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## Symbia Evo

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### **Description**

The Symbia Evo has the following base features:

- Gantry
- Patient Bed
- Acquisition Workplace
- SPECT Acquisition Features

#### **Gantry**

The gantry has two Variable Angle SPECT detectors and an, open design with 102 x 78 cm (40.2 x 30.7 in) patient opening. The two Foresight Digital SPECT detectors can be configured for a myriad of applications including 76° or 90° for cardiac applications and at 180° or numerous other configurations for all other whole body and general protocols. The unobstructed gantry base permits planar imaging of seated and standing patients and patients on wheelchairs, or on standard imaging tables, gurneys and hospital beds. Optional caudal tilt of one detector allows for optimum detector positioning of static and dynamic acquisitions. The contemporary design of the gantry incorporates Siemens-typical design elements.

The gantry supports circular orbits and non-circular orbits using autocontour. Autocontour, with infrared real-time body contouring, is a standard component which minimizes patient to collimator distance to 1.2 cm (0.45 inches) in Whole Body and SPECT noncircular orbit acquisition modes.

All motorized motions of the patient bed, gantry and detectors are controlled from the hand controller which can be plugged into either side of the gantry.

The Patient Positioning Monitor (PPM) is a touch screen flat panel display monitor which can be rotated for a wide range user access and visibility. It is used for the following functions:

- Patient Positioning with window and persistence adjustment
- Acquisition Parameter display (elapsed time, time remaining, view number, count rate, etc.)
- Detector and bed position information
- Gantry Control (reconfiguration, collimator change, offset zoom)

#### **Patient Bed**

The patient-oriented design of the imaging bed consists of 40.0 cm (15.8 inch) wide and 2.6 mm (0.10 inch) aluminum pallet, supporting patient weights up to 227 kg (500 lbs). Minimum bed height is 53 cm (21 inches) for easy patient access. Programmable table positions for wheelchairs and gurneys minimize the transport efforts of patients and staff. Integrated rulers on each side of the patient bed, allow for quick whole body set up. The patient bed can easily be removed for rail-free access of sitting/standing patients, wheelchairs, imaging tables, gurneys and hospital beds.

A fully integrated source holder is provided for quick and convenient quality control.

Since patient comfort plays an important role in high quality medical imaging, the Symbia Evo comes equipped with the following comfort accessories:

- a head holder to support and stabilize the head during brain SPECT examinations
- a SPECT armrest to support upper arms and hands during SPECT examinations
- a whole body armrest to support the arms and keep them within the detector field of view during whole body examinations
- a set of patient support straps to help patient lie still on bed

#### **Acquisition Workplace**

The syngo-based high performance acquisition workstation provides a wide range of clinical acquisition protocols utilizing a graphical user interface, keyboard and mouse.

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### SPECT Acquisition Features

#### **SPECT Acquisition Modes:**

- Planar static and dynamic
- Whole Body
- SPECT
- Gated SPECT
- Dynamic SPECT
- Whole Body SPECT

#### **Workflow Features:**

The system combines acquisition, post-processing (optional), and display into user customizable workflows that automate many clinical routines, remembering parameters for each clinical protocol, the workflow will automatically print, archive, and distribute your results to other devices on your network.

#### **Quality Control:**

Automatic and manual motion correction features aids in the improvement of the quality of the acquired images. Besides correcting for motion, gated studies can be beat normalized and quality control images such as sinograms and linograms created to document the results.

#### **3D Orientation:**

Reorient acquired SPECT volumes interactively to achieve the desired image orientation. Cardiac and general orientations are supported. If desired, the orientation applied to one volume can be automatically applied to up to 3 additional volumes.

#### **Image Registration:**

Multiple techniques provide accurate registration of acquired images including translation and rotation in three primary planes, optional automatic registration and landmark registration. The choice of output matrix size is a standard feature.

#### **Reconstruction:**

The reconstruction engine can reconstruct up to 5 volumes concurrently. Standard SPECT as well as wholebody, dynamic and gated cardiac volumes can be created. An advanced technique that provides high image quality comes standard with our system.

Flash 3D is a 3D iterative image reconstruction solution which offers the best reconstruction resolution in the market today following NEMA requirements. Flash 3D reconstruction uses a measured 3D collimator beam model in the iteration process. Correct modeling of the collimator distributes the activity over the slices for more accurate reconstruction. With Flash, the spatial resolution of the collimator is modeled to maintain the precise shape of the lesion. As a result, images are reconstructed with more counts in the correct volume, increasing image contrast.

The key components behind Flash 3D technology are:

- Ordered Subset Expectation Maximization (OSEM) reconstruction algorithm using 3D collimator modeling to increase resolution and decrease noise, while maintaining the exact shape of organs and lesions, when compared to filtered back projection reconstruction.
- Scatter Correction that uses patient specific scatter projection estimates to form a generalized dual-or triple energy window method to compensate for scatter during the iterative reconstruction process.

Symbia utilizes energy independent low profile digital Foresight detectors.

Detector assembly technical specifications:

- True rectangular FOV of 38.7 x 53.3 cm (15.25 x 21 in.)

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- 59 photomultiplier tubes – 53, 7.6 cm (3 in.) and 6, 5.1 cm (2 in.) diameter tubes
- .95 x 59.1 x 44.5 cm (3/8 x 23 x 17.4 in.) NaI (TI) crystal material

The Low Profile Digital Foresight Detector features:

- Balanced performance between energy resolution and spatial resolution
- One, 10-bit high-speed flash ADC per PMT
- Variable PMT selection ensures high resolution for all multi-energy and multi-peak applications
- Optimized dynamic digital integration time to improve high count rate capability
- Individual PMT pile-up correction for improved performance at high count rates
- Energy independence maintains clinical performance at all energies including multi-peak and dual isotope studies
- Location independence maintains consistent spatial resolution across the field of view
- Crystal variation correction for optimal uniformity and linearity across all energies

Single source (Co-57 or Tc-99m) tunes the detector for all energies

The low energy high resolution collimator has the following technical specifications:

- 148,000 hexagonal holes
- Sensitivity: 202 cpm/microCurie
- Resolution: 7.5mm at 10 cm
- Weight: 22 kg (49 lbs)

The medium energy collimator has the following technical specifications:

- 14,000 hexagonal holes
- Sensitivity: 275 cpm/microCurie
- Resolution: 12.5 mm at 10 cm
- Weight: 64 kg (140 lbs)

The high energy collimator has the following technical specifications:

- 8,000 hexagonal holes
- Sensitivity: 135 cpm/microCurie
- Resolution: 13.4 mm at 10 cm
- Weight: 125 kg (275 lbs)

Due to the weight of these collimators, it is recommended that an individual collimator cart containing only the 2 high energy collimators be utilized.

The pinhole collimator with 4 mm aperture has the following technical specifications:

- 1 round hole
- Sensitivity: 123 cpm/microCurie for 99m Tc
- Resolution: 6.6 mm at 10 cm
- Weight: 80 kg (177 lbs)

SPECT imaging with a pinhole collimator is not allowed.

The pinhole collimator occupies the upper 2 locations on a collimator cart; Therefore, only an additional 2 collimators (1 pair) can be stored on the same cart.

The 6 mm aperture has the following technical specifications:

- Sensitivity: 271 cpm/microCurie for 99m Tc
- Resolution 9.5 mm at 10 cm

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The 8 mm aperture has the following technical specifications:

- Sensitivity: 478 cpm/microCurie for 99m Tc
- Resolution: 12.5 mm at 10 cm

The productivity package includes the following features:

- Integrated Collimator Changer
- Automatic Collimator Exchange
- Automatic Quality Control

### **Integrated Collimator Changer**

Innovative collimator exchange system that is mounted beneath the patient bed. Saves time and effort when changing collimators. Holds two sets of low or medium energy collimators including SMARTZOOM collimators.

### **Automatic Collimator Changer**

Fully automated changing of collimators within the integrated collimator changer. Collimator removal or exchange is initiated from the patient positioning monitor.

### **Automatic Quality Control**

Automatic quality control is performed via self-shielding Gd-153 line and Co-57 point sources. The sources are housed in the patient bed and are extended automatically as part of the camera's quality control procedures. The daily, weekly, and monthly procedures are customer scheduled and performed automatically without manual intervention.

The useful life of the 370 MBq (10 mCi) Gd-153 line, used for daily extrinsic floods and monthly multi-head registration procedures, is 2 years. The useful life of the 1.85 MBq (50  $\mu$ Ci) Co-57 point, used for intrinsic floods, is 1 year.

Sources that have been replaced are returned to the source vendor for disposal. Return shipment costs are not included in the purchase price.

The collimator cart is automatically clamped to the patient bed once positioned by the user. The clamping mechanism allows precise collimator exchange to occur.

The collimator cart is designed to hold 2 sets of collimators, or 1 set in combination with a pinhole collimator.

Due to the weight of the high energy collimators, it is recommended that an individual collimator cart containing only the 2 high energy collimators be utilized.

This option does not include the cost of any room modifications for sub-floor installation of the cable.

The extended pivot increases the range from 33 degrees to 45 degrees to allow better handling of wide hospital beds.

The Monitor: 19 in. LCD technical features are:

- 19" active display
- Optimal picture resolution of 1280 x 1024
- Anti-glare panel surface
- Up to 170 degree viewing angle

The Symbia scanner comes standard with a single hand controller that can be plugged into either side of the gantry. This option adds an additional hand controller for added efficiency in accessing the motorized motions for

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the patient bed, gantry, and detectors.

Hospital promotional videos, patient procedure information, relaxation videos, and music CDs are just a few examples of the material that can be experienced with e.media.

Outside of Region 1 (United States, U.S. Territories, and Canada), the DVD player, which must be purchased locally and must meet the following minimum specifications:

- Media: DVDs and Audio CDs
- Video Format: NTSC, PAL or SECAM
- Audio: DVD per DVD PCM Standard
- CD per Redbook Standard
- Outputs: Audio L/R, Phono Jack
- Power: 100-240 VAC 50/60 HZ
- Power consumption: < 8 w max

Organ processing provides generic tools for the manipulation of NM images. In addition, it provides dedicated processing protocols for the many different types of exams performed in nuclear medicine departments. Features provided are:

- Cardiac: Planar Gated Blood Pool, First Pass, Shunt
- Lung: Perfusion, Ventilation, V/Q
- Thyroid
- Renal: GFR, ERPF, MAG3, Transplant, TER, Ace Inhibitor
- Gastric
- Hepatobiliary
- Brain: Patlok, Lassen, IMP, IMP-ARG, NIMS
- GSA Liver
- Parathyroid: Scaled subtraction
- Image manipulation tools: Series Filter, Series Arithmetic, Series Reformat, and Series ROI and Curve
- Manual Fusion

The Planar ½ Time Imaging package is based upon a statistical, adaptive de-noising and de-blurring process for planar imaging. It can be used to:

- Shorten the acquisition time of planar imaging, and/or
- Reduce the dose administered to the patient, and/or
- Enhance the image quality of statistically poor imaging results

The Cardiology Engine provides the Cedars Cardiac SPECT Suite, a comprehensive set of quantitation programs for the evaluation of SPECT Myocardial Perfusion Imaging

The engine calculates a comprehensive set of cardiac parameters including ejection fractions, volumes, wall motion including right ventricular free wall motion in QBS, wall thickening, perfusion (%). QPS allows for the quantitation of prone SPECT data and of serial perfusion changes. Both 20 and AHA-17 segment scoring models are available. In addition to calculating an Eccentricity Index, QGS also calculates a more regional measure of LV shape known as the Shape Index. Displays include gated slices with contours, a motion frozen display which results in better resolution and contrast by eliminating motion of the cardiac cycle, interactive 3D images, and polar maps. Manual over-ride of contours and DICOM compatible output are additional features. Outputs include DICOM secondary capture files, result files as well as the ability to generate an AVI file format. The Cedars application is an OEM product developed and supported by Cedars Sinai.

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Applications include: Cedars SPECT Suite

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A broadband connection is required for full remote service functionality and optimal system uptime. The Siemens Remote Service option allows for remote access to your networked workstations. Hardware may need to be purchased.

Features include:

- Image Transfer
- Remote updates including Virus Protection
- Error log retrieval
- Remote Workflow revisions
- Remote configuration
- License management
- Remote workstation control via netmeeting

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Installation includes:

- Complete system assembly
- Alignment
- System startup
- Calibrations
- Performance verification to factory specifications

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Specifications:

1.4 KVA

Input configuration: 120 VAC, 5-15P

Output configuration: 120 VAC, (6) 5-15R

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This educational offering must be completed by the later of (12) months from purchase of training or if applicable, completion of installation. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

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This cost represents the typical direct expense to Siemens to pay for travel and lodging to attend training at the Siemens Cary, NC training facility. All arrangements must be arranged through Siemens designated travel agency. The precise expense may vary, depending upon the timing of the travel schedule and changes to airfare and hotel rates. Should the expense to Siemens exceed this cost, Customer will not be charged for the difference; should the expense be less than this cost, Siemens will not refund the difference.

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