Flash speed. Lowest dose.

SOMATOM Definition Flash

Datasheet for *syngo* CT 2009A

Answers for life.

SIEMENS


STOP

SOMATOM Definition Flash

Flash speed

The SOMATOM Definition Flash opens a door to unprecedented levels of patient friendliness with the speed to cover the entire thorax in less than a second – if necessary even without a breathhold. A full meter scan requires only around 2 seconds, while for perfusion or dynamic vascular imaging, long range scans become routine and gated chest CTs become sub-second procedures. Your patients will be off the table in minutes and can go back with positive feelings about their scan experience. Demanding patients, i.e. obese and trauma patients, restless children, etc. will hardly cause a ripple in your daily routine. All can be scanned quickly and efficiently.

Lowest dose

Maybe even more important – and impressive – is the incredible reduction in dose for all scans, resulting, e.g. in dose down to sub-mSv for cardiac imaging. In its second generation, Dual Energy automatically provides a second contrast for the best possible diagnosis without extra dose. At the same time, X-CARE allows protecting individual organs and the most radiation-sensitive body regions – for example, female breasts – by accurately and efficiently minimizing exposure.

SOMATOM Definition Flash – Standard System Configuration

System Hardware	
0.33 s rotation time	•
2 x Multislice UFC™ (Ultra Fast Ceramic) Detector	•
2 x 0 MHU STRATON® X-ray tube	•
200 kW (2 x 100 kW generators)	•
CT patient table (220 kg/485 lbs table load)	•
z-Sharp™ Technology	•
Cooling system water/water	•

Workplaces	
syngo® Acquisition Workplace	•
19" (48 cm) flat screen monitor	•
DVD storage	•
CD storage	•

CARE Applications	
Adaptive Dose Shield	•
CARE Filter	•
CARE Topo	•
CARE Dose4D™	•
CARE Bolus CT	•

System Software	
Flash Spiral Scanning	•
syngo Examination	•
syngo Viewing	•
syngo Filming	•
syngo Archiving & Networking	•
syngo Service Solutions	•
Image Filter	•
SureView™	•
SOMATOM® LifeNet	•
Video Capture and Editing Tool	•
Scan Protocol Assistant	•
e-Logbook	•

Applications	
Real-time MPR	•
syngo 3D SSD (Surface Shaded Display)	•
syngo Volume Calculation	•
syngo Dynamic Evaluation	•
syngo VRT (Volume Rendering Technique)	•
CT-Angiography	•
WorkStream4D™ (3D-Recon)	•

• Standard feature

SOMATOM Definition Flash – System Options

System Hardware	
0.28 s rotation time	○
Multi-purpose CT patient table (up to 300 kg/660 lbs table load)	○
Additional 19" (48 cm) flat screen monitor	○
Dual 19" (48 cm) flat screen monitor	○
UHR (Ultra High Resolution)	○
z-UHR (Ultra High Resolution)	○
Table side rails	○
400 mm patient restraint strap	○
Table cover paper dispenser	○
Split cooling system water/air	○

Workplaces	
syngo CT Workplace	○
syngo MultiModality Workplace	○
syngo WebSpace	○
Additional 19" (48 cm) flat screen monitor	○
Dual 19" (48 cm) flat screen monitor	○
Enhanced graphics accelerator	○

CARE Applications	
Flash Spiral Cardio, Flash Cardio Sequence and Adaptive ECG-Pulsing™ (included in *syngo* HeartView Flash)	○
CARE Contrast CT*	○
X-CARE*	○
Selective Photon Shield	○

CT Intervention	
Advanced 3D Intervention Suite	○
Intervention Pro	○
Adaptive 3D Intervention	○
i-Fluoro	○
i-Control (wireless/cable)	○

System Software and Applications on *syngo* Acquisition Workplace	
Dual Energy Scanning with Selective Photon Shield	○
Heart Perfusion Scanning	○
Adaptive 4D Spiral Plus	○
syngo Expert-i	○
Extended FOV (Field of View)	○
syngo Security Package	○
Siemens Virus Protection	○
syngo HeartView Flash (incl. Flash Spiral Cardio, Flash Cardio Sequence and Adaptive ECG-Pulsing™)	○
syngo Cardio BestPhase Plus	○
syngo Calcium Scoring	○
syngo Fly Through	○
syngo Dental CT	○
syngo Pulmo CT	○
syngo Volume Perfusion CT Neuro	○
syngo Volume Perfusion CT Body	○
syngo Image Fusion	○
Respiratory Gating and Triggering	○

syngo Applications for *syngo* MultiModality and *syngo* CT Workplace	
syngo VRT	○
syngo InSpace4D™	○
syngo InSpace4D Advanced Vessel Analysis	○
syngo InSpace4D EP (Electrophysiology)**	○
syngo InSpace Lung Parenchyma Evaluation	○
syngo Fly Through	○
syngo Dental CT	○
syngo Pulmo CT	○
syngo HeartView Flash (incl. Flash Spiral Cardio, Flash Cardio Sequence and Adaptive ECG-Pulsing)	○
syngo Cardio BestPhase Plus for *syngo* CT Workplace	○
syngo Calcium Scoring	○
syngo Circulation	○
syngo Circulation Plaque Analysis	○
syngo Circulation PE Detection**	○
syngo Circulation PE Detection Basic***	○
MI Hybrid Visualization	○
syngo Heart Perfusion	○
syngo Volume Perfusion CT Neuro	○
syngo Neuro DSA CT (Digital Subtraction Angiography)	○
Autopreprocessing CT DSA	○
syngo Neuro PBV CT	○
syngo Volume Perfusion CT Body	○
syngo Volume Perfusion CT Body Myocardium*	○
syngo CT Oncology	○
syngo Colonography CT	○
syngo Colonography CT with PEV (Polyp Enhanced Viewing)	○
CT Colonography Virtual Dissection	○
syngo LungCARE CT	○
syngo LungCAD	○
syngo Image Fusion	○
WorkStream4D (3D-Recon and Recon card CT Workplace) for *syngo* CT Workplace	○
syngo Expert-i	○
syngo Dual Energy with Optimum Contrast	○
syngo DE Direct Angio	○
syngo DE Virtual Unenhanced	○
syngo DE Heart PBV	○
syngo DE Musculoskeletal	○
syngo DE Calculi Characterization	○
syngo DE Hardplaque Display	○
syngo DE Lung PBV	○
syngo DE Lung Vessels	○
syngo DE Lung Nodules	○
syngo DE Xenon ****	○
syngo DE Gout	○
syngo DE Brain Hemorrhage	○

○ Optional feature
* Delivery planned 2010
** Not available in the US
*** For US only
**** Please confirm approval status of Xenon gas as contrast agent for lung ventilation in your country

System Hardware

Gantry	
Aperture	78 cm
Scan field	50 cm (78 cm*)
Distance between gantry front to scan plane	35 cm
Rotation time	0.28*, 0.33, 0.5, 1.0 s
Temporal resolution	*syngo* HeartView Flash provides 75 ms temporal resolution independent of the heart rate (down to 37.5 ms using 2-segment reconstruction, except Flash Spiral)
Continuously rotating two tube-detector units with optimized geometry for high-resolution data acquisition across the entire scan field	
Data acquisition system	
Max. number of slices/rotation	2 x 128
Number of detector rows	2 x 64
Number of detector electronic channels (DAS) utilized for up to 2 x 128 slices/rotation acquisition	2 x 128
Number of detector elements	77,824 (47,104 system A; 30,720 system B)
Number of projections	up to 4,608 (1/360°) on each data acquisition unit
Dual Source, cardio acquisition modes*	Acquisition of 2 x 128 x 0.6 mm** with Dual Source single segment reconstruction, resulting in heart-rate-independent temporal resolution of 75 ms; down to 37.5 ms using 2-segment reconstruction
Dual Source, Flash Spiral modes*	Acquisition of 2 x 128 x 0.6 mm** in Dual Source acquisition mode, for increased scan speed up to 400 mm/s (458 mm/s when ECG-triggered*, results in temporal resolution of 75 ms)
Dual Source, dual power acquisition modes	Acquisition of up to 2 x 128 x 0.6 mm** with the parallel utilization of two 100 kW sources, resulting in up to 128 slices/rotation with 200 kW of power reserve
Dual Source, dual energy acquisition modes*	Acquisition of up to 2 x 128 x 0.6 mm** with the parallel utilization of two sources with different kV settings and Selective Photon Shield, resulting in improved differentiation
Single source spiral acquisition modes	16 x 0.3 mm (z-UHR)**, 8 x 0.3 mm (z-UHR)**, 128 x 0.6 mm**, 64 x 0.6 mm*, 40 x 0.6 mm, 32 x 0.6 mm*, 20 x 0.6 mm, 16 x 0.6 mm (UHR), 10 x 0.6 mm, 8 x 0.6 mm (UHR), 32 x 1.2 mm
Sequence acquisition modes	64 x 0.6 mm, 32 x 0.6 mm, 8 x 0.6 mm (UHR), 2 x 1 mm, 32 x 1.2 mm, 12 x 1.2 mm, 1 x 5 mm, 1 x 10 mm
Heart Perfusion mode	Sequence shuttle mode to dynamically cover up to approximately twice the detector width for myocardial perfusion studies with sufficient temporal resolution even for high heart rates
Adaptive 4D Spiral Plus mode	Spiral scan mode for whole organ perfusion and dynamic CTA acquisition of up to 48 cm

* Optional

** Acquisition modes enabled by z-Sharp Technology

System Hardware

Data acquisition system	
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 4,608 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 2 x 128-slice detector electronics enable a virtually simultaneous readout of two projections for each detector element-resulting in a full 2 x 128-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.
z-UHR (Ultra High Resolution)*	Siemens' proprietary z-UHR enables previously unachievable image detail with an isotropic resolution of 30 lp/cm (0.17 mm) at 0 % MTF (± 10 %). The combination of z-Sharp Technology and z-UHR offers an isotropic detail in the range of flat panel or Micro CT technology.
UFC Detector	Ultra-short afterglow; Special supporting z-Sharp Technology; Optimal for sub-second and multislice acquisition

* Optional

System Hardware

Tube assembly	
Tube	2 x STRATON high performance CT X-ray tube
Tube current range	single source 20–800 mA Dual Source 40–1600 mA
Tube voltage	80, 100, 120, 140 kV
Dual energy	parallel utilization of two sources with different kV settings
Tube anode heat storage capacity	0 MHU (0.53 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 30 MHU (22,000 kJ) anode heat storage capacity)
Cooling rate	7.3 MHU/min
Focal spot size according to IEC 60336	0.7 x 0.7 mm/7° 0.9 x 1.1 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	permanent: 1.6 mm Al equivalent mode dependent: additional 0.5 mm Al Selective Photon Shield*

Generator	
Max. power	200 kW (2 x 100 kW)

Patient table	
Max. table load	220 kg/485 lbs
Table feed speed Flash Spiral mode ECG-triggered Flash Spiral mode*	2–200 mm/s up to 400 mm/s up to 458 mm/s
Vertical table travel range	48–92 cm/18.9–32.2” (at table top)
Vertical travel speed	20–50 mm/s
Scannable range	200 cm/78.74”
Distance between gantry front and table base	40 cm/15.8”

Multi-purpose patient table*	
Max. table load	300 kg/660 lbs
Table feed speed Flash Spiral mode ECG-triggered Flash Spiral mode*	2–200 mm/s up to 400 mm/s up to 458 mm/s
Vertical table travel range	55–92 cm
Vertical travel speed	20–50 mm/s
Scannable range	200 cm
Distance between gantry front and table base	35 cm
Additional exchangeable high-capacity patient table tops and trauma table top	
RTP table top	

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

Three laser light markers
Horizontal, sagittal, and vertical laser light that shows the isocenter position of the scan plane

Integrated display panel
Gantry front display showing current scan parameters such as kV, mA, scan time, table position, ECG trace**, patient name, and heart rate**

Gantry front and rear control panels
For convenient patient positioning (e.g. in case of trauma or interventional exams)

* Optional
** Optional for *syngo* HeartView Flash

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
1x Xeon QuadCore 2.66 GHz processor
Graphics accelerator
NVIDIA Quadro FX 1700
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	
8 GB	
RAID	
Software RAID 0 for enhanced read/write performance	
Image storage	
2 x 146 GB; 520,000 uncompressed images	
Additional storage	
CD-R	700 MB 1,100 images
DVD DICOM drive	4.7 GB DVD media 8,000 images
External USB 2.0 disks for quick and easy raw data storage are supported. External USB memory stick for image data.	
DICOM viewer	
Included on each CD; 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 Xeon 3.0 GHz processor

Graphics accelerator

NVIDIA Quadro FX 3500 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

8 GB

RAID

Software RAID 0 for enhanced read/write performance

Image storage

Shared database with *syngo* Acquisition Workplace

Additional storage

CD-R	700 MB 1,100 images
DVD DICOM drive	4.7 GB DVD media 8,000 images

DICOM viewer

Included on each CD; automatically started on the viewer's PC

* Optional

syngo Workplaces

syngo MultiModality Workplace*

The *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 Xeon 3.0 GHz processor

Graphics accelerator

NVIDIA Quadro FX 3500 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

8 GB

Disc expansion

For increased capacity and performance (add. 147 GB for image data)

Image storage

146 GB; 260,000 uncompressed images

Additional storage

CD-R	700 MB 1,100 images
DVD DICOM drive	4.7 GB DVD media 8,000 images

DICOM viewer

Included on each CD; automatically started on the viewer's PC

* Optional

syngo CT.3D

syngo CT.3D (on *syngo* CT Workplace*)	◦
syngo CT Workplace	
19" (48 cm) flat screen monitor	
Enhanced graphics accelerator	
syngo Expert-i	
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 CT.3D (on *syngo* MultiModality Workplace*)	◦
syngo MultiModality Workplace	
19" (48 cm) flat screen monitor	
Enhanced graphics accelerator	
syngo Expert-i	
syngo 3D Basic	
syngo VRT	
syngo Fly Through	
syngo InSpace4D	
syngo Volume Calculation	
syngo Dynamic Evaluation	

CT Engines

CT Acute Care Engine*	◦
0.28 s rotation time	
Flash Spiral Scanning	
z-UHR/UHR	
Table side rails	
Extended FOV	
syngo HeartView Flash (incl. Flash Spiral Cardio, Flash Cardio Sequence, and Adaptive ECG-Pulsing)	
syngo Cardio BestPhase Plus	
syngo Circulation	
syngo Circulation Plaque Analysis	
syngo Circulation PE Detection**	
syngo Circulation PE Detection Basic***	
syngo InSpace4D Advanced Vessel Analysis	
syngo Calcium Scoring****	
syngo Volume Perfusion CT Neuro****	
syngo Neuro PBV CT	
syngo Neuro DSA CT	
• Autopreprocessing CT DSA	

CT Cardiac Engine*	◦
0.28 s rotation time	
Flash Spiral Scanning	
syngo HeartView Flash (incl. Flash Spiral Cardio, Flash Cardio Sequence, and Adaptive ECG-Pulsing)	
syngo Cardio BestPhase Plus	
syngo Circulation	
syngo Circulation Plaque Analysis	
syngo InSpace4D Advanced Vessel Analysis	
syngo Calcium Scoring****	

CT Neuro Engine*	◦
syngo Volume Perfusion CT Neuro****	
syngo Neuro PBV CT	
syngo Neuro DSA CT	
• Autopreprocessing CT DSA	

CT Oncology Engine*	◦
syngo CT Oncology	
syngo Colonography CT with PEV	
syngo Prefetching	

◦ Optional feature
* *syngo* software feature of CT Clinical Engines available within *syngo* MultiModality Workplace
** Not available in the US
*** For US only
**** *syngo* software feature of CT Clinical Engines available within *syngo* Acquisition Workplace and *syngo* MultiModality Workplace

syngo WebSpace and e-Tune

syngo WebSpace*

syngo WebSpace is a state-of-the-art thin-client-server solution. It is the gateway to real-time access to thin-slice CT data and cutting-edge 3D and 4D tools based on *syngo* InSpace4D™ software solution – enterprise-wide and beyond. The proprietary Fast Data Link between the SOMATOM Definition and *syngo* WebSpace provides virtually instantaneous availability of the reconstructed thin slices. Above that, *syngo* WebSpace can easily be integrated in your PACS environment. With a single mouse click the current case immediately opens in 3D on your PACS workstation**. All 3D rendering takes place on the central *syngo* WebSpace server, so that even the largest CTA and cardiac studies can be reviewed from any client computer** in the network with astonishing speed.

Server hardware

syngo WebSpace runs on standard, commercially available server hardware and is released for the hardware configuration which is available from Siemens

Client software

To be downloaded from *syngo* WebSpace server and installed on the client computer. Client software requires approximately 50 MB of free disk space.

Minimum requirements for client computer

PC or laptop computer, Windows™ 2000; XP

1 GHz processor and up to 16 GB RAM

Graphics card according to the standard Open GL 1.2 or higher

Network requirements

100 Mbit local area network

Remote access with 2 Mbit broad band connection

Configuration

	Trend	Expert	Department	Clinic
Concurrent sessions	3	5	10	20
Slices per user (max.)	5,000	5,000	5,000	5,000
Slices total (max.)	5,000	5,000	10,000	20,000
RAM	12 GB	12 GB	12 GB	16 GB
Volume rendering devices	1 x VolPro 4 GB	1 x VolPro 4 GB	2 x VolPro 4 GB	4 x VolPro 4 GB

e-Tune*

For maximum investment protection, Siemens offers e-Tune as an option for the *syngo* WebSpace service contract. e-Tune is a dedicated program for *syngo* WebSpace which contains maintenance, updates, and upgrades to the latest available software version. This range of services makes *syngo* WebSpace a complete and future-proof solution – just as you would expect from a partner like Siemens.

* Optional

** Client computer must meet minimum specifications

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.

Adaptive Dose Shield

Eliminates pre- and post-spiral overradiation

Dynamic STRATON tube collimator, blocking clinically unnecessary dose

X-CARE**

Partial scanning to reduce direct X-ray exposure for the most dose-sensitive body regions, e.g. the breasts, thyroid gland or eye lens

Flash Spiral Scanning

Ultra-fast spiral scanning in Dual Source mode with up to 400 mm/s (for cardiac scanning up to 458 mm/s*), allows for additional dose saving especially in ECG-gated scans, e.g. cardiac or chest scanning

Pediatric protocols

Special clinical protocols with 80 to 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

Synchronized scanning and contrast injection*

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

Flash Spiral Cardio* and Flash Cardio Sequence*

Ultra-fast cardiac spiral for maximum dose reduction (part of *syngo* HeartView Flash*). Down to below 1 mSv patient dose in moderate heart rates. ECG-synchronized Flash Cardio Sequence for dose-efficient but versatile low dose cardiac imaging, including high heart rates and functional evaluation.

Adaptive ECG-Pulsing with MinDose*

Dose-modulated cardiac spiral for dose reduction during the selectable heart phase (part of the *syngo* HeartView Flash*). Up to 50 % dose savings for the patient. MinDose allows to lower the tube current down to 4 % in the phases not intended for reconstruction use, resulting in additional dose savings of 20–30 %.

CARE Bolus CT

Scan mode for contrast bolus triggered data acquisition

Significant improvement of the planning procedure 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 an ROI (Region of Interest)

* Optional

** Optional, delivery planned 2010

CT Intervention

Adaptive 3D Intervention Suite*
Complete solution for non-fluoroscopic and fluoroscopic minimally invasive 3D volume interventions. Includes Intervention Pro, i-Fluoro, i-Control (wireless or cable), foot switch.

Intervention Pro*
Spiral and sequential non-fluoroscopic interventional procedures
i-Sequence biopsy mode with user-configurable dose and windowing display
i-Spiral mode for complete organ coverage
Switching scan modes on the fly during intervention with one single click
Up to 8 image display for better navigation in the volume
Layout Editor with user-configurable screen layouts
Interventional Toolbar with measurement tools and automatic table positioning via buttons or joystick with auto-stop function
Switch between continuous and incremental table movement with user-configurable increment
i-Precision view: increases or decreases the predefined mAs value
HandCARE for i-Sequence: real-time dose modulation during the CT-guided intervention avoids direct X-ray irradiation of the radiologist's hands

Adaptive 3D Intervention*
Near to real-time coronal, sagittal, and oblique image guidance
Layout Editor 3D: user-configurable screen layouts in 3D
Display of coronal, axial, and sagittal MPRs and VRT
Interventional Toolbar with path planning tools such as Auto Needle Detection
i-NeedleSharp: avoids needle artifacts during a sequential intervention

i-Fluoro*
Real-time fluoroscopic image guidance with up to 10 frames/s
Image matrix 512 x 512
Fluoroscopy mode with X-ray up to 100 s (dependent on hardware configuration)
Dose & Time Watch for continuous observation of dose and scan time
Up to 8 image display for better navigation in the volume
Intelligent carry-over and adaptation of interventional scan parameters
Interventional Toolbar with measurement tools and automatic table positioning via buttons or joystick with auto-stop function
Switching scan modes on the fly during intervention with one single click
Switch between continuous and incremental table movement with user-configurable increment or "move table top only" mode
Additional flat screen monitor 19" (48 cm) for parallel image display in the examination room
Foot switch: radiation release directly at the gantry
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.

i-Control*
In-room intervention module for full remote control of gantry, table, and user interface

* 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

Patient communication
Integrated patient intercom
Automatic Patient Instruction (API) • Freely recordable • 30 API text pairs • Presets in nine languages available

Topogram	
Length	128–2,000 mm
Scan times	2–21 s
Views	a.p., p.a., lateral

Sequence acquisition	
Reconstructed slice widths	0.6, 0.75, 1, 1.2, 1.5, 2, 2.4, 3, 4, 4.8, 5, 6, 7, 7.2, 8, 10, 15, 20 mm
Scan times (full scan)	0.28, 0.33, 0.5, 1.0 s
Partial scan times (260°)	0.2, 0.24, 0.36, 0.72 s
No. of uninterrupted scans per range	100
No. of ranges per protocol	33
Scan cycle time (min. scan cycle time depending on rotation time)	0.75–60 s (± 10 %)
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 38.4 mm	

System Software

Multislice Spiral Acquisition	
Reconstructed slice widths	0.4 (z-UHR)**, 0.5 (z-UHR)**, 0.6, 0.75, 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 10 mm
Scan times (full scan)	0.28, 0.33, 0.5, 1.0 s
Slice increment	0.1–10 mm
Pitch factor	0.35–3.0 up to 3.4 (ECG-triggered Flash Spiral)* down to 0.3 (z-UHR)* down to 0.17 (*syngo* HeartView Flash)* down to 0.07 (Respiratory Gating and Triggering CT)*
Spiral scan time	max. 80 s
Scan length	max. 197 cm
No. of ranges per protocol	33
Automatic clustering of scans	
Optimized special reconstruction algorithm (PFO: Posterior Fossa Optimization) for reduction of beam hardening artifacts in head images	

Adaptive 4D Spiral Plus*
Facilitates whole organ volume perfusion studies in head and body applications
Phase resolved CTA studies with up to 48 cm
Continuously repeated bi-directional table movement during spiral acquisition enables an extended range for 4D information

Extended Field of View (FOV)*
Special image reconstruction algorithms that provide visualization of objects using an FOV up to 78 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 adaptation
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 2 x 128-slice acquisition

* Optional
** Optional, with z-UHR option
*** 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	0.4*, 0.5*, 0.6–20 mm (38 mm using dynamic multiscan)
Scan field	50 cm (78 cm**)
Recon field	5–50 cm, 5–78 cm with extended FOV**
Recon time	up to 40 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
Freely 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 storage	
Capacity	2.8 TB
External USB 2.0 devices for quick and easy raw data storage are supported	

* Optional, with z-UHR option

** Optional, reconstruction area outside the standard 50 cm FOV is for visualization purposes only and is not of diagnostic image quality

System Software

Evaluation tools

Parallel evaluation of more than 10 Regions of Interest (ROI)
- 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

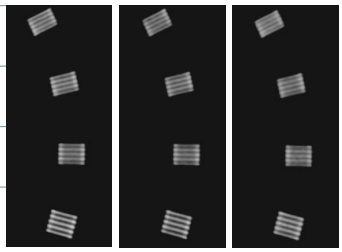
* Optional

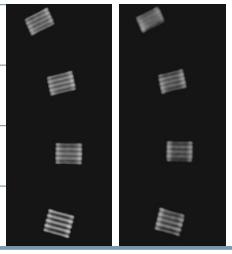
** Standard on *syngo* Acquisition Workplace, optional on *syngo* CT Workplace

Image Quality

Phantom validation of z-Sharp Technology

CATPHAN measurement demonstrates clearly industry's highest routine isotropic resolution
- 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		

Phantom validation of z-UHR*

CATPHAN measurement results in industry's highest isotropic resolution of 0.24 mm in all three planes (x, y, and z)
- 0.24 mm x 0.24 mm x 0.24 mm
- for ultra-high resolution bone-imaging
- isotropic detail in the range of flat panel or Micro CT technology
- 0.3 mm collimation

* Optional

Image Quality

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)
- at a specific dose level (mGy)

Spiral

Phantom	CATPHAN (20 cm)
Object size	5 mm
Contrast difference	3 HU
$CTDI_{VOL}$	11 mGy at eff. 180 mAs
Technique	10 mm, 120 kV, body mode

Sequence

Phantom	CATPHAN (20 cm)
Object size	5 mm
Contrast difference	3 HU
$CTDI_{VOL}$	11 mGy at eff. 180 mAs
Technique	10 mm, 120 kV, body mode

High-contrast resolution

Industry's highest isotropic high-contrast resolution in all three planes (x, y, and z)

x-y-plane*	0 % MTF (± 10 %) 30 lp/cm, 0.17 mm
	2 % MTF (± 10 %) 24 lp/cm, 0.21 mm
z-plane**	0 % MTF (± 10 %) 30 lp/cm, 0.17 mm
	2 % MTF (± 10 %) 22 lp/cm, 0.23 mm
Technique	160 mA, 120 kV, 0.5 s, 0.3 mm

Homogeneity

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

Dose, $CTDI_{100}$ values

Phantom		kV	kV	kV	kV
Ø		80	100	120	140
16 cm	A	4.6	9.2	14.9	22.1
	B	5.3	10.1	15.9	23.5
32 cm	A	1.1	2.4	4.2	6.3
	B	2.4	4.9	7.9	11.3

A: at center B: 1 cm below surface

Technique
collimation 32 x 1.2 mm
100 mAs
360° rotation
PMMA-Phantom
absorbed dose for reference material air
max. deviation ± 40 % for 80 kV, ± 30 % for other kV settings
typically less than 15 %
values according to IEC 60601-2-44

* Optional with UHR. Standard high-contrast resolution 17.4 lp/c, at 0% MTF and 16.4 lp/cm at 2% MTF

** Optional with z-UHR

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 structures

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

Adaptive ECG-synchronized Cardio Sequence scan allowing for additional dose saving

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 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 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 Pulmo CT*

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

* Optional

** Optional, on *syngo* MultiModality Workplace only

Applications

syngo HeartView Flash*

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.

Dual Source acquisition mode with single-segment reconstruction enables heart-rate independent temporal resolution of 75 ms (factor 2 higher than single source acquisition with same parameters)

Down to 37.5 ms temporal resolution combining *syngo* HeartView Flash acquisition with robust 2-segment reconstruction (except Flash Spiral)

Ultra-fast Flash Spiral Cardio scanning allows for maximum dose saving

ECG-synchronized Flash Cardio Sequence for dose-efficient but versatile low dose cardiac imaging, including high heart rates and functional evaluation

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 artifact-free data reconstruction

syngo Cardio BestPhase Plus*

Provides a proposal for the heart phase and 3D VRT visualization of the heart in several user selectable heart phases to aid the physician in the choice of the desired heart phase for image reconstruction

syngo Calcium Scoring*

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

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

MI Hybrid Visualization*

Allows the hybrid viewing of SPECT/PET data with cardiac CT data processed with *syngo* Circulation

* Optional

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

*** For US only. Optional.

Applications

syngo Volume Perfusion CT Neuro*

Evaluates dynamic CT data of the brain. Additionally, it allows imaging of blood brain barrier disruptions in brain tumors. Supports evaluation of volume perfusion studies with Adaptive 4D Spiral mode.

syngo Neuro DSA CT (Digital Subtraction Angiography)*

The fully automated workflow facilitates optimal visualization and evaluation of complex intracranial vascular structures

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 Volume Perfusion CT Body*

For functional analysis of organs and tumors. Useful for interventional procedures and radiation therapy monitoring and planning. Supports evaluation of whole organ volume perfusion studies performed with Adaptive 4D Spiral mode.

syngo Volume Perfusion CT Body Myocardium**

Allows the display and analysis of dynamic CT data of the heart. The application might help to evaluate myocardial ischemia and assess hemodynamic changes in ischemic cardiac segments.

4D Noise Reduction*

Image optimization algorithm for dynamically acquired images, e.g. in perfusion scanning. Allows to significantly improve image quality with no increase in dose or, alternately, reduce dose up to 50 % without compromising image quality.

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 Colonography CT*

For non-invasive visualization and quantitative evaluation of colon polyps

Enables real-time virtual 3D endoluminal viewing

syngo Colonography CT with PEV (Polyp Enhanced Viewing)*

Computer-assisted identification of polyps with virtual second reader support

CT Colonography Virtual Dissection*

Unfolded display of the entire colon which allows to view the whole organ at once

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.

* Optional
** Optional, delivery planned 2010

Applications

syngo Dual Energy with Selective Photon Shield*

By using both tubes with different settings of 80/140 kV or 100/140 kV simultaneously, *syngo* Dual Energy allows to visualize the chemical composition of material. In addition, the Selective Photon Shield improves material differentiation add by up to 80 % with reduced noise. Two spiral data sets are acquired in a single scan providing diverse information and ultimately to differentiate, characterize, isolate, and distinguish the imaged tissue. With Optimum Contrast 3D data can be analyzed and the optimal mix of low and high kV information is automatically combined into a single dataset for best possible contrast display.
At the moment twelve Dual Energy applications are available:

- *syngo* DE Direct Angio
- *syngo* DE Virtual Unenhanced
- *syngo* DE Heart PBV
- *syngo* DE Musculoskeletal
- *syngo* DE Calculi Characterization
- *syngo* DE Hardplaque Display
- *syngo* DE Lung PBV
- *syngo* DE Lung Vessels
- *syngo* DE Lung Nodules
- *syngo* DE Xenon**
- *syngo* DE Gout
- *syngo* DE Brain Hemorrhage

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

e-Logbook

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* Acquisition Workplace, the *syngo* CT Workplace or the *syngo* MultiModality Workplace from virtually anywhere in your hospital

* Optional

** Please confirm approval status of Xenon gas as contrast agent for lung ventilation in your country

Installation

Dimensions	Height (mm/inch)	Width (mm/inch)	Length (mm/inch)	Weight (kg/lbs)
Components				
Gantry, including water/water cooling system	≤ 1,980 / 78.0	≤ 1,206 / 47,5	≤ 2,314 / 91.1	≤ 2,600 / 5,732
Patient table	≤ 1,020 / 40.2	≤ 750 / 29.5	≤ 2,432 / 95.7	≤ 500 / 1,102
Operator's console	≤ 720 / 28.3	≤ 800 / 31.5	≤ 1,400 / 55.1	≤ 65 / 143
Power cabinet A	≤ 1,950 / 76.8	≤ 900 / 35.4	≤ 700 / 27.6	≤ 570 / 1,257
Power cabinet B	≤ 1,950 / 76.8	≤ 900 / 35.4	≤ 700 / 27.6	≤ 400 / 882
Water/air cooling system*				
Indoor unit	≤ 1,950 / 76.8	≤ 905 / 35.6	≤ 900 / 35.4	≤ 380 / 838
Outdoor unit	≤ 950 / 37.4	≤ 1,145 / 45.1	≤ 1,700 / 66.9	≤ 150 / 331
Image recon. system	≤ 530 / 20.9	≤ 320 / 12.6	≤ 761 / 29.9	≤ 60 / 132
***syngo* Workplaces**				
syngo Acquisition Workplace	≤ 500 / 19.7	≤ 250 / 9.8	≤ 650 / 25.6	≤ 30 / 66
syngo CT Workplace*	≤ 500 / 19.7	≤ 250 / 9.8	≤ 650 / 25.6	≤ 30 / 66
syngo MultiModality Workplace*	≤ 500 / 19.7	≤ 250 / 9.8	≤ 650 / 25.6	≤ 30 / 66
***syngo* WebSpace**				
syngo WebSpace Server*	≤ 508 / 20.0	≤ 282 / 11.1	≤ 732 / 28.8	≤ 70 / 154

* Optional

Installation

Power supply	
Nominal voltage 3/N~	380–480 V in 20 V steps
Nominal line frequency	50; 60 Hz
Line impedance	80–125 mOhm (dependent on voltage)
Nominal power connection system**	150 + 135 kVA (water/water cooling)
Nominal power connection water/air split cooling system*/**	16 kVA

Power consumption	
Computer on	3 kVA
System on standby	6 kVA
Water/air cooling on standby*	16 kVA
System scanning	285 kVA
Water/air cooling when system scanning*	295 kVA

Protection against input power fluctuation/interruptions	
X-ray	10 ms
Controllers	20 ms
Image reconstruction	180 s
System, *syngo* Acquisition Workplace, *syngo* CT Workplace	with UPS
Disabling of Dual Source mode, for single source acquisition possible	

Fluctuation	
Nominal voltage	± 10 %
Nominal frequency	± 5 %

Electromagnetic compatibility	
This product is in compliance with IEC 60601-1-2 and fulfills CISPR 11 Class A	
Emissions class	according to IEC 601-1-2

Cooling	
Heat dissipation to water cooling environment (using standard water/water cooling system)	max. 15 kW
Heat dissipation to air cooling environment (using optional water/air split cooling system)	max. 15 kW

Examination room environment	
Temperature range	18–28 °C
Relative air humidity without condensation	15–85 %

Surface area for installation	
System	30 m^2

* Optional

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

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Please find fitting accessories:
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