



System specifications

Biograph Vision Quadra

[siemens-healthineers.com/quadra](https://www.siemens-healthineers.com/quadra)

System overview

PET/CT gantry and system	
Height	203.6 cm (80.2 in)
Width	234.4 cm (92.3 in)
Depth	235.4 cm (92.7 in)
Patient port	78 cm (30.7 in)
Weight:	
PET	3,000 kg (6,614 lb)
CT	2,215 kg (4,883 lb)
Patient handling system (PHS)	720 kg (1,587 lb)
Total system weight	5,935 kg (13,084 lb)

System hardware

System hardware standard

SOMATOM Definition Edge/128-slice CT

Installation kit

Universal physiological measurement module (UPMM)

TwinBeam Dual Energy with Split Filter and Tin Filter

FAST image reconstruction system (IRS) for CT

System hardware options

Acculine RT install kit

Biograph™ sources including phantom shield

Alternative keyboards (German, Spanish, French, Swedish, Portuguese)

Respiratory triggering system (CT Only)

Radiation therapy pallet

Cardiac trigger with patient cable (CT Only)

Computer desk

Computer cabinet

Pediatric cradle

NEMA 2018 Self-test kit including phantom kit

PET ACR quality phantom

syngo®.via

System configuration

Scanner room environment
Temperature range 18-28°C (64.4-82.4°F)
Temperature should not vary more than ±1.5°C (2.7°F) per hour.
Relative air humidity 20-75%, with dewpoint below 17°C (63°F)
HVAC requirement: 3.0 kW
Air climate control must be provided 24 hours per day, seven days per week.
Variation in floor levelness not to exceed 12.7 mm (0.5 in) over 5.2 m (17 ft)
Recommended room size: 3.66 m (12.0 ft) x 7.67 m (25. 2 ft)

Utility room environment
Temperature range 18-30°C (64.4-86°F)
Relative air humidity without condensation 20-75% (Recommended level 30-70%)
Gantry heat exchanger – maximum 29 kW to water cooling environment
Air climate control must be provided 24 hours per day, seven days per week.
Recommended room size: 2.13 m (7.0 ft) x 4.06 m (13.3 ft)
Operator's room environment
Temperature range 18-28°C (64.4-82.4°F)
Relative air humidity without condensation 20-75% (Recommended level 30-70%)
Air climate control must be provided 24 hours per day, seven days per week.
Recommended room size: ≥3.2 m (10.5 ft) x ≥4 m (13 ft)

System configuration

SMART PHS	
Magnetic drive	Yes
Positioning accuracy	<0.5 mm
Table speed range	0.1-200 mm/sec
Acquisition speed range	0.1-50 mm/s
Maximum patient load	227 kg (500 lb)
Maximum co-scan range (with pallet extension)	106 cm (41.73 in)
Length	381 cm (150 in)
Width	49 cm (19.3 in)
Weight	720 kg (1,587 lb)
System power requirements	
Nominal voltage	3/N~ 380-480 V ($\pm 10\%$) in 20 V steps
Nominal line frequency	50; 60 Hz (± 2 Hz)
Line impedance	80-125 mOhm
Maximum power consumption	160 kVA
Standard accessories	
Table mattress	
Table extensions	
CFK head holder with cushion	
Head-arm support	
Knee-leg support	
Restraint straps	
Head rest	
CT quality assurance phantom (20 cm)	
PET cylindrical water phantom (20 cm)	
PET and CT phantom holders (two L-brackets and half moon)	
Gantry offset phantom (twin rod phantom holder)	

System software

Software configuration (standard)
HD FoV Pro - 78 cm (CT extended FoV)
Sureview™
FAST Scan Assistant
FAST Adjust
Camtasia
CARE kV
CARE Profile
CARE Dashboard
CARE Child
CARE Filter
CARE Topo
CARE Dose4D™
CARE Bolus CT
Workstream 4D (3D-Recon)
<i>syngo</i> 3D Bone Removal
<i>syngo</i> Examination
<i>syngo</i> Viewing
<i>syngo</i> Filming
<i>syngo</i> TrueD Basic
<i>syngo</i> VRT (Volume Rendering Technique)
<i>syngo</i> Volume Calculation
<i>syngo</i> 3D SSD (Surface Shaded Display)
<i>syngo</i> 3D Real Time MPR
<i>syngo</i> Archiving and Network
<i>syngo</i> Dynamic Evaluation
<i>syngo</i> Service Solutions

Software configuration (standard) continued
CT SAFIRE
CT DICOM viewer – included on each CD; automatically started on the viewer's PC
CT FAST Dual Energy Results
CT Single Source Dual Energy scan mode
100 kW Power
High-speed 0.30 s rotation
DICOM SR Viewer
Export as JPEG
Auto beat histogram
PET injection time reminder
PET Dose Structured Report
Diagnostic CT autoloading to TrueD
Detector Guard
Ultra-low-dose CT protocols for PET attenuation correction
FAST PET Workflow AI

System software

Software configuration (optional)
Adaptive 4D Spiral
z-UHR (including UHR)
syngo Image Fusion
syngo Expert-i
CARE Contrast CT
syngo Pulmo CT
syngo Security Package
Cardio BestPhase Plus
Cardiac CT (HeartView CT with Adaptive ECG-Pulsing)
NEMA 2018 test suite/NEMA 2018 PET self test
Respiratory CT gating/triggering
Respiratory open interface allows use of Varian RPM/RGSC respiratory gating devices
CT X-CARE
CT FAST Planning
CT DirectBreathhold
CT respiratory-guided workflow
CT FAST Spine
CT FAST 3D Align
CT DirectDensity
ADMIRE (iterative) CT reconstruction
iMAR CT metal artefact reduction

PET acquisition (standard)
PET service tools
3D acquisition
Dynamic PET
Listmode acquisition with offline histogramming supports dynamic images
PET reconstruction (standard)
Reconstruction matrices available: 128 x 128, 220 x 220, 256 x 256, 440 x 440, 512 x 512, 880 x 880
Asynchronous processing/reconstruction
Simultaneous reconstruction of 2 PET datasets
3D image-based scatter correction
3D iterative reconstruction
HiRez processing
3D DIFT (Direct Fourier Transform) filtered backprojection
Prompts Gamma Correction (⁸² Rb, ¹²⁴ I, ⁶⁸ Ga)
HD•PET reconstruction
PET ToF reconstruction
PET offline reconstruction
ultraHD•PET (HD•PET + Siemens ToF)
Reconstruction of dynamic datasets

System hardware

PET detector assembly	
Bore diameter	78 cm
Detector ring diameter	82 cm
Detector material	LSO
Detector element dimensions	3.2 x 3.2 x 20 mm
Detector elements per module	200
SiPMs per module	128
SiPM coverage of crystal array	100%
Crystal elements per ring	7,600
Number of crystal element rings	320
Modules per ring	38
Total number of detector elements	243,200
Total number of SiPMs	155,648
Plane spacing	1.65 mm
Axial FOV	106 cm
PET transaxial FOV ²	70 cm
PET data acquisition/processing	
Coincidence window	4.7 ns
Energy resolution	9% FWHM
Acquisition modes	Static, list-mode, supports PET dynamic

System hardware

PET NEMA 2018 performance (depending on acceptance angle)	
NEMA performance measures represent preliminary values derived from internal testing. All measurements are performed with the factory LLD setting of 435 keV.	
NEC rate k=0 (kcps)	≥1940
Effective activity concentration (kBq/cc)	≤20
Scatter fraction at peak NEC (%)	≤43
Scatter fraction (depending on acceptance angle) at low activity (%)	≤40
TOF (depending on acceptance angle)	
FWHM at peak NEC (psec)	≤249 ³
FWHM at 5.3 kBq/cc (psec)	≤249 ³
Spatial resolution – axial (depending on acceptance angle)	
FWHM @ 1 cm (mm)	≤4.3
FWHM @ 10 cm (mm)	≤5.4
FWHM @ 20 cm (mm)	≤5.4
Spatial resolution – transverse (depending on acceptance angle)	
FWHM @ 1 cm (mm)	≤4.0
FWHM @ 10 cm (mm)	≤4.8
FWHM @ 20 cm (mm)	≤5.2
Sensitivity (depending on acceptance angle)	
Average sensitivity (cps/kBq)	≥150 ⁴
Effective sensitivity (cps/kBq)	≥803 ⁵
PET reconstruction times	
ultraHD•PET¹	
Reconstructions are parallel to acquisitions, and two reconstructions jobs can be performed at the same time.	
Reconstruction time (static) (440 x 440 matrix, 645 imaging planes)	5 minutes

System hardware

CT reconstruction system

The Biograph Vision Quadra PET/CT scanner incorporates the Siemens SOMATOM Definition Edge scanner as the CT component.

The CT image reconstruction system, also known as IRS, contains a cluster of high-performance processors dedicated to asynchronous preprocessing and reconstruction of the CT data.

Cluster of high-performance processors providing up to 80 images/s with FAST IRS

CT general specifications

Aperture	78 cm
Scan field	HD FoV Pro - 78 cm (CT extended FoV) Diagnostic FoV 50 cm
z-Sharp™ Technology	
z-UHR ¹ (ultra high resolution)	
Rotation times	1.0, 0.5, 0.33, 0.28 s
Maximum number of slices/rotation	128 (acquired slices) 384 (reconstructed slices)
Temporal resolution	71 ms
Multislice Stellar detector	
Number of detector rows	64
Number of detector electronic channels	128
Number of detector elements	47,104
Total channels/slice	1,472
Number of projections	up to 4,608 (1/360°)

System hardware

CT general specifications (continued)	
Generator maximum power	100 kW
X-ray tube	STRATON
Tube current	20-800 mA
Tube voltages	70, 80, 100, 120, 140 kV
Tube cooling rate	7.3 MHU/min (5.400 kJ/min)
Tube anode heat storage capacity	0 MHU (0.6 MHU capacity combined with 7.3 MHU/min (5,400 kJ/min) cooling rate is comparable to the performance of a conventional tube with approximately 50 MHU (37,000 kJ) anode heat storage capacity)
Tube focal spot sizing according to IEC 60336/1993	0.7 x 0.7 mm/7°, 0.9 x 1.1 mm/7°
CARE Filter tube	Equivalent to 6.8 mm Al (145 kV)
CARE Filter (beam limiting device/collimator)	0.5 mm Al, 0.3 mm Ti (equivalent to 0.3 mm Al) tube: 6.8 mm Al
CT topogram	
Length of topogram field	128-2,200 mm
Topogram scan times	1.5-20 s
CT sequence acquisition	
Reconstructed slice widths in sequence acquisition	0.5, 0.6, 0.75, 1, 1.2, 1.5, 2, 2.4, 3, 4, 4.8, 5, 6, 7, 7.2, 8, 10, 14.4, 15, 20 mm
Full scan times (360° rotation)	0.28, 0.33, 0.5, 1.0
Partial scan times (260° rotation)	0.21, 0.24, 0.36, 0.72
Number of uninterrupted scans per range	100
Number of ranges per protocol	33
Scan cycle time (varies with rotation speed)	0.5-60 s (+/-10%)

System hardware

CT spiral acquisition	
Reconstructed slice widths in spiral acquisition	0.4 ¹ , 0.5, 0.6, 0.75, 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 10 mm
Scan times (360° full scan)	0.28, 0.30, 0.5, 1.0s
Slice increment	0.1-10 mm
Pitch factor	0.35-1.7, 0.17 ¹ , 0.09 ¹
Spiral scan time maximum	80 s (160 s with optional CT respiratory gating)
Number of ranges per protocol	33

System hardware

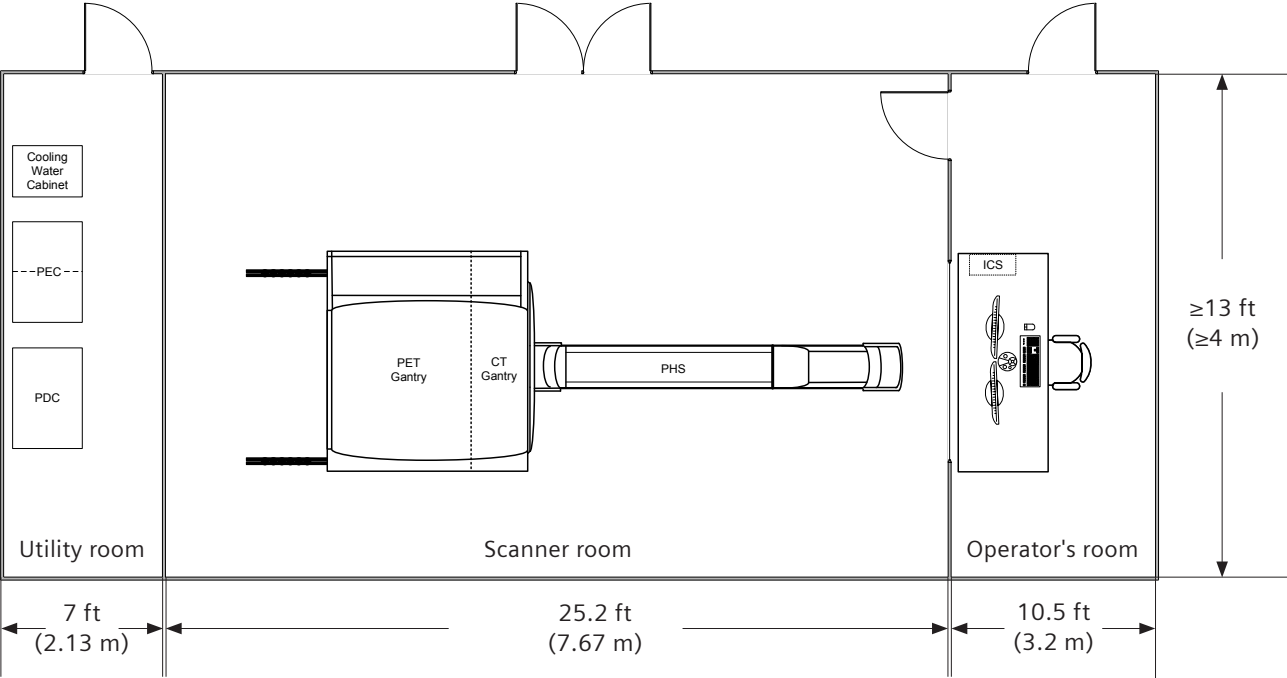
CT reconstruction		
Real-time display supported during spiral acquisition		
Reconstruction field	5-50 cm, 5-78 cm (HD FoV Pro)	
Reconstruction matrix	512 x 512	
HU scale	-1,024 to +3,071	
Extended HU scale	-10,240 to +30,710	
Reconstruction time	up to 80 images/s	
CT image quality		
Low-contrast resolution (CATPHAN 20 cm) technique – 10 mm, 120 kV		
	Sequence	Spiral
Object size	5 mm	5 mm
Contrast difference	3 HU	3 HU
Dose at surface	11 mGy @ 180 mAs	12 mGy @ 180 mAs
Standard high-contrast resolution		
x/y-plane	2% MTF	16.4 lp/cm ($\pm 10\%$)
	10% MTF	14.0 lp/cm ($\pm 10\%$)
	50% MTF	11.4 lp/cm ($\pm 10\%$)
Technique: 12 x 1.2 mm, 120 kV, 350 mA, 1.0 s, 1.2 mm slice		
z-plane	2% MTF	18.5 lp/cm ($\pm 10\%$)
	10% MTF	15.0 lp/cm ($\pm 10\%$)
	50% MTF	10.3 lp/cm ($\pm 10\%$)
Technique: 128 x 0.6 mm, 120 kV, 240 mA, 0.5 s, pitch 0.6, SAFIRE strength 5, 0.5 mm slice		
Ultra-high resolution (UHR mode ¹)		
x/y-plane	2% MTF	24 lp/cm ($\pm 10\%$), 0.20 mm
	10% MTF	23.3 lp/cm ($\pm 10\%$), 0.21 mm
	50% MTF	18.7 lp/cm ($\pm 10\%$)
Technique: 16 x 0.6 mm, 120 kV, 160 mA, 1.0 s, 1 mm slice		
z-plane	2% MTF	22 lp/cm ($\pm 10\%$), 0.21 mm
	10% MTF	17.5 lp/cm ($\pm 10\%$), 0.29 mm
	50% MTF	7.5 lp/cm ($\pm 10\%$)
Technique: 16 x 0.3 mm, 120 kV, 160 mA, 1.0 s, pitch 0.3, 0.4 mm slice		
Homogeneity		
20 cm water phantom		
Cross-field uniformity	Maximum ± 4 HU	Typical ± 2 HU

System hardware

Dose, CTDI100 values						
Phantom		kV	kV	kV	kV	kV
∅		70	80	100	120	140
16 cm	A	2.6	4.2	8.5	13.9	20.3
	B	2.8	4.5	8.8	14.3	20.9
32 cm	A	0.6	1.1	2.4	4.3	6.6
	B	1.4	2.3	4.7	7.8	11.7
A		• at center				
B		• 1 cm below surface				

Technique: collimation 32(16) x 1.2 mm, 100 mAs, 360° rotation, PMMA phantom, absorbed dose for reference material air, maximum deviation ±40%, ±40% for 80 kV, typically <15%, values according to IEC 60601-2-44

Example room layout



Note: This layout is for reference purposes only. The system layout varies by site.

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¹ Optional

² On sinogram

³ Denotes acceptance value. Measured value of <228ps, based on phantom studies performed on a single system. Data on file.

⁴ Denotes acceptance value. Measured value of 170.7 cps/kBq, based on phantom studies performed on a single system. Data on file.

⁵ Denotes acceptance value. Measured value of 1000 cps/kBq, based on phantom studies performed on a single system. Data on file.

Biograph Vision Quadra is not commercially available in the USA and other countries. Its future availability cannot be guaranteed. Please contact your local Siemens Healthineers organization for further details.

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