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WAREHOUSE LYONS B82013  
V.A. Medical Center  
BLDG 13 A&MMS 90D  
VALLEY ROAD  
LYONS, NJ 07939

P.O.# 561-B82013

**EQUIPMENT SUMMARY:**

**TITAN HIGH FIELD MRI SYSTEM**

<u>QTY</u>	<u>DESCRIPTION</u>
1	PRE-INSTALLATION KIT FOR TITAN
1	MRI SYSTEM MAGNET
1	TITAN SYSTEM ELECTRONICS
1	ASGC FOR TITAN WITHOUT HIGH ORDER SHIM
1	REGIONAL KIT (USA)
1	16-CHANNEL RF ELECTRONICS
5	MEDIA,DVD-RAM DRIVE (9.4 GB)
1	GATING WAVEFORM LCD DISPLAY
1	WIRELESS CARDIAC GATING UNIT
1	WIRELESS PERIPHERAL / RESPIRATORY GATING PACKAGE
1	SOFTWARE, MBODY PACKAGE
1	MVASCULAR PACKAGE
1	NON-CONTRAST MRA AND SUPERFASE PACKAGE
1	MNEURO PACKAGE
1	BODY VISION AND DTI PACKAGE FOR VANTAGE
1	DICOM STORAGE COMMITMENT KIT
1	DICOM Q/R SCP UNIT
1	CONSOLE DESK 65" X 36" X 30"
1	SILENT SCAN STEREO AND INTERCOM SYSTEM
1	LCD MONITOR FOR ECG
1	PATIENT PADS FOR SPINE AND EXTREMITY
1	OVERHEAD CABLE INSTALLATION
1	GANTRY LIGHTING OPTION
1	PQUBE AC POWER MONITOR AND ENCLOSURE
1	PIANISSIMO ZEN PACKAGE
1	PIANISSIMO ZEN APPLICATION
1	PIANISSIMO ZEN HARDWARE PACKAGE FOR 8 - 16 CHANNEL SYSTEMS
1	UNINTERRUPTIBLE POWER SUPPLY TITAN S2 480V

<b><u>QTY</u></b>	<b><u>DESCRIPTION</u></b>
1	3 PHASE 160 KVA UPS G9000 SERIES
1	ENERGY 160 KVA BATTERY CABINET G9000 SERIES
1	TOSHONT POWER DISTRIBUTION PANEL / MAINTENANCE PANEL
1	ALARM PANEL, REMOTE STATUS
1	160KVA G9000 SERIES START UP
1	HASKRIS OPC12 OUTDOOR CHILLER AND WW3 INDOOR HEAT EXCHANGER TO COOL TITAN 1.5T MRI
1	4-CHANNEL FLEX SPEEDER COIL
1	16-CHANNEL FLEX SPEEDER MEDIUM COIL
1	16-CHANNEL FLEX SPEEDER LARGE COIL
1	FLEX COIL POSITIONING PAD SET
1	ATLAS BODY SPEEDER COIL
1	ATLAS SPEEDER HEAD/NECK COIL
1	ATLAS SPINE SPEEDER COIL
1	MSK SPEEDER PACKAGE
1	RAPID TRANSPORT SYSTEM - RIGHT
1	MRXPERION INJECTION SYSTEM KIT
1	MRXPERION INJECTION SYSTEM
1	INJECTOR INSTALLATION
1	MRXPERION PENETRATION PANEL KIT
1	NEUROLINE+ APPLICATION

**PURCHASABLE OPTIONS:**

<u>QTY</u>	<u>DESCRIPTION</u>
1	ATLAS EXTENDED TABLE TRAVEL - FACTORY OPTION
1	PROTON SPECTROSCOPY FOR TITAN S2 (OR200)
1	ADVANCE PROTON MULTI-VOXEL SPECTROSCOPY PACKAGE (WITH HIGH ORDER SHIM)
1	MBREAST PACKAGE
1	RADIANCE PLUS BREAST IMAGING PACKAGE FOR TITAN
1	QD HEAD COIL
1	MR THEATER KIT 1.5T (V3.6 OR LATER, NOT RTS OR EXTENDED TABLE COMPATIBLE)

## TITAN HIGH FIELD MRI SYSTEM

Vantage Titan is an open-bore 1.5-T MRI system that permits outstanding image quality without compromising on features or performance. The 71-cm patient aperture and ultra-short 1.4-m magnet offer a large 55 cm × 55 cm × 50 cm field of view. The system is designed to be eco-friendly, and its low power consumption increases daily cost performance. In addition, the M-Power user interface and Atlas SPEEDER™ provide a variety of solutions for users at all levels to improve workflow. Incorporating open bore technology and all the capabilities of a 1.5-T system, Vantage Titan combines the best of both worlds in one product.

### **Patient-Focused MRI**

The wide bore (71 cm) and ultra-short 1.4-m magnet reduce patient anxiety and ensure comfortable examinations. Canon Medical Systems' innovative Pianissimo™ technology dramatically reduces the level of acoustic gradient noise, enhancing patient comfort. The optional Pianissimo Zen mUTE sequences reduce noise by up to 99%<sup>1</sup>), about 2dB over ambient noise. The combination of Pianissimo's quiet gradients and Pianissimo provide an even more comfortable examination for your patients.

### **Outstanding Image Quality**

With 34 mT/m of gradient strength and a 32-channel receiver system, image quality is better than ever. Vantage Titan offers a wide variety of imaging techniques to meet the demands of the clinical environment, including non-contrast MRA.

### **Ease of Use**

Atlas SPEEDER, Canon Medical Systems' new parallel imaging technology with outstanding diagnostic versatility and streamlined workflow, permits easy setup and acquisition for all clinical studies. Innovative functions are newly added to the M-Power user interface, taking MRI performance and flexibility to a new level.

### **M-Power Productivity Features**

Vantage Titan incorporates M-Power and Atlas SPEEDER technologies, which allow easy system operation. The M-Power user interface, which has been optimized based on analysis of actual clinical workflow, maximizes workflow efficiency in examinations of every clinical region. EasyTech automatically sets the locator positions for the spine and heart. Atlas SPEEDER, Canon Medical Systems' integrated coil system featuring parallel imaging technology, provides outstanding diagnostic versatility and streamlined workflow, resulting in easy setup and acquisition in all clinical studies.

### **User Interface**

Vantage Titan 1.5T employs a new M-Power platform to provide user-friendly operability. The user interface is designed for intuitive operation, enabling even those with less experience to operate the system without difficulty. The interface has been created in accordance with the "universal design" concept, with the aim of reducing stress on the operator. This operability is implemented as a common standard among Canon Medical Systems. Vantage Titan also employs a new image processing engine, which provides three-dimensional image processing and color fusion processing, as well as flexible support for clinical application software.

Canon Medical Systems' industry-leading and proprietary non-contrast MRA techniques, minimize risk to patients while delivering superb images. The new M-Power state-of-the-art user interface is designed to maximize ease-of-use and efficiency.

## **KEY COMPONENTS**

### **Magnet**

The Vantage Titan uses the world's shortest (1.4 m) self-shielded superconducting magnet. A wide 71 cm patient aperture minimizes patient anxiety, ensuring a comfortable examination environment for all patients.

The superconducting magnet provides an extremely stable magnetic field. Stability is 0.1 ppm/hr or better. The integrated refrigeration unit eliminates liquid nitrogen usage and provides zero Helium boil-off system. The operating panel supports the following operations to facilitate patient set-up and scanning: scan start, abort, and pause/resume, emergency table stop, laser light localizer ON/OFF, ventilation adjustment, lighting adjustment, and patient table operation. The panel is also provided with a table position display, interlock display, and system ready LED.

### **Computer System**

The computer system is designed to provide outstanding multi-tasking performance, permitting image reconstruction and advanced image processing to be performed simultaneously with scanning. This helps to increase examination productivity.

The host computer system is on the Windows 7 Ultimate operating system with 6-core dual processor system or more (12 CPUs or more). The clock speed is 2.4 GHz with a main memory capacity of 12 GB.

The reconstruction system is a 6-core dual-processor system or more (12 CPUs or more) running at 2.93 GHz and has a main memory of 24 GB. The reconstruction speed is 12,600 images/second or more (256 x 256, FFT). The hard disk capacity is 3.5 TB.

### **Patient Table**

The patient table is ergonomically designed to maximize both patient comfort and patient throughput. The tabletop can be lowered to 430 mm from the floor. Hydraulic drive ensures smooth and quiet vertical tabletop movement.

- Maximum patient load: 200 kg
- Option 1: Atlas Extended Table Travel (MZPT-1504/S2)
  - Increases the usable scanning range to 205 cm.
- Option 2: High Load Capacity Table (MZPT-1510/S3)
  - Maximum patient load: 250 kg

### **Digital RF System**

The Digital RF system consists of a digital transmitter and wideband analog/digital receivers supporting array acquisition. The number of receiver channel can be selected as options. The digital transmitter provides the precise RF phase control needed to employ advanced pulse sequences. The high-frequency data sampling capability supports fast scan techniques.

### **RF Power Amplifier**

An output rating of 20 kW ensures that the system can generate the short pulses required for advanced pulse sequences. To ensure patient safety, RF power is emitted only when the SAR calculated by the system is below a preset limit.

### **Gradient Subsystem**

The combination of a powerful gradient power supply unit and a high-precision active shield gradient coil ensures stable image quality with all sequences, eliminating eddy currents. (34 mT/m, SR 148 T/m/s, 100% duty cycle). Canon Medical Systems' innovative Pianissimo technology is a patented gradient acoustic noise reduction technology that dramatically reduces scanning noise.

### **Patient Comfort and Safety**

A short open gantry (1.4-m magnet) with the largest clinical FOV markedly reduces patient anxiety and ensures comfort during examination.

### **Pianissimo™ Noise Reduction System**

Pianissimo noise-reduction technology, standard on all Titan systems, uses a unique vacuum-sealed chamber to dramatically reduce acoustic sound levels making patients more cooperative and comfortable. There is no compromise in image quality or speed of acquisition. Pianissimo is always on-there is no user interaction required or special sequences that need to be selected.

### **Pianissimo Plus Imaging Package**

Imaging sequences designed to further reduce the already-quiet Pianissimo noise-reduction technology.

### **Lighting and Ventilation**

Adjustable lighting/ventilation improves patient comfort in the magnet during scanning.

#### **Patient Call System**

The patient call system allows the patient to signal the operator during scanning. The system includes a hand switch that is activated by the patient.

#### **Intercom System**

The integrated intercom system allows two-way communication between the patient and the operator.

#### **Patient Observation System**

A CCD camera is used to observe the patient during scanning.

#### **Oxygen Monitor**

The oxygen monitor automatically activates the customer supplied ventilation system if the oxygen level falls in the scan room.

#### **Emergency Run-Down Unit**

This safety switch allows automatic ramp-down of the magnetic field in the event of an emergency.

#### **SAR Calculation**

The system always calculates SAR before scanning. If the calculation result indicates that the preset limit will be exceeded, scanning cannot be started.

#### **Imaging Techniques and Parameters**

A wide range of imaging techniques are provided to complement the Vantage Titan's precise and powerful digital RF system, computer platform, and high-performance gradient subsystem.

#### **Conventional Pulse Sequences**

- SE (spin echo)
- FE (field echo)
- IR (inversion recovery)

#### **Fast Scan Techniques**

##### **FastSE**

The flop angle for 180° RF pulses can be varied to reduce saturation transfer contrast (STC) effects and the specific absorption rate (SAR) to ensure patient safety. FastSE is compatible with both 2DFT and 3DFT. Flow compensation and presaturation are available.

##### **FastIR**

An inversion pulse is added to the 2DFT FastSE technique to enhance T1 contrast. This results in a much shorter scan time than in conventional IR. Multislice is available.

#### **FastFLAIR (Fluid-Attenuated IR)**

Increases contrast between fluids, such as CSF, and lesions to improve specificity using FastIR with a long TI, TE, and TR. This results in a much shorter scan time than in conventional IR. Multislice is available.

#### **FastSTIR**

Suppresses fat signals using FastIR with a short TI. This results in a much shorter scan time than in conventional STIR. Multislice is available.

#### **FastFE**

A pre-pulse is applied prior to FE pulse sequences to enhance T1 contrast with short scan times. Segmentation of scans is available to increase spatial resolution. FastFE is applicable to both 2DFT and 3DFT.

### **Advanced Fast Scan Techniques**

#### **FASE (Fast Advanced Spin Echo)**

This pulse sequence, which is based on FastSE with a large number of echoes (max. 276 ETL), is combined with advanced Fourier imaging (AFI) to reduce the scan time significantly with an echo factor of 512 (scan time reduction factor) in the standard configuration or 1,024 with optional software. A single shot is sufficient to generate an image in a few seconds. A pre-pulse is available for fat suppression. This technique is compatible with both 2DFT and 3DFT. FASE provides T2-weighted images and is an RF refocused echo planar imaging (EPI) technique. High contrast is achieved.

T2-weighted images with short scan times can be used to clearly depict the gallbladder, hepatic ducts, and pancreatic duct without contrast agent. FASE expands the range of clinical applications of MRI, supporting magnetic resonance cholangiopancreatography (MRCP), MR urography, and MR myelography.

The Contrast Free MRA application supports an expanded range of clinical applications such as fresh blood imaging (FBI) or swap phase encode extended data acquisition (SPEED).

#### **Hybrid EPI (Echo Planar Imaging)**

The Vantage Titan has Hybrid EPI capabilities to support the use of up to 27 echoes each with a different phase encoding similar to FastSE. Hybrid EPI uses a combination of both FastSE and EPI data, providing T2-weighted contrast while reducing SAR.

#### **Multi-Shot EPI**

Utilizes gradient echoes for SE-EPI, which are divided by up to 15 echo factors for one acquisition. Multislice is available.



### **Single-Shot EPI**

Both SE type and FE type are available. FE-type Single-Shot EPI requires the mNeuro package.

### **True SSFP**

T2/T1-contrast images can be obtained quickly using the steady-state free precession technique. This is suitable for scanning relatively longer T2 tissues and vascular structures during breath-holding. Fat saturation is possible by dividing scans into multiple segments.

#### **- FSE/FASE T2 Plus**

By promoting transverse magnetization recovery in FSE and FSE 2D, the scan time can be reduced and the resolution can be increased with no loss of T2 contrast and SNR.

### **SSFP**

T2/T1-contrast images can be obtained quickly using the steady-state free precession technique. This is suitable for imaging relatively longer T2 tissues such as CSF and synovial fluid. The slice thickness can be reduced by 3DFT scanning.

### **FASE3D mVox**

Enables acquisition of clear images with reduced SAR by changing the refocusing flip angle for each echo.

## **Vascular Imaging Techniques**

### **2D-TOF (Time of Flight)**

The time of flight effect is induced by the in-flow of fresh spins into the imaging slice to differentiate blood flow from tissue. Slices are acquired sequentially through the imaging volume. This technique functions optimally when the vessels are perpendicular to the acquired slices. It depicts relatively slower blood flow and is suitable for cervical, abdominal, and extremity applications. Maximum intensity projection (MIP) images can be displayed from multiple viewing angles. An overlapping scanning technique improves the visualization of vessels. A moving presaturation band can also be applied to differentiate between arterial and venous flow in certain body areas. ECG gating is applicable for 2D-TOF.

### **3D-TOF (Time of Flight)**

3DFT with TOF is used to depict multidirectional vascular structures and faster blood flow. MIP images can be displayed from multiple viewing angles. SORS-STC and ISCE RF pulses can be combined with 3D-TOF to improve vessel detail.

### **3D-CE (Contrast Enhanced)**

Contrast agent is injected in order to enhance blood signals, followed by a 3D-FE or 3D-FastFE sequence.

**SORS-STC (Slice-Selective Off-Resonance Sinc Pulse Saturation Transfer Contrast)**

Enhances blood flow and suppresses background signals by using a slice-selective off-resonance pulse. SORS-STC is more effective than conventional spatially nonselective STC (or MTC) because it suppresses background tissues without reducing the signals from blood flow.

**ISCE (Inclined Slab for Contrast Enhancement)**

Provides increased vessel detail by using an RF pulse with a different flip angle in combination with 3D-TOF to enhance signals from blood flow throughout the imaging volume.

**Multi Coverage**

Separates the data acquisition area of 3D TOF MRA into a few regions in order to limit signal reduction due to saturation effects.

**2D-PS (Phase Shift)**

The phase shift effect is generated by applying a flow encoding gradient pulse. The phase shift is proportional to the flow velocity. 2D-PS can be used with a volume slice to increase coverage of vessels and shorten scan times. Selecting the flow velocity allows specific vessels to be depicted.

**Cine 2D-PS (Phase Shift)**

2D-PS can be used with the cardiac-gating unit for cine imaging.

**Flow Quantification**

Blood flow velocity can be measured using cine 2D-PS with the cardiac-gating unit.

**3D-PS (Phase Shift)**

The phase shift effect, when used with 3DFT, is suitable for showing multidirectional vascular structures. Selecting the flow velocity allows specific vessels to be visualized. MIP images can be displayed from multiple viewing angles.

**MOLLI (Optional)**

In the FFE2D sequence, scanning is possible using the optional MOLLI (MODified Look-Locker Inversion recovery) method. In this method, ECG gating is used in combination and data acquisition is performed with several different TI values at equal time intervals from the R wave which is used as the trigger. In addition, the number of IR pulses, initial TI value for each IR pulse, number of data acquisitions, and resting time can be set. mCardiac Package (MSSW-CFA3) is required.

**PSIR (Optional)**

In the FFE2D sequence, scanning is possible using the PSIR (Phase Sensitive Inversion recovery) method. In this method, ECG gating is performed and it is possible to acquire real images in which phase correction is performed using the reference images acquired at the same time. mCardiac Package (MSSW-CFA3) is required.

**BEST (Blood Vessel Enhancement by Selective Suppression Technique)**

A postprocessing algorithm that selectively enhances small vessel detail and suppresses background tissue signals.

**Cardiac Tagging\***

Allows myocardial movement to be visualized by applying several presaturation bands. ECG gating is required. The number and positions of tags can be selected.

**Fat Suppression Techniques**

The Vantage Titan includes a comprehensive selection of fat suppression techniques to support a wide range of applications.

**STIR (Short TI Inversion Recovery)**

A short TI 180° pre-pulse with IR suppresses fat signals to enhance water-proton images.

**FastSTIR**

STIR with FastIR to reduce scan times.

**WFOP (Water/Fat Opposed Phase)**

An asymmetric SE technique in which image acquisition is performed at the instant the signals from water and fat go out of phase.

**FatSAT (Fat Saturation)**

Fat saturation pulses are applied to presaturate fat only. The multislice off-resonance fat suppression technique (MSOFT), an innovative Canon Medical Systems technology, ensures uniform fat suppression over all slices by using an offset RF pulse for each slice. Offset values are determined based on data acquired by auto-active shimming.

**Enhanced Fat Free**

Enhanced Fat Free utilizes dual fat suppression pulses to provide uniform fat saturation with wide-area coverage. This technique is especially useful for scans with high temporal resolution.

**PASTA (Polarity Altered Spectral and Spatial Selective Acquisition)**

Another innovative technique for suppressing fat signals in SE and FastSE sequences to obtain uniform water images over all slices. It consists of a narrow-bandwidth 90° RF pulse to separate water from fat. Opposing slice gradient polarity is used for 90° and 180° RF pulses to refocus water signals.

**DIET (Dual Interval Echo Train)-FastSE**

A drawback of FastSE is the high brightness levels from fat tissue signals. DIET is a new technique that reduces fat signals in FastSE by utilizing a pulse sequence with irregular echo intervals to achieve contrast near SE levels.

**SPAIR**

By utilizing adiabatic pulse, SPAIR enables to achieve homogeneous field excitation, free from the influence of B1 strength changes. This improves the uniformity of the fat suppression effect.

**WET (Water Excitation Technique)**

WET enables the spatial-position-selective and frequency-selective excitation of water. This technique can be applied to many types of sequences.

**WFS (Water Fat Separation)\***

WFS provides water based images and fat based images by calculating images acquired with two different echo. WFS is not quantitative in nature.

**UTE Imaging Optional Package**

Data is acquired with a very short TE by starting radial scan (in which data is acquired in a radial pattern from the center of the k-space) immediately after the RF excitation pulse is applied, without using a phase encode gradient pulse. Because UTE enables observation of signals with short T2\* values and acquires the data starting from the center of the k-space for each TR, this technique is less susceptible to motion.

**Pianissimo Zen Optional Package**

The Pianissimo Zen quiet scan reduces noise by up to 99%. A data acquisition sequence with a very short TE is possible in the same manner as for the UTE application. By adding an inversion pulse to the above sequence, mUTE3) T1 and Mute 4D-MRA images can be acquired. An Optional Pianissimo Zen Hardware Package is required.

**Gating****Cardiac Gating**

Multislice/single-phase and single-slice/multiphase imaging techniques are available. Cardiac images can be displayed in cine mode. Retrospective gating is also available as an option.

**Peripheral Pulse Gating\***

Reduces CSF pulsation artifacts.

**Respiratory Gating\***

Reduces respiratory motion artifacts.

- Retrospective gating\*

## **Artifact Suppression Techniques**

### **Flow Compensation**

Utilizes gradient moment nulling techniques to reduce flow artifacts.

### **Presaturation**

Up to seven presaturation bands can be set to reduce motion, flow, and wrap-around artifacts. The Vantage Titan's graphical user interface allows multiple bands in the orthogonal and oblique directions to be set with ease. The following preset presaturation bands are available.

- Anti-phase aliasing
- Anti-frequency aliasing
- Flow suppression
- Leading or following slices (for 2D-TOF)

### **Skipping SAT\***

Reduces the number of presaturation pulses in order to increase the number of slices.

### **No Wrap (Frequency and Phase Directions)**

Eliminates wrap-around artifacts by increasing the sampling data points in frequency or encoding steps in phase. The no wrap function is applicable up to a  $512 \times 512$  matrix with 3DFT.

### **Phase Swap**

The phase and frequency encoding directions can be swapped to minimize flow and respiratory motion artifacts.

### **Breath-hold Imaging**

An Auto-Voice function instructs patients when to hold their breath.

### **JET™ Technique**

JET acquires the data for the k-space in non-Cartesian mode and suppresses motion artifacts by detecting and correcting for in-plane motion using the data for the central part of the k-space, which is acquired repeatedly. This application can suppress not only image artifacts in patients who are unable to remain still during scanning, but also artifacts due to involuntary motion such as CSF flow. This technique is based on FastSE 2D, and uses T2W and FLAIR contrast enhancement.

### **2D Real-Time Motion Correction (2D-RMC)**

An image with reduced respiratory motion artifacts can be obtained by following the scanning cross section and acquisition timing relative to diaphragm motion. FASE 3D is applied.

## **User Interface**

Vantage Titan employs a new platform to provide user-friendly operability. The user interface is designed for intuitive operation, enabling even those with less experience to operate the system without difficulty. The interface has been created in accordance with the "universal design" concept, with the aim of reducing stress on the operator. This operability is implemented as a common standard among Canon Medical Systems. Vantage Titan also employs a new image processing engine, which provides three-dimensional image processing and color fusion processing, as well as flexible support for clinical application software.

### **Image Display and Processing**

Images acquired in scanning are displayed, various processing is applied to these images as required, and the images are printed onto film. Image Matrix, which displays thumbnails of actually acquired images, allows the user to quickly search for and select the desired images. A variety of image processing functions are provided to serve different purposes. The excellent parallel processing capability of Vantage Titan allows image processing to be performed in parallel with scanning.

The Vantage Titan's platform supports a wide range of high-speed image processing capabilities.

### **Reconstruction**

The maximum reconstruction matrix is 1,024 × 1,024.

#### **FINE**

Doubles the reconstruction matrix to improve the inplane spatial resolution without increasing scan times for both 2D and 3D images. This technique can also be applied to the slice encoding direction for 3D images.

#### **Refine Filter**

User-selectable reconstruction filter to enhance image quality.

#### **Batch Multiplanar Reconstruction**

Provides oblique as well as interactive MPR.

#### **Display Monitor**

The console features a high-resolution 24" LCD color monitor. The display matrix is 1,920 × 1,200 with 256 B/W gradation levels.

#### **Host Computer Includes:**

- Windows 7 Ultimate with 6-core 12 CPU system
- Clock speed: 2.4 GHz or more
- 12 GB or more of main memory
- 300 GB hard drive for system use (unformatted storage)
- 600 GB hard drive for image data (unformatted storage)
- Stores approximately 1,120,000 images (256x256 images)

### **Reconstruction System**

- 6-core dual-processors system
- Reconstruction speeds up to 12,600 images/ second (256x256,FFT)
- Simultaneous image reconstruction during scanning
- Reconstruction matrix up to 1,024x1,024
- Main memory capacity: 24 GB or more
- 3.5TB hard disk drive (unformatted storage)

### **DVD and Blu-ray Drive Unit**

#### **DVD (single side)**

- Storage capacity: DVD 4.7 GB (unformatted)
- Saved image capacity: Approximately 22,000 images (256 × 256 images, raw data not saved)

#### **DVD-RAM (both side)**

- Storage capacity: DVD 9.4 GB (unformatted)
- Saved image capacity: Approximately 44,000 images (256 × 256 images, raw data not saved)

#### **Blu-ray (single layer)**

- Storage capacity: 25 GB (unformatted)
- Saved image capacity: Approximately 110,000 images (256 × 256 images, raw data not saved)

#### **Blu-ray (double layer)**

- Storage capacity: 50 GB (unformatted)
- Saved image capacity: Approximately 220,000 images (256 × 256 images, raw data not saved)

*\* DICOM format data cannot be archived in Blu-ray disk.*

### **Connection with External Devices**

- Interface: Ethernet (1000Base-T) DICOM 3.0

### **Networking**

#### **DICOM 3.0**

The Vantage Titan supports DICOM 3.0 for transferring image data over networks.

The system is provided with Storage SCU, Print SCU, DICOM Media, and MWM SCU as standard. In addition, Storage Commitment, Q/R SCU, Q/R SCP, and MPPS SCU are available as options. IHE profiles are supported.

### **Image Maker Express Marketing Support**

Image Maker Express is an online marketing resource that helps Canon Medical Systems customers build demand for imaging service by growing

their referring physician and patient relationships. Image Maker Express includes:

- Easy-to-use marketing resources and tools developed exclusively for Canon Medical Systems customers to bring together effective marketing strategies and tactics.
- A wealth of collaterals and content to create high-quality brochures, print ads and more to help market the Canon Medical Systems customer's new imaging capabilities.

Image Maker Express Materials available include:

- Product images and logos
- Clinical images and videos
- PowerPoint presentations and promotional videos
- Brochure samples
- Customizable press releases and media tips
- Marketing strategy tutorials

*\*Offerings may vary per product*

### **Applications Support**

Each system includes three phases of operator training.

**Phase I:** Two vouchers for a one-week intensive course at the Canon Medical Systems Institute of Advanced Imaging in Irvine, California.

- One technologist must attend prior to system installation
- Travel expenses included
- The second voucher is valid for six months following installation
- Additional vouchers available for \$3,500

**Phase II:** Two weeks of on-site training at the customer's facility.

- For one to four technologists
- Covers operation of the complete system including set up of customized scan protocols

**Phase III:** On-site training to follow up on questions, review key areas and address requests for advanced imaging procedures.

- 32 hours of training
- Four to six weeks after the initial training
- For one to four technologists

### **Performance Pro**

Performance Pro is a custom program created to offer a unique approach to education, focusing on achieving technical proficiency and optimal productivity. The program includes the following:



- A planning meeting at your facility with Canon Medical Systems' MRI Applications Manager. The purpose of the meeting is to discuss objectives and timing, and to explain Canon Medical Systems' custom approach. During the meeting the manager also will ensure that the following takes place:
  - Review Canon Medical Systems' New Customer Education Guide (what to expect and how to plan and prepare).
  - Introduce the Canon Medical Systems Three Phase Education Program and the role of the Canon Medical Systems Institute of Advanced Imaging.
  - Co-develop a custom training program based on the facility's specific needs and ensure it is well documented for execution.
- A trained Applications Specialist will be assigned ownership of the education experience for the facility. They will perform the following duties:
  - Participate in planning meetings with the project team to address any training issues in a proactive fashion.
  - Communicate with the facility prior to the turnover date to ensure everything is on track and all questions or concerns are addressed.
  - Ensure all materials (training manuals and learning aids) are on site at the time of the go-live date.
- A Quality Installation Checklist developed by Canon Medical Systems' service team and physicists will be used to ensure all system requirements have been met and the scanner is working properly and yielding good image quality.
- A Clinical Evaluation will be conducted by a National Clinical Support specialist prior to the turnover to ensure the system is ready for go-live date. The specialist will communicate approval to the Applications Manager, the assigned Applications Specialist, the Account Executive and the Service Team.
- Consistent on-site service support during the turnover.
- The Canon Medical Systems Institute of Advanced Imaging will properly train and prepare the core trainers to perform their role with the most advanced education approach in the industry.
- Canon Medical Systems will send two Application Specialists to the turnover. One will work with technologists for two consecutive weeks (the assigned Applications Specialist) and the other will work with physicians for one week to achieve desired image quality.

- At the start of the turnover, Canon Medical Systems will begin with a presentation for the staff and referring physicians to highlight system capabilities and generate excitement.
- Performance Pro is a blended learning approach and includes prerequisites and additional accredited CE courses for the clinical staff.

A special visit will be conducted by National Clinical Support Specialist four to six weeks after turnover to check protocols and image quality. The specialist will be available to meet with physicians and technologists to answer all questions.

The training is offered to the Customer at no charge, providing that it is completed no later than one (1) year after the warranty start date.

#### **Additional On-Site Training**

Additional On-site training available for purchase.

#### **InTouch Center®**

This centralized service facility provides applications and service support for Titan 1.5T customers 24 hours a day, seven days a week.

#### **InnerVision™ Plus**

Remote system diagnostics are available around-the-clock to help identify problems and provide potential solutions before care is interrupted or an engineer can arrive.

#### **InTouch Agreements**

Based on customer needs, InTouch customer agreements can range from an a-la-carte approach to full-security agreements that provide complete system protection.

#### **Technical Assistance**

Customer support specialists are available 24/7 to help resolve technical issues in real time. Application support specialists are also available to assist staff with protocol and image-quality issues.

#### **Service Support**

##### **Local Customer Teams**

A single call mobilizes a local team of Canon Medical Systems customer engineers. With an average of 10 years of Canon Medical Systems experience and 105 hours of specialized training, they can resolve almost any performance issue.

##### **Parts Support**

A complete inventory of Titan 1.5T product parts is ready for shipment when and where they are needed, any time of day or night.

**Installation**

Canon Medical Systems' installation coordinator and Atlas site planning guide are made available to facilitate site planning. All installation and standard rigging costs are included.

*Note: RF Shielding and RF Room are not included or provided by Canon Medical Systems*

## COMPONENT SUMMARY:

<u>PART NUMBER</u>	<u>QTY</u>	<u>DESCRIPTION</u>
	1	PRE-INSTALLATION KIT FOR TITAN
	1	MRI SYSTEM MAGNET
	1	TITAN SYSTEM ELECTRONICS
	1	ASGC FOR TITAN WITHOUT HIGH ORDER SHIM
	1	REGIONAL KIT (USA)
	1	16-CHANNEL RF ELECTRONICS
	5	MEDIA,DVD-RAM DRIVE (9.4 GB) <ul style="list-style-type: none"><li>• 9.4 GB</li><li>• Two-sided</li></ul>
	1	<b>GATING WAVEFORM LCD DISPLAY</b> Displays physiological signals (ECG, respiration, peripheral). Mounted on the magnet front so a single operator can verify proper ECG lead placement from the magnet room.
	1	<b>WIRELESS CARDIAC GATING UNIT</b> Performs wireless ECG gating for cardiovascular MR examinations that require gating.
	1	<b>WIRELESS PERIPHERAL / RESPIRATORY GATING PACKAGE</b> Performs wireless peripheral and respiratory gating for cardiovascular, MRA and body MR examinations that require gating.
	1	<b>SOFTWARE, MBODY PACKAGE</b>
	1	<b>MVASCULAR PACKAGE</b> The M-Power mVascular Software Package contains pulse sequences and imaging functions to perform Contrast MRA, Dynamic Contrast MRA (Freeze Frame) and Contrast Free MRA exams.  MRA Software includes:  <b>Visual Prep</b> Enables the technologist to begin scanning at the optimal time by observing the contrast medium as it flows to the target region. By using subtraction techniques, images can be displayed even more clearly and without signal inversion.

- Other features of VisualPrep include:
- WB coil scanning:
  - View the contrast flow using the WB coil while conducting the main scan with the optimal receive coil.
  - This includes all coils supporting the SPEEDER technique.
- Dynamic scan:
  - Execute VisualPrep at the start of the second segment and subtract images automatically in post-processing.
  - Acquire arterial phase images in the first segment and venous-phase images in the second.
- Moving Bed:
  - Specify in each stage of MovingBed.
  - Acquire images without contrast, then start contrast images at optimal time.
- Gated Scan: Image the heart in synchronization with cardiac contraction.

### **Moving Bed**

Allows MRA to be performed over a wide range, such as from the chest or abdomen to the lower limbs, by moving the couch-top between scans.

- Set optimal couch-top slide distances according to the flow speed of the contrast.
- Use with VisualPrep to start scanning at the optimal time.
- Enable effective fat suppression by performing shimming acquisition semi-automatically in advance at each couch-top position.

### **STAMD**

Depicts the spatial relationship between blood vessels more clearly by changing the slice range for MIP processing in a step-by-step manner.

### **Dynamic Complex Data Subtraction**

To prevent signal inversion in the blood vessels, perform subtraction between the dynamic images and the reference image that is acquired before contrast medium injection. Subtraction is available automatically after data acquisition is completed.

### **Fat Suppression in FFE 3-D Swirl Encode Imaging**

The increase in the scan time is minimized by applying the fat-saturation pulse most effectively.

## **1 NON-CONTRAST MRA AND SUPERFASE PACKAGE**

Provides pulse sequences effective for non-contrast vascular imaging, cardiac imaging and functions that expand the range of clinical applications.

### **Fresh Blood Imaging (FBI)**

- Produces angiograms and venograms without the use of contrast.

- Combines ECG gating with (FASE) Fast Advanced Spin Echo pulse sequences.
- Acquires arterial and venous flow in one acquisition, which can be viewed together or separately using an automated subtraction technique.
- Integrated Atlas SPEEDER coil technology allows multiple consecutive stations to be imaged. These stations can be automatically stitched together, creating one large field-of-view image that depicts vasculature from above the femoral bifurcation to the feet.

#### **Contrast-Free Improved Angiography (CIA) – Flow Spoiled FBI**

- An extension of Fresh Blood Imaging using additional flow spoiler gradients to produce a stronger separation between arterial and venous flow signals.
- Uses a flow preparation scan to optimize the effectiveness of the Flow Spoiler pulses. This ensures that the optimal Flow Spoiler value is selected.
- The improved visualization of slower vascular flow is especially useful for diabetic patients with compromised circulation.

#### **Time-SLIP (Spatial Labeling Inversion Pulse)**

- Based on Arterial Spin Labeling, uses a non-selective spatial inversion pulse, spatial tag pulses and natural blood as its own tracer.
- Applicable in multiple regions of the body for both hemodynamic velocity and vascular visualization.
- Especially useful for imaging complex vessels flowing in multiple directions, such as renal arteries, portal venous system and pulmonary arteries.
- Can be used as a non-contrast MRA option for the carotid arteries.

#### **TSA**

Non-contrast, time-resolved, head-and-neck blood flow using the Time-SLIP technique with variable BB-TI times.

#### **Time-SLIP BB TI**

Non-contrast vascular imaging of the abdomen and lung fields with Time-SLIP Optimization.

- Determines optimal BBTI in FASE imaging by varying the TI at regular intervals.
- Programmable parameters are the:
  - Initial TI value (unit: lms)
  - Interval (1 to 500 ms)
  - Number of repetitions (max 1000)

#### **SPEED (Swap Phase Encode Extended Data Acquisition)**

For non-contrast vascular imaging.

- Acquires two images with phase encode directions shifted by 90 degrees for the same slice in a single scan. Then combines the images using a composite MIP post-processing technique.
- The matrix and FOV scanning parameters are automatically set to square.
- Respiratory gating can be combined with cardiac gating or peripheral-pulse gating.

### **FASE BB (Black Blood)**

Used for chest imaging to acquire cardiac and thoracic images with reduced blood-flow artifacts. Applies a black-blood pre-pulse to suppress the signals from blood flowing into the slice plane.

### **Sequential FASE**

Multislice imaging of the heart and great vessels, useful for the sequential acquisition of different slice images in the same cardiac phase.

### **TrueSSFP 2-D/3-D**

- Rapidly obtains T2 or T1 contrast-weighted images.
- Suitable for imaging relatively longer T2 tissues and vascular structures during breath holds.
- Fat saturation is possible by dividing scans into multiple segments.

### **FSE/FASE T2 Plus**

- Reduces scan times and increases resolution with no loss of T2 contrast and SNR by promoting transverse magnetization recovery in FSE and FSE 2-D.

### **FSE 3-D RealIR Head Imaging**

Obtains heavily T1-weighted FSE 3-D images in a shorter time.

### **FE 3-D SSFP**

Used in neuro and orthopedic applications to acquire images with T2/T1 contrast in a shorter time.

### **m-Vox**

- Allows isotropic, FSE, 3-D volume acquisitions, which can then be reformatted into multiple imaging planes to increase efficiency and reduce patient imaging time.
- Can be used with T2 and T2 FLAIR contrasts.

## **1 MNEURO PACKAGE**

The mNeuro software package provides pulse sequences for diffusion imaging, perfusion imaging and fMRI (functional magnetic resonance imaging) as well as new imaging functions to expand the range of clinical applications.

### **Diffusion Imaging**

Images can be acquired by enhancing diffusion water molecules in the body.

### **EPI Diffusion**

- Isotropic diffusion-weighted images can be generated through calculations based on images acquired with MPG applied in the slice, readout or phase directions.
- Apparent diffusion coefficient images can be generated by calculation using two or more images acquired with different MPG levels. It is possible to specify this method before the start of the scan.

## **1 BODY VISION AND DTI PACKAGE FOR VANTAGE**

### **DTI – Diffusion Tensor Imaging**

Visualizes white-matter fibers running in a specific direction based on the diffusion anisotropy.

#### **The following can be calculated based on the acquired images:**

- Amount of diffusion in each direction
- Degree of anisotropy
- Sum of diffusion factors

#### **Requires at least seven sets of diffusion-weighted images:**

- One set must be without MPG (motion probing gradient)
- At least six sets must be with the MPG pulses applied in different directions (with 6 directions possible).

The information generated from the diffusion gradients can be used to calculate directional vector, which can be used to describe the trajectory of molecular motion. The fiber direction is indicated by the tensor's main linear trajectory (lambda1, lambda2 and lambda3).

### **Post-Processing for Diffusion Tensor**

- FA (Fraction Anisotropy) image shows the degree of diffusion anisotropy, and can be generated automatically after image acquisition.
- Lambda1, lambda2, lambda3 images (characteristic value images) are generated by converting these values from the diffusion tensor.

### **Perfusion Function (ASL)**

Generates perfusion-weighted images without contrast by labeling the blood with the RF pulse and using it as a tracer to obtain vascular or perfusion-weighted images.

Captures images of flow components entering the slice by eliminating the stationary tissues. This is done by subtracting the tagged image, which includes the labeled flow, from the control image.

### **Functional Magnetic Resonance Imaging (fMRI)**

Generates images of local areas in which the signal intensity increases when the patient is stimulated due to the BOLD and inflow effect.



Two series of images are acquired:

- When stimulation is applied to the patient
- When the patient is at rest

No contrast is needed because:

- Hemoglobin is used as a native contrast medium
- Cerebral function information is assumed from the changes in signal intensity

### **Multishot FE EPI**

- Single-shot EPI is modified by extending the ETS, which reduces the imaging time while ensuring the spatial resolution and SNR of a standard FE technique.
- The time required for T1 weighted-imaging of the abdomen is reduced while maintaining high-image contrast, spatial and temporal resolution.

### **High b value**

- Increases the contrast in diffusion-weighted images.
- The permissible maximum b value is 10000.
- An extended sampling time is used to improve the image quality.

### **Diffusion for tissues with short T2**

- SE\_EPI sequences with 105ms TE or less is used for tissues with short T2.
- Two types of MPG pulse application methods are available:
  - 3-Axis
  - Tensor
- DTI license is required for the Tensor method.

### **Fat suppression**

Three types of fat suppression methods are available:

- PASTA
- FatSAT (recommended for DWI of the head)
- IR

### **SPEEDER**

Parallel imaging can be used with EPI to reduce distortion.

### **T1 weighted imaging for the abdomen**

- Use the 3-DFT-EPI technique for higher data acquisition efficiency by increasing the number of phases for dynamic scanning or for reducing breath-hold time.
- The 3-DFT technique achieves resolution in the slice direction as high as 1mm.

### **V-TRACE (Variable True Rate Angiography with Combined Encodings)**

This head-imaging application acquires four image contrasts in one sequence, visualizing slow- and fast-velocity vessels together. V-TRACE is

especially effective for visualizing collateral vessels, which are difficult to see with standard TOF imaging.

Combines the advantages of TOF and FSBB to produce MRA images that depict blood vessels with a wide range of flow velocities, making it ideal for head imaging.

This dual-echo 3-D FE sequence generates high-intensity vascular images in a scan time nearly equivalent to only TOF or FSBB.

- First echo acquired using standard TOF
- Second echo acquired using flow-sensitive black blood (FSBB) technique
- Echoes are combined using one of two subtraction methods:
  - Simple weighted subtraction (SWS) for thin slabs in the axial plane
  - Frequency weighted subtraction (FWS) for thick slabs in any plane
- Pulse sequence type: FE3-D\_hop
- Main contrast types:
  - 3-D TOF
  - FSBB
  - T1W
  - Combined 3-D TOF and FSBB
- Scanning plane:
  - Axial
  - Coronal
  - Sagittal

V-TRACE does not employ an STC pulse for background suppression, therefore, the SAR does not increase, and the original TOF image can be used as a T1W 3-D image.

## **1 DICOM STORAGE COMMITMENT KIT**

Guarantees the receiver that another device has taken ownership of the images sent.

- Identifies that images have been sent to a destination
- Stores selected images on a DICOM-compliant server
- Obtains commitment to retain the images

*Note: This is a single user license. A separate license must be ordered for each console.*

## **1 DICOM Q/R SCP UNIT**

Query and retrieve image data on the MR console from a network image server, such as PACS.

*Note: This is a single user license. A separate license must be ordered for each console.*

**1 CONSOLE DESK 65" X 36" X 30"**

Measures 65" x 36" x 30"

**1 SILENT SCAN STEREO AND INTERCOM SYSTEM**

Includes the following:

**Patient Microphone**

Patient's headset has a built-in microphone for crystal-clear communication between technologist and patient. Coupled with Pianissimo technology, the patient will be heard, regardless of scan type or location within the MRI bore.

**Patient Alarm System**

A hand-held, rubber squeeze bulb for claustrophobic patients to trigger an audible alarm at the communication console.

**Communication Console**

Includes a flexible, gooseneck microphone for effortless patient communication.

**Patient Comfort Music Headset**

Offers hearing protection and allows patients to relax to music, free from gradient noise. Careful matching of transducer characteristics and filter design provides remarkably clear music.

**1 LCD MONITOR FOR ECG**

**1 PATIENT PADS FOR SPINE AND EXTREMITY**

**1 OVERHEAD CABLE INSTALLATION**

**1 GANTRY LIGHTING OPTION**

The ambient gantry lighting kit provides a soothing blue glow on the front cover of the magnet. Patients who see a bright friendly scanner will ultimately respond more positively and tolerate the scanning process more effectively.

**1 PQUBE AC POWER MONITOR AND ENCLOSURE**

**1 PIANISSIMO ZEN PACKAGE**

**1 PIANISSIMO ZEN APPLICATION**

The Pianissimo Zen silent sequence package reduces noise by up to 99%<sup>1)</sup>, down to as little as 2 dB above ambient noise. The combination of Pianissimo and Pianissimo Zen make Galan the quietest MR system in its class, providing comfortable examination for your patients.

High-speed gradient field switching is suppressed, making it possible to provide quiet scanning. In addition, a data acquisition sequence with a very short TE is possible in the same manner as for the UTE application. By adding an inversion pulse to the above sequence, mUTE T1 and mUTE 4D-MRA images can be acquired. Also, settings to achieve quieter FASE Diffusion are available.

*1). 99% reduction by unit of Loudness level "dB" and 97% reduction by unit of perceived loudness "Sone"*

**1 PIANISSIMO ZEN HARDWARE PACKAGE FOR 8 - 16 CHANNEL SYSTEMS**

**1 UNINTERRUPTIBLE POWER SUPPLY TITAN S2 480V**

**G9000 UPS**

The G9000 Uninterruptible Power System (UPS) utilizes state-of-the-art design and construction to deliver industry-leading efficiency, reliability, performance, and flexibility to meet today's critical power demands.

A High Efficiency Design separates the G9000 from the competition. Efficiency greater than 92.5% at 20% loading means lower power losses, reduced air conditioning needs, and reduced utility costs across a wide load range without sacrificing frequency or output voltage stability.

A Transformer-Less Design allows the G9000 to be lighter with a smaller footprint. With its compact size, the G9000 has the highest energy density per square foot of any UPS of similar capacity. The UPS provided 7 minutes of run time after loss of power to the system.

**WARRANTY**

The G9000 UPS and the UPS backup battery system are supported by industry-leading three-year parts and labor warranty\* and a 24/7/365 hotline. This ensures that customers get the quickest possible resolution to any warranty or service issues that may arise.

*\* Conditional to system startup by our authorized UPS service provider.*

**1 3 PHASE 160 KVA UPS G9000 SERIES**

**1 ENERSY 160 KVA BATTERY CABINET G9000 SERIES**

**1 TOSHONT POWER DISTRIBUTION PANEL / MAINTENANCE PANEL**

**1 ALARM PANEL, REMOTE STATUS**

**1 160KVA G9000 SERIES START UP**

**1 HASKRIS OPC12 OUTDOOR CHILLER AND WW3 INDOOR HEAT EXCHANGER TO COOL TITAN 1.5T MRI**

The Haskris cooling system consists of two units: Models OPC12 and WW3. Model OPC12 is an outdoor refrigerated chiller to be installed on a rooftop or concrete pad outside the building. The OPC12 is designed for extreme climates, is fully weather-proof and can operate comfortably in ambient air temperatures between -20F and +120F. Model WW3 is an indoor heat exchanger system that gets installed in the MRI equipment room. The WW3 is custom designed to Canon Medical Systems specification to include an integrated 3-circuit piping manifold, built-in city water backup circuit with Building Automation System (BAS) interlock and space saving footprint.

All models are factory tested under full MRI heat load prior to shipment and offer an industry-leading reliability rating of 99.97% uptime. Models include UL and CSA certification. OSHPD certified designs are available.

**1 4-CHANNEL FLEX SPEEDER COIL**

This versatile, 4 element coil's flexible design allows it to wrap around extremities, joints and a variety of other anatomical areas the user wishes to image.

**1 16-CHANNEL FLEX SPEEDER MEDIUM COIL**

The medium 16-element flexible coil is designed to be lightweight and easy to position for multiple clinical applications. The coil:

- Easily wraps around extremities, joints and a variety of other anatomical areas the user wishes to image
- Lies flat for long bone studies
- Combines with other integrated coils to create a posterior and anterior array for maximum contrast and spatial resolution
- Has a pre-amplifier located on it, so there's no extra box to deal with when positioning the coil on the patient

*Note: On an 8-channel RF system this coil operates as an 8-element coil.*

*Prerequisite: This coil will only work with the 1.5T Titan with software at or above 2.20.*

**1 16-CHANNEL FLEX SPEEDER LARGE COIL**

The large 16-element flexible coil is designed to be lightweight and easy to position for multiple clinical applications. The coil:

- Easily wraps around extremities, joints and a variety of other anatomical areas the user wishes to image
- Lies flat for long bone studies
- Combines with other integrated coils to create a posterior and anterior array for maximum contrast and spatial resolution

- Has a pre-amplifier located on it, so there's no extra box to deal with when positioning the coil on the patient

*Note: On an 8-channel RF system this coil operates as an 8-element coil.*

*Prerequisite: This coil will only work with the 1.5T Titan with software at or above 2.20.*

## **1 FLEX COIL POSITIONING PAD SET**

The Flex Coil Positioning Pad Set contains positioning accessories for ankle, knee, elbow and other clinical applications. The pad set will facilitate in positioning the coil easily and reliably for optimal image quality.

## **1 ATLAS BODY SPEEDER COIL**

### **Titan 16 channel RF configuration**

16-element array design is suitable for chest, cardiac, abdominal and pelvic studies with an extended field of view (EFOV) with 50 cm of coverage as well as optimal signal-to-noise ratio.

- Works with the Atlas Spine Coil to create a 32-element array.
- Combine with Atlas Head/Neck and Atlas Spine Coil or with two other body coils for full-body coverage.

### **Titan 8 channel RF configuration**

The body coil creates an 8 element array when combined with the integrated spine coil.

*Note: Standard Atlas Body Coils cannot be used on the Titan system.*

## **1 ATLAS SPEEDER HEAD/NECK COIL**

- The Atlas SPEEDER Head/Neck (MJA-177A) is designed for optimal imaging of the head, neck and feet using Atlas SPEEDER technology (Canon Medical Systems' advanced parallel imaging).
- This array coil is part of the Atlas integrated coil design and can be used in combination with the Atlas SPEEDER Spine and Atlas SPEEDER Body. This advanced coil technology permits the use of up to 16 coil elements for excellent coverage as well as a high signal-to-noise ratio. Its patient friendly design gives the patient a greater feeling of openness.

## **1 ATLAS SPINE SPEEDER COIL**

Feet-first positioning maximizes patient comfort and increases flexibility with this moveable, 32-element array suitable for spine studies with optimal signal-to-noise ratio. This coil is integrated into the patient table and can remain on the table for most exams.

- Coil covers 100 cm and can be positioned at either end of the table.

- Works with the Atlas body coils to form the posterior elements of the array. Together the spine and body coils can be used for imaging the spine, abdomen, pelvis and lower extremities.

#### **1 MSK SPEEDER PACKAGE**

This coil package consists of dedicated Shoulder SPEEDER and Knee/Foot SPEEDER. The Shoulder SPEEDER is a soft and flexible 6-element array coil with a winged design, which provides an excellent signal-to-noise ratio. The Knee/Foot SPEEDER is an 8-channel array coil which designed for scanning of the knee, wrist, hand, foot and ankle.

#### **1 RAPID TRANSPORT SYSTEM - RIGHT**

Canon Medical Systems' unique rapid transport system provides a complete, MR compatible, patient transport system that does not disable the scanner when it is removed. This system allows the gurney to transport the patient from room to imaging suite, dock on top of the Titan's table and then be moved in the scanner for imaging. When the patient is done, the table comes out and lowers the top back onto the gurney for transport back to the patient's room. The scanner is still capable of imaging while this occurs as the MR table has not been removed.

*Prerequisite: Requires V2.21 or later Software on the 3T  
Requires V2.2 or later Software on the 1.5T*

#### **1 MRXPERION INJECTION SYSTEM KIT**

Medrad® MRXperion™ MR Injection System has new automation features that allow less time preparing for the injection and more time to focus on the patient

- Designed for injection of MR contrast media and saline with two independent injection syringes
- Includes system installation, clinical in-service training, and one-year manufacturer's warranty

#### **1 MRXPERION INJECTION SYSTEM**

#### **1 INJECTOR INSTALLATION**

#### **1 MRXPERION PENETRATION PANEL KIT**

#### **1 NEUROLINE+ APPLICATION**

NeuroLine+ is the fully automatic positioning software for brain imaging. Key features of NeuroLine+ include:

- Easy setting after the auto locator positioning.
- High reproducibility and efficiency for brain examinations.

## OPTIONS

### **ATLAS EXTENDED TABLE TRAVEL - FACTORY OPTION**

This option allows the table to travel a total of 205 cm. The additional table movement will allow the operator to experience the most flexibility when positioning the patient. A majority of exams can be done in the feet first position. The Vantage Atlas provides the highest level of patient comfort with this feature.

*Note: This is a factory option. Not available for High Capacity Couch configurations.*

### **PROTON SPECTROSCOPY FOR TITAN S2 (OR200)**

### **ADVANCE PROTON MULTI-VOXEL SPECTROSCOPY PACKAGE (WITH HIGH ORDER SHIM)**

### **MBREAST PACKAGE**

### **RADIANCE PLUS BREAST IMAGING PACKAGE FOR TITAN**

The RADIANCE Plus Breast Imaging Package is an all inclusive package that includes specialized sequences and the Sentinelle Breast SPEEDER Coil. This coil is an 8-channel coil specially designed for high-resolution imaging of the breasts and axillary tissues. This coil is SPEEDER compatible, can be used in unilateral and bilateral exams, and allows the Vantage Body Coil to be used at any time while the coil is in the scanner to accommodate for large FOV body coil localizers.

#### Compatibility

- 1.5T Vantage Titan

#### Interventional Access

- Variable Coil Geometry
- Lateral approach accessibility for biopsy:
  - 70 cm and 60 cm bore: 352.71 cm<sup>2</sup>
- Medial approach accessibility for biopsy:
  - 70 cm and 60 cm bore: 276.82 cm<sup>2</sup>
- Bilateral intervention capable

#### Patient Accommodation

- Volume per breast (70 cm bore): 8287 cc
- Volume per breast (60 cm bore): 6672 cc
- Distance from sternum to bore  
(70 cm bore, Titan): 35 cm
- Distance from sternum to bore  
(60 cm bore, Atlas): 30 cm



- Arms at side, arms back or arms forward positioning
- Adjustable head rest
- Patient pads: 9 with memory foam
- Patient weight up to 200kg

#### Training

- 6.0 Category A Continuing Education Hours with initial applications training on imaging and intervention. This applications training is provided by Sentinelle Medical Imaging.

#### Techniques included in this package:

- Quick 3-D's for dynamic evaluation
- Enhanced Fat saturation
- Silicone saturation
- High resolution axial and sagittal sequences
- Unique slice selective fat saturation
- LFOV imaging
- SPEEDER compatible

#### *Note:*

##### *Warranty / Service*

*Customer hereby acknowledges and agrees that solely as a convenience to Customer, Canon Medical Systems is entering into an agreement with Sentinelle, ("Vendor") in order for such Vendor to sell, deliver, install, and service its products, and perform other work to and for the benefit of Customer. However, Customer hereby agrees that Canon Medical Systems will not be liable for any defects in design, material and workmanship in the products or services sold and/or performed by Vendor or otherwise be responsible for such products or services. Customer will have no rights or remedies against Canon Medical Systems for such products or services. Customer's sole remedy will be against Vendor. Additional warranty may be purchased directly from Sentinelle ("Vendor") after the initial 12 month warranty period has expired.*

*Prerequisite: V9.5 Software*

#### **QD HEAD COIL**

##### **MR THEATER KIT 1.5T (V3.6 OR LATER, NOT RTS OR EXTENDED TABLE COMPATIBLE)**

MR Theater utilizes a technology for displaying expansive virtual reality images inside the bore of MRI systems. High reality images are projected onto a dome-shaped screen in the bore to divert the patient's attention from the examination space.

A semi-transparent dome screen installed inside the bore moves in synchrony with the patient table and permits continuous projections of expansive images onto both the dome screen and bore interior from an external projector located behind the MRI system.

Patients can view the images from a mirror installed on the patient table so they may experience a visual space unlike the actual examination space, diverting their attention away from the bore itself.

JOB SPECIFICATIONS	
APPLICATION:	MRI COOLING
VOLTAGE / PHASE / FREQUENCY:	208-230/3/60 or 460/3/60 (specify when ordering)
BTUH REQUIRED:	108,000
OUTDOOR CHILLER AMBIENT RANGE (°F):	-20 to +120
OUTDOOR CHILLER CONDENSING METHOD:	AIR COOLED
OUTDOOR CHILLER REFRIGERANT:	R-407C
MRI CIRCULATING FLUID:	WATER
MRI FLOW RATE (GPM):	15 @ 72.5 PSI
MRI SUPPLY TEMPERATURE (°F):	65

MODEL - DESCRIPTION OF EQUIPMENT
<b>OPC12 OUTDOOR CHILLER</b>
– ADDITIONAL 4 YEAR COMPRESSOR WARRANTY
– MODBUS CONNECTION INCLUDED/BACNET AVAILABLE
– PROGRAMMABLE LOGIC CONTROLLER (PLC) INCLUDING: <ul style="list-style-type: none"> <li>○ PUMP PRESSURE (FLOW) INDICATOR &amp; HIGH/LOW ALARMS</li> <li>○ REFRIGERANT HIGH/LOW PRESSURE INDICATOR &amp; ALARM</li> <li>○ POWER ON AND FAULT INDICATOR</li> <li>○ HIGH TEMP INDICATOR</li> <li>○ DIGITAL I/O DISPLAY STATUS</li> <li>○ COMPONENT MANUAL OVERRIDE FOR TROUBLESHOOTING</li> </ul>
– ECM (ELECTRONICALLY COMMUTATED) VARIABLE SPEED FAN
– TANK LOW LEVEL INDICATOR (INCLUDED IN PLC)
– CIRCUIT BREAKERS IN LIEU OF FUSES
– SEMI-CLEAR TANK FOR EASE OF TANK LEVEL INDICATOR
– HEAD PRESSURE CONTROL (DOWN TO -30°F AMBIENT)
<b>WW3 INDOOR HEAT EXCHANGER</b>
– BUILT-IN PIPING MANIFOLD w/FLOWMETERS AND METERING VALVES
– BUILT-IN CITY WATER BACKUP SWITCHOVER
– NON-FERROUS SYSTEM PUMP, 15 GPM @ 72 PSI
– REMOTE CONTROL PANEL FOR OUTDOOR CHILLER
<b>ACCESSORIES AND SERVICES</b>
– PROPOLYENE GLYCOL
– 1 YEAR LIMITED WARRANTY (see details below)
– FREIGHT (CONTINENTAL USA)/START-UP SUPPORT/6 MO PM (upon request)