)	66 cm [26 in]

## COLLIMATOR SPECIFICATIONS

	LEAP	LEHR	MEAP	PINHOLE	DIVERGING
isotope	Tc-99m	Tc-99m	In-111, Ga-67	Tc-99m, I-123	Tc-99m
useful energy range (keV)	50-170	50-170	50-350	60-160	50-170
hole shape	hex	hex	hex	round	hex
septal thickness (mm)	0.2	0.2	1.0	n/a	0.3
hole diameter (mm)	1.5	1.5	2.3	4, 6, and 8	1.9
hole length (mm)	23	30	30	218	30
sensitivity @ 10cm (cpm/uCi) <sup>2</sup>	250*	132*	153 <sup>^</sup>	210*	106*
system spatial resolution @ 10cm w/o scatter (mm) <sup>2</sup>	10.3	7.4	11.2	10.0	10.8
focal length @ exit surface (mm)	n/a	n/a	n/a	n/a	350
diameter at base of cone (mm)	n/a	n/a	n/a	285	n/a
weight (lbs)	26	34	68	38	40
type	parallel	parallel	parallel	pinhole	diverging

<sup>2</sup> All spatial resolution and sensitivity numbers are typical values. Sensitivity numbers within +/-7% of spec are acceptable.

\* Sensitivity measured using 16% Tc-99m window.

<sup>^</sup> MEAP sensitivity calculated using Ga-67 with 86-100 keV and 170-200 keV windows.

# Technical Specifications

## BREAST IMAGING ACCESSORY

	MBI
isotope	Tc-99m
useful energy range (keV)	130-152
hole shape	hex
septal thickness (mm)	0.3
hole diameter (mm)	1.9
hole length (mm)	22
sensitivity @ 10cm (cpm/uCi) <sup>3</sup>	466
system spatial resolution @ 6 cm w/o scatter (mm) <sup>2</sup>	8.9
focal length @ exit surface (mm)	n/a
collimator weight (lbs)	30
accessory weight (lbs)	36
type	parallel
accessory compression range	2-19 cm [0.8-7.5 in]
stabilization pressure	8 lbs

2 All spatial resolution and sensitivity numbers are typical values. Sensitivity numbers within +/-7% of spec are acceptable.

3 Sensitivity measured using 130-152keV Tc-99m window.

## ENVIRONMENTAL/OPERATION REQUIREMENTS

system weight	320 kg [705 lbs]
height	179.1cm [70.5 in]
width	74 cm [29 in]
length	170 cm [67 in]
minimum room size	8 x 8 ft
floor clearance	8.9 cm [3.5 in]
power requirements	15A @ 120VAC, 60Hz, 7.5A @ 240VAC, 50/60Hz
operating temperature range	18-29° C [65-84° F]
relative operating humidity	30-75%
architectural modifications	none required
environmental storage	5-50° C [41-122° F]
storage humidity	10-90% (non-condensing)

## COLLIMATOR CART (OPTION)

length	83.8 cm [33 in]
width	58.4 cm [23 in]
height	119.4 cm [47 in] without accessories
weight	116.6 kg [257 lbs] without collimators or accessories
storage capacity	five collimators plus one breast imaging accessory



# Cardius® XPO Series



Cardius® 2 XPO



Three imaging systems, all of which provide outstanding image quality, superior efficiency, and increased patient comfort.



### **Cardius® 2 XPO**

Includes the standard features of the XPO series with modern dual-head solid-state technology.



### **Cardius® 2M XPO**

Includes the standard features of the Cardius 2 XPO specially designed to endure a mobile environment.



### **Cardius® 3 XPO**

Specifications are similar to the Cardius 2 XPO with the addition of a third detector for further reduction in dose and/or imaging time.

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#### **Improve speed and efficiency with triple-head technology**

The Cardius 3 XPO system packs even more imaging power with its triple-head detector design. The Cardius 3 XPO is the only solid-state camera dedicated for nuclear cardiology SPECT applications to feature three detectors. More efficient than competitive dual-head system designs, it offers enhanced workflow and imaging efficiency while maintaining its superior resolution and imaging quality.

#### **Consider the Cardius 3 XPO for:**

- **Optimum diagnostic results**
- **High definition, solid-state, triple-head detectors**
- **Up to a 38% increase in patient throughput**

# The Cardius® XPO Series

The Cardius Series of imaging systems utilizes advanced solid-state technology and cardiac software coupled with an innovative design that promotes greater comfort and optimizes diagnostic results.

Setting a new standard in the nuclear imaging industry, the increased image quality and system efficiency are hallmarks of Digirad's state of the art multi-head systems.

Digirad developed sophisticated imaging technology for both the dual and triple-head Cardius cameras. Not only do the benefits of the innovative design and capabilities substantially advance your imaging results, they also measurably improve workflow and efficiency. When you upgrade your equipment to the Cardius Series, you're taking a step into the future of nuclear medicine.



## Cardius® XPO Cameras Feature:

- **Solid-state Detectors**
- **Faster Imaging**
- **Higher Clarity**
- **Increased Comfort**
- **Greater Efficiency**
- **Patient Friendly Design**
- **Small Footprint**

## Dual-head and Triple-head Imaging Systems

### What Sets Cardius Apart?

#### High Definition Solid-State Detectors (HDSD)

The high definition feature of Digirad's proprietary solid-state detectors adds a superior level of image quality, reliability, and performance to these compact, rugged, and better body conforming imaging systems.

#### TruACQ Count-Based Imaging™

Digirad's exclusive TruACQ Count-Based Imaging is the first and only "on the fly" count-based SPECT imaging technique that ensures consistent counts for every patient study regardless of patient size, weight, or dose.

#### Size

Lightweight and extremely compact, the Cardius system can be installed in a room as small as 7 x 8 feet (56 square feet) and can be placed on nearly any floor.

#### Open and Upright

Designed to be more patient friendly, the upright design allows for easier ingress and egress for patients up to 500 lbs. In addition, it can help provide better separation between the heart and viscera, improving both clinical quality and physician confidence.



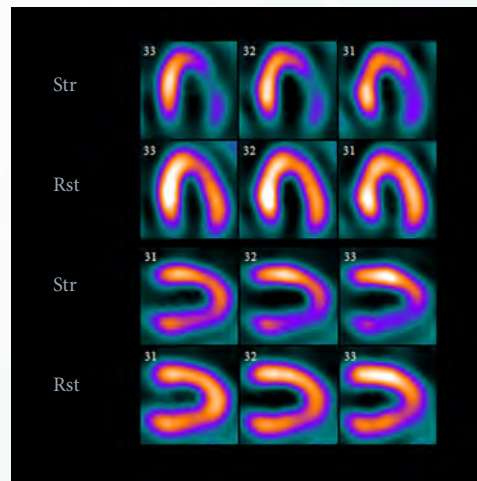
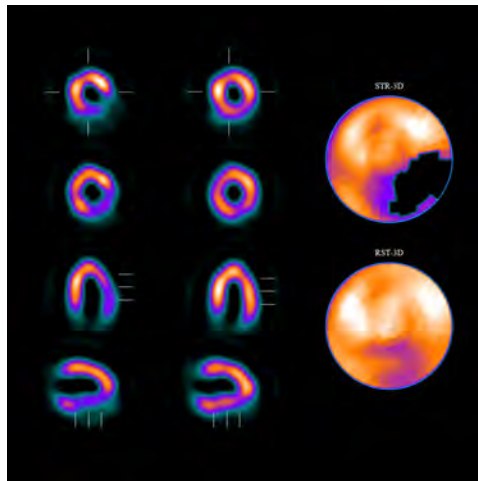
#### Process Optimization

The components of the imaging experience, including patient information, set-up, operation, data processing and handling, presentation of final clinical results, and reporting are significantly optimized with the Cardius system. With Digirad's SeeQuanta™ advanced acquisition software, exams are performed simply and efficiently while ensuring maximum consistency with less operative variability.

In today's healthcare environment, the need to improve efficiency and quality is of the utmost importance. That's why Digirad created the Cardius® XPO series of dedicated cardiac SPECT imaging systems.

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The compact, patient-friendly, open design features exclusive solid-state detectors and advanced cardiac software, making our dual-head Cardius 2 XPO and triple-head Cardius 3 XPO the preferred choice of industry-leading cameras.



# Technical Specifications

## DETECTORS

detector technology	solid state, segmented Csl (TI)/ silicon photodiode
field-of-view (rectangular)	15.8 x 21.2 cm [6.2 x 8.3 in]
pixel size (voxel)	6.1 x 6.1 mm

### reconstructed spacial resolution

FWHM (typical value)	15.8 mm @ 20 cm orbit radius
energy resolution	< 10.5 %
energy range	50 - 170 keV
sensitivity	225 cpm/uCi

## GANTRY

type	upright chair
length	152 cm [60 in]
width	73 cm [29 in]
height (from floor to top of arm rest)	170 cm [67 in]
system weight C2 XPO	342 kg [755 lbs]
system weight C3 XPO	376 kg [830 lbs]

Note: specifications are subject to change. All photos and images may vary slightly from actual product.

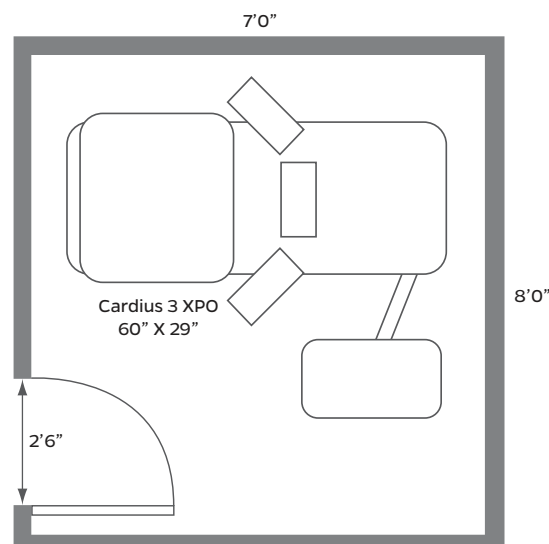
## CARDIAC IMAGING

applications	SPECT, Gated SPECT, MUGA, Planar, Planar Gated
heart orientation	cardiocentric imaging, heart in axis of rotation
start angle	-45 or -30° LAO

	C2XPO	C3XPO
tomographic acquisition range	180°	202.5°
orbit radius	18 - 40.5 cm [7.1 - 15.9 in]	21 - 38 cm [8.3 - 15 in]
acquisition frames	32 or 64	30 or 60

## ENVIRONMENTAL/OPERATION REQUIREMENTS

minimum room size	2.1 m x 2.4 [7 x 8 ft]
power requirements	20A (dedicated line) @ 120 VAC, 60 Hz 10A (dedicated line) @ 240 VAC, 50/60 Hz
operating temperature	18 - 27°C [65-80°F]
relative operating humidity	30 - 75%
architectural modifications	not required
environmental storage	0 - 50°C [32 - 122°F]
patient weight limit	227 kg [500 lbs]



MINIMUM ROOM LAYOUT 7' X 8' [2.1 m x 2.4 m]