

PURCHASE ORDER: 652-B80066

REQUESTING SERVICE: MEDICAL/CARDIOLOGY  
SHIP TO: CHF,ACQ & MAT MGT  
V.A. Medical Center  
REC. WHSE. BLDG 500  
1201 BROAD ROCK BLVD.  
RICHMOND, VA 23249

Qty

Item Description

1

**Artis Q.zen ceiling EP**

Artis Q.zen ceiling for electrophysiology

The Artis Q.zen product line uses a new detector technology based on crystalline silicon, setting new standards for low-dose fluoroscopy in interventional imaging. The GIGALIX X-ray tube concentrates high pulse power on small, square-shaped focal spots (flat emitter technology for all focal spots).

The Artis Q.zen ceiling for electrophysiology now features PURE(r). PURE adds smooth interaction to Siemens' smart technologies. It is designed to boost productivity and enhance outcomes for certain clinical applications, while increasing image quality and reducing dose.

The ceiling-mounted C-arm offers highly flexible positioning. The motorized rotation of the C-arm from a head-end position to a lateral position allows for free head access and full patient coverage without rotating the table.

The patient table is fitted with a freely movable patient positioning tabletop.

The mid-size zen30HDR detector enables ultra-low dose imaging.

Digital acquisition technology with up to 7.5 f/s in 1k/12 bit matrix is available.

The complete CARE+CLEAR package offers optimal image quality at the lowest reasonable dose.

Live and reference images are displayed on two 19" flat screens in the exam room. In the control room live images are displayed on a third screen.

1

**Automap**

Automatic stand positioning depending on the selected reference image and automatic reference image selection depending on the stand positioning.

1

**4P wireless footswitch inst. of cbl**

Wireless footswitch connection

Note: Wireless replaces the wired connection.

**Qty****Item Description**

1

**Head-end table tilting**

Motorized tilt and stepping of the patient table in longitudinal direction for electrophysiological or peripheral examinations, for example, as well as for stabilizing a patient. Includes a power-assisted tabletop control module.

Notes:

Table tilting reduces the maximum patient weight to 200 kg. As before however, it is possible to install up to 40 kg of additional accessories.

Note: It is mandatory to provide UPS back up with this table option in order to comply with IEC 60601-2-43 CL. 201.15.101. Reason: In the event of power failure a neutral table position suitable for CPR must be reachable within 15 seconds. Please include a suitable UPS from Siemens as required or make sure any existing / planned UPS provision for your installation site will satisfy the requirement

1

**Table tilt and cradle (OR)**

Motorized dual-axis tilt and stepping of the patient table in longitudinal direction for surgical, electrophysiological, or peripheral examinations, for example, as well as for stabilizing a patient. Includes a power-assisted tabletop control module.

Notes:

Table tilting reduces the maximum patient weight to 200 kg. As before however, it is possible to install up to 40 kg of additional accessories.

1

**wide TT thin mat. ins. of std. TT**

Patient positioning tabletop made of carbon fiber in wide, straight design for interventional, radiological examinations. The tabletop is straight all the way to the head area.

Matching the wide patient positioning tabletop, special-foam mattress, 4 cm, made of open-pore polyurethane material and a latex-free cover.

Note: The wide patient positioning tabletop with the thin mattress replaces the narrow tabletop, including mattress, described in the basic configuration. The head-end holder, handles, and shoulder supports are eliminated because they can only be used with the narrow tabletop.

1

**Ceiling rail extension**

Rails for extending the longitudinal travel range of the display suspensions system by 1.2 m.

1

**Fluoro Loop**

Storage and review of dynamic fluoroscopic sequences (Fluoro Loop). This saves an additional acquisition and reduces dose. The maximum storable fluoroscopic time depends on the selected pulse rate, e.g. 34 s at 30 p/s, 68 s at 15 p/s.

1

**CLEARstent Live**

CLEARstent Live is a real-time stent enhancement tool and provides a stabilized view of the moving stent which is displayed on the Assist/Reference Monitor. CLEARstent Live allows real-time verification of stent positioning while moving the device. This enables the physician to precisely position the stent in relation to the anatomy of the heart and stents that already have been implanted. Contains both CLEARstent Live license and CLEARstent license.

The CLEARstent imaging function allows an improved display of fine stent structures, i.e. the grid of inflated stents. CLEARstent is a post-processed stent enhancement and may be used also on previously acquired images.

Using the CLEARstent function special reference images from any scene or fluoroscopy scene acquired natively will be generated. Composite images are created by averaging several frames of a scene and by considering the alignment of balloon markers. If an ECG signal is available, the heart phase will also be taken into account.

Qty	Item Description
1	<p><b>Card acq. mode w/high speed</b></p> <p>Fast acquisition module for DR and DSA as well as digital card acquisition technology with frame rates of 7.5, 10, 15 and 30 f/s, acquisition, display and storage in 1k matrix.</p>
1	<p><b>Vascular analysis</b></p> <p>Vessel analysis with determination of degree of stenosis, distance measurement and calibration.</p>
1	<p><b>syngo EP Engine</b></p> <p>A workstation for reconstruction, post-processing and handling of 3D information including specific applications for Electrophysiology.</p> <p>The package includes the following functionalities:</p> <ul style="list-style-type: none"> <li>- 3D high-contrast and CT-like soft-tissue imaging ( syngo DynaCT and syngo DynaCT Cardiac (triggered/ untriggered)) a proven 3D reconstruction algorithms for 3D reconstruction of the heart from projection images of a rotational angiography from an Artis system with flat detector</li> <li>- 3D roadmap for dynamic overlay of planning data and 3D volumes on live fluoroscopy,</li> <li>- Marking of points or lines on the 3D information and overlay of these markings on live fluoroscopy,</li> <li>- Workflow support for electrophysiology guidance (including one-click segmentation tool for the left atrium)</li> <li>- In-room control for table-side operation of advanced applications,</li> <li>- Expert-i functionality for remote operation of the XWP.</li> </ul> <p>- 3D Wizard for expert step-by-step guidance in 3D acquisition,</p> <p>- Parallel patient processing capabilities,</p> <p>- Fusion functionality (3D/3D and 2D/3D) for integration of pre-interventional 3D datasets from other modalities into the Angio-room.</p> <p>Please note - availability of this following new feature depends on the regulatory release status in your country. (Please check with your respective Siemens representative to verify availability.)</p> <p>New: Workflow support for electrophysiology guidance, including one-click segmentation and automatic model-based segmentation tool for the left atrium.</p>
1	<p><b>Upgrade DynaCT</b></p> <p>syngo DynaCT offers excellent soft tissue image quality (512 matrix) through rotational angiography, for neuro and general interventional angiography. Abdominal soft-tissue images are reconstructed within 30 seconds, and neuro soft-tissue images in less than one minute.</p> <p>syngo DynaCT 360° Large Volume in conjunction with an Artis zeego system allows the acquisition of a large 3D volume for the DynaCT reconstruction in only six seconds. This results in better image quality, less motion artifacts and the possibility of saving contrast medium.</p> <p>DynaCT is a prerequisite for Dyna3D Highspeed.</p>
1	<p><b>Lower body radiation protection</b></p> <p>This radiation shield protects the user from scattered radiation when standing at the table side. It can be attached to the accessory rails either on the right or on the left side of the patient positioning table.</p> <p>It provides the user an additional accessory rail.</p> <p>It includes a basic unit</p> <p>(71.5 cm x 75 cm / 28.2" x 29.5" (l x w); 7.7 kg / 16.98 lb),</p> <p>one lower body radiation protection pivot swivel element</p> <p>(77 cm x 48 cm / 30.3" x 18.9" (l x w); 3.8 kg / 8.4 lb)</p>

**Qty****Item Description**

and three clip-on units  
(57 cm / 22.4" x 33 cm / 12.99" (l x h), 2.2 kg / 4.85 lb;  
27 cm / 10.6" x 33cm / 12.99", 0.9 kg / 1.98 lb and  
27 cm / 10.6" x 25cm / 9.8", 1 kg / 2.2 lb )  
with a lead of 0.5 mm / 0.02" Pb.  
The maximum weight of the accessory rails is 40 kg (88.2 lb).

Intended only for use with Artis / ARTIS tables.

2

**Moveable upper body rad. protection**

This radiation shield protects the user from scattered radiation.  
For room heights up to 290 cm / 114.2".  
It includes a ceiling rail (4 m / 157.5"), a ceiling mounted and movable stand (80 cm or 57 cm / 31.5" or 22.4"), a support arm (75 cm x 90 cm / 29.5" x 35.4") and an acrylic glass.  
The shield is made of acrylic glass with lead equivalent of 0.5 mm  
(w x h: 61 cm x 76 cm / 24" x 29.9"), which can pivot and rotate around a fixed point with a range of 360 degrees.  
The operation range is limited when used with Artis floor/biplane MN.  
Max. weight: 18 kg / 39.68 lb.

1

**VA kit Artis Q/Q.zen systems**

Second set of system documentation (operator manual, etc.)

1

**Intercom - Comfort**

Intercom system for communication between examination room and control room.  
It includes  
- a microphone with a control box for the control room  
- a microphone with an adaptive acoustic filter for background noise suppression for the examination room  
- a footswitch for conversation selection for the examination room  
The microphone of the examination room is installed on the ceiling.

1

**Large Display diagn. Protection**

The high quality laminated glass protective screen protects the panel of the monitor against mechanical damage and fluid ingress on the front.  
It is suited for clinical image evaluation.  
Features:  
The laminated glass enforces high mechanical strenght and resistivity against mechanical impact,  
the special coating reduces reflections for a continuous image quality,  
excellent spectral transmissison of at least 98%,  
can be added to existing Artis Large Display installations.  
Weight: approx. 12kg (55") up to 16kg (60")

Note: Observe the maximum permissible load of the display suspension, a combination with other options mounted to the display suspension might be restricted.

1

**Narrow tabletop with thick mattress**

This tabletop is for maximum freedom of C-arm angulation.  
It includes a carbon fiber patient tabletop and a set of three Velcro body straps for securing and compressing the patient.  
Maximum weight: 240 kg (529.1 lb)  
Maximum weight in connection with tilting table: 200 kg (440.93 lb).  
Weight: 10 kg / 22 lb.  
Length: 2287 ± 1mm / 90 ± 0.04".  
Width head-end: 228 mm / 8.98".

**Qty****Item Description**

Width middle body: 450 mm / 17.7".

Width lower body: 525 ± 0.5 mm / 20.7 ± 0.02".

Matching this tabletop a mattress and a mattress cover is included. This mattress adapts to the individual body shape under the influence of body weight and heat.

It is made of open-pore polyurethane material.

Mattress thickness: 70 ± 5 mm / 2.8".

Mattress weight: 14.9 kg / 32.8 lb.

1

**Acc. rail module, wide tabletop**

This is an attachable module with accessory rails for placing the control modules near the patient's abdomen.

It includes a carbon fiber module with accessory rails (45 cm / 17.7") attached to the right and left slides over the outer edges of the patient positioning tabletop.

Length: 48 cm (18.9 ")

Width (without accessory rails): 47.5 cm (18.7") 55 cm / 21.65"

Width (with accessory rails): 54.5 cm (21.5") 62 cm / 24.4"

Length: 62 cm (24.4")

Weight: 5.9 kg (13 lb)

Maximum weight: 40 kg (88.19 lb).

Intended only for use with Artis / ARTIS wide tabletop.

1

**Arm rest for radial access wide**

Carbon fiber armrest for cardiology and angiography to connect at the table top. The unilateral armrest can be used for radial access and other arm rest applications.

It is made of radiolucent carbon fiber material nearly free of shadows and artifacts and it is easy to clean.

With an additional pad made of the similar material as the table mattress and additional form-cushions with fixation material to overextend the wrist to get an easy access to the radial artery. The armrest is rotatable and latching in 22, 5° steps from 0° to 180° (8 steps) by slightly lifting and moving. It can be mounted on left or right side of the table top shape. This type can be mounted on wide and long tabletops. The max. Load is 10 kg. Weight: 2, 5 kg

1

**Arm rest**

Arm support used for the arm approach. Length: 1 m (39.4"). Slides underneath the patient mattress and is held in position by the patient's weight.

Made of radiolucent carbon fiber material which is easy to clean. It includes two additional support pads of two different heights (4 and 7 cm).

Length pad: 60 cm / 23.62"

Width: 9 to 20 cm / 3.54" to 7.87"

Maximum weight: 5 kg (11.02 lb)

Weight (with pads): 2.1 kg / 4.63 lb

Intended only for use with Artis / ARTIS tables.

1

**Arm holder (pair)**

The patient's arms can be comfortably placed along the body using these two arm holders. They slide underneath the patient mattress and is held in position by the patient's weight.

It includes two pairs of arm holders of different length (540 mm / 690 mm - 21.2" / 27.2") and height (85 mm / 115 mm - 3.35" / 4.53"), suitable both for thick and thin patient mattresses.

Weight small arm holder: each 0.65 kg / 1.43 lb

Weight large arm holder: each 0.95 kg / 2.09 lb.

Intended only for use with Artis / ARTIS tables.

1

**Sec. operation in the control room**

Interface for connecting the additional system control from the control room.

Qty	Item Description
	Rail profile for hanging control modules (e.g. the table module) in the control room.
	Safety button for switching off all system functions from the control room.
1	<b>Secondary Hand Switch Ctrl (C Room)</b> Additional hand switch for radiation release and additional control functions.
1	<b>DICOM RIS-Modality Worklist</b> Import of patient/examination data from an external RIS/HIS patient management system with DICOM MWL (Modality Worklist).
1	<b>OEM recording system interface</b> Cable connection to an OEM measurement system.
	Holder for the ECG interface when using an OEM measurement system in the examination room.
	Recording, storage, and display of an ECG lead. Displayed together with the image information on a single monitor.
1	<b>Injector conn. in the control room</b> Interface for controlling the contrast medium injector in the control room.
	Injectors can be offered by Siemens Healthcare Accessory Solutions
1	<b>Large Display</b> Preparation for the large color flat screen display on a ceiling-mounted, longitudinally mobile, swiveling, rotating, and height-adjustable display holder in the examination room.  Note: If a Large Display is selected, the Artis basic configuration includes a connection kit for the Large Display instead of the displays for the examination room. The type of large display can be chosen with a separate position.
1	<b>Large Display video controller 18</b> Large Display Video Controller 18 is the middle of three different video controller sizes. A maximum of 18 video signals can be connected and displayed simultaneously on the Large Display. The Large Display video controller 18 receives various internal and external video signals for presentation to scale on the Large Display. Up to 18 external and internal video sources can be connected (max. 14 DVI-D and 4 analog (VGA) channels).
1	<b>Add 19" display for LD (rear mount)</b> 19" TFT display including 36 m cable with DVI-D connection and transceiver for display installation on the rear of the DCS in combination with the Large Display.
1	<b>LD High Contrast panel size 55"</b> Large color flat screen display (including cables) for the examination room, with a panel diagonal of 55". This large display version provides an excellent clinical image quality due to its new IPS panel technology.
1	<b>Artis Cockpit - 1 console</b> The Artis Cockpit enables the operation of up to 9 systems and the presentation of up to 9 video signals on a high-resolution High Bright 30" display. The connected systems are operated via keyboard and mouse.  Attention: If a Cockpit is selected, the Artis basic configuration includes a connection kit for the Cockpit instead of the display for the control room.

Qty	Item Description
1	<p><b>Initial onsite training 32 hrs</b></p> <p>Up to (32) hours of on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Training will cover agenda items on the ASRT approved checklist. Uptime Clinical Education phone support is provided during the warranty period for specified posted hours. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p>
1	<p><b>Follow-up training 32 hrs</b></p> <p>Up to (32) hours of follow-up on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Uptime Clinical Education phone support is provided during the warranty period for specified posted hours. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p>
1	<p><b>Follow-up training 12 hrs</b></p> <p>Up to (12) hours of follow-up on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Uptime Clinical Education phone support is provided during the warranty period for specified posted hours. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p>
1	<p><b>Additional onsite training 32 hours</b></p> <p>Up to (32) hours of on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Training will cover agenda items on the ASRT approved checklist if applicable. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p>
1	<p><b>GOVT Training Class (T &amp; L not included)</b></p> <p>Tuition for (1) government attendee to attend a classroom course of choice at one of the Siemens training centers. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p>
1	<p><b>Eaton 93PM-150 kW UPS</b></p> <p>Complete system backup without interruption. One UPS per lab.</p> <p>Includes the following:</p> <p>Eaton 93PM UPS Electronics Cabinet w/integrated maintenance bypass sidecar  Eaton 93PM Single Battery Cabinet System (Full load back-up time @ 150kW of 7.1 minutes.)  Eaton 93PM Remote Monitoring Panel  Network Card  Eaton 24x7 start-up  One year (24x7) warranty through Eaton Corp.</p> <p>Not approved for sites that require OSHPD.</p> <p>Shipment is to customer's dock. Customer is responsible for logistics from the dock to inside location.</p>
1	<p><b>IEC Main Disconnect Panel - AX/125A</b></p> <p>Integrated Electrical Cabinet/Main Disconnect Panel for Artis single plane systems.</p>

**Qty****Item Description**

Components supplied:

- IEC Main Disconnect Panel
- The Installation, Operations and Service Manual
- 4 sets of Emergency Power Off push buttons

Panel Dimensions: 30 in x 20 in x 8 in (H x W x D)

Weight: 67 pounds

This product is certified for OSHPD sites.

DOES NOT INCLUDE installation. Customer is responsible for the installation of the cabinet. Includes one year warranty. Service provided by Siemens.

1

**Standard Rigging zee SP GOV**

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**Blue anti-fatigue floor mat for hospital**

Offset Part 14434137 VA Kit Artis Q/ Q.zen systems

One complimentary biomedical tuition is included with the purchase of this system. This training

Offset Initial onsite training 32 hours (



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**OPTIONS on Quote Nr:**

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**OPTIONS**

**Qty**

**Item Description**

1

**syngo CTO Guidance**

Expand your procedure mix by treating more CTO patients

Treating Chronic Total Occlusions (CTOs) is one of the most challenging procedures in interventional cardiology. Incomplete crossing of the lesion is a high risk.

syngo CTO Guidance enables better planning with automatic segmentation of coronaries coming from the CTA. This helps to get a better understanding of the lesion and planning the procedure. Further, it provides additional information during the procedure and guidance with color-coded COROwave to avoid foreshortening.

This enables more physicians to treat complex CTO cases and helps to expand the hospital's procedure mix.

syngo CTO Guidance provides industry-leading support and guidance during CTO revascularization procedures.

# Detailed Technical Specifications

## Description

### System description:

The single plane X-ray angiography system for digital acquisitions was designed to meet the requirements of modern angiography and interventional procedures, with a focus on electrophysiology.

### C-arm ceiling-mounted stand:

System cable outlet at the ceiling carriage, on the patient's left side.

- Up to 5 preprogrammed work positions, additional 50 user-definable work positions and 3 direct positions can be stored and recalled from table side.
- One single joystick for patient angle oriented operation of C-arm and change of source image distance (SID).
- Integrated computerized collision protection
- C-arm positioning 0° to the head end and variable up to 135° to the left and right side along the patient longitudinal axis.
- Double oblique projections of  $\pm 100^\circ$  in orbital movements and up to 330° (+180°/-150°) in rotational movements.
- Variable C-arm speeds up to 25°/s.
- Variable focal-spot-to-detector distance between 90 cm and 120 cm.
- Isocenter-floor distance 108 cm.
- Focus-isocenter distance 78.5 cm.

### MULTISPACE.T

The stand can be positioned on the left or right of the patient or at the head end, or at any angle in between. It can be moved longitudinally to any position along the length of the patient and also has a park position at a sufficient distance from the patient.

In Focus allows the projection angle to the patient to remain unchanged when rotating the C-arm around the table.

IsoTilt allows the projection angle to the patient to remain unchanged when tilting the patient table (if the tilting function is available).

Both In Focus and IsoTilt improve the efficiency of an examination because there is no need to spend time adjusting the projection angle.

### Patient table configuration

#### Table

- Direct patient access from all sides, both through the swiveling table and large tabletop cantilever.
- Electromechanical release of table swivel at the touch of a button at the table.
- Telescopic foot with motor-driven height adjustment.
- Maximum patient weight: 250 kg. It is possible to install up to 40 kg of additional accessories, plus a further 100 kg for patient resuscitation.

The table can be rotated to ensure quick access to the patient even in emergency situations.

#### Tabletop

Wide-shaped carbon fiber patient positioning tabletop with head-end recess, ideal for cardiological applications. Tabletop tapered in the thorax area for maximum freedom of C-arm angulation.

## Description

### Mattress

Matching, special-foam mattress, 8 cm, incl. a latex-free cover.

This visco-elastic comfort mattress reacts to temperature and has the special property of adapting to the individual body shape under the influence of body weight and heat.

### Application-specific accessories

- Infusion bottle holder
- Unilateral armrest: Carbon fiber armrest for cardiology and arm angiography to slide underneath the positioning mattress.
- ECG cable clips
- Hand switch for radiation release and additional control functions.

If narrow tabletop is selected:

- Head-end holder: Accessory rail plus holder, which is installed at the head end of the narrow tabletop. For attaching hand grips, shoulder supports, head supports, articulated arm supports, and anesthesia curtain.
- Handgrips with support  
The patient can hold on to these hand grips with his arms above his head resting comfortably on the supports. This is beneficial for examinations requiring the arms to be held in a specific position. The two stainless steel hand grips with two radiolucent arm rests (12.5 x 24.5 cm/ 4.9" x 9.65") are mounted to the accessory rails of the head-end holder.  
It can only be used in combination with the narrow tabletop and with the head-end holder.

## Operating modes

### Fluoroscopy

- Digital pulsed fluoroscopy with pulse frequencies of 7.5 p/s, 10 p/s, 15 p/s, and 30 p/s in 1k/12 bit matrix. Pulse rates of 0.5 - 4 p/s are also possible with CAREvision.
- Overlay fade: On-line overlay of the reference image onto the active fluoroscopy. This improves efficiency and safety during interventional procedures because additional information which is clinically necessary can be displayed directly in the live fluoroscopy image.

### Digital acquisition technology

Digital acquisition technology with frame rates of 0.5 to 7.5 f/s in 1k/12 bit matrix and digital real-time filtration.

Single image and serial acquisitions with time-controlled and manually variable frame rate.

The 1k image matrix with a bit depth of 12 bits allows an excellent image contrast by using 4,096 shades of grey. Thus, the image quality meets highest expectations in angiography and fulfills all prerequisites for precise diagnostics and safe interventions.

## CARE package

### ALARA principle

Siemens follows the ALARA principle: "As Low as Reasonably Achievable"; the CARE package (Combined Applications to Reduce Exposure) was developed based on this research and development principle to protect the examiner and the patient.

### Dose saving

- CAREfilter: Intelligent control software that minimizes X-ray dose. During fluoroscopy and acquisition, special copper prefilters are automatically inserted into the X-ray beam depending on current X-ray transparency, which is calculated continuously. This is necessary to ensure that the optimal prefilter value is always active. This automation makes work easier for the user because the optimal filter setting need not be adjusted manually for each case.  
The adaptive Cu prefiltration has five steps (0.1, 0.2, 0.3, 0.6, 0.9 mm) and is used to lower the reference air kerma and improve radiation quality by reducing the low-energy X-ray radiation.

## Description

- CAREvision with zen30HDR detector: Pulsed fluoroscopy with additional, reduced pulse rates of 0.5, 1, 2, 3, 4 p/s. Adaptation of pulse rate to the current application requirements for significant reduction of radiation exposure, especially during interventional procedures.
- CAREprofile: Radiation-free positioning of the primary and semi-transparent diaphragms by means of graphic display in the LIH (Last Image Hold). Collimator shutters and semi-transparent filters can be adjusted as a graphical overlay on the last-image-hold without any need for fluoroscopy or radiation.
- CAREposition: Radiation-free object repositioning by means of graphic display of the X-ray center beam and image edges in the LIH image. With CAREposition it is possible to reposition the object under visual control without radiation.
- In case of table movements the current position of the central beam and the image edges are superimposed on the LIH image as orientation points.
- Low dose acquisition: enables dose savings of up to 67 % during the examination. The Low Dose Acquisition protocol can be released with a separate pedal on the footswitch.

### Dose monitoring

- CAREwatch: Display of the measured dose-area product and the calculated patient reference air kerma on the flat-screen display. Electronics unit with DIAMENTOR measurement chamber integrated in the collimator housing for dose acquisition.  
Configurable screens on the data display and imaging system monitor:  
During fluoroscopy: Reference air kerma rate.  
During fluoroscopy interval: Accumulated reference air kerma or dose-area product, or percentage of the reference air kerma limit (total from fluoroscopy and acquisition).
- CAREguard: Monitoring the reference air kerma. If the accumulated reference air kerma exceeds one of the three configurable limits, a warning appears on the live display and tableside on the touchscreen control. This allows ideal monitoring of the accumulated reference air kerma during the examination.
- CAREmonitor: Special model-based monitoring of the measured skin entry dose, taking into account the geometric conditions of the system (actual device angulation, table position, patient weight, patient size). It then continually displays whether the skin entry dose applied to a specific region of the patient's body exceeds a specific configurable upper limit. CAREmonitor continually calculates and displays the actual accumulated skin entry dose as a portion of this upper limit. This helps the user to detect a potential patient hazard at an early stage. The patient is therefore better protected against the damaging effects of radiation.

### Dose documentation

- CAREreport: Dose information as part of the DICOM Structured Report. After each examination, the information is available in DICOM format and can be sent to a DICOM archive together with the image data, for example. Saving dose information in DICOM format also enables flexible analysis and further processing via a DICOM-capable analysis software/database.
- CARE Analytics: Standalone PC program for analyzing doses in angiography, CT, and radiological examinations. The data can be exported to statistics programs such as Microsoft Office Excel and SPSS for further analysis. CARE Analytics is available for download from the Siemens Intranet.

### **CLEAR package**

The CLEAR package enables optimized image quality through real-time processing of the image data without increasing the radiation dose.

- CLEARpulse optimizes the X-ray pulse in two ways: the high pulse power allows for additional filtration to reduce radiation. In addition CLEARpulse shortens the X-ray pulse through the use of grid-pulsed flat emitter technology in concert with a high anode rotation speed. The required X-ray energy can be provided in a shorter period of time, thereby shortening the X-ray pulse by up to 43% at constant tube voltage. Moving objects like coronary arteries can be visualized sharper and with less blurring artifacts.
- 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.
- CLEARvessel: Every pixel is analyzed in real time, and vessel edges are shown in high contrast without adding noise to the image.
- CLEARmotion: 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

## Description

significantly during fluoroscopy.

In addition there is Dynamic Density Optimization (DDO) for on-line harmonization of native series and single images.

### Image generation

#### X-ray generator

Microprocessor-controlled high-frequency X-ray generator with automatic dose rate control.

- Power output: 100 kW at 100 kV (IEC 60601-2-7 and IEC 60601-2-54).
- SID tracking: Automatic tube current adaptation to focal-spot-to-detector distance.
- CAREmatic: Automatic X-ray control system for fully automatic calculation and optimization of exposure data based on fluoroscopic data.
- Patient transparency monitoring.
- Tube load monitoring with indication in the live display.

The optimal X-ray parameters depend on the transparency of the patient at the current angulation, measured during fluoroscopy. These parameters are continuously calculated and updated. Test shots are no longer required. This ensures superior image quality and minimum radiation exposure for user and patient with every exposure release.

#### GIGALIX 125/40/90 - X-ray tube assembly

Dual-focus high-performance X-ray tube assembly with unique flat emitter technology for generating extremely high tube currents of max. 250 mA in fluoroscopy and 1000 mA in acquisition. This provides very good image quality even with heavier patients or steep angulations. The focus is always quadratic and permits outstanding perceptibility of small structures with a nominal focus of 0.4/0.6. The anode has a high heat storage capacity of 5.2 MHU and the metal center tube with liquid bearing technology allows a maximum cooling power of 1520 KHU/min. This means that pauses are not required during radiation, even for lengthy procedures. The X-ray tube is almost silent, which is an additional benefit for patient and user.

#### zen30HDR Flat Detector (High Dynamic Range)

The flat detector is based on a new crystalline silicon technology. The active sensor matrix enables strengthening of the signal directly at the pixel, reducing the electronic noise especially for fluoroscopy. Catheters and vascular prostheses can be displayed with extremely low dose, reducing radiation exposure for the patient and personnel. It is particularly beneficial for complex procedures with long fluoro times and when treating children.

160 µm pixel arrays provide highest spatial resolution of up to 3.1 LP/mm and excellent contrast. The detector features 16-bit analog-to-digital conversion, resulting in an extremely high gray scale resolution of 65,536 gray scales.

The extremely short readout time of the detector (2 ms) opens the possibility of higher frame rates in the future.

Fluoroscopy as well as image acquisition are always done in 1k matrix and 16 bit gray scale resolution with high detail visibility. Acquisition frame rates of up to 60 f/s are possible.

Usable input formats:

- Overview: 26.1 cm x 28.7 cm; diagonal 39 cm.
- Zoom 1: 22.5 cm x 22.5 cm; diagonal 32 cm.
- Zoom 2: 18.7 cm x 18.7 cm; diagonal 26 cm.
- Zoom 3: 14.3 cm x 14.3 cm; diagonal 20 cm.
- Zoom 4: 11.3 cm x 11.3 cm; diagonal 16 cm.
- Zoom 5: 7.2 cm x 7.2 cm; diagonal 10 cm.

The compact design with integrated collision protection provides maximum C-arm angulation range for excellent patient access.

## Description

Motorized adjustment of the detector-patient distance.

The grid can easily be removed, saving the user time in examinations not requiring a grid. For example in pediatrics, where dose reduction is especially important.

### Collimator

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

- Independent rotation and shift of filter blades
- Automatic synchronous rotation of detector and collimator unit to compensate image rotation at the different examination positions of the support stand.
- Rotation also possible via table side control enabling upright images of objects or body parts not aligned with the table e.g. arms.
- Manual rotation of the detector and collimator unit using the control right on the detector housing.
- Five-step adaptive Cu pre-filtration (CAREfilter) to reduce the equivalent skin dose and improve radiation quality through dose saving for the soft radiation parts. Filter steps: 0.1; 0.2; 0.3; 0.6; 0.9 mm Cu.

Electronics unit with DIAMENTOR dose measurement chamber integrated in the collimator housing, for acquisition of the dose-area product and the calculated patient entry air Kerma at the patient entrance reference point (CAREwatch).

### StraightView

The flat detector and the multileaf collimator are installed on a motorized rotating turntable on the C-arm. They automatically line up with the table swivel, thus ensuring upright images of objects which are in line with the table. The flat detector and multileaf collimator can also be rotated together at any angle relative to the table, enabling upright presentation and collimation of objects which are not in line with the table.

### Image processing

- Image display as positive and negative, windowing, contrast and brightness control, electronic display shutter, image shift (roaming), vertical and horizontal image inversion, magnifying glass, and zoom functions
- Storing of single images as reference images for acquisition and fluoroscopy
- Quantification: angle and length measurements, automatic and manual calibration
- Text functions: user-definable image annotation, free annotation or by means of text components, comments line for the image, R/L display
- Fast and direct access to all series, single images, reference images, and photo file images via MULTIMAP. Access possible both in the examination and in the control room for displaying or post-processing images

### Imaging system

#### Dual architecture

In order to provide highest level system availability, the imaging system consists of two independent computer systems that manage central tasks such as real-time image processing during fluoroscopy or acquisition as well as post-processing and networking functionality separately from one another. This ensures the best possible system performance and availability.

#### Image storage capacity

25,000 images in 1k/12 bit image matrix. This can be optionally extended to 50,000 / 100,000 images.

### Image export and networking

#### DVD/CD burner

DVD drive for automatic digital image storage in the background on DVD-/CD-ROM for off-line data exchange in DICOM format.

#### Networking

## Description

- Network interface (1000 BaseT) with the following integrated DICOM services:
- DICOM Send: Sending of images into the DICOM network: The DICOM Send function enables fully automatic transfer of generated image data to a DICOM archive and/or a DICOM workstation. The user can perform his examinations without interruption, while the system is fully automatically transferring the images to the archive scene by scene. This is a background process, and thus does not interfere with the ongoing fluoroscopy or acquisition.
- DICOM Storage Commitment (StC): Feedback from the image archive. The DICOM StC function automatically gives feedback on whether the generated image data were successfully transferred. This provides the necessary certainty to the user before deleting the acquired images locally in the imaging system.
- DICOM-Query/Retrieve: Retrieval of archived images from a digital archive or from a workstation: Already archived image data from a previous examination can be fully retrieved and is then available for review and processing. The user can request CT or MR system images from the archive and display the image in the examination room. There is no need for a separate workstation.
- DICOM Structured Report: All the quantification results obtained on the system as well as all dose information on the individual radiation releases can be saved in DICOM SR (enhanced SR) format and transferred to a DICOM network.

### Note concerning DICOM interface(s)

The description in the DICOM Conformance Statement downloadable from the Internet is exclusively binding for the functionality of the DICOM interface(s).

Functionalities across interfaces with/between partner systems require explicit validation, since the interpretation of the interface by the partner/target system is not part of the product's responsibility.

A modification of the interface that might be required is not included in the offer; e.g. for the rare case that available configurations are not sufficient. With regard to expenses for interface configurations that might be required, the agreements on maintenance/service of the product apply.

### ECG image data

Recording, storage, and display of an ECG lead. The ECG lead is displayed and stored together with the image information.

## Display and display suspension

### Displays in the exam room

Live and Assist displays are 19" TFT color and gray scale flat-screen displays with high luminance and extended viewing angle.

- Screen size: 19" (48 cm)
- Resolution: 1,280 x 1,024 (pixels)
- Excellent brightness for the entire service life: 400 cd/m<sup>2</sup> at a contrast ratio of 1000:1
- Flicker-free and distortion-free image display
- Ambient light sensor for optimum adaptation of the image display to the room brightness

Reference images are shown on the Assist display.

Data for device and table position, dose data, and system messages are displayed in the examination and control room on both the live and the Assist display.

### Displays in the control room

19" high-contrast display for live image display in the control room is included as a desktop version.

### Display suspension

Ceiling-mounted, swiveling, rotating, and height-adjustable display suspension system with longitudinal travel. It features two 19" high-contrast TFT displays for live and reference image display in the examination room (Standard configuration – unless modified).

## Description

### Operation

#### syngo

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.

#### Footswitch

A 4-pedal wired footswitch to release fluoroscopy, exposure, and table brake as well as a configurable additional function is included as standard.

#### In the examination room

For an ideal workflow, full operation capabilities for the system can be accessed directly at the patient table. These include complete system operation through modular control elements for controlling C-arm movements, the patient table, and the multileaf collimator.

syngo-based touchscreen with multi-functional joystick for operation of the imaging system, including post-processing and quantification as well as selection of the organ programs. The touchscreen is specifically configurable to individual clinical requirements.

This means that the user can operate the system on their own without having to leave the examination room if this is deemed necessary by the situation.

#### In the control room

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

### **Siemens Remote Service SRS™**

Prepared for Siemens Remote Service SRS™ (during warranty, then with service contract):

- Hardware and software remote diagnosis.
- System remote configuration, e.g. adding of a DICOM node.

Early warning system ensuring system operation.

### **syngo Evolve**

syngo Evolve is a service feature that is offered as a separate sales option. It is a key component of our upgrade strategy and allows you to take advantage of technological advancements.

### **Customer Care – the customer care solution from Siemens Healthcare**

From the moment you purchase your Siemens system you will benefit from many services that are offered by "Customer Care"\*. These include:

- Initial application training
- Interactive e-learning for various applications
- Free customer magazines
- Arrangements for clinical training via a global network
- Free trial licenses

You will find information on our e-learning program and further details on general "Customer Care" services on the Internet.

\* The availability of "Customer Care" services may be restricted for some systems.

### **User Training**

Siemens recognizes the significant investment you are making in purchasing a new imaging system and are determined that you are able to realize the full capability of this new system. Siemens clinical applications training ensures you have every opportunity to fully utilize your new system.

Content of user training: Handover Training and Follow-up Training



Description
<ul style="list-style-type: none"> <li>- Introduction to the functions, options, and handling of the Angiography system</li> <li>- Instruction on the use of the Angiography system together with modern, highly-developed applications</li> </ul> <p>Delivery &amp; duration of the user training varies and may be country specific so for additional information please contact your local Siemens representative.</p>
<p>Automap optimizes the procedure workflow, especially during interventions. A selected reference image displaying the needed medical information (e.g. before dilatation) is used as the basis for moving the system to the correlated position automatically. The intervention can be continued immediately without manually repositioning the patient. On the other hand, the system is able to select a reference image for the current device position. In case of changes in device position, this enables the user to see the corresponding reference images quickly and safely.</p>
<ul style="list-style-type: none"> <li>- <math>\pm 15^\circ</math> head up/head down positioning.</li> <li>- Iso-tilt functionality for maintaining the projection during table tilt along the patient axis.</li> <li>- Motorized, power-dependent table movement in longitudinal direction when the table is tilted (power-assisted control).</li> <li>- Electromechanical release of table swivel at the touch of a table button.</li> <li>- Max. patient weight 200 kg. It is possible to install up to 40 kg of additional accessories.</li> </ul>
<ul style="list-style-type: none"> <li>- <math>\pm 15^\circ</math> lateral tilting range.</li> <li>- <math>\pm 15^\circ</math> head up/head down positioning.</li> <li>- Iso-tilt functionality for maintaining the projection during table tilt along the patient axis.</li> <li>- Motorized, power-dependent table movement in longitudinal direction when the table is tilted (power-assisted control).</li> <li>- Max. patient weight 200 kg. It is possible to install up to 40 kg of additional accessories.</li> <li>-</li> </ul>
<p>The visco-elastic comfort mattress reacts to temperature and has the special property of adapting to the individual body shape under the influence of body weight and heat.</p> <p>-</p>
<p>Measuring program integrated in the imaging system for objective, precise and reproducible evaluation of vessels.</p> <ul style="list-style-type: none"> <li>- Automated contour detection.</li> <li>- Determination of degree of stenosis.</li> <li>- Automatic and manual reference diameter determination.</li> <li>- Automatic and manual calibration methods.</li> <li>- Distance and angle measurement.</li> </ul> <p>The Vessel analysis allows precise quantification under sterile conditions, direct at table side with the touchscreen control. This speeds up the intervention and makes the procedure safer for the patient. The reports can be easily stored in the patient folder for documentation and to show the correct analysis of dilatations etc.</p> <p>Especially to be used for vessel sizes between 0.5 mm and 50 mm.</p>
<p><b>Contents:</b></p> <p>The functionality of the syngo X Workplace can be extended with additional software functions to suit specific user or clinical needs in angiography, surgery, and cardiology. The use of the licensed software is limited exclusively to the specific syngo X Workplace included with this configuration.</p> <p><b>syngo X Workplace PC</b></p> <p>The high-performance workstation is equipped with an Open GL accelerator board to support 3D applications. To exchange medical images on DICOM-compatible CD-Rs and DVDs, the system is equipped with a CD/DVD burner.</p>

## Description

*syngo* X Workplace can be connected to an existing network via 1000/100/10 Mbit Ethernet.

### **Examination room: 19" color flat display or Artis Large Display connection kit**

With this configuration, if an Artis Large Display is ordered - the configuration includes a connection kit for the Artis Large Display. If an Artis Large Display was not ordered - a display is delivered additionally for the examination room....

### **Control room: 19" color flat display or Artis Cockpit connection kit**

In this configuration, there is also one display for the control room or one connection kit for an Artis Cockpit.

The Siemens 19" LCD color display features very high contrast even under very bright ambient light conditions. The Gamma curve was precisely adapted to the CIE/DICOM recommendation and is thus especially suited for gray scale display.

#### LCD color display

- 19" (48 cm) screen size
- Resolution: 1280 x 1024 (pixels)
- Excellent brightness for the entire service life: 180 cd/m<sup>2</sup> at a contrast ratio of 800:1.
- Flicker-free and distortion-free image display
- Anti-glare screen

The controlled background lighting provides stable lighting throughout the entire product life cycle.

### ***syngo* X Workplace Basic User Software**

The *syngo* X Workplace software features an intuitive and thus easy to learn user interface developed from prototypes tested in close cooperation with users.

Standard functions such as filming or image review, and optional clinical application software, are performed in individual processes on dedicated task cards. A number of functions and input parameters, as well as the language used, can be selected according to individual requirements.

### **Package includes the following software licenses**

Basic software with CD and dongle for the following functions:

- Patient Browser
- Filming
- Viewer
- System services

#### Patient Browser:

- Patient management.
- DICOM communication with Send, Receive, Query/Retrieve, Print.
- Reading and importing image data from CDs/DVDs.
- Module for writing DICOM CDs/DVDs for data exchange. Writing is in background mode.

#### Filming:

A virtual filmsheet shows a 1:1 display of the film sheets to be printed. This permits an effective preview of the filming job and the windowing of images, as well as providing a large number of evaluation functions.

#### Viewer:

The Viewer supports interactive 2D review, evaluation, and documentation functions. Multiple studies from the same patient can be displayed side-by-side for comparison.

- Image display: 1.024<sup>2</sup> screen matrix, configurable with up to 64 image segments.
- CINE display: Automatic or interactive dynamic presentation technique for the visualization of time and volume series.
- Synchronized viewing of multiple series.
- Measurement and annotation: Text annotation; distance, angle, circle, ROI and pixel lens, depending on

## Description

information available from the acquisition system.

### System services:

Microsoft Office Word, Excel, PowerPoint plus Outlook are supported (not provided!).

- Any user-selectable file, such as cardiac or angiographic acquisitions, DSA or 3D AVI video sequences, can be burned to CD, or exported to USB stick, to prepare quality presentations and demos of pathologies.
- Network module: For connection to a local Ethernet (Gigabit or 100 Mbit) for communication with networked archives, printers, diagnostic and therapy workstations, and teleradiology routers.

### Scope of functions

- Network stations can be configured.
- Unlimited selection of stations.

## 3D image generation

### 3D rotational angiography

In 3D rotational angiography, a sequence of 2D projection images is acquired by a C-arm performing a fast rotation around the isocenter in which the patient is positioned.

Image data are transferred automatically to a *syngo* X Workplace for time-optimized 3D image data reconstruction.

- All parameters required for the 3D reconstruction are included in the organ program. This enables optimized image quality and easy handling, as well as the fastest possible 3D reconstruction.
- Rotation speed is up to 60°/s (Artis ceiling), and 45°/s (Artis floor and Artis biplane).
- Angle triggering allows a reduction in dose through a reduced acquisition frame rate while at the same time achieving better image quality.

3D reconstruction and visualization of a volume are performed in real time in volume rendering technique, MPR, and MIP. 3D Rotational angiography is used in particular as support in interventional radiology and neuroradiology in the angiography laboratory. Based on dedicated acceleration hardware the primary reconstruction results are available in full diagnostic quality in the examination room within 19 seconds for high contrast images and less than 20 seconds for *syngo* DynaCT cardiac images. Subsequent secondary reconstructions are available even faster.

Note: For biplane systems rotation angiography is available in plane A only.

### **syngo DynaCT Cardiac**

*syngo* DynaCT Cardiac for zen30HDR detector allows the use of proven 3D reconstruction for contrasted X-ray projection images of ventricles and vessels of the heart. *syngo* DynaCT Cardiac for zen30HDR detector contains reconstruction algorithms for

- ECG-triggered 3D acquisitions (multiple C-arm rotations, approx. 30 seconds exposure time). The ECG-triggered acquisition protocol acquires all projection images in the same cardiac phase. As a consequence, even areas of the heart that are subject to considerable motion can be reconstructed to a sharp volume with negligible motion artefacts.

as well as for

- untriggered 3D acquisitions (one C-arm rotation, approx. 5 seconds exposure time).

Clinical applications currently supported by DynaCT Cardiac:

### Electrophysiology:

- 3D visualization of the left atrium to support ablation of atrial fibrillation (segmentation of the left atrium using electrophysiology guidance, must be ordered separately)
- 3D visualization of the coronary venous tree to support biventricular pacemaker implantation

### Interventional Cardiology/Surgery:

- Planning, support and follow-up before, during and after heart valve replacement through 3D visualization of the aortic valve and coronary ostia

### Pediatrics:

## Description

- 3D visualization of the congenital heart defects before and after surgical interventions: There are low-dose organ programs especially developed for pediatric acquisitions available.

*syngo* DynaCT Cardiac is especially suited for the planning, performance and follow-up of interventions through display of current cardiac 3D morphology directly in the cath lab or hybrid OR.

DynaCT Cardiac Volume can also serve as a basis for magnetic navigation systems (e.g., Niobe Navigant) or (in connection with electrophysiology guidance Segmentation, separate option) can be used by electroanatomical mapping systems (CARTO, Ensite Velocity) for increased precision of electrophysiological mapping as well as time savings.

### 3D Image Manipulation

The 3D XWP comes with applications that facilitate interactive volume rendering, accelerated by a high-end graphics card. It offers support for large data records of up to 1,600 images (512 x 512 matrix).

In angiography, surgery, and cardiology, the three-dimensional information is used for diagnosis, planning of therapy and documentation.

Diagnosis and treatment can be performed in one session. This offers a significant advantage thanks to the fully-integrated workflow, for example the

- Transfer of the projection angle (that has been adjusted by the user in the XWP 3D volume) to the C-arm stand.
- Realtime synchronization between reconstructed volume and C arm position (Volume following the C arm position)
- Indication whether the angulation can be achieved at the C-arm without collision with the patient or table.

#### Features:

- Reconstruction protocols for visualization of vessels, bones, clips and coils.
- The result of the reconstruction can be native or subtracted.
- Modification of reconstruction area to allow zoom via reconstruction.
- Visualization with shading and light source for an improved three-dimensional impression.
- Link between C arm geometry and reconstructed volume: driving the C arm to exact projection position according to the view of the reconstructed volume and/or setting the volume to follow realtime C arm positions.

#### Image data:

- Viewing of volume data from AX, CT, MR, and PET modalities.
- Loading of two volume data sets simultaneously.
- Multiple Layouts: single (1on1), double (2 on1) and quadruple (4on1) for MPR display.
- Two displays are supported for simultaneous display of two volumes side-by-side.

#### Image display modes:

- VRT, Color VRT, MIP, MinIP, and MPR rendering.
- Thin slice renderings for VRT, MIP, and MinIP.
- Variable light source.
- Shading effects.

#### Volume editing:

- Cut planes.
- Editing of clip planes and control volumes.
- ROI punching.

#### Presets:

## Description

- Series-specific bookmarks, to store and retrieve volume visualization parameters.
- Global presets for series-unspecific application of volume visualization parameters.

### Output:

- Radial ranges, including macro range definitions.
- 2D and 3D measurements, measurement grid, distance measurement and annotations.
- AVI format export with selectable compression format and compression ratio.
- TIFF, PNG, BMP, JPEG image export.
- Send to film sheet.
- Sending of parallel ranges results to PACS

Diagnosis and treatment can be performed in one session. This offers a significant advantage thanks to the fully-integrated workflow, for example the

- Transfer of the projection angle to the C-arm stand.
- Indication whether the angulation can be achieved at the C-arm without collision with the patient or table.

### 3D accessories

Includes the accessories required for 3D setup and calibration.

### Dual volume visualization

Enables the differentiation between two high-contrast 3D objects that have virtually the same contrast density and allows the display of one low-contrast and one high-contrast volume in one view. It enables clear differentiation between contrast-filled vessels, bones, stents and coils. Furthermore, visualization of the anatomical structure of tumors in combination with the feeding vessels becomes possible.

### 3D roadmap

The operator can overlay any 3D volume or excerpts of it, onto the live fluoro image. Via a Fade in- Fade out with the joystick the degree of visibility of the overlaid information can be determined at any time. This tool offers the physician real-time three dimensional guidance for more confidence. It avoids repeated injection of contrast material during fluoroscopy by overlaying a 3D vessel tree instead. The 3D roadmap is automatically updated in real-time according to any table, C-arm, zoom and SID changes. Even patient movement can be manually updated.

The overlay appears on the display of the syngo Workplace so the 3D Roadmap information is available in parallel with the regular 2D images of the live display of the acquisition system

### Toolbox functionality

Toolbox is a generic application to interactively mark structures of interest in a 3D volume, e.g. a syngo DynaCT Cardiac image, using points and lines. Analogously to syngo 3D Roadmap, these markings are projected onto the live 2D X-ray illustrating the position of the 3D anatomical structure within the live X-ray.

Included functionalities:

- Overlay of any lines and dots drawn on the VRT or MPRs on live 2D image.

This functionality provides an easy link between information that may only be visible in the 3D volume (VRT or MPRs) and the Fluoroscopy images.

### Workflow support for Electrophysiology Guidance

Automated segmentation works on preoperative 3D CT or MR data sets or on intraoperative 3D rotational angiography data sets (syngo DynaCT Cardiac), the later being acquired in the cath lab.

Using three-dimensional visualization of ventricle and vessel morphology (especially of the complex and individual anatomy of the left atrium), electrophysiology guidance might reduce the examination time of ablations as a therapy for atrial fibrillation and simultaneously increases the chances of the ablation's success.

Electrophysiology Guidance functions:

- Both CT and MR data sets from Siemens modalities and external suppliers are processed.
- In addition, 3D image data acquired intraprocedurally through C-arm rotational angiography (syngo DynaCT

## Description

- Cardiac) immediately before, during or after the procedure in the examination room are processed and used.
- Using "One-Click Segmentation" functionality of included *syngo* LA Segmentation, the various structures of the heart (particularly the left atrium, pulmonary veins and left atrial appendage) are automatically segmented and visualized in a single step.
  - Different interactive post-processing methods of segmentation results.
  - Clipping functionality: can be applied to segmentation results, enabling visualization of the interior surface of a segmented ventricle.
  - EP Notebook: Ablation points can be planned before the procedure and saved during the procedure for subsequent documentation as "ablated".
  - Interface connectivity to Sensis (integration of saved visualizations into Sensis Report).
  - Interface connectivity to common electroanatomical mapping systems (CARTO, Ensite Velocity) with the capability of automated export of extracted surfaces or segmentation results.
  - DICOM Networking.
  - "Adjust C-arm"/"Adjust 3D" functionality: Automatic adaptation of Artis C-arm angulation to current *syngo* Workplace 3D views (including segmentation results) of the heart and vice versa.
  - *syngo* 3D Roadmap: Direct overlay of multiple (multicolored) segmentation results onto live fluoroscopy image is possible. The overlay functionality is activated/ deactivated directly from the electrophysiology guidance user interface.

### **fusion functionality:**

A fused CT, MR or PET image can be overlaid with live fluoroscopy in combination with 3D roadmap functionality providing information during interventional procedures that are available neither in 2D X-ray nor in 3D rotational angiography.

The package includes 2D/3D Fusion as well as 3D/3D Fusion:

2D/3D Fusion - allows to spatially align any pre-acquired 3D volume of the patient with two 2D X-ray projections. This eases the workflow during the procedures and reduces the X-ray dose because no additional 3D acquisition is required.

3D/3D Fusion – allows to spatially align two 3D volumes from the same or different modality in such way that the anatomical structures overlay each other. Any *syngo* DynaCT or *syngo* Dyna3D image can be fused with datasets from e.g., CT, MR or PET.

**Please note – availability of this following new feature depends on the regulatory release status in your country. Please check with your respective Siemens representative to verify availability.**

The included LA Segmentation can also be performed using an automatic, model-based segmentation functionality. The left atrium is automatically segmented and visualized after a DynaCT acquisition / reconstruction.

## **Common functions**

### **Inroom control functionality**

Allows for remote control of the *syngo* X-Workplace from the examination room via touchscreen and joystick mounted table-side or on a trolley.

For this, a set of functions is offered inroom for e.g. 3D image assessment and manipulation, 3D navigation, multimodality image integration, or for actively following the steps of a pre-defined workflow.

### ***syngo* Expert-i**

*syngo* Expert-i enables the physician to interact with the *syngo* X-Workplace from virtually anywhere.

When clinical questions arise at the *syngo* X-Workplace, a second user with a Windows PC can quickly and efficiently access the *syngo* X-Workplace via the network. He or she can assume full control of every application on the *syngo* X-Workplace and can see all screen content that is displayed for the local user on the main monitor. This allows the parties involved to discuss clinical questions via phone and quickly reach solutions on a joint basis.

### **DICOM**

Industrial standard for the transmission of information between DICOM-compatible units from different manufacturers. The scope of functions is described in detail in the DICOM Conformance Statement and in the standard version includes the Transmission/ Reception, Query/ Retrieve and Basic Print functions.

### **Note concerning DICOM interface(s)**

## Description

For diagnostic purposes, only hardcopy cameras/laser printers explicitly approved for this system may be used.

The description in the DICOM Conformance Statement downloadable from the Internet is exclusively binding for the functionality of the DICOM interface(s).

Functionalities across interfaces with/between partner systems require explicit validation, since the interpretation of the interface by the partner/target system is not part of the product's responsibility.

A modification of the interface that might be required is not included in the offer; e.g. for the rare case that available configurations are not sufficient. With regard to expenses for interface configurations that might be required, the agreements on maintenance/service of the product apply.

*syngo* DynaCT is especially suited to support radiologists and neuro-radiologists during interventional procedures in the angiography suite with both endovascular and non-endovascular procedures. *syngo* DynaCT provides enhanced decision making during oncology procedures such as chemoembolization and RF-ablations. In neuroradiology, *syngo* DynaCT allows the visualization of bleeds, the ventricular system of the brain and microstent placement.

With *syngo* DynaCT it is possible to visualize a density difference of 10 HU (Hounsfield Units) of an object 5 mm in size, or 5 HU for an object 10 mm in size, in a Thick-MPR display (measured with a CATPHAN 16 CT phantom with the CTP 515 module). DynaCT also offers:

- a new reconstruction algorithm optimized for fan beam geometry
- 20sDR-H 109 kV for native DynaCT e.g., for detecting bleeding
- faster 3D acquisition in 4x4 Binning mode

For *syngo* DynaCT 360 applications in the abdomen or thorax in conjunction with an Artis zeego system, the larger field of view (FOV 35 cm x 25 cm, 13.8" x 9.8") allows complete visualization of tumors, their feeding vessels and the surrounding tissue, e.g. in chemoembolizations. The larger FOV also optimally supports vascular treatments in the abdomen such as the placement of stent prostheses. The short acquisition time makes it easier for patients, especially those that are critically ill, to hold their breath during the acquisition.

The lower body radiation protection can be attached to the accessory rails either on the right or on the left side of the patient positioning table.

It consists of the following shielding units:

- A basic unit shielding the area between accessory rails and the floor. It is flexible and can be adapted to the examiner's preferences.
- One LB radiation protection pivot swivel element that can move out of the way during collisions with the tube and still retain its protective function.
- Two clip-on units pointing upwards from the upper edge of the basic unit with a length of 57 cm and 27 cm.

The scattered radiation shielding units can be attached to the basic unit in an overlapping and fan-shaped way to allow closed, adapted scattered radiation protection even in the lower thorax area.

The maximum load of the accessory rails is 40 kg, the weight of the attached scattered radiation protection is 8 kg.

Radiation protection attached via a ceiling-mounted, mobile stand for protection against scattered radiation; incl. 4 m ceiling rail.

- Swivable and rotatable around the fixed point, range of rotation 360°.
- Counter-balanced, height-adjustable support arm.
- Acrylic glass with Pb equivalent of 0.5 eq (w x h: 61 cm x 76 cm), with recess for interventional examinations.

Communication / Intercom system for communication between examination room and control room, with additional footswitch for conversation selection in the examination room.

Microphone and control box on the console in the control room.

With adaptive acoustic filter for background noise suppression in the examination room.

Microphone in the examination room installed on the ceiling.

Description
<p><i>Ordering information that can be deleted from the final version of the offer follows:</i>  <i>Intercom - Comfort replaces the old intercom system (without adaptive acoustic filter for background noise suppression).</i>  <i>Delivered as an option only, not included in the basic configuration</i></p>
<p>The visco-elastic comfort mattress for narrow tabletop reacts to temperature and has the special property of adapting to the individual body shape under the influence of body weight and heat.</p>
<p>The insert with accessory rails attached to the right and left slides over the outer edges of the patient positioning tabletop.  It is locked in place through two screws on either side. The part to be inserted underneath the tabletop consists of radiolucent carbon fiber material, which avoids disturbing edges in the image.  Max. load capacity of the accessory rails: 40 kg.  Length of the accessory rails: 45 cm.</p> <p><i>Ordering information that can be deleted from the final version of the offer follows:</i>  <i>For wide tabletops.</i>  <i>Delivered as an option only, not included in the basic configuration.</i>  <i>Not in conjunction with the Surgery table.</i></p>
<p><i>Not in conjunction with the multi-section Surgery metal / carbon tabletop or the multi-section Surgery metal / carbon tabletop RoW.</i></p>
<p>For Artis tabletops, the two arm holders help to laterally position the arms comfortably along the patient's body. They are slid laterally underneath the mattress, level with arms, and fixed by the patient's body weight. The patient's arms can be immobilized with commercially available securing straps (not included). Two pairs of arm holders of different length and height (matching the mattress height) are supplied, that are suitable both for thick and thin mattresses.</p> <p>An arm holder weighs 8 kg.</p> <p><i>Ordering information that can be deleted from the final version of the offer follows:</i>  <i>Not in conjunction with the Surgery table and multi-section metal / carbon tabletop or the multi-section Surgery metal / carbon tabletop RoW.</i>  <i>Already included in the following basic configurations:</i></p> <ul style="list-style-type: none"> <li>- Combination Interventional cardiology / radiology</li> <li>- Interventional radiology</li> <li>- Neuroradiology</li> <li>- Combination Interventional radiology / cardiology</li> <li>- Vascular surgery</li> <li>- Neurosurgery</li> </ul> <p><i>Can also be ordered as an option.</i></p>
<p>Rail profile (short table attachment) for table operation</p> <ul style="list-style-type: none"> <li>- Weight: 1.4 kg</li> <li>- Rail length: 12 cm</li> <li>- Width: 20 cm</li> <li>- Height: 14.5 cm</li> </ul> <p>Rail profile (long table attachment) for device operation (with or without table operation)</p> <ul style="list-style-type: none"> <li>- Weight: 2.8 kg</li> <li>- Rail length: 25 cm</li> </ul>



<b>Description</b>
<ul style="list-style-type: none"> <li>- Width: 20 cm</li> <li>- Height: 14.5 cm</li> </ul>
<p><b>Note concerning DICOM interface(s)</b> For diagnostic purposes, only hardcopy cameras/laser printers explicitly approved for this system may be used.</p> <p>The description in the DICOM Conformance Statement downloadable from the Internet is exclusively binding for the functionality of the DICOM interface(s).</p> <p>Functionalities across interfaces with/between partner systems require explicit validation, since the interpretation of the interface by the partner/target system is not part of the product's responsibility.</p> <p>A modification of the interface that might be required is not included in the offer; e.g. for the rare case that available configurations are not sufficient.</p> <p>With regard to expenses for interface configurations that might be required, the agreements on maintenance/service of the product apply.</p>
<p>Cable connection to the OEM measurement system for ECG triggering. Necessary requirement for ECG-triggered Dyna CT card and for ECG triggered fluoroscopy.</p>
<p><b>Display mount</b></p> <p>Preparation for the large display. The large display area allows for both large display and the free positioning of examination-relevant video signals. The fully integrated tableside control allows for selection from among twelve layout variants.</p> <p>For the diagnostic color display in TFT technology, with high luminance and extended viewing angle, the gamma curve has been adapted particularly for gray scale display according to the CIE / DICOM recommendation.</p> <p>Video signals such as live, assist and reference images, syngo X Workplace, Sensis/recording systems, PACS, HIS/RIS, ultrasound, ECG, external video, endoscope, mapping systems, system and table position, system messages and dose information can be individually positioned and displayed on the Large Display, if connected.</p> <p>The extended Roadmap function is included, if DSA is available:</p> <ul style="list-style-type: none"> <li>- Native live fluoro image during fluoroscopy; otherwise Last Image Hold.</li> <li>- Native live fluoro image during roadmap / subtracted fluoroscopy; otherwise Last Image Hold.</li> <li>- Native live acquisition during DSA acquisition; otherwise native max-fill image.</li> </ul> <p>If the dual reference function is available, parallel static reference images are displayed on both reference monitors.</p> <p>Technical specification for the 60" display:</p> <ul style="list-style-type: none"> <li>- Display size (W x H) 60 " , 133 cm x 74.8 cm .</li> <li>- Screen size 60 " , 153 cm</li> <li>- Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.</li> <li>- Color depth 16.7 10<sup>6</sup> colors.</li> <li>- excellent brightness over the lifetime: 300 cd/m<sup>2</sup> at a contrast ratio of 4000:1.</li> <li>- Flicker-free and distortion-free image display.</li> </ul> <p>Technical specification for the 55" display:</p> <ul style="list-style-type: none"> <li>- Display size (W x H) 55 " , 121 cm x 68 cm .</li> <li>- Screen size 55 " , 139 cm</li> <li>- Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.</li> <li>- Color depth 1.07 10<sup>9</sup> colors.</li> </ul>

## Description

- excellent brightness over the lifetime: 350 cd/m<sup>2</sup> at a contrast ratio of 1450:1.
- Flicker-free and distortion-free image display.

Technical specification for the 56" display:

- Display size (W x H) at 56", 124.4 cm x 70 cm
- Screen size at 56", (142.2 cm)
- Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.
- Color depth 16.7 10<sup>6</sup> colors.
- excellent brightness over the lifetime: 300 cd/m<sup>2</sup> at a contrast ratio of 800:1.
- Flicker-free and distortion-free image display.

### Bypass concept

In case of error, such as controller failure, the Large Display switches automatically to bypass mode and emergency fluoroscopy is displayed on the Large Display.

### Backup concept

The Large Display has a backup concept to ensure against power supply failure (2 separate power supplies for the left and right sides of the Large Display).

### Display mount

The longitudinally mobile, swiveling, rotating, and height adjustable display holder with normal working range contains a large color flat display. All cables are integrated.

Technical data for the display holder:

- Longitudinal travel range 217.5 cm with 300 cm rails.
- Longitudinal travel range 337.5 cm with 425 cm rails.
- Height adjustment range 85 cm.
- Swivel range (max. system rotation) 300 degrees.
- Display swivel range 330 degrees.

Note: *The type of large display can be chosen with a separate position.*

The Large Display video controller 18 receives various internal and external video signals for presentation to scale on the Large Display.  
Up to 18 external and internal video sources can be connected (max. 14 DVI-D and 4 analog (VGA) channels).

Important images for diagnostic purposes can be displayed to scale in their original size on the Large Display. Less important, non-diagnostic information can be displayed at a reduced size by the interpolation algorithm for image information integrated in the video controller.

An enlarged or reduced display can be selected individually via the display configurations at the fully integrated tableside control. The video controller then takes over interpolation and adaptation of image size.

In waveform images with high resolution, such as for electrophysiological recording systems, the curves are displayed free of artifacts because of a special interpolation algorithm.

The Display is attached to the rear of the DCS Large Display.  
Mounting brackets are already available.

Flat display in TFT technology with high luminance and extended viewing angle.

- Screen size 19" (48 cm).
- Resolution 1280 x 1024 (pixels).
- Excellent brightness for the entire service life: 400 cd/m<sup>2</sup> at a contrast ratio of 1000:1.
- Viewing angle (horizontal and vertical) 176 degrees.
- Flicker-free and distortion-free image display.

Ambient light sensor for optimum adaptation of the image display to the room brightness.

## Description

### Large color flat display

The IPS panel technology combined with the large display area represents a new dimension in medical image display.

This technology combines high luminance and high contrast, consistent for all viewing angles. It provides an incomparable image impression especially for gray scale images.

For the diagnostic color display in TFT technology, with high luminance and extended viewing angle, the gamma curve has been adapted particularly for gray scale display according to the CIE / DICOM recommendation.

Technical specification for the 55" display:

Display size (W x H) 55", 121 cm x 68 cm .

Screen size 55", 139 cm

Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.

Color depth 1.07 10<sup>9</sup> colors.

excellent brightness over the lifetime: 400 cd/m<sup>2</sup> at a contrast ratio of 1450:1.

Flicker-free and distortion-free image display.

Backup concept

The Large Display has a backup concept to ensure against power supply failure (2 separate power supplies for the left and right sides of the Large Display).

Functionality:

- Four screen layouts can be selected with a click of the mouse.
- The four screen layouts per monitor can be configured from a previous selection.
- The position of the image sources in the layout can be changed via Drag and Drop.

Contents:

A controller with the following technical specifications:

- 7 digital video inputs: DVI single link, up to 165 MHz (6 HDMI, 1 DVI-I).
- Video bandwidth: Maximum aggregated bandwidth of 360 Mpixels/s.
- 2 analog video inputs
- Network connection: 1 10/100 Base-T Ethernet port

A high-resolution 30" LCD color display corresponding to the medical standard, with high luminance and extended field of view.

- Screen size 29.8" (76 cm).
- Resolution: 2560 x 1600 (pixels).
- Guaranteed brightness for the entire service life: 400 cd/m<sup>2</sup> at a contrast ratio of 800:1 (where black = 0.5 cd/m<sup>2</sup> ).
- Viewing angle (H, V): 170°, 170°
- Calibration according to DICOM (Part 14) standard.
- Ambient light sensor for optimum adaptation of the image display to the room brightness.

Information on connecting third-party systems to the Artis Cockpit:

When connecting external video signals to the Artis Cockpit, note the following requirements to display images from third-party video sources:

- The connection of third-party devices is only permissible if they meet the specifications of the Cockpit interface.
- The connection of the Cockpit interface to the Cockpit controller must be performed by a Siemens service technician.
- The connection to the third-party device must always be performed by the technician of the third-party company or by the responsible on-site hospital technician.
- Siemens cannot assume any warranty for the connection of the third-party device with respect to the image quality and its suitability for diagnosis.

## Description

- For this reason, it is strongly recommended that the image quality tests prescribed by the third-party manufacturer are performed again prior to use. These tests can ensure that the required image quality is achieved.
- The system configurator is responsible for ensuring that the valid versions of the relevant standards are met.

Note the following conditions if video signals are to be shown on a third-party provider display:

- The display of external video signals depends on the operational state of the Artis system. If the Artis system has a malfunction or is shut down, the display of external video signals is no longer possible. For this reason, do not feed the video signal into the Artis system if lacking the external video signal could result in a hazardous situation.
- A third-party provider's unit may be connected only if it corresponds to the specifications of the video interface on the Siemens system..
- The connection may only be established by a Siemens service technician. Attention: The connection must be made with fiber-optic cables to ensure that the unit's galvanic isolation is maintained.
- A third-party provider's unit must be connected by a technician from the third-party provider or by a hospital technician responsible for the equipment.
- It is strongly recommended that a test of image quality be performed by the third-party provider prior to start-up. This test ensures that the required image quality is achieved.
- The person placing it on the market is responsible for ensuring that applicable standards are maintained in the current version, e.g. 4 kV insulation

Siemens will not be held liable for the inclusion of third-party provider units with respect to image quality and their suitability for clinical diagnosis

If an external component is connected to the Cockpit system via a USB port - using a separate keyboard as the operating unit - the following must be observed:

- The external component must support the use of a standard keyboard with 104 keys.
- If this requirement cannot be met, the third-party device can only be operated directly via the keyboard supplied by the manufacturer of the device. A USB connection between the Cockpit and the external component is then not permissible and therefore operation using the Cockpit syngo keyboard is not possible.

**These instructions must be followed; otherwise, operating errors and loss of data may result.**

Please refer to the Cockpit operating instructions for the key assignment of the syngo keyboard and the standard 104-key keyboard.

Eaton 93PM-150/150 4-Wire UPS Electronics Cabinet: 150kW Frame cabinet with three (3) Power Modules (UPM) configured as a 150kW capacity system specifically for a medical imaging application. 480 volts input / 480 volts output, 4-Wire + Gnd. Double Conversion Topology, Unit efficiency up to 97% (up to 99% with ESS), Unit output rating @ Unity Power Factor, Input current distortion < 3% @ 100% load, Patented ABM Technology, Patented HotSync parallel firmware control, Scalable Architecture, Parallel Redundancy and Capacity capable. Onboard monitoring of UPS status via front panel display is standard. Includes single feed input with three (3) circuit breaker (BIB, MBP, MIS) integrated maintenance bypass in a 14.7" wide right-mounted sidecar. Four (4) internal min-xslot communication card bays. One (1) Power Xpert Gateway UPS Mini-Slot Card (PXGMS) included.

Included Services: Start-up (7x24): PLUS One (1) year on-site labor coverage (7x24).

UPS Cabinet Dimensions: 36.7"W x 42.0"D x 74.0"H

UPS Cabinet Weight: 1,566 Lbs.

Eaton 93PM 480Vdc Battery System: One (1) IBC-L Integrated Battery Cabinet consisting of one (1) string of 240 cells (@480Vdc), 40 Batteries, and 500A Circuit Breaker in cabinet. Full load back-up time @ 150kW of 7.1 minutes.

Battery Cabinet Dimensions: 32.3"W x 42.0"D x 74.0"H

Battery Cabinet Weight: 4,225 Lbs.

Eaton 93PM Remote Monitoring Device: Wall-mounted display panel for monitoring the UPS status in the imaging suite when the UPS is located elsewhere in the facility. Requires Power Xpert Gateway Mini-Slot Card for interface with the 93PM UPS (included with the 93PM UPS quoted above).

RMP Dimensions: 5.9"W x 0.8"D x 3.2"H

RMP Weight: 0.5 Lbs.

## Description

Eaton Power Xpert Gateway UPS Mini-Slot Card (PXGMS): This card can provide Web/SNMP and Modbus TCP/IP connectivity and functionality for the 93PM UPS system for the purpose of remotely monitoring the status of the UPS via an Ethernet network connection.

This panel incorporates several features desirable for system installations to minimize down time, protect the X-Ray Generator electronics, and to reduce operational delays after a power outage. The panel has a main circuit breaker, Q1, provides fully integrated "X-Ray ON" warning light control and a relay to reduce the room lighting during the procedure. When the main circuit breaker is turned off, all power circuits within the panel will be de-energized.

Q1 provides the disconnect means and lock-out and tag-out (LOTO) the X-Ray Generator power circuit for maintenance purposes. The K2 contactor will open with any loss of power or by pressing any Emergency Power Off (EPO) pushbutton. The contactor control circuit is factory configured to automatically re-energize the X-Ray Generator upon restoration of facilities power. The control circuit may be re-configured to require the operator to manually restart the equipment once the incoming power has been restored. This protects the sensitive electronic circuits of the X-Ray Generator from sags and surges that immediately follow power loss from blackouts, storms, utility reclosure operations, and out of phase automatic transfer switch operations. The SC1 cabinet is protected by an electronic circuit breaker, Q4.

The control circuits for the EPOs are low voltage 24 VDC and are fully powered from within the panel. The restart functionality and EPO circuitry is controlled with a safety relay, K10.

The white SAFETIES OK indicator light on the front of the panel is illuminated when none of the EPOs are pressed. When the white light is active, pressing the green START pushbutton will cause the X-Ray Generator to be energized. The green START button will illuminate, and the white SAFETIES OK light will go off. Pressing the STOP button will de-energize the system. Any EPO pressed while the system is energized will result in the immediate de-energizing of the X-Ray Generator system.

If an EPO is pressed at any time, the EPO must be reset which will cause the SAFETIES OK light to activate. Then the START button will activate the X-Ray system.

### IMPORTANT:

If building power is removed from the panel while the X-Ray system is energized, the power to the X-Ray system will be restored when building power returns without any human interaction. The X-Ray system can then be restarted normally.

Additional provisions are made to integrate the "X-Ray ON" warning lights and room lighting with the X-Ray Equipment. The facility lighting panel provides 120- or 277-volt power that is controlled by contacts relays of K4 and K5 mounted in the IEC. The signal controlling the relays comes directly from the Siemens Generator/Power Cabinet. The IEC will accept signals from the generator at either 24 Volts AC or DC.

## NT60010835 Interstate Mat Corporation Anti-fatigue Mat

Industrial-grade anti-fatigue floor mat that provides comfort and durability. As a high-quality product designed to fight fatigue, it provides support for tired, aching feet, legs and back. Beveled edges for safety. Size 3'x5'.