Flash speed. Lowest dose.

SOMATOM Definition Flash

Datasheet for syngo CT 2009A

Answers for life.
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

<table>
<thead>
<tr>
<th>System Hardware</th>
<th>CARE Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.33 s rotation time</td>
<td>Adaptive Dose Shield</td>
</tr>
<tr>
<td>2 x Multislice UFC™ (Ultra Fast Ceramic) Detector</td>
<td>CARE Filter</td>
</tr>
<tr>
<td>2 x 0 MHU STRATON® X-ray tube</td>
<td>CARE Topo</td>
</tr>
<tr>
<td>200 kW (2 x 100 kW generators)</td>
<td>CARE Dose4D™</td>
</tr>
<tr>
<td>CT patient table (220 kg/485 lbs table load)</td>
<td>CARE Bolus CT</td>
</tr>
<tr>
<td>z-Sharp™ Technology</td>
<td>System Software</td>
</tr>
<tr>
<td>Cooling system water/water</td>
<td>Flash Spiral Scanning</td>
</tr>
<tr>
<td>Workplaces</td>
<td>syngo Examination</td>
</tr>
<tr>
<td>syngo® Acquisition Workplace</td>
<td>syngo Viewing</td>
</tr>
<tr>
<td>19” (48 cm) flat screen monitor</td>
<td>syngo Filming</td>
</tr>
<tr>
<td>DVD storage</td>
<td>syngo Archiving &amp; Networking</td>
</tr>
<tr>
<td>CD storage</td>
<td>syngo Service Solutions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CARE Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Filter</td>
</tr>
<tr>
<td>SureView™</td>
</tr>
<tr>
<td>SOMATOM® LifeNet</td>
</tr>
<tr>
<td>Video Capture and Editing Tool</td>
</tr>
<tr>
<td>Scan Protocol Assistant</td>
</tr>
<tr>
<td>e-Logbook</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
</tr>
<tr>
<td>Real-time MPR</td>
</tr>
<tr>
<td>syngo 3D SSD (Surface Shaded Display)</td>
</tr>
<tr>
<td>syngo Volume Calculation</td>
</tr>
<tr>
<td>syngo Dynamic Evaluation</td>
</tr>
<tr>
<td>syngo VRT (Volume Rendering Technique)</td>
</tr>
<tr>
<td>CT-Angiography</td>
</tr>
<tr>
<td>WorkStream4D™ (3D-Recon)</td>
</tr>
</tbody>
</table>

• 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
** 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aperture</td>
<td>78 cm</td>
</tr>
<tr>
<td>Scan field</td>
<td>50 cm (78 cm*)</td>
</tr>
<tr>
<td>Distance between gantry</td>
<td>35 cm</td>
</tr>
<tr>
<td>front to scan plane</td>
<td></td>
</tr>
<tr>
<td>Rotation time</td>
<td>0.28*, 0.33, 0.5, 1.0 s</td>
</tr>
<tr>
<td>Temporal resolution</td>
<td>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)</td>
</tr>
</tbody>
</table>

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

#### Data acquisition system

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. number of slices/rotation</td>
<td>2 x 128</td>
</tr>
<tr>
<td>Number of detector rows</td>
<td>2 x 64</td>
</tr>
<tr>
<td>Number of detector electronic channels (DAS) utilized for up to 2 x 128 slices/rotation acquisition</td>
<td>2 x 128</td>
</tr>
<tr>
<td>Number of detector elements</td>
<td>77,824 (47,104 system A; 30,720 system B)</td>
</tr>
<tr>
<td>Number of projections up to 4,608 (1/360°) on each data acquisition unit</td>
<td></td>
</tr>
<tr>
<td>Dual Source, cardio acquisition modes*</td>
<td>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</td>
</tr>
<tr>
<td>Dual Source, Flash Spiral modes*</td>
<td>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)</td>
</tr>
<tr>
<td>Dual Source, dual power acquisition modes</td>
<td>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</td>
</tr>
<tr>
<td>Dual Source, dual energy acquisition modes*</td>
<td>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</td>
</tr>
<tr>
<td>Single source spiral acquisition modes</td>
<td>16 x 0.3 mm (z-UHR)<strong>, 8 x 0.3 mm (z-UHR)</strong>, 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</td>
</tr>
<tr>
<td>Sequence acquisition modes</td>
<td>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</td>
</tr>
<tr>
<td>Heart Perfusion mode</td>
<td>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</td>
</tr>
<tr>
<td>Adaptive 4D Spiral Plus mode</td>
<td>Spiral scan mode for whole organ perfusion and dynamic CTA acquisition of up to 48 cm</td>
</tr>
</tbody>
</table>

* Optional
** Acquisition modes enabled by z-Sharp Technology
### Data acquisition system

<table>
<thead>
<tr>
<th>Technology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>z-Sharp Technology</td>
<td>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.</td>
</tr>
<tr>
<td>z-UHR (Ultra High Resolution)*</td>
<td>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.</td>
</tr>
<tr>
<td>UFC Detector</td>
<td>Ultra-short afterglow; Special supporting z-Sharp Technology; Optimal for sub-second and multislice acquisition</td>
</tr>
</tbody>
</table>

* Optional
## System Hardware

### Tube assembly

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tube</strong></td>
<td>2 x STRATON high performance CT X-ray tube</td>
</tr>
<tr>
<td><strong>Tube current range</strong></td>
<td>- single source: 20–800 mA</td>
</tr>
<tr>
<td></td>
<td>- Dual Source: 40–1600 mA</td>
</tr>
<tr>
<td><strong>Tube voltage</strong></td>
<td>80, 100, 120, 140 kV</td>
</tr>
<tr>
<td><strong>Dual energy</strong></td>
<td>parallel utilization of two sources with different kV settings</td>
</tr>
<tr>
<td><strong>Tube anode heat storage capacity</strong></td>
<td>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)</td>
</tr>
<tr>
<td><strong>Cooling rate</strong></td>
<td>7.3 MHU/min</td>
</tr>
<tr>
<td><strong>Focal spot size</strong></td>
<td>0.7 x 0.7 mm/7° according to IEC 60336 0.9 x 1.1 mm/7°</td>
</tr>
<tr>
<td><strong>Computer-controlled monitoring of anode temperature</strong></td>
<td>Multifan principle with Flying Focal Spot</td>
</tr>
<tr>
<td><strong>CARE Filter</strong></td>
<td>Al equivalent: tube: 6.8 mm Al</td>
</tr>
<tr>
<td></td>
<td>Beam limiting device: permanent: 1.6 mm Al equivalent mode dependent: additional 0.5 mm Al</td>
</tr>
<tr>
<td></td>
<td>Selective Photon Shield*</td>
</tr>
<tr>
<td><strong>Generator</strong></td>
<td>Max. power: 200 kW (2 x 100 kW)</td>
</tr>
</tbody>
</table>

### Patient table

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max. table load</strong></td>
<td>220 kg/485 lbs</td>
</tr>
<tr>
<td><strong>Table feed speed</strong></td>
<td>2–200 mm/s</td>
</tr>
<tr>
<td><strong>Flash Spiral mode</strong></td>
<td>up to 400 mm/s</td>
</tr>
<tr>
<td><strong>ECG-triggered</strong></td>
<td>up to 458 mm/s</td>
</tr>
<tr>
<td><strong>Flash Spiral mode</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Vertical table travel range</strong></td>
<td>48–92 cm/18.9–32.2” at table top</td>
</tr>
<tr>
<td><strong>Vertical travel speed</strong></td>
<td>20–50 mm/s</td>
</tr>
<tr>
<td><strong>Scannable range</strong></td>
<td>200 cm/78.74”</td>
</tr>
<tr>
<td><strong>Distance between gantry front and table base</strong></td>
<td>40 cm/15.8”</td>
</tr>
</tbody>
</table>

### Multi-purpose patient table*

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

### 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 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

<table>
<thead>
<tr>
<th></th>
<th>8 GB</th>
</tr>
</thead>
</table>

#### RAID

- Software RAID 0 for enhanced read/write performance

#### Image storage

<table>
<thead>
<tr>
<th></th>
<th>2 x 146 GB; 520,000 uncompressed images</th>
</tr>
</thead>
</table>

#### Additional storage

<table>
<thead>
<tr>
<th></th>
<th>700 MB</th>
<th>1,100 images</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>4.7 GB DVD media</th>
<th>8,000 images</th>
</tr>
</thead>
</table>

- 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
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**

<table>
<thead>
<tr>
<th>Device</th>
<th>Capacity</th>
<th>Images</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD-R</td>
<td>700 MB</td>
<td>1,100</td>
</tr>
<tr>
<td>DVD DICOM drive</td>
<td>4.7 GB DVD media</td>
<td>8,000 images</td>
</tr>
</tbody>
</table>

**DICOM viewer**

Included on each CD; 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
- Enhanced graphics accelerator
- syngo Expert-i
- syngo 3D Basic
- syngo VRT
- syngo Fly Through
- syngo InSpace4D
- syngo Volume Calculation
- syngo Dynamic Evaluation

*(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 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.

**Configuration**

<table>
<thead>
<tr>
<th></th>
<th>Trend</th>
<th>Expert</th>
<th>Department</th>
<th>Clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concurrent sessions</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Slices per user (max.)</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Slices total (max.)</td>
<td>5,000</td>
<td>5,000</td>
<td>10,000</td>
<td>20,000</td>
</tr>
<tr>
<td>RAM</td>
<td>12 GB</td>
<td>12 GB</td>
<td>12 GB</td>
<td>16 GB</td>
</tr>
<tr>
<td>Volume rendering devices</td>
<td>1 x VolPro 4 GB</td>
<td>1 x VolPro 4 GB</td>
<td>2 x VolPro 4 GB</td>
<td>4 x VolPro 4 GB</td>
</tr>
</tbody>
</table>

**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

**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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>128–2,000 mm</td>
</tr>
<tr>
<td>Scan times</td>
<td>2–21 s</td>
</tr>
<tr>
<td>Views</td>
<td>a.p., p.a., lateral</td>
</tr>
</tbody>
</table>

### Sequence acquisition

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reconstructed slice widths</td>
<td>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</td>
</tr>
<tr>
<td>Scan times (full scan)</td>
<td>0.28, 0.33, 0.5, 1.0 s</td>
</tr>
<tr>
<td>Partial scan times (260°)</td>
<td>0.2, 0.24, 0.36, 0.72 s</td>
</tr>
<tr>
<td>No. of uninterrupted scans per range</td>
<td>100</td>
</tr>
<tr>
<td>No. of ranges per protocol</td>
<td>33</td>
</tr>
<tr>
<td>Scan cycle time (min. scan cycle time depending on rotation time)</td>
<td>0.75–60 s (± 10 %)</td>
</tr>
</tbody>
</table>

### Dynamic Multiscan:
- Multiple (continuous) sequence scanning without table movement for fast dynamic contrast studies with maximum slice thickness of 38.4 mm
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
### Image reconstruction

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time display</td>
<td>Real-time image display (512 x 512) during spiral acquisition</td>
</tr>
<tr>
<td>Slice thickness</td>
<td>0.4*, 0.5*, 0.6–20 mm (38 mm using dynamic multiscan)</td>
</tr>
<tr>
<td>Scan field</td>
<td>50 cm (78 cm **)</td>
</tr>
<tr>
<td>Recon field</td>
<td>5–50 cm, 5–78 cm with extended FOV **</td>
</tr>
<tr>
<td>Recon time</td>
<td>up to 40 images/s with full cone beam reconstruction with z-Sharp Technology with full image quality</td>
</tr>
<tr>
<td>Recon matrix</td>
<td>512 x 512</td>
</tr>
<tr>
<td>HU scale</td>
<td>−1,024 to +3,071</td>
</tr>
<tr>
<td>Extended HU scale</td>
<td>−10,240 to +30,710</td>
</tr>
<tr>
<td>Freely selectable slice thickness for prospective and/or retrospective reconstruction</td>
<td></td>
</tr>
</tbody>
</table>

### CINE display

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display of image sequences</td>
<td></td>
</tr>
<tr>
<td>Automatic or interactive with mouse control</td>
<td></td>
</tr>
<tr>
<td>Max. image rate</td>
<td>30 frames/s</td>
</tr>
</tbody>
</table>

### Windowing

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window width and center freely selectable</td>
<td></td>
</tr>
<tr>
<td>Single window</td>
<td></td>
</tr>
<tr>
<td>Double window (e.g. bone/soft tissue)</td>
<td></td>
</tr>
<tr>
<td>Multiple window settings for multi-image display</td>
<td></td>
</tr>
<tr>
<td>Organ-specific window settings, e.g., for soft tissue and bones</td>
<td></td>
</tr>
</tbody>
</table>

### Filming

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital film documentation</td>
<td>connection to a suitable digital camera</td>
</tr>
<tr>
<td>Connection via DICOM Basic print</td>
<td></td>
</tr>
<tr>
<td>Automatic filming</td>
<td></td>
</tr>
<tr>
<td>Interactive virtual film sheet</td>
<td></td>
</tr>
<tr>
<td>Customizable film formats with up to 64 images</td>
<td></td>
</tr>
<tr>
<td>Filming parallel to other activities</td>
<td></td>
</tr>
<tr>
<td>Independent scanning and documentation</td>
<td></td>
</tr>
<tr>
<td>Freely selectable positioning of images onto film sheet</td>
<td></td>
</tr>
<tr>
<td>Configurable image text</td>
<td></td>
</tr>
</tbody>
</table>

### Printing

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital film documentation</td>
<td>connection to a suitable digital camera</td>
</tr>
<tr>
<td>Connection via DICOM Basic print</td>
<td></td>
</tr>
<tr>
<td>Automatic filming</td>
<td></td>
</tr>
<tr>
<td>Interactive virtual film sheet</td>
<td></td>
</tr>
<tr>
<td>Customizable film formats with up to 64 images</td>
<td></td>
</tr>
<tr>
<td>Filming parallel to other activities</td>
<td></td>
</tr>
<tr>
<td>Independent scanning and documentation</td>
<td></td>
</tr>
<tr>
<td>Freely selectable positioning of images onto film sheet</td>
<td></td>
</tr>
<tr>
<td>Configurable image text</td>
<td></td>
</tr>
</tbody>
</table>

### Image transfer/networking

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface for transfer of medical images and information using the DICOM standard. Facilitates communication with devices from different manufacturers.</td>
<td></td>
</tr>
<tr>
<td>DICOM Storage (Send/Receive)</td>
<td></td>
</tr>
<tr>
<td>DICOM Query/Retrieve</td>
<td></td>
</tr>
<tr>
<td>DICOM Basic print</td>
<td></td>
</tr>
<tr>
<td>DICOM Get Worklist (HIS/RIS)</td>
<td></td>
</tr>
<tr>
<td>DICOM MPPS</td>
<td></td>
</tr>
<tr>
<td>DICOM Storage Commitment</td>
<td></td>
</tr>
<tr>
<td>DICOM viewer on CD</td>
<td></td>
</tr>
</tbody>
</table>

### Raw data storage

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>2.8 TB</td>
</tr>
<tr>
<td>External USB 2.0 devices for quick and easy raw data storage are supported</td>
<td></td>
</tr>
</tbody>
</table>
## 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

### 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

### 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.

### 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

<table>
<thead>
<tr>
<th>Pitch</th>
<th>0.55</th>
<th>1.0</th>
<th>1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>z-axis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.33 mm</td>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
<td><img src="image3" alt="Image" /></td>
</tr>
<tr>
<td>0.36 mm</td>
<td><img src="image4" alt="Image" /></td>
<td><img src="image5" alt="Image" /></td>
<td><img src="image6" alt="Image" /></td>
</tr>
<tr>
<td>0.38 mm</td>
<td><img src="image7" alt="Image" /></td>
<td><img src="image8" alt="Image" /></td>
<td><img src="image9" alt="Image" /></td>
</tr>
<tr>
<td>0.42 mm</td>
<td><img src="image10" alt="Image" /></td>
<td><img src="image11" alt="Image" /></td>
<td><img src="image12" alt="Image" /></td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Pitch</th>
<th>0.55</th>
<th>1.0</th>
<th>1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>z-axis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.33 mm</td>
<td><img src="image13" alt="Image" /></td>
<td><img src="image14" alt="Image" /></td>
<td><img src="image15" alt="Image" /></td>
</tr>
<tr>
<td>0.36 mm</td>
<td><img src="image16" alt="Image" /></td>
<td><img src="image17" alt="Image" /></td>
<td><img src="image18" alt="Image" /></td>
</tr>
<tr>
<td>0.38 mm</td>
<td><img src="image19" alt="Image" /></td>
<td><img src="image20" alt="Image" /></td>
<td><img src="image21" alt="Image" /></td>
</tr>
<tr>
<td>0.42 mm</td>
<td><img src="image22" alt="Image" /></td>
<td><img src="image23" alt="Image" /></td>
<td><img src="image24" alt="Image" /></td>
</tr>
</tbody>
</table>

* 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**

<table>
<thead>
<tr>
<th>Phantom</th>
<th>CATPHAN (20 cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object size</td>
<td>5 mm</td>
</tr>
<tr>
<td>Contrast difference</td>
<td>3 HU</td>
</tr>
<tr>
<td>CTDI\textsubscript{vol}</td>
<td>11 mGy at eff. 180 mAs</td>
</tr>
<tr>
<td>Technique</td>
<td>10 mm, 120 kV, body mode</td>
</tr>
</tbody>
</table>

**Sequence**

<table>
<thead>
<tr>
<th>Phantom</th>
<th>CATPHAN (20 cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object size</td>
<td>5 mm</td>
</tr>
<tr>
<td>Contrast difference</td>
<td>3 HU</td>
</tr>
<tr>
<td>CTDI\textsubscript{vol}</td>
<td>11 mGy at eff. 180 mAs</td>
</tr>
<tr>
<td>Technique</td>
<td>10 mm, 120 kV, body mode</td>
</tr>
</tbody>
</table>

**High-contrast resolution**

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

<table>
<thead>
<tr>
<th>Plane</th>
<th>MTF (± 10 %)</th>
<th>lp/cm</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>x-y-plane*</td>
<td>0 %</td>
<td>30</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>2 %</td>
<td>24</td>
<td>0.21</td>
</tr>
<tr>
<td>z-plane**</td>
<td>0 %</td>
<td>30</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>2 %</td>
<td>22</td>
<td>0.23</td>
</tr>
</tbody>
</table>

Technique 160 mA, 120 kV, 0.5 s, 0.3 mm

**Homogeneity**

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

**Dose, CTDI\textsubscript{100} values**

<table>
<thead>
<tr>
<th>Phantom</th>
<th>kW</th>
<th>kW</th>
<th>kW</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>140</td>
</tr>
<tr>
<td>16 cm</td>
<td>A</td>
<td>4.6</td>
<td>9.2</td>
<td>14.9</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>5.3</td>
<td>10.1</td>
<td>15.9</td>
</tr>
<tr>
<td>32 cm</td>
<td>A</td>
<td>1.1</td>
<td>2.4</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>2.4</td>
<td>4.9</td>
<td>7.9</td>
</tr>
</tbody>
</table>

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 kW settings typically less than 15 % values according to IEC 60601-2-44

* Optional with UHR. Standard high-contrast resolution 17.4 lp/cm, 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

### syno Dual Energy with Selective Photon Shield*

By using both tubes with different settings of 80/140 kV or 100/140 kV simultaneously, *syno* Dual Energy allows to visualize the chemical composition of material. In addition, the Selective Photon Shield improves material differentiation added 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:

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

### syno Expert-i*

Enables the physician to interact with the *syno* Acquisition Workplace, the *syno* CT Workplace or the *syno* 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

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Height (mm/inch)</th>
<th>Width (mm/inch)</th>
<th>Length (mm/inch)</th>
<th>Weight (kg/lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Components</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gantry, including water/water cooling system</td>
<td>≤ 1,980 / 78.0</td>
<td>≤ 1,206 / 47.5</td>
<td>≤ 2,314 / 91.1</td>
<td>≤ 2,600 / 5,732</td>
</tr>
<tr>
<td>Patient table</td>
<td>≤ 1,020 / 40.2</td>
<td>≤ 750 / 29.5</td>
<td>≤ 2,432 / 95.7</td>
<td>≤ 500 / 1,102</td>
</tr>
<tr>
<td>Operator’s console</td>
<td>≤ 720 / 28.3</td>
<td>≤ 800 / 31.5</td>
<td>≤ 1,400 / 55.1</td>
<td>≤ 65 / 143</td>
</tr>
<tr>
<td>Power cabinet A</td>
<td>≤ 1,950 / 76.8</td>
<td>≤ 900 / 35.4</td>
<td>≤ 700 / 27.6</td>
<td>≤ 570 / 1,257</td>
</tr>
<tr>
<td>Power cabinet B</td>
<td>≤ 1,950 / 76.8</td>
<td>≤ 900 / 35.4</td>
<td>≤ 700 / 27.6</td>
<td>≤ 400 / 882</td>
</tr>
<tr>
<td><strong>Water/air cooling system</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor unit</td>
<td>≤ 1,950 / 76.8</td>
<td>≤ 905 / 35.6</td>
<td>≤ 900 / 35.4</td>
<td>≤ 380 / 838</td>
</tr>
<tr>
<td>Outdoor unit</td>
<td>≤ 950 / 37.4</td>
<td>≤ 1,145 / 45.1</td>
<td>≤ 1,700 / 66.9</td>
<td>≤ 150 / 331</td>
</tr>
<tr>
<td>Image recon. system</td>
<td>≤ 530 / 20.9</td>
<td>≤ 320 / 12.6</td>
<td>≤ 761 / 29.9</td>
<td>≤ 60 / 132</td>
</tr>
<tr>
<td><strong>syngo Workplaces</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>syngo Acquisition Workplace</td>
<td>≤ 500 / 19.7</td>
<td>≤ 250 / 9.8</td>
<td>≤ 650 / 25.6</td>
<td>≤ 30 / 66</td>
</tr>
<tr>
<td>syngo CT Workplace*</td>
<td>≤ 500 / 19.7</td>
<td>≤ 250 / 9.8</td>
<td>≤ 650 / 25.6</td>
<td>≤ 30 / 66</td>
</tr>
<tr>
<td>syngo MultiModality Workplace*</td>
<td>≤ 500 / 19.7</td>
<td>≤ 250 / 9.8</td>
<td>≤ 650 / 25.6</td>
<td>≤ 30 / 66</td>
</tr>
<tr>
<td><strong>syngo WebSpace</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>syngo WebSpace Server*</td>
<td>≤ 508 / 20.0</td>
<td>≤ 282 / 11.1</td>
<td>≤ 732 / 28.8</td>
<td>≤ 70 / 154</td>
</tr>
</tbody>
</table>

* Optional
### Installation

#### Power supply

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage 3/N~</td>
<td>380–480 V in 20 V steps</td>
</tr>
<tr>
<td>Nominal line frequency</td>
<td>50; 60 Hz</td>
</tr>
<tr>
<td>Line impedance</td>
<td>80–125 mOhm (dependent on voltage)</td>
</tr>
<tr>
<td>Nominal power connection system**</td>
<td>150 + 135 kVA (water/water cooling)</td>
</tr>
<tr>
<td>Nominal power connection water/air split cooling system*/**</td>
<td>16 kVA</td>
</tr>
</tbody>
</table>

#### Power consumption

<table>
<thead>
<tr>
<th>State</th>
<th>Power (kVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer on</td>
<td>3</td>
</tr>
<tr>
<td>System on standby</td>
<td>6</td>
</tr>
<tr>
<td>Water/air cooling on standby*</td>
<td>16</td>
</tr>
<tr>
<td>System scanning</td>
<td>285</td>
</tr>
<tr>
<td>Water/air cooling when system scanning*</td>
<td>295</td>
</tr>
</tbody>
</table>

#### Protection against input power fluctuation/interruptions

<table>
<thead>
<tr>
<th>Source</th>
<th>Duration (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-ray</td>
<td>10</td>
</tr>
<tr>
<td>Controllers</td>
<td>20</td>
</tr>
<tr>
<td>Image reconstruction</td>
<td>180</td>
</tr>
<tr>
<td>System, syngo Acquisition Workplace, syngo CT Workplace</td>
<td>with UPS</td>
</tr>
<tr>
<td>Disabling of Dual Source mode, for single source acquisition possible</td>
<td></td>
</tr>
</tbody>
</table>

#### Fluctuation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>± 10%</td>
</tr>
<tr>
<td>Nominal frequency</td>
<td>± 5%</td>
</tr>
</tbody>
</table>

#### 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature range</td>
<td>18–28 °C</td>
</tr>
<tr>
<td>Relative air humidity without condensation</td>
<td>15–85 %</td>
</tr>
</tbody>
</table>

#### Surface area for installation

| System                                  | 30 m²         |

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