Join the World of CT

SOMATOM Spirit

Datasheet
syngo CT 2010C

Answers for life.

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SOMATOM Spirit

The difference that makes SOMATOM Spirit your first choice? New technology, more performance, less cost.

The SOMATOM® Spirit is the accumulated result of Siemens' global network encompassing well over 400,000 employees in 190 countries. Siemens Healthcare has been a leader in CT innovations for more than 35 years and continually introduces highly advanced CT products adapted for practical clinical routine. We take pride in possessing in-depth knowledge of customers' requirements and needs. The motivation and passion of our employees to exchange ideas with colleagues around the world results in the universal expertise to create unique, cost-effective solutions, which are then integrated into cutting-edge systems like the SOMATOM Spirit.

Yesterday's wish is now reality at Siemens. The SOMATOM Spirit is a Multislice CT scanner for all who dreamed about an affordable and reliable system with the absolute newest, future-oriented technology.

SOMATOM Spirit is a sub-second, Multislice CT scanner adapted specifically for economical day-to-day clinical routine. The system benefits from Siemens' latest developments in CT technology, including advances that lead to superb image quality and dose efficiency. Our system is designed to perform CT examinations easier than ever before. The simplified user interface guides the operator, and workflow is automated wherever possible, inspiring a spirit of confidence from the beginning. The new, trendsetting design is not only optically appealing and aesthetic, it is also ergonomic. The slim gantry and its wide opening ensure easy access and high patient comfort.

From the minute you take delivery of your new SOMATOM Spirit, you will benefit from its low-cost concept. Minimum space requirements, installation within one day, air cooling, and a very impressive cost/performance ratio assure life cycle profitability.

Please take a closer look at the SOMATOM Spirit.

SOMATOM Spirit – Standard System Configuration

System Hardware	
1 s rotation time	•
Multislice UFC™ (Ultra Fast Ceramic) Detector	•
2.0 MHU liquid bearing X-ray tube	•
26 kW generator	•
CT patient table (200 kg/440 lbs table load)	•

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

CARE Applications	
CARE Filter	•
CARE Topo	•
CARE Dose4D™	•

System Software	
syngo Examination	•
syngo Viewing	•
syngo Filming	•
syngo Archiving & Network	•
syngo Service Solutions	•
Image Filter	•
SureView™	•
Video Capture and Editing Tool	•

Applications on *syngo* Acquisition Workplace	
Real-time MPR	•
syngo Dynamic Evaluation	•
syngo 3D SSD (Surface Shaded Display)	•
syngo Volume Calculation	•
CT-Angiography	•

• Standard feature

SOMATOM Spirit – System Options

System Hardware	
0.8 s rotation time	◦
Power Package: 40 kW power generator and 3.5 MHU tube	◦
Additional 19" (48 cm) flat screen monitor	◦
Radiation Treatment Planning Enhancement*	◦
Additional 19" (48 cm) flat screen monitor	◦

CARE Applications	
CARE Bolus CT	◦

System Software and Applications on *syngo* Acquisition Workplace	
Extended FOV (Field of View)	◦
syngo Security Package	◦
Siemens Virus Protection	◦
e-Logbook	◦
syngo Fly Through	◦
syngo Dental CT	◦
syngo Osteo CT	◦
syngo VRT	◦
syngo Neuro Perfusion	◦
syngo Body Perfusion	◦
syngo 3D Bone Removal	◦

◦ Optional feature
* Requires Power Package

System Hardware

Gantry	
Aperture	70 cm
Gantry depth	68.5 cm (27“)
Scan field	50 cm
Distance scan plane to gantry cover	24 cm
Tilt	± 25°; ± 30°*
Rotation time	0.8**, 1.0, 1.5 s
Continuously rotating tube-detector unit with optimized geometry for high-resolution data acquisition across the entire scan field	

Data acquisition system	
Max. number of slices/rotation	2
Number of physical detector rows	2
Number of physical detector channels/slice	672
Number of detector elements	1,344
Total channels per slice	1,344
Number of projections	up to 1,500 (1.5 s/360°)
Sequence acquisition modes	2 x 1 mm, 2 x 4 mm, 2 x 5 mm, 2 x 1.5 mm, 2 x 2.5 mm
Spiral acquisition modes	2 x 1 mm, 2 x 5 mm, 2 x 1.5 mm, 2 x 2.5 mm, 2 x 4 mm
Speed and efficiency based on UFC (Ultra Fast Ceramic) Detector with ultra short afterglow	
Designed to effectively suppress scattered radiation	

* Optional with Power Package
** Optional

System Hardware

Tube assembly	
Tube	DURA 202 MV; DURA 352* High performance CT X-ray tube
Tube current range	30–180 mA; 30–240 mA*
Tube voltage	80, 130 kV
Tube anode heat storage capacity	2.0 MHU; 3.5 MHU*
Focal Spot size according to IEC 60 336	0.8 x 0.7 mm / 0.8 x 0.4 mm
Computer controlled monitoring of anode temperature	
Multifan principle with Flying Focal Spot for all rotation times	

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

Three laser light markers
Coronal, sagittal, and axial laser light, that show the isocentric position of the scan plane. With RTP (Radiation Treatment Planning) Enhancement, the laser lights can be easily adjusted.**

CARE Filter	
Al equivalent	tube: 5.5 mm Al
Beam limiting device	collimator: 0.15 mm Al, 0.6 mm Ti (equivalent to 5.5 mm Al)

Generator	
Max. power	26 kW; 40 kW*

Patient table	
Max. table load	200 kg/440 lbs
Table feed speed	1–100 mm/s
Vertical table travel range	45–83 cm (at table top) (17.7–32.7")
Vertical travel speed	≤ 22.4 mm/s
Scannable range	153 cm (60")
Distance between gantry front and table base	37 cm (14.5")

Automatic patient positioning
Two configurable buttons on the gantry panel
One-touch, quick patient positioning for pre-selected clinical protocols – e.g. head and thorax

* Optional with Power Package

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 E5540 Quad Core HT 2.53 GHz

Graphics accelerator

NVIDIA NVS290

Standard monitor

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

Additional monitor*

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

RAM storage

4 GB

Image storage

420 GB; 240,000 uncompressed images

Additional storage

CD-R 700 MB; 1,100 images
External USB 2.0 disks for quick and easy raw data storage are supported

DICOM viewer

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

* Optional

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 sub-second 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.

Pediatric protocols

Special clinical protocols with 80 or 130 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

CARE Bolus CT*

Scan mode for contrast bolus triggered data acquisition

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

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

* 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)

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

At least 100 protocols can be edited, modified, and stored

Patient communication

Integrated patient intercom

Automatic Patient Instruction (API)
- Freely recordable
- Presets in seven languages available

Gantry front control panels

For convenient patient positioning (e.g. in case of trauma or interventional exams)

Gantry tilt control from the operator's console

Three laser light markers

Coronal, sagittal, and axial laser light, that show the isocentric position of the scan plane. With RTP (Radiation Treatment Planning) Enhancement, the laser lights can be easily adjusted.**

Topogram

Length	128–1,024 mm
Scan times	1.5–11.2 s
Views	top, lateral
Real-time topogram	
Manual interruption possible once desired anatomy has been imaged	

Sequence Acquisition

Reconstructed slice widths	1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 8.0, 10.0 mm
Scan times full scan (360°)	0.8*, 1.0, 1.5 s
Partial scan times (240°)	0.53*, 0.67 s
No. of uninterrupted scans per range	99
No. of ranges in autorange	9
Standard scan cycle time	2.5 s (± 10 %) at 1 s scan time
Acquisition with or without table feed	
Automatic clustering of scans	

Dynamic Multiscan

Multiple (continuous) sequence scanning without table movement for fast dynamic contrast studies

Dynamic scan cycle time	1.5 s (± 10 %) at 1 s scan time

Multislice Spiral Acquisition

Standard reconstructed slice widths	1.0, 1.25, 2.0, 3.0, 5.0, 6.0, 8.0, 10.0 mm
Scan times full scan (360°)	0.8*, 1.0, 1.5 s
Reconstruction increment	0.1–10 mm
Pitch	0.5–2.0
Spiral scan time max.	60 s
Scan length	max. 153 cm

Extended Field of View*

Special image reconstruction algorithms that provide visualization of objects using a FOV up to 70 cm***

Scan protocol assistant

Easy and intuitive way to change and manage scan protocols

* Optional
** Optional for RTP
*** 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

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 image quality constant.

Image reconstruction

Real-time display	Real-time image display (512 x 512) during spiral acquisition
Slice thickness	1.0–10.0 mm
Scan field	50 cm
Recon field	5–50 cm, 5–70 cm with extended FOV*
Standard recon time	up to 5 images/s
Recon matrix	512 x 512
HU scale	–1,024 to +3,071
Extended HU scale	–10,240 to +30,710

Wide range of selectable slice thickness for prospective selection and/or retrospective reconstruction for spiral scans

Real-time image display in 512 x 512 matrix parallel to spiral acquisition (e.g. for trauma)

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 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 image CD produced from CT system

Raw data

Drive size	65 GB
Capacity	12,000 scan-seconds

External USB 2.0 disks for quick and easy raw data storage are supported

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

System Software

Evaluation tools

Parallel evaluation of more than 5 Regions of Interest
- Circle
- Irregular
- Polygonal

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

Profile cuts
- Horizontal
- Vertical
- Oblique

Distance measurement

Angle measurement

Online measurement of a 5 x 5 pixel size ROI

Freely selectable positioning of coordinate system

Crosshair

Image annotation and labeling

syngo Dynamic Evaluation

Evaluation of contrast enhancement in organs and tissues

Calculation of
- Time-density curves (up to 5 ROI's)
- 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
- Posterior Fossa Optimization for reduction of beam hardening artifacts in head images
- Low Contrast Enhancement for improving low contrast detectability
- High Contrast Enhancement for increased sharpness of high contrast structures

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

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)
- with a particular patient dose (mGy)

Phantom	CATPHAN (16 cm)
Object size	3 mm
Contrast difference	3 HU
Dose at the surface	17.9 mGy* at 100 mAs
Technique	1.0 s, 0.8 s** 10 mm, 130 kV

Phantom	CATPHAN (20 cm)
Object size	5 mm
Contrast difference	3 HU
Dose at the surface	13.7 mGy* at 90 mAs
Technique	1.0 s, 0.8 s** 10 mm, 130 kV

High-contrast resolution

0 % MTF (± 10 %)	15.5 lp/cm, 0.32 mm
2 % MTF (± 10 %)	14.0 lp/cm, 0.36 mm
Technique	60 mAs, 130 kV, 1.5 s, 1.0 mm

Homogeneity

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

Dose, $CTDI_{100}$ values (mGy/100 mAs)

Phantom Ø		80 kV	130 kV
16 cm	A	5.1	18.8
	B	5.8	20.0
32 cm	A	1.3	5.8
	B	2.9	10.9
A: at center	B: 1 cm below surface		
Technique	PMMA-Phantom Absorbed dose for reference material air Max. deviation ± 30 %, typically less than 15 % Slice > 1 mm Collimation 2 x 4 mm 100 mAs 360° rotation Values according to IEC 60601-2-44		

* Air KERMA, measured on the surface of the phantom with max. deviation ± 30 %

** Optional

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

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

Automated Bone Removal*

Simplified workflow

Fast accurate presentation of subtracted CTA data sets

syngo Fly Through*

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

syngo Dental CT*

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

syngo Osteo CT*

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

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

Includes table mat and reference Phantom for Osteo CT studies

syngo Neuro Perfusion*

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

syngo Body Perfusion*

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

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

RTP Enhancement**

Hardware and software components to optimize the RTP process

e-Logbook*

Tool to collect patient information for statistics, documentation, and research
- View
- Archive
- Print
- Export

* Optional

** Optional; requires Power Package

Installation

Dimensions	Height (mm / inch)	Width (mm / inch)	Length (mm / inch)	Weight (kg / lbs)
Components				
Gantry	≤ 1,820 / 71.7	≤ 685 / 27.0	≤ 2,300 / 90.6	≤ 1,200 / 2,640
Patient table	≤ 895 / 35.2	≤ 680 / 26.7	≤ 2,230 / 87.8	≤ 430 / 881
Operator's console	≤ 720 / 28.3	≤ 800 / 31.5	≤ 1,200 / 47.2	≤ 60 / 132
UPS	≤ 440 / 17.3	≤ 135 / 5.3	≤ 490 / 19.3	≤ 40 / 88
Line Connection Box (LCB)	≤ 820 / 32.3	≤ 350 / 13.7	≤ 750 / 29.5	≤ 110 / 242
Image reconstruction system	≤ 450 / 17.7	≤ 220 / 8.7	≤ 620 / 24.4	≤ 30 / 66
Computer system				
syngo Acquisition Workplace	≤ 450 / 17.7	≤ 220 / 8.7	≤ 620 / 24.4	≤ 30 / 66

Power supply	
Nominal voltage ± 10 %	190–480 V
Nominal line frequency ± 10 %	50; 60 Hz
Max. power consumption	≤ 40 kVA
Power consumption	≤ 1.0 kW standby
Mean power consumption	≤ 3.6 kW scanning
Line impedance	100–400 mOhm (dependent on voltage)
Nominal power connection fuse 100 A selectivity	1:1.25

Protection against input power instability	
X-ray	20 ms
Controllers	300 ms

Electromagnetic compatibility

This product is in compliance with IEC 60601-1-2 and fulfills CISPR 11 Class A

Examination room environment	
Temperature range	18–30 °C
Relative air humidity without condensation	20–85 %
Heat dissipation (Gantry)	≤ 4.7 kW scanning ≤ 1.5 kW standby
Heat dissipation (Computer)	≤ 0.9 kW

Surface area for installation	
Complete system	14.8–18.0 m^2 / 150–194 ft^2*

Voltage fluctuation	
Nominal voltage (± 10 %)	190–480 V
Nominal frequency (± 10 %)	50; 60 Hz

* Depending on the adjustable scan range and safety distances according to country-specific requirements

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