



Trusted Performance Without Compromise

SOMATOM Sensation Open
Datasheet for *syngo* CT 2007S

Answers for life.

SIEMENS

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SOMATOM Sensation Open

Sensation Open

Trusted Performance Without Compromise

In the CT world, the name Sensation is analogous to quality. From a development and engineering perspective the SOMATOM® Sensation is a system that has been engineered without compromises. The known build-quality for which the Sensation is known, and fact that Siemens have been in the 64-slice market longer than any other CT vendor offers you the confidence that the investment you make in the SOMATOM Sensation system is secure.

Speed, resolution, or coverage?

With traditional CT, the trade-off between speed, resolution, coverage, and dose is a constant factor in selection of scan parameters. If high speed is required then resolution is lost and visa-versa. With the introduction of the STRATON® X-ray tube and z-Sharp™ Technology in the SOMATOM Sensation this trade-off has been removed. From a clinical perspective this simply means that the highest speed of scanning can be used for long CTA examinations with the knowledge that if a close examination of a small renal artery is required, the highest image quality of 0.33 mm isotropic resolution is still available. This point alone sets the SOMATOM Sensation apart from conventional CT systems.

Optimized for Oncology

The SOMATOM Sensation Open, with a large 82 cm bore and reconstructed field of view, is optimized for oncology diagnosis and therapy planning. With access to *syngo* Virtual Simulation (VSIM) at the Acquisition console the SOMATOM Sensation Open further enhances your radiation therapy planning capabilities. The SOMATOM Sensation Open is also available in a sliding gantry configuration to offer even greater flexibility for diagnosis and treatment. Whether installed within the emergency department, operating theater, angiography suite, or radiation therapy treatment room, the SOMATOM Sensation in the sliding gantry configuration has the potential to significantly extend the clinical capabilities of your institution.



SOMATOM Sensation Open – Standard System Configuration

System Hardware	CARE Applications
1.0 s rotation time •	CARE Filter •
Multislice UFC™ (Ultra Fast Ceramic) Detector •	CARE Topo •
0 MHU STRATON® X-ray tube •	CARE Dose4D™ •
50 kW generator •	CARE Bolus CT •
CT patient table (200 kg/440 lbs table load) •	
82 cm Extended Field of View •	
Workplaces	System Software
<i>syngo</i> ® Acquisition Workplace •	<i>syngo</i> Examination •
19" (48 cm) flat screen monitor •	<i>syngo</i> Viewing •
DVD storage •	<i>syngo</i> Filming •
CD storage •	<i>syngo</i> Archiving & Network •
	<i>syngo</i> Service Solutions •
	Image Filter •
	SureView™ •
	SOMATOM® LifeNet •
	Video Capture and Editing Tool •
	Scan Protocol Assistant •
	Applications on <i>syngo</i> Acquisition Workplace
	Real-time MPR •
	<i>syngo</i> 3D SSD (Surface Shaded Display) •
	<i>syngo</i> Volume Calculation •
	<i>syngo</i> VRT (Volume Rendering Technique) •
	<i>syngo</i> Dynamic Evaluation •
	CT-Angiography •
	WorkStream4D™ (3D-Recon) •

SOMATOM Sensation Open – System Options

System Hardware		<i>syngo</i> Applications for <i>syngo</i> MultiModality and <i>syngo</i> CT Workplace	
0.5 s rotation time	◦	<i>syngo</i> VRT for CTWP and MMWP	◦
High-capacity patient table (280 kg/615 lbs table load)	◦	<i>syngo</i> InSpace4D™	◦
RTP patient table	◦	<i>syngo</i> InSpace EP	◦
Additional 19" (48 cm) flat screen monitor	◦	<i>syngo</i> Fly Through	◦
Dual 19" (48 cm) flat screen monitor with dual display functionality	◦	<i>syngo</i> Dental CT	◦
z-Sharp™ Technology	◦	<i>syngo</i> Osteo CT	◦
		<i>syngo</i> Pulmo CT	◦
Workplaces		<i>syngo</i> Circulation	◦
<i>syngo</i> CT Workplace	◦	<i>syngo</i> Circulation Plaque Analysis	◦
<i>syngo</i> MultiModality Workplace	◦	<i>syngo</i> Circulation PE Detection*	◦
Additional 19" (48 cm) flat screen monitor	◦	<i>syngo</i> Circulation PE Detection Basic**	◦
Dual 19" (48 cm) flat screen monitor with dual display functionality	◦	<i>syngo</i> InSpace4D Advanced Vessel Analysis	◦
2 GB enhanced graphics card	◦	<i>syngo</i> Calcium Scoring	◦
4 GB enhanced graphics card (optional)	◦	<i>syngo</i> Volume Perfusion CT Neuro	◦
CARE Applications		<i>syngo</i> Neuro DSA CT (Digital Subtraction Angiography)	◦
CARE Contrast CT	◦	<i>syngo</i> Neuro PBV CT***	◦
Basic Intervention	◦	<i>syngo</i> CT Oncology***	◦
Advanced Intervention incl. CARE Vision CT with HandCARE™	◦	<i>syngo</i> Volume Perfusion CT Body	◦
Adaptive ECG-Pulsing™ (included in <i>syngo</i> HeartView CT)	◦	<i>syngo</i> Colonography CT	◦
System Software and Applications on <i>syngo</i> Acquisition Workplace		<i>syngo</i> Colonography CT PEV (Polyp Enhanced Viewing)	◦
<i>syngo</i> Security Package	◦	<i>syngo</i> LungCARE CT	◦
Siemens Virus Protection	◦	<i>syngo</i> LungCAD	◦
e-Logbook	◦	<i>syngo</i> Image Fusion	◦
<i>syngo</i> HeartView CT (incl. Adaptive ECG-Pulsing)	◦	<i>syngo</i> Expert-i	◦
<i>syngo</i> Calcium Scoring	◦	WorkStream4D****	◦
<i>syngo</i> Fly Through	◦	<i>syngo</i> InSpace Lung Parenchyma Evaluation***	◦
<i>syngo</i> Dental CT	◦	<i>syngo</i> Security Package	◦
<i>syngo</i> Osteo CT	◦		
<i>syngo</i> Pulmo CT	◦		
<i>syngo</i> Volume Perfusion CT Neuro	◦		
<i>syngo</i> Image Fusion CT	◦		
Respiratory Gating and Triggering CT	◦		
Advanced Interventions	◦		

* On *syngo* MultiModality Workplace only.
Not available in the US

** For US only

*** On *syngo* MultiModality Workplace only

**** On *syngo* Acquisition Workplace and *syngo* CT Workplace only

◦ Optional feature

System Hardware

Gantry	
Aperture	82 cm
Scan field	50 cm
Tilt	± 30°
Rotation time	0.5*, 1.0 s
Temporal resolution	down to 125 ms***
Continuously rotating tube-detector unit with optimized geometry for high-resolution data acquisition across the entire scan field	
Data acquisition system	
Max. number of slices/rotation	24, 40*
Number of detector rows	40
Number of detector electronic channels (DAS) utilized for 40 slices/rotation acquisition	40
Number of detector elements	26,880
Total channels per slice	1,344
Number of projections	2,320, 4,640* (1/360°)
Sequence acquisition modes	24 x 1.2 mm, 1 x 5 mm, 1 x 10 mm, 20 x 0.6 mm*, 12 x 1.2 mm*, 12 x 0.6 mm
Spiral acquisition modes	24 x 1.2 mm, 20 x 0.6 mm*, 40 x 0.6 mm**
z-Sharp Technology*	The unique STRATON X-ray tube utilizes an electron beam that is accurately and rapidly deflected, creating two precise focal spots alternating 4,640 times per second. This doubles the X-ray projections reaching each detector element. The two overlapping projections result in an oversampling in z-direction. The resulting measurements interleave half a detector slice width, doubling the scan information without a corresponding increase in dose. Siemens' proprietary UFC (Ultra Fast Ceramic) detector and the corresponding detector electronics enable a virtually simultaneous readout of two projections for each detector element, resulting in a full 40-slice acquisition.** z-Sharp Technology*, utilizing the STRATON X-ray tube and the UFC detector, provides scan speed independent visualization of 0.33 mm isotropic voxels, and a corresponding elimination of spiral artifacts in the daily clinical routine at any position within the scan field.
UFC Detector	Ultra short afterglow. Special supporting z-Sharp Technology. Optimal for sub-second and multislice acquisition.

* Optional

** Acquisition modes enabled by z-Sharp Technology

*** Optional, with 0.5 s rotation time and *syngo* HeartView CT

System Hardware

Tube assembly	
Tube	STRATON High performance CT X-ray tube
Tube current range	28–400 mA
Tube voltage	80, 100, 120, 140 kV
Tube anode heat storage capacity	0 MHU (0.6 MHU capacity combined with 5.0 MHU/min (3,700 kJ/min) cooling rate is comparable to the performance of a conventional tube with approximately 30 MHU (22,000 kJ) anode heat storage capacity)
Cooling rate	5 MHU/min
Focal Spot size according to IEC 60336	0.8 x 1.1 mm/7° 0.7 x 0.7 mm/7°
Computer controlled monitoring of anode temperature	
Multifan principle with Flying Focal Spot	

CARE Filter	
Al equivalent	tube: 6.8 mm Al
Beam limiting device	collimator: 0.5 mm Al, 0.6 mm Ti (equivalent to 5.5 Al)

Generator	
Max. power	50 kW

Three laser light markers

Horizontal, sagittal, and vertical laser light that show the isocenter position of the scan plane

Foot pedals

4 pairs of foot pedals are provided on the bottom edge of the patient table allowing table lifting and lowering from various positions

Patient table	
Max. table load	200 kg/440 lbs
Table feed speed	2–150 mm/s
Vertical table travel range	53–102 cm/20.8–40.2" (at table top)
Vertical travel speed	2–45 mm/s
Scannable range	157 cm/61.81"
Distance between gantry front and table base	37 cm/14.6"

High-capacity patient table*	
Max. table load	280 kg/615 lbs
Table feed speed	10–100 mm/s when scanning patients > 200 kg/440 lbs
Vertical table travel range	65–102 cm/25.6–40.2" (at table top)
Vertical travel speed	2–45 mm/s
Scannable range	157 cm/61.81"
Distance between gantry front and table base	37 cm/14.6"

RTP patient table*	
Max. table load	200 kg/440 lbs
Table feed speed	2–150 mm/s
Vertical table travel range	53–102 cm/20.8–40.2" (at table top)
Vertical travel speed	2–45 mm/s
Scannable range	157 cm/61.81"
Distance between gantry front and table base	37 cm/14.6"

Integrated display panel

Gantry front display showing current scan parameters such as kV, mA, scan time, table position, gantry tilt, and ECG trace**

Gantry front and rear control panels

For convenient patient positioning (e.g. in case of trauma or interventional exams)
Gantry tilt control from the operator's console

* Optional

** Optional with syngo HeartView CT

syngo Workplaces

syngo Acquisition Workplace

The *syngo* Acquisition Workplace provides an intelligent and reliable workflow for data acquisition, image reconstruction, and routine postprocessing at the CT scanner. Built on the unique *syngo* platform, the *syngo* Acquisition Workplace is intuitive and user friendly.

High-performance computer

2 x Dual Core Intel Xeon 3.0 GHz processor or
1 x Quad Core Intel Xeon 2.66 GHz

Graphics accelerator

NVIDIA graphics card for fast 3D postprocessing

Standard monitor

Flat screen monitor 19" (48 cm)
1,280 x 1,024 resolution
1,024 x 1,024 image display matrix
0.29 mm pixel size

Additional monitor*

Flat screen monitor 19" (48 cm)
Replication of primary monitor at remote location
Distance from host up to 30 m

Dual monitor*

Flat screen monitor 19" (48 cm)
Dual monitor enables the simultaneous display of two scans on two monitors within the 3D task card, ideally used for comparison of follow-up studies or native and contrast enhanced scans

RAM storage

At least 3 GB

RAID

Software RAID 0 for enhanced read/write performance

Image storage

146 GB; 260,000 uncompressed images

Additional storage

DVD DICOM drive	4.7 GB DVD media 8,400 images Write-RW/+RW/-DL/Read
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CD-R	700 MB 1,100 images
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External USB 2.0 disks for quick and easy raw data storage are supported

DICOM viewer

Included on each image CD produced from the CT system; automatically started on the viewer's PC

* Optional

syngo Workplaces

syngo CT Workplace*

The *syngo* CT Workplace is a dedicated CT processing workplace that provides instant access to image and scan data via a shared database with the *syngo* Acquisition Workplace. With access to our comprehensive portfolio of CT clinical applications, the *syngo* CT Workplace can be customized to further enhance clinical performance.

High-performance computer

2 x Dual Core Intel Xeon 3.0 GHz processor

Graphics accelerator

NVIDIA graphics card for fast 3D postprocessing
Volume Pro Graphics Accelerator*; 2 GB on-board image memory additionally accelerates applications

Standard monitor

Flat screen monitor 19" (48 cm)
1,280 x 1,024 resolution
1,024 x 1,024 image display matrix
0.29 mm pixel size

Dual monitor*

Flat screen monitor 19" (48 cm)
Dual monitor enables the simultaneous display of two scans on two monitors within the 3D task card, ideally used for comparison of follow-up studies or native and contrast enhanced scans

RAM storage

3 GB

RAID

Software RAID 0 from AWP via Gigabit Link for enhanced read/write performance

Image storage

Shared database with *syngo* Acquisition Workplace

Additional storage

DVD DICOM drive	4.7 GB DVD media 8,400 images Write-RW/+RW/-DL/Read
CD-R	700 MB 1,100 images

DICOM viewer

Included on each image CD produced from the CT system; automatically started on the viewer's PC

* Optional

syngo Workplaces

syngo MultiModality Workplace*

syngo MultiModality Workplace provides the unique advantage of an efficient multi-modality diagnostic workflow at a single workplace. Based on the unique syngo platform, it manages the clinical diagnostic workflow anywhere within the clinical environment. With the syngo MultiModality Workplace radiologists and clinicians benefit from access to our comprehensive syngo applications for Computed Tomography, Magnetic Resonance, PET and SPECT imaging, Angiography and Radiation Therapy Planning.

High-performance computer

2 x Dual Core Intel Xeon 3.0 GHz processor

Graphics accelerator

NVIDIA graphics card for fast 3D postprocessing
Enhanced graphics card* additionally accelerates applications

Standard monitor

Flat screen monitor 19" (48 cm)
1,280 x 1,024 resolution
1,024 x 1,024 image display matrix
0.29 mm pixel size

Dual monitor*

Flat screen monitor 19" (48 cm)
Dual monitor enables the simultaneous display of two scans on two monitors within the 3D task card, ideally used for comparison of follow-up studies or native and contrast enhanced scans

RAM storage

6 GB, 8 GB*

RAID

RAID 0 for enhanced read/write performance

Image storage

147 GB; 260,000 uncompressed images

Additional storage

CD-R	700 MB 1,100 images
DVD DICOM drive	4.7 GB DVD media 8,400 images Write-RW/+RW/-DL/Read

DICOM viewer

Included on each image CD produced from the CT system; automatically started on the viewer's PC

* Optional

syngo CT.3D

CT Engines

syngo CT.3D (on syngo CT Workplace) ◦

- syngo CT Workplace
- 19" (48 cm) flat screen monitor
- 2 GB Volume Pro Graphics Accelerator
- syngo 3D Basic
- syngo VRT
- syngo Fly Through
- syngo InSpace4D
- syngo Volume Calculation
- syngo Dynamic Evaluation
- WorkStream4D
- (3D-Recon and Recon Card CT Workplace)
- syngo Expert-i

syngo CT.3D (on syngo MultiModality Workplace) ◦

- syngo MultiModality Workplace
- 19" (48 cm) flat screen monitor
- 2 GB volume enhanced graphics card
- 4 GB volume enhanced graphics card (optional)
- syngo 3D Basic
- syngo VRT
- syngo Volume Calculation
- syngo Dynamic Evaluation
- syngo Expert-i

CT Neuro Engine* ◦

- syngo Volume Perfusion CT Neuro
- syngo Neuro DSA CT
- syngo Neuro PBV CT
- Auto-preprocessing CT DSA

CT Oncology Engine* ◦

- syngo CT Oncology
- syngo Colonography CT
- syngo Colonography CT PEV
- syngo CT Prefetching
- syngo Image Fusion CT

◦ Optional feature

* syngo software feature of CT Clinical Engines available within syngo MultiModality Workplace

CARE Applications

UFC Detector

Up to 30% dose reduction compared to conventional CT detectors

High efficiency for low mAs requirements enable best possible image quality with low patient dose

Ultra short afterglow. Specially developed for subsecond and multislice applications.

SureView – Multislice Spiral Image Reconstruction

Brilliant image quality and dose savings up to 20% in spiral mode

CARE Filter

Specially designed X-ray exposure filter installed at the tube collimator. Up to 25% dose reduction with increased image quality.

CARE Contrast CT*

Facilitates contrast enhanced CT examinations

Enables the synchronization between scanning and contrast injection

One button control for safe and easy use

Pediatric protocols

Special clinical protocols with 80 or 120 kV selection and a wide range of mAs settings. The X-ray exposure is adapted to the child's (and small adult's) weight and age, substantially reducing the effective patient dose.

CARE Topo

Real-time topogram

Manual interruption possible once desired anatomy has been imaged

CARE Dose4D – minimizing dose, maximizing quality – patient by patient

Automated real-time tube current adjustment for best diagnostic image quality at lowest possible dose, independent of patient size and anatomy

Fully automated dose management for adults and children with up to 68% dose reduction

* Optional

CARE Applications

Adaptive ECG-Pulsing*

Dose modulated cardiac spiral for dose reduction during the selectable heart phase (part of the *syngo* HeartView CT*). Up to 50% dose savings for the patient.

CARE Bolus CT

Scan mode for contrast bolus triggered data acquisition

Significant improvement of the planning procedure and diagnosis by enabling an optimum spiral scan start after contrast injection

The procedure is based on repetitive low dose monitoring scans at one slice level and analysis of the time density curve in a ROI (Region of Interest)

Basic Intervention*

For non-fluoroscopic CT interventions

Biopsy mode with user configurable dose and windowing display

Switch between continuous and incremental table movement with user configurable increment

Automatic table positioning via buttons or joystick with auto-stop function

3 image display

Zoom and pan functionality

Head and feet label for easy orientation adaptable to physician's position

Auto-move table to displayed image position

Advanced Intervention incl. CARE Vision with HandCARE*

For fluoroscopic CT interventions

Perform interventions with real-time image guidance, including CT fluoroscopic mode. Single slice or simultaneous display of 3 slices for optimal navigation with two alternate display methods:

A) 128 x 128, 1024 x 1024, 128 x 128

B) 512 x 512, 512 x 512, 512 x 512

Head and feet label for easy orientation adaptable to physician's position

Auto-move table to displayed image position

User configurable dose and windowing display

Switch between continuous and incremental table movement with user configurable increment

Automatic table positioning via buttons or joystick with auto-stop function

Includes Real-time image guidance:

Image rate up to 10 frames/s

Image matrix 512 x 512

Foot switch. Radiation release directly at the gantry.

Additional flat screen monitor 19" (48 cm).

For parallel image display in the examination room.

HandCARE. Real-time dose modulation during the CT-guided intervention. The tube current is automatically switched off to avoid direct X-ray exposure to the physician's hands. HandCARE yields dose savings of up to 70% for the physician and up to 30% for the patient.

* Optional

System Software

Patient registration

Direct input of patient information on *syngo* Acquisition Workplace immediately prior to scan
Pre-registration of patients at any time prior to scan

Special emergency patient registration (allows examination without entering patient data before scanning)

Transfer of patient information from HIS/RIS via DICOM Get Worklist

Transfer of examination information from scanner into HIS/RIS via MPPS (Modality Performed Procedure Step)

Protocols

Up to 10,000 protocols can be edited, modified, and stored

Scan Protocol Assistant

Patient communication

Integrated patient intercom

Automatic Patient Instruction (API)

- Freely recordable
- 30 API text pairs
- Presets in nine languages available

Synchronized scanning and contrast injection*

CARE Contrast facilitates enhanced CT examinations through the hardware and software integration of CT scanner and injector

Topogram

Length 128–1,536 mm

Scan times 1.5–15.6 s

Views a.p., p.a., lateral

Real-time topogram

Manual interruption possible once desired anatomy has been imaged

Sequence Acquisition

Reconstructed slice widths 0.6*, 1.2, 2.4, 3*, 4.8, 5*, 6*, 7.2, 9.6, 10, 12*, 14.4 mm

Scan times (full scan) 0.5*, 1.0 s

Partial scan times (260°) 0.35*, 0.67 s

No. of uninterrupted scans per range 100

No. of ranges per protocol 19

Scan cycle time 0.75–60 s (± 10%)
(min. scan cycle time depending on rotation time)

Acquisition with or without table feed

Automatic clustering of scans

Dynamic Multiscan:

Multiple (continuous) sequence scanning without table movement for fast dynamic contrast studies with maximum slice thickness of 28.8 mm

* Optional

System Software

Multislice Spiral Acquisition

Reconstructed slice widths	0.6*, 0.75*, 1.0*, 1.5, 2, 3, 4, 5, 6, 7, 8, 10 mm
Scan times full scan (360°)	0.5*, 1.0 s
Slice increment	0.1–10 mm
Pitch factor	0.45–2.0, down to 0.17 (syngo HeartView CT)* down to 0.10 (Respiratory Gating and Triggering CT)*
Spiral scan time	max. 100 s
Scan length	max. 157 cm
No. of ranges per protocol	19

Automatic clustering of scans

Optimized special reconstruction algorithm (PFO: Posterior Fossa Optimization) for reduction of beam hardening artifacts in head images

Extended Field of View (FOV)

Special image reconstruction algorithms that provide visualization of objects using a FOV up to 82 cm**

Automatic patient positioning

Two user-configurable buttons on the gantry panel
One touch, quick patient positioning for preselected clinical protocols – e.g., head, thorax

Scan protocol assistant

Easy and intuitive way to change and manage scan protocols

Auto Field of View adaption

When positioning the scan range, the width of the range is automatically adapted to cover the whole body of the patient

SureView: Siemens' patented solution for Multislice CT reconstruction

Excellent for clinical workflow:

Forget about compromises in your clinical workflow. Just specify the slice thickness in your protocols according to your clinical needs. SureView automatically takes care of providing excellent volume image quality – with exceptional performance.

Multiply your clinical performance with SureView:

High-quality imaging at any scanning speed. SureView allows the CT scanner to automatically select the necessary pitch value to achieve the coverage and scan time defined by you, while keeping selected slice thickness and image quality. Includes advanced cone beam reconstruction algorithms for elimination of cone beam artifacts with 40-slice* acquisition

* Optional

** The image quality for the area outside the standard 50 cm scan field does not meet the image quality specifications shown in the technical data sheet and image artifacts may appear, depending on the anatomy scanned

System Software

Image reconstruction	
Real-time display	Real-time image display (512 x 512) during spiral acquisition
Slice thickness	0.6*–14.4 mm (28.8 mm using dynamic multiscan)
Scan field	5–82 cm
Recon field	5–50 cm, 5–82 cm with extended FOV**
Recon time	up to 20 images/s with full cone beam reconstruction with z-Sharp Technology* with full image quality
Recon matrix	512 x 512
HU scale	–1,024 to +3,071
Extended HU scale	–10,240 to +30,710
Wide range of selectable slice thickness for prospective and/or retrospective reconstruction	
CINE display	
Display of image sequences	
Automatic or interactive with mouse control	
Max. image rate	30 frames/s
Windowing	
Window width and center freely selectable	
Single window	
Double window (e.g. bone/soft tissue)	
Multiple window settings for multi-image display	
Organ-specific window settings, e.g. for soft tissue and bones	

Filming	
Digital film documentation, connection to a suitable digital camera	
Connection via DICOM Basic print	
Automatic filming	
Interactive virtual film sheet	
Customizable film formats with up to 64 images	
Filming parallel to other activities	
Independent scanning and documentation	
Freely selectable positioning of images onto film sheet	
Configurable image text	
Printing	
Documentation on postscript printer supported	
Image transfer/Networking	
Interface for transfer of medical images and information using the DICOM standard. Facilitates communication with devices from different manufacturers.	
DICOM Storage (Send/Receive)	
DICOM Query/Retrieve	
DICOM Basic print	
DICOM Get Worklist (HIS/RIS)	
DICOM MPPS	
DICOM Storage Commitment	
DICOM Viewer on CD	
Raw data	
Capacity	340 GB
External USB 2.0 disks for quick and easy raw data storage are supported	

* Optional

** The image quality for the area outside the standard 50 cm scan field does not meet the image quality specifications shown in the technical data sheet and image artifacts may appear, depending on the anatomy scanned

System Software

Evaluation tools

Parallel evaluation of more than 10 Regions of Interest

- Circle
- Irregular
- Polygonal

Statistical evaluation

- Area/Volume
- Standard deviation
- Mean value
- Min./max. values
- Histogram

Profile cuts

- Horizontal
- Vertical
- Oblique

Distance measurement

Angle measurement

Online measurement of a 5 x 5 pixel size ROI

Freely selectable positioning of coordinate system

Crosshair

Image annotation and labeling

syngo Dynamic Evaluation

Evaluation of contrast enhancement in organs and tissues

Calculation of

- Time-density curves (up to 5 ROIs)
- Peak-enhancement images
- Time-to-peak images

Video Capture and Editing Tool

Integrated solution for imaging and visualization of 4D information, allowing the generation and editing of video files for improved diagnoses, recording, and teaching. A wide range of multimedia formats are supported, e.g. AVI, Flash (SWF), GIF, QuickTime (MOV), streaming video.

2D postprocessing

Image zoom and pan

Image manipulations

- Averaging, subtraction
- Reversal of gray-scale values
- Mirroring

Advanced image algorithms

- LCE: Low Contrast Enhancement for improving low contrast detectability
- HCE: High Contrast Enhancement for increased sharpness of high contrast structures
- ASA: Advanced Smoothing Algorithm edge preserving smoothing filter, dedicated to Cardiac exams

WorkStream4D**

4D workflow with direct generation of axial, sagittal, coronal, or double-oblique images from standard scanning protocols

Elimination of manual reconstruction steps

Reduction of data volume up to a factor of 10, since virtually all diagnostic information is captured in 3D slices

syngo Security Package*

Provides functionality for user management and flexible access control for patient data

Siemens Virus Protection*

Offers top-level defense in safeguarding CT systems against viruses

* Optional

** Standard on *syngo* Acquisition Workplace, optional on *syngo* CT Workplace

Image Quality

Phantom validation of z-Sharp Technology*

CATPHAN measurement demonstrates clearly industry's highest routine isotropic resolution of 0.33 mm

- 0.33 mm x 0.33 mm x 0.33 mm
- in daily clinical routine
- at any scan speed (any pitch)
- at all positions of the scan field

Pitch	0.55	1.0	1.5
z-axis			
0.33 mm			
0.36 mm			
0.38 mm			
0.42 mm			

Pitch	1.0 Center	1.0 100 mm off-center
z-axis		
0.33 mm		
0.36 mm		
0.38 mm		
0.42 mm		

Low-contrast resolution

Low-contrast resolution is the ability to see

- a small object (mm)
- with a certain contrast difference (HU)
- on a particular phantom (Ø)
- at a certain mAs value (mAs)
- with a particular patient dose (mGy)

Spiral

Phantom	CATPHAN (20 cm)
Object size	5 mm
Contrast difference	3 HU
Dose at the surface	20 mGy at 140 mAs
Technique	10 mm, 120 kV

Sequence

Phantom	CATPHAN (20 cm)
Object size	5 mm
Contrast difference	3 HU
Dose at the surface	18 mGy at 140 mAs
Technique	10 mm, 120 kV

High-contrast resolution

x-y-plane	0% MTF ($\pm 10\%$) 16.0 lp/cm, 0.32 mm
	2% MTF ($\pm 10\%$) 15.4 lp/cm, 0.34 mm
z-plane	0% MTF ($\pm 10\%$) 20 lp/cm, 0.25 mm**
	2% MTF ($\pm 10\%$) 18 lp/cm, 0.28 mm**
	0% MTF ($\pm 10\%$) 15 lp/cm, 0.33 mm
	2% MTF ($\pm 10\%$) 13 lp/cm, 0.38 mm
Technique	160 mA, 120 kV, 1.0 s, 1.2 mm/0.6 mm

Homogeneity

Cross-field uniformity in a 20 cm water phantom	max. ± 4 HU typ. ± 2 HU
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Dose, CTDI₁₀₀ values

Phantom		kV	kV	kV	kV
Ø		80	100	120	140
16 cm	A	6.1	11.7	18.7	27.2
	B	6.8	12.6	19.8	28.6
32 cm	A	1.6	3.4	5.8	9.0
	B	3.5	7.0	11.1	16.4

A: at center B: 1 cm below surface

Technique Collimation 24 x 1.2 mm

100 mAs

360° rotation

PMMA-Phantom

Absorbed dose for reference material air

Max. deviation $\pm 30\%$

Typically less than 15%

Values according to IEC 60601-2-44

* Optional

** Optional with z-Sharp Technology

Applications

Real-time MPR

Real-time multiplanar reformatting of secondary views

Variable slice thickness (MPR thick, MPR thin) and distance with configurable default values

Viewing perspectives

- Sagittal
- Coronal
- Oblique
- Double oblique
- Freehand (curvilinear)

syngo 3D SSD (Surface Shaded Display)

Three-dimensional display of surfaces with different density values

- Soft tissue
- Bone
- Contrast-enhanced vessels

syngo Volume Calculation

Measurements of various tissues and organs with HU-based region growth algorithms and interactive ROI definition

syngo VRT (Volume Rendering Technique)

Advanced 3D application package for the optimal display and differentiation of different organs through independent control of color, opacity, and shading in up to 4 tissue classes

CT-Angiography

MIP: Maximum Intensity Projection

MinIP: Minimum Intensity Projection

Thin MIP function for projection within a small slab to focus on particular vascular structure

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

syngo InSpace4D* – real-time interactive evaluation, in space and time

One-click bone removal

Automated segmentation and removal of bony structures for vascular analysis

4D evaluation of the beating heart with full resolution

Real-time navigation through moving anatomy in user selectable arbitrary planes

High performance volume reading for physician's diagnosis and pre-surgical planning in daily clinical routine

syngo Fly Through*

Virtual Endoscopy software enabling visualization of vessels, airways, and the intestines

syngo Dental CT*

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

syngo Osteo CT*

Non-invasive measurement of the bone mineral density of the lumbar spine to help early diagnosis of osteopenia and osteoporosis, and to assess the effectiveness of treatment

Osteo CT measurements are standardized to the ESP Phantom (ESP: European Spine Phantom)

Includes table mat and reference Phantom for Osteo CT studies

syngo Pulmo CT*

Quantitatively evaluates lung density and structure to help early diagnosis and treatment of lung disease and surgical intervention planning

* Optional

Applications

syngo HeartView CT*

syngo HeartView CT with ECG-synchronized true isotropic volume acquisition using prospective ECG triggered or retrospective ECG-gating mode

Basis for 3D cardiac scanning and reconstruction, e.g. CT-Angiography of the coronary and thoracic vessels or Calcium Scoring

The ECG signal used for gating the CT images is acquired by an integrated ECG device. The ECG signal is displayed on the gantry front cover and the scan interface.

Adaptive ECG-synchronized dose modulation (pulsing) allowing for optimal dose savings

Advanced irregular and ectopic heartbeat detection algorithm

Quality control tools enable retrospective ECG viewing and interaction as well as computer-assisted heart phase definition

Automatic detection of irregular heartbeats with intuitive ECG-editing functionality to assure artefact-free data reconstruction

syngo Circulation*

Fully automated cardiac evaluation

Automatic quantification of stenoses

One-click heart isolation

One-click coronary segmentation

Full evaluation of left-ventricular function

syngo Circulation Plaque Analysis*

Manual definition of HU values for three components (calcified, intermediate, low)

Automatic plaque volume definition

Color coding of plaque components

Automatic histogram

Fully integrated in *syngo* Circulation

syngo Circulation PE Detection**

Automatic off-line algorithm for pulmonary emboli evaluation

Automatic detection, marking and reporting of pulmonary lesions

syngo Circulation PE Detection Basic***

Intuitive pulmonary artery evaluation tool with integrated reporting functionality

syngo InSpace4D AVA (Advanced Vessel Analysis)*

Optional plug-in for *syngo* InSpace4D

Dedicated *syngo*-based application for analysis of vessel lesions

Automatic vessel segmentation plus accurate quantification of vascular lesions. Compatible with CT and MR datasets.

syngo InSpace EP (Electrophysiology)****

Provides cardiac 3D visualization including an automated segmentation functionality of the left atrium and pulmonary veins

Supports the electrophysiologist during planning, performing, and follow-up of Atrial Fibrillation ablations

syngo Calcium Scoring*

Displays the quantity and distribution of coronary calcification for the diagnosis and treatment of cardiac disease

Calibration for mass score calculation depending on patient size

syngo Volume Perfusion CT Neuro*

Evaluates dynamic CT data of the brain. Used for the early differential diagnosis of acute ischemic stroke. Additionally, it allows imaging of blood brain barrier disruptions in brain tumors.

syngo Neuro DSA CT (Digital Subtraction Angiography)*

The fully automated bone removal facilitates optimal visualization and evaluation of complex intracranial vascular structures and helps to delineate aneurysms and other vascular diseases

* Optional

** Optional, on *syngo* MultiModality Workplace only. Not available in the US

*** Optional, on *syngo* MultiModality Workplace only. For US only

**** Optional, on *syngo* MultiModality Workplace only

Applications

syngo Colonography CT*

For non-invasive visualization and quantitative evaluation of colon polyps
Enables real-time virtual 3D endoluminal viewing

syngo Colonography CT PEV (Polyp Enhanced Viewing)*

Computer-assisted identification of polyps with virtual second reader support

syngo Neuro PBV**

Dedicated postprocessing application for 3D evaluation of perfused blood volume in the whole brain

Calculation of the blood volume in the parenchyma, as an indicator for stroke

syngo CT Oncology**

Fast-track routine diagnostic oncology, staging, and follow-up. It provides a range of fully automated tools specifically designed to support physicians in the detection, segmentation, and evaluation of suspicious lesions including dedicated tools for lung, liver, and lymph node assessment. It also offers a fully automated follow-up protocol and features LungCAD (Computer Assisted Detection). *syngo* CT Oncology also facilitates functional imaging offering fusion of PET with CT data.

syngo Volume Perfusion CT Body*

For functional analysis of organs and tumors. Useful for interventional procedures and radiation therapy monitoring and planning.

syngo Image Fusion*

Registration and composite display of CT, MR, NM, and PET images. Provides for optimal physician's diagnosis by fusion of morphological data with functional information.

Respiratory Gating and Triggering CT*

Hardware and software components that allow for the capture and storage of a patient's respiratory signal data during a spiral (for gated reconstruction) or triggered sequence acquisition

Respiratory data is synchronized with the CT acquisition data

The user can select the image reconstruction points (based on respiratory cycle amplitude)

Preselection of up to 8 phases for respiratorily gated reconstruction

Organ motion artifacts caused by respiration are minimized or eliminated and better accuracy is obtained regarding organ position, size, and volume

Open Interface. Supporting connection to multi vendor respiration monitoring devices (e.g. Varian RPM System).

e-Logbook for AWP*

Tool to collect patient information for statistics, documentation, and research

- View
- Archive
- Print
- Export

syngo Expert-i*

Enables the physician to interact with the *syngo* CT Workplace or *syngo* MultiModality Workplace from virtually anywhere in your hospital

* Optional

** Optional, on *syngo* MultiModality Workplace only

Installation

Dimensions	Height (mm/inch)	Width (mm/inch)	Length (mm/inch)	Weight (kg/lbs)
Components				
Gantry	≤ 1,990/78.3	≤ 940/37.0	≤ 2,280/89.8	≤ 2,000/4,400
Patient table	≤ 1,022/40.2	≤ 690/27.2	≤ 2,430/95.7	≤ 500/1,100
Operator's console	≤ 720/28.3	≤ 800/31.5	≤ 1,400/55.1	≤ 65/143
Power cabinet	≤ 1,815/71.5	≤ 905/35.6	≤ 800/31.5	≤ 550/1,210
Cooling system				
Water/Water	≤ 1,815/71.5	≤ 905/35.6	≤ 860/33.9	≤ 200/440
Direct Water/Air*	≤ 1,815/71.5	≤ 905/35.6	≤ 900/35.4	≤ 400/880
Remote Water/Air*	≤ 1,815**/71.5**	≤ 905**/35.6**	≤ 900**/35.4**	≤ 355**/781**
	≤ 950***/37.4***	≤ 1,145***/45.1***	≤ 1,700***/66.9***	≤ 130***/286***
Image Recon. System	≤ 1,550/61.0	≤ 610/24.0	≤ 610/24.0	≤ 120/264
Computer system				
<i>syngo</i> Acquisition Workplace	≤ 500/19.7	≤ 250/9.8	≤ 620/24.4	≤ 30/66
<i>syngo</i> CT Workplace*	≤ 500/19.7	≤ 250/9.8	≤ 620/24.4	≤ 30/66
<i>syngo</i> MultiModality Workplace*	≤ 500/19.7	≤ 250/9.8	≤ 620/24.4	≤ 30/66

* Optional

** Indoor unit

*** Outdoor unit

Installation

Power supply	
Nominal voltage 3/N~	380–480 V in 20 V steps
Nominal line frequency	50; 60 Hz
Line impedance	130–180 mOhm (dependent on voltage)
Nominal power connection*	104 kVA (w/w) 111 kVA (w/a)**
Line fuse protection	125 A
Power consumption	
Computer on	2 kVA
System on standby	
w/w	8 kVA
w/a**	10 kVA
Scanning (operation for 12 s)	
w/w	104 kVA
w/a**	111 kVA
Scanning (operation for 100 s)	
w/w	60 kVA
w/a**	63 kVA
Accuracy	
Installation Accuracy: Precise adjustment laser combined with marking lines on the patient table and a dedicated measurement phantom assure highest installation accuracy of gantry and table	
Laser Accuracy: Alignment of lateral lasers with respect to the center of the imaging plane: ± 2 mm	
Orthogonal alignment of sagittal lasers with respect to the imaging plane: ± 2 mm over the length of laser projection	
Orthogonal orientation of CT scanner table top with respect to the imaging plane: ± 2 mm	
Gantry Tilt Accuracy: $\pm 0.5^\circ$ from neutral position	
RTP Patient Table Accuracy: Tabletop sag with respect to the imaging plane: 4 mm over the length of 90 cm and a patient load of 135 kg (TG66 compliance)	

Protection against input power fluctuation/interruptions	
X-ray	5 ms
Controllers	20 ms
Image Reconstruction System,	180 s
<i>syngo</i> Acquisition Workplace,	optional
<i>syngo</i> CT Workplace	with UPS**
Fluctuation	
Nominal voltage	$\pm 10\%$
Nominal frequency	$\pm 5\%$
Electromagnetic compatibility	
This product is in compliance with IEC 60601-1-2 and fulfils CISPR 11 Class A	
Cooling	
Heat dissipation to water cooling environment (only w/w cooler)	max. 15 kW
Heat dissipation to outside air (only w/a cooler)**	max. 26 kW
Heat dissipation to air cooling environment (using optional w/a split cooling system)**	max. 15 kW
Examination room environment	
Temperature range	15–28 °C
Relative air humidity without condensation	15–75%
Surface area for installation	
System	30 m ²
Emissions class	according to IEC 601-1-2

w/w = water/water; w/a = water/air

* Power consumption – notice: If pretransformer needed, at least 10% more power: 125 kVA

** Optional

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