B-MED™

IMAGING | EQUIPPING HOSPITALS FOR EXCELLENCE

Brilliance CT 16-slice configuration

The Brilliance CT 16-slice configuration is a high performance system that is ideally suited for routine CT studies, CTA and advanced motion-sensitive applications like CT Colonography and Pulmonary studies. With fast reconstruction and many automated tools for setting up patients and managing scans, it can help you increase throughput. The Brilliance CT also includes a range of thoughtful features to help maximize dose efficiency.

PHILIPS

Brilliance highlights

The Brilliance CT 16-slice offers high-quality imaging, fast reconstructions, task automation, and an array of features to minimize radiation doses. The Brilliance 16-slice scanner is available in two configurations: a 5.0 MHU X-ray tube - 48 kW generator configuration and a 8.0 MHU X-ray tube - 60 kW generator configuration.

The Philips Advantage	Clinical Value
5.0 MHU X-ray tube and 48 kW generator configuration	Provides the power and throughput necessary for all routine applications and advanced applications like CT Colonography, CTA and pulmonary imaging
8.0 MHU X-ray tube and 60 kW generator configuration	Enhances throughput and enables advanced applications and bariatric imaging
RapidView 6	Delivers up to 6 images per second
RapidView 20*	Delivers up to 20 images per second for faster reconstruction, higher throughput and less waiting for images
Flexible slice acquisition modes, including 16x0.75 mm and 16x1.5 mm	More channels and better coverage means faster acquisitions and shorter breathhold times
Subsecond 360° Rotation Time (down to 0.4 sec*)	Faster rotation times mean less susceptibility to motion artifacts
Tach Technology	Philips patented ASIC chip provides virtually noise-free signal conversion for better image quality
Dynamic Focal Spot (DFS)	Rapid deflection of the electron beam effectively doubles the sampling rate and spatial resolution
Ultra High Resolution (up to 24 Lp/cm spatial resolution)	High spatial resolution means better definition of small structures
DoseWise	A Philips-wide approach to radiation dose management focusing on lowering patient dose while providing diagnostic image quality
Clinical applications on console	Nearly all of the Philips world-class applications are available on the console as well as the Extended Brilliance Workspace and Brilliance Workspace Portal

Console

The console runs Brilliance Workspace on a Dell PC with a monitor (1,280 x 1,024 Flat Panel LCD). The console can be set up with single or dual monitors. An optional slave monitor can display the images from the main console at a remote location, such as the radiology reading room.

* Optional

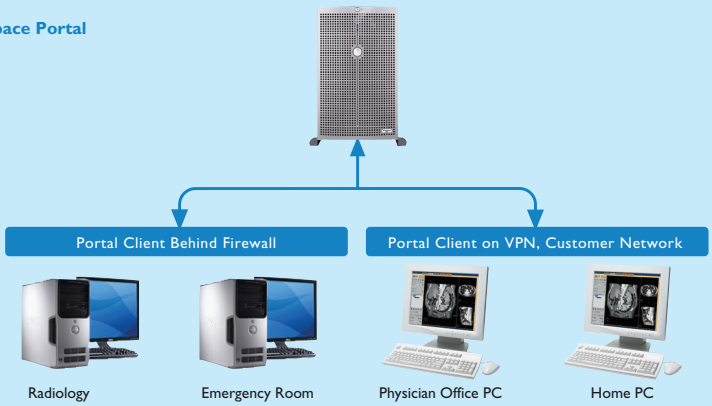
The CT user environment

Brilliance is a flexible, scalable CT work environment for planning, scanning, visualization, and archiving. The Brilliance Workspace offers a range of clinical applications at the scanner console. The Extended Brilliance Workspace* delivers advanced clinical applications to a dedicated PC. And finally, the Brilliance Workspace Portal* makes it possible for users to work efficiently with extremely large data sets from a typical laptop or home computer, wherever they are.

Brilliance CT Workspace

Extended Brilliance Workspace

Brilliance Workspace Portal



Standard Applications	Optional Applications
CT Viewer	Virtual Colonoscopy
MPR	AVA-Stenosis
SSD 3D	AVA-Stent Planning
MIP	CT Perfusion
Volume Rendering	Advanced Brain Perfusion
CT Endoscopy	Lung Nodule Assessment
Q-CTA	Lung Emphysema
Test Injection	CT Reporting
Combine Images	CT/MR Image
	Dental Planning
	Cardiac Viewer
	Heartbeat-CS
	Cardiac CT Angio
	LV/RV Analysis
	EP Planning
	Stereotaxis

* Optional

Gantry and table

Gantry

Feature	Specification
X-ray tube and Detectors Architecture	Third generation; Rotate-rotate
Rotation times	0.4**, 0.5, 0.75, 1, 1.5, 2 seconds for full 360° scans 0.28**, 0.33, seconds for partial angle 240° scans
Gantry aperture, mm	700mm
Intercom system	Two-way connection between the gantry and console areas
Gantry tilt, degrees	-30° to +30° with 0.5° increments
Controls located on Gantry (left and right, front and back)	Tilt, Couch In/Out, Couch Up/Down, Emergency Stop, X-Ray Indicator
Controls located at Operator's Console	Tilt, Couch In/Out, Couch Up/Down, Emergency Stop, X-Ray Indicator, Start Scan, Pause
Focus-detector distance	1040mm
Focus-isocenter distance	570mm

AutoVoice

A standard set of commands for patient communication before, during, and after scanning is available in the following languages:

- English
- French
- Spanish
- Italian
- Japanese
- Hebrew
- Arabic
- Russian
- Georgian
- Turkish
- German
- Danish
- Swedish

Customized messages can also be created.

Patient Table

Feature	Specification
Vertical range, mm	578 to 1028mm with 1.0mm increment
Manual longitudinal stroke, mm	1900mm
Scannable range, mm	1750mm
Z-position accuracy	±0.25mm
Longitudinal speed, mm/s	0.5 – 100mm/s
Max Load Capacity with Accuracy, lb	450 lbs (204kg) with 0.25mm Z-axis accuracy 650 lbs (295kg) with Bariatric Patient Support*
Floating tabletop	Carbon-fiber table top with foot pedal and hand control for easy positioning and quick release.

* Optional

** Optional, Requires 8.0 MHU X-ray tube and 60 kW generator

Accessories

Standard Accessories

Patient restraint kit

Elevated head holder

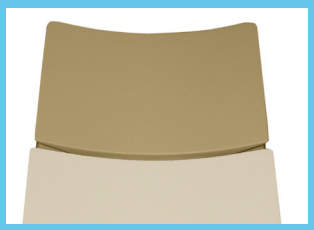


Table extension

Coronal head holder – supine

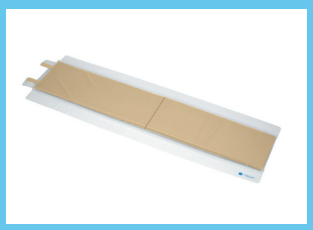
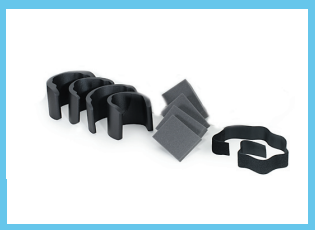
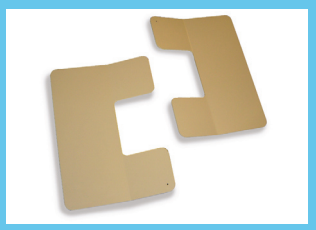
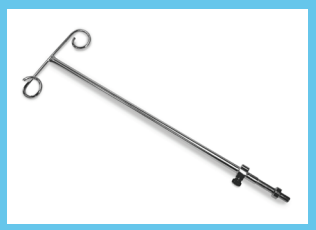


Table pad


Cushions and pads


Arm rests

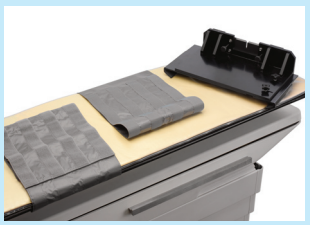

IV poles

Optional Accessories

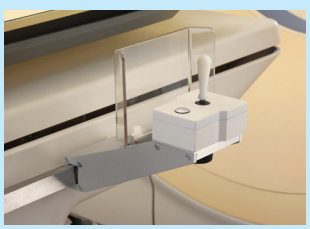
Infant cradle

Therapy table top

Flat head holder


Radiology Flat Top Kit

Load and unload foot pedals


Interventional couch controls

Scan and image acquisition

Generator

	8.0 MHU X-ray tube and 60 kW generator configuration	5.0 MHU X-ray tube and 48 kW generator configuration
Output capacity	60 kW	48 kW
kV	90, 120, 140 kVp	90, 120, 140 kVp
mA	20-500 mA; 1 mA increments	20-400 mA; 1 mA increments

X-ray Tube

	8.0 MHU X-ray tube and 60 kW generator configuration	5.0 MHU X-ray tube and 48 kW generator configuration
Anode storage capacity	8 MHU	5 MHU
Anode max cooling rate	1608 kHU/min	815 kHU/min
Focal spot (IEC)	Large: 1.0mm x 1.0mm Small: 0.5mm x 1.0mm	Large: 1.0mm x 1.0mm Small: 0.5mm x 1.0mm
Anode diameter	200mm	190mm
Anode rotation speed	105 Hz (6300rpm)	105 Hz (6300rpm)
Target angle	7°	7°
Maximum On-Time (@ maximum mA 120kV, Large Focal Spot)	23 sec @ 500 mA	54 sec @ 400 mA

Detector

Feature	Specification
Material	Solid-State GOS with 16,128 elements
Dynamic range	1,000,000:1
Slip ring	Optical - 1.1 Gbps transfer rate
Data sampling rate	Up to 4640 views/revolution/element
Slice collimations available	2 x 0.6mm,16 x 0.75mm, 16 x 1.5mm, 8 x 3.0mm, 4 x 4.5mm
Slice thickness (Spiral mode)	0.65 - 7.5mm variable
Slice thickness (Axial mode)	0.6 - 12mm
Scan angles	240°, 360°, 420°
Scan field of view	250mm, 500mm

Image Quality

Feature	Specification			
Spatial Resolution	Cut-off	2%	10%	50%
Ultra High mode (lp/cm)	24.0	23	16	8
High mode (lp/cm)	16.0	15	12	6
Standard mode (lp/cm)	13.0	12	6	3.5
Noise	0.27% [120kVp, 250mAs, 9mm, 250mm FOV, UA Filter, 21.6cm water equivalent phantom]			
Low-contrast resolution	4.0mm @ 0.3% [120kVp, 250mAs, 9mm, 250mm FOV, UB Filter, 27mGy at surface of CATPHAN phantom]			
Absorption range	-1024 to +3072 Hounsfield units			

Scanning modes

Spiral Scanning

- Multiple contiguous slices acquired simultaneously with continuous table movement during scans
- Multiple, bidirectional acquisitions
- Spiral exposure: Up to 100 seconds
- Spiral pitch: 0.13 to 1.7 (user-selectable)

Axial Scanning

- Multiple-slice scan with up to 16 contiguous slices acquired simultaneously with incremental table movement between scans
- Fused modes for reconstructing thick slices from thin slice acquisitions

Clinical enhancements

Bolus Tracking*

An automated injection planning technique to monitor actual contrast enhancement and initiate scanning at a predetermined level.

Spiral Auto Start (SAS)*

Spiral Auto Start integrates the injector with the scanner, allowing the technologist to monitor the contrast injection and to start and stop the scan (with the predetermined delay) while in the scan room.

Rate Responsive CV Toolkit**

Enables cardiac imaging and includes an ECG monitor, Retrospective Tagging, Prospective Gating, the Cardiac Viewer, Heartbeat-CS and CT Reporting. Uses the Philips adaptive multicycle reconstruction to optimize the temporal resolution.

Heartbeat CS Pro*

Includes ECG Prospective Gating. The scanner automatically triggers axial multislice scan acquisitions using an ECG signal. Philips patented Beat-to-Beat Variable Delay Algorithm enables accurate and reproducible calcium scoring studies.

Continuous CT (CCT)*

This application provides visual guidance for interventional procedures using a foot pedal and a remote monitor. Exposures, taken once per rotation in either single or continuous mode, are limited to a 240 degree axial centered beneath the patient to shield the clinician's hands from direct X-ray exposure.

CT Fluoroscopy Package*

This application provides near real-time guidance for interventional procedures (up to 8 fps) using a foot pedal and a remote monitor. The Fluoro mode is particularly useful in complicated procedures involving breathing and abdomen motion.

Jog Scan*

Jog Scan provides up to 48mm of imaging area for perfusion studies. The scanner acquires two 24mm volumes of interest by translating the couch back and forth – doubling the standard perfusion coverage.

Pulmonary Toolkit*

Pulmonary Toolkit enables the user to trigger a scan at a particular breath level (axial and/or spiral prospective gating), minimizing artifacts caused by respiratory motion. This allows better chest imaging of patients who cannot hold their breath.

Pulmonary Toolkit Oncology**

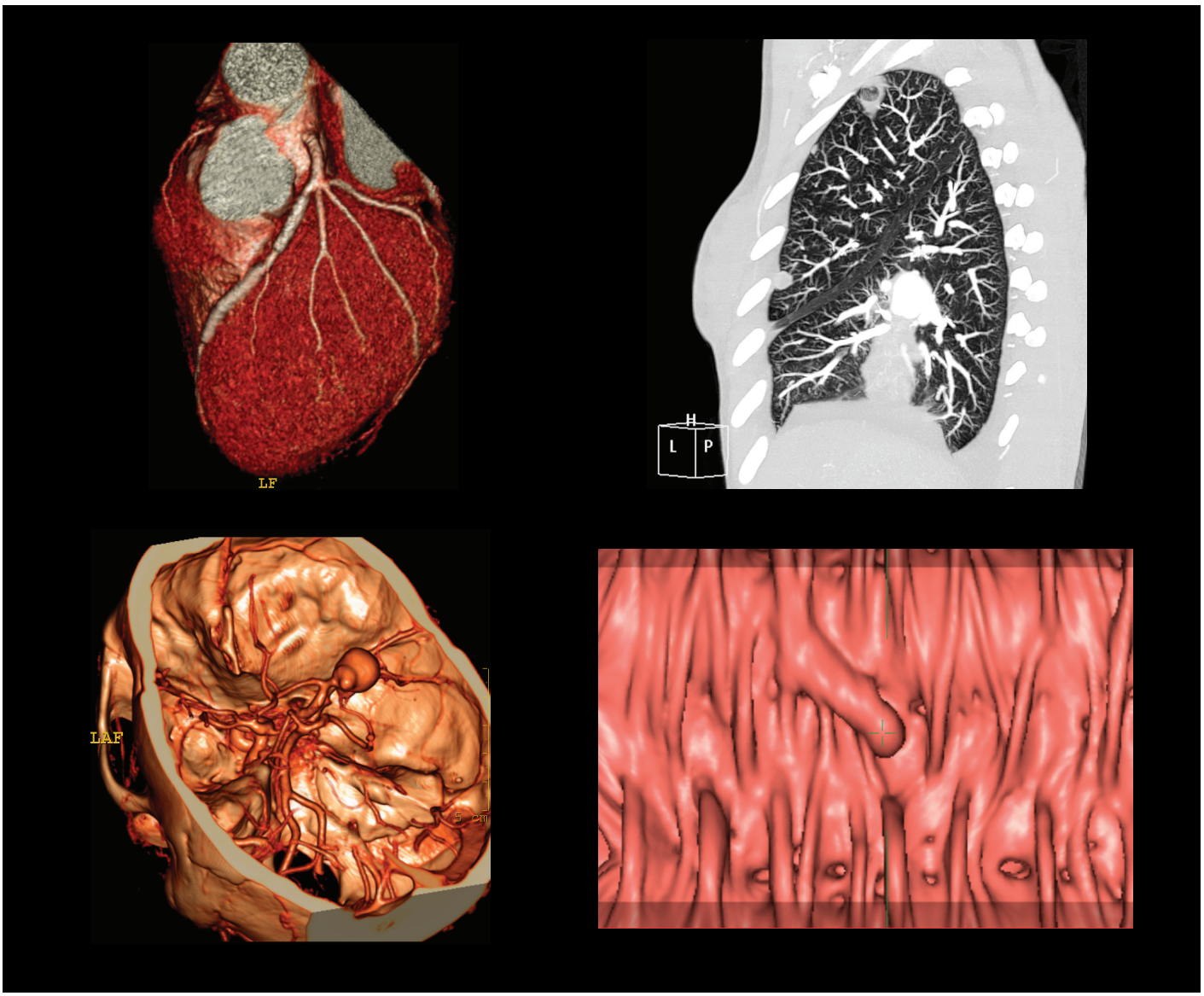
Pulmonary Toolkit Oncology includes the Pulmonary Toolkit features plus Retrospective Spiral (4D CT). This feature results in the ability to generate multiple phases allowing for visualization of motion during the respiratory cycle and delineating a target volume.

*Optional

** Optional, Requires 8.0 MHU X-ray tube and 60 kW generator

Clinical examples

Protocol	Resolution	Collimation	Rotation (sec)	Pitch	Slice Width (mm)	Scan Coverage (mm)
Cardiac CT Angiography*	Standard	16x0.75mm	0.4	0.2	1.0	115
Pulmonary Embolism CTA	Standard	16x0.75mm	0.5	0.94	1.0	285
Circle of Willis CTA	High	16x0.75mm	1.0	0.31	0.8	80
CT Colonography	Standard	16x1.5mm	0.5	0.7	2.0	380



* Optional

Dose management

DoseWise is a philosophy, a set of principles and practices, focused on lowering radiation dose for patients and staff. Philips focuses on system design optimization, current (mA) optimization and increasing dosage awareness to reduce the cumulative risk of radiation while obtaining high-quality images.

DoseWise features

DoseRight ACS (Automatic Current Selection)
Optimizes the dose for each patient based on the planned scan by suggesting the lowest possible mAs settings to maintain constant image quality at low dose throughout the exam.

DoseRight D-DOM (Dynamic Dose Modulation)
Automatically controls the tube current rotationally, increasing the signal over areas of higher attenuation (lateral) and decreasing signal over area of less attenuation (AP).

DoseRight Z-DOM (Longitudinal Dose Modulation)
Automatically controls the tube current, adjusting the signal along the length of the scan, increasing the signal over regions of higher attenuation (shoulders, pelvis) and decreasing the signal over regions of less attenuation (neck, legs).

Dedicated Pediatric Protocols
Developed in collaboration with top children's hospitals, Brilliance age and weight-based infant and pediatric protocols optimize image quality with low dose.

Dose Performance Data

CTDI vol	Measurement Dose Levels
Head	12.9 mGy / 100 mAs
Body	6.5 mGy / 100 mAs

Using IEC standard phantoms

Reconstruction

Philips RapidView reconstruction generates up to 6 images per second using a 512^2 matrix. (20 ips reconstruction is available as an option.)

Reconstruction Field of View
- 50 to 500mm continuous
- 25 to 250mm (Ultra High mode)

Image Matrix
- 512^2 (768^2 and $1{,}024^2$)*

Cone Beam Reconstruction
Philips patented Cone Beam Reconstruction Algorithm (COBRA) enables true three-dimensional data acquisition and reconstruction in spiral scanning.

Adaptive Filtering
Adaptive filters reduce pattern noise (streaks) in non-homogenous bodies, improving overall image quality.

Adaptive Multicycle Reconstruction
(Part of Rate Responsive CV Toolkit*)
Image data can be prospectively gated or retrospectively tagged. COBRA automatically delivers the best temporal resolution possible (as low as 53mseconds).

Evolving Reconstruction
Real-time 256^2 matrix image reconstruction and display in step with spiral acquisition or off-line. Images can be modified for window width and level, zoom and pan prior to larger matrix reconstruction. At the end of the acquisition, all images are updated with the desired viewing settings.

Off-Line Reconstruction
Off-Line (batch) background image reconstruction of user-defined groups of raw data files with automatic image storage.

* Optional

Networking

The Brilliance CT supports 10/100/1000Mbps (10/100/1000BaseT) network speeds. For optimal performance, Philips recommends a minimum of 100Mbps network speed (1Gbps preferred) and for the CT network to be segmented from the rest of the hospital network.

Archiving

Brilliance Workspace allows full implementation of the DICOM 3.0 communications protocol and enables connectivity to DICOM 3.0 compliant scanners, workstations, and printers; supports IHE requirements for DICOM Connectivity.

Type	Hard Drive	DVD-RAM	CD
Capacity	146GB	4.7GB	700MB
Images	250,000[1]	15,000[2]	1200[1]
Patients[3]	833	50	4

[1] 512x512 Matrix Uncompressed

[2] 512x512 Matrix Compressed

[3] Based on 300 images per study

CD Writer*

A DICOM CD Writer option stores DICOM images and associated image viewing software on very low cost CD media. Images on these CDs can be viewed and manipulated on PCs meeting the minimum specifications. Ideally suited for individual result storage and referring physician support.

Filming

This function allows the user to set up and store filming parameters. Pre-stored protocols can be set to include auto-filming. The operator can film immediately after each image, at the end of a series, or film after the end of a study and review images before printing. The operator can also automatically film the study at three different windows and incorporate "Combine Images" functionality to manage large datasets. Basic monochrome and color DICOM print capability are supported.

DICOM

Brilliance Workspace supports IHE requirements for DICOM connectivity and can work with DICOM 3.0-compliant scanners, workstations, and printers It supports IHE requirements for Scheduled Workflow and other integration profiles as defined in IHE statement. Brilliance Workspace includes DICOM service classes to communicate with the following modalities:

- CT
- MR
- Nuclear Medicine including PET/CT
- Computed Radiography
- Radiography & Fluoroscopy (R&F)

Brilliance Workspace includes the following DICOM functionality:

- Service Class User & Provider (CT, MR, NM, Secondary Capture)
- DICOM Print
- DICOM Modality Worklist User
- Querty/Retrieve User and Provider
- Modality Performed Procedure Step User
- Storage Commitment User
- Removable Media

* Optional

Site planning

Contact the Philips Site Planning department for specific requirements pertaining to optional imaging/viewing/power equipment, floor space and electrical, mechanical, structural or environmental specifications.

Power Requirements

- 200/208/240/380/400/415/480/500 VAC
  50/60 Hz 100kVA
- Three-phase distribution source

Console Uninterrupted Power Supply (UPS)*
Provides up to 30 minutes of backup power for host computer, reconstruction, and monitors.

Environmental Requirements

Temperature:

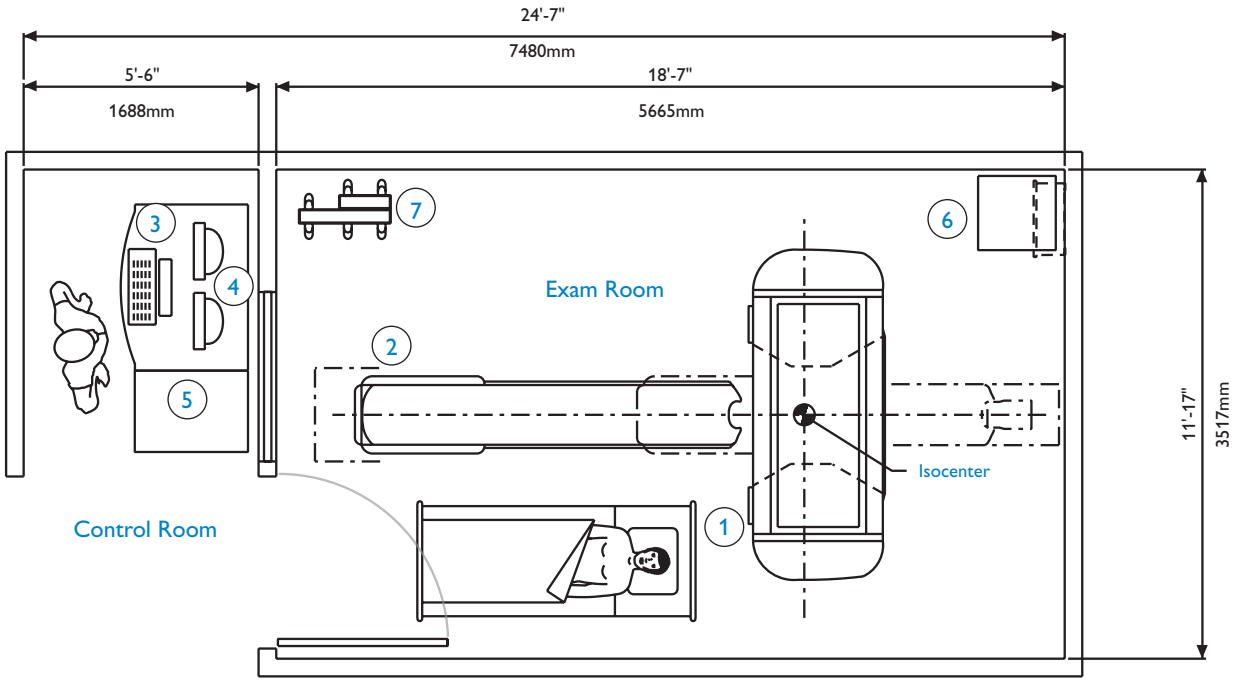
Gantry room:	18° to 24° C (64° to 75° F)
Control room:	15° to 24° C (59° to 75° F)
Storage/Transport:	-5° to +35° C (23 ° F to 95° F)

Humidity:

Gantry/Control:	35% to 70% non-condensing
Storage/Transport:	10% to 90% non-condensing

Heat Dissipation:

Gantry:	18,000 BTU/hr
Computer:	2,559 BTU/hr
Reconstruction:	5,293 BTU/hr



Dimensions and weights

	weight	height	width	depth
① gantry	1896kg (4180lbs.)	203cm (80″)	239cm (94″)	94cm (37″)
② patient table	385kg (850lbs.)	101cm (40″)	69cm (27″)	249cm (98″)
③ console table*	56kg (125lbs.)	76cm (30″)	119cm (47″)	91cm (36″)
④ LCD monitor**	10kg (22lbs.)	49cm (19″)	49cm (19″)	22cm (9″)
⑤ computer and recon cabinet	150kg (331lbs.)	76cm (30″)	58cm (23″)	90cm (36″)
⑥ transformer (xfmr)	271kg (598lbs)	112cm (44″)	56cm (22″)	53cm (21″)
⑦ console UPS*	34kg (75lbs.)	51cm (20″)	38cm (15″)	56cm (22″)

* Optional

** Dimensions and weights for one unit

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