

**WAREHOUSE BLDG 14 B69032**

**V.A. Medical Center**

**3601 S 6TH AVENUE**

**TUCSON, AZ 85723**

**po#: 678-B69032**

**Qty**

**Item Description**

1

**MAGNETOM Aera - System**

MAGNETOM Aera is designed to provide you the versatility you need to meet the increasing demands in healthcare. Maximize 1.5T with its core technologies Tim(r) 4G and Dot(r), along with its comprehensive application portfolio and experience unique functionalities to increase patient comfort.

Every case. Every day.

System Design

- Short and open appearance (145 cm system length and 70 cm Open Bore Design) to reduce patient anxiety and claustrophobia
- Whole-body superconductive Zero Helium Boil-Off 1.5T magnet
- Actively Shielded water-cooled Siemens gradient system for maximum performance
- TrueForm Magnet and Gradient Design

Tim 4G (Total imaging matrix in the 4th generation) for excellent image quality and speed

- Siemens unique DirectRF(tm) technology enabling the all digital-in/ digital-out design
- Dual-Density Signal Transfer Technology
- Head/Neck 20 DirectConnect
- Spine 32 DirectConnect
- Body 18
- Flex Large 4
- Flex Small 4
- Flex Coil interface
- Tim Coil interface

Dot (Day optimizing throughput) for higher consistency, flexibility and efficiency

- Dot Display
- Dot Control Centers
- Brain Dot Engine

Tim Application Suite allowing excellent head-to-toe imaging

- Neuro Suite

Qty

**Item Description**

- Angio Suite
- Cardiac Suite
- Body Suite
- Onco Suite
- Breast Suite
- Ortho Suite
- Pediatric Suite
- Scientific Suite

Further included

- High performance host computer and measurement and reconstruction system
- Siemens uniqueTimCT FastView localizer and CAIPIRINHA
- syngo MR software including
- 1D/2D PACE
- BLADE
- iPAT<sup>2</sup>
- Phoenix
- Inline Diffusion
- WARP
- MDDW (Multiple Direction Diffusion Weighting)
- CISS
- DESS

The system (magnet, electronics and control room) can be installed in 30sqm space. For system cooling either the Eco Chiller options or the Separator is required.

1

**Tim [204x64] XQ Gradients #Ae**

Tim [204x64] XQ-gradients performance level Tim 4G with it's newly designed RF system and innovative coil architecture enables high resolution imaging and increased throughput. Up to 204 simultaneously connected coil elements in combination with the 64 independent RF channels, allow for the most flexible parallel imaging and support the most demanding applications. Maximum SNR through the new Tim 4G matrix coil technology. This option includes Advanced High Order Shim. XQ - gradients The XQ- gradients are designed combining high performance and linearity to support clinical whole body imaging at 1.5T. The force compensated gradient system minimizes vibration levels and acoustic noise. The XQ gradient system combines 45 mT/m peak amplitude with a slew rate of 200 T/m/s.

1

**PC Keyboard US english #Tim**

Standard PC keyboard with 101 keys.

1

**Pure White Design #T+D**

The MAGNETOM Aera / MAGNETOM Skyra design is available in different light and appealing variants which perfectly integrates into the different environments. The color of the main face plate cover of the Pure White Design Variant with the integrated Dot Control Centers and the unique Dot Display is brilliant white surrounded by a brilliant silver trim. The asymmetrical deco area on the left side is colored white matte and also with a brilliant surrounding silver trim.

The table cover is presented also in the same color and material selection.

1

**Tim Dockable Table #Ae**

The Tim Dockable Table is designed for maximum patient comfort and smooth patient preparation. Tim Dockable Table can support up to 250 kg (550 lbs) patients without restricting the vertical or horizontal movement.

The one step docking mechanism and the innovative multi-directional navigation wheel ensure easy maneuvering and handling. Critically ill or immobile patients can now be prepared outside the examination room for maximum patient care, flexibility and speed.

Qty	Item Description
1	<p><b>Add. Tim Dockable Table #Ae</b></p> <p>Additional mobile table solution with integrated removable Spine 32 for installations that already have a Tim Dockable Table and would like to increase their throughput even more.</p>
1	<p><b>Height Leveling kit,120mm#T+D(Dock tabl)</b></p> <p>Height leveling kit to adjust the Tim Dockable Table for MAGNETOM Aera/ MAGNETOM Skyra systems which are installed on a pedestal with the following heights: 90 mm - 195 mm in combination with the Tim Dockable Table</p>
1	<p><b>SW syngo MR E11</b></p> <p>syngo MR E11 software with new Dot features and applications.</p> <p>DotGO</p> <p>Go for consistent results, efficiently with Dot engines.</p> <p>Dot Cockpit</p> <p>The central tool to continuously build knowledge into standardized exam strategies and to make those available for every user in the MRI department. Dot Cockpit is the new starting point for every exam.</p> <ul style="list-style-type: none"> <li>- TGSE</li> <li>- WARP including VAT</li> </ul>
1	<p><b>Quiet Suite #T+D</b></p> <p>Quiet Suite enables complete, quiet examinations for neurology and orthopedics with at least 70% reduction in sound pressure levels.</p>
1	<p><b>DotGO Ultimate Package, USA#T+D</b></p> <p>The DotGO Ultimate Package includes:</p> <ul style="list-style-type: none"> <li>- Spine Dot Engine</li> <li>- Large Joint Dot Engine</li> <li>- Angio Dot Engine</li> <li>- Abdomen Dot Engine</li> <li>- Cardiac Dot Engine</li> <li>- Breast Dot Engine</li> </ul> <p>The DotGO Ultimate package offers a comprehensive set Dot Engines for the maximum coverage of MR examination requests. Robust image quality can be achieved efficiently and consistently in the clinical areas of Neuro, MSK, Vascular, Cardiac and Oncology.</p> <p>The Spine Dot Engine provides the functionality of Inline Composing and Tim Planning Suite for streamlining workflows in all spine imaging.</p> <p>The Large Joint Dot Engine enhances standardization of the knee, hip and shoulder workflows and optimizes reproducible image quality by incorporating automation tools</p> <p>The Angio Dot Engine provides semi-automatic detection of arterial and venous timing windows using a test bolus technique. This information is feedback for next planning steps automatically adapting scan parameters to the individual patient and patient's condition..</p> <p>The Abdominal Dot Engine offers intuitive guidance and a high level of automation. It allows automatic sequence scaling according to physiological characteristic.</p> <p>The Cardiac Dot Engine uses anatomical landmarks, standard views of the heart, such as dedicated long axis and short-axis views - easily generated and reproduced.</p> <p>The Breast Dot Engine provides lesion detection, implant evaluation and breast biopsy. The Dot engines support various breast coils, head-first or optional feet-first positioning and</p>

Qty	Item Description
	examination approaches (fatsat, nonfatsat).
1	<b>TimCT Angio Dot Engine #T+D</b> syngo TimCT Angiography employs the revolutionary TimCT Continuous Table move technology for large Field of View angiographies with the smoothest workflow and the most homogeneous image quality. syngo TimCT Angiography is built on the Tim technology as well as on a highly advanced patient table with high positioning accuracy and an RF shielded table drive. TimCT Angio Dot Engine makes TimCT even easier by guidance throughout the exam and by providing automatic detection of arterial and venous timing windows using a test bolus technique. This information is fed back into the next planning steps automatically adapting scan parameters to the individual patient and patient's condition. Where needed, automatic voice commands support the communication with the patient.
1	<b>Composing syngo #Tim</b> This application provides dedicated evaluation software for creation of full-format images from overlapping MR volume data sets and MIPs (starting from syngo MR B13) acquired at multiple stages.
1	<b>Native syngo #Tim</b> Integrated software package with sequences and protocols for non-contrast enhanced 3D MRA with high spatial resolution. syngo NATIVE particularly enables imaging of abdominal and peripheral vessels and is an alternative to MR angiography techniques with contrast medium, especially for patients with severe renal insufficiency.
1	<b>Vessel View syngo #Tim</b>
1	<b>3D VRT syngo</b>
1	<b>Fly Through syngo</b> Integrated syngo image analysis is a vital component of the MR examination. This application provides dedicated evaluation software for simulation of virtual endoscopy or bronchoscopy and for Fly-Through in vascular structures, where real endoscopic procedures are impossible.
1	<b>LiverLab #T+D</b> LiverLab is a system guided workflow to examine the hepatic fat and iron status, as part of the Abdomen Dot Engine.
1	<b>FREEZEit Body MRI Package #T+D</b> FREEZEit Body Package contains two robust sequences for advanced body imaging: TWIST VIBE and StarVIBE. - TWIST VIBE is a new fast, high-resolution 4D imaging sequence for multi-arterial liver imaging. - StarVIBE is a motion insensitive VIBE sequence using a stack-of-stars trajectory.
1	<b>Cushion Set Feet First #T+D</b> The Feet-First Cushion Set is required for adapting a Sentinelle Endorectal Coil purchased with a Tim system that includes a Body Matrix coil for feet-first use with a Tim 4G system that includes the Body 18 coil.
1	<b>Additional PMU Sensor Kit #T+D</b> Additional PERU, PPU and charging stand.
1	<b>Flow Quantification #Tim</b> Special sequences for quantitative assessment of flow.
1	<b>Argus Flow</b>
1	<b>Advanced Cardiac Package #T+D</b> This package contains special sequences and protocols for advanced cardiac imaging including 3D and 4D syngo BEAT functionalities. It supports advanced techniques for ventricular function imaging, dynamic imaging, tissue characterization, coronary imaging, and more.

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1	<p><b>MyoMaps #T+D</b></p> <p>This package contains special sequences and protocols for inline T1,T2 and T2* calculation at the heart. The generation of T1 and T2 parametric maps is enhanced by the use of motion correction. T1,T2 and T2* parametric maps could be used to support assessment of cardiovascular disease.</p>
1	<p><b>Argus 4D Ventr.Function syngo #Tim</b></p> <p>syngo Argus 4D Ventricular Function software processes MR cine images of the heart and generates quantitative results for physicians in the diagnostic process.</p>
1	<p><b>Mapit syngo #Tim</b></p> <p>Based on the T1, T2 or T2* properties of the cartilage syngo ParametricMap allows the early detection of osteoarthritic break down of cartilage structures even before morphological changes occur. The method supports therapeutic decisions in individual patients and can be used to control treatments non-invasively, replacing surgeries or biopsies.</p> <p>The assessment of T1, T2 and T2* properties of tissues in other body regions is also possible. syngo ParametricMap provides very fast 2D and 3D high resolution imaging sequences and the Inline calculation of parametric maps for the T1, T2 and T2* properties of the imaged tissue.</p>
1	<p><b>Image Fusion syngo</b></p> <p>This application provides a dedicated evaluation software for spatial alignment (matching) and visualization of image data either from different modalities (CT,MR,NM,PET) or from the same modality but from multiple examinations of the same patient. It supports optimal diagnostic outcome (fusion of morphological and functional information) and therapy planning.</p>
1	<p><b>Neuro Perfusion Eval #T+D</b></p> <p>Neuro Perfusion Evaluation syngo provides a task card for detailed post-processing of brain perfusion data sets. Color display of the relative Mean Transit Time (relMTT), relative Cerebral Blood Volume (relCBV), corrected rel CBV, and relative Cerebral Blood Flow (relCBF) is supported. Flexible selection of the Arterial Input Function (AIF) for more reliable analysis taking into account the dynamics over time of the contrast agent enhancement. Furthermore a calculation of maps using automatically selected local Arterial Input Functions (AIF) is provided to reduce the amount of user interactions.</p> <p>The detailed evaluation of brain perfusion data sets generates parameter maps for TTP and PBP and for the hemodynamic parameters relMTT, relCBV, rel CBVcor and relCBF. These may show perfusion deficits and assist in the diagnosis and grading of e.g. vascular deficiencies and brain tumors.</p>
1	<p><b>DTI Package #T+D</b></p> <p>The DTI Package is a bundle of:</p> <ul style="list-style-type: none"> <li>- Diffusion Tensor Imaging</li> <li>- DTI Evaluation and</li> <li>- DTI Tractography syngo</li> </ul> <p>The bundle comprehends all acquisition and postprocessing tools for comprehensive DTI exams.</p>
1	<p><b>RESOLVE #T+D</b></p> <p>RESOLVE is a diffusion-weighted, readout-segmented EPI sequence optimized towards high resolution imaging with reduced distortions. The sequence uses a very short echo-spacing compared to single-shot EPI, substantially reducing susceptibility effects. A 2D-navigator correction is applied to avoid artefacts due to motion-induced phase errors. This combination allows diffusion weighted imaging of the breast, prostate, brain and spine with a high level of detail and spatial precision.</p>
1	<p><b>Arterial Spin Labeling 3D #T+D</b></p> <p>3D acquisition of non-contrast enhanced brain perfusion with a TGSE sequence for minimal susceptibility and full brain coverage. Higher SNR, optimized contrast uniformity and reduced motion sensitivity. Inline calculation of PWI (perfusion weighted images) for a qualitative assessment of brain perfusion.</p>

Qty	Item Description
1	<p><b>Arterial Spin Labeling 2D</b></p> <p>ASL is a non contrast enhanced brain perfusion technique. EPI sequence enhanced for PASL (Pulsed Arterial Spin Labeling) with preparation module (inversion pulse, saturation pulses) and selectable prospective motion correction. Perfusion-weighted color maps and relative cerebral blood flow (relCBF) color maps are calculated with Inline technology.</p>
1	<p><b>SWI #Tim</b></p> <p>Susceptibility Weighted Imaging is a high-resolution 3D imaging technique for the brain with ultra-high sensitivity for microscopic magnetic field inhomogeneities caused by deoxygenated blood, products of blood decomposition and microscopic iron deposits. Among other things, the method allows for the highly sensitive proof of cerebral hemorrhages and the high-resolution display of venous cerebral blood vessels.</p>
1	<p><b>fMRI Trigger Converter</b></p> <p>An optical trigger signal is available to trigger external stimulation devices in fMRI experiments.</p> <p>With the "fMRI Trigger Converter" this signal can be converted to an electrical signal (TTL/BNC and RS 232 interface for PC; modes: toggle or impulse).</p>
1	<p><b>Spectroscopy Package #T+D</b></p> <p>The Spectroscopy Package is a comprehensive software package which bundles Single Voxel Spectroscopy, 2D Chemical Shift Imaging, 3D Chemical Shift Imaging and syngo Spectroscopy Evaluation.</p> <p>Sequences and protocols for proton spectroscopy, 2D and 3D proton chemical shift imaging (2D CSI and 3D CSI) to examine metabolic changes in the brain (e.g. in tumors and degenerative diseases) and in the prostate are included. Furthermore included is the comprehensive syngo Spectroscopy Evaluation Software which enables fast evaluation of spectroscopy data on the syngo Acquisition Workplace.</p>
1	<p><b>GRACE syngo #Tim</b></p> <p>Integrated software package including sequences and protocols for proton spectroscopy, optimized for breast studies.</p> <p>SVS (Single Voxel Spectroscopy) technique (spin echo sequence) optimized for breast spectroscopy.</p> <ul style="list-style-type: none"> <li>- The technique contains a special spectral lipid suppression pulse (user definable) for lipid signal reduction.</li> <li>- Water reference detection (to visualize the normalized choline signal) (Siemens unique)</li> <li>- Online frequency shift correction for reduction of breathing related artifacts, inline implementation, no additional user interaction is required.</li> </ul> <p>Clinical applications:</p> <ul style="list-style-type: none"> <li>- Can help the physician improve the specificity for tumor diagnoses</li> <li>- Predicting clinical response to neoadjuvant chemotherapy in an early stage (24 hours after receiving the first dose)</li> </ul> <p>Specific characteristic starting with SW version syngo MR B15:</p> <ul style="list-style-type: none"> <li>- includes reference tube for quantitative spectroscopy</li> </ul> <p>In order to obtain best spectral quality, it is recommended to use one of the following breast coils: Siemens Breast Matrix Coil, 16-channel AI Breast Coil, Breast 18, (2/4/8)-channel or (2/10/16)-channel Sentinelle Breast coil.</p>
1	<p><b>Tim Whole Body Suite #T+D</b></p> <p>Tim Whole Body Suite puts it all together. This suite enables table movement for imaging of up to 205 cm (6' 9") FoV without compromise. In combination with Tim's newly designed ultra highdensity array higher spatial and temporal resolution can be achieved along with unmatched flexibility of any coverage up to Whole Body.</p> <p>For faster exams and greater diagnostic confidence.</p>

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1	<p><b>TWIST syngo #Tim</b></p> <p>This package contains a Siemens unique sequence and protocols for time-resolved (4D) MR angiographic and dynamic imaging in general with high spatial and temporal resolution. syngo TWIST supports comprehensive dynamic MR angio exams in all body regions. It offers temporal information of vessel filling in addition to conventional static MR angiography, which can be beneficial in detecting or evaluating malformations such as shunts. In case of general dynamic imaging, for example an increase in spatial resolution by a factor of up to 2 at 60 seconds temporal resolution (compared to conventional dynamic imaging) is possible due to intelligent k-space sampling strategies. Alternatively, increased temporal resolution at constant spatial resolution is possible.</p>
1	<p><b>MR Elastography #T+D</b></p> <p>MR Elastography offers a new diagnostic tool for all Tim+Dot systems that allows identifying variations in liver tissue stiffness.</p> <p>The MR Elastography package consists of new protocols and sequences, new reconstruction algorithms and inline reconstruction.</p>
1	<p><b>fMRI Trigger Converter</b></p> <p>An optical trigger signal is available to trigger external stimulation devices in fMRI experiments.</p> <p>With the "fMRI Trigger Converter" this signal can be converted to an electrical signal (TTL/BNC and RS 232 interface for PC; modes: toggle or impulse).</p>
1	<p><b>syngo BreVis Biopsy #T +D</b></p> <p>syngo BreVis Biopsy is a task card for easy and effective breast biopsy planning for the Acquisition Workplace (AWP).</p>
1	<p><b>2/10/16ch Sentinelle BreastCoil #Ae</b></p> <p>The 2/10/16-channel Sentinelle Breast Coil can be used as a breast imaging coil, a bilateral biopsy coil, as well as a unilateral biopsy coil providing large biopsy access</p> <p>This coil consists of a positioning frame with exchangeable coils with different numbers of channels as described in detail in the E text.</p> <p>The preamplifiers are integrated into the coil.</p> <p>The coil is iPAT-compatible.</p>
1	<p><b>Tim Coil Interface 1.5T</b></p> <p>Coil adapter plug for up to 8 receive and 1 transmit channels, in order to connect existing dedicated knee and breast coils (Tx/Rx 15-channel Knee Coil, CP Extremity Coil, 4-channel BI Breast Coil, 16-channel AI Breast Coil, (2/4)/8-channel Sentinelle BreastCoil and (2/10)/16-channel Sentinelle BreastCoil) with all MAGNETOM 1.5T Systems using Tim 4G-technology.</p>
1	<p><b>Peripheral Angio 36 #Ae</b></p> <p>The new Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility:</p> <ul style="list-style-type: none"> <li>- 36 channels</li> <li>- Dual Density Signal Transfer</li> <li>- Ultra light-weight</li> <li>- SlideConnect Technology</li> </ul> <p>The 36-channel coil includes 36 integrated pre-amplifiers for excellent signal-to-noise ratio. The single SlideConect Plug allows for fast and easy patient preparation.</p> <p>The Peripheral Angio 36 features:</p> <ul style="list-style-type: none"> <li>- 36-element design with 36 integrated preamplifiers, distributed over 6 planes with 6 elements each</li> <li>- Operates in an integrated fashion with Body 18 coils and with the Spine 32 . For Whole-Body examinations also with the Head/ Neck 20</li> <li>- Automatic table feed and active coil switch</li> </ul>

**Qty****Item Description**

- Can be utilized head and feet first
- Both legs are independently covered with coil elements, maximizing the coil filling factor and the signal-to-noise ratio
- No coil tuning
- iPAT-compatible
- Dual-Density Signal Transfer enables ultra-high density coil designs by integrating key RF components into the local coil
- SlideConnect technology for easy coil set up
- One cable only for easy handling
- Includes special non-ferromagnetic coil cart for safe, user-friendly storage

**Applications:**

- High-resolution angiography of both legs incl. Pelvis (by additional use of the Body 18) with highest signal-to-noise ratio
- Visualization of the iliac arteries and aorta in combination with Body 18
- Bilateral examinations of long bones of the legs

**Typically combined with:**

Head/ Neck 20, Body 18, Spine 32, and all flexible coils such as Flex Large 4 or Flex Small 4

1

**Shoulder 16 Coil Kit #Ae**

The new Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility. The Shoulder 16 Coil Kit for examinations of the left or right shoulder consists of a base plate and two different sized iPAT compatible 16 channel coils (Shoulder Large 16 and Shoulder Small 16). These will be attached and can be relocated on the base plate. The 16-element coils with 16 integrated pre-amplifiers ensure maximum signal-to-noise ratio. Shoulder Large 16 and Shoulder Small 16 will be connected via a SlideConnect plug for fast and easy coil set-up and patient preparation.

1

**Hand/Wrist 16 #Ae**

The new Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility.

Hand/Wrist 16 for examinations of the left or right hand and wrist region consists of a base plate and an iPAT compatible 16-channel coil and allows high resolution imaging of the wrist and the hand within one examination. Hand/Wrist 16 will be connected via a SlideConnect plug for fast and easy patient preparation.

1

**Foot/Ankle 16 #Ae**

The new Tim 4G coil technology with Dual Density Signal Transfer and DirectConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility.

Foot/Ankle 16 for examinations of the left or right foot and ankle region consists of a base plate and an iPAT compatible 16-channel coil and allows high resolution imaging of the foot and ankle within one examination. Foot/Ankle 16 is a cable-less coil and will be connected via DirectConnect for fast and easy patient preparation.

1

**Tx/Rx 15-channel Knee Coil DDST #Ae**

New 15-channel transmitter/receiver coil for joint examinations in the area of the lower extremities.

**Main features :**

- 15-element design (3x5 coil elements) with 15 integrated preamplifiers,
- iPAT-compatible
- SlideConnect Technology

1

**Body 18 #Ae**

The Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology



**Qty****Item Description**

combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility:

- 18 channels (inherent) or up to 30 (in combination with the Spine 32)
- Dual Density Signal Transfer
- Ultra light-weight
- SlideConnect Technology

The Body 18 is part of the standard configuration. The 18-channel coil with its 18 integrated pre-amplifiers ensures excellent signal-to-noise ratio. The 18 coil elements provide extensive coverage in all directions. The single SlideConnect plug allows for fast and easy patient preparation. The light-weight coil ensures highest patient comfort.

The Body 18 Coil features:

- 18-element design with 18 integrated preamplifiers (3 clusters of 6 elements each)
- Operates in an integrated fashion with the Spine 32 as an 30 channel body coil
- Can be combined with further Body 18 coils for larger coverage
- Can be positioned in different orientations (0°, 90°, 180°, 270°) for patient specific adaptations
- No coil tuning
- iPAT compatible in all directions

The highly flexible design enables a wide variety of applications including:

- Thorax (incl. heart)
- Abdomen
- Pelvis
- Hip

Typically combined with:

- Head / Neck 20
- Spine 32
- Additional Body 18 coil(s) (optional)
- Peripheral Angio 36 (optional)
- Flex Large 4
- Flex Small 4
- Loop coils (optional)
- Endorectal coil (optional)

1

**Tx/Rx CP Head Coil #Ae**

Circularly polarized no-tune transmit/receive coil with an open patient-friendly design. The integrated transmit mode allows volume selective excitation. Integrated, extremely low-noise pre-amplifiers permit very high signal-to-noise ratio. Furthermore, the coil is outfit with SlideConnect Technology, allowing for easier patient preparation and less table time for the patient.

1

**Special Purpose Coil #Ae**

The 4-channel special purpose coil is a no-tune receiver coil designed for examination with small Field-of-Views.

1

**MR Workplace Table 1.2m**

Table suited for syngo Acquisition Workplace and syngo MR Workplace based on syngo Hardware.

1

**MR Workplace Table, height adjust.**

The table is suitable for the syngo Acquisition Workplace and the syngo MR Workplace based on syngo hardware.

This 110V version has motorized table height adjustment.

1

**MR Workplace Container, 50cm**

50 cm wide extra case for the syngo host computer with sliding front door to allow change of storage media (CD/DVD/USB).

Qty	Item Description
1	<p><b>Soft Tissue Motion Correction #Tim</b></p> <p>3D post-processing step, elastic soft tissue/breast motion correction. The algorithm enables higher accuracy in detection of multi-focal lesions.</p> <p>Key features are:</p> <ul style="list-style-type: none"> <li>- possible for images with matrix sizes up to 512x512</li> <li>- w/o contrast media and on 2D/3D datasets</li> <li>- works on fat sat, water excitation and non fat sat</li> <li>- independent on slice orientation</li> <li>- original images remain untouched</li> </ul> <p>This option includes BRACE (BReast Acquisition and CorrEction) functionalities.</p>
1	<p><b>syngo Security Package</b></p>
1	<p><b>Patient Supervision TV #T+D</b></p> <p>The supervision solution is customizable and designed to address different site specific requirements. Up to 4 cameras can be optionally connected for patient supervision in the examination or waiting room.</p> <p>This package contains a special video camera for monitoring the patient during an MR examination, conveniently mounted on the wall of the examination room. The information is displayed on an LCD monitor in the control room, included in this kit.</p>
1	<p><b>Patient TV wall support</b></p> <p>Wall mount for the patient monitor.</p>
1	<p><b>Comfort Kit #T+D</b></p> <p>Vacuum cushions for stable positioning of the patient during the examination. The kit comprises of an integrated vacuum pump and 3 anatomically shaped (spine, head, small joints) cushions of different sizes.</p>
1	<p><b>Coil Storage Cart #T+D</b></p> <p>Specially designed non-ferromagnetic cart for easy storage of the most commonly used coils and accessories.</p>
1	<p><b>Separator 60kW</b></p> <p>The SEP (Separation cabinet) has to be used if a central hospital chilled water supply is available or if a chiller of any brand/type is already available. The SEP is the interface between the on-site water chiller (of any brand or type) or the interface to the central hospital cooling water supply. For the above-mentioned cases the SEP is mandatory!</p> <p>In these cases, the primary water specifications must fulfill the requirements (i.e. 63 kW heat dissipation; 100+-10l/min flow; 6 to 12°C water temperature; pH value 6 to 8, max. working pressure 6 bar).</p> <p>Dimensions: 1950mm x 650mm x 650mm (height x width x depth) Weight: approx. 340kg</p>
1	<p><b>UPS Cable #Tim</b></p> <p>Power cable for connecting the UPS Powerware PW 9130-3000i (14413662) to the ACC of MAGNETOM Tim and MAGNETOM Tim+Dot systems for backing up the computer.</p> <p>Standard cable length: 9 m.</p>
1	<p><b>UPS Powerware PW9130G-3000T-XLEU</b></p> <p>UPS system Eaton PW9130G-3000T-XLEU for MAGNETOM Tim, MAGNETOM Tim+Dot and</p>

Qty	Item Description
	<p>MAGNETOM Symphony systems for safeguarding computers.</p> <p>Power output: 3.0 kVA / 2.7 kW</p> <p>Bridge time: 5 min full load / 14 min half load</p> <p>Input voltage: 230 VAC</p>
1	<p><b>UPS Battery module</b></p> <p>UPS battery module Eaton PW 9130N-3000T-EBM for all MAGNETOM Tim, MAGNETOM Tim+Dot and MAGNETOM Symphony systems for safeguarding computers.</p> <p>Extension for: PW9130i-3000T</p> <p>Battery type: Closed, maintenance-free</p> <p>Extension of the bridge time to: 24 minutes with a module</p> <p>Dimensions (H x W x D): Battery module: 346 x 214 x 412 mm</p> <p>incl. bracket set</p> <p>Weight: approx. 50 kg</p>
1	<p><b>Additional Set of Manuals</b></p> <p>Additional set of manuals for the above selected MR system.</p>
1	<p><b>MR_GOV_RIG_INSTL</b></p>
1	<p><b>T+D Preinstall kit for dockable table</b></p>
1	<p><b>Standard Cryogens</b></p>
1	<p><b>MR Project Management</b></p> <p>A Siemens Project Manager (PM) will be the single point of contact for the implementation of your Siemens equipment. The assigned PM will work with the customer's facilities management, architect or building contractor to assist you in ensuring that your site is ready for installation. Your PM will provide initial and final drawings and will coordinate the scheduling of the equipment, installation, and rigging, as well as the initiation of on-site clinical education.</p>
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>MR Dot Govt. Training Class (No T&amp;L)</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>Additional onsite training 24 hours</b></p> <p>Up to (24) 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>

Qty	Item Description
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>GOV'T ONLY - MR Training Class</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>Offset for Initial onsite train 32 hrs</b></p>
1	<p><b>Armrest #MR</b></p>
1	<p><b>Dimplex chiller - 60 kW</b></p> <p>The Dimplex Thermal Solutions outdoor, air-cooled, water/glycol chiller has been specially designed for medical applications to provide stable, fully dedicated cooling.</p> <p>60 kW water/glycol air-cooled heat exchanger/chiller package for outside installation. Features dual tandem refrigerator circuits and dual redundant pumps. Unit also includes fluid reservoir and controls as well as remote control display to monitor the heat exchanger package operation from indoors at the operator's work station. This design also includes the features to meet the specification of OSHPD requirements. For use with Siemens SEP cabinet.</p> <p>Features:</p> <p>Dual 10 hp compressor, dual refrigerant circuits to smoothly transition through the 25 to 100% heat load capacity cycles of patient scanning and idling</p> <p>Energy savings and quiet operation when minimal cooling is required between patient use, and overnight for facilities located amongst residential areas</p> <p>Full capacity cooling enabling optimized utilization</p> <p>Dual, redundant fluid pumps, with automatic switch-over ensures no loss of flow</p> <p>Pricing also includes:</p> <p>Filter &amp; flow meter kit</p> <p>Service package including two start-up visits (one upon cold head start-up, one at commissioning), one PM visit during 12 month P&amp;L warranty period.</p> <p>One year warranty through Dimplex Thermal Solutions.</p> <p>Customer is responsible for rigging and installation. Customer is responsible for providing glycol as specified by the manufacturer.</p> <p>Coastal, low ambient temperature and split chillers are available.</p>
1	<p><b>Start-up of DTS chiller</b></p>
1	<p><b>9390 160kVA Power Conditioner</b></p> <p>Includes: PW9390 160kVA Electronics Cabinet configured as Power Conditioner @ .9 pf, Power Conditioner includes: Single Feed Option, Hi-Res Delta Kit, and 8" Side Car housing 3-Circuit Breaker, 480V, 35kAIC Integrated Maintenance Bypass. Start-Up (5x8) and One (1) Year On-Site Parts and Labor coverage (7x24), Plus One (1) Year of remote monitoring.</p> <p>Installation including rigging, electrical, and any HVAC required is not included and is the responsibility of the customer or its contractor.</p>
1	<p><b>9390 100-160kVA UPS Cab w/sidecar Calc</b></p>
1	<p><b>9390 100-160kVA UPS Cab. w/sc Br. Pair</b></p>
1	<p><b>IEC Main Disconnect Panel - MR</b></p> <p>Integrated Electrical Cabinet/Main Disconnect Panel for MR.</p>

**Qty****Item Description**

Components supplied:

The IEC Main Disconnect Panel

This Operations & Maintenance Manual

(4) sets of Emergency Power Off pushbuttons and installation instructions

Drawings and electrical schematics

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

1

**Spectris Solaris EP Injector iCBC**

Includes Spectris Solaris EP injector and Integrated Continuous Battery Charger (ICBC).

- Optimized color touch screen with few keystrokes.
- Six user-programmable phases for added flexibility.
- Independent Keep Vein Open (KVO) allows more time to focus on patient.
- Large 115 mL saline syringe allows for longer KVO and multiple flushes.
- Design of low pressure tubing eliminates dead space in the "T" connection that can waste contrast.
- The clear barrel design with molded FluidDots help detect the presence of air in a syringe.
- Pressure Limit Setting control software enables user to select from one to six preset maximum pressure limits, ranging from 100-300 psi, and to view current pressure during injection next to the pre-selected maximum value on the Solaris display.

Installation, applications and one year warranty provided by Medrad.

Not for mobile use, refer to Siemens part number M3SSMR300EPM for the Solaris injector used in a mobile environment.

This product has been tested and verified for compatibility with the following Siemens' products: MAGNETOM Trio, Espree, Essenza, Verio, Avanto, Symphony, Aera, Skyra and Biograph mMR. Compatibility with other products cannot be guaranteed and use with any other products may void service contracts and/or system warranties.

1

**MR Wall sign -English**

Highly durable 1mm PVC wall signs with high-tack, double-back tape. Sticks to most any surface. English. 12" x 18".

1

**MR Wall sign - Spanish**

Highly durable 1mm PVC wall signs with high-tack, double-back tape. Sticks to most any surface. Spanish. 12" x 18".

1

**MRI Patient Audio System**

The MRI Patient Audio System is to be installed in the technologist room and is connected to the Siemens intercom system. The package provides the following benefits:

- Create custom, commercial-free radio stations based on artist, song or genre preferences
- Avoid any AM/FM tuning issues that may occur in RF-shielded rooms
- Compatible with all popular audio apps (e.g. tunein, Spotify, iTunes, Audible, iHeartRadio, Pandora, etc.)

Includes amplifier; all cables and adapters; Bose Companion 2 technologist speakers; 3.5 mm to RCA cable; and customized iPad Mini with all original accessories and TuneIn Radio Pro App (pre-paid and installed).

The MR Stereo can play regular radio, internet radio (depending on quality of and access to Radio wave signals and Wi-Fi signals) and device (iPAD) stored audio content. Optimal performance requires access to radio wave signals for regular radio and Wi-Fi signals for Internet radio through the facility's wireless network.

Qty

**Item Description**

Installation is not included unless purchased with the Siemens system.

Includes 3 year limited liability warranty on all system components through MRIaudio.

1

**Elastography hardware**

RESOUNDANT Hardware starter set for Elastography

The hardware components of the MR Elastography option create, conduct and introduce mechanical waves into the human body. They are designed to be used in conjunction with imaging systems.

The set includes these major specific components of the MR Elastography option:

The active driver, which creates the mechanical waves

Two (2) passive drivers, which applies the mechanical waves to the patient's body

Long and short plastic tubing for mechanical wave transfer from active to passive driver - one 30 foot tube and an additional 9 foot section. For maximum performance use only the 30 foot hose or both the 30 foot and 9 foot hoses. Additional 9 foot hoses can be ordered if site restrictions make it necessary, but doing so may require power setting adjustments.

Applicator belt for securing the passive driver to the patient's body

Cords and cables for connecting the trigger box with the active driver and the components with the scanner electronics. Cable connecting active driver to fMRI trigger box is 50 feet.

DO NOT TAKE THE ACTIVE DRIVER OR TRIGGER BOX INTO THE MAGNET ROOM.

Customer is responsible for hardware installation.

Requires minimum software version syngo MR D13A or syngo MR B19.

The system price includes two years parts warranty.

1

**Maglife Serenity Advanced**

Schiller Maglife Serenity MR patient monitor - Advanced package with Magscreen monitor.

Includes: Mobile cart, Magscreen monitor (with printer), 6 hour battery, installation, training and one year warranty from Schiller.

Features: ECG, SPO2, Respiratory, non-invasive blood pressure, ETCO2, O2, NO2, Inspired and expired CO2, Inspired and Expired Agents (2 agents simultaneously with auto ID), Inspired N2O, Inspired and expired O2. WiFo (wireless within Faraday Cage, wired to Magscreen).

Maglife monitor: Multi Parameter Monitor for MR Environment. Mains Connection and Battery Operation. Feature: ECG, Wireless SpO2, NIBP, Magnetic field Measurement. Build by: 12,1" Display unit, Main unit, power supply.

Magscreen: 12.1 inch TFT screen for remote display and control of MAGLIFE Serenity, linked with bi-directional Fiber Optic and/or network.

Accessories: adult and pediatric ECG electrodes, "SkinPrep" Gel, ECG preamplifier, ECG cable (3 wire Clip), 3 Cuffs (adult, pediatric, neonate), SpO2 sensor adult (pediatric on request), Mains cable, patient monitor sample lines, Airway "T" Adapters, Water trap, FIO2 fuel cell, pressure reducer & manometer, Calibration Gas.

1

**Maglife Serenity Basic w/Magscreen**

Schiller Maglife Serenity MR patient monitor - Basic package with Magscreen monitor.

Includes: Mobile cart, , Magscreen monitor (no printer), 6 hour battery, installation, training and one year warranty from Schiller.

**Qty****Item Description**

Features: ECG, SPO2, Respiratory, and non-invasive blood pressure. WiFo (wireless within Faraday Cage, wired to Magscreen).

Maglife monitor: Multi Parameter Monitor for MR Environment. Mains Connection and Battery Operation. Feature: ECG, Wireless SpO2, NIBP, Magnetic field Measurement. Build by: 12.1 inch Display unit, Main unit, power supply.

Magscreen: 12.1 inch TFT screen for remote display and control of MAGLIFE Serenity, linked with bi-directional Fiber Optic and/or network.

Accessories: adult and pediatric ECG electrodes, "SkinPrep" Gel, ECG preamplifier, ECG cable (3 wire Clip), 3 Cuffs (adult, pediatric, neonate), SpO2 sensor adult (pediatric on request), Mains cable.

1

**Inline Perfusion #Tim**

Automatic real-time calculation of Global Bolus Plot (GBP), Percentage of Baseline at Peak map (PBP), and Time-to-Peak map (TTP) with Inline technology.

One complimentary biomedical tuition is included with the purchase of this system. This training must be completed before the end of the warranty period.

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.

Offset Part 14407354 Additional Set of Manuals

Offset Part MR\_FOLLOWUP\_32 Follow-up training 32 hrs

# Detailed Technical Specifications

## MAGNETOM Aera - USA

### Description

MAGNETOM Aera - the first 1.5T Tim+Dot system - integrates the next generation Tim (Total imaging matrix) - Tim 4G and the Siemens unique Dot (Day optimizing throughput) engines enabling workflow efficiency combined with higher diagnostic confidence due to consistent results.

The system includes:

#### Tim 4G+Dot

Tim 4G provides increased patient comfort and optimized workflow efficiency. Only one patient setup, no repositioning, no changing of coils. Ultra-light-weighted coils with high density of coil elements for maximized patient comfort and increased SNR. Feet-first positioning for almost all examinations possible reduces claustrophobia. Tim 4G with its 4G flexibility, 4G accuracy and 4G speed brings image quality and acquisition speed to a new level.

Dot offers a customizable framework for patient personalization, user guidance and exam automation. Optimized scan strategies are provided and can be selected based on patient condition, which allow for high quality exams even when conditions change. Integrated decision points allow the user to easily add or remove one or a group of protocols with one click. Step by step image and text guidance guides novice users even through the most complicated exams. Exam automation allows optimal timing for breathing, scanning, planning or contrast arrival. Dot can be easily customized to follow the individual standards of care. Dot is personalized, guided and automated and designed to improve workflow efficiency and image consistency.

MAGNETOM Aera with its 70 cm Open Bore design and a system length of only 145 cm gives a patient friendly appearance that can significantly help patients with anxiety or claustrophobia.

#### Magnet:

- Ultra-short 137 cm long (145 cm with covers), whole-body superconductive 1.5T magnet with active shielding (AS) technology with counter coils
- External Interference Shielding (E.I.S.)
- Excellent homogeneity enabled by TrueForm magnet design which allows for a cylindrically optimized homogeneity volume resulting in higher image quality (50 × 50 × 45 cm<sup>3</sup> DEV, typ. 3.1 ppm based on the 24-plane plot method)
- The magnet has a helium capacity of approximately 1,280 liters and a typical Helium boil-off rate of 0 l/yr during typical, undisturbed clinical operation depending on the sequences used and examination time, and provided the system is serviced in regular intervals.
- It has an integrated magnet cooling system.

#### Gradient system :

- Actively shielded water-cooled world-class gradient system
- True Form Gradient Design
- All axes force compensated

#### DirectRF - RF Transmit/Receive System:

- Fully integrated Transmit and Receive path in the magnet housing including extremely compact water-cooled solid state amplifier with 26.1 kW peak power
- High dynamic range
- Immediate feedback loop for real-time sequence adaptation
- Integrated no tune transmit/receive Body Coil
- The revolutionary Tim 4G technology allows connecting up to 204 coil elements simultaneously enabling higher SNR and iPAT in all directions. No repositioning of patients is needed even for large Field of View examinations.
- Dual-Density Signal Transfer enables ultra-high density coil design by integrating key RF components into the



## Description

local coil.

### **Tim 4G Coils:**

The new Tim 4G coil technology with Dual-Density Signal Transfer, DirectConnect and SlideConnect technology combines key imaging benefits:

Excellent image quality, high patient comfort, and unmatched flexibility.

The Tim 4G coils are designed for highest image quality combined with easy handling. The high coil element density increases SNR and reduces examination times. DirectConnect and SlideConnect™ technology reduce patient set up time significantly. The coils are designed with the patient in mind. Light weighted coils and open design ensure highest patient comfort which results in better patient cooperation and image quality. No coil changing with multi-exam studies saves patient setup- and table time.

AutoCoilSelect enables dynamic, automatic, or interactive selection of the coil elements within the Field of View and speeding the exam preparation at the host.

All coils are time-saving “no-tune” coils.

A comprehensive set of pads for comfortable and stable patient positioning together with safety straps are included.

- **Head/Neck 20**

The 20-channel coil with its 20 integrated pre-amplifiers ensures excellent signal-to-noise ratio. The unique DirectConnect technology allows users connecting the 20 coil elements of the Head/Neck20 without cables. The patient friendly open design allows for maximum patient comfort which is supported in addition by a look-out mirror for claustrophobic patients. The high channel coil is iPAT compatible in all directions.

The open and light design of the upper coil part increases patient comfort and is removable for easy patient handling. The lower coil part may remain on the table for most of the examinations can be used without the upper part. The Head/Neck 20 and Spine 32 are smoothly integrated into the patient table, thus enabling high flexibility in imaging and fewer coil changes and easy handling when switching patients. The Head /Neck 20 coil is equipped with two removable cushioned head stabilizers for stable and comfortable patient positioning.

The Head/ Neck 20 can be used for applications like head examinations, neck examinations, MR Angiography, combined head/neck examinations or for imaging of the TMJ (temporomandibular joints).

Typically combined with the Spine 32 and Body 18 or Peripheral Angio 36 but also other combinations eg with flexible coils like the Flex Large 4 are possible.

- **Body 18**

The 18-channel coil with its 18 integrated pre-amplifiers ensures maximum signal-to-noise ratio. The 18 coil elements of the Body 18 with only one SlideConnect Plug allows for fast and easy patient preparation resulting in less table time. Fast acquisition times enabled by iPAT in all directions. The light-weighted coil ensures highest patient comfort.

Body 18 operates in an integrated fashion with the Spine 32 as an 30 channel body coil

Body 18 can be combined with further Body 18 coils for larger coverage and positioned in different orientations (0°, 90°, 180°, 270°) for patient specific adaptations

The Body 18 is typically used in combination with the Spine 32 for examinations of the thorax, abdomen, pelvis or hip and operates as a 30 channel body coil (3 rings 10 elements). The Body 18 can also be used for cardiac or vascular applications. Through its perfect combinability with the Spine 32, further Body 18 (optional), the Peripheral Angio 36 (optional), but also the Head/Neck 20 and all flexible coils (e.g. Flex Large 4, Flex Small 4) it contributes for a broad range of indications up to whole-body imaging.

- **Spine 32**

The 32-channel coil with its 32 integrated pre-amplifiers ensures maximum signal-to-noise ratio. The unique DirectConnect technology allows connecting the 32 coil elements of the Spine 32 without the need to plug in any cable. The patient friendly ergonomic design allows for maximum patient comfort. The high element coil is iPAT compatible in all directions.

Smoothly integrated into the patient table the Spine 32 may remain on the patient table for nearly all exams.

The Spine 32 is typically combined with Body 18, Head/Neck 20, Peripheral Angio 36 (optional) or Flex Large 4, Flex Small 4.

## Description

- Flex Large 4/ Flex Small 4

Light-weighted, very flexible, iPAT compatible, 4-element no-tune receiver coils which are made of soft and smooth material. The coils can be wrapped around or used flat.

Both coils can be connected via Flex Coil interface. One Flex Coil interface is already delivered as standard.

The coils can be used for different examinations ranging from examinations of the extremities to abdominal examinations.

### Tim Table

- The maximum scan range of the Tim Table is 140 cm. A scan range of 205 cm can be achieved with the Tim Whole Body Suite (optional)
- The maximum patient weight of 250 kg (550 lbs) is valid for horizontal and vertical movements, which ensures maximized patient comfort for obese patients.
- The patient table can be lowered to a minimum height of 52 cm from the floor, for easier patient positioning and better accessibility for geriatric, pediatric or immobile patients. An infusion stand is integrated to ensure fast patient set up also for critical patients.
- Multiple Tim4G coils can be connected at once for efficient and patient friendly examinations.
- The Tim Table can be moved with two clicks into the isocenter - one click to the upmost position and one click into the isocenter.

### Dot (Day Optimizing Throughput) engine

Dot multiplies the power of Tim resulting in greater image consistency and diagnostic confidence

### Dot Control Centers and Dot Display

- The ergonomically designed Dot Control Centers are integrated left and right into the front covers for controlling table movement and interaction with the Dot Display. The Dot Control Centers are well illuminated for easy visual recognition.
- Automated table move up to upmost position, to center position or Home position facilitate smooth patient preparation and will reduce table time
- Variable (6 levels) ventilation and lighting inside the magnet bore or volume adjustments are possible for increased patient comfort
- The Dot Display provides on board guidance for patient set up where it's needed - directly at the scanner. Information such as patient name or exam type or required patient position, guidance for ECG set up and immediate visualization of physiological curves will be provided for convenient operation.
- Almost all table control functions, including ventilation and illumination of the magnet bore, can be also controlled from the operator console for convenient operation.

### Dot Technology

Dot gives uniquely tailored, optimized scans configurable to patient condition or clinical question.

Dot provides patient personalization, user guidance and exam automation and is of course configurable by the user to adapt to the different clinical needs and standards of care.

### Brain Dot Engine

The Brain Dot Engine provides guided and automated workflows customizable to the site specific standards of care for general brain examinations. The Brain Dot Engine supports the user in achieving reproducible image quality with increased ease of use and time efficient exams.

The brain workflow can be personalized to the individual patient condition and clinical need. Several predefined strategies are included, which can be easily selected with one click. They can be changed at any time during the brain workflow.

Protocols tailored for use of contrast media are integrated.

- Standard: Standard examination with 2D protocols
- Resolution focus: Examination with 3D protocols (with e.g. SPACE) for detailed views
- Speed focus: Examination with fast 2D protocols (with e.g. HASTE) for further speeding up the exam
- Motion insensitive: Examination with syngo BLADE protocols
- to minimize and correct for the effects of motion automatically

Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each

## Description

individual step of the scanning workflow. Both - images and text - are easily configurable by the user.

Easy positioning of the patient with AutoPosition. The patient is automatically placed at the isocenter without any laser marking required.

AutoAlign Head provides automated, positioning and alignment of slice groups to the anatomy, relying on multiple anatomical landmarks. Besides basic brain positioning, AutoAlign Head computes reference position for several other brain structures such as the inner ear, the orbits and the optic nerve.

Automatic real-time calculation of trace-weighted images and ADC maps with Inline DiffusionTechnology.

Easy rerun or repeat with functionality allows for reduced table time. Alternatively an exam can be repeated with a changed strategy.

The Brain Dot Engine as all Dot engines can be modified by the user to their individual standard of care.

### Tim Application Suite

The Tim Application Suite offers a complete range of clinically optimized sequences, protocols and workflow functionalities for all body regions. Excellent head-to-toe imaging can be accomplished with the sequences and features included in this application suite. To enable this comprehensive application range, ten dedicated application packages have been included.

- syngo TimCT FastView
- Neuro Suite
- Angio Suite
- Cardiac Suite
- Body Suite
- Onco Suite
- Breast Suite
- Ortho Suite
- Pediatric Suite
- Scientific Suite

### syngo TimCT FastView

syngo TimCT FastView is a “one go” localizer for the whole body or large body regions such as the whole spine or the whole abdomen. It acquires the complete extended Field of View in one volume with isotropic resolution. Transversal, coronal and sagittal reformats of the volume are calculated inline and displayed for planning subsequent exams. Moreover, while planning is underway, adjustments are acquired automatically for further time savings in subsequent measurements.

syngo TimCT FastView runs without laser light positioning to further streamline the workflow for several indications.

### Neuro Suite

Comprehensive head and spine examinations can be performed with dedicated programs. High resolution protocols and fast protocols for uncooperative patients are provided. The Neuro Suite also includes protocols for diffusion imaging, perfusion imaging, and fMRI. It includes for example:

- EPI sequences and protocols for diffusion, perfusion and fMRI for advanced neurological applications. Diffusion weighted imaging is possible with up to 16 b-values in the orthogonal directions. Dynamic Analysis software (included in standard configuration) enables calculation of:
  - ADC maps
  - t-test maps from the EPI images for fMRI
  - Time-to-Peak maps for perfusion analysis.
- Whole spine protocols acquire in multiple steps via software controlled table movement in a single click.
- 3D isotropic resolution volume imaging using T1 3D MPRAGE / 3D FLASH, SPACE DarkFluid, T2 SPACE and 3D TSE
- T2-weighted high resolution 3D Restore protocols optimized for inner ear examinations
- Whole-spine protocols in multiple steps with software controlled table movement
- 2D and 3D MEDIC protocols for T2-weighted imaging, particularly for C-spine examinations in axial orientation where reproducibility is difficult due to CSF pulsations and blood flow artifacts

## Description

- 3D Myelograms with 3D HASTE and 3D True-FISP for anatomical details
- Dynamic sacro-iliac joint imaging after contrast administration using a fast T1-weighted FLASH 2D sequence
- Spine diffusion protocols to differentiate osteoporosis versus tumor infiltration and post-radiotherapy changes versus residual tumor with PSIF sequence
- Precision filter for high spatial accuracy e.g. for neuro intra-operative imaging and stereotactic planning
- 3D CISS (Constructive Interference in Steady State) for excellent visualization of fine structures such as cranial nerves. High resolution imaging of inner ear and spine
- AutoAlign Head LS providing a fast, easy, standardized, and reproducible patient scanning supporting reading by delivering a higher and more standardized image quality

### Angio Suite

Excellent MR Angiography can be performed to visualize arteries and veins with or without contrast agent.

#### *Contrast-enhanced MRA*

- 3D contrast-enhanced MRA protocols for e.g. single step, dynamic, peripheral, whole body MRA with the shortest TR and TE. The strong gradients make it possible to separate the arterial phase from the venous phase.
- TestBolus workflow for optimized bolus timing and superb image quality.
- CareBolus functionality for accurate determination of the bolus arrival time and the "Stop and Continue" of the 3D ce-MRA protocol after the 2D bolus control scan.
- Dynamic ce-MRA for 3D imaging over time.

#### *Non-contrast-MRA and venography*

- 2D and 3D Time-of-Flight (ToF) protocols for MRA for the Circle of Willis, carotids, neck vessels, and breath-hold protocols for abdominal vessels
- Triggered 2D ToF sequences for non-contrast MRA, particularly of the abdomen and the extremities
- 2D/3D Phase-Contrast
- MR venography with 2D/3D Time-of-Flight (ToF) and Phase-Contrast
- TONE (Tilted Optimized Non-saturation Excitation) and MTC (Magnetization Transfer Contrast) techniques for improved Contrast-to-Noise Ratio (CNR)

#### *Image processing tools*

- MPR, MIP, MinIP, and 3D SSD (Multiplanar Reconstruction, Maximum Intensity Projection, Minimum Intensity Projection, Shaded Surface Display)
- Inline MIP for immediate results
- Inline subtraction of pre- and post-contrast measurements
- Inline standard deviation maps of Phase-Contrast measurements for delineation of arteries and veins

### Cardiac Suite

The cardiac suite covers comprehensive 2D routine cardiac applications, ranging from morphology and ventricular function to tissue characterization. Featuring *syngo* BEAT 2D in conjunction with iPAT and T-PAT techniques.

#### *Cardiac views*

- Fast acquisition of the basic cardiac orientations for further examination planning
- Cardiac scouting provides users with a step-by-step procedure for the visualization and planning of typical cardiac views, e.g. based on TrueFISP or Dark Blood TurboFLASH: short axis, 4-chamber and 2-chamber views.

#### *syngo BEAT*

- Unique tool for fast and easy cardiovascular MR imaging
- E.g. 1 click change from FLASH to TrueFISP for easy contrast optimization
- 1-click to switch arrhythmia rejection on / off
- 1-click change from Cartesian to radial sampling to increase effective image resolution (e.g. in pediatric patients) and avoid folding artifacts in large patients

#### *Visualization of structural cardiovascular pathologies with CMR – syngo BEAT*

- Breath-hold and free breathing techniques for strong contrast between the blood and vascular structures. Dark Blood TSE and HASTE imaging are available for the structural evaluation of the cardi thoracic anatomy, including vessels or heart valves. Cine techniques (FLASH & TrueFISP) for high-resolution valve evaluation
- Multiple contrasts such as T1- and T2-weighted imaging for use in diseases such as myocarditis (inflammation / hyperaemia), ARVD (fibrous-fatty degeneration) or acute myocardial infarction (edema)

## Description

- Dark-blood TSE with motion compensation for high-quality vessel wall imaging in small or large vessels  
*Tools for rapid evaluation of left or right ventricular function*
- Acquisition of a stack of short-axis slices (standard segmented FLASH, or advanced segmented TrueFISP)
- Automatic adjustment of the acquisition window to the current heart rate
- Use of the Inline ECG for graphical ECG triggering setup
- Retrospective gating with cine sequences (TrueFISP, FLASH)
- Protocols for whole-heart coverage
- iPAT integration for highest temporal and spatial resolution
- Real-time imaging in case the patient is not able to hold his breath  
*Dynamic imaging and tissue characterization with syngo BEAT*
- Protocols for high-contrast and high-resolution tissue characterization
- Protocols for stress and rest imaging with TrueFISP or TurboFLASH contrast support the acquisition of multiple slices with high resolution and arbitrarily adjustable slice orientation for each slice
- T-PAT with mSENSE and GRAPPA for advanced parallel imaging provides fast high-resolution dynamic imaging
- Segmented IR TrueFISP / FLASH with T1 scout for optimization of tissue contrast
- Advanced tissue characterization with 2D phase-sensitive IR (PSIR) sequences TrueFISP and FLASH contrast. Magnitude and phase-sensitive images with one acquisition
- Simple: no adjustment of inversion time (TI) necessary with PSIR technique
- Ungated single-shot PSIR imaging for tissue characterization under difficult conditions: free-breathing technique that can be applied even in case of arrhythmia

### Physiological Measurement Unit (PMU) - Wireless Physio Control

- Synchronizes the measurement with the physiological cycles (triggering to minimize motion artifacts caused by cardiac and respiratory movements)
- Wireless Sensors
- Wireless Vector ECG / respiration and pulse sensors for physiologically synchronized imaging, rechargeable battery-powered - for optimized patient handling
- Physiological Signals Display
- ECG (3 channels)
- Pulse
- Respiration
- External Trigger Input Display

### ECG Triggering:

- Acquisition of multiple slices, e.g. of the heart, at different phases of the cardiac cycle
- Excellent image quality by synchronizing data acquisition with cardiac motion
- Peripheral Pulse Triggering: Reduces flow artifacts caused by pulsatile blood flow
- Excellent image quality by synchronizing data acquisition to the pulsatile blood flow
- Respiratory Triggering: Excellent image quality by synchronizing data acquisition with the respiratory motion
- External Triggering: Interface for trigger input from external sources (e.g. Patient Monitoring System) inside the examination room
- Interface for trigger input from external sources (e.g. pulse generator, trigger sources for fMRI) outside the examination room
- Optical trigger output for fMRI
- Retrospective gating for ECG, peripheral pulse, and external trigger input

### Breast Suite

MR imaging has proven a very high sensitivity for breast lesions and is the gold standard for the examination of silicone implants. Extremely high spatial and temporal resolution can be achieved in very short measuring times by using iPAT with GRAPPA.

Excellent soft tissue differentiation, customized protocols (e.g. with fat saturation or water excitation or silicone excitation), as well as flexible multiplanar visualization allow for fast, simple and reproducible evaluation of MR breast examinations.

This package includes:

## Description

- Quantitative evaluation and fast analysis of the data with colorized Wash-in, Wash-out, Time-To-Peak, Positive-Enhancement-Integral, MIPtime and combination maps with Inline technology or for offline calculation
- High-resolution 2D protocols for morphology evaluation
- High-resolution 3D protocols covering both breasts simultaneously
- Protocols to support interventions (fine needle and vacuum biopsies, wire localization)
- Protocols for evaluating breasts with silicone implants
- Automatic and manual frequency adjustment, taking into account the silicone signal
- Detection of the silicone signal either to suppress the silicone signal, if the surrounding tissue is to be evaluated, or to suppress the tissue signal in order to detect an implant leakage
- SPAIR - robust fat sat (robust fat suppression using an adiabatic frequency selective inversion pulse)
- DIXON - 2-point Dixon with 3D VIBE, the following contrasts can be obtained: in-phase, opposed phase, fat and water image.
- iPAT with GRAPPA for maximum resolution in short time
- Inline subtraction and MIP display
- Offline subtraction, MPR and MIP display
- syngo REVEAL: diffusion imaging for breast exams
- iPAT Extension allows bilateral 3D sagittal breast imaging with Fat Sat or Water excitation

The Breast Suite also includes:

### **syngo VIEWS (Volume Imaging with Enhanced Water Signal)**

- bilateral - both breasts are examined simultaneously
- axial - the milk ducts are directly displayed
- fat-saturated or water-excited - fat complicates clinical evaluation and is suppressed
- near-isotropic 3D measurement - the same voxel size in all three directions for reconstruction in any slice direction
- submillimeter voxel - highest resolution for precise evaluation

### **Body Suite**

Body Suite covers your needs for clinical body applications. Ultrafast high resolution 2D and 3D protocols are provided for abdomen, pelvis, MR Colonography, MRCP, dynamic kidney, and MR Urography applications. Siemens unique 2D PACE technique makes body imaging easy allowing for multi-breath hold examinations as well as free breathing during the scans. Motion artifacts are greatly reduced with 2D PACE Inline technology.

This package includes:

- Free breathing 2D PACE applications with 2D/3D HASTE (RESTORE) and 2D/3D TSE (RESTORE)
- Optimized fast single shot HASTE protocols and high-resolution 3D RESTORE protocols based on SPACE and TSE for MRCP and MR Urography examinations

### **ABDOMEN:**

2D:

- T1w (FLASH) breath-hold scans +/- Fat Sat (SPAIR, Q-FatSat, in-/opp-phase)
- T2w (HASTE, TSE/BLADE, EPI ) breath-hold scans +/- Fat Sat (SPAIR, FatSat, STIR)
- T1w (TFL) triggered scans (2D PACE free breathing) in-/opp-phase
- T2w (HASTE, TSE/BLADE, EPI) triggered scans (2D PACE free breathing) +/- Fat Sat (SPAIR, FatSat, STIR) as well as HASTE- and TSE-multi-echo
- Optimized fast single shot HASTE protocols and high-resolution 3D RESTORE protocols based on SPACE and TSE for MRCP and MR urography examinations

3D:

- Dixon (VIBE 2pt-Dixon) breath-hold scans, following contrasts can be obtained: in-phase, opposed phase, fat and water image.
- Dynamic (VIBE + Q-FatSat) protocols for best visualization of focal lesions with high spatial and temporal resolution
- Colonography bright lumen with T2-weighted TrueFISP and dark lumen with T1-weighted VIBE
- CAIPIRINHA enables VIBE sequence with improved iPAT2 algorithm to improved abdominal dynamic scans as well as SNR. Reduced patient stress can be achieved through reduced acquisition (and breathhold) times.

### **PELVIS:**

## Description

- High-resolution T1w, T2w pelvic imaging (prostate, cervix)
- Isotropic T2w SPACE 3D protocols for tumor search in the pelvis
- Dynamic volume examinations with 3D VIBE
- *syngo* REVEAL: diffusion imaging for liver and whole body exams

### Onco Suite

MR imaging has an excellent advantage of soft tissue contrast, multi-planar capabilities and the possibility of selectively suppressing specific tissue e.g. fat or water. This helps visualize pathologies, particularly metastases. The Onco Suite features a collection of sequences as well as protocols and evaluation tools that guide through a detailed screening of clinical indications, such as in hepatic neoplasms.

This package includes:

- STIR TSE and HASTE, FLASH in-phase and opposed-phase protocols with a high sensitivity to metastases visualization
- Dynamic imaging protocols for assessment of the kinetic behavior for lesion visualization and characterization
- Quantitative evaluation and fast analysis of the data with colorized Wash-in, Wash-out, Time-To-Peak, Positive-Enhancement-Integral, MIPTIME and combination maps with Inline technology or for offline calculation
- Display and analysis of the temporal behavior in selected regions of interest with the included MeanCurve postprocessing application. This includes the capability of using additional datasets as a guide for defining regions of interest even faster and easier than before.
- *syngo* REVEAL: diffusion imaging for liver and whole body exams

Dedicated prostate protocols for detection, localization, and staging of tumors and recurrences

- *syngo* REVEAL (diffusion-weighted imaging)
- Protocols with high temporal resolution allow time course evaluation based on pharmacokinetic modeling

### OrthoSuite

Ortho Suite is a comprehensive collection of protocols for joint and spine imaging. MR imaging is especially suitable for avascular necrosis and internal derangements. The protocols included in this Suite can also be applied for imaging of tumors and infections.

This package includes:

- 2D TSE protocols for PD, T1 and T2-weighted contrast with high in-plane resolution and thin slices
- 3D MEDIC, 3D TrueFISP protocols with water excitation for T2-weighted imaging with high in-plane resolution and thin slices
- High resolution 3D VIBE protocol for MR arthrography (knee, shoulder and hip)
- 3D MEDIC, 3D TrueFISP, 3D VIBE protocols with water excitation having high isotropic resolution, optimized for 3D post-processing
- PD SPACE with fat saturation and T2 SPACE with high isotropic resolution optimized for 3D post-processing
- Whole spine single-step or multi-step protocols
- Excellent fat suppression in off-center positions, e.g. in the shoulder due to high magnet homogeneity
- Dynamic TMJ and ilio-sacral joint protocol
- Susceptibility-insensitive protocols for imaging in the presence of a prosthesis
- Multi-Echo SE sequence with up to 32 echoes for the calculation of T2 time maps (calculation included in the Scientific Suite)
- High resolution 3D DESS (Double Echo Steady State): T2 / T1-weighted imaging for excellent fluid-cartilage differentiation

*syngo* WARP Susceptibility Artifact Reduction

- 2D TSE sequences with high bandwidth protocols tailored to reduce susceptibility artifacts. Available protocols include T1-weighted, T2-weighted, proton density and STIR contrast.

### Pediatric Suite

The parameters for pediatric imaging vary significantly in comparison to the parameters for adults. The reasons are developing tissues, body size, faster heart rates and restricted compliance with breath-hold commands. Protocols can be adapted for imaging infants.

### Scientific Suite

## Description

Scientific Suite supports the scientifically oriented user with an easy access to application-specific data for further processing and advanced image computation methods.

- Support of USB memory sticks
- Access to the file system by means of a secure and convenient browser
- Anonymization of patient data
- Easy generation of AVIs and screenshots for integration into presentations and training videos
- Export function for tables, statistics and signal-time-courses in a communal format (MeanCurve, Spectroscopy, DTI evaluation)
- Advanced image computation methods such as T2 and T1 time calculation, addition, subtraction, multiplication, division, and integration of images

The sequences, features and techniques for acquisition and reconstruction included in the Tim Application Suite are described in detail below.

### Sequences

Spin Echo family of sequences:

- Spin Echo (SE) - Single, Double, and Multi Echo (up to 32 echoes); Inversion Recovery (IR)
- 2D / 3D Turbo Spin Echo (TSE) - Restore technique for shorter TR times while maintaining excellent T2 contrast; TurboIR: Inversion Recovery for STIR, DarkFluid T1 and T2, TrueIR; Echo Sharing for dual-contrast TSE
- 2D / 3D HASTE (Half-Fourier Acquisition with Single Shot Turbo Spin Echo) - Inversion Recovery for STIR and DarkFluid contrast
- SPACE for 3D imaging with high isotropic resolution with T1, T2, PD, and DarkFluid Contrast

Gradient Echo family of sequences:

- 2D / 3D FLASH (spoiled GRE) - dual echo for in- / opposed phase imaging 3D VIBE (Volume Interpolated Breathhold Examination) - quick fat saturation; double echo for in-phase / opposed phase 3D imaging; DynaVIBE: Inline 3D elastic motion correction for multi phase data sets of the abdomen; Inline Breast Evaluation
- 2D / 3D MEDIC (Multi Echo Data Image Combination) for high resolution T2 weighted orthopedic imaging and excellent contrast
- 2D / 3D TurboFLASH - 3D MPRAGE; single shot T1 weighted imaging e.g. for abdominal imaging during free breathing
- 3D GRE for field mapping
- 2D / 3D FISP (Fast Imaging with Steady State Precession)
- 2D / 3D PSIF - PSIF Diffusion
- Echo Planar Imaging (EPI) - diffusion-weighted; single shot SE and FID e.g. for BOLD imaging and Perfusion-weighted imaging; 2D / 3D Segmented EPI (SE and FID)
- ce-MRA sequence with Inline subtraction and Inline MIP
- 2D / 3D Time-of-Flight (ToF) Angiography - single slab and multi slab; triggered and segmented
- 2D / 3D Phase Contrast Angiography
- *syngo* BEAT Tool - TrueFISP segmented; 2D FLASH segmented;
- Magnetization-prepared TrueFISP (IR, SR, FS); IR T1 scout; Retrogating

Standard Fat/Water Imaging

- Fat and Water Saturation. Additional frequency selective RF pulses used to suppress bright signal from fatty tissue. Two selectable modes: weak, strong
- Quick FatSat
- SPAIR: robust fat suppression for body imaging using a frequency selective inversion pulse
- Fat / Water Excitation. Spectral selective RF pulses for exclusive fat / water excitation
- Dixon technique for fat and water separation - available both based on VIBE (2 point Dixon)

Standard Techniques

- True Inversion Recovery to obtain strong T1-weighted contrast
- Dark Blood inversion recovery technique that nulls fluid blood signal



## Description

- Saturation Recovery for 2D TurboFLASH, gradient echo, and T1-weighted 3D TurboFLASH with short scan time (e.g. MPRAGE)
- Freely adjustable receiver bandwidth, permitting studies with increased signal-to-noise ratio
- Freely adjustable flip angle. Optimized RF pulses for image contrast enhancement and increased signal-to-noise ratio
- MTC (Magnetization Transfer Contrast). Off-resonance RF pulses to suppress signal from certain tissues, thus enhancing the contrast. Used e.g. in MRA
- Argus viewer for reviewing cine studies•
- Report Viewer for DICOM structured reports including report editing
- Dynamic Analysis for addition, subtraction, division, standard deviation, calculations of ADC maps, T1 and T2 values, TTP, t-Test, etc.
- Image Filter
- 3D post-processing MPR, MIP, MinIP, SSD
- Flexible film formats and paper print
- Data storage of images and cine AVI files on CD / DVD with DICOM viewer as the viewing tool for hand out to the patients or referrals
- Selectable centric elliptical phase reordering via the user interface
- Inversion Recovery to nullify the signal of fat, fluid or any other tissue
- Multiple Direction Diffusion Weighting (MDDW) - perform diffusion tensor imaging with multiple diffusion weightings and up to 12 directions for generating data sets.

### Standard techniques for Flow Artifact reductions

- LOTA (LongTerm Data Averaging) technique to reduce motion and flow artifacts
- Pre-saturation techniques using RF saturation pulses to suppress flow and motion artifacts
- Tracking SAT bands maintain constant saturation of venous and/or arterial blood flow eg. for 2D/3D sequential MRA
- TONE (Tilted Optimized Non-saturating Excitation - variable excitation flip angle to compensate inflow saturation effects in 3D MRA - selectable on desired flow direction and speed
- Gradient Motion rephasing permitting effective reduction of flow artifacts

### Standard Motion Correction

- *syngo* Blade - improves image quality by minimizing and correcting for the effects of motion during an MR sequence acquisition. e.g. head, spine, orthopedic imaging and the abdomen
- 1D PACE (Prospective Acquisition CorrEction) allows examination of patients with free breathing
- 2D PACE (Precise Motion Correction) detects and corrects respiratory motion eg of the heart or liver

MAGNETOM Aera runs *syngo* MR software. *syngo*® is the unique software platform for medical applications. Parallel working and one-click exams are efficiently supported and increase productivity. Parallel scanning and reconstruction are standard.

The unique Phoenix technique is the easiest way to exchange protocol data. It supports intelligent extraction of sequence parameters from images acquired on a MAGNETOM Aera system.

Inline technologies, scan@center or AutoVoiceCommands speed up the workflow further.

The context-sensitive "Online Help" function and *syngo* Scan Assistant offer support and propose solutions to MR-specific questions and parameter conflicts.

Studies can be easily networked and managed using the standard DICOM 3.0 protocol for efficient support of workflow. The following standard functions are supported: Send/Receive, Query/Retrieve, Basic Print for DICOM-compatible laser cameras (Camera is not included in the basic unit. Verify if existing camera is compatible or order separately.), DICOM Worklist, DICOM Storage Commitment (SC) DICOM Modality Perform Procedure Step (MPPS), DICOM Structured Report (SR), DICOM Study Split.

### Patient Communication

- The intercom system includes an ergonomically designed patient communication unit for desktop positioning on the *syngo* Acquisition Workplace and pneumatic headphones for the patient.
- It controls emergency table stop, volume control of speaker and headphones in the examination room, volume control of speaker in the control room, response to the patient's activation of the assistance-call button and provides a connection to an external audio system (external audio system is not included in the basic

## Description

unit) for music playback.

### Computer system

The high performance measurement and reconstruction system and the high performance host computer are ideally suited for even the most demanding applications. The PC-based computer system uses the intuitive *syngo* MR user interface. The computer system includes the following components:

High-performance measurement and reconstruction system

- Two Intel Quadcore Processor  $\geq$  E5620
- Clock rate of  $\geq 2 \times 2.4$  GHz, or comparable
- Main memory (RAM) of 48 GB
- Hard disk for raw data  $\geq 300$  GB
- Hard disk for system software  $\geq 100$  GB
- Parallel Scanning and Reconstruction of up to 8 data sets
- Reconstruction speed
  - 12,195 recons per second (256 x 256 FFT, full FoV)
  - 37,914 recons per second (256 x 256 FFT, 25 % recFoV)

High-performance host computer

- Intel Xeon processor  $\geq$  E5-1620 QuadCore
- Clock rate 3.6 GHz, or comparable
- Main Memory (RAM) 16 GB
- Three hard disks
  - system SW  $\geq 300$  GB SAS
  - data base  $\geq 300$  GB SAS
  - images  $\geq 300$  GB SAS
- DVD-R writer for CD-R (approx. 4000 images 256<sup>2</sup> DICOM Standard, ISO 9660 ) and DVD-R (approx. 25 000 images 256<sup>2</sup> DICOM Standard, ISO 9660) storage of DICOM data or other data like AVI files
  - DVD-ROM drive
  - Electronic mouse.
- The combination of host computer and the measurement and reconstruction system offers a truly powerful imaging system designed for large image matrix sizes of up to 1024 x 1024. The unrestricted multitasking capability allows time-saving parallel scanning and reconstruction.
- High-resolution 19" color LCD flatscreen monitor with 1280 x 1024 pixel display, integrated gamma correction for optimum display of radiographic grayscale images and automatic backlight control for longterm brightness stability.

### Installation:

- The relatively lightweight design of the MAGNETOM Aera in most cases eliminates the need for structural building reinforcements and thus facilitates installation in upper floors.
- The compact integrated design allows for short installation times and reduces the required space to less than 30 sqm (323 sq. ft.) for the entire installation. The minimum room height clearance is only 2.40 m (7' 10").
- MAGNETOM Aera allows siting of the system without a dedicated computer room - no additional cooling or floor requirements.
- MAGNETOM Aera combines state-of-the-art performance with peace of mind. High system availability is ensured by the expert, highly trained Siemens MR service engineers;
- Your Siemens service contract (not included in the basic unit) offers a comprehensive range of benefits such as Uptime Remote Diagnostics for improved productivity

### Tim [204x64] performance level

Tim 4G offers DirectRF a completely redesigned RF architecture. This new all digital-in/ digital-out design integrates all RF transmit and receive components at the magnet, eliminating analog cables for true signal purity. This compact and efficient design enables an dynamic feedback control for temporal stability and power linearity. The all-new innovative coil architecture packs more coil elements in a smaller space. Therefore up to 204 coil elements can be simultaneously connected. The newly designed ultra high density array is an essential part supplementing Tim4G. Combined with the 64 independent RF channels advanced iPAT capabilities and SNR are enabled.

## Description

An additional benefit of multiple coil elements and receiver channels is improved performance in multi-directional, i.e. three dimensional, high-speed, high-resolution iPAT in the head-feet, anterior-posterior or left-right directions. This option includes Advanced High Order Shim.

### XQ gradients

Siemens XQ gradients provide actively shielded, water cooled world-class gradients. All axes are force-compensated.

The XQ gradients have

- Maximum gradient amplitude of 45 mT/m, per axis, i.e. 78 mT/m vector summation gradient performance,
- max. slew rate 200 T/m/s per axis, i.e. 346 T/m/s vector summation,
- minimal rise time 225  $\mu$ s, from 0 to 45 mT/m amplitude
- Max. output voltage for each of the gradient axes 2250 V
- Max. output current for each of the gradient axes 900 A
- Separate cooling channels that simultaneously cool primary and secondary coils allow the application of extremely gradient intensive techniques in a new class of performance.
- 100% duty cycle for fast and demanding techniques such as ultra-short TE MRA in continuous operation, thin slice single breath-hold liver studies and EPI imaging techniques (all optional in appropriate clinical packages).
- Variable Field-of-View selection from 0.5 cm to 50 cm (up to 45 cm in z direction) for optimal coverage and highest spatial resolution in diagnostics. The minimum slice thickness in 2D and 3D is 0.1 mm and 0.05 mm, respectively.
- Acquisition of sagittal, transverse, coronal, single oblique and double oblique slices with highest resolution.
- The extremely compact water-cooled gradient amplifier features a modular expandable design with excellent linearity and pulse reproducibility. It is digitally controlled and has very low switching losses due to ultrafast solid state technology.

The option features:

- Display and storage of full-format images, e.g. of the spine, the central nervous system or the vessel tree (starting from *syngo* MR B13), combined from multiple overlapping stages.
- Dedicated composing algorithms, optimized for the generation of anatomical or angiographic (starting from *syngo* MR B13) full-format images.
- Data sets with different FoV, resolution, matrix and slice thickness can be combined (starting from *syngo* MR B13).
- Generation of full-format images from inline MIPs (starting from *syngo* MR B13).
- Original, detail and reconstructed images can be displayed in different layouts.
- Comparison of two reconstructed images for evaluation and diagnosis is thus made possible.
- Filming in different layouts is supported.
- Measurements of basic functions via reconstructed images is then possible.
- Measurements of extended orthopedic functions: scoliotic angle, kyphotic angle, vertical distance measurement and differences in width of the intervertebral spaces.

*Prerequisite: SW syngo MR B13.*

RESOLVE is a diffusion-weighted, readout-segmented EPI sequence optimized towards high resolution imaging with reduced distortions.

The sequence uses a very short echo-spacing compared to single-shot EPI, substantially reducing susceptibility effects. A 2D-navigator correction is applied to avoid artefacts due to motion-induced phase errors. This combination allows diffusion weighted imaging of the breast, prostate (SEEit sequence for prostate DWI), brain and spine with a high level of detail and spatial precision.

Additionally, an automatic reacquisition of data with large phase errors can be used to ensure that diffusion-weighted images of the brain are not affected by CSF pulsation.

3D acquisition of non-contrast enhanced brain perfusion with a TGSE sequence for minimal susceptibility and full brain coverage. Higher SNR, optimized contrast uniformity and reduced motion sensitivity. Inline calculation of PWI (perfusion weighted images) for a qualitative assessment of brain perfusion.

## Description

Despite a strong sensitivity for local magnetic field inhomogeneities Susceptibility Weighted Imaging (SWI) as a 3D technology keeps up the signal near large susceptibility leaps due to very thin slices and high resolution in the slice (high image quality e.g. in the area of the forebrain near the frontal sinus).

Moreover, the phase information of the MR signal is integrated in the image display. In order to further increase sensitivity for localized microscopic magnetic field inhomogeneities, large-area magnetic field inhomogeneities (e.g. caused by susceptibility leaps near the sinus) are specifically suppressed in the phase images.

This allows even small amounts of deoxygenated hemoglobin (e.g. in cerebral veins) or from products of hemoglobin decomposition (e.g. from hemorrhages) to be displayed.

Interesting measuring times for the ultra-high-resolution 3D protocols are achieved through parallel imaging with iPAT (GRAPPA).

The Susceptibility Weighted Imaging package includes:

- SWI measuring sequence, iPAT compatible
- optimized measuring protocols for the head
- inline-postprocessing for automatic calculation of relevant images within the scope of image reconstruction:
  - calculation of susceptibility-weighted images
  - venous angiography: MIP of a thin slice block

SWI has been optimized for clinical use to support diagnostics with cerebrovascular diseases (e.g. cerebral insult), venous malformation, brain trauma and tumors.

*Prerequisite: Software syngo MR B13*

The table design matches the MED-wide uniform design with silver-finished rim, use of friendly colors matching the Siemens color pattern for MAGNETOM and SOMATOM.

Table height 72 cm, matching the *syngo* Acquisition Workplace and *syngo* MR Workplace console table, for installation in the operator room either directly to the left or right of the *syngo* Acquisition Workplace or *syngo* MR Workplace console table or separately.

- Width 50 cm
- Depth 80 cm
- Height 72 cm

Alternatively this casing is also suited for the Recon image processor (except for the MR systems with the Tim generation: there the Recon image processor is always placed inside the electronics cabinet).

Two different registration algorithms (fast and high quality) are now available to compensate for patient motion of the breast. Both correction possibilities can be applied offline for 2D and 3D MR data sets.

New image data are reconstructed and saved in a separate series within the patient browser. They can be combined with the original non-corrected image data.

Fast algorithm

- Suitable for small to moderate motion
- Works in less than 3 minutes for large data sets

High quality algorithm

- Optimized set of motion parameters suitable for more severe motion
- More time intensive for large data sets

*Prerequisite: Software syngo MR B13*

Software option for general regulatory security rules, providing enhanced security features including user management and audit trail functionality. This package supports customers in their achieving compliance with the HIPAA "Privacy" rule.

Included Features:

User authentication to prohibit unauthorized access

Privileges to define user/role based functionality

Permissions to control data access

Audit trails to log system and data access

*MAGNETOM Harmony, Symphony, Sonata, Concerto, Trio, Allegra systems require Software version syngo MR*

## Description

2004A!

Power cable to connect the 3 KVA Powerware 9125 small UPS system (pn PWR9125H3000) to the ACC cabinet of the MAGNETOM Avanto/ Espree/ Tim Trio for backing up the host computer and imager.

Configuration includes connection box.

The standard cable length is 9 m.

An MR-compatible arm rest that supports the patient's arm on the magnet patient table when starting intravenous lines. The board is removed after the IV is inserted.

This product has been tested and verified for compatibility with the following Siemens' products: MAGNETOM Trio, Verio, Espree, Essenza, Avanto, Symphony, Area Skyra and Biograph mMR. Compatibility with other products cannot be assured and may void service contracts and/or system warranties.

Integrated Electrical Cabinet/Main Disconnect Panel for MR.

Components supplied:

- The IEC Main Disconnect Panel
- This Operations & Maintenance Manual
- (4) sets of Emergency Power Off pushbuttons and installation instructions
- Drawings and electrical schematics

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

This panel incorporates several features desirable for system installations to minimize down time, protect the MR and Helium Chiller electronics, and to reduce operational delays after a power outage. The panel has a main circuit breaker, Q1 with individual branch breakers for the MR, RF Cabin and Chiller. When the main circuit breaker is turned off, all power circuits within the panel will be deenergized.

The MR power is protected by an electronic circuit breaker, Q2, and is controlled by a contactor, K2. Q2 also provides the disconnect means to lock-out and tag-out (LOTO) the MR power circuit for maintenance purposes. The contactor will open with any loss of power or by pressing any Emergency Power Off (EPO) pushbutton. The K2 contactor control circuit is factory configured to automatically reenergize the MR upon restoration of facilities power. The control circuit may be re-configured to require the operator to manually restart the MR once the incoming power has been restored. This protects the sensitive electronic circuits of the MR from sags and surges that immediately follow power loss from blackouts, storms, utility reclosure operations, and out of phase automatic transfer switch operations.

The Chiller Loads are protected by an electronic circuit breaker, Q3. Q3 also provides the disconnect and lock-out and tag-out (LOTO) means for the Chiller power circuit for maintenance purposes.

The RF Cabin Load power is connected to terminals protected by a circuit breaker, F1, and powered by the main circuit breaker, Q1. Unless Q1 is turned off, the RF Cabin loads will always be on, and may only be de-energized from inside the IEC panel.

The control circuits are low voltage 24 VDC and are fully powered from within the panel.

The restart functionality and e-stop circuitry is controlled with a safety relay, K10. See page 10 for detail.

The white SAFETIES OK indicator light on the front of the panel is illuminated when none of the Emergency Power Off (EPO) buttons are pressed. When the white light is active, pressing the green START pushbutton will cause the MR system 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 MR system. Any EPO pressed while the MR system is energized will result in the immediate deenergizing of the MR system.

## Description

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 MR system.

### IMPORTANT:

If building power is removed from the panel while the MR system is energized, the MR system will reenergize when building power is restored without any human interaction.

Panel Dimensions: 36 in x 30 in x 8.0 (H x W x D)

Weight: 150pounds

This product is certified for OSHPD sites.

Includes Spectris Solaris EP injector and Integrated Continuous Battery Charger (ICBC).

- Optimized color touch screen with few keystrokes.
- Six user-programmable phases for added flexibility.
- Independent Keep Vein Open (KVO) allows more time to focus on patient.
- Large 115 mL saline syringe allows for longer KVO and multiple flushes.
- Design of low pressure tubing eliminates dead space in the "T" connection that can waste contrast.
- The clear barrel design with molded FluidDots help detect the presence of air in a syringe.
- Pressure Limit Setting control software enables user to select from one to six preset maximum pressure limits, ranging from 100-300 psi, and to view current pressure during injection next to the pre-selected maximum value on the Solaris display.

Installation, applications and one year warranty provided by Medrad.

**Not for mobile use, refer to Siemens part number M3SSMR300EPM for the Solaris injector used in a mobile environment.**

**This product has been tested and verified for compatibility with the following Siemens' products:**

**MAGNETOM Trio, Espree, Essenza, Verio, Avanto, Symphony, Aera, Skyra and Biograph mMR.**

**Compatibility with other products cannot be guaranteed and use with any other products may void service contracts and/or system warranties.**