Artis zeego

Multi-axis system for interventional radiology
VC 14

Data sheet

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Multi-axis system for interventional radiology

The Artis **zeego** multi-axis system is specifically designed to meet the escalating demands of interventional radiology, today and in the future.

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

The CARE package helps to reduce radiation for the operator and patient with high diagnostic and interventional outcomes.

The CLEAR package offers a comprehensive range of applications to enhance image quality without increasing the dose.

There's never been anything quite like Artis **zeego**. It's the first multi-axis gantry that can be positioned exactly the way you want. And with far greater ease and precision than any traditional floor or ceiling-mounted system.

Maximum flexibility in positioning

Through the Artis **zeego's** unique multiple axis design, system positioning that was previously unavailable now becomes a reality.

Artis **zeego** helps to maximize body coverage while maintaining C-arm angle flexibility including cardiac angulations.

3D rotational imaging can be performed from the patient's left, right or head.

Flexible park positions provide operators with more work space.

Compact C-arm enables access to both the patient's left and right sides and provides better access than conventional ceiling-mounted systems.

As a floor-mounted system with ceiling-mount capabilities, Artis **zeego** can easily meet laminar flow and sterility requirements.

Operator comfort

Key to Artis **zeego's** flexibility is its variable isocenter, which lets you adjust the working height of the system to your needs.
This helps reduce fatigue associated with performing long procedures.

2k imaging

2k imaging allows you to visualize the fine vessels in overview formats.
2k imaging provides four times the information and twice the resolution for pre- and post-baseline imaging.

Patient table

Patient table with free-floating removable tabletop and a maximum patient weight of up to 250 kg.
Optionally the table can be equipped with tilt/cradle capability and motorized stepping.

* Option


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Tableside control

The slimline tableside control panel features easy-to-read *syngo* icons to allow quick and convenient operation of connected systems.
The layout can be customized on site.
The new mouse-like control joystick allows easy operation and can be mounted on the right- or left-hand side

Detector

The high resolution 30 x 40 flat detector for all procedures.

CARE Package

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

CAREvision: reduced pulse rates in fluoroscopy

CAREprofile: radiation-free collimation

CAREposition: radiation-free patient repositioning

CAREfilter: automated CU prefiltration of X-ray beam

CAREwatch: display of dose in the examination room

CAREguard: effective skin dose control

CAREreport: dose information embedded in DICOM structured report

Artis zee Large Display*

Multiple sources can be displayed on the full-color 56-inch medical-grade screen in brilliant quality.
The screen layout can be switched from the tableside control panel.

Artis zee Cockpit*

Multiple systems can be controlled from one workplace by using only one mouse, one keyboard and one monitor.
This saves space in the control room.

CLEAR Package

The CLEAR applications provide outstanding image quality to increase certainty during interventions.

CLEARcontrol: harmonization of the image especially in areas with large density differences

CLEARview: dose-adaptive noise reduction for sharp images

CLEARvessel: crisp visualization of vessel edges

CLEARmotion: detection of fine structures and effective compensation of motion artifacts

CLEARchoice allows you to customize the images to the preferred quality on site.

X-ray tube

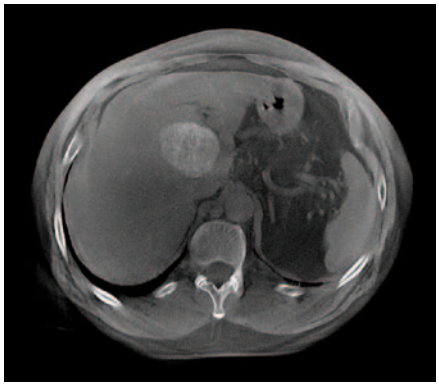
The new MEGALIX Cat Plus tube features the new flat emitter technology.
This enables a higher current during fluoroscopy resulting in better image quality for obese patients.

* Option

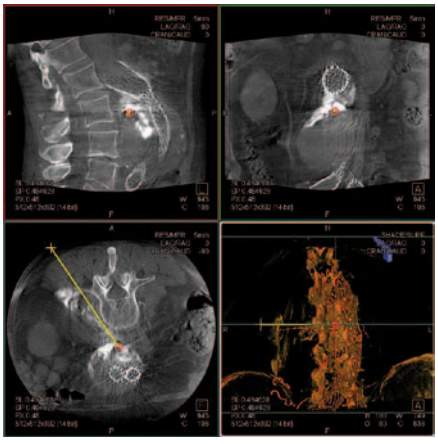
Advanced imaging and intuitive guidance[1]

The Artis **zeego** imaging chain enables a range of advanced applications – from cross-sectional imaging of soft tissue at tableside to advanced guidance tools including an integrated crosshair laser light – that allow interventional clinicians to care with greater speed and precision. The 3D data sets are acquired quickly and easily with the help of on-screen workflow guidance.

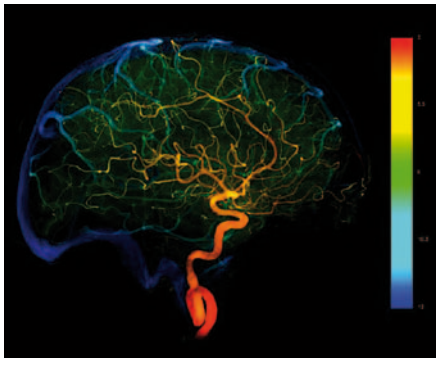
- ***syngo* InSpace 3D***
  Real-time high-contrast imaging
- ***syngo* iDentify***
  Simultaneous visualization of dual-volume high-contrast imaging or one high- and one low-contrast data set. Clearly differentiate between contrast-filled vessels, bones and stents or see the anatomical structure of tumors in combination with the feeding vessels.
- ***syngo* iPilot***
  Visualization and fading between live 2D fluoro and 3D images for improved orientation and effective device guidance. *syngo* iPilot updates dynamically during movements of the C-arm, table, zoom and source-to-image distance changes and allows compensation of patient movements.
- ***syngo* iGuide***
  Integrated needle guidance in one smooth on-screen workflow, increasing confidence in and accuracy of needle procedures.
- ***syngo* iFlow***
  Dynamic flow evaluation of a complete Digital Subtraction Angiography (DSA) run in a full-color single image, all at the press of a button. Results in a greater understanding of the contrast flow within pathology, assists in image review and clearly demonstrates post-procedural results.



Large Volume *syngo* DynaCT



syngo iGuide



syngo iFlow

- ***syngo* Aortic ValveGuide****
  syngo Aortic ValveGuide offers fast and precise 3D information of the aortic root anatomy during the procedure, thus providing excellent support for planning the valve implantation.
  Color-coded anatomical landmarks together with the overlay of the 3D structures and the live fluoroscopy created with *syngo* iPilot allow for efficient valve positioning.

zeego opens your eyes

syngo DynaCT soft tissue imaging results are available directly at the tableside in less than one minute, increasing confidence and virtually avoiding patient transfer to CT.

A dedicated abdominal acquisition (minimum 200 degree rotation acquisition) at patient's left/right enables excellent soft tissue image quality in the abdomen.

The whole picture

Large Volume *syngo* DynaCT imaging with **zeego** provides better coverage of the entire abdomen, a clear advantage when treating obese patients.
It provides images of the whole liver for biopsies, chemoembolization, and other oncology procedures.
It enables full orientation of soft-tissue volume for needle work, biopsies and RF applications.
zeego Large Volume *syngo* DynaCT provides full coverage of the whole skull, enabling clinicians to view both tumors and the vessels feeding them.

Not all features shown are necessarily standard and available in all countries.

* Option

[1] A *syngo* X-Workplace is required to produce 3D results. For details regarding the X-Workplace, please refer to the specific data sheet.

** The product here mentioned is not commercially available in the US.
Due to regulatory reasons their future availability cannot be guaranteed.

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Multi-axis system for interventional radiology

Stand

The floor-mounted multi-axis single-plane C-arm system for digital imaging techniques is designed for the challenges of modern diagnostic and interventional procedures for universal angiography, neuroradiology and cardiology. The stand allows positioning in angular, orbital, lateral and longitudinal directions including a variable isocenter.

C-arm system	
Highly flexible and quick positioning	
Integrated, computerized collision monitoring – ICP (ICP = Intelligent Collision Protection)	
Stand rotation	motorized ± 90°
Longitudinal travel speed of stand	variable up to 150 mm/s (5.91"/s), up to 270 mm/s (10.63"/s) in PERIVISION mode
Programmable positioning	up to 5 system positions additional 50 user-definable user positions and 3 direct positions
Double oblique projections	max. LAO: 200° [1] (= 160° RAO) max. RAO: 200° [1] (= 160° LAO) max. caudal: 65° [1] max. cranial: 45° [1]
C-arm positioning speeds	variable rotation up to 25°/s with LAO/RAO and with cran/caud
Speed for rotational angiography	up to 60°/s
Variable focal spot-to-detector distance	between 90 cm (35.43") and 120 cm (47.24"); speed up to 9 cm/s (3.54"/s)
Longitudinal C-arm movement	motorized up to 150 mm/s (5.91"/s)
Isocenter-to-floor distance	variable between 1030 mm (40.55") and 1470 mm (57.87")
Focus-to-isocenter distance	785 mm (30.91")
Patient coverage (Minimum without repositioning)	195 cm (76.77") or 230 cm (90.55"): (dependent on tabletop)

MULTISPACE
Free positioning of system and table relative to one another
Motorized stand rotation allows free positioning of the system and table for additional C-arm positions
OR position orthogonal to the longitudinal axis of the patient
Orthogonal system control oriented to the longitudinal patient axis with automatic collimator rotation
IsoTilt function for tilting the table and maintaining the C-arm projection during a longitudinal tilt (depending on the type of table)
InFocus function for automatic maintenance of the projection during stand rotation

Automap*
Automatic stand positioning depending on the reference image selected
Automatic reference image selection depending on the current stand positioning

[1] Maximum angulations vary depending on working position

* Option

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Multi-axis system for interventional radiology

Patient tables		
Depending on the diagnostic and therapeutic focus, the various patient table configurations enable user-specific application		
Standard table+		
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 (30.52" to 43.31")	
Table length	281.5 cm (110.83")	
Lift speed	4 cm/s (1.57"/s)	
Table rotation	± 120°	
Manual longitudinal travel	125 cm (49.21")	
Manual transverse travel	± 17.5 cm (6.89")	
Maximum unobstructed overhang	224 cm (88.19")	
Maximum table load	390 kg (859.8 lbs.)	(250 kg [551.2 lbs.] patient weight with wide tabletop) (100 kg [220.5 lbs.] emergency CPR) (40 kg [88.2 lbs.] accessories)
Table with tilt+		
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)
OR version table+		
Similar to standard table, with head-down/head-up and lateral tilt options, 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)

+ Modular choice (several variations to choose from)

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Multi-axis system for interventional radiology

Tabletops

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

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“)
Tabletop width	52.5 cm (20.67“)
Max. patient weight	200 kg (440.9 lbs.) for table tilt and OR table 250 kg (551.1 lbs.) for standard table
Al equivalent	≤ 1.2 mm (0.05“) at 100 kV, HVL 1.4 mm (0.06“) Al (according to CFR)
Mattress thin	< 0.6 mm (0.02“) Al (= Standard)
Mattress thick	< 1.0 mm (0.04“) Al (= Option)
Heatable mattress*	(see Artis **zee** Accessory catalog)

Narrow tabletop/mattress+

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

Tabletop length	228.6 cm (90“)
Tabletop width	45.0 cm (17.72“)
Max. patient weight	200 kg (440.9 lbs.) for table tilt and OR table 250 kg (551.1 lbs.) for standard table
Al equivalent	≤ 1.4 mm (0.06“) at 100 kV, HVL 1.4 mm (0.06“) Al (according to CFR)
Mattress thin	< 0.6 mm (0.02“) Al (= Standard)
Mattress thick	< 1.0 mm (0.04“) Al (= Option)
Heatable mattress*	(see Artis **zee** Accessory catalog)

Neuro tabletop/mattress*

Narrow form with a dovetail interface at the table head end. The interface provides the possibility 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.

Tabletop length	201.0 cm (79.13“)
Tabletop width	45 cm (17.72“)
Maximum patient weight	200 kg (440.9 lbs.) for table with tilt and OR table 250 kg (551.2 lbs.) for standard table
Al equivalent	≤ 1.4 mm (0.06“) at 100 kV, HVL 3.7 mm (0.15“) Al (according to CFR)
Mattress thin	< 0.6 mm (0.02“) at 100 kV, HVL 3.7 mm (0.15“) Al (= Standard)
Mattress thick	< 1.0 mm (0.04“) at 100 kV, HVL 3.7 mm (0.15“) Al (= Option)

* Option

+ Modular choice (several variations to choose from)

Artis zeego

Multi-axis system for interventional radiology

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

CLEARpackage
The CLEARpackage enables optimized image quality through real-time processing of the image data.
CLEARcontrol: The new 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. • Precondition to run low dose acquisition protocols
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 artefacts. 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.

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)
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.
Quantification: Angle/length measurement with automatic calibration
Text functions: Preconfigured image labeling using text modules or free annotation, comment line for image, patient positioning annotation
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 (512^2 or 1 k matrix) as static reference image
DICOM network connection and *syngo* user interface

Ready Processed Images
Configurable mode to store and archive overlays and post-processing data in the image

Image storage capacity
25,000 images in 1k/12-bit matrix
50,000 images in 1k/12-bit matrix*
100,000 images in 1k/12-bit matrix*

* Option

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Multi-axis system for interventional radiology

Operating modes
Fluoroscopy
Digital pulsed fluoroscopy, with 10, 15, 30 p/s in 1k/12-bit matrix and digital real-time filtering for advanced noise reduction with motion detector
Additional fluoroscopy pulse rate from 0.5 to 7.5 p/s* (CAREVISION)
Roadmapping (requires DSA option) with automatic pixel shift
Overlay fade, online superimposing of active fluoro and reference image
Store Monitor: Last Image Hold – images (LIH) can be stored on the disk
Store Reference: LIH image can be stored as a reference image, even when fluoroscopy is performed
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., 17 s at 30 p/s, 34 s at 15 p/s
Roadmap Plus*[1]
Simultaneous display of subtracted, native fluoroscopy and reference images
DR – 0.5 - 7.5 f/s^{+} [1]
Individual and serial images in original matrix size, full format and zoom 1 + 2 in 2k*, digital real-time filtering, individual image and series frame rates from 0.5 f/s to 7.5 f/s native, including time-controlled and manually variable frame rates
Acquisition, display, and storage in original matrix size (up to 2k)*
DSA – 0.5 - 7.5 f/s^{+} [1]
Digital subtraction angiography in original matrix size, full format and zoom 1 + 2 in 2k*, digital real-time filtering, individual image and series frame rates from 0.5 f/s to 7.5 f/s, including time-controlled and manually variable frame rates
Acquisition, display and storage in original matrix size (up to 2k)*
Remask, peak opacification for iodine contrast (MaxOpac) and CO_2 contrast (MinOpac), display of anatomical background (Landmark) from 0 to 100%
High-speed acquisition for DSA, DR*
Acquisition at 10/15/30 f/s
Subtracted display possible only with DSA
Cardiac acquisition*
Acquisition at 7.5, 10, 15 and 30 f/s, acquisition, display and storage in 1k matrix, 12-bit
Cardiac acquisition includes IC Stent* software for enhanced stent visibility: operable at tableside, available in < 30 s
PERISTEPPING*
Peripheral digital angiography stepping of stand 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

[1] If DSA option is selected; $^{+}$ Modular choice (several variations to choose from); * Option
Note: 2k imaging for 30 x 40 cm FD only

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Multi-axis system for interventional radiology

Operating modes
PERIVISION*
Peripheral digital angiography with stepping of the stand 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
Pixel shift
Manual pixel shift
Automatic pixel shift
Flexible pixel shift (rubber masking)
3D Acquisition* incl. DYNAVISION DSA/DR
Digital rotational angiography including 3D effect with dynamic, native subtracted image display and angle triggering. Angle triggering enables a reduction in dose while simultaneously improving image quality.
Bolus time and angle resolution can be preselected in the exposure program
Rotation speed up to 60°/s
Selectable exposure frequency up to 30 f/s in 1k matrix, 60 f/s in 0.5 k matrix
Dynamic subtraction display with optimal alignment of mask and filling
Automatic pixel shift over the entire scene
Digital rotational angiography with angle triggering for acquisition of *syngo* InSpace 3D high-contrast images* and *syngo* DynaCT low-contrast images*
syngo* DynaCT
Digital rotational angiography with angle triggering, for acquisition of *syngo* InSpace 3D high-contrast images and *syngo* DynaCT low-contrast images
Acquisition rate selectable up to 30 f/s in 1k matrix, 60 f/s in 512 matrix/native
syngo* DynaCT Cardiac
Creates cross-sectional 3D images of the beating heart/the left atrium. By using multiple, e.g., 2 – 4, C-arm runs with ECG-gated acquisition and 3D reconstruction to take into account the cardiac phases, the temporal resolution of the 3D volume is optimized. This results in high-resolution visualization of moving cardiac structures.
Large Volume *syngo* DynaCT*
3D large volume, intended for imaging of organs in the abdominal area
Two excentric rotational runs are combined into one set of data for 3D rendering

* Option

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Multi-axis system for interventional radiology

Overview of operating modes
DR, single image – 0.5-7.5 f/s
DSA, single image – 0.5-7.5 f/s
High-speed acquisition for DSA*, DR up to 30 f/s*
Dynavision DR-DYNA up to 60 f/s*
Dynavision DSA up to 60 f/s*
Card acquisition – FD 30 x 40 up to 30 f/s*
Card subtraction – FD 30 x 40 up to 30 f/s*

Additional functions
ECG recording and storage*
Recording, storage and display of an ECG waveform
ECG waveform displayed on the display with synchronous image information
ECG-triggered fluoroscopy*
ECG-triggered fluoroscopy provides a still image of the catheter even with moving objects. This enables the use of low pulse frequencies, resulting in a significantly lower dose compared to normal fluoroscopy/acquisition.

Post-processing modes
Changing window values
Zooming/Panning
Anatomical background**
Anatomical surroundings visible by fading in the native image
Electronic shutter
To collimate an image electronically
Annotation
For inserting predefined or free text and drawing lines, arrows and circles
Distance and angle measurement
Setting new mask*
A new mask can be set with "Move Mask" or "Replace Mask"
Pixel shift*
Manual pixel shift, automatic pixel shift, flexible pixel shift (rubber masking)

* Option; ** With DSA option only

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Multi-axis system for interventional radiology

Quantification
QVA – Vascular analysis for vessel diameters of 0.5 mm – 50 mm* (not for coronary analysis)
Measurement program integrated into the image 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*[2]
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 (surface-length and Simpson methods)
Centerline, radial and regional wall motion analyses
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 quantification
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
IZ3D*
IZ3D is reconstruction software for calculating 3D coronary models from at least two 2D projection images for coronary vessel analysis with determination of stenosis level, distance measurement, and diameter calculation.

Note: 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 algorithms are from the Thorax Center at the Erasmus University in Rotterdam. They are clinically validated and internationally recognized for scientific purposes (multicenter studies).

* Option; [2] Only on cardiac acquisition scenes

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syngo DynaCT*

For reconstruction of two-dimensional images acquired via Artis angiography systems into three-dimensional images or models

Protocols on acquisition system support standard imaging, the C-arm travels around the patient in an arc

syngo DynaCT Cardiac*

Fast acquisition mode:
Creates cross-sectional images of structures with limited movement like the left atrium, the pulmonary vessels and the aortic arch with just one 5 s run of the C-arm.

ECG-gated acquisition mode:
Creates cross-sectional 3D images of the beating heart. By using multiple, e.g. 2 – 4, C-arm runs with ECG-gated acquisition and 3D reconstruction to take account of the cardiac phases, the temporal resolution of the 3D volume is optimized. This results in high-resolution visualization of moving cardiac structures.

Soft tissue imaging for interventional radiology applications[1]

Two-dimensional images acquired via native rotational angiography are used to obtain CT-like slices or CT-like images

Standard CT post-processing techniques are applied

High frame rates enable scans to be performed within approx. 5 – 20 seconds

syngo X Workplace*

syngo X Workplace high-end post-processing workstation, comprising Windows XP PC with *syngo*-based user software and network modules, for real-time 3D reconstruction and 3D viewing

Optional

In-room controls and display

Further recommended *syngo* X Workplace applications:

syngo Neuro PBV IR
syngo InSpace 3D for Stenosis Measurement
syngo DSA
syngo Fly Through
syngo iPilot
syngo iGuide
syngo IZ3D
syngo DynaCT Cardiac
syngo iFlow
syngo 3D/3D Fusion
syngo Aortic Valve Guide**

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

Networking

Ethernet interface, full-duplex, gigabit transfer rate

* Option
** The product here mentioned is not commercially available in the US. Due to regulatory reasons their future availability cannot be guaranteed.

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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

Archiving
DVD drive for automatic digital image storage (incl. DICOM viewer) on a DVD or CD-R for offline data exchange in DICOM format, such as JPEG, Bitmap or AVI
DVD recorder for archiving fluoroscopies and acquisitions on a DVD
USB interface to copy images on a memory stick or on an external hard disk
DICOM viewer on CD or DVD

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

Integration of the Siemens Recording System
AXIOM Sensis XP Interface*
Interface to AXIOM Sensis XP hemodynamic and electrophysiological recording system for automatic acquisition or transfer of patient demographic data and system parameters (dose report)

Viewing in the examination room
Multi-Modality Viewing*
View images from the *syngo* Multi-Modality Workplace (e.g., *syngo* InSpace 3D, CT, MR, Angio), Terason ultrasound on a separate display
Conversion to PAL/NTSC*
Live images (DVI format) can be converted to a low-res PAL/NTSC video norm (PAL/NTSC format)
Dual monitor configuration*
Connection of an additional image monitor for parallel display of two different reference images

* Option

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Multi-axis system for interventional radiology

CARE	
CAREmatic	
Automatic X-ray control system for fully automatic calculation and optimization of exposure data based on fluoroscopic values	
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
CARevision	
Pulsed fluoroscopy with additional reduced pulse frequencies of 0.5, 1.0, 2.0, 3.0, 4.0, 7.5 p/s	
Pulse frequency can be adjusted to the requirements of each application to significantly reduce radiation exposure, particularly during interventions	
CAREprofile	
Radiation-free positioning of primary and semi-transparent collimators via graphic display in the LIH image on the image display	
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 (DIAMENTOR) is integrated into the collimator housing for acquisition of dose area product or reference air kerma / reference air kerma rate	
Displayed on the data display and 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)
Low-dose *syngo* DynaCT*	
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 Alderfer phantom.	
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.	
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.	

* Option

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Multi-axis system for interventional radiology

Operation

In the examination room

Complete system operation via modular control elements at the patient table for controlling C-arm movement, patient table, and collimators

Touchscreen control with multi-functional joystick for operating the imaging system including post-processing and quantification as well as selecting organ programs

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

Wireless footswitch*

Wireless connection[1]

Hands-free operation allows better focus on the patient and promotes sterile operations

In the control room

Siemens Healthcare universal *syngo* interface using keyboard and mouse for complete system functions such as post-processing, archiving, and configuring fluoro and acquisition 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*

[1] Not available in all countries
* Option

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Multi-axis system for interventional radiology

Flat detector 30 x 40	
Amorphous silicon flat detector with a 48 cm diagonal entrance plane	
High-resolution 2k** matrix (1920 x 2480) with 154 µm pixel size and 14-bit digitization depth	
High-speed fiber optic connection to the digital imaging system	
Integrated temperature stabilizer	
Integrated collision protection with removable grid	
Detector rotation	landscape/portrait selection with vertical display
Input fields	48, 42, 32, 22, 16, 11 cm (18.9", 16.54", 12.6", 8.66", 6.3", 4.33")
Material	aSi with CsI scintillator
Image cover	< 1.5 mm carbon fiber
Pixel size	154 µm
Maximum acquisition speed	up to 60 f/s
Matrix	up to 1920 x 2480
Digitization depth	14 bit
Spatial resolution of detector	3.25 LP/mm
Detector quantum efficiency (DQE)	≥ 73% (at 0.05 Lp/mm)
Modulation depth	≥ 60% (at 1.0 Lp/mm)
Modulation depth at the Nyquist frequency (3.25 LP/mm)	10%
Weight	20 kg (44 lbs.)

** 2k matrix possible only with DR/DSA/PERIVISION or DYNAVISION mode up to 7.5 f/s

Laser crosshairs*
Laser crosshairs for FD 30 x 40, integrated into the flat detector housing with tableside operation for simpler and quicker patient positioning
Class II laser, wavelength 600 – 700 nm (red), < 1 mW output power

Rotatable collimator
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

* Option

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Multi-axis system for interventional radiology

X-ray generator	
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)	1000 mA at 100 kV ≙ 100 kW 800 mA at 125 kV ≙ 100 kW
Tube current	0.5 to 1000 mA
Pulse frequency	max. 60 P/s
Max. mA in pulsed fluoro mode	250 mA (small focus) 68 mA (micro focus)
Pulse time	0.5 to 800 ms
Max. continuous power in fluoro mode	3000 W
kV and mA for continuous fluoroscopy	40 to 125 kV 0.1 to 24 mA
kV for acquisition	40 to 150 kV
CAREMATIC automatic X-ray control system for fully automatic calculation and optimization of exposure data based on fluoroscopic values	
Patient transparency monitoring	
Monitoring of tube load with data display	
kV and mA post-display on image display	
Generator control is fully integrated in the system control	

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Multi-axis system for interventional radiology

X-ray tube

MEGALIX Cat Plus 125/20/40/80-122GW (for the 30 x 40 detector)			
• New high-performance X-ray tube			
• Up to 40% greater fluoro power with new flat emitter technology			
• Increased contrast during fluoroscopy, especially for examinations on obese patients			
• Extended tube life, Increased lifetime			
• Oil/water cooled			
Max. exposure voltage (IEC 60613)	125 kV		
Focal spot (IEC 60336)	0.3	0.6 x 0.6[2]	1.0
Nominal power (IEC 60613) (thermal anode reference power = 300 W)	17 kW	38 kW	80 kW
Nominal power (thermal anode reference power = 0 W)	19 kW	42 kW	93 kW
Anode angle	12°		
Maximum anode heat content	2,500,000 J (3,375,000 HU)		
Heat content of the X-ray tube assembly	3,600,000 J (4,900,000 HU)		
Continuous heat dissipation of the tube assembly	max. 2900 W		
Anode rotation	150 Hz (3-phase current)		
Max anode current in fluoroscopy	250 mA		
Output	10 min 20 min > 30 min	4000 W 3000 W 2500 W	
Maximum cooling capacity of the anode	400,000 J/min. (540,000 HU/min.)		
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.)		

Artis **zee** Cockpit*

MX 300W	30" viewing area enables a new dimension in medical imaging in the control room. Up to 6 different image sources can be shown on the same display, allowing high flexibility in arranging images in 4 different screen layouts.
Resolution	2560 x 1600
Display area (W x H)	641 x 401 mm
Panel	TFT color LCD panel (VA)
Display Controller	
Video inputs	
Video input connector	6 x DVI-D (Artis **zee**, AXIOM Sensis, *syngo* Workplace, *syngo* Dynamics, *syngo* Imaging (XS), *syngo* Workflow) 1 x VGA

* Option; [2] Image quality was improved

Artis zeego

Multi-axis system for interventional radiology

Display Ceiling Suspension – DCS PRO+	
Ceiling-mounted suspension system for 2 to 6 displays enables height adjustment, longitudinal travel, tilt and 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°
2nd DCS* with 2 to 3 displays+	

Integrated Data Display
All examination-relevant data of the system and table geometric data, system messages, and dose data with the CAREWATCH option are displayed on the reference display of the imaging system

DCS-extended* / DCS Large Display extended*	
Ceiling-mounted suspension system DCS-extended for 3 to 8 displays enables height adjustment, longitudinal travel, tilt and swivel capabilities. Enhanced positioning range and flexibility by double pivot cantilever.	
Length of longitudinal rails	300 cm (118.1“)
Travel range of ceiling-mounted carriage	< 190 cm (74.8“)
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°

Display boom interface*
Universal interface for third-party display boom

* Option; + Modular choice (several variations to choose from); [1] Future availability

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Multi-axis system for interventional radiology

Displays		
19" Monochrome Flat Displays	**DSB 1906-DC+**	**DSB 1908-DC+**
19" TFT high-contrast black-and-white display for flicker-free, distortion-free live image and reference image display for 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	
Maximum brightness	1000 cd/m²	
Typical brightness	400 cd/m²	
Contrast ratio	600 : 1	
Horizontal viewing area	170°	
Power consumption	< 75 VA (W)	

19" Color Display DSC 1904-DC+	
Suitable for color display in the control room with ambient light sensor; not to be used as live display in the examination room	
Diagonal screen measurement	19" (48 cm)
Image display	1280 x 1024
Maximum brightness	280 cd/m²
Typical brightness	137 cd/m²
Contrast ratio	450 : 1
Horizontal viewing area	170°
Power consumption	< 75 VA (W)

* Option; + Modular choice (several variations to choose from)

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Multi-axis system for interventional radiology

Artis zee Large Display*	
DSC 5608-DC	
56" viewing area enables a new dimension in medical imaging. Up to 21 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.	
Resolution	3840 x 2160
Display area (W x H)	1244 x 700 mm
Panel technology	Color, TFT, MVA
Viewing angle	176° H and V
Contrast ratio	1200 : 1; min. 900 : 1
Luminance	450 cd/m² (131 fL); min. 400 cd/m² (117 fL)
LUT	11 bit
Antireflection coating	Anti-glare
Dimensions without stand (W x H x D)	1317 x 774 x 144 mm
Weight without stand	49 kg

Display Controller	
Input performance	
Total number of inputs	Digital: 21 Analog: 6
Number of simultaneous visible inputs	21
Digital input performance	DVI-D single link; max. 1920 x 1200, 60 Hz
High speed analog input performance (3 ports)	Max. 1600 x 1200, 60 Hz
Standard analog input performance (3 ports)	Max. 1280 x 1024, 75 Hz
Connectivity	21 inputs can be combined: Digital: up to 21 (DVI-D) Analog: up to 6 (DVI-I and VGA)
Ambient conditions	
Operating temperature	0°C to + 40°C (– 32°F to + 104°F)
Storage temperature	– 20°C to + 55°C (– 4°F to + 131°F)
Operating humidity	10% to 80%, relative, not condensing
Storage humidity	10% to 95%, relative
Barometric pressure	700 hPa to 1060 hPa
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
Degree of protection	IP20
Dimensions (W x H x D)	482.6 x 177 x 470 mm
Weight	< 20 kg

* Option

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Multi-axis system for interventional radiology

Injectors

MEDRAD MARK V ProVis*	
Contrast medium syringe	150 ml
Flow rates for 150 ml syringes	0.3 – 10.0 ml/s, ml/min/hr in 0.1 ml/s increments 10 – 50 ml/s in 1 ml/s increments 0.3 – 10.0 ml/min/hr in 0.1 ml/min/hr increments 10 – 59 ml/min/hr in 1 ml/min/hr increments
Release delay for injection or radiation	0 to 99.9 s in 0.1 s increments
Pressure limit	6 to 83 bar, corresponds to 100 to 1200 psi
Cylinder	150 ml
Feedback on actual injection parameters	
Mechanical construction	movable stand, removable injector head
Rack mount version	
Ceiling-mounted injector head, swivel only or swivel/movable mount	

ACIST CV* (Order through SPH price book)	
Contrast medium syringe	100 ml
Flow rates	0.6 to 40 ml/s in 0.1 increments
Release delay for injection or radiation	0 to 99.9 s
Pressure limit	14 to 83 bar (200 to 1200 PSI)

ANGIOMAT Illumena* (Order through SPH price book)	
Contrast medium syringe	150 ml
Flow rates	0.1 ml/s to 9.9 ml/s in 0.1 ml/s increments 10 ml/s to 40 ml/s in 1.0 ml/s increments 0.1 ml/min to 9.9 ml/min in 0.1 ml/min increments 10 ml/min to 999 ml/min in 1.0 ml/min increments
Pressure limit	5.7 to 83 bar (75 to 1200 PSI)
Adjustable volume	Volume: 0.1 to volume in syringe in 0.1 ml increments up to 9.9 ml, 1.0 ml increments thereafter
Fill rate	0.2 to 25 ml/s
Feedback on actual injection parameters	
Mechanical construction	movable stand, removable injector head
Rack mount version	
Ceiling-mounted injector head, swivel only or swivel/movable mount	

* Option

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Multi-axis system for interventional radiology

Injectors

MEDRAD Avidia Pedestal* (not for USA, and not in conjunction with surgery table)	
Contrast medium syringe	150 ml
Contrast flow mode fixed	0.1 to 50 ml/s
Variable syringe filling speed	1.0 to 20 ml/s
Pressure range	83 bar (1200 PSI)
Syringe	150 ml
Feedback on actual injection parameters	
Mechanical construction	movable stand, removable injector head
Rack mount version	
Injector head on overhead tube support, swivel only or swivel/movable mount	

MEDTRON Accutron HP-D*/** (only for EU)	
Contrast medium syringe	2 x 200 ml
Flow rates	0.1-30 ml/s in 0.1 increments
Adjustable rise time	0.1 to 10 seconds, 0.1 s increments
Pressure limit	83 bar, programmable in 5-83 bar in 1 bar increments
Cylinder	200 ml
Double head injector, feedback on actual injection parameters	
Mechanical construction	movable stand, removable injector head
Rack mount version	
Injector head on overhead tube support, swivel only or swivel/movable mount	

* Option; ** Not for USA

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Multi-axis system for interventional radiology

Remote Service*	
Preparation for Siemens Remote Service (SRS):	
Allowed hardware and software remote diagnosis	
Allowed remote system configuration, e.g., adding a DICOM node	
Early warning system to help ensure system operation (Guardian)	

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.	
Nominal power	15 kVA
Line voltage	400 V for 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. 65 seconds after switching on and restarting the generator, you will be able to work with continuous fluoroscopy in emergency operation mode.	
Nominal power	40 kVA
Line voltage	400 V for 440 V or 480 V; an adaptation to 440/480 V is required.

Installation data	
Line voltage connection, 3-phase current, ⅄/△	
Generator	
Nominal voltage[1] (3 ph ± 10%)	380, 400, 420, 440, 460 V at 50/60 Hz ± 1 Hz 480 V at 60 Hz ± 1 Hz
Fuse	internal 50 A, external 60 A slow-blow fuse
Power consumption	8 kVA for fluoro; 160 kVA for acquisition
Max. connection value	32.9 to 41.6 kVA
System control cabinet	
Nominal voltage[1] (3 ph ± 10%)	380, 400, 420, 440 and 460 V at 50/60 Hz ± 1 Hz; 480 V at 60 Hz ± 1 Hz
Fuse	internal 32 A, external 50 A slow-blow fuse
Power consumption	max. 17.2 kVA
Max. connection value	21.1 to 26.6 kVA

[1] Max. allowable nominal voltage between phases (L1, L2, L3) and PE 300 V

* Option

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Multi-axis system for interventional radiology

Internal line resistance for generator A100[2)]

U_N/P	100 kW	80 kW
380 V*	≤ 0.08 Ohm	≤ 0.10 Ohm
400 V*	≤ 0.09 Ohm	≤ 0.11 Ohm
420 V	≤ 0.09 Ohm	≤ 0.12 Ohm
440 V	≤ 0.10 Ohm	≤ 0.14 Ohm
460 V	≤ 0.11 Ohm	≤ 0.15 Ohm
480 V	≤ 0.12 Ohm	≤ 0.16 Ohm

* Resistance values in Ohm at U_N ± 10%
[2)] To achieve the full generator power, the measured internal line resistance may not exceed the following values

Standard accessories

Arm holder (pair)
Arm rest
Infusion bottle holder
Instrument tray
Set of body straps

Optional accessories

Please refer to separate catalog

Weight

Examination room	Floor stand	approx. 1813 kg	(3997 lbs.)
	Floor stand overhead carriage	60 kg	(132 lbs.)
	Corrugated hose with cables	40 kg	(88 lbs.)
	Display ceiling suspension (DCS Pro) (depending on configuration)	245 – 310 kg	(540 – 683 lbs.)
	Patient table (depending on table)	452 – 550 kg	(996 – 1213 lbs.)
	Control console cart	26 kg	(57 lbs.)
	Injector wall connection	5 kg	(11 lbs.)
Control room	Imaging system	approx. 150 kg	(331 lbs.)
	UPS for image system (option)	51 kg	(112 lbs.)
	Control room distributor	29 kg	(64 lbs.)
	Miscellaneous	22 kg	(49 lbs.)
Equipment room	Generator	300 kg	(661 lbs.)
	Cooling system	42 kg	(93 lbs.)
	System control cabinet 1	270 kg	(595 lbs.)
	System control cabinet 2 (only with OR table)	125 kg	(276 lbs.)
	Cable cabinet	120 kg	(265 lbs.)
	Stand control cabinet	167 kg	(368 lbs.)
Subsystem	Control console (option)	approx. 60.0 kg	(132 lbs.)
	Video container (option)	60.5 kg	(133 lbs.)
	Second data display (option)	9.0 kg	(20 lbs.)
	19" display for DVD recorder (option)	8.7 kg	(19 lbs.)
	DVD recorder (option)	4.6 kg	(10 lbs.)

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Multi-axis system for interventional radiology

System power consumption	
System in standby[1]	3.0 kVA + 0.4 kVA when tube cooling is running + 0.35 kVA when the Large Display is switched on[3]
System off[2]	1.6 kVA

[1] System is ready for radiation, but stand movement or radiation does not take place
[2] System switched off from the Artis zeego control console
[3] Large Display available only beginning with VC14

Note: Depending on the system configuration, different values are possible.

Ambient conditions (operation)		
Examination and control room	Temperature range: Relative humidity:	+ 15°C to + 30°C (recommended temp. 22°C [72°F]) 20 – 75% without condensation
Imaging system	Temperature range: Relative humidity: Temperature gradient: Air flow: Noise level:	+ 10°C to + 35°C 20 – 75% without condensation max. 10°C/h 630 m^3/h < 53 dB (A)
Generator	Temperature range: Relative humidity: Temperature gradient: Air flow: Noise level:	+ 10°C to + 35°C 20 – 75% without condensation max. 5°C/h 160 m^3/h < 55 dB (A)
Cooling system (for MEGALIX tube)	Cooling air: Air flow: Noise level:	+ 5°C to + 30°C (frost-free room) 950 m^3/h 55 dB (A) at 50 Hz; 59 dB (A) at 60 Hz
System control cabinet 1	Temperature range: Relative humidity: Temperature gradient: Air flow: Noise level:	+ 15°C to + 30°C 20 – 75% without condensation max. 5°C/h 650 m^3/h 48 dB (A)
System control cabinet 2 (only for OR table)	Temperature range: Relative humidity: Temperature gradient: Air flow: Noise level:	+ 10°C to + 35°C 20 – 75% without condensation max. 5°C/h n/a n/a

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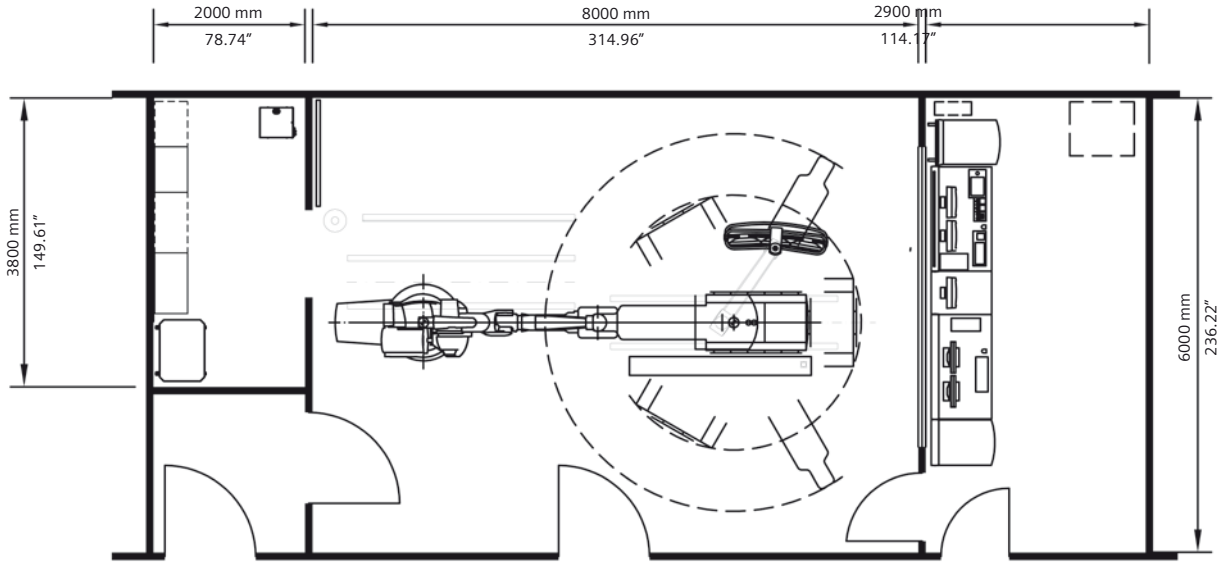
Multi-axis system for interventional radiology

Room plan in mm (inches)



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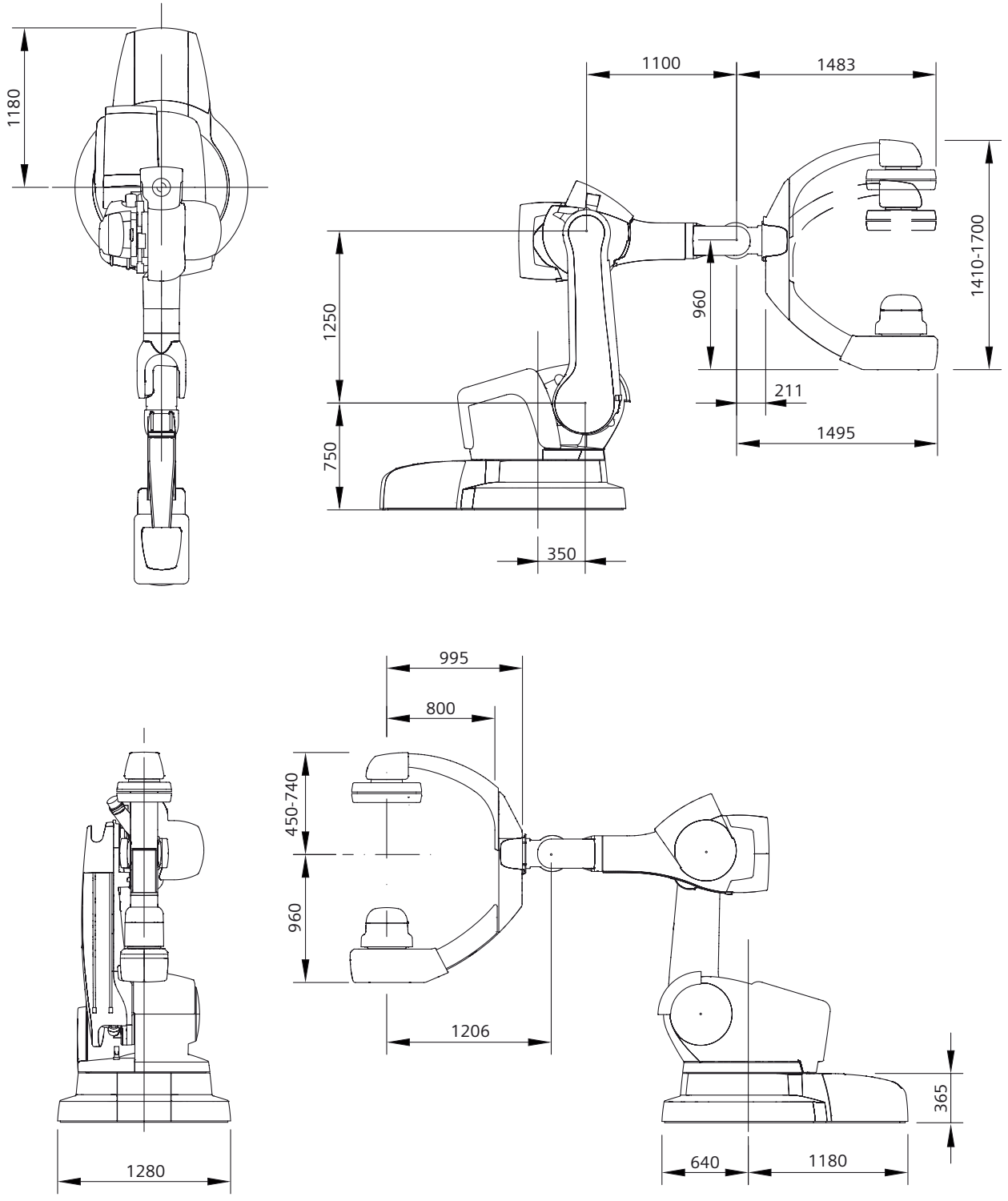
System view in mm (inches)



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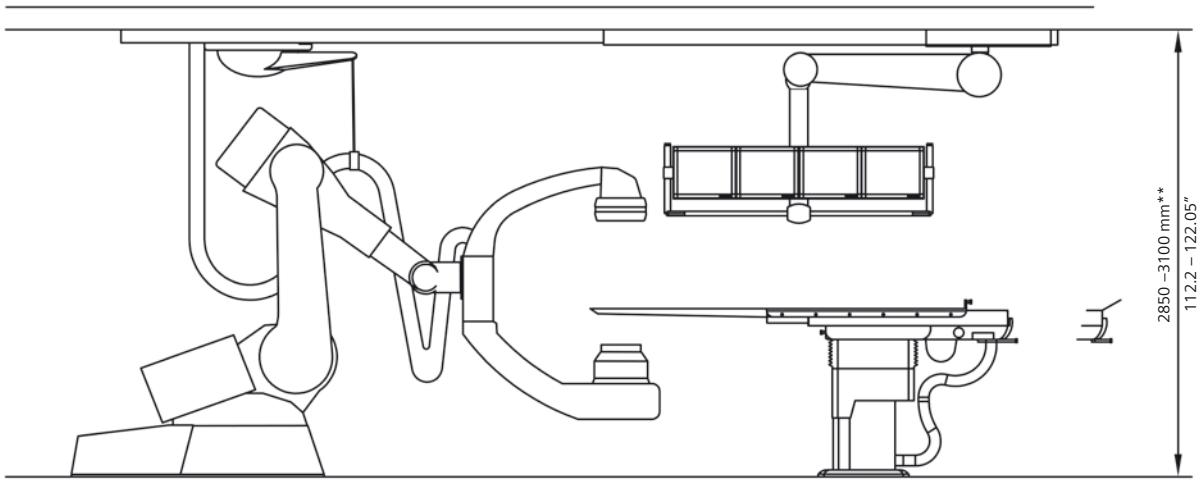
Multi-axis system for interventional radiology

System view in mm (inches)



** With a room height between 2600 – 2850 mm [102.36 – 112.2"], the ceiling park position can only be used with restriction (limited head space for persons > 180 cm [70.87"])

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