SIEMENS

SOMATOM Volume Zoom
Computed Tomography System for Volume Scanning

DATA

SOMATOM Volume Zoom
Pioneering the New Dimension

Think Volume, not Slices

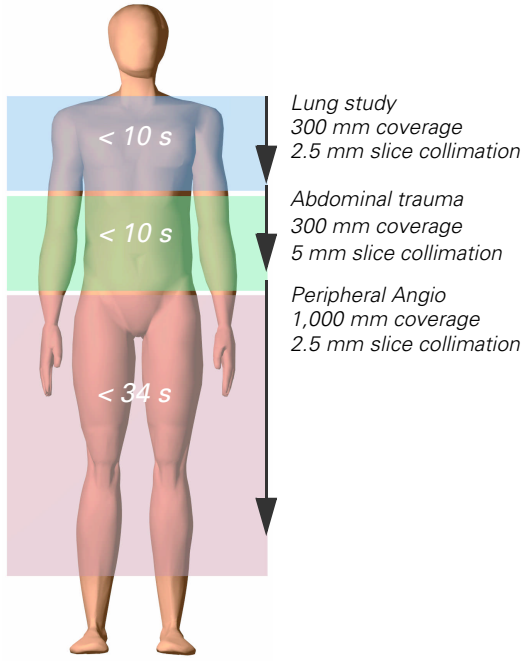
3-D reconstructions virtually in axial quality

End Compromise in CT Exams

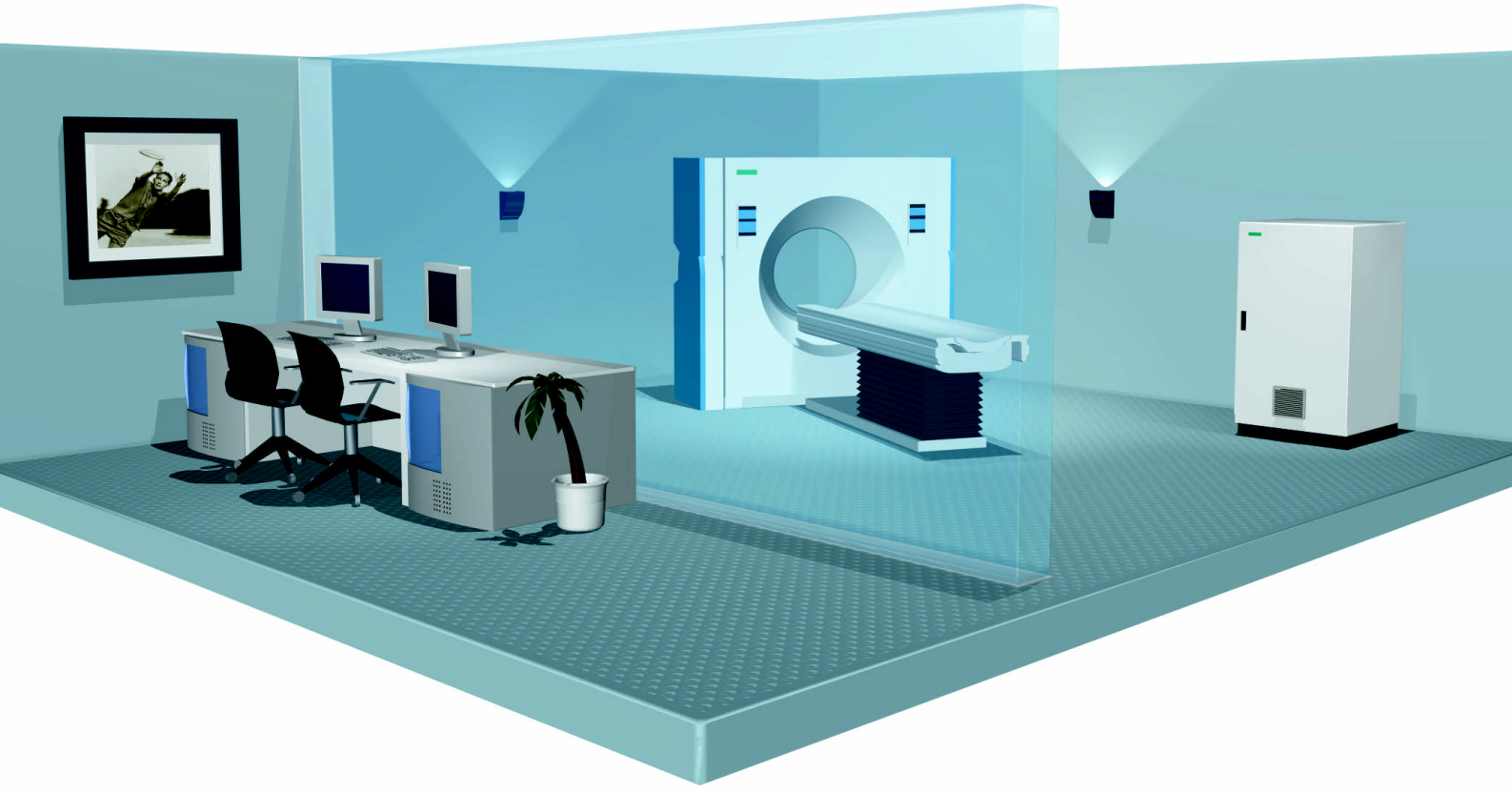
Acquisition speed: up to 8 slices/second

Freeze the Heartbeat

HeartView CT with down to 125 ms temporal resolution



Contents



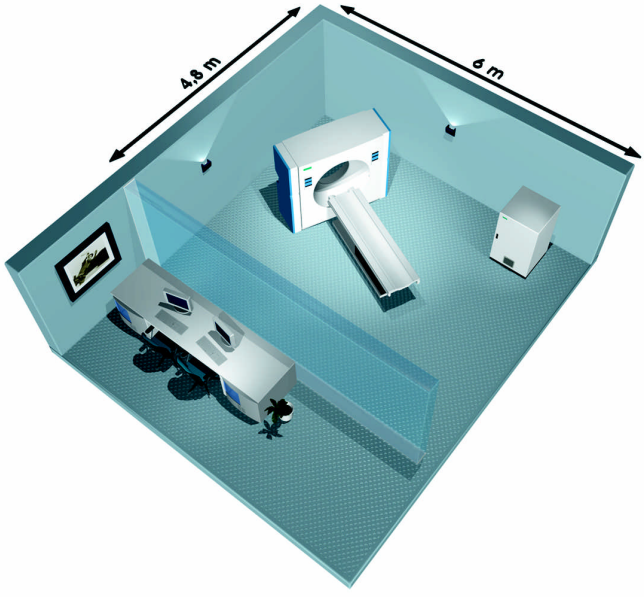
Ultra-fast gantry design

500 milliseconds for a full rotation— up to 8 slices per second

Adaptive Array Detector (AAD)

Fastest detector system in the world.
No clinical restrictions with slice thickness.
Most dose efficient geometry.

Fast compact installation



Spiral CT Features and Data

Ultra-fast scanning technique with continuous table feed

All examinations deliver breathtaking temporal resolution and never-before-seen resolution of detail

Adapt scanning technique to application through freely selectable pitch and flexible slice selection

Minimal misregistration of minute details between individual slices due to patient motion

Up to 80 mm/s volume coverage for minimized examination times; improved throughput and minimal problems with uncooperative patients

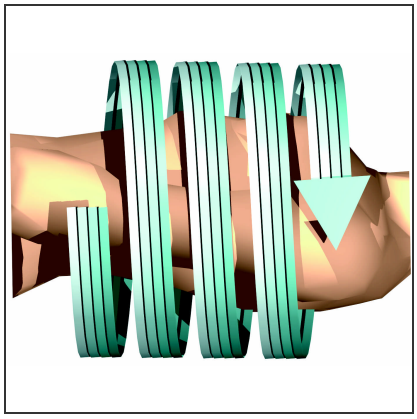
Examination of complete anatomic regions within a fraction of a breath-hold, with isotropic 3-D resolution

Data acquisition of an entire anatomical volume of up to 157 cm without pause

Spiral Mode with retrospective ECG gating, down to 125 ms temporal resolution (HeartView CT) for virtually motion-free studies of critical anatomical regions like the lung or the heart, and vascular studies

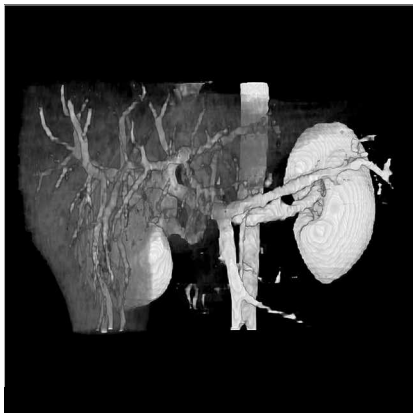
Optimum timing for contrast media studies; premium image quality due to uniform contrast enhancement for complete examination

Virtually unlimited scanning flexibility to adapt to all anatomical and physiological requirements



Flexible selection of slice thickness, prospectively and retrospectively (Combi Scan)

Excellent data sets for reconstructions of secondary views



- MPR
- 3D
- MIP
- Volume Rendering [optional]*
- Virtual Endoscopy [optional]*

* Post-processing on a workstation

Volume Zoom

Spiral image reconstruction

Multiple and fully flexible reconstruction of raw data (prospective and/or retrospective)

SureView Spiral Reconstruction

mAs	preselectable
Effective slice width	preselectable
Pitch	1–8 (freely selectable)
Slice broadening with pitch	none
Dose	Savings of about 20% due to noise reduction over sequential images

Freely selectable position and number of images

Freely selectable slice increment
- contiguous
- overlapping

Combi Scan

Freely selectable slice thickness for prospective and/or retrospective reconstruction

Obese Patient Mode

Ensures virtually artifact-free scanning when the anatomy is not completely contained within the measurement field

Guide View

Immediate image display parallel to spiral acquisition (e.g. for trauma and intervention), in interpolated 512 × 512 matrix

Multislice CARE Bolus

Scan mode for contrast bolus triggered data acquisition [optional]

Acquisition times

New horizons in examination performance with 500 ms rotation time

Spiral performance: Examples of typical acquisition times

Aorta	600 mm coverage, 4×2.5 mm collimation at e.g. 120 kV, 130 mAs in 21 s
Angio Head	60 mm coverage, 4×1.0 mm collimation at e.g. 140 kV, 90 mAs in 7 s
Upper Abdomen	300 mm coverage 4×2.5 mm collimation at e.g. 120 kV, 165 mAs in 10 s
Peripheral Angio	900 mm coverage, 4×2.5 mm collimation at e.g. 120 kV, 130 mAs in 31 s

Spiral data	Standard	Optional
Rotation times	0.5 s, 0.75 s, 1.0 s, 1.5 s	
Pitch	1–8 (freely selectable)	
Scan time	max. 80 s	100 s
Scan length	157 cm only limited by table	
Interspiral delay	5–300 s	
Slice increment	0.1–10 mm	
Special correction for tilted gantry	Yes	

Pitch. Pitch is the ratio of table feed per rotation to collimation of a single slice.
Increment. Increment is the distance between the center of adjacent images.

Topogram

Survey radiograph with diagnostic image quality for planning of complete examination

Real-Time Topogram

CARE Topo. Manual interruption possible once desired anatomy has been imaged

Topogram data

Length	128–1024 mm
Scan times	1.6–10.6 s
Views	a.p. p.a. lateral

Sequence

Ultra-fast axial scan sequence

Acquisition with or without table feed

Automatic clustering of scans

Prospective ECG triggering with HeartView CT [optional]

Sequence slice width

Slice collimation [mm]	Slice thickness [mm]
2 × 0.5	0.5
4 × 1.0	1.0
4 × 2.5	2.5
4 × 5.0	5.0
2 × 8.0	8.0

Using Combi Scan

Slice coll. [mm]	No. slices fused	Slice thickn. [mm]
2 × 0.5	2	1.0
4 × 1.0	2	2.0
4 × 1.0	4	4.0
4 × 2.5	2	5.0
4 × 5.0	2	10.0

Sequence data

Scan times	0.5 s 0.36 s (partial) * 0.75 s 0.54 s (partial) ** 1.0 s; 1.5 s
Temporal resolution with dedicated reconstruction	* 250 ms for HeartView CT ** 375 ms for HR (e.g. lungs)
Number of uninterrupted scans per range	100
Max. number of ranges in autorange	9
Scan cycle time (scan time 0.5–1.5 s)	0.75–60.0 s (±10%)

Volume Zoom

SOMATOM WorkStream

Volume Navigator

The first user interface designed exclusively for Volume CT

Unique dual-console design consisting of a main console, the Volume Navigator, and an integrated diagnostic console, the Volume Wizard. No transfer times due to the shared data base.

This workflow-oriented design offers a seamless, scalable worksurface to the user and optimally supports 3-D evaluations in the clinical routine

Platform is intuitive, easy to handle and easy to learn

Minimal user interaction for all routine scanning procedures

Complete examination protocols
- predefined
- customizable

(e.g. complete 3-phase liver examination)

Integrated Scan Assistant:
On-line help platform that intuitively guides you in your selection of parameters to maximize clinical workflow

Image reconstruction

Slice thickness	0.5–10 mm
Scan field	50 cm, 25 cm
Recon field	5–50 cm
Recon time	1.5 images/s
Recon matrix	512 × 512
HU scale	– 1,024 to + 3,071
Extended HU scale	–10,240 to +30,710

Image display: Standard monitor

Monitor size	21"
Monitor resolution	1,280 × 1,024
Image display matrix	max. 1,024×1,024
Pixel size	min. 0.26 mm

Image display: Flat screen [optional]

Monitor size	18"
Monitor resolution	1,280 × 1,024
Image display matrix	1,024×1,024
Pixel size	min. 0.28 mm

CINE Display. Display of image sequences
- interactively with mouse-controlled rate
- or automatically

Image rate	> 10/s

Automated transfer

- Automatic filming
- Automatic archiving
- Automatic sending to network

syngo

Easy to use

Straightforward to connect

Prepared for the future

Image storage

Main storage	36 GB 60,000 images

Image transfer/Networking

DICOM. Interface for transmitting medical images and information in the DICOM industrial standard. Permits communication between devices from different manufacturers.
- DICOM Send/Receive
- DICOM Query/Retrieve
- DICOM Basic print
- DICOM Get worklist (HIS/RIS)
- DICOM Archive

Interface for transmitting medical images and information through telephone lines via modem

DICOM Conformance Statement:
www.med.siemens.com/med/e/dicom

DICOM = Digital Imaging and Communications in Medicine

Note: Software functionality is configurable between Volume Navigator and Volume Wizard within certain limitations.

Volume Wizard

syngo speaking

Filming

Digital film documentation, connection to a suitable digital camera

Connection via DICOM Basic print

Connection to non-DICOM cameras using SPCI/SPDI [optional] via converter

Automatic filming

Filming Interactively

Filming parallel to other activities

Independent scanning and documentation—no waiting time due to camera delays

Freely selectable positioning of images onto film sheet

Configurable image text

Printing

Printing of images on paper with laser printer (Postscript) [optional]

Archiving

CD-R [optional]	650 MB 1,100 images
MOD Maxoptix [optional]	2.3 GB 4,000 images
MOD Pioneer read-only [optional]	1.7 GB

Windowing

Window width and center freely selectable

Single window

Double window (e.g. bone/soft tissue)

Organ-specific window settings for soft tissue and bone windows

Image evaluation & annotation

Parallel evaluation of more than 10 Regions of Interest
- Circle
- Irregular
- Polygonal

Statistical evaluation:
- Area/Volume
- Standard deviation
- Mean value
- Min/max values

Profile cuts
- Horizontal
- Vertical
- Oblique

Distance measurement (more than 10)

Angle measurement (more than 10)

On-line measurement of a 5 × 5 pixel size ROI

Freely selectable positioning of coordinate system

Image annotation and labeling

2-D post-processing

Image zoom and pan

Image manipulations:
- Subtraction/Addition
- Averaging
- Reversal of gray-scale values
- Mirroring

Image filter functions

Dynamic evaluation to acquire time density curves

Real-Time MPR

Real-time multiplanar reformatting of secondary views

Viewing perspectives
- sagittal
- coronal
- paraxial
- oblique
- double oblique
- freehand (curvilinear)

CT Angiography

MIP: Maximum Intensity Projection

Evaluation of spiral images and display of vessels, vascular anomalies, aneurysms, plaques, and stenoses

3D Display

SSD: Shaded Surface Display

Three-dimensional display of surfaces with different density values:
- Soft tissues
- Bones
- Contrast-enhanced vessels

Note: Software functionality is configurable between Volume Navigator and Volume Wizard within certain limitations.

Volume Zoom

Image Quality

Low-contrast detectability

5 parameters to compare low-contrast detectability between systems

Low-contrast detectability is the ability to see
- a small object (mm)
- with a certain contrast difference (HU)
- in a particular phantom (∅)
- with a certain slice width
- at an mAs value (mAs)
- with a particular patient dose (mGy)

Spiral

Phantom	CATPHAN (20 cm)
Object size	5 mm
Contrast diff.	3 HU
Dose at the surface	17 mGy* at 120 mAs (Standard body kernel) 80 mAs (Special head mode)
Technique	120 kV 4 × 5 mm collimation 10 mm slice width

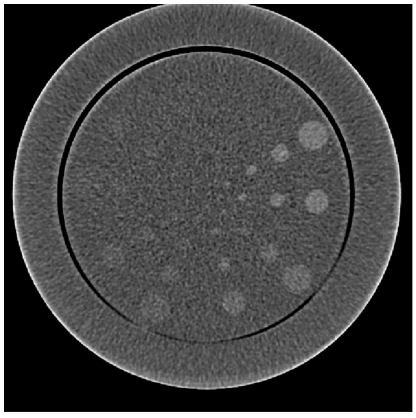
Sequence

Phantom	CATPHAN (20 cm)
Object size	5 mm
Contrast diff.	3 HU
Dose at the surface	21 mGy* at 150 mAs (Standard body kernel) 100 mAs (Special head mode)
Technique	120 kV 10 mm collimation 10 mm slice width

*Air KERMA,
measured on the surface of the phantom

High-contrast resolution

0% MTF ±10%	30 lp/cm 0.17 mm
2% MTF ±10%	24 lp/cm 0.21 mm
Technique	300 mA 120 kV 0.75 s 1 mm



Dose, $CTDI_{100}$ values

Phantom ∅		kV: 80	120	140
		[mGy/100 mAs]		
16 cm	A	4.5	14.4	22.2
	B	5.5	16.3	24.7
16 cm (Special head mode)	A	6.4	18.3	25.8
	B	8.6	22.2	30.2
32 cm	A	1.2	4.6	7.0
	B	3.4	10.6	15.3

A: at center
B: 1 cm below surface
Technique: 10 mm slice-width
4 x 5 mm collimation
360° rotation
PMMA-Phantom
Absorbed dose for reference material air.
Max. deviation ± 30 %
typically less than 15 %
values adjusted to new IEC

Homogeneity

Cross-field uniformity in a 20 cm water phantom	max. ± 4 HU typ. ± 2 HU

Phantom positioned near center of rotation

Components

Gantry

Continuously rotating tube–detector unit with optimized geometry for high-resolution data acquisition across the entire scan field

Aperture	70 cm
Tilt	± 30°
Rotation times full scan	0.5, 0.75, 1.0, 1.5 s
Rotation times partial scan	0.36, 0.54 s

Patient accessibility

Distance gantry front to scan plane	32 cm

Data acquisition

Ultra Fast Ceramic Detector UFC

Speed and efficiency based on UFC™

Design effectively suppresses scattered radiation for precision quantitative CT

Number of detector rows	8
Elements	5376
Channels per slice	1,344
Number of projections	2,320 [1/360°]

X-ray generator

High-frequency generator

Max. power	60 kW

Tube assembly

Siemens DURA®
high-performance CT x-ray tube

Computer-controlled monitoring of anode temperature

Multifan principle with Flying Focal Spot

Tube	DURA Akron-B
Tube current range	28–500 mA
Tube voltages	80, 120, 140 kV
Anode heat storage capacity	5.3 MHU
CARE Filter equival. to 11 mm Al	1.2 mm Ti (Body modes) 1.6 mm PTFE

Focal spot size according to IEC 336/1993

small	0.5×0.7 mm/7°
large	0.8×1.2 mm/7°

Volume Zoom

Patient Handling

Patient table

Max. table load	200 kg / 450 lbs
Table speed	1–150 mm/s
Vertical table travel range	48–102 cm (at table top)
Vertical travel speed	2.5–50 mm/s
Scannable range (metal-free)	157 cm

Intervention with C-arm. Table top allows use of a mobile C-arm during examination

Distance between gantry front and table base	40 cm
Optional with installation	64 cm
Scannable range w/o head holder	124 cm

Lateral light marker

Positioning aid for horizontal patient positioning

Patient communication

Integrated patient intercom

Automatic Patient Instruction (**API**)
- Freely recordable

Number of API text pairs	30

Patient registration

On-line registration

Preregistration of patients

Patient information from HIS/RIS via DICOM Get worklist

External data input
- Barcode
- Magnetic card

Fast trauma protocols

Emergency patient registration

Clinical Applications

Overview of the options available for customizing your system

HeartView CT

Acquisition technique and program for heart cycle triggered or gated CT reconstructions.

HeartView CT allows reconstruction of Cardiac images with a temporal resolution of down to 125 ms in any phase of the heart cycle.

Basis for 3-D Cardiac reconstructions (e.g. CT Angiography of the coronary vessels and Calcium Scoring), as well as for lung imaging at the heart level.

The ECG trace used for gating of the CT images is supplied by an external ECG monitor (Siemens approved ECG monitor and interface).

Multislice Calcium Scoring

Application for estimating the amount of calcium in CT images obtained with HeartView CT.

Multislice Calcium Scoring calculates different scores (e.g. Agatston scores, volumetric scores) within user-defined regions for up to four coronary arteries.

Multislice CARE Bolus

Scan mode for contrast bolus triggered data acquisition. Multislice CARE Bolus optimizes the effectiveness of Sub Second Multislice CT in contrast examinations.

The switching time between monitoring phase and acquisition phase is reduced to less than 2 seconds.

Multislice CARE Vision CT

Enables safer, more efficient CT-guided interventional procedures to be performed. The subsecond scan times and multislice capability are fully exploited for optimum speed and security.

Additional monitor. For parallel image display in the examination room

Monitor size	19“ (flat screen 18“)
Distance from host	max. 30 m optional: max. 120 m

Foot switch. For exposure release directly at the gantry

Multislice Perfusion CT

Evaluation of dynamic serio data of the brain following contrast bolus injection. Aids in the assessment of cerebral perfusion disturbances

Multislice Pulmo CT

Quantitative evaluation of the lung tissue

Multislice Dental CT

Reformatting of panoramic slices and paraxial sections through the lower and upper jaw for analysis in connection with implantation surgery

Multislice Osteo CT

Quantitative determination of bone mineral density (BMD) of the vertebrae

Osteo CT measurement is standardized to the ESP* Phantom

*European Spine Phantom

System Configuration Choices

System Options

Color choice

Select the color of the gantry side panels; they can be either
- Blue or
- White

Keyboard

- English
- German
- French
- Spanish

Archiving devices

- MOD Maxoptix 5 $^{1}/_{4}$", 2.3 GB
- CD-Recorder 650 MB
- MOD Pioneer (read-only), 1.7 GB

External data input

Select between
- Barcode
- Magnetic card

Remote Access

Remote service (diagnostics) via modem or ISDN/analog router

Flat Screen

For Volume Wizard and Volume Navigator

Monitor size	18"
Monitor resolution	1,280 × 1,024
Image display matrix	1,024×1,024
Pixel size	min. 0.28 mm

3DVirtuoso

Advanced 3-D workstation : evaluation, post-processing, MIP, SSD, Color Volume Rendering, and 3-D Processing

Ultra-fast data link to scanner

Sliding Gantry

System option to perform both CT examinations and other procedures (e.g. angiography) in one suite using a common patient table.

The CT gantry can be moved away from the common patient table to facilitate the execution of other procedures.

Installation

Dimensions

Component	Height mm	Width mm	Lengeth mm	Weigth Kg
Gantry	≤1,990	≤890	≤2,220	≤2,100
Patient table	≤850	≤680	≤2,430	≤500
Volume Navigator, Volume Wizard	≤720	≤800	≤1,400	≤65
Power cabinet	≤1,815	≤905	≤800	≤550
Cooling system	≤1,815	≤905	≤860 w/w* ≤900 w/a*	≤200 w/w* ≤400 w/a*
Computer system	≤484/600	≤685	≤302	≤30/30

* w/w = water/water w/a = water/air [optional]

Examination room environment

Temperature range	15–28 °C
Relative air humidity without condensation	15–75 %

Cooling

Max. heat dissipation including cooling system	≤13.5 kW scanning ≤ 9.5 kW standby

Power supply

Nominal voltage 3/N~	380–480 V in 20 V steps
Nominal line frequency	50; 60 Hz
Line impedance	100–160 mOhm (dependent on voltage)
Nominal power connection	66–83 kVA (fuse 100 A)

Power consumption

Computer on	4 kVA / 1.1 kW
System	
on standby	
w/w*	7 kVA / 5 kW
w/a*	10 kVA / 7.5 kW
scanning (120 kV, 260 mA, 80 s)	
w/w*	48 kVA
w/a*	50 kVA

* w/w = water/water
w/a = water/air [optional]

Protection against input power fluctuation

Interruptions

X-ray	5 ms
Controllers	20 ms
IRS, navigator and wizard	20 ms, 300 s optional with UPS

Fluctuation

Nominal voltage	±10%
Nominal frequency	±5%

Volume Zoom

Electromagnetic compatibility

In compliance with IEC 601-1-2	
Emissions class	A, CISPR11
Emissions class	According to IEC 601-1-2

Surface area for installation

System	≥ 30 m^2
Gantry & table	25 m^2

This product bears a CE marking in accordance with the provisions of directive 93/42/EEC of June 14th, 1993 for medical products.

CE 0123

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CAPE design

Siemens **medical**
Solutions that help

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