

## Detailed Technical Specifications

### Symbia Intevo 6

Part No. / Product	Description
	<p>The Symbia Intevo 6 camera system consists of the following integrated features:</p> <ul style="list-style-type: none"> <li>- Gantry</li> <li>- Patient Bed</li> <li>- Acquisition Workplace</li> <li>- SPECT Acquisition Features</li> <li>- CT Acquisition Features</li> </ul> <p><b><u>Gantry</u></b></p> <p>The gantry has two Variable Angle SPECT detectors and an open design with a 70 cm (27.6 in.) patient opening. The two low profile digital SPECT detectors can be configured at 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 Ultra Fast Ceramic multislice spiral CT detector rotates at 100 RPM (0.6 sec per revolution).</p> <p>The gantry supports circular and non-circular orbits. Autocontour, with infrared real-time body contouring, is a standard component which minimizes patient to collimator distance to 1.2 cm (0.45 in.) in Whole Body and SPECT non-circular orbit acquisition modes.</p> <p>All motorized motions of the system are controlled from hand controller which can be plugged into either side of the gantry.</p> <p>The Patient Positioning Monitor is a touch screen flat panel which can be rotated for a wide range of user access and visibility. It is used for the following functions:</p> <ul style="list-style-type: none"> <li>- Patient positioning with window and persistence adjustment</li> <li>- Acquisition parameter display (elapsed time, time remaining, view number, count rate, etc.)</li> <li>- Camera information (detector and bed positions)</li> <li>- Gantry control (reconfiguration, collimator change, offset zoom, and adjusting the CT acquisition limits.)</li> </ul> <p>A fully integrated source holder is provided for quick and convenient quality control.</p> <p><b><u>Patient Bed</u></b></p> <p>The patient-oriented design of the imaging bed consists of 35.6 cm (14 in.) wide and 15 mm (0.6 in.) thin, carbon fiber pallet, supporting patient weights up to 227 kg (500 lbs). Minimum bed height is 53 cm (21 in.) 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 bed also provides automatic, uninterrupted table feed for multi-rotation continuous CT volume scanning. The patient bed can be easily pivoted to the side for rail-free access of sitting/standing patients, wheelchairs, imaging tables, gurneys and hospital beds.</p> <p><b><u>Acquisition Workplace</u></b></p> <p>The syngo-based high performance workstation provides a multi-modality graphical user interface, keyboard and mouse. SPECT and CT acquisition, quality control, and display are integrated in a single workplace. Workflows for a wide variety of clinical protocols are included. The workplace offers customizable displays and full DICOM archiving and printing functionality.</p>

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	<p><b><u>SPECT Acquisition Features</u></b></p> <p><b>SPECT Acquisition Modes</b></p> <ul style="list-style-type: none"> <li>- Planar static and dynamic</li> <li>- Whole Body</li> <li>- SPECT</li> <li>- Gated SPECT</li> <li>- Dynamic SPECT</li> <li>- Whole Body SPECT</li> </ul> <p><b>SPECT Features</b></p> <p><b>Workflow Features:</b> 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.</p> <p><b>Quality Control:</b> 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.</p> <p><b>3D Orientation:</b> 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.</p> <p><b>Image Registration:</b> 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.</p> <p><b>Reconstruction:</b> The reconstruction engine supports up to 5 multi-isotope studies concurrently. Standard SPECT as well as wholebody, dynamic and gated cardiac volumes can be created. Advanced techniques that provide high image quality come standard with our system:</p> <ul style="list-style-type: none"> <li>- <u>xSPECT Iterative Reconstruction</u> The xSPECT ordered-subset conjugate-gradient reconstruction algorithm uses xSPECT technology to register the SPECT information into the CT frame of reference laying the foundation for higher SPECT image resolution with xSPECT Bone (purchasable option) and accurate and reproducible quantitative results with xSPECT Quant Tc99m (purchasable option).</li> <li>- <u>Flash Iterative Reconstruction</u> 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: <ul style="list-style-type: none"> <li>- 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.</li> <li>- CT Attenuation Correction that creates very precise attenuation maps from the high quality CT data to correct for attenuation and increase reading accuracy.</li> <li>- Scatter Correction that uses patient specific scatter projection estimates to form a generalized</li> </ul> </li> </ul>

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	<p style="text-align: center;">dual-or triple energy window method to compensate for scatter during the iterative reconstruction process.</p> <p><b><u>CT Acquisition Features</u></b></p> <p><b>CT Acquisition Modes</b></p> <ul style="list-style-type: none"> <li>- Topogram, scanning perspectives: anterior-posterior (ap), posterior-anterior (pa), lateral (lat)</li> <li>- Spiral CT, continuous volume scanning technique with uninterrupted table feed in the multi-rotation mode</li> <li>- Sequential CT, incremental, slice-by-slice imaging mode with no table movement during data acquisition</li> </ul> <p><b>CT Features</b></p> <p><b>CARE Dose 4D:</b>  Care Dose 4D automatically determines the minimal x-ray dose level needed to obtain optimal image quality, for all scan modes. The initial or starting tube current for every axial slice position is determined from the topogram image. Then, during the data acquisition for each axial slice, the x-ray attenuation values are closely monitored and the tube current is adjusted, on a real time basis, to optimize the x-ray dose level for the specific organs and anatomy in the x-ray path.  Several clinical benefits are achieved with CARE Dose 4D:</p> <ul style="list-style-type: none"> <li>- Significant x-ray dose reduction (up to 68 %) possible for all body regions scanned compared with standard sequence or spiral scanning</li> <li>- Consistent, optimal image quality with the x-ray dose level unique for every patient and for every anatomical region</li> <li>- Thinner axial slices and/or longer scan ranges possible because of reduced tube loading</li> <li>- Ultra-low dose examinations for pediatric patients</li> </ul> <p><b>SureView™ – Multislice Image Reconstruction System</b></p> <ul style="list-style-type: none"> <li>- Excellent Image Quality and no slice broadening at any pitch – IQ is kept constant for all scan speeds, independent of the selected range and scan time.</li> <li>- Up to 20% dose savings in spiral mode.</li> </ul> <p><b>Workstream4D</b>  4D workflow with direct generation of axial, sagittal, coronal, or double-oblique images from standard scanning protocols. Elimination of manual reconstruction steps. Reduction of data volume up to a factor of 10, since virtually all diagnostic information is captured in 3D slices. Fast image reconstruction of up to 16 images/s in 512 matrix is provided.</p> <p><b>Asynchronous Recon:</b>  Asynchronous Recon allows for multiple image reconstructions and reformats, parallel to scanning. With this feature, up to eight reconstruction job requests can be loaded into a scan protocol. Immediately upon completion of the scan acquisition, these reconstruction jobs are automatically executed in the background without delaying the start of next patient examination.</p> <p><b>Image reconstruction:</b>  Reconstruction using raw data zoom with the possibility of freely selecting the image center either before scanning (prospectively) or retrospectively.</p> <p><b>Image display:</b>  CT value scale for window setting -1024 to +3071 HU. For very dense objects the CT value scale can be extended from -10240 to +30710 HU.</p> <p><b>Multiplanar Reconstruction (MPR)</b>  Real-time MPR for real-time reconstruction of secondary slices.  Slice orientation: coronal, sagittal, irregular as well as multi-planar with SIR and Oblique. Cutlines can be determined using the reference tomogram or in sagittal reformatted images (SRI). 512 x 512 reconstruction matrix.</p>

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	<p>Symbia utilizes energy independent low profile digital Foresight detectors.</p> <p>Detector assembly technical specifications:</p> <ul style="list-style-type: none"> <li>– True rectangular FOV of 38.7 x 53.3 cm (15.25 x 21 in.)</li> <li>– 59 photomultiplier tubes – 53, 7.6 cm (3 in.) and 6, 5.1 cm (2 in.) diameter tubes</li> <li>– .95 x 59.1 x 44.5 cm (3/8 x 23 x 17.4 in.) NaI (TI) crystal material</li> </ul> <p>The Low Profile Digital Foresight Detector features:</p> <ul style="list-style-type: none"> <li>– Balanced performance between energy resolution and spatial resolution</li> <li>– One, 10-bit high-speed flash ADC per PMT</li> <li>– Variable PMT selection ensures high resolution for all multi-energy and multi-peak applications</li> <li>– Optimized dynamic digital integration time to improve high count rate capability</li> <li>– Individual PMT pile-up correction for improved performance at high count rates</li> <li>– Energy independence maintains clinical performance at all energies including multi-peak and dual isotope studies</li> <li>– Location independence maintains consistent spatial resolution across the field of view</li> <li>– Crystal variation correction for optimal uniformity and linearity across all energies</li> </ul> <p>Single source (Co-57 or Tc-99m) tunes the detector for all energies</p>
	<p>The low energy high resolution collimator has the following technical specifications:</p> <ul style="list-style-type: none"> <li>- 148,000 hexagonal holes</li> <li>- Sensitivity: 202 cpm/microCurie</li> <li>- Resolution: 7.5mm at 10 cm</li> <li>- Weight: 22 kg (49 lbs)</li> </ul>
	<p>The medium energy collimator has the following technical specifications:</p> <ul style="list-style-type: none"> <li>- 14,000 hexagonal holes</li> <li>- Sensitivity: 275 cpm/microCurie</li> <li>- Resolution: 12.5 mm at 10 cm</li> <li>- Weight: 64 kg (140 lbs)</li> </ul>
	<p>The pinhole collimator with 4 mm aperture has the following technical specifications:</p> <ul style="list-style-type: none"> <li>- 1 round hole</li> <li>- Sensitivity: 123 cpm/microCurie for 99m Tc</li> <li>- Resolution: 6.6 mm at 10 cm</li> <li>- Weight: 80 kg (177 lbs)</li> </ul> <p>SPECT imaging with a pinhole collimator is not allowed.</p> <p>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.</p>
	<p>The 6 mm aperture has the following technical specifications:</p> <ul style="list-style-type: none"> <li>- Sensitivity: 271 cpm/microCurie for 99m Tc</li> <li>- Resolution 9.5 mm at 10 cm</li> </ul>
	<p>The 8 mm aperture has the following technical specifications:</p> <ul style="list-style-type: none"> <li>- Sensitivity: 478 cpm/microCurie for 99m Tc</li> <li>- Resolution: 12.5 mm at 10 cm</li> </ul>

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	<p>The productivity package includes the following features:</p> <ul style="list-style-type: none"> <li>- Integrated Collimator Changer</li> <li>- Automatic Collimator Exchange</li> <li>- Automatic Quality Control</li> </ul> <p><b>Integrated Collimator Changer</b></p> <p>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.</p> <p><b>Automatic Collimator Changer</b></p> <p>Fully automated changing of collimators within the integrated collimator changer. Collimator removal or exchange is initiated from the patient positioning monitor.</p> <p><b>Automatic Quality Control</b></p> <p>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.</p>
	<p>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 µCi) Co-57 point, used for intrinsic floods, is 1 year.</p> <p>Sources that have been replaced are returned to the source vendor for disposal. Return shipment costs are not included in the purchase price.</p>
	<p>The collimator cart is automatically clamped to the patient bed once positioned by the user. The clamping mechanism allows precise collimator exchange to occur.</p> <p>The collimator cart is designed to hold 2 sets of collimators, or 1 set in combination with a pinhole collimator.</p> <p>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.</p>
	<p>The extended pivot increases the range from 33 degrees to 45 degrees to allow better handling of wide hospital beds.</p>
	<p>The Symbia Intevo and T series scanners come 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 the patient bed, gantry, and detectors.</p>
	<p>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:</p> <ul style="list-style-type: none"> <li>- Cardiac: Planar Gated Blood Pool, First Pass, Shunt</li> <li>- Lung: Perfusion, Ventilation, V/Q</li> <li>- Thyroid</li> <li>- Renal: GFR, ERPF, MAG3, Transplant, TER, Ace Inhibitor</li> <li>- Gastric</li> <li>- Hepatobiliary</li> <li>- Brain: Patlok, Lassen, IMP, IMP-ARG, NIMS</li> <li>- GSA Liver</li> </ul>

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	<ul style="list-style-type: none"> <li>- Parathyroid: Scaled subtraction</li> <li>- Image manipulation tools: Series Filter, Series Arithmetic, Series Reformat, and Series ROI and Curve</li> <li>- Manual Fusion</li> </ul>
	<p>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:</p> <ul style="list-style-type: none"> <li>— Shorten the acquisition time of planar imaging, and/or</li> <li>— Reduce the dose administered to the patient, and/or</li> <li>— Enhance the image quality of statistically poor imaging results</li> </ul>
	<p>The Cardiology Engine provides the Corridor4DM Cardiac Suite, a comprehensive set of quantitation programs for the evaluation of SPECT Myocardial Perfusion Imaging</p> <p>The Corridor4DM application includes comprehensive interactive processing and display, generation of 2D, 3D, and polar maps images, calculation of ventricular volumes, myocardial mass and ejection fraction for gated SPECT studies and utilizes gated bloodpool data to calculate left ventricular Ejection Fraction. Compare perfusion and functional polar maps to gender matched normal files, which includes additional support for attenuation correction. Also included are a normal database generator and the ability to create reports within the Corridor4DM application. The Corridor4DM application is an OEM product developed and supported by INVIA.</p> <p>Outputs include DICOM secondary capture files, result files, reports as well as the ability to generate an AVI or TIFF file.</p> <p>Supported software for Profile Reconstruction cardiac data</p> <p>Applications include: Corridor4DM Cardiac Suite</p>
	<p>This package supports images from NM, PET, CT, MR and AX and features the following:</p> <p><b>3D Package</b></p> <p>Basic 3D package used to navigate through volume data and to create surface shaded and maximum intensity projection images. This package supports the following features:</p> <ul style="list-style-type: none"> <li>- Surface Shaded Display</li> <li>- Maximum Intensity Projection (MIP)</li> <li>- MPR user defined Thickness</li> <li>- Interactive 3D volume rotation</li> <li>- Interactive 3 slice display</li> <li>- Oblique cuts at any angle within the volume</li> <li>- Storage of fused results as DICOM secondary capture images</li> <li>- Region of interest punch tool</li> <li>- Curved cuts along any user defined pathway</li> <li>- Storage of 3D results</li> </ul> <p><b>Image Fusion Package</b></p> <p>Image Fusion Package for spatial alignment, superimposition, and visualization of image data of one patient where image data has been generated by different modalities. Supports optimal diagnosis by fusing the morphological with the functional information.</p> <ul style="list-style-type: none"> <li>- Easy-to-use visual alignment with 6 degrees of freedom (3X translation, 3X rotation)</li> <li>- Landmark based registration with convenient landmark editor for point-based registration using anatomical landmarks</li> <li>- Storage of transformation matrix after registration for later retrieval</li> <li>- Side by side visualization with correlated pointer and simultaneous scrolling</li> <li>- 2D alpha blending in monochrome or pseudo-color with adjustable balance between the two</li> </ul>

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	<p>superimposed data sets.</p> <p><b>Automatic Image Fusion</b></p> <p>Enhances the existing Image Fusion Package with techniques for automatic image registration. Surface Matching and Mutual Information algorithms allow for mix of image registration between anatomic modalities and functional modalities.</p> <p>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.</p> <p>Features include:</p> <ul style="list-style-type: none"> <li>- Image Transfer</li> <li>- Remote updates including Virus Protection</li> <li>- Error log retrieval</li> <li>- Remote Workflow revisions</li> <li>- Remote configuration</li> <li>- License management</li> <li>- Remote workstation control via netmeeting</li> </ul>
	<p>Installation includes:</p> <ul style="list-style-type: none"> <li>- Complete system assembly</li> <li>- Alignment</li> <li>- System startup</li> <li>- Calibrations</li> <li>- Performance verification to factory specifications</li> </ul> <p>This option is required for all US Installations</p>
	<p>Specifications:</p> <p>1.4 KVA</p> <p>Input configuration: 120 VAC, 5-15P Output configuration: 120 VAC, (6) 5-15R</p>
	<p>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.</p>
	<p>With the use of optimized workflows included in this Neurology Engine, one can combine standardized anatomy and a comprehensive normal 99Tc-ECD database with advanced fusion techniques, to enable automatic correlation of the patient's study with an average brain for quick computation of abnormalities. The fusion engine produces results that are reliable and reproducible between multiple sessions and multiple users. The superior quantification tools include voxel-by-voxel and regional evaluation of abnormal brain perfusion and automatic positioning of anatomical regions of interest which are optimized for evaluation of dementia. Additional anatomical brain regions of interest are possible which makes this application flexible to evaluate a number of neurological</p>

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	<p>disorders. In addition, several anatomical regions may be selected for quick assessment of a single patient scan or for quantitative comparison to other scans. Unique fusion techniques, automated evaluation steps, and comprehensive quantification tools meet the needs of the emerging SPECT or SPECT and independently acquired CT neurological evaluations. A reporting mechanism is also incorporated to help ensure consistent patient reporting.</p> <p>Scenium Striatal Analysis provides a workflow for Ioflupane brain assessment. This powerful workflow enables:</p> <p>Visual assessment is aided by combining automatic slab creation with optimal window leveling to ensure reproducible displays across patients and users.</p> <p>Quantification includes a table of results with the most relevant quantification parameters such as left/right ratios and striatum and background ratios. These calculations are made based on a pair of 3D Striatal ROIs that are automatically positioned on the patient scan, but can also be manipulated by the user for a perfect fit to the patient anatomy.</p> <p>Scenium Subtraction analysis provides an advanced subtraction workflow aimed primarily at epileptic seizures. This feature implements the SISCOM technique (Subtraction Ictal SPECT Coregistered to MRI) for an easy and reproducible Epilepsy assessment. This powerful workflow enables both reproducible visual assessment as well as quantification.</p> <p>Applications include: syngo Scenium SPECT Database Comparison, Scenium Striatal Analysis, and Scenium Subtraction</p>
	<p>xSPECT Quant is the first and only truly quantitative solution for Tc99m SPECT imaging. This unique advanced reconstruction technique enables absolute quantification of disease uptake that is both accurate and reproducible. With xSPECT Quant quantitative values are derived automatically during the reconstruction in units of Bq/ml or SUV's. These values can be confidently compared across patients, systems and time.</p>
	<p>xSPECT Bone is the most advanced SPECT bone imaging reconstruction software available. It uses the CT as the frame-of-reference for image reconstruction enabling CT-like anatomical clarity and resolution. xSPECT Bone defines five tissue classes: air, adipose, soft tissue, soft bone and cortical bone. Based on attenuation coefficients each image voxel in the <math>\mu</math>-map is indexed into one of these classes. The result is a patient-specific linear zone map, which can improve image resolution. For the first time, physicians can potentially detect and distinguish between cancerous lesions and degenerative disorders and may better visualize small or low-uptake lesions thanks to a level of clarity and image detail never before experienced in nuclear medicine.</p>
	<p>IQ-SPECT is a unique ultra-fast cardiac solution option for general purpose SPECT systems. The foundation for IQ-SPECT relies on 3 key technological advancements:</p> <ul style="list-style-type: none"> <li>- SMARTZOOM collimators</li> <li>- Cardio-centric orbit</li> <li>- Advanced reconstruction</li> </ul> <p><b><u>SMARTZOOM collimators</u></b> The SMARTZOOM collimator is capable of magnifying the heart and capture up to 4 times higher sensitivity than conventional LEHR collimators.</p> <p><b><u>Cardio-Centric Orbit</u></b> An intelligent Cardio-Centric Orbit is used to maintain the heart at the center of the SMARTZOOM field of view for every view of the acquisition.</p> <p><b><u>Advanced Reconstruction</u></b> The advanced reconstruction method fully models the collimator and the camera system while performing distance-dependent isotropic resolution recovery, CT based attenuation compensation (Symbia T, and Symbia Intevo series scanners), and energy window based scatter correction.</p> <p>The entire IQ-SPECT solution was carefully designed to address the needs of the clinic, with a selection of optimized protocol options:</p> <ul style="list-style-type: none"> <li>- 4 minutes using standard dose</li> <li>- 8 minutes using half dose</li> </ul>

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	<p>- 16 minutes using only a quarter of the dose</p>
	<p>This cost represents the typical direct expense to _____ to pay for travel and lodging to attend training at the _____ training facility. All arrangements must be arranged through _____ 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 _____ exceed this cost, Customer will not be charged for the difference; should the expense be less than this cost, _____ will not refund the difference.</p>
	<p>This cost represents the typical direct expense to _____ to pay for travel and lodging to attend training at the _____ training facility. All arrangements must be arranged through _____ 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 _____ exceed this cost, Customer will not be charged for the difference; should the expense be less than this cost, _____ will not refund the difference.</p>