

**Datasheet**

# Artis zee

Biplane-mounted system  
for interventional imaging

[siemens-healthineers.com/artis-zee](https://siemens-healthineers.com/artis-zee)



# Artis zee

## **Biplane flat detector system for interventional imaging**

The Artis zee with PURE® biplane system is specifically designed to meet the escalating demands for interventional imaging.

Artis zee biplane can be equipped either with two as20 dynamic flat detectors, or if more flexibility is required, with the as40HDR variant in the frontal plane and the as20 detector in the lateral plane, or for more coverage with two large as40HDR flat detectors.

High image quality with low dose is provided by the CARE+CLEAR packages.

Artis zee and its flexible configuration capabilities enable tailoring to:

- Interventional radiology
- Hybrid procedures
- General vascular applications
- Interventional cardiology
- Electrophysiology
- Pediatric cardiology
- Minimally invasive surgical angiography



# Highlights

## **zee excellent image quality**

The Artis zee with PURE® imaging chain provides enhanced image quality and features key advances that improve the clarity of both live fluoro and roadmap images, and enhances the visualization of stents, their meshes, coils and guidewires.

zee enhanced workflow with new ergonomic controls

Be it preexamination, postprocessing or quantification, the tableside control for the Artis zee provides the user with complete control.

- Modular system controls for freedom within the examination room
- Ergonomically designed graphical user interface
- Mouselike joystick control for increased comfort
- Import and functions of integrated recording solution, Sensis or AXIOM Sensis XP, accessible via tableside touchscreen.

## **Positioning flexibility**

The Artis zee biplane system offers great positioning flexibility in both singleplane and biplane applications and at the same time provides excellent patient access.

A second isocentric work position provides full head access to the patient even in biplane mode.

Additionally the system features MULTISPACE.F\* for further enhanced positioning of the C-arm relative to the table using standrotation. The small footprint combined with the positioning flexibility make the system an ideal solution for hybrid rooms where interventional cardiac and minimally invasive surgical procedures are performed.

## **Patient table**

Patient table with free-floating easily exchangeable tabletop.

Optionally the table can be equipped with tilt/cradle capability and motorized stepping.

\* Option

## **HDR Detector technology**

**Artis zee is available with a large detector with high dynamic range**

The as40HDR detector is designed to deliver excellent image quality with *syngo DynaCT*\*.

The 16-bit analog/digital converter and true 16-bit imaging chain enables a high dynamic range leading to a four times greater greyscale resolution for enhanced soft tissue contrast in 3D imaging with *syngo DynaCT*\*.

An up to 10 % increased DQE helps to improve image quality and dose efficiency.

## **Artis zee with PURE®**

**Adding smooth to smart**

In angiography, many physicians don't get to experience the full capabilities of their modern interventional systems as both procedures and system interaction get increasingly complex.

With PURE®, increase your process efficiency in the angio suite, enable all your staff members to get the full potential of the system, and expand your clinical capabilities – with an angio system that combines better ease of use, integrated expert therapy guidance, and tools providing better diagnostic information.

\* Option



## CARE+CLEAR

- Reduced radiation dose for your patients, you and your staff
- Optimized image contrast and sharpness without increasing dose
- Efficient and transparent dose monitoring, reporting, and documentation
- CARE+CLEAR portfolio comes standard with every Artis system

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# Imaging system

## X-ray tube

### MEGALIX Cat Plus 125/40/90 (for the as20 detector)

High-performance X-ray tube

Up to 40 % greater fluoro power with flat emitter technology

Increased contrast during fluoroscopy, especially for examinations on obese patients

Oil/water cooled

Max. exposure voltage (IEC 60613) 125 kV

Focal spot (IEC 60336) 0.4 <sup>1)</sup> 0.8

Nominal power

(thermal anode reference power = 300 W) 35 kW 90 kW (IEC 60613:1989)

Nominal power

(thermal anode reference power = 0 W) 42 kW 112 kW (IEC 60613:1989)

Nominal radiographic anode input power 38 kW 99 kW (IEC 60613:2010)

Anode angle 8°

Maximum anode heat content 2,500,000 J (3,375,000 HU)

Maximum heat content of the

X-ray tube assembly 3,600,000 J (4,900,000 HU)

Maximum cooling capacity of the anode 400,000 J/min. (540,000 HU/min.) / 6667 W

Continuous heat dissipation  
of the tube assembly

max. 2900 W

Anode rotation 160 Hz (3-phase current)

Max anode current in pulsed fluoro mode 250 mA small focus

Maximum anode current in acquisition 800 mA large focus

Anode input power  
10 min 4000 W  
20 min 3000 W  
> 30 min 2500 W

Total filtration (IEC 60601-1-3)  $\geq 2.5$  mm Al

Leakage radiation (IEC 60601-1-3) < 0.44 mGy/h (at 125 kV in 1 m distance: 2500 W)

Weight approx. 37 kg (79.4 lbs.)

### Cooling unit

Cooling medium water (not distilled) with coolant additive

Cooling medium temperature max. 55 °C

Max. pressure 3.1 bar

Flow rate 3.5 l/min

Weight (cooling system) < 28 kg (61.73 lbs.) + 6.5 kg (14.33 lbs.) cooling liquid

<sup>1)</sup> With flat emitter technology

# Imaging system

## X-ray tube

### MEGALIX Cat Plus 125/20/40/80 (for the as40HDR detector)

High-performance X-ray tube

Up to 40% greater fluoro power with flat emitter technology

Increased contrast during fluoroscopy, especially for examinations on obese patients

Oil/water cooled

Max. exposure voltage (IEC 60613)	125 kV		
Focal spot (IEC 60336)	0.3	0.6 x 0.6 <sup>1)</sup>	1.0
Nominal power (thermal anode reference power = 300 W)	17 kW	38 kW	80 kW (IEC 60613:1989)
Nominal power (thermal anode reference power = 0 W)	19 kW	42 kW	93 kW (IEC 60613:1989)
Nominal radiographic anode input power	19 kW	39 kW	85 kW (IEC 60613:2010)
Anode angle	12.5°		
Maximum anode heat content	2,500,000 J (3,375,000 HU)		
Maximum heat content of the X-ray tube assembly	3,600,000 J (4,900,000 HU)		
Maximum cooling capacity of the anode	400,000 J/min. (540,000 HU/min.) / 6667 W		
Continuous heat dissipation of the tube assembly	max. 2900 W		
Anode rotation	160 Hz (3-phase current)		
Max anode current in pulsed fluoro mode	250 mA small focus 66 mA micro focus		
Maximum anode current in acquisition	800 mA large focus		
Anode input power	10 min	4000 W	
	20 min	3000 W	
	> 30 min	2500 W	
Total filtration (IEC 60601-1-3)	≥ 2.5 mm Al		
Leakage radiation (IEC 60601-1-3)	< 0.44 mGy/h (at 125 kV in 1 m distance: 2500 W)		
Weight	approx. 36 kg (79.4 lbs.)		

## Cooling unit

Cooling medium	water (not distilled) with coolant additive
Cooling medium temperature	max. 55 °C
Max. pressure	3.1 bar
Flow rate	3.5 l/min
Weight (cooling system)	< 28 kg (61.73 lbs.) + 6.5 kg (14.33 lbs.) cooling liquid

<sup>1)</sup> With flat emitter technology

# Imaging system

## X-ray generator A100 Plus

Microprocessor-controlled high-frequency X-ray generator with automatic dose rate control for fluoroscopy and acquisition

Multi-pulse converter frequency	100 kHz
Max. generator power (IEC 60601-2-7 and IEC 60601-2-54)	1000 mA at 100 kV $\hat{=}$ 100 kW 800 mA at 125 kV $\hat{=}$ 100 kW
Tube current (continuous fluoroscopy)	0.5 mA to 250 mA in 0.01 mA steps
Tube current (acquisition mode)	15 mA to 1000 mA in 0.01 mA steps
Tube current (pulsed fluoroscopy)	15 mA to 250 mA in 0.01 mA steps (small focus)
Pulse frequency	0.5 p/s to 66 p/s or continuous mode
Pulse time	0.5 ms to 800 ms
Max. continuous power in fluoro mode	3000 W
Tube voltage	40 kV to 125 kV in 0.1 kV steps

\* Option

# Imaging system

## Detector as20+<sup>1)</sup>

Amorphous silicon flat detector with 25 cm diagonal entrance plane

High-resolution a-Si matrix with 184 µm pixel size and 14-bit digitization depth

High-speed fiber optic connection to the digital imaging system

Integrated temperature stabilizer	yes
Integrated collision sensor	yes
Removable grid	yes
Detector rotation	yes <sup>2)</sup>
Active detector cooling	yes, liquid cooling
Active imaging size	177 mm x 177 mm
Detector housing (W x L x H)	246 mm x 246 mm x 99 mm
Detector housing and collision protection	286 mm x 286 mm
Input fields (diagonal)	25, 20, 16, 10 cm (9.84", 7.87", 6.3", 3.94")
Material	a-Si with CsI scintillator
Image cover	< 1.5 carbon fiber
Digitization depth	14-bit (16384 gray scale levels)
Pixel pitch	184 µm
Image display matrix	1024 x 1024 pixels
Nyquist frequency	2.7 lp/mm
DQE (detective quantum efficiency)	0 lp/mm: 75 % typical at 3.2 µGy (RQA5)
MTF (modulation transfer function)	1 lp/mm: 65 % typical (according to IEC 62220)
Signal to electronic noise ratio (SENR)	≥ 9.4 dB at 5 nGy (RQA5, 1x1 binning, high gain) <sup>3)</sup>
Weight	< 10 kg (22.05 lbs.)

## Cooling unit

Cooling medium	ethylene glycol : distilled water = 40 : 60 (volume)
Cooling medium temperature	max 40 °C
Max pressure	approx. 0.18 MPa
Flow rate	0.6 l/min
Weight (cooling system)	14.2 kg (33.3 lbs.)

+ Modular choice

<sup>1)</sup> Only with Artis table

<sup>2)</sup> Only in frontal plane

<sup>3)</sup> SENR = 20 x log (Signal-to-electronic noise ratio) = 20 x log (sensitivity x dose / electronic noise)

# Imaging system

## Detector as40HDR

Amorphous silicon flat detector with 48 cm diagonal entrance plane

High-resolution a-Si matrix with 154 µm pixel size and 16-bit digitization depth

Integrated collision sensor	yes
Removable grid	yes
Detector rotation	yes
Active detector cooling	yes, liquid cooling
Active imaging size	382 mm x 293 mm
Image display matrix	1024 x 1024 pixels (for images up to 2480 x 1920 pixels)
Size incl. housing and collision protection	512 mm x 405 mm
Input fields	48 cm, 42 cm, 32 cm, 22 cm, 16 cm, 11 cm (18.9", 16.54", 12.6", 8.66", 6.3", 4.33")
X-ray conversion technology	a-Si with CsI scintillator
Digitization depth	16-bit (65536 gray scale levels)
Pixel pitch	154 µm
Nyquist frequency	3.25 lp/mm
DQE (detective quantum efficiency)	0 lp/mm: 77 % typical at 2µGy (RQA5)
MTF (modulation transfer function)	1 lp/mm: 59 % typical (according to IEC62220)
Signal to electronic noise ratio (SENR)	11 dB typical at 5 nGy (RQA5, 1x1 binning, high gain)

### Cooling unit

Cooling medium	ethylene glycol : distilled water = 40 : 60 (volume)
Cooling medium temperature	max. 40 °C
Max pressure	approx. 0.18 MPa
Flow rate	0.6 l/min

\* Modular choice

# Imaging system

## Laser crosshairs\*

Laser crosshairs for as40HDR, integrated into the flat detector housing with tableside operation for simplified patient positioning and facilitated puncture planning in combination with *syngo* Needle Guidance.

Class 1M (IEC 60825-1) laser, wavelength 600 – 700 nm (red), < 1 mW output power

## Rotatable collimator for as20 detector

Compact collimator for cardioangiography with rectangular blade and wedge-shaped finger filter

Automatic synchronous rotation of the detector and collimator unit to compensate for image rotation at different examination positions of the support stand; rotation also possible via remote control enabling upright images of objects or body parts not aligned with the table, e.g. arms.

## Rotatable collimator for as40HDR detector

Angio collimator with rectangular blade, wedge-shaped filters for DSA and cardiological applications and graduated finger filter

Independent rotation and shift of filter blades

Automatic synchronous rotation of the detector and collimator unit to compensate for image rotation at different examination positions of the support stand; rotation also possible via remote control enabling upright images of objects or body parts not aligned with the table, e.g. arms.

\* Option

<sup>1)</sup> Only in frontal plane

# Imaging system

## Operating modes

### Fluoroscopy

Digital pulsed fluoroscopy, with 7.5, 10, 15, 30 p/s

Additional fluoroscopy pulse rates from 0.5, 1, 2, 3, 4, 6\*\* p/s (CAREVISION)

Roadmapping (requires DSA option) with automatic pixel shift

Overlay fade, online superimposing of active fluoro and reference image

Store Monitor: Any image can be stored on the disk

Store Reference: Any image can be stored as a reference image, even during online fluoroscopy

Store Fluoro\*: Last 1024 image of last performed fluoro

Last Image Hold (LIH)

### Fluoro Loop\*

Storage and display of dynamic fluoro sequences

The maximum fluoro time that can be saved depends on the pulse frequency selected, e.g., 34 s at 30 p/s, 68 s at 15 p/s

### Roadmap\*<sup>1)</sup>

Individual windowing of vessel map and tool image

Previous Roadmap Mask function with automatic adjustment of system geometry

Show progress function for embolization procedures

### CLEARmap\*

Fast and easy access to enhanced image quality in Roadmap. CLEARmap enables enhanced image quality and functionality with fewer system interactions. CLEARmap simplifies the workflow, while saving dose and contrast e.g. by allowing zooming and panning during Roadmap and using pre-acquired DSA images for Roadmap.

\* Option

\*\* With as20 detector

<sup>1)</sup> With DSA option only

<sup>2)</sup> Requires 2k option

<sup>3)</sup> Requires High-speed option

# Imaging system

## Operating modes

### Cardiac acquisition\*

Acquisition at 7.5, 10, 15 and 30 f/s, acquisition, display and storage in original matrix, 12-bit

Pediatric option with 60 f/s

### DR – 0.5 - 7.5 f/s

Digital radiography with digital real-time filtering, applicable for single images and series with frame rates from 0.5 f/s to 7.5 f/s (to 30 f/s<sup>3)</sup>).

Acquisition, display and storage are performed in original matrix size at a resolution of up to 4.76 megapixels with as40HDR<sup>2)</sup>

Time-controlled and manually variable frame rates are included

### DSA – 0.5 - 7.5 f/s\*

Digital subtraction angiography with digital real-time filtering, applicable for single images and series with frame rates from 0.5 f/s to 7.5 f/s (to 30 f/s<sup>3)</sup>)

Acquisition, display and storage are performed in original matrix size at a resolution of up to 4.76 megapixels<sup>2)</sup>

Remask, peak opacification for iodine contrast (MaxOpac) and CO<sub>2</sub> contrast (MinOpac), display of anatomical background (Landmark) from 0 to 100 %

Time-controlled and manually variable frame rates are included

### 2k option\*

Enables full pixel resolution for acquisition and storage of single images and series (up to 7.5 f/s) with a resolution of up to 4.76 megapixel (2480 pixel x 1920 pixel)

It requires an as40HDR detector and is applicable for digital radiography, digital subtraction angiography, 3D-acquisition and Perivision in overview format, zoom 1 and zoom 2

\* Option

\*\* With as20 detector

<sup>1)</sup> With DSA option only

<sup>2)</sup> Requires 2k option

<sup>3)</sup> Requires High-speed option

# Imaging system

## Operating modes

### High-speed acquisition for DR and DSA\*

Acquisition at 10/15/30 f/s

Subtracted display possible only with DSA

### Anatomical background<sup>1)</sup>

Anatomical surroundings visible by fading in the native image

### Setting new mask<sup>1)</sup>

A new mask can be set with "Move Mask" or "Replace Mask"

### Pixel shift<sup>1)</sup>

Manual pixel shift, automatic pixel shift, flexible pixel shift (rubber masking)

### CLEARmatch

Automatic pixel shift processing during Roadmap and DSA based on real time movement detection for most accurate subtracted image display.

Six degrees of freedom: two translative, rotational, zoom and two shearing movement.

### CLEARstent\*

Software for enhanced stent visualization, can be activated from tableside

### CLEARstent Live\*

Real-time stent enhancement for facilitation of cardiac procedures

\* Option

<sup>1)</sup> With DSA option only

# Imaging system

## Operating modes

### DYNAVISION DR\*

Native 2D viewing with 3D impression based on digital rotational angiography with angle triggering.

Angle triggering enables a reduction in dose while simultaneously improving image quality.

Rotation speed up to 45°/s

Acquisition rate up to 30 f/s (as20 detector); up to 75 f/s (as40HDR detector)

### DYNAVISION\*<sup>1)</sup>

Subtracted 2D viewing with 3D impression based on digital rotational angiography with angle triggering.

Angle triggering enables a reduction in dose while simultaneously improving image quality.

Dynamic subtraction display with optimal alignment of mask and filling and automatic pixel shift over the entire scene.

Rotation speed up to 45°/s

Acquisition rate up to 30 f/s (as20 detector); up to 75 f/s (as40HDR detector)

### 3D Acquisition\* for syngo DynaCT

Allows native or subtracted 3D reconstruction based on digital rotational angiography with angle triggering for acquisition of syngo Dyna3D high-contrast images\* and/or syngo DynaCT low-contrast images\*.

Automatic image data transfer to the optional syngo X Workplace while all parameters needed for the 3D reconstruction are already included in the exam set. This allows for 3D reconstruction and optimized image quality.

Rotation speed up to 45°/s

Acquisition rate up to 60 f/s (as20 detector); up to 75 f/s (as40HDR detector)

### 3D CARD Acquisition\* for syngo DynaCT Cardiac

Allows native 3D reconstruction based on digital rotational angiography with angle triggering or ECG gating for acquisition of syngo DynaCT Cardiac images\*.

Automatic image data transfer to the optional syngo X Workplace while all parameters needed for the 3D reconstruction are already included in the exam set. This allows for 3D reconstruction and optimized image quality.

Rotation speed up to 45°/s

Acquisition rate up to 60 f/s (as20 detector); up to 75 f/s (as40HDR detector)

\* Option

<sup>1)</sup> With DSA option only

# Imaging system

## Operating modes

### **PERISTEPPING\* (only with as40HDR detector)**

Peripheral digital angiography stepping of the table with a single contrast-medium injection performed while observing the contrast medium bolus

Position-dependent variable frame rates

Fully automatic exposure control

The collimator setting is automatically saved for each stepping increment

### **PERIVISION\* (only with as40HDR detector)**

Peripheral digital angiography with stepping of the table and online subtraction display in one examination procedure with a single contrast-medium injection while observing the contrast medium bolus

One automatically acquired mask image for each individual position

Position-dependent variable frame rates

Fully automatic exposure control

The collimator setting is automatically saved for each stepping increment

### **ECG-triggered fluoroscopy and acquisition\***

ECG-triggered fluoroscopy/acquisition provides a still image of the catheter while compensating for cardiac movement. This enables the use of low pulse frequencies, resulting in a significantly lower dose compared to normal fluoroscopy/acquisition

### **Multiple acquisition program**

Up to 128 acquisition programs per each mode for flexible adjustment of the X-ray and image processing parameters to the different procedures (selectable in the examination room and in the control room)

## Additional functions

### **ECG recording and storage\***

Recording, storage and display of an ECG waveform

ECG waveform is displayed with synchronous image information

\*Option

# Imaging system

## Imaging system

High-resolution digital imaging system with excellent image quality due to real-time image processing

Advanced parameter sets to control image impression as well as asymmetric edge enhancement. Fast, direct access to all series, single images and reference images, store monitor images, in both the examination room and the control room

Possible display of CT/MR images (512<sup>2</sup> or 1 k matrix) as static reference image

Windows 10 operating system

## Image storage capacity

50,000 images in 1k/12-bit matrix

100,000 images<sup>1)</sup> in 1k/12-bit matrix\*

## CLEAR MAX

CLEAR MAX optimizes image quality through real-time processing of the image data.

CLEARcontrol: The histogram analysis provides a more homogeneous image impression by harmonizing over- and underexposed areas of the image. This is done fully automatically, thus eliminating any further manual user corrections through windowing.

CLEARview: Dose-dependent filtering of the image data efficiently suppresses image noise, enabling clear, sharp images, even for low-dose acquisitions.

CLEARvessel: Every pixel is analyzed in real time, and vessel edges are shown in high contrast without adding noise to the image.

CLEARmotion: Detection of fine structures and effective compensation of motion artifacts.

Fine moving structures, such as small vessels and guidewires, are detected in the image and motion artifacts are suppressed efficiently. The visibility of small moving vessels and guidewires is improved significantly during fluoroscopy.

CLEARchoice: Allows to customize the image quality to their preferences.

CLEARstent\*: Uses a fully automatic process to improve the visibility of the deployed stent for cardiac interventions.

## CLEARstent Live\*

Real-time stent enhancement for facilitation of cardiac procedures.

\* Option

<sup>1)</sup> Full image storage capacity is available only if DVD-recording functionality is not active

# Imaging system

## General functions

### Changing window values

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### Zooming/Panning

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Modification on the fly during postprocessing and pre-configurable for each individual acquisition program

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### Annotation

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For inserting predefined or free text and drawing lines, arrows and circles

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### Distance and angle measurement

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### Text functions

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Preconfigured image labeling using text modules or free annotation, comment line for image, patient positioning annotation

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## EP Option

Dedicated measure to improve signal noise in the EP lab. The kit is mounted to the tube and will minimize electromagnetic interference to the other EP recording and EP mapping systems in direct proximity to the system.

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\* Option

# Imaging system

## CARE

Combined applications to reduce exposure (CARE) help to reduce radiation dose for the operator and the patient

### CAREfilter

Five-level adaptive Cu prefiltration (CAREfilter) for reduction of skin dose; automatic selection control based on the absorption of the object

Filter levels 0.1, 0.2, 0.3, 0.6, 0.9 mm Cu

The increase of prefiltering from 0.2 to 0.9 mm at 70 kV results in a dose saving up to 50 % <sup>1)</sup>

### CAREvision

Pulsed fluoroscopy with additional reduced pulse frequencies of 0.5, 1.0, 2.0, 3.0, 4.0, 6.0\*\* p/s

Pulse frequency can be adjusted to the requirements of each application to significantly reduce radiation exposure, particularly during interventions

The reduction from 30 fps to 7.5 fps at 70 kV results in a dose saving up to 75 % <sup>1)</sup>

### CAREprofile

Radiation-free positioning of primary and semi-transparent collimators via graphic display in the LIH image on the image display

CAREprofile provides radiation-free collimator and image filter adjustment <sup>2)</sup>

### CAREposition

With CAREposition it is possible to perform visually controlled object positioning without radiation

Radiation-free object positioning via graphic display of the central beam and image edges in the LIH image on the image display

When the table is moved, the current positions of the central beam and image edges are superimposed on the LIH image by a graphic overlay

### CAREwatch

A measurement chamber is integrated into the collimator housing for acquisition of dose area product and reference air kerma / reference air kerma rate

Displayed on the image system display

Different displays can be configured for fluoroscopy and for fluoro pause:

During fluoro: reference air kerma rate

During fluoro pause: accumulated reference air kerma or dose area product or percentage of a configurable dose limit value (total of fluoroscopy and acquisition)

\* Option

\*\* 6.0 p/s with as20 detector only

<sup>1)</sup> Dose saving dependent on patients weight and size

<sup>2)</sup> According to Article Nickoloff, Cardiovasc. Intervent. Radiol. (2007) 30:168-176 virtual collimation can reduce the total fluoroscopy time by 0.5–3 min in many examinations.

# Imaging system

## CARE

### CAREmonitor

CAREmonitor shows the accumulated peak skin entrance dose according to the current projection in the form of a fill indicator on the live monitor. Any change to the C-arm, table, SID, zoom, or collimator prompts the system to automatically update the calculation.

### CAREguard

CAREguard provides an effective way to control skin dose. Three reference air kerma threshold values can be defined. If the accumulated reference air kerma exceeds a configured threshold, a warning sound is given and a pop-up displays on the system.

### CAREreport

CAREreport is a DICOM structured dose report; it contains all patient demographics, procedure, and dose information. Using commercially available programs or in-house software, this information can be filtered for further processing, such as dose analysis.

### Low-dose syngo DynaCT\* (included in syngo DynaCT option)

The low-dose syngo DynaCT provides 3D information during the treatment of very radiosensitive patients such as children. 3D imaging results can be achieved at only 0.3 mSv (neuro) based on Alderson phantom.

The reduction from 360 nGy/f to 100 nGy/f at 70 kV results in a dose saving up to 72 % <sup>1)</sup>

### Low-dose acquisition

Low-dose acquisition provides excellent image quality with a dose reduction of up to 67 % in comparison to normal acquisition protocols. One acquisition pedal of the footswitch can be configured as a low-dose acquisition pedal.

The reduction from 240 nGy/f to 80 nGy/f at 70 kV results in a dose saving up to 67 % <sup>1)</sup>

### Low-dose fluoroscopy

The reduction from "Fluoro" to "Fluoro –" results in a dose saving up to 50 % <sup>1)</sup>

### Automatic exposure control

Automatic X-ray control operating five fully independent, self-adjusting, and angulation-driven parameters for optimal dose calculation based on fluoroscopic values

### Publications <sup>1)</sup>

Nickoloff et al., Cardiovasc Intervent Radiol (2007) 30:168-176

White Paper, Low-dose imaging is becoming a clinical reality

\*Option

<sup>1)</sup> Dose saving dependent on patients weight and size

# Quantification

## Quantification

### **QVA – Vascular analysis for vessel diameters of 0.5 mm – 50 mm\* (not for coronary analysis)**

Measurement program integrated into the imaging system for exact and reproducible vascular analysis

Automatic contour recognition

Stenosis quantification

Automatic and manual determination of reference diameter

Automatic and manual calibration methods

Diameter measurement

### **LVA – Left ventricular analysis\*<sup>2)</sup>**

Scientific measurement program integrated in the imaging system for evaluating the functional efficiency of the left ventricle

Automatic and manual contour recognition

Calculation of the ejection fraction, volumes and indices (area-length and Simpson methods)

Wall motion (centerline, radial and regional methods)

Automatic and manual calibration

Diameter measurement

### **QCA – Scientific coronary analysis for vessel diameters of 0.5 mm – 7 mm\***

Scientific cardiological vascular analysis with stenosis quantification:

Scientific measurement program integrated into the imaging system for clinically validated, objective, exact and reproducible evaluation of coronary arteries

Automatic contour recognition

Stenosis measurement with geometrical and densitometric calculations

Automatic and manual determination of reference diameter

Automatic and manual calibration methods

Diameter measurement

### **QCA bifurcation\***

Adds the option of quantifying bifurcations to scientific coronary analysis

## **Angle/length measurement with automatic calibration**

## **DICOM network connection and syngo user interface**

*Remark: Quantitative Coronary Analysis (QCA) is based on the gold standard in coronary analysis: CAAS II (Cardiovascular Angiography Analysis System Mark II) by Pie Medical, Netherlands. The CAAS II algorithms were developed at Erasmus University in Rotterdam. They have been clinically validated and are internationally recognized for scientific purposes (multi-center studies).*

\*Option

<sup>2)</sup> Only on cardiac acquisition scenes

# Advanced applications

## IVUSmap\*

Integrated cardiac workflow simultaneously records of IVUS and X-ray images and subsequent co-registration

Synchronized navigation in angiography or IVUS images along the coronary artery, allowing for measurement of areas and distances and insertion of bookmarks

Automated workflow guided by touch screen display

Works exclusively with Volcano® IVUS systems<sup>2)</sup>

## CLEARstent\*

Improves the visibility of the deployed stent during cardiac interventions

Optionally, contrast can be given. CLEARstent then calculates a scene alternating between the contrast-filled lumen and the stent-enhanced image.

Resulting images and scenes can be archived in PACS and reviewed on any DICOM viewer

## CLEARstent Live\*

CLEARstent Live improves visibility of stents and balloons or other devices in real time, in relation to cardiac anatomy or previously deployed, for cardiac interventions.

CLEARstent Live supports frame rates up to 15 fps

Works even when the balloon is moved within the coronary vessel or contrast agent is injected, allowing precise stent positioning relative to previously implanted stents and/or vessel anatomy, therefore facilitating complex procedures

Processed images are displayed side by side with original scene on assist monitor (when present, otherwise on reference monitor)

CLEARstent Live scenes are automatically saved to scene directory allowing for review of resulting DICOM images on any DICOM viewer

## IZ3D\*

IZ3D offers automated detection and 3D analysis of single and bifurcated coronary arteries from 2D angiographic images.

Out-of-plane magnification and foreshortening errors are minimized by calculating true geometric shape in 3D space from two 2D X-ray projections.

In stent planning mode, a virtual stent can be specified. This virtual stent is then displayed in the 3D image and corresponding markers are overlaid onto live fluoro and acquisition.

## IZ3D Store

IZ3D Store\* allows to export the 3D data set generated via IZ3D. The result is stored in STL-format and can be used for scientific 3rd party applications.

\* Option

<sup>2)</sup> With non-mobile IVUS systems

# System specifications

## Stand

The Artis zee biplane angio system is specifically designed to meet the escalating demands for interventional radiology, interventional cardiology, minimally invasive and hybrid procedures.

## C-arm system

Highly flexible and quick positioning

One joystick per plane for patient-angle oriented C-arm and detector movements

Integrated computerized collision protection

Programmable positioning	up to 7 system positions; 50 user-definable examination positions and 3 direct positions
Isocenter-to-floor distance	106 cm (41.73") for both planes
Focus-to-isocenter distance	75 cm (29.53") for both planes
Patient coverage (free floating tabletop, minimum without repositioning)	180 cm (70.87") or 188 cm (74") (dependent on FD size)

## Floor stand

C-arm standard positioning	motorized 0° at the head end and 35° on the left side relative to the longitudinal axis of the table
C-arm oblique projections <sup>1)</sup>	± 130° LAO/RAO and + 55°/- 45° CRAN/CAUD at 0° head-end C-arm position; ± 45° LAO/RAO and + 15°/- 45° CRAN/CAUD at 35° left-side C-arm position
Angulation speed	variable rotation up to 25°/s with LAO/RAO and 18°/s with CRAN/CAUD; variable rotation, automated runs up to 45°/s
Variable focal spot-to-detector distance	between 90 cm and 120 cm (35.43" and 47.24"); speed up to 9 cm/s (3.54"/s)
C-arm depth	92.5 cm (36.4")

## Ceiling-mounted support

Ceiling-mounted, compact C-arm for hemiaxial oblique projections, also during simultaneous biplane operation

C-arm oblique projections <sup>1)</sup>	from 0° to 120° LAO or 0° to 120° RAO (depending on mount orientation of ceiling C-arm) max. + 55°/- 45° CRAN/CAUD <sup>1)</sup>
Angulation speed	variable rotation up to 10°/s
Variable focal spot-to-detector distance	94 cm and 124 cm (37" and 48.82") (as20 detector); 94 cm and 122 cm (37" and 48.03") (as40HDR detector); 94 cm and 122 cm (37" and 48.03") (mixed detector); speed up to 9 cm/s (3.54"/s)

\* Option

<sup>1)</sup> Maximum angulations depend on stand position, table position and patient size

# System specifications

## Stand

### MULTISPACE.F\* – Maximum positioning flexibility

Additional stand rotation for free positioning of system and table relative to one another, for the following positions and others

Patient access from the left side

Right-side C-arm positioning	30° relative to the longitudinal axis of the patient and double oblique projections of 58°/65° LAO/RAO and + 45°/- 45° cran/caud
OR position	orthogonal to the longitudinal axis of the patient and double oblique projections of 50°/45° LAO/RAO and + 43°/- 45° cran/caud
Stand rotation	manual from + 60° to - 220°
Orthogonal system control oriented to the longitudinal axis of the patient	

### Automap\*

Automatic stand positioning depending on the reference image selected

Automatic reference image selection depending on the current stand positioning

\* Option

# System specifications

## Patient tables (for free-floating tabletops)

Depending on the diagnostic and therapeutic focus, the various patient table configurations enable user-specific application

### Standard table<sup>+</sup>

Floor-mounted patient table for all angiographic examinations and interventions

Large unobstructed cantilevered tabletop and wide range of rotation enables access to patient from all sides and easy transfer and positioning

Telescoping column with motorized height adjustment

Table control module for operation of all table functions

Table height	77.5 cm to 110 cm (30.5" to 43.3")	
Table length	281.5 cm (110.8") (with narrow and wide tabletop)	
Lift speed	4 cm/s (1.58"/s)	
Table rotation	± 120° with 5° increments	
Manual longitudinal travel	125 cm (49.2")	
Manual transverse travel	± 17.5 cm (6.9")	
Maximum unobstructed overhang	224 cm (88.19") (with narrow and wide tabletop)	
Maximum table load	390 kg [859.8 lbs.]	(250 kg [551.2 lbs.] patient weight with narrow, wide and neuro tabletop) (100 kg [220.5 lbs.] emergency resuscitation) (40 kg [88.2 lbs.] accessories)

### Table with stepping (PERISTEPPING)<sup>+</sup>

Similar to the standard table, but with additional motorized longitudinal travel and PERISTEPPING.

Speed of table movement	270 mm/s
-------------------------	----------

### Table with tilt<sup>+</sup>

Similar to standard table, with head-down/head-up tilt options and servo operation, prepared PERISTEPPING

Tilt angle head down/head up	± 15°
------------------------------	-------

Tilt speed head down/head up	4.0°/s
------------------------------	--------

Servo-supported table control module for operation of all table functions including motorized longitudinal table movement in tilt position with power-dependent control

Maximum table load	340 kg [749.6 lbs.]	(200 kg [440.9 lbs.] patient weight) (100 kg [220.5 lbs.] emergency CPR) (40 kg [88.2 lbs.] accessories)
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### OR table (with tilt and cradle)<sup>+</sup>

Similar to table with tilt, with head-down/head-up, lateral tilt options and servo operation, prepared PERISTEPPING

Tilt angle lateral	± 15°
--------------------	-------

Tilt speed lateral	2.5°/s
--------------------	--------

Maximum table load	340 kg [749.6 lbs.]	(200 kg [440.9 lbs.] patient weight) (100 kg [220.5 lbs.] emergency CPR) (40 kg [88.2 lbs.] accessories)
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<sup>+</sup> Modular choice

# System specifications

## Free-floating tabletops

Four carbon-fiber tabletops with special, contoured foam mattresses are available:

### Narrow tabletop/mattress\*

Narrow form with recess at head end, e.g., for cardiological applications. The tabletop is tapered in the thorax region for great freedom of C-arm angulation.

Tabletop	Length: 228.6 cm (90"); width: 45.0 cm (17.72")
Max. patient weight	200 kg (441 lbs.) for table with tilt and OR table 250 kg (551.2 lbs.) for standard table and table with stepping
Al equivalent of tabletop	≤ 1.4 mm (0.06") at 100 kV, HVL 3.6 mm (0.15") Al
Al equivalent of mattress thin	< 0.6 mm (0.02") at 100 kV, HVL 3.6 mm (0.15") Al (= Standard)
Al equivalent of mattress thick	< 1.0 mm (0.04") at 100 kV, HVL 3.6 mm (0.15") Al (= Option)
Heatable mattress*	(see Artis Accessory catalog)

### Wide tabletop/mattress\*

Wide, straight shape for universal applications. The tabletop is straight up to the head area and offers maximum positioning comfort, even for obese patients

Tabletop	Length: 228.6 cm (90"); width: 52.5 cm (20.67")
Max. patient weight	200 kg (441 lbs.) for table with tilt and OR table 250 kg (551.2 lbs.) for standard table and table with stepping
Al equivalent of tabletop	≤ 1.4 mm (0.06") at 100 kV, HVL 3.6 mm (0.15") Al
Al equivalent of mattress thin	< 0.6 mm (0.02") at 100 kV, HVL 3.6 mm (0.15") Al (= Standard)
Al equivalent of mattress thick	< 1.0 mm (0.04") at 100 kV, HVL 3.6 mm (0.15") Al (= Option)
Heatable mattress*	(see Artis Accessory catalog)

\*Option

\* Modular choice

# System specifications

## Free-floating tabletops

### Long tabletop/mattress<sup>†</sup>

Longer design with a wide, straight form for special angiographic applications, e.g., angio OR. The tabletop is straight and lengthened to increase accessibility with high positioning comfort.

Table length	316.6 cm (124.65")
Max. unobstructed overhang	259.1 cm (102.01")
Tabletop	Length: 263.7 cm (103.8"); width: 52.5 cm (20.67")
Max. patient weight	160 kg (352.7 lbs.)
Al equivalent of tabletop	≤ 1.5 mm (0.06") at 100 kV, HVL 3.6 mm (0.15") Al
Al equivalent of mattress thin	< 0.6 mm (0.02") at 100 kV, HVL 3.6 mm (0.15") Al (= Standard)
Al equivalent of mattress thick	< 1.0 mm (0.04") at 100 kV, HVL 3.6 mm (0.15") Al (= Option)

### Neuro tabletop/mattress<sup>†</sup>

Narrow form with a dovetail interface at the table head end. The interface allows for attaching head clamps, e.g. for neurosurgical applications. The tabletop is tapered in the thorax region for the greatest possible freedom of C-arm angulation.

Table length	253.9 cm (99.96")
Max. unobstructed overhang	196.4 cm (77.32")
Tabletop	Length: 201.0 cm (79.13"); width: 45 cm (17.72")
Maximum patient weight	200 kg (441 lbs.) for table with tilt and OR table 250 kg (551.2 lbs.) for standard table
Al equivalent of tabletop	≤ 1.4 mm (0.06") at 100 kV, HVL 3.6 mm (0.15") Al
Al equivalent of mattress thin	< 0.6 mm (0.02") at 100 kV, HVL 3.6 mm (0.15") Al (= Standard)
Al equivalent of mattress thick	< 1.0 mm (0.04") at 100 kV, HVL 3.6 mm (0.15") Al (= Option)

\*Option

† Modular choice

# System specifications

## Artis Large Display\*

55" viewing area enables a new dimension in medical imaging. Up to 26 different image sources can be shown on the same display, allowing high flexibility in arranging different screen layouts. Important images can be scaled to the desired size, less important information can be moved out of the focus.

<b>Display</b>	<b>55" +</b>
Resolution	3840 x 2160
Pixel size	0.315 x 0.315
Display area (W x H)	1209.6 x 680.4 mm
Panel technology	Color, TFT (IPS)**
Viewing angle	178° H and V
Calibrated contrast	1000 : 1
Max. luminance	700 cd/m <sup>2</sup>
Calibrated luminance	400 cd/m <sup>2</sup>
Dimensions without stand (W x H x D)	1265.3 x 735.7 x 134.5 mm
Weight without stand	42 kg ± 2 kg (92.6 lbs. ± 4.4)
Power consumption	350 W
Power safe mode	40 VA
<b>Multi-Display Controller</b>	Three different controllers are available
Optimized waveform display	Enables visualization of especially ECG and EEG waveforms when the video signal is displayed in a shrunken format below the original video resolution of the source system. Optimized waveform display with channels 5, 6, 9, 14, 15, 18, 24, 27.
Number of inputs	9 physical, simultaneously usable: 7 digital + 1 high-speed analog, 1 standard analog; 18 physical, simultaneously usable: 14 digital + 2 high-speed analog, 2 standard analog; 26 physical, simultaneously usable: 20 digital + 6 analog
Digital input specifications	DVI-D single link; max. 1920 x 1200, 60 Hz
High-speed analog input specifications (3 ports)	Max. 1920 x 1200, 60 Hz
Standard analog input specifications (3 ports)	Max. 1280 x 1024, 75 Hz

\* Option

+ Depends on logistic regulations

\*\* IPS (In-plane-switching) is an innovative screen technology which provides higher luminance, a higher dynamic range and consistent contrast from all viewing angles (only available with 55" display).

# System specifications

## Artis Large Display\*

### Ambient conditions

Operating temperature	5 °C to + 40 °C (– 41 °F to + 104 °F)
Operating humidity	10 % to 80 %, relative, not condensing
Storage temperature	– 20 °C to + 55 °C (– 4 °F to + 131 °F)
Storage humidity	10 % to 95 %, relative
Barometric pressure	700 hPa to 1060 hPa or up to 3000 m (10,000 ft)

### Power requirements

Input voltage	100 to 240 V AC, 50 to 60 Hz
Input current	5.0 to 2.5 A
Redundancy	2 independent power supplies, hot-swap capable

### Mechanical specifications

Mechanical adaption	19" rack design, 4 U high
Dimensions (W x H x D)	482.6 x 178 x 350 mm (482.6 x 178 x 450 mm with 24 video plugs)
Weight	< 20 kg (44.1 lbs.)

\* Option

+ Depends on logistic regulations

\*\* IPS (In-plane-switching) is an innovative screen technology which provides higher luminance, a higher dynamic range and consistent contrast from all viewing angles (only available with 55" display).

# System specifications

## Displays

### 19" Color Display<sup>+</sup>

19" TFT color and gray scale live and reference images display. High-speed presentation of motion studies and dynamic images in X-ray diagnostics as well as interventional therapeutic procedures

Light weight, high luminance and contrast values

Ambient light sensor for optimum adaption to the room brightness

Diagonal screen measurement	19" (48 cm)
Image display	1280 x 1024
Pixel size	0.294 x 0.294 mm
Calibrated luminance	400 cd/m <sup>2</sup>
Max. contrast ratio	900 : 1
Viewing angles (H, V)	178°
Power consumption	< 58 VA (W)
Power save mode	< 8 VA (W)

### 19" Color Display<sup>+</sup>

Suitable for color display in the control room; not to be used as live display in the examination room

Diagonal screen measurement	19" (48 cm)
Image display	1280 x 1024
Pixel size	0.294 x 0.294 mm
Calibrated luminance	180 cd/m <sup>2</sup>
Max. contrast ratio	800 : 1
Viewing angle (min.)	178° H and V
Power consumption	< 75 VA (W)
Power save mode	< 10 VA (W)

### 21" Color Display<sup>+</sup>

21" TFT color and gray scale images display

Light weight, high luminance and contrast values

Ambient light sensor for optimum adaption to the room brightness

Diagonal screen measurement	21" (54 cm)
Image display	1600 x 1200
Pixel size	0.270 x 0.270 mm
Calibrated luminance	270 cd/m <sup>2</sup>
Max. contrast ratio	1500 : 1
Viewing angles (H, V)	178°
Power consumption	< 48 VA (W)
Power save mode	< 0.5 VA (W)

<sup>\*</sup>Option

<sup>+</sup>Modular choice

# System specifications

## Display Ceiling Suspension

### DCS Large Display plus two

For one Large Display and two additional 19"/21" displays enables height adjustment, longitudinal travel, swivel capabilities with enhanced working load (+ 25 kg [55.1 lbs.]) in comparison with standard DCS-LD protected).

Length of longitudinal rails	425 cm (214.6")
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Travel range of ceiling-mounted carriage	< 315 cm (124")
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Vertical lift (height adjustment)	85 cm (33.46")
-----------------------------------	----------------

Length of cantilever	120 cm (47.24")
----------------------	-----------------

Rotation range of the ceiling-mounted support to the rail axis	300°, settings every 30°
--	--------------------------

Rotation range of displays	330°, settings every 30°
----------------------------	--------------------------

### DCS\* / DCS PRO\*

Ceiling-mounted suspension system for 2 to 8 displays enables height adjustment, longitudinal travel, swivel capabilities.

Length of longitudinal rails	425 cm (167.32")
------------------------------	------------------

Travel range of ceiling-mounted carriage	< 315 cm (124")
--	-----------------

Vertical lift (height adjustment)	85 cm (33.46")
-----------------------------------	----------------

Length of cantilever	120 cm (47.24")
----------------------	-----------------

Rotation range of the ceiling-mounted support to the rail axis	300°, settings every 30°
--	--------------------------

Rotation range of displays	330°, settings every 30°
----------------------------	--------------------------

2<sup>nd</sup> DCS\* with 2 to 3 displays<sup>+</sup>

### DCS-extended\* / DCS Large Display extended\*

Ceiling-mounted suspension system DCS-extended for 4 to 8 displays or one Large Display enables height adjustment, longitudinal travel, swivel capabilities. Enhanced positioning range and flexibility by double pivot cantilever.

Length of longitudinal rails	425 cm (167.32") or 545 cm** (214.6")
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Travel range of ceiling-mounted carriage	< 315 cm (124") or 320 cm** (126")
--	------------------------------------

Vertical lift (height adjustment)	88.5 cm (34.84")
-----------------------------------	------------------

Length of double cantilever	60 cm and 120 cm (23.62" and 47.24")
-----------------------------	--------------------------------------

Rotation range between cantilever extension and carriage	300°, settings every 30°
--	--------------------------

Rotation range of displays	330°, settings every 30°
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### Display boom interface\*

Universal interface for third-party display boom

\* Option

+ Modular choice

\*\* System and DCS are in one rail system

# System specifications

## Artis Cockpit\*

One or two displays support up to nine different image sources, in 4 different screen layouts, on the same displays.

Configurations	1 keyboard/mouse	1 display
	1 keyboard/mouse	2 displays
	2 keyboards/mice	2 displays

### High brightness display 30"

Panel	Color TFT 30"
Resolution	2560 x 1600
Pixel size	0.256 mm x 0.250 mm
Contrast ratio	1500 : 1
Viewing angles (H, V)	178°
Power consumption	57 W / max. 116 W
Power save mode	1 W
Max. luminance	750 cd/m <sup>2</sup>
Typical luminance	400 cd/m <sup>2</sup>
Display area (W x H)	655.36 mm x 409.6 mm
Dimensions without stand (W x H x D)	731 mm x 485 mm x 84 mm
Weight without stand	14.3 kg (31.5 lbs.)
Weight incl. stand	20.7 kg (45.6 lbs.)

### Display Controller

#### Video inputs

Video input connector	up to 9 input signals 7 x DVI-D 1920 x 1200, 60 Hz; 1 x VGA 1920 x 1200, 60 Hz; 1 x DVI-I analog 1280 x 1024, 60 Hz
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\*Option

# System specifications

## Operation

An ideal workflow requires full user operation capabilities for the system including imaging system and generator under sterile conditions in the examination room. That way the user is able to operate the system independently without the need to leave the examination room. The intuitive *syngo* operating elements allow for managing the whole process from preparation of the patient to image post-processing in a safe, reliable, and time-efficient way.

## Operation in the examination room

Complete system operation through modular control elements directly at the patient table for controlling C-arm movements, patient table and multileaf collimator. Touchscreen with multi-functional joystick for operation of the imaging system, including post-processing and quantification as well as selection of the organ programs. It is based on *syngo* operation. The touchscreen is specifically configurable to individual clinical requirements.

Data regarding system and table geometry, dose data with CAREwatch, as well as system messages, are shown on the live display.

Ergonomically designed footswitch for releasing fluoroscopy, acquisition, and table brake, as well as an additional configurable function.

### Wireless footswitch\*<sup>1)</sup>

Permits easy positioning of the footswitch

## Operation in the control room

Standard Siemens *syngo* control via keyboard and mouse for all imaging system functions such as image post-processing, archiving and configuring of organ programs.

### Additional operating options in the control room

The entire system can also be operated from the control room using the same functions as in the examination room:

- Touchscreen control\* with multi-functional joystick
- Control modules\* for C-arm, table and collimator
- Multi-functional hand switch\* for acquisition control, switching acquisition frame rates and/or step movements (option for PERISTEPPING and/or PERIVISION)
- Footswitch\*

\*Option

<sup>1)</sup> Not available in all countries

# Connectivity

## DICOM Functions

### DICOM Send

Sends images and series to DICOM networks or workstations

### DICOM StC (Storage Commitment)

Receives archiving confirmation from the image archive

### DICOM Print\*

Prints image material using virtual film sheets via DICOM print laser camera or network laser printer

### DICOM Query/Retrieve

Searches for images and series in DICOM networks (Query)

Imports images and series from DICOM networks (Retrieve)

### DICOM Get Worklist\*

Imports patient and procedure data from a DICOM patient management system

### DICOM MPPS\* (Modality Performed Procedure Step)

Sends dose data as well as patient examination status to a patient data management system

Exam protocol can be sent as DICOM image

### DICOM SR

Stores quantification results and relevant dose data as DICOM Structured Report and sends it to DICOM network

### Ready Processed Images

Configurable transfer mode to store and archive overlays and post-processing results in the image pixels

## Networking

Ethernet interface, full-duplex, gigabit transfer rate

\*Option

# Connectivity

## Data export\*

USB interface, supports manual storage of clinical images/scenes in DICOM, jpeg, Bitmap or AVI format

## Integration of the Siemens Recording System

### Sensis Interface\*

Interface to Sensis hemodynamic and electrophysiological recording system for automatic acquisition or transfer of patient demographic data and system parameters (dose report)

**For more information about the Sensis recording system, please refer to separate data sheet**

## Connection with ACUSON Freestyle Elite ultrasound system

### Artis Freestyle Access\*

Preparation for the connection of ACUSON Freestyle Elite with Artis Access ultrasound system to the Artis. It allows for viewing of ultrasound images on the Large Display, transfer of demographic patient information, and mounting of the ultrasound unit on the Large Display ceiling suspension.

## syngo X Workplace\*

syngo X Workplace post-processing workstation with syngo-based user software and network modules, for real-time 3D reconstruction and 3D viewing

**For more information about the syngo X Workplace applications, please refer to separate data sheet**

## Malware protection

The malware protection is a whitelisting solution

\*Option

# Connectivity

## Injectors

For more information and additional injectors, please refer to the accessories catalog

## Standard and optional accessories

Please refer to separate catalog

## Remote Service\*

Preparation for Siemens Remote Service (SRS):

Allows remote hardware and software diagnosis

Allows remote system configuration, e.g., adding a DICOM node

Early warning system to help ensure system operation (Guardian)

## Security Package

**syngo Security Package\***

SW option for Artis with expanded security features such as user management and audit trail function

\*Option

# Room preparation

## Emergency power supply\*

### Emergency power supply\* for the imaging system

Bridging of the imaging system power supply (50/60 Hz) until line voltage is back. In case of power failures of more than 90 seconds the imaging system will be shut down automatically.

Nominal power	2 kVA
---------------	-------

### Emergency power supply\* for all system, table movements and imaging system

Emergency power supply for uninterrupted power supply for all system and table movements, as well as imaging system and monitors for a period of at least 10 min. during a primary power failure.

On-site emergency power supply system is a legal requirement in accordance with IEC 60601-2-43 (for tilt and Artis OR tables)

Nominal power	15 kVA
---------------	--------

Line voltage	400 V / 440 V or 480 V; an adaptation to 440/480 V is required.
--------------	---

### Emergency power supply\* for the entire system incl. emergency fluoro

Emergency power supply for the entire system incl. emergency fluoro for a period of at least 10 minutes during a primary power failure. Uninterrupted power supply for all system and table movements, as well as imaging system and monitors.

Approx. 30 seconds after power failure the generator has finished restart and you will be able to work with continuous fluoroscopy in emergency operation mode.

Nominal power	40 kVA
---------------	--------

Line voltage	400 V / 440 V or 480 V; an adaptation to 440/480 V is required.
--------------	---

## Internal line resistance for generator A100 Plus<sup>1)</sup>

$U_N/P$	80 kW	100 kW
380 V	≤ 135 mOhm	≤ 110 mOhm
400 V – 460 V	≤ 135 mOhm	≤ 135 mOhm
480 V	≤ 135 mOhm	≤ 125 mOhm

<sup>1)</sup>To achieve the full generator power, the measured internal line resistance should not exceed the following values. Resistance values in Ohm at  $U_N \pm 10\%$

# Room preparation

Weight <sup>1)</sup>			
Examination room	Floor stand (incl. mounting plate)	approx. 710 kg	(1565 lbs.)
	Ceiling stand		
	(including longitudinal rail)	approx. 566 kg	(1248 lbs.)
	Display ceiling suspension (DCS)		
	(depending on configuration)	235 – 355 kg	(518 – 782.6 lbs.)
	Patient table (depending on table)	452 – 550 kg	(996 – 1213 lbs.)
	Injector wall connection	approx. 5 kg	(11 lbs.)
Control room	Control console cart	approx. 26 kg	(57.32 lbs.)
	Imaging system	approx. 200 kg	(441 lbs.)
	UPS for imaging system (option)	51 kg	(112 lbs.)
	Control room distributor	29 kg	(64 lbs.)
	Miscellaneous	50 kg	(110 lbs.)
	Large display container	115 kg	(253.53 lbs.)
	Large display	approx. 60 kg	(132.27 lbs.)
	Control console	60 kg	(132 lbs.)
	Video container	60.5 kg	(133 lbs.)
	XWP	52.0 kg	(114.64 lbs.)
Artis Cockpit	31.0 kg	(68.34 lbs.)	
Equipment room	Generator (per plane)	350 kg	(771.6 lbs.)
	Cooling system (per plane)	42 kg	(93 lbs.)
	System control cabinet	250 kg	(551 lbs.)
	System control cabinet for OR table	125 kg	(276 lbs.)
	System control cabinet	165 kg	(363.76 lbs.)
	Cable cabinet	120 kg	(265 lbs.)

## Installation data

Line voltage connection, 3-phase current, TN-S

### Generator

Nominal voltage<sup>2)</sup> (3 phase) 380 V, 400 V, 420 V, 440 V, 460 V  $\pm$  10%, 50/60 Hz  $\pm$  1 Hz, 480 V, 60 Hz

Fuse internal 60 A, 63 A slow-blow fuse

Power consumption 1.8 kVA system off  
2.25 kVA system in standby  
8 kVA for fluoroscopy  
160/161 kVA for acquisition

### System control cabinet

Nominal voltage<sup>2)</sup> (3 phase) 380 V, 400 V, 420 V, 440 V, 460 V  $\pm$  10%, 50/60 Hz  $\pm$  1 Hz, 480 V, 60 Hz

Fuse internal 26 A, external 50 A slow-blow fuse

Power consumption max. 11 kVA (long-time loading > 5 min)

<sup>1)</sup> All weight specifications are for reference only. Depending on the system configuration, the resulting ceiling and floor loads will be different.

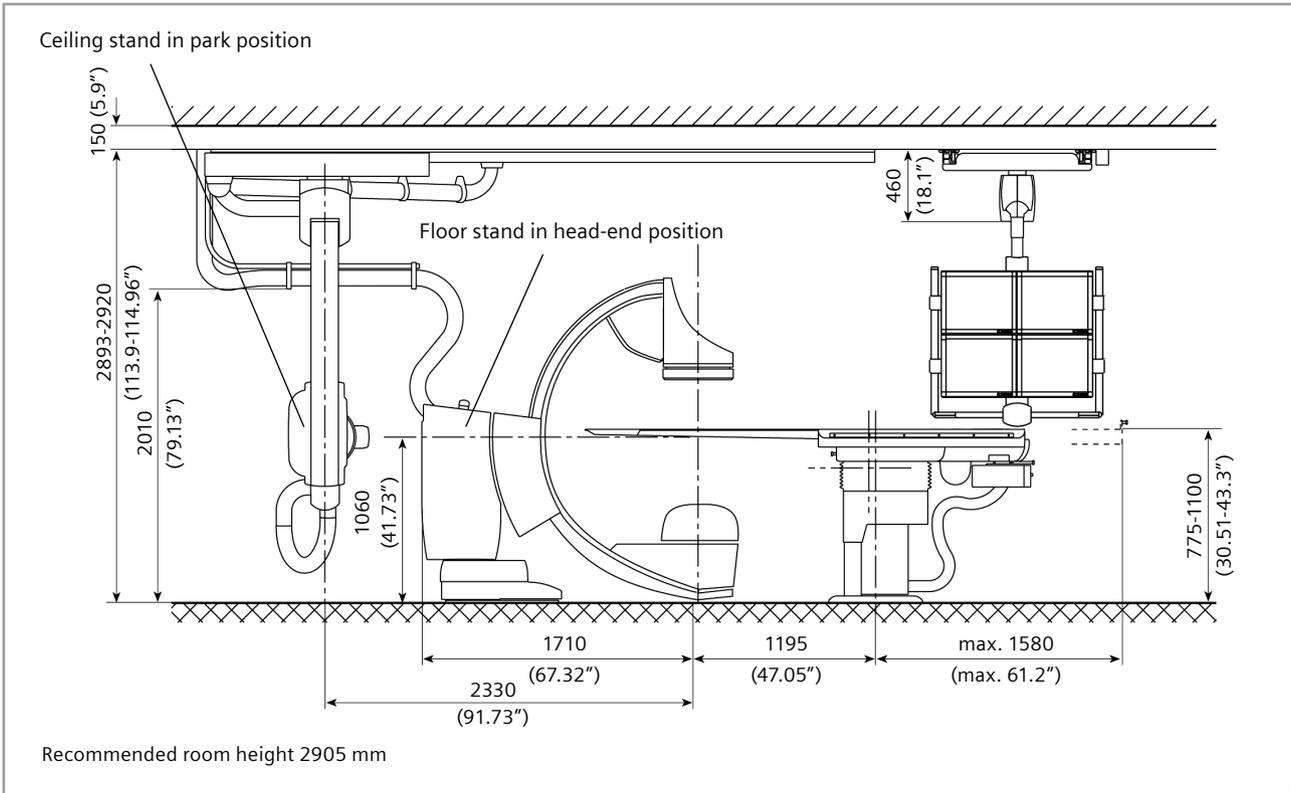
<sup>2)</sup> Max. allowable nominal voltage between phases (L1, L2, L3) and PE 277 V

# Room preparation

Ambient conditions (operation)		
Examination, control- and equipmentroom	Temperature range: Relative humidity: Temperature gradient: Barometric pressure:	+ 15°C to + 30°C (recommended 22 °C) 20 – 75 % below dew point max. 5 °C/h 70 kPa – 106 kPa
Imaging system	Temperature range: Relative humidity: Temperature gradient: Air flow: Noise level:	+ 10°C to + 35°C 20 – 75 % (not condensing) max. 10°C/h 850 m <sup>3</sup> /h < 53 dB (A)
Generator	Air flow: Noise level:	160 m <sup>3</sup> /h < 55 dB (A)
Cooling system (for MEGALIX tube)	Cooling air: Air flow: Noise level:	+ 15°C to + 30°C (frost-free room) 950 m <sup>3</sup> /h 55 dB – 59 dB at 50/60 Hz
System control cabinet 1	Air flow: Noise level:	650 m <sup>3</sup> /h 48 dB (A)
System control cabinet 2 (only for OR table)	Please see room conditions	
System control cabinet 3	Air flow: Noise level:	500 m <sup>3</sup> /h 48 dB (A)
<i>For further informations see room conditions</i>		
Stand	Mechanical impact: Vibrations: Noise level:	max. 10 g/16 ms max. 0.1 g/10-200 Hz < 55 dB (A)
Operation altitude	Less than or equal to 3000 meters (10,000 ft)	
Overvoltage category	II	
Pollution degree	2	
Oxygen enriched environment	n/a	

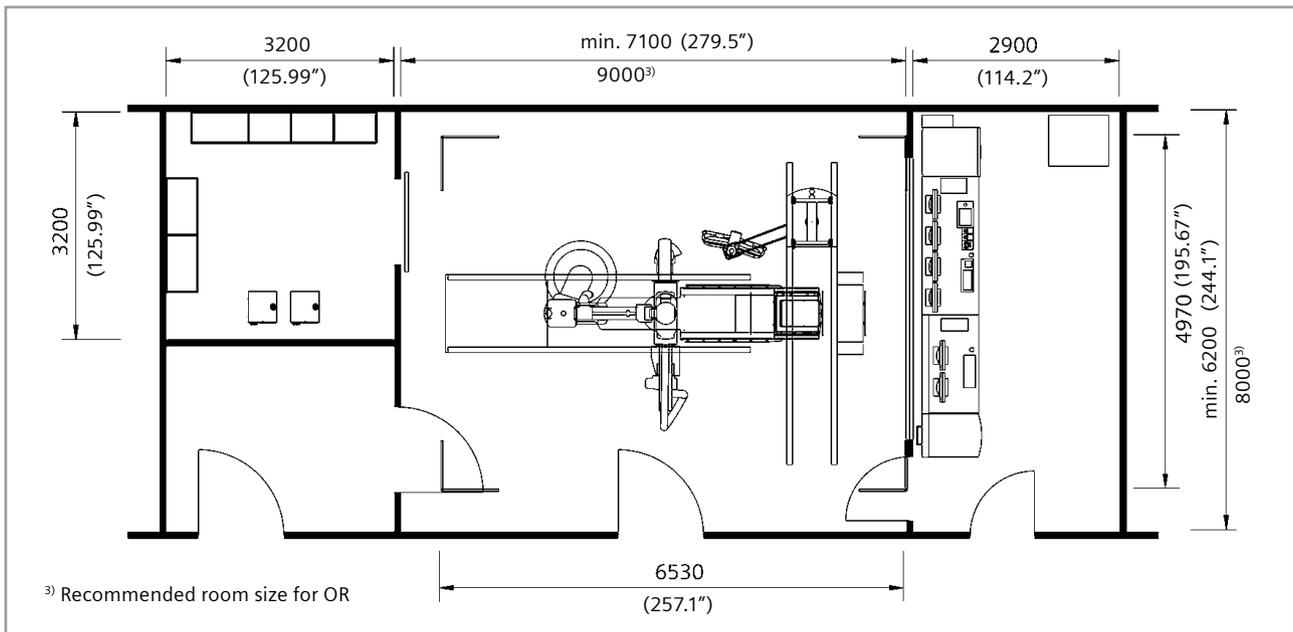
# Room preparation

## System view (mm)



# Room preparation

## Room layout (mm)



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For biplane systems 10094141, 10502504  
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