MAGNETOM Amira – A BioMatrix System

Data sheet based on syngo MR XA50

siemens-healthineers.com/amira



Embrace human nature with BioMatrix

Patients have unique, individual characteristics. Their different physiologies and anatomies – but also the way we interact with them and with technology – cause unwarranted variations.

These unique human characteristics – biovariabilities – pose significant challenges in MRI: Inconsistent exams. Poor image quality. Increased need for rescans. Unpredictable scheduling. They all can negatively impact the quality and cost of the care you provide. BioMatrix technology helps to overcome these challenges with a whole new approach: by embracing human nature. Instead of expecting patients to adjust to the technology, BioMatrix automatically adjusts to the patient. BioMatrix Sensors, Tuners, and Interfaces allow you to anticipate motion, adapt to the patient, and to simplify and accelerate patient preparation – no matter who comes next.

"To provide our patients with individual therapies, we need every piece of information available. In imaging, this means we need robust, standardized, and reproducible image data, always of the same quality regardless of the patient or user. BioMatrix Technology gives us this data quality and comprehensive image information and is helping us on our way to quantitative radiology."

Professor Konstantin Nikolaou, M.D. University Hospital Tübingen, Germany





Anticipate motion for high-quality results with BioMatrix Sensors.



Adapt to challenging anatomies for reliable exams with BioMatrix Tuners.



Accelerate patient preperation for increased efficiency with BioMatrix Interfaces.

BioMatrix Technology



Anticipate motion for high-quality results

BioMatrix Sensors Respiratory Sensors

The Respiratory Sensors automatically detect breathing patterns as soon as the patient is positioned with BioMatrix Body 13 coil on chest or abdomen. This provides a simplified workflow as respiratory triggered scans can be performed without additional user interaction.



Adapt to challenging anatomies for reliable exams

BioMatrix Tuners SliceAdjust

SliceAdjust technology provides distortion free whole-body DWI scans as well as reliable fat saturation for both DWI and TSE sequences. It avoids broken spine artifacts in whole-body DWI for excellent correlation with anatomical scans.







Accelerate patient preparation for increased efficiency

BioMatrix Interfaces Select&GO

With one-touch positioning on the Select&GO touch display based on the underlying BioMatrix Body Model artificial intelligence is employed to accelerate patient positioning by up to 30%¹⁾. Delays due to incorrect positioning can now be avoided. The user simply selects the region or organ to be scanned on the touch display and the patient is automatically and precisely positioned for the respective scan

- Select&GO suggests scan scenarios based on the set of coils plugged in.
- Precise positioning is empowered by an intelligent anatomical body model for organ localization.
- Use cases without upfront patient registration are supported.
- Physiological curves and guidance for patient set up of triggering device are displayed.
- Breast biopsy planning results can be displayed for both Grid method and Post Pillar method.

Further functionalities include:

- In-bore ventilation (6-step regulation)
- In-bore lighting (6-step regulation)
- Headphone volume adjustment (25-step regulation)
- In-room loudspeaker adjustment (25-step regulation)
- Start scan



- Alarm off
- Continuous table movement at two predefined speed levels
- Automatic transfer from any vertical position to home position
- Automatic transfer to isocenter
- Automatic transfer from any horizontal position to home position
- Laser light localization, horizontal table movement, lighting adjustments, and ventilation are also possible from the console

Technology

Color TFT-LCD (LED Backlight), Projective Capacitive Touch Technology (PCAP)

Screen Size

10.4", 4:3

Screen Matrix

1024 × 768 pixels

Color Depth 24 bit

¹⁾ Data on file, results may vary.

MAGNETOM Amira A BioMatrix System

No matter what.

Count on consistent quality with BioMatrix and myExam Companion

Count on financial certainty with productivity-boosting technologies

Count on new clinical opportunities with free-breathing applications



DirectRX Technology

General

- Tim's new and unique all digital-out design integrates all RF receive components at the magnet
- Optical RF system improves SNR by reducing electrical noise and increasing signal detection
- Digital-out design: optical links between magnet and equipment room to achieve highest RF stability
- Receiver is integrated in the magnet housing
- Dual-Density Signal Transfer enables ultra-high density coil design by integrating key RF components into the local coil
- Receiver with high dynamic range without adjustments

RF transmit technology

Frequency stability (5 min)	$\pm 2 \times 10^{-10}$		
Frequency control	32 bits (0.015 Hz)		
Phase control	16 bits (0.006 degrees)		
Body coil	Integrated whole body no tune transmit/receive coil with 16 rungs		
	Optimized RF efficiency and signal-to-noise ratio (SNR)		
Transmitter path	Transmit amplitude	16 bit control 50 ns resolution	
	Gain stability (after first minute)	< 0.1 dB (1 s)	
		< 0.4 dB (5 min)	
Transmit amplifier	Compact water-cooled amplifier		
	Transmit amplifier bandwidth	500 kHz	
	Peak power	15 kW	

Transmit Technology

RF receiver technology

RF Receiver Technology

The revolutionary Total imaging matrix optimizes coil positioning and virtually eliminates coil changing times. It also features Dual-Density Signal Transfer in the local receive coils, which enables the high density design. All local coils are no tune coils. Further Tim 4G features are AutoCoilSelect for dynamic, automatic, or interactive selection of the coil elements within the FoV.

Receive path	Maximum number of channels ¹⁾	96
	Number of independent receiver channels that can be used simultaneously in one single scan and in one single FOV, each generating an independent partial image	16, 24
	Quadrature demodulation and filtering	Digital
	Receiver bandwidth	500 Hz –1 MHz (for each channel)
	Receiver signal resolution	32 bit
	ADC sampling rate	80 MHz
	Preamplifier noise figure	<0.6 dB
	Dynamic range at coil connector (referred to 1 Hz resolution bandwidth)	156 dB instantaneous at receiver 161 dB with automatic gain control at local coil connector

¹⁾ Channels (coil elements) that can be connected simultaneously

Patient Handling

General

BioMatrix Interfaces, Tim 4G and myExam Assist help increase patient comfort and improve workflow efficiency.

- BioMatrix Interfaces simplify how the user interacts with the MRI scanner. One-touch positioning using the Select&GO touch display with the underlying
- BioMatrix Body Model accelerates patient positioning – powered by artificial intelligence. Delays due to incorrect positioning can now be avoided. The user simply selects the region or organ to be scanned on the touch display and the patient is automatically and precisely positioned for the respective scan.
- Set up the patient once, no repositioning, no changing of coils needed
- Scan range of 140 cm allows most examinations examinations with full usage of the surface coils, without the need for patient repositioning
- Imaging with optimized high coil element density ultra-light weight surface coils
- Feet-first examinations for many applications (e.g. lumbar spine, pelvis, colonography, body angio) reduces the level of anxiety experienced by highly claustrophobic patients
- myExam Companion gives the user advice during the positioning process, on the Select&GO displays, very helpful in the case of ECG, for example

Patient Positioning Aids

Standard set of cushions for comfortable and stable patient positioning together with safety straps.

BioMatrix Table

This patient table is mounted and directly to the magnet assembly with components to support respiratory sensor in BioMatrix Body 13 coil. Comfortable patient table solution which fits the needs for patients up to 200 kg supporting full weight capacity in vertical and horizontal movement. Integrated coils for fast patient preparation and enhanced user comfort. Examinations of patients with a scan range of up to 140 cm. Integrated infusion stand.

Max. patient weight for vertica and horizontal table movemen	l 200 kg (440 lbs) t	
Max. scan range	140 cm	
User can adjust the table speed wheel on the Select&GO Contr	d with two predefined speed mode ol Centers	buttons or accelerate continuously with the
Vertical table movement	Range	58–89 cm + 10 mm ¹⁾
	Speed	13 sec one click table up
Horizontal table movement	Max. range	2150 mm
	Max. speed	200 mm/s
	Repositioning accuracy ²⁾	± 0.5 mm

¹⁾ Depending on the floor conditions

²⁾ Accuracy for repositioning from one direction

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). The physiological curves are visualized at the Select&GO Display.

Wireless Sensors

Wireless Vector ECG / respiration and pulse sensors for physiologically synchronized imaging, rechargeable battery-powered – for optimized patient handling

Physiological Signals

- ECG (2 channels)
- Pulse
- Respiration

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 PulseTriggering:

- 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

Noise reduction features

General Features

- Acoustically optimized mountings for all components including gradient coil and body coil
- Minimized structure borne noise transfer to building
- Noise attenuating foam between magnet and cover
- Encapsulation of noise producing components

Gradient

- Special epoxy resin and casting technology for damping vibrations
- Reduction of gradient stray field to decrease eddy currents
- Noise-optimization of the MR system with an acoustically soft but mechanically rigid mounting of the gradient coil inside the magnet
- Force compensation for all axes

Magnet

- Encapsulation of the entire magnet
- Efficient floor decoupling for reduction of noise transferred to the building
- Noise-optimized cold head

Body Coil

Material of supporting tube of the body coil is optimized for low vibration and noise.

- In order to achieve maximum noise reduction, the body coil tube was extended beyond the gradient coil
- Copper structures are slotted and glued to the tube to reduce high frequency noise
- The Body coil is acoustically decoupled by special suspensions

General Sequence Design

Optimized sequence timing.

- Sequences automatically avoid parameter settings that cause the gradient coil to resonate
- No relevant application drawbacks no increase in sequence parameters, e.g. full performance

"Whisper Mode"

The "Whisper Mode" is a user selectable mode that reduces the max. slew rate and max. amplitude of the gradients and enables very quiet imaging techniques.

Quiet Suite

A family of sequences for extremely quiet neuro and orthopedic imaging, with up to 97% reduction in sound pressure¹⁾:

- QuietX TSE, SE and GRE sequences for T1, T2, DarkFluid, SWI and DWI contrasts
- PETRA, a 3D T1-weighted UTE sequence.

Quiet Suite sequences employ optimized gradient waveforms to achieve highly signifi cant noise reductions and smoother, more pleasant sounds with no decrements in image quality or substantial increases in scan times. Optimized protocols for the brain, spine and large joints are provided. Acquisition Parameters

Acquisition Parameters

Acquisition Parameters ¹⁾	AWP	
2D	Number of slices	1 – 128 (steps of 1)
	Slice order	Sequential or interleaved
3D Slabs / Partitions	Number of 3D partitions for matrix 256 × 256	4 – 512
	Number of 3D Slabs (3D volumes)	1 – 128 (steps of 1)
Acquisition Matrix	Frequency encoding (true imaging matrix without interpolation or oversampling)	64 – 1024 (in steps of 2; sequence dependent)
	Phase encoding	32 – 1024 (in steps of 1)
Reduced Matrix	Phase resolution (rectangular matrix)	32 × n n × n (steps of 1)
	Slice resolution (3D volumes)	50-100 %
Partial Fourier Imaging	Phase partial Fourier (Half Fourier)	4/8–1 (steps of 1/8)
	Read partial Fourier (asymmetric echo)	Selectable
	Slice partial Fourier (3D volumes)	5/8-1 (steps of 1/8)
Rectangular Field of View	In phase encoding direction	3–100%
Averaging	Number of data acquisitions	1 – 32 (steps of 1)
	Averaging mode	Short term, Long term (LOTA)
Oversampling	Read oversampling	100% standard
	Phase oversampling	0-100% (steps of 12.5%)
	Slice oversampling (3D volumes)	0-100% (steps of 12.5%)
Interpolation	In plane interpolation	Selectable (factor of 2)
	3D interpolation (3D volumes)	Selectable (up to factor of 2)
Serial Acquisitions	Number of repeated scans	With constant delay times 1-4096
		With different delay times 1–65
Swap	Exchange of read-out and phase- encoding direction	Yes
Slice Orientation	Slice orientation for 2D and 3D scans	Transverse, sagittal, coronal, oblique, double oblique (steps of 0.1°)
	Multi-slice multi-angle (simultaneously)	Yes

¹⁾ Combinations of the parameters stated are not always possible; some parameters may depend on optional application packages

Standard Acquisition and Reconstruction Techniques

Standard techniques

- True Inversion Recovery to obtain strong T1-weighted contrast
- Dark Blood inversion recovery technique that nulls fluid blood signal
- 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-tonoise 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, multiplication, calculations of ADC maps and b-value images
- Image Filter
- 3D post-processing MPR, MIP, MinIP, VRT
- Flexible film formats and paper print
- Data storage of images and cine AVI files on an export media with DICOM viewer as the viewing tool
- 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) diffusion tensor imaging measurements can be done with multiple diffusion-weightings and up to 12 directions for generating data sets for diffusion tensor imaging.

- WARP 2D TSE sequence combining optimized highbandwidth protocols and View Angle Tilting (VAT), tailored to reduce susceptibility artifacts caused by orthopedic MR-Conditional¹⁾ metal implants.
- Advanced WARP 2D TSE based Slice Endcoding for Metal Artifact Correction (SEMAC) technique for the reduction of through-plane distortions from large MR Conditional¹⁾ implants.

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; TurbolR: Inversion Recovery for STIR, DarkFluid T1 and T2, TrueIR
- 2D TSE with multiple average it is possible to acquire T2-weighted TSE images during shallow breathing, in a time efficient manner
- 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 Accelerated with CAIPIRINHA technique for T2 and PD contrast.
- 2D/Optimized high bandwidth TSE (T1, T2, and PD weighted and STIR) with WARP. Reduces susceptibility artifacts.

¹⁾ MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens Healthineers.

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 Perfusionweighted imaging; 2D/3D Segmented EPI (SE and FID)
- RESOLVE (Readout Segmentation Of Long Variable Echo-trains) delivers high- resolution, low-distortion diffusion-weighted imaging (DWI) for accurate depiction of lesions
- Segmented ToF for shorter acquisition time with the same quality
- 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
- BEAT Tool TrueFISP segmented; 2D FLASH segmented; Magnetization-prepared TrueFISP (IR, SR, FS); IR TI scout; Retrogating

Turbo Gradient Spin Echo (TGSE)

Hybrid Turbo Spin Echo / Gradient Echo used primarily for T2-weighted imaging

• Shorter measurement time

- Decreased RF power deposition
- Improved visualization of hemorrhage, due to magnetic susceptibility differences
- High resolution imaging of brain

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 and thorax 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 on VIBE and Turbo Spin Echo sequences

Standard Flow Artifact Reduction

- LOTA (Long Term Data Averaging) technique to reduce motion and flow artifact
- Pre-saturation technique. RF saturation pulses to suppress flow and motion artifacts
- Tracking SAT bands maintain constant saturation of venous and / or arterial blood flow, e.g. for 2D / 3D sequential MRA
- TONE (Tilted Optimized Non-saturating Excitation). Variable excitation flip angle to compensate inflow saturation effects in 3D MRA. TONE pulse selectable depending on the desired flow direction and speed
- GMR (Gradient Motion Rephasing). Sequences with additional bipolar gradient pulses, permitting effective reduction of flow artifacts

Standard Scan Time Reduction

Elliptical scanning reduces scan time for 3D imaging

iPAT – integrated Parallel Acquisition Technique high-performance and flexible Parallel Imaging with integrated AutoCalibration

Two algorithms – mSENSE and GRAPPA – for maximum quality for all applications

iPAT is compatible with all relevant sequence techniques (e.g. SE, TSE, SPACE, MEDIC, TIRM DarkFluid, HASTE, EPI, MPRAGE, 3D VIBE, FLASH, TrueFISP, TurboFLASH, FLASH Phase Contrast, etc)

iPAT is compatible with all multi-element coils, as well as coil combinations

T-PAT with mSENSE and GRAPPA for advanced parallel imaging provides fast high-resolution dynamic imaging

3 different calibration techniques can be used:

- AutoCalibration with an integrated reference (calibration) scan to additionally save on total scan time
- TurboCalibration uses a separate measurement directly before the actual measurement. Images measured using TurboCalibration are characterized by reduced PAT artifacts.
- T-PAT and PAT averaging for motion artifact suppression using Self-Calibration

iPAT²

More slices and coverage in the same breathhold by applying PAT in 2 directions simultaneously (phaseencoding direction and 3D direction for 3D sequences) The effective PAT factor can be maximized, and PAT applications are extended. Typical clinical applications are MR Angiography or ultrafast isotropic T1-weighted 3D imaging of the head

A new iPAT² sequence technique named CAIPIRINHA (Controlled Aliasing In Parallel Imaging Results IN Higher Acceleration) has been added. It can be applied to volumetric 3D imaging e.g. in the abdominal region.

Standard Motion Correction

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
- Motion insensitive Turbo Spin Echo sequence
- Can be used with all coils and in all planes
- Supports T2-weighted, T1-weighted, PD-weighted, STIR, and DarkFluid protocols
- Simultaneous in-plane motion correction for arbitrary slice orientations
- Versatile sequence e.g. supporting iPAT with GRAPPA, Restore pulses and supports respiratory triggered imaging of the abdomen using 2D PACE

1D PACE (Prospective Acquisition CorrEction)

Quick and easy acquisition control for free breathing examinations, e.g. for cardiac imaging

2D PACE Precise Motion Correction

- Detects and corrects respiratory motion of the heart, liver, etc. for free breathing high resolution 2D and 3D examinations
- Significantly increased image quality
- Improved security in the diagnosis of diseases in moving organs and precise slice registration for multi breathhold studies
- Eliminates the need for respiratory belt
- PAT averaging for motion artifact suppression using Self-Calibration

Standard Workflow Enhancements

AutoCoilDetect

Detects the position and orientation of coils automatically. Shows coils in the user interface right within the graphical slice positioning.

AutoCoilSelect

Automatic detection and selection of all coil elements in the active Field-of-View.

Standard Susceptibility Artifact Reduction

WARP & Advanced WARP

- 2D TSE sequence combining optimized high-bandwidth protocols and View Angle Tilting (VAT), tailored to reduce susceptibility artifacts caused by orthopedic MR-Conditional¹⁾ metal implants.
- This helps in evaluation of soft tissue in proximity of the implant.
- Available protocols include T1-weighted, T2-weighted, proton density and STIR contrast.
- Advanced WARP enables the reduction of gross artifacts (i.e. through-plane artifacts) caused by large MR Conditional¹⁾ implants. It contains the 2D TSE based SEMAC techniques and is especially useful in the case of hip and knee joint replacements. Available pulse sequences include T1-weighted, T2-weighted, proton density and STIR contrast.

syngo Scan Assistant

Shows parameter constraints and provides possible solutions.

scan@center

Automated movement of table so that the scan is performed in the magnet isocenter – can be activated or deactivated by the user.

AutoVoiceCommands

These multi-language automatic voice commands during the scaning to help synchronize timing of breathing, scanning, and contrast media injection.

¹⁾ MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens Healthineers.

Phoenix and PhoenixZIP

Exchange of protocol data (e.g. via Internet) by drag & drop clinical images. PhoenixZIP allows transfer of whole measurement programs.

Online Help Functions

Context sensitive and quick resource for questions about software operation or MR physics.

DirectConnect™

Cable-less direct connection for Head / Neck 16, Spine 18.

SlideConnect[®]

SlideConnect[®] cable connectors can be securely pluggedin with one hand only.

Recon&GO technology – Zero-click post-processing

Recon&GO technology encompasses a wide range of Inline functionalities to help streamline the clinical workflow by automating post-processing steps before image viewing.

Recon&GO provides Ready-to-Read results with zero clicks, even for advanced cases. Examples:

 Inline Composing: automatic composing of multiple adjacent coronal or sagittal images for anatomical or angiographic examinations.

- Inline Substraction: Automatic subtraction of images, e.g. pre- and post-contrast enhancements
- Inline calculation of ADC and extrapolated b-values
- Inline MIP on-the-fly, e.g. MR Angiography with automatic image subtraction and following MIP in three orthogonal planes
- Prospective motion correction (1D and 2D PACE) on-the-fly
- · Automatic perfusion and diffusion maps
- Automatic on-the-fly calculation of standard deviation, for better differentiation of arterial and venous phases
- Automatic launch of post-processing applications
- Inline Display: automatically shows reconstructed images. It offers immediate access to the results and opens automatically for e.g. interactive real-time scanning or Care Bolus examinations
- Inline Movie: automatically starts the cine image display

TimCT FastView

TimCT FastView is the "one go" localizer for the wholebody (from head to middle thigh) 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. Transverse, coronal and sagittal reformats of the volume are calculated in-line and displayed for planning subsequent exams.

- Inline reconstruction of the localizer images during the scan
- Localizing images in three planes over the maximum Field of View available for subsequent planning in all orientations
- TimCT FastView runs without laser light positioning to further streamline the workflow for several indications

Tim Application Suite

The Tim Application Suite offers a complete range of clinically optimized examinations for all regions. The Tim Application Suite – allowing excellent head-to-toe imaging – is provided standard on MAGNETOM Amira with BioMatrix.

- Neuro Suite
- Angio Suite
- Cardiac Suite
- Body Suite
- Onco Suite
- Ortho Suite
- Breast Suite
- Scientific Suite
- Pediatric Suite¹⁾

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.

General features

- Fast 2D imaging with SE, TSE, GRE protocols for highresolution imaging in all orientations and all contrasts
- BLADE motion correction for TSE imaging in all orientations and contrasts
- EPI sequences and protocols for diffusion imaging, perfusion imaging, and fMRI for advanced neuro applications. Diffusion-weighted imaging is possible with up to 16 b-values in the orthogonal directions
- 3D TOF for non-contrastenhanced angiography
- 3D isotropic resolution volume imaging using T1 3D MPRAGE/3D FLASH, SPACE DarkFluid, T1 SPACE, T2 SPACE, BLADE, and 3D TSE T2-weighted high resolution 3D Restore protocols optimized for inner ear examinations

¹⁾ MR scanning has not been established as safe for imaging fetuses and infants under two years of age. The responsible physician must evaluate the benefit of the MRI examination in comparison to other imaging procedures.

- Double Inversion Recovery 3D protocols (DIR SPACE) with two user-selectable inversion pulses for the simultaneous suppression of e.g. cerebro-spinal fluid and white matter
- MP2RAGE (Magnetization Prepared 2 Rapid Acquisition Gradient Echoes) provides homogeneous tissue contrast for segmentation and applications such as voxel-based morphometry. In combination with Maplt¹⁾, it also provides T1 mapping functionality.
- 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
- 3D Myelo 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
- PSIF sequence for diffusion-weighted imaging of the spine
- 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
- TGSE sequence used primarily for T2-weighted imaging for shorter measurement time, decreased RF power deposition, improved visualization of hemorrhage, and high resolution imaging of brain 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
- RESOLVE (Readout Segmentation Of Long Variable Echo-trains) delivers high- resolution, low-distortion diffusion-weighted imaging (DWI) for accurate depiction of lesions
- High-resolution T2 SPACE pulse sequence optimized for inner ear examinations

Angio Suite



Excellent MR Angiography can be performed to visualize arteries and veins.

- 3D MRA pulse sequences for carotid arteries, abdominal arteries, and peripheral arteries, with short TR and TE. The strong gradients make it possible to separate the arterial phase from the venous phase
- Dynamic MRA for 3D imaging over time
- Signal from Respiratory Sensor can be selected to actively trigger MR image acquisition, e.g. with NATIVE¹⁾

Contrast-enhanced MRA

- 3D contrast-enhanced MRA protocols for e.g. single step, dynamic, peripheral with the shortest TR and TE. The strong gradients make it possible to separate the arterial phase from the venous phase
- TestBolus workflow for optimal bolus timing and excellent 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

¹⁾ Optional

Non-contrast MRA and venography

- 2D or 3D Time-of-Flight (ToF) protocols for MRA for the Circle of Willis, carotids, neck vessels, and breathhold protocols for abdominal vessels
- Segmented ToF saves up to 25% acquisition time with the same image quality, and meanwhile reduce the specific absorption rate (SAR).
- Triggered 2D ToF sequences for non-contrast MRA, particularly in the abdomen and the extremities
- MR venography with 2D/3D Time-of-Flight (ToF) and Phase-Contrast
- TONE (Tilted optimized non-saturating excitation) and MTC (Magnetization Transfer Contrast) techniques for improved Contrast-to-Noise Ratio (CNR)

Image processing tools

- 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

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)¹⁾ and avoid folding artifacts in large patients

Visualization of structural cardiovascular pathologies with CMR – BEAT

- Breathhold 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 cardiothoracic anatomy, including vessels or heart valves. Cine techniques (FLASH & TrueFISP) for high-resolution valve evaluation
- Multiple contrasts such as T1- and T2-weighted imaging
- Dark-blood TSE with motion compensation for highquality 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
- Integration of Compressed Sensing Cardiac Cine²⁾ for highest temporal and spatial resolution (segmented and real-time pulse sequences)

Dynamic imaging and tissue characterization with 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 and ePAT with mSENSE and GRAPPA for advanced parallel imaging provides fast high-resolution dynamic imaging
- Segmented IR TrueFISP/FLASH with TI scout for optimization of tissue contrast
- Advanced tissue characterization with 2D phasesensitive 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

¹⁾ MR scanning has not been established as safe for imaging fetuses and infants under two years of age. The responsible physician must evaluate the benefit of the MRI examination in comparison to other imaging procedures.

²⁾ Optional

Body Suite



The Body Suite is dedicated to clinical body applications. Ultra-fast high resolution 2D and 3D protocols are provided for abdomen, pelvis, MR Colonography, MRCP, dynamic kidney, and MR Urography applications.

2D PACE technique makes body imaging easy, allowing for multi-breathhold 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)
- It is possible to use a phase navigator, which measures respiratory induced off-resonance effects. The positioning can be done automatically for most protocols.
- Optimized fast single shot HASTE protocols and highresolution 3D RESTORE protocols based on SPACE and TSE for MRCP and MR Urography examinations
- REVEAL: diffusion imaging for abdomen and other body region exams. In protocols with multiple b-values individual numbers of averages may be specified per value. Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected.
- In pulse sequences with multiple b-values, individual numbers of averages may be specified per b-value.
 Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline calculation (extrapolation) of high b-values (up to b=5000 s/mm²) is possible.

• Signal from Respiratory Sensors can be selected to actively trigger MR image acquisition.

Abdomen

2D:

- T1 (FLASH) breathhold scans with and without FatSat (SPAIR, Quick FatSat, in- / opp-phase)
- T2 (HASTE, TSE / BLADE, EPI) breathhold scans with and without FatSat (SPAIR, FatSat, STIR)
- 2D TSE with multiple average- it is possible to acquire T2-weighted TSE images during shallow breathing, in a time efficient manner
- T1 (TFL) triggered scans (2D PACE free breathing) in- / opp-phase
- T2 (HASTE, TSE / BLADE, EPI) triggered scans (2D PACE free breathing) with and without FatSat (SPAIR, FatSat, STIR) as well as HASTE- and TSE-multi-echo
- Optimized fast single shot HASTE protocols and highresolution 3D RESTORE protocols based on SPACE and TSE for MRCP and MR urography examinations

3D:

- Dixon (VIBE 2pt-Dixon) breathhold scans, following contrasts can be obtained: in-phase, opposed phase, fat and water image
- Dynamic (VIBE and Quick-FatSat) protocols with Inline motion correction for best visualization of focal lesions with high spatial and temporal resolution
- Colonography bright lumen with T2 TrueFISP and dark lumen with T1-weighted VIBE
- CAIPIRINHA (Controlled Aliasing In Parallel Imaging Results IN Higher Acceleration) – reduces breath-hold times for 3D VIBE FS and 3D DIXON (in, opposed, water, fat)

Pelvis

- High-resolution T1, T2 pelvic imaging (prostate, cervix)
- Isotropic T2 SPACE 3D protocols for tumor search in the pelvis

- Dynamic volume examinations with 3D VIBE
- REVEAL: Diffusion-weighted imaging of the prostate, cervix, rectum and other organs with multiple b-values. Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline calculation (extrapolation) of high b-values (up to b = 5000 s/mm²) is possible.

Thorax

- High-resolution T1, T2 thorax imaging
- Motion-insensitve pulse sequences (BLADE, HASTE)
- TrueFISP pulse sequences for imaging of respiratory mechanics
- Dynamic imaging with TWIST¹, TWIST-VIBE¹)
- Non-contrast-enhanced vessel visualization with SPACE pulse sequences
- STIR pulse sequences for the evaluation of lymph nodes
- Diffusion-weighted imaging with REVEAL

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. The Onco Suite features a collection of sequences as well as protocols and evaluation tools that may be used for a detailed assessment of a variety of oncological conditions.

General features

- STIR TSE, HASTE, and FLASH in-phase and opposedphase pulse sequences for highly sensitive visualization of focal lesions
- Dynamic imaging pulse sequences for assessment of the kinetic behavior of tissue
- Quantitative evaluation and fast analysis of the data with colorized Wash-in, Wash-out, Time-To-Peak, Positive-Enhancement-Integral, MIP-time and combination maps with Inline technology
- 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.

- REVEAL: Diffusion-weighted imaging with multiple b-values. In pulse sequences with multiple b-values, individual numbers of averages may be specified per b-value. Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline calculation (extrapolation) of high b-values (up to b = 5000 s / mm²) is possible. For reduced distortions and homogeneous signal intensity even in the presence of challenging susceptibility interfaces and at station boundaries, SliceAdjust (slice-by-slice adjustments) can be selected.
- RESOLVE: high-resolution, low-distortion diffusionweighted imaging (DWI). In pulse sequences with multiple b-values, individual numbers of averages may be specified per b-value. Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline calculation (extrapolation) of high b-values (up to b = 5000 s / mm²) is possible.

Prostate protocols

- Dedicated prostate protocols for a variety of clinical scenarios
- Protocols with high temporal resolution (VIBE, TWIST¹) and TWIST-VIBE¹) allow time course evaluation of contrast wash-in and wash-out behavior.
- Prostate spectroscopy (3D CSI¹⁾ volume scan) with up to 8 sat bands (suppression of water and fat signal)

Whole-Body imaging

- TSE STIR pulse sequences for head-to-pelvis imaging
- Dedicated pulse sequences for focus regions head, neck, thorax, abdomen and pelvis
- Diffusion-weighted imaging with REVEAL including SliceAdjust

Ortho Suite



The Ortho Suite is a comprehensive collection of protocols for joint imaging including the spine.

General features

- 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 protocols 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
- T1, T2, and PD SPACE, 3D imaging with high isotropic resolution optimized for post-processing
- Whole-spine, single-step, and multi-step protocols
- Excellent fat suppression in off-center positions, e.g. in the shoulder due to high magnet homogeneity
- Dynamic TMJ protocol (different joint positions)
- Dynamic ilio-sacral joint protocol for contrast dynamics
- Multi Echo SE sequence with up to 32 echoes for T2 time mapping
- High resolution 3D DESS (Double Echo Steady State): T2/T1-weighted imaging for excellent fluid-cartilage differentiation

¹⁾ Optional

- 2 point Dixon technique for fat and water separation Turbo Spin Echo sequence
- WARP 2D TSE sequence combining optimized highbandwidth protocols and View Angle Tilting (VAT), tailored to reduce susceptibility artifacts caused by orthopedic MR-Conditional¹⁾ metal implants. This helps in evaluation of soft tissue in proximity of the implants. Available protocols include T1-weighted, T2-weighted, proton density and STIR contrast.
- Advanced WARP enables the reduction of gross artifacts (i.e. through-plane artifacts) caused by large MR Conditional¹⁾ implants. It contains the 2D TSE based SEMAC techniques and is especially useful in the case of hip and knee joint replacements. Available pulse sequences include T1-weighted, T2-weighted, proton density and STIR contrast.
- Advanced WARP enabled by Compressed Sensing²⁾ Together with Compressed Sensing (CS), significant shorter acquisition time can be achieved and makes advanced WARP clinically viable. Compressed Sensing applies 8-fold undersampling of k-space in combination with an interative reconstruction algorithm. As a result, images with very comparable diagnostic quality can now be performed in about 50% less acquisition time.

Breast Suite



MR imaging provides excellent tissue contrast that may be useful in the evaluation of the breasts. Extremely high spatial and temporal resolution can be achieved in very short measuring times by using iPAT with GRAPPA and CAIPIRINHA.

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.

General features

This package includes:

- 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

²⁾ Optional

¹⁾ MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens Healthineers.

- 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
- iPAT² with CAIPIRINHA that allows state-of-the-art sagittal breast imaging and further improvement of the temporal resolution in dynamic scans while maintaining spatial resolution
- Inline subtraction and MIP display
- Offline subtraction, MPR and MIP display
- REVEAL: diffusion imaging for breast exams. In protocols with multiple b-values individual numbers of averages may be specified per b-value.
- RESOLVE: Diffusion-weighted, readout-segmented (multi shot) EPI sequence for high-resolution susceptibility-insensitive DWI of the breast

RADIANT (ultra-sound like reconstruction around the nipple)

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

Turbo Suite Essential

Turbo Suite Essential comprises established acceleration techniques to maximize productivity for all contrasts, orientations and all routine imaging applications from head-to-toe.

General features

- iPAT and iPAT²
- T-PAT (temporal iPAT)
- CAIPIRINHA for advanced iPAT² supporting SPACE and VIBE sequences

See separate sections for details.

Turbo Suite Excelerate¹⁾

Turbo Suite Excelerate comprises continuous access to cutting edge acceleration techniques such as Simultaneous Multi-Slice and Compressed Sensing for static 2D and static 3D imaging applications in Neuro, MSK and Body MRI.

General features

- SMS for TSE and TSE DIXON
- SMS for DWI and BOLD
- SMS for RESOLVE and QuietX DWI
- Compressed Sensing SPACE
- Compressed Sensing ToF
- Compressed Sensing SEMAC
- Wave-CAIPI SWI

See separate sections for details.

¹⁾ Optional

Turbo Suite Elite¹⁾

Turbo Suite Elite comprises cutting edge Compressed Sensing applications for advanced abdominal and cardiovascular imaging with dynamic 2D and dynamic 3D applications.

General features

- Compressed Sensing GRASP-VIBE
- Compressed Sensing Cardiac Cine
- TWIST
- TWIST-VIBE
- StarVIBE

See separate sections for details.

Scientific Suite

The Scientific Suite supports scientific users by providing easy access to application-specific data for further processingand advanced image calculus.

General features

- Support of USB Memory sticks
- Anonymization of patient data
- Easy creation of AVIs and screen snapshots to include in presentations or teaching videos
- Export of tables, statistics and signal time courses to communal exchange formats like e.g. tabulated text files (MeanCurve, Spectroscopy evaluation, DTI evaluation)
- Advanced image calculus including T2 and T1 time calculation, addition, subtraction, multiplication, division, log, and integration of images

Pediatric Suite²⁾

Tissue relaxation times in pediatrics are very different compared to those of adults. The reasons for these differences are: developing tissues, body size, faster heart rates, and compliance with breathhold commands. Protocols can be easily adapted for imaging infants.

¹⁾ Optional

²⁾ MR scanning has not been established as safe for imaging fetuses and infants under two years of age. The responsible physician must evaluate the benefit of the MRI examination in comparison to other imaging procedures.

Tim Planning Suite

Easy planning of extended Field of View examinations in an efficient way using Set-n-Go pulse sequences. The Tim Planning Suite allows planning of several stations at once, e.g. on composed localizer images. The overlap of slice groups can be adjusted. All stations can have independent parameter settings although they are displayed together. A special coupling mode allows easy positioning of all stations at once according to the patient's anatomy. Fully supports scan@center and Phoenix functionality.

General features

- Tim Planning UI with optimized layout for slice positioning
- Ready to use Set-n-Go pulse sequences for different clinical questions
- Integrated toolbar for fast advanced slice

myExam Companion



myExam Autopilot

Automate intelligently – myExam Autopilot offers users most advanced and intelligent automation. It enables users to scan at high quality with virtually a simple click and has the potential to remove burdensome routine tasks.

myExam Assist

Flexible and guided – myExam Assist provides guided workflows. Users can select exam strategies or flexibly adapt them based on the patient's condition. It allows for high quality, efficient exams even when conditions change.

Intelligence that works with you

MAGNETOM Amira with myExam Companion enables intuitive operation for any professional. Using the new possibilities of digitalization and AI, data is turned into integrated expertise and tailored assistance to benefit the user and address the clinical question. This helps users efficiently achieve high-quality results – regardless of their experience level, the patient, or throughput.

myExam Companion includes:

myExam Cockpit

Customize intuitively – myExam Cockpit allows users to customize protocols intuitively. It provides a central workspace for protocol management. Users can set up and maintain protocols, build knowledge into standardized exams and make those continuously available for every user in the MRI department.

myExam Autopilot

myExam Autopilot enables users to automate their routine MRI intelligently.

- MRI operation drastically simplified
- Automated protocol without the need for any manual adjustments.
- Clear design with a focus on what users need and without any distractions
- Novel usability with click interaction

myExam Brain Autopilot



myExam Brain Autopilot helps users to automate intelligently. It enables less trained staff to scan brain MRI at high quality. By using automation and AI, it takes away burdensome routine tasks for all technologists. Same as myExam Assist, myExam Brain Autopilot provides the automations such as AutoPosition, AutoAlign Head LS, AutoCoverage, inline MRPs, inline Diffusion, and the flexibility of customization for site-specific standards of care.

Predefined protocols allow users to scan with minimal manual interactions. Users can switch to myExam Assist at any time to further personalized scan settings on the fly for individuals.

Intuitive user interface

A new and intuitive user interface simplifies scanning so that exams can be performed, or strategies can be selected at virtually one click of a button. This new philosophy to operate MRI helps any user to generate consistent, comprehensive results.

The exam workflow of myExam Brain Autopilot is streamlined and intuitive. The user interface consists of the following main areas:

Workline

The Workline is the central element to lead and propagate the workflow including general information, patient safety information, exam settings, workflow steps, and control area. Users can start, continue, stop, insert or remove pause for the examinations from Workline. Users can activate the step in Workline to view scanned images and information, preview of pending steps, and access step specific controls such as repeat or delete via the info and control stage.

Image stage

The image stage is the image viewing area. Users can preview scan regions of pending steps and judge scanned image quality.

Exam settings

The Exam settings is a dedicated dialog offers the possibility to change settings of the workflow such as patient language, exam strategies, decisions and patient comfort settings. The dialog can be accessed at any time during the workflow.

Information and control stage

Information and control stage is next to the image stage. Step specific information as well as situation specific controls such as delete or repeat the step are displayed in this area.

Summary

It is the last step of myExam Autopilot workflow. All acquired image series are summarized as thumbnail overview here.

Image distribution and basic filming tasks can be done in this workflow step as well.

myExam Cockpit

Intuitive exam management by providing unprecedented flexibility in MRI configuration.

At the heart of this new flexibility is myExam Cockpit. It is the central exam management platform enabling highly flexible and intuitive configuration, manipulation, organisation and updating of all exams. Whether you are using myExam Assist or not, myExam Cockpit is the starting point for every exam.

MRI flexibility from the start:

- One central user-interface for every exam
- Fast and intuitive exam configuration (80% better usability)
- User-friendly functionalities like drag&drop, Dynamic Search
- Exam strategies created with one click
- Multiple strategies in one exam
- Change exams on the fly
- Update parameter changes to all or a selection of identically configured exams anywhere in myExam Cockpit. (Identical Configurations)

Take the lead in defining the standard of MRI in your institution!

myExam Cockpit



Designed to realize the full potential of myExam Assist. myExam Cockpit is your central interface for all exam management tasks. This includes flexible configuration of all myExam Assist, according to your standards of care. In the following, we introduce the most important features of myExam Cockpit.

Configure all exams from one central interface

myExam Cockpit enables you to configure and save all of your MRI exams and myExam Assist.

myExam Explorer and Program Editor on one page

myExam Cockpit offers two tasks: myExam Explorer and Program Editor. In myExam Explorer you browse through exams and organize your exams. In the Program Editor, you modify them and you can find protocol histories and compare your exams.

A program overview

With myExam Cockpit, you can see the whole exam workflow, the different User Trees, Exam, Strategies, Decisions, pulse sequences and AddIns are visualized together on one page.

Dynamic search delivers highlighted results

In myExam Explorer, searching for pulse sequences is very quick. Just type in your search query, and results are highlighted instantly.

Editing exams instantly

In order to modify an exam opened in the myExam Explorer, you can immediately switch to the Program Editor with one click.

Adding a new Exam Strategy

In the Program Editor, just drag & drop or click on the strategy button in the sidebar, and a new Exam strategy is added to your exam workflow. This step automatically creates a new myExam Assist.

Drag & drop from the sidebar

In the Program Editor, you can add pulse sequences to a strategy by drag & drop from the sidebar.

User-friendly toolbar

Use the toolbar for opening and saving of programs, for Copy, Paste, Undo, Redo – in the same way as you are used to in Office programs.

10-min exam

The 10-min exam provides fast protocols for the most common MRI examinations for the anatomies brain, spine and the large joints. The body regions specific protocols are implemented in myExam Companion workflow.

General features

- Best-practice based protocols
- Optimized image quality for the high throughput requirement
- For most commonly scanned body regions: brain, c-spine, t-spine, l-spine, shoulder, hip and knee
- Integrated with myExam Companion workflow

myExam Assist

myExam Brain Assist



myExam Brain Assist optimizes brain examinations with guided and automated workflows customized to your standards of care. myExam Brain Assist supports the user to achieve reproducible image quality using automation tools and functionalities incorporated into the program.

Patient View

Within the Patient View the user can easily tailor examinations to an individual patient. Exam Strategies allow you to choose the most appropriate strategy with one mouse click, the complete scan setup is then automatically prepared.

Guidance View

Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each individual step of the scanning workflow to ensure perfect scanning even by non-expert operators. Both images and text are easily configurable by the user.

Parameter View

The new streamlined Parameter View displays a userdefined subset of parameters which are available for manual pulse sequence optimization. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.

AutoPosition

Accurate positioning of the anatomy in the isocenter without need for laser light positioning.

AutoAlign Head LS

Automated positioning and alignment of slice groups to the anatomy, relying on multiple anatomical landmarks. Provides fast, easy, and reproducible patient scanning and facilitates the reading by consistently delivering high image quality with a standardized slice orientation, both for follow-ups and across patients. AutoAlign Head LS computes the central positioning for many routine brain structures such as AC-PC, Midbrain & Temporal Lobes. The inner ear, the orbits and the optic nerve are also standard positioning orientations with the AutoAlign Head LS. It delivers robust and consistent results independently of patient age, head position, disease or existing lesions.

AutoCoverage

Maximizes the speed of the examination by automatically setting the number of slices and the FoV to fully cover the brain. This is performed based on the information delivered by AutoAlign, eliminating manual setting and the scanning of unnecessary slices.

Exam Strategies

Examinations can be easily personalized to the individual patient condition and clinical need. myExam Brain Assist comes with the following predefined examination
strategies, which the user can select according to patient conditions or change at any time during the workflow, when conditions change:

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

BLADE

Motion insensitive Turbo Spin Echo sequence. Improves image quality by correcting for the effects of motion during an MR acquisition. BLADE can be used in head, spine, and other body regions.

Rerun

A sequence inside the examination Queue can be selected and a rerun of the corresponding series can be triggered with identical sequences or parameters.

Inline MPRs

Automatic multiplanar reconstruction for 3D datasets.

The Multi Planar Reconstruction (MPR) tool can be easily configured to automatically generate any required 2D images from high resolution 3D acquisitions by using the position information from the AutoAlign algorithm.

Inline Diffusion

Automatic calculation of trace-weighted images and ADC maps with Inline Technology.

Customization

myExam Brain Assist can be easily modified by the user to their individual standard of care.

- Add/remove protocol steps
- Change guidance content (images and text)
- Change or add Exam strategies
- Add clinical decision points
- Add / remove parameters in the parameter viewing card
- User-defined offsets to the standard positions delivered by AutoAlign
- Customize within myExam AddIn functionalities such as AutoCoverage, AutoFOV, InlineMPR reconstructions

myExam Spine Assist

myExam Spine Assist delivers optimized cervical, thoracic and lumbar spine imaging for all patients and provides guided and automated workflows customized to your standards of care. myExam Spine Assist supports the user in achieving reproducible image quality with increased ease of use and time efficient exams.

Patient View

Within the Patient View the user can easily tailor examinations to an individual patient. Exam Strategies allow you to choose the most appropriate strategy with one mouse click, enabling automatic preparation of the complete MR examination.

Parameter View

The new streamlined Parameter View displays a userdefined subset of parameters which are available for manual pulse sequence optimization. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.

AutoAlign Spine LS

Automated and highly reliable positioning and alignment of slice groups to the spine anatomy, based on multiple anatomical landmarks. Provides fast, easy, and reproducible patient scanning and facilitates the reading by consistently delivering high image quality with a standardized slice orientation, both for follow-ups and across patients. AutoAlign Spine LS automatically detects and labels vertebra and body disks as well as suggests and provides guided positioning for sagittal, coronal and double oblique axial slices in the spine. The anterior saturation band is automatically positioned to reduce imaging artifacts. All settings are open to user modifications.

AutoLabeling

Automatic labeling of vertebra for easier examination planning and faster reading

Interactive Snapping

Just drag the slide group over the sagittal plane. AutoAlign Spine LS delivers automatic double oblique positioning of axial slice groups to intervertebral disk layers.

AutoCoverage

Maximizes the speed of the examination by automatically setting the number of slices and the FoV to fully cover the C, T or L-spine. This is performed based on the information delivered by AutoAlign Spine LS, eliminating manual setting and the scanning of unnecessary slices.

Guidance View

Step-by-step user guidance can be seamlessly integrated. Example images and guidance text can be displayed for each individual step of the scanning workflow to ensure perfect scanning even by novice opera-tors. Both images and text are easily configurable by the user.

Exam Strategies

Examinations can be easily personalized to the individual patient condition and clinical need. myExam Spine Assist comes with the following predefined examination strategies, which the user can select according to patient conditions or change at any time during the workflow, when conditions change:

- Standard: for fast routine spine examinations
- Post surgery: for detailed evaluation of spine including fat saturation and Dixon techniques.
- High Bandwith (WARP) : Optimized strategy for the reduction of susceptibility artifacts¹⁾.

WARP

Susceptibility artifact reduction techniques. 2D TSE sequences combining high-bandwidth pulse sequences and the VAT (View Angle Tilting)-technique, tailored to reduce susceptibility artifacts (e.g. from MR Conditional¹¹ implants). Available pulse sequences include T1-weighted, T2-weighted, and STIR contrast.

Rerun

An image inside the examination UI can be selected and a rerun of the corresponding series can be triggered with identical sequences or parameters.

Inline Curved reconstructions

Automatic curved reconstruction from 3D acquisitions by using the position information from the AutoAlign Spine LS algorithm.

Customization

myExam Spine Assist can be easily modified by the user to their individual standard of care.

- Add/remove protocol steps
- Add guidance content (images and text)
- Change or add Exam Strategies
- Add clinical decision points
- Add/remove parameters in the parameter viewing card
- User-defined offsets to the standard positions delivered
- by AutoAlign Spine LS (also for the saturation region) • Inline curved and MPR reconstructions

¹⁾ MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens Healthineers.

myExam Large Joint Assist



myExam Large Joint Assist optimizes image guality of knee, hip and shoulder scans by proposing the most appropriate protocols according to the examination strategy chosen for the specific patient. It ensures reproducible image quality and streamlines large joint examinations to the greatest extent. myExam Large Joint Assist features AutoAlign and AutoCoverage for knee, hip and shoulder. The WARP and Advanced WARP techniques (including high bandwidth pulse sequences, VAT and SEMAC) provide susceptibility artifact reduction functionality (e.g. from MR Conditional¹⁾ metal implants), and include optimized pulse sequences for knee and hip examinations. High resolution 3D imaging programs together with user-configurable automatic Inline MPR (Multi Planar Reconstruction) calculations provide increased efficiency, reproducibility and ease of use.

AutoPosition

Accurate positioning of the anatomy in the isocenter without need for laser light positioning.

Patient View

Within the Patient View the user can easily tailor examinations to an individual patient. Exam Strategies can be integrated. With one mouse-click you simply choose the most appropriate scan strategy, and then the queue is automatically loaded and filled with the complete scan setup.

Guidance View

Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user.

Parameter View

The new streamlined Parameter View displays a userdefined subset of parameters which are available for manual pulse sequence optimization. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.

Exam Strategies

The workflow can be personalized to the individual patient condition and clinical need. myExam Large Joint Assist comes with the following predefined strategies, which the user can select according to patient conditions or change at any time during the workflow, when conditions change:

¹⁾ MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens Healthineers.

- Standard: Achieve highest image quality in a reasonable scan time with 2D and 3D pulse sequences
- Speed focus: Examine patients in the shortest possible time with pulse sequences being accelerated to the maximal extent
- Motion Insensitive (BLADE): Compensate for the effects of motion with motion insensitive BLADE pulse sequences.
- WARP: Optimized strategy for the reduction of susceptibility artifacts¹⁾.

AutoAlign

Automated, localizer based positioning and alignment of slice groups to the anatomy, relying on anatomical landmarks. Providing fast, easy, and reproducible patient scanning and supporting the reading by consistently delivering high image quality with a standardized slice orientation.

AutoCoverage

Maximizes the speed of the examination by automatically setting the number of slices and the FoV to fully cover knee, hip or shoulder anatomy. This is performed based on the information delivered by AutoAlign, eliminating manual setting and the scanning of unnecessary slices. This feature is configurable.

Inline MPRs

Automatic multiplanar reconstruction for 3D datasets. The Multi Planar Reconstruction (MPR) tool uses the position information from the AutoAlign algorithm and can be easily configured to automatically generate any required 2D images from high resolution 3D acquisitions.

WARP Susceptibility Artifact Reduction

WARP and advanced WARP (SEMAC) integrates different techniques tailored to reduce susceptibility artifacts caused by orthopedic MR Conditional¹⁾ implants. 2D TSE sequence combining optimized high-bandwidth pulse sequences and View Angle Tilting (VAT) technique, helps in evaluation of soft tissue in proximity of the implant. SEMAC (Slice Encoding for Metal Artifact Correction) is a technique to correct through-plane distortions by means of additional phase encoding in slice direction. It is especially useful in the case of hip and knee joint replacements. Available pulse sequences can be found in the library.

Customization

myExam Large Joint Assist can be easily modified by the user to their individual standard of care.

- Add/remove protocol steps
- Change guidance content (images and text)
- Change or add Exam strategies
- Add clinical decision points
- Add/remove parameters in the parameter viewing card

¹⁾ MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens Healthineers.

myExam Abdomen Assist¹⁾



myExam Abdomen Assist offers standardized, efficient, and comprehensive workflows for the upper abdomen with excellent image quality. The workflow covers the liver, biliary and pancreatic system and, if slightly adapted, kidneys as well. The workflow is prepared for easy reading and reporting together with *syngo*.via.¹⁾

Patient View

Within the Patient View the user can easily tailor the exam to each individual patient. Several pre-defined Exam Strategies can be integrated. The user just selects the appropriate strategy with one click, and the queue and the complete scan set-up are automatically updated. Furthermore protocols tailored for use of contrast media can be integrated.

Guidance View

Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user.

Parameter View

The new streamlined Parameter View displays the parameters that are really needed for the scan set-up. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.

AutoPosition

Accurate positioning of the anatomy in the isocenter without need for laser light positioning.

AutoAlign and AutoCoverage

Automated adaptation of scanning parameters according to anatomical and physiological characteristics (including breath-hold adaptations)

AutoNavigator

Automatic breathing pattern detection and scaling of triggered scans

AutoFoV (automatic Field of View calculation)

Based on the localizer images the optimal FoV is automatically estimated. In case the patient moves during the examination, this step can be repeated at any time.

¹⁾ Optional

Abdomen Library Assist

A storage folder for individual sequences optimized with functionality. StarVIBE¹⁾, TWIST-VIBE¹⁾ pulse sequences are integrated into the Abdomen Library Assist.

4D Movie toolbar

With the 4D Movie toolbar the user can navigate in an optimized way through space and time of multiphase data.

Automatic sequence scaling

According to physiological characteristic (AutoFoV, AutoNavigator, breathhold adaptations)

Exam Strategies

The workflow can be personalized to the individual patient's condition and clinical need. The following predefined strategies are included. They can be changed at any time during the workflow:

- Breathhold (fast with robust image quality)
- Respiratory Synchronized (using PACE triggering, high image resolution)
- Motion-insensitive (fast, using BLADE and PACE triggering)

Decisions

Decisions can be seamlessly integrated into the scanning workflow. The user just selects the queue, and the appropriate pulse sequence or set of pulse sequences are added automatically. For the abdomen, pre-configured decision points are offered for MRCP and Diffusion.

MRCP decision point

myExam Assist provides comprehensive guidance, including positioning help. MRCP is measured and Inline Radial Ranges are generated in-line.

Timeline monitoring

For best overview of multi-phase breathhold examinations, the contrast media enhancement curve is visualized.

Automatic timing

Liver dynamics is done using the care bolus approach. Auto Bolus Detection enables the system to monitor the arrival of contrast agent in a user defined ROI. When "Auto Bolus Detection" is enabled, Auto ROI can be enabled in the patient view, which allows the system to perform an automatic ROI positioning on the descending aorta at the level of the diaphragm. The ROI positioning can be confirmed and adjusted by the user.

Bolus Timing

An alternative way of performing liver dynamics. The optimal time window for data acquisition is derived by the system after the application of a test bolus. Visual guidance and interactive evaluation during the setup provide ease-of-use.

AutoVoiceCommands

Seamlessly integrated into the scanning workflow. The system plays them automatically at the desired time point. This assists the user in providing the optimal timing of scanning, breathing and contrast media. The user can monitor which breathhold or pauses are actually played, and could add pauses between the automatic breath-hold commands if necessary.

Inline Subtraction

Within the contrast-enhanced abdomen exam, multiple phases are acquired: native, arterial phase, portal-venous phase and late-phase. The scanner automatically subtracts the native measurement from the arterial, portal-venous and late phase.

Inline Registration

For best visualization of lesions the system can be set to automatically perform a registration / alignment of the anatomy for the different dynamic phases. The importance of registration / correction can be seen when examining nodular enhancing pathologies.

Customization

Taking full advantage of the new myExam Assist configuration platform. Providing various guidance and customization options, featuring "AutoTiming", "Auto Coverage", "Local Voice Command", etc.

Existing myExam Assist programs can be adapted by the user to their individual standard of care.

- Add/remove protocol steps
- Change guidance content (images and text)
- Change or add Exam Strategies and Decision Points
- Modify the Parameter View
- Library Assist alternative pulse sequences with preconfigured add-ins. Only simple drag&drop needed.

myExam LiverLab Assist¹⁾

myExam LiverLab Assist is a system guided workflow to examine the hepatic fat and iron status independent of myExam Abdomen Assist.

The inline First look Dixon sequence gives the user a first overview of possible fat and/or iron overload in the whole liver. Based on the resulting images, liver segmentation runs without user interaction.

If further evaluation is needed, the user can choose from two methods:

- Multi-echo Dixon VIBE is an image-based method to calculate maps such as water, fat, fat signal fraction, and R2^{*}.
- HISTO is a single-breath-hold single-voxel spectroscopy method to calculate fat fraction as well as water R2^{*}.

¹⁾ Optional

myExam Whole-Body Assist (from head to pelvis)¹⁾



myExam Whole-Body Assist allows easy, seamless planning of multiparametric multistation exams with automated recognition of individual anatomy and consistent settings for spatial resolution, image contrast, and breath-hold capacity.

- Landmark-based automatic segmentation of the anatomical regions based on FastView scan
- AutoCoverage: scan range across the chest, abdomen and pelvis can be easily defined with a coverage slider
- Automatic overlap of stations
- Core Protocol with WB T2 HASTE, WB T1 VIBE, WB DWI, and whole-spine exam
- Protocol can be extended with dedicated scans of the focus regions Chest, Abdomen, Pelvis with dynamic exams of the respective region
- AutoBolus detection for focus region Abdomen (liver)
- Supports 2D and 3D acquisitions in axial and coronal orientation
- Option to repeat stations flexibly (results are integrated accordingly during composing)

Guidance View

Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user.

Parameter View

The new streamlined Parameter View displays the parameters that are really needed for the scan set-up. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.

iPAT compatibility

Enabled by Tim 4G

Customization

Existing myExam Assist programs can be adapted by the user to their individual standard of care.

- Add/remove protocol steps
- Change guidance content (images and text)
- Change or add Decision Points
- Modify the Parameter View

myExam Angio Assist¹⁾



The timing of the contrast injection and scan is commonly regarded as the most challenging part of an angiographic exam. myExam Angio Assist guides the user through angiographic single- or multi-station examinations by providing visualization of arterial and venous timing windows using a test bolus technique. This information is fed back into the next planning steps, so that scan parameters can be adapted to the individual patient and patient's condition. Where needed, automatic voice commands support the communication with the patient.

Guidance View

Step-by-step user guidance is seamlessly integrated. Sample images and guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user.

Parameter View

The new streamlined Parameter View displays the parameters that are really needed for the scan set-up. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.

Test bolus

Visual display of arterial/venous timing window

Feedback of bolus timing information

Timing information is fed back into planning steps, and parameters can be adapted automatically

Automatic timing

myExam Angio Assist can also be used with the Care Bolus approach. Auto Bolus Detection enables the system to monitor the arrival of the contrast agent in a user defined ROI and trigger sequence timing automatically.

AutoVoiceCommands

Integrated into the scanning workflow. The system plays them automatically at the right point in time. This ensures optimal timing of scanning, breathing, and contrast media. The user can monitor which breath-holds or pauses are actually played, and can add pauses between the automatic breath-hold commands if necessary.

Customization

Existing myExam Assist programs can be modified by the user to their individual standard of care.

- Add/remove protocol steps
- Change guidance content (images and text)
- Change or add Exam Strategies and Decision Points
- Modify the Parameter View

¹⁾ Optional

myExam Cardiac Assist¹⁾



Cardiac examinations used to be the most complex exams in MR. Now myExam Cardiac Assist supports the user in many ways. Using anatomical landmarks, standard views of the heart, such as dedicated long-axis and short-axis views, are easily generated, and can be reproduced readily using different scanning techniques. Scan parameters are adjusted to the patient's heart rate, and automatic voice commands are given. All of this helps handle the complexity of CMR examinations with confidence and supports customized workflows that are easy to repeat.

Patient View

Within the Patient View, the user can easily tailor the exam to each individual patient (e.g. patient with arrythmia, limited breath-hold capability). Two pre-defined Exam Strategies are integrated. The user just selects the appropriate strategy with one click, and the queue and the complete scan set-up are updated automatically to the users, pre-defined standard of care.

Guidance View

Step-by-step user guidance is integrated seamlessly. Example images and guidance text are displayed for the individual steps of the scanning workflow. Both images and text are easily configurable by the user.

AutoPosition

Accurate positioning of the anatomy in the isocenter without need for laser light positioning.

AutoFoV (automatic Field of View calculation)

Based on the localizer images, the optimal FoV is estimated automatically. In case the patient moves during the examination, this step can be repeated at any time.

Automated parameter adaptation

Scan parameters are adapted automatically to the patient's condition (heart rate etc.).

AutoAlign Heart

Based on the localizer images, automatic detection of five cardiac landmarks is obtained and used to optimally plan cardiac exams without user interaction. The fully automatic planning process results in 2-, 3- and 4-chamber views, a stack of short-axis views and specific valve orientations. In case the patient moves during the examination, this step can be repeated at any time.

Inline Ventricular Function Evaluation

Inline VF performs volumetric evaluation of cardiac cine data fully automatically right after image reconstruction. There is no user input necessary. If desired, the dataset for the inline calculated segmentation results can be loaded to in 4D Ventricular Function Analysis for further review or processing

Automated localization

Automated localization of short-axis views

Inline Time Course Evaluation¹⁾

Automatic, real-time and motion corrected calculation of a parametric upslope map with inline technology

Guided slice positioning

Easy way to match slice positions (short-axis) between cine, dynamic imaging, tissue characterization

Cardiac Views

Easy selection of cardiac views (e.g. 3 chamber view) during scan planning

Automatic display of images

Automatic display of image in dedicated cardiac image orientations instead of the standard DICOM orientations.

Adaptive triggering

Acquisition adapts in realtime to heart rate variations for non-cine applications.

1) Not for USA

Automated Naming

Automated naming of series depending on cardiac views and contrast.

AutoVoiceCommands

AutoVoiceCommands are seamlessly integrated into the scanning workflow. The system plays them automatically at the desired time point. This ensures synchronized timing of scanning, breathing and contrast media. The user can monitor which breath-hold or pauses are actually played, and could add pauses between the automatic breath-hold commands if necessary.

Exam Strategies

The workflow can be personalized to the individual patient condition and clinical need. The following predefined strategies are included. They can be changed at any time during the workflow:

- Standard: Breath-hold (segmented acquisition)
- Limited patient capabilities: Realtime (single-shot imaging if breath-hold is not possible or arrhythmias occur)

Customization

Existing myExam Assist programs can be modified by the user to their individual standard of care.

- Add/remove protocol steps
- Change guidance content (images and text)
- Change or add Exam Strategies and Decision Points
- Modify the Parameter View

Flow measurements

Blood flow measurements can be easily added to existing myExam Cardiac Assist using pre-defined Flow sequences from myExam Library Assist.

Cardiac specific layout for the exam task

Automatically chosen layouts show the new physio display and are configured for every step of the exam

myExam Breast Assist¹⁾



myExam Breast Assist provides optimized protocols for tissue depiction, implant evaluation, and breast biopsy. For ease of use, different examination strategies (FatSat, non-FatSat, feet-first/head-first positioning, InterVIEWS) are available, with or without Care Bolus, for mediumchannel and high-channel coils.

Biopsy is supported with a dedicated workflow.

Patient View

The user simply tailors the exam to the condition of each individual patient (e.g. patient with implants) and defines the examination approach (CareBolus, AutoCoverage, Frequency Adjustment Confirmation Mode, Silicone Protocols, Inline MPR).

Implant situation

Based on an implant type identification scan, the user can visually select or modify the exam dependent on the actual implant type and laterality. The system automatically modifies the scan queue accordingly, and the frequency adjustment setting of the pulse sequences is changed (assume silicone). The user may change these modifications.

Guidance View

Sample images and a guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user.

Parameter View

This view displays the parameters that are really needed for the examination. The displayed parameters are easily configurable by the user. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.

AutoPosition

Accurate positioning of the anatomy in the isocenter without need for laser light positioning.

Autocoverage (Automatic segmentation, AutoFoV, AutoSlice)

Based on the localizer data, an automatic segmentation is performed, which allows the estimation of the optimal FoV (entire FoV for both breasts, right or left breast, breast with chest) and which is used to automatically adapt the size of the adjust volume to the patients anatomy. The user may modify this segmentation. The user can predefine for every pulse sequence individually which parameters shall be automatically adjusted, e.g. whether time or slice thickness shall remain constant.

MPR Planning

For user-selected pulse sequences, e.g. the high-resolution "delayed VIEWS", adjustable MPRs are calculated automatically.

Biopsy support

A Biopsy imaging workflow is provided for supporting interventions with the 4-ch BI Breast coil. The breast Biopsy imaging workflow seamlessly integrates with the separate Breast Biopsy Software¹⁾, which guides intervention planning and execution for both grid method and post / pillar method.

Single frequency adjust

The user can preselect to show the frequency adjustment dialogue only once for the exam queue. This preselection stays valid until a new coil combination or z-position is used.

Customization

Existing myExam Assist programs can be modified by the user to their individual standard of care.

- Add/remove protocol steps
- Change guidance content (images and text)
- Change or add Exam Strategies and Decision Points
- Modify the Parameter View

syngo MR Software

syngo MR XA 50 offers a single monitor acquisition workplace as default and dual monitor as optional with one keyboard and one mouse. This dual monitor setup, with separated scan and viewing monitors, makes for a more natural working environment in which the technologist has a complete overview of the examination and results. Constant context switches are reduced, enabling multitasking for increased quality and productivity.

The scanning side is primarily responsible for the act of scanning and light quality assurance. The viewing side is responsible for additional results generation in the form of basic and advanced post processing as well as data handling (DICOM – Export, Import, Transfer, Record to media) Several applications can be opened in parallel. The acquisition workplace can host one MR View&GO and up to three post-processing applications in parallel. An attached MR workplace can host up to four additional applications.

syngo MR Examination

AutoScout

- Automatic start of localizer scan with very short acquisition time
- Arbitrary orientations (multi-slice multi-angle)
- Automatically loads images into Graphical Slice Positioning

Graphical Slice Positioning

Simultaneous use of three arbitrary localizer images from possibly different measurements for graphically positioning slices and sat regions. Interactive modification of measurement parameters (slice thickness, distance factor, oversampling etc.):

- Automatic selection of relevant coil elements
- · Graphical selection of coil elements
- Off-center positioning (shift of FoV within the selected slice position)
- True multi-slice multi-angle, e.g. simultaneous measurement of multiple images (stacks with different orientation)
- Recall of previous slice and / or sat region positioning
- Paging through all images during graphical positioning
- Inline Movie, allowing positioning of slices on e.g. the beating heart
- Inline Display loads images immediately when they are available, e.g. during image reconstruction
- Allows quick overview via image stamps. Loads entire series of planning images with drag-and-drop
- Slice positioning (GSP) on 3D reconstructed images
- Slice positioning (GSP) on 2D and 3D distortion corrected images
- Slice positioning (GSP) on composed images
- Multiselect GSP segements for synchronized interaction (e.g. scrolling)

MR View&GO – Image Viewing, basic post-processing, filming, and distribution

The MR View&GO is the central application for image viewing, quality assurance, basic post-processing, filming, and result distribution. The functionality is provided in 7 dedicated workflow steps which provide guidance, allow independent work, and do not require any reloading of data.

MR View&Go steps:

Viewing

Overview of all available data with automatic loading of newly acquired or received images. Multi-modal image viewing and comparison are possible.

3D

Specialized layouts for MPR, MIP, and VRT.

Calculation

Analysis, Correction, and Filter tools

Mean Curve

Spatial and temporal analysis of images

Composing

Composing and combining of images from different table positions

Filming

Preparation of virtual film sheets for DICOM printer

Distribution

Central place to select data sets for archiving and DICOM transfer

Image Display

- Various display layouts selectable incl. time point comparison
- Multi-modality viewing
- Image zoom and pan
- Image annotation and marker
- Non-interpolated display
- Free interactive definition of cut planes in axial, sagittal, coronal, oblique, and double oblique orientations
- Mosaic View
- Predefined Views of certain anatomical regions (AutoViews)¹⁾
- Free interactive image rotation of MIP and VRT
- Interactive 3D reference point for spatial localization on different orientations
- Interactive slice thickness adjustment
- Interactive selection of relevant parts of MIP and VRT volumes by 3D shutters or freehand cut out
- Fast scrolling through data sets (500 images) with 15 frames per second
- 4D viewing with intuitive temporal (phase navigation in 4D data sets) and spatial scrolling extended by the 4D movie toolbar with phase tags
- Movie Mode for cine display with spatial navigation during running movie

Windowing

- · Freely selectable window width and center
- Auto-windowing for optimized contrast
- Saves window values
- Various color LUTs incl inversion of gray-scale values

Evaluation

Parallel evaluation of multiple regions of interest

- ROI (Freehand, Circle)
- VOI (Freehand, Sphere)
- Statistical evaluation of ROI/VOI
- Area or Volume
- Standard deviation
- Mean value
- Min/max values
- Number and sum of pixels or voxels
- Interactive segmentation (Region Growing)
- Pixel lens with position marker
- Distance (line and polyline)
- Angle

Range creation and curved reconstructions

Free definition (slice thickness, spacing, numbering, ...) of parallel, radial, radial sliced, MPR, MIP, MinIP, MIP thin, VRT, VRT thin, and Fusion are available as output display types

- Configurable reconstruction presets
- Anatomical Ranges Presets¹⁾ of certain body regions

Position display

Displays measured slice positions on localizer image or selected series

Corrections

- Motion Correction
- ¹⁾ Optional

- 3D elastic motion correction, for offline 3D correction in all directions over entire 2D and 3D data sets suitable for e.g. soft tissue MR exams
- 2D and 3D distortion correction
- Undo 2D distortion correction

Image filter

Smoothing or edge enhancement of image stacks

Mean Curve

Time-intensity analysis for contrast-enhanced examinations

- on-the-fly analysis with pixel lens
- interactive mean curve segment to navigate to a specific phase and slice position of the 4D dataset
- configurable settings
- export to .CSV functionality

Spine Labeling

Automatic calculation of spine labels or take-over of labels from myExam Spine Assist

Filming

- Connection via DICOM Basic Print or with locally connected printer
- Interactive filming
- Support of virtual film sheets
- Filming parallel to other activities
- Independent scanning and documentation no wait time due to camera delays
- Simultaneous handling of multiple film jobs

- Freely selectable positioning of images onto virtual film sheet
- Selectable various film layouts
- Windowing, image zoom and pan, and annotations on film sheet
- Configurable image text

Analysis Tools

Arithmetic operations on images and series (e.g. for evaluation of contrast media studies)

- Addition, subtraction, multiplication, division of single images and whole series
- Arithmetic mean across a range of selected images
- ADC maps and calculated b-values with interactive preview

Several evaluation functions may be started consecutively in the background

MPR – Multi-Planar Reconstruction

Real-time multi-planar reformatting of secondary views

MIP – Maximum Intensity Projection

3D reconstructions of vessels from a 3D data set, or a 2D sequential slice data set (acquired with dedicated MR Angiography sequences)

• MIP thin / MIP thick

MinIP – Minimum Intensity Projection

Similar to MIP but reconstructs the minimum intensity (e.g. for Dark Blood techniques)

¹⁾ Optional

VRT Volume Rendering Technique

- 3D rendering with free definition of multiple trapezes for opacity and color
- User specific preset creation
- VRT thick and thin

Cinematic VRT (CRT)¹⁾

Cinematic Rendering Technique is a rendering technology based on a physically accurate simulation of how light interacts with matter. It aims at providing a photorealistic rendering of anatomical regions

Image Fusion

MPR image fusion with interactive adjustment of mixing ratio and various (color) LUTs, as well as interactive adjustment of alignment (visual alignment)

Result Handling and sending (Distribution)

- Overview over all acquired data and easy selection of target DICOM nodes for archiving
- 4D support with archiving of sub-sets of 4D data sets
- Status information about distribution state for each data set
- Series Saving: for data within a selected viewing segment the current representation can be saved as new result series. In case the segment contains MPR data, automatically parallel ranges are generated.

syngo MR Network Communication

DICOM Services (Digital Imaging and Communications in Medicine)

Interface for transmitting medical images and information in the DICOM 3.0 industrial standard. Allows for communication between devices from different manufacturers

- DICOM Send / Receive
- DICOM Query / Retrieve
- DICOM SC Storage commitment
- DICOM Basic Print
- DICOM Modality Worklist
- DICOM MPPS Modality performed procedure steps
- DICOM Structured Reports
- DICOM Study Split
- Enhanced MR Images (Multiframe)
- Loading time decrease due to reduced header information redundancy
- · Reduced object size
- Reduced memory consumption and archive (On average 40%¹⁾ reduction in data storagerequirement with Multiframe DICOM) resulting in archive costs reduction, extended online period of exams in the STS and faster image availability at the target nodes.
- Better application support due to usage of DICOM standard attributes
- Color support within the MR modality image
- MR quantification by support of RealWorldValueMapping
- Archiving and application support of MR Spectroscopy objects
- Archiving support of DTI and other non-image data with Raw Data objects

DICOM Study Split

DICOM Study Split provides the mapping of one study acquired based on multiple requests to multiple studies directly at the scanner. For example, two requests for head and neck acquisition can be registered once, scanned once and immediately mapped to two separate studies for individual reading.

Multiple requested procedures can be combined in a time saving manner by scanning a larger body region and then splitting them to individual billing relevant studies for separate reading.

This package allows:

- Time saving simple mapping of multiple requested procedures to multiple acquired series with one scan
- Simple creation of studies with individual billing based on one scan workflow
- Improvement for departmental workflow by eliminating need to load / change and to request / execute splitting on a separate workstation after the scan
- Immediate visual selection, check and correction of images to study assignments
- Overlapping region images can be copied to both studies

DICOM interoperability

For remote DICOM nodes (e.g. PACS systems) which doesn't support the DICOM Enhanced MR Image format an conversion to DICOM MR Images can be activated.

Expert-i

Interactive real-time access to imaging data and exam information from any PC within the hospital network during the MR exam.

¹⁾ Data on file, Results may vary.

syngo MR Network Communication

Exchange Media Storage of images and additional data (e.g. AVI files) on CD/DVD

DICOM Viewer

A viewing tool which can be stored together with images on an export media to be handed out to the patient

Image Transfer

Local network	Ethernet
Data transfer rate	Max. 1 Gbit/s
Transfer rate (DICOM Enhanced MR Images with 80 frames per instance)	Approx. 160 – 250 frames/s

Computer System

syngo Acquisition Workplace

General

Full multi-tasking for simultaneous functionality, e.g.:

- Patient registration and pre-registration
- Scanning
- Reconstruction
- Viewing
- Post-processing
- Filming
- Data storage

Color LCD Monitor

High resolution flicker-free flat-screen monitor Horizontally tiltable, forward and backward Automatic backlight control for long-term brightness stability Optional second monitor Screen size (diagonal) 24" Horizontal frequency 65 – 78 kHz Vertical frequency 53 – 63 Hz Screen matrix 1920 × 1200

Host computer

Processor	Intel Xeon ≥ W-2133 (6-Core)
Clock rate	3.6 GHz
RAM	64 GB
Hard disk	SSD: ≥ 480 GB
CD/DVD writer	Not built in, but optionally connectable by USB
Media drives	Media Card Reader

Advanced host computer¹⁾

Processor	Intel Xeon ≥ W-2145 (8-Core)
Clock rate	3.7 GHz
RAM	96 GB
Hard disk	SSD: ≥ 480 GB
CD/DVD writer	Not built in, but option- ally connectable by USB
Media drives	Media Card Reader

Measurement and reconstruction system Tim [96 × 24]

• •	
Processor	Intel Xeon E3-1225v5
Clock rate	3.3 GHz
Main memory (RAM)	32 GB
Hard disk for raw data	SSD: ≥ 480 GB
Hard disk for system software	SSD: ≥ 240 GB
Parallel Scan & Recon	Simultaneous scan and reconstruction of up to 12 data sets
Reconstruction speed	11 900 recons per second (256 ² FFT, full FoV) 47 400 recons per second (256 ² FFT, 25 % recFoV)

Highend measurement and reconstruction system¹⁾

Intel Xeon 2xES-2609v4
2 × 1.7 GHz
96 GB
SSD: ≥ 480 GB
SSD: ≥ 240 GB
22 300 recons per second (256 ² FFT, full FoV) 84 700 recons per second (256 ² FFT, 25 % recFoV)

syngo MR Workplace¹⁾

Measurement and reconstruction system Tim [96 × 16]

Processor	Intel Xeon E3-1225v5
Clock rate	3.3 GHz
Main memory (RAM)	16 GB
Hard disk for raw data	SSD: ≥ 480 GB
Hard disk for system software	SSD: ≥ 240 GB
Parallel Scan & Recon	Simultaneous scan and reconstruction of up to 12 data set
Reconstruction speed	11 900 recons per second (256 ² FFT, full FoV) 47 400 recons per second (256 ² FFT, 25 % recFoV)

Color LCD Monitor as for syngo Acquistion Workplace

Host computer

Processor	Intel Pentium ≥ J5005 (4-Core)
Clock rate	1.5 GHz
RAM	8 GB
Hard disk	SSD: ≥ 128 GB
CD/DVD writer	Not built in, but optionally connectable by USB
Media drives	Media Card Reader

¹⁾ Optional; prerequisite Advanced host computer

Installation

Siting and Installation

Short installation time due to integrated digital DirectRX technology

Typical installation time

Less than 7 working days

Radio Frequency Shielding

For shielding the examination room from external RF sources

RF attenuation factor	>90 dB
Frequency range	15 – 65 MHz

Magnetic Shielding

Room shielding

For additional reduction of the magnetic fringe field, suitable iron shielding can be installed in the walls of the examination room. The room shielding can be used to create a magnetic shielding enclosure

One-Floor Installation

A combination of active shielding and a special shielding (installed on the ceiling of the magnet room or below it) will keep the 0.5 mT line within the same floor as the MRI scanner installation, even in case of very low room heights

System Electronics Cabinets

Two cabinets which may be placed directly against the wall or even in a corner

Require service access only from the front, saving considerable space

Integrated water cooling cabinet may eliminate the need for a dedicated computer room

Power Requirements

Line voltage	380, 400, 420, 440, 460, 480 V
Stability tolerances	± 10 %
Line frequency	50/60Hz, ±1Hz
Connection value ¹⁾	38 kVA

Cooling system

Two different customer specific cooling alternatives (Separator or Eco chiller) available.

Separator option for connection	Water consumption	50 l/min ¹⁾
to available cooling system	Heat dissipation to water	36 kW

Eco Chiller option with automatic adaptation to the required cooling demands (e.g. different night/day mode) to decrease energy cost

 $^{1)}$ Water temperature $12\,^{\circ}\text{C}/45\,^{\circ}\text{F}$

Power Consumption¹⁾

Space Requirements

System off	4.4 kW
System ready to measure	8.7 kW
Scan	13.1 kW

Min. total space require-	< 27.5 m ²
ment (for magnet,	
electronics,	
and console room)	



¹⁾ All values are typical values, applicable for 400V/50Hz. The power consumption measurement is based on the COCIR methodology – MRI – Measurement of energy consumption. Many variables impact power consumption, thus there can be no guarantee that each customer will achieve the same values

Dimensions

		Width [cm]	Depth [cm]	Height [cm]	Weight [kg]
Examination Room	Magnet 1.5 Tesla AS (incl. Helium)	222	155	213	3200
	Magnet in operation, incl. gradient coil, body coil, BioMatrix Table and covers	234	426	223	4558
	BioMatrix Table	77	250	58-89 +1.0 ¹⁾	
	Required min. room height clearance			240 ²⁾	
	Min. transport dimensions	234	175	209	
Control Room	syngo Acquisition Workplace (table + monitor)	120	80	118 (75+43)	
	Host computer	17	45	39	
	syngo MR Workplace ³⁾	120	80	118 (75+43)	
Equipment Room	Electronics cabinet, incl. system control, RF system, gradient power system, image processor	160	65	198 ⁴⁾	930
	Heat dissipation	\leq 5 kW, only v	entilation migh	nt be required	
	Cooling system	66	65	187	318

Depending on the floor conditions
Finished floor to finished ceiling

³⁾ Optional

⁴⁾ Without attachments

myExam Autopilot

On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens Healthineers sales organization worldwide. Availability and packaging may vary by country and is subject to change without prior notice. Some/All of the features and products described herein may not be available in the United States.

The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which do not always have to be present in individual cases.

Siemens Healthineers reserves the right to modify the design, packaging, specifications, and options described herein without prior notice. Please contact your local Siemens Healthineers sales representative for the most current information.

Note: Any technical data contained in this document may vary within defined tolerances. Original images always lose a certain amount of detail when reproduced.

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customers' unique setting. Since there is no "typical" hospital and many variables exist (e.g. hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

Siemens Shenzhen Magnetic Resonance Ltd. Siemens MRI Center Gaoxin C. Ave. 2nd, Hi-Tech Industrial Park 518057 Shenzhen PEOPLE's REPUBLIC OF CHINA



MAGNETOM Amira – A BioMatrix System

Tim [96 × 16] XF Gradients Tim [96 × 24] XF Gradients

siemens-healthineers.com/amira





Magnet System



General

Superconducting Magnet

- Short bore, patient-friendly design, high homogeneity 1.5 Tesla with 60 cm bore design
- Easy siting due to AS (Active Shielding) and E.I.S. (External Interference Shielding) magnet technology

TrueForm Magnet Design

TrueForm magnet design produces a cylindrically optimized homogeneity volume that corresponds better to the true form of the human body. This results in better image quality as well as better fat saturation for the whole area covered in a scan. TrueForm reduces the overlap needed between steps for large virtual FoV exams and thus reduces the number of steps needed for a given scanning range

Magnet Parameters

Operating field strength	1.5 Tesla
Magnet type	Superconductor
Field stability over time	< 0.1 ppm / h
Weight (with cryogens)	3200 kg
Magnet length	1.55 m
System length including covers at the height of Iso-center	168.5 cm
Bore design	60 cm

Homogeneity (based on highly accurate 24 plane plot)

TrueForm	magnet	design	with a	cylindric	ally op	timized	homogenei	ity vo	lume f	or h	ighe	r imag	e qua	lity	

10 cm DSV	Guaranteed	0.02 ppm
	Typical	0.01 ppm
20 cm DSV	Guaranteed	0.075 ppm
	Typical	0.04 ppm
30 cm DSV	Guaranteed	0.3 ppm
	Typical	0.15 ppm
40 cm DSV	Guaranteed	1.4 ppm
	Typical	1.07 ppm
45 cm DSV	Typical	3.2 ppm
$50 \times 50 \times 45 \text{ cm}^3 \text{ DEV}$	Guaranteed	5.0 ppm
	Typical	4.7 ppm

In compliance with the German "Qualifikationsvereinbarung". Standard deviation Vrms (volume root-mean square) measured with highly accurate 24 plane plot method (20 points per plane). Standard active shim with 3 linear channels. DSV = Diameter spherical volume (x, y, and z direction); DEV = Diameter elliptical volume.

Shimming

Both: passive and acti	ve shimming. Passive shimming dur	ing installation	
Standard active shim	with 3 linear channels (1 st order)		
3D Shim	Patient-specific autom	ated shim	
	Time to shim	Approx. 20 s	

Shielding

Active Shielding (AS)	5 th generation active shielding (AS) technology with counter coils		
Fringe field (axial × radial)	0.5 mT ¹⁾	4.0 × 2.5 m	
	0.1 mT	5.8 × 3.4 m	
External Interference Shield (E.I.S.)	Patented shielding system integrated into the magnet		
	Continuous compensati interferences during me nearby power lines)	on and automatic suppression of external magnetic field easurement (caused by moving ferromagnetic objects or	

Magnet Cooling System

Zero Helium boil-off technology	
Refill interval (typical) ²⁾	Not applicable
Boil-off rate (typical) ²⁾	0.0 liter/year
Max. helium capacity	Approx. 1300 liters

¹⁾ Pacemaker safety limit

²⁾ For typical clinical use, depending on sequences and operating time with running helium compressor. The system needs to be serviced at regular interval. Undisturbed magnet cooling for 24 hours and 7 days a week.

Gradient System

XF Gradients: General Features

- Actively shielded (AS) whole-body gradient coil system
- Extremely low eddy currents
- Water-cooled coil and amplifier for maximum performance
- All axes force compensated

Gradient Performance for Each Axis

Max. amplitude	33 mT / m
Min. rise time	264 µs
Max. slew rate	125 T / m / s

Vector Gradient Performance (vector addition of all 3 gradient axes)

Max. eff. amplitude	57 mT / m
Max. eff. slew rate	217 T / m / s
Gradient duty cycle	100%

XF Gradients: Amplifier

Water-cooled, highly compact, modular design		
Ultra-fast solid-state technology with very low switch- ing losses		
Max. output voltage ¹⁾	1125 V	
Max. output current ¹⁾	330 A	

XF Gradients: Resolution Parameters

5 mm
500 mm
min. 0.1 mm max. 200 mm
min. 0.05 mm max. 20 mm
min. 5 mm max. 500 mm
1024
14 µm

¹⁾ Values for each of the 3 gradient axes

 $^{2)}\,$ Depending on the application, the maximum FoV in the z-direction can be up to 45 cm

Sequences: XF Gradients

		Matrix	Matrix		
		64	128	256	
Spin Echo	min. TR [ms]	5.7	5.9	6.4	
	min. TE [ms]	1.6	1.7	2.1	
Inversion Recovery	min. TR [ms]	27	28	28	
	min. TE [ms]	1.6	1.7	2.1	
	min. TI [ms]	21	21	21	
2D GRE	min. TR [ms]	0.68	0.91	1.14	
	min. TE [ms]	0.28	0.28	0.28	
3D GRE	min. TR [ms]	0.68	0.91	1.14	
	min. TE [ms]	0.28	0.28	0.28	
TrueFISP	min. TR [ms]	1.86	2.07	2.74	
	min. TE [ms]	0.85	0.87	1.15	
TSE (HASTE)	min. Echo Spacing [ms]	1.6	1.7	2.3	
	min. TR [ms]	5.7	5.9	6.7	
	min. TE [ms]	1.6	1.7	2.3	
	max. Turbo Factor = 512				
Turbo GSE	min. Echo Spacing [ms]	0.8	0.98	1.08	
	min. TR [ms]	6.3	6.9	7.4	
	min. TE [ms]	3	3.5	4	
	max. Turbo Factor = 65				
	max. EPI Factor = 21				
EPI (single-shot and multi-shot)	min. Echo Spacing [ms]	0.33	0.51	0.81	
	min. TR [ms]	10	10	10	
	min. TE [ms]	2.2	2.4	2.9	
	min. Measurement time	16	21	35	
	max. EPI Factor = 256				
Diffusion Imaging	Max. b-value = 10 000 s / mm ²				
	Min. TE [ms] with b = 1000 s/mm ²	52	53	56	

All matrices without interpolation. Combinations of the stated parameters are not always possible; some parameters may require optional application packages.
Coils

Standard Integrated Whole-Body Coil

No tune transmit/receive coil

1.5T Tim 4G Coils

The Tim coils are designed for high image quality in combination with easy handling. High element coils increase SNR and reduce examination times. DirectConnect[™] and SlideConnect[®] technology reduce patient set up time. Light weight, ergonomically designed coils enable highest patient comfort.

- No coil changing with multi-exam studies saves patient setup time
- All coils are time-saving "no-tune" coils
- Low-noise preamplifiers
- AutoCoilSelect for dynamic, automatic, or interactive selection of the coil elements within the Field of View

Standard Coils

Head/Neck 10 (DirectConnect™)	Application area	Head and neck	
	Dimensions with look out mirror $(L \times W \times H)$	440 mm × 330 mm × 370 mm	
	Weight	4.7 kg	
Spine 18 (DirectConnect™)	Application area	Spine	
	Dimensions (L × W × H)	1200 mm × 489 mm × 63 mm	
	Weight	11 kg	
Body 6 (SlideConnect [®])	Application area	• Thorax • Heart • Abdomen	PelvisHip
	Dimensions (L × W × H)	322 mm × 530 mm × 40 mm	
	Weight	1.4 kg	

On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens Healthineers sales organization worldwide. Availability and packaging may vary by country and is subject to change without prior notice. Some/All of the features and products described herein may not be available in the United States.

The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which do not always have to be present in individual cases.

Siemens Healthineers reserves the right to modify the design, packaging, specifications, and options described herein without prior notice. Please contact your local Siemens Healthineers sales representative for the most current information.

Note: Any technical data contained in this document may vary within defined tolerances. Original images always lose a certain amount of detail when reproduced.

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customers' unique setting. Since there is no "typical" hospital and many variables exist (e.g. hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

Free page for better readability of the following two-pager in double-page mode (front and back on the same screen)



siemens-healthineers.com/amira

General

The Head/Neck 16 is part of the standard system configuration

- 16-channel design with 16 integrated preamplifiers, two rings of 6 elements each and one ring with 4 elements
- Cable-less coil with DirectConnect[™] technology
- Combined coil for head and neck examination for optimized workflow
- Upper coil part easy removable
- Lower coil part usable without upper part for highly claustrophobic patients
- Lower coil part may stay on the patient table for most of the examinations
- Smoothly integrated into the patient table with Spine 18
- Open patient-friendly design
- Cushioned head stabilizers (removable)
- No coil tuning
- iPAT-compatible in all directions
- Dual-Density Signal Transfer enables ultra-high density coil designs by integrating key RF components into the local coil
- Detachable double mirror

Applications

- Head examination
- Neck examination
- MR Head / Neck Angiography
- Combined head / neck examination
- TMJ (temporomandibular joints)

Typically combined with

- Spine 18
- BioMatrix Body 13
- Special-Purpose 4¹⁾
- Flex Large 4¹⁾
- Flex Small 4¹⁾



¹⁾ Optional

Head/Neck 16



Weight

Dimensions $(L \times W \times H)$

Total	4.7 kg	440 mm × 330 mm × 370 mm
Anterior part	1.7 kg	

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer



siemens-healthineers.com/amira



General

The Spine 18 is part of the standard system configuration.

- 18-channel design with 18 integrated preamplifiers, 6 rows of 3 elements each
- Cable-less coil with DirectConnect[™] technology
- Smoothly integrated into the patient table and streamlined with Head/Neck 16
- May remain on the patient table for nearly all exams
- No coil tuning
- iPAT-compatible in all directions
- Dual-Density Signal Transfer enables ultra-high density coil designs by integrating key RF components into the local coil

Applications

- High resolution imaging of the whole spine
- Various applications in combination with additional coils

Typically combined with

- BioMatrix Body 13
- Head / Neck 16
- Peripheral Angio 16¹⁾
- Flex Large 4¹⁾
- Flex Small 4¹⁾
- UltraFlex Large 18¹⁾²⁾
- UltraFlex Small 18¹⁾²⁾



²⁾ only on Tim [96×24]



Spine 18



Weight

Dimensions (L × W × H)

11 kg

1200 mm × 489 mm × 63 mm

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer



siemens-healthineers.com/amira



General

The BioMatrix Body 13 with Respiratory Sensor is part of the standard system configuration.

- Can be combined with further Body 13 coils for larger coverage
- No coil tuning
- iPAT-compatible in all directions
- Dual-Density Signal Transfer enables ultra-high density coil design by integrating key RF components into the local coil.
- SlideConnect[®] technology for easy coil set up
- The Respiratory Sensor is seamlessly integrated into the BioMatrix Body 13.

Applications

- Thorax
- Heart
- Abdomen
- Pelvis
- Hip
- Vascular

Typically combined with

- Head/Neck 16
- Spine 18
- Additional BioMatrix Body 13 coils¹⁾
- Peripheral Angio 16¹⁾
- Flex Large 4¹⁾
- Flex Small 4¹⁾

Coil specifications

Max. number of independent channels in one single scan and one single FoV	Tim [96×16]	Up to 16 independent channels in combination with two Body 13 coils, Matrix Mode combination from up to 34 elements.
	Tim [96×24]	Up to 24 independent channels in combination with two BioMatrix Body 13 coils, Matrix Mode combination from up to 34 elements.
	BioMatrix Body 13 only	13 coil elements with 13 integrated pre-amplifiers, 2 rows of 4 elements each and 1 row of 5 elements.



BioMatrix Body 13



Weight

1.4 kg

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

Flex Large 4/Flex Small 4

siemens-healthineers.com/amira



General

- Four integrated low-noise preamplifiers
- Allows flexible coil positioning
- Only one interface necessary for all Flex coils
- Several Flex Coil Interfaces can be used simultaneously
- Connection via Flex Coil Interface 1.5 T¹⁾

Applications

Flex Large 4	Imaging of large regions such as medium to large shoulder, hip, and knee
Flex Small 4	Imaging of small regions such as small to medium shoulder, wrist, elbow, and ankle

Features

- Wrap-around coil made from soft and flexible material
- 4-channel design
- iPAT-compatible
- No coil tuning

Typically combined with

- Head/Neck 16
- BioMatrix Body 13
- Peripheral Angio 16¹⁾
- Flex Large 4²⁾
- Flex Small 4²⁾
- Spine 18

¹⁾ Optional



²⁾ second Flex coil interface 1.5T needed (Optional)

Flex Large 4/Flex Small 4



Weight

Dimensions (L × W × H)

Flex Large 4	Flex Small 4	Flex Large 4	Flex Small 4
550 g	450 g	516 mm × 224 mm	366 mm × 174 mm

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

UltraFlex Large 18/ UltraFlex Small 18

siemens-healthineers.com/amira



General

- 18-channel design with 18 integrated pre-amplifiers, with 3 rows of 6 elements each
- Dual-Density Signal Transfer enables ultra-high density coil designs by integrating key RF components into the local coil
- Positioning Aids for shoulder, knee, ellbow and foot/ ankle for easy and confortable patient positioning

Applications

UltraFlex Large 18	Imaging of large regions such as medium to large shoulder, hip, knee, ankle, and hand
UltraFlex Small 18	Imaging of small regions such as small to medium shoulder, wrist, elbow, and ankle

Features

- Wrap-around coil made from soft and flexible material
- 18-channel design
- iPAT-compatible
- No coil tuning
- Dedicated positioning aids for foot, ankle, shoulder, elbow and knee imaging

Typically combined with

• Spine 18¹⁾



UltraFlex Large 18/UltraFlex Small 18



Weight¹⁾

Dimensions $(L \times W \times H)$

UltraFlex Large 18	UltraFlex Small 18	UltraFlex Large 18	UltraFlex Small 18
1.8 kg	1.4 kg	590 mm × 290 mm	410 mm × 190 mm
		× 14 mm	× 14 mm

¹⁾ Without coil interfade

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer



siemens-healthineers.com/amira



General

- 8-channel design with 16 integrated preamplifiers, in 8 CP pairs, i.e., 4 levels with 2 CP elements each
- Operates in an integrated fashion with BM Body 13 coil and with the integrated Spine coil
- Can be utilized feet first only
- Both legs are independently covered with coil elements, maximizing the coil filling factor and the signal-to-noise ratio
- No coil tuning
- iPAT-compatible in all directions
- SlideConnect[®] technology for easy coil set up
- One cable only for easy handling

Applications

- High resolution angiography of both legs with highest signal-to-noise ratio
- Bilateral examinations of long bones of the legs

Typically combined with

- BioMatrix Body 13
- Spine 18
- Flex Large 4¹⁾
- Flex Small 4¹⁾



Peripheral Angio 16



Weight

Dimensions $(L \times W \times H)$

6.1 kg

970 mm × 650 mm × 260 mm

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer



siemens-healthineers.com/amira



General

- 16-channel coil with 16 integrated preamplifiers
- iPAT-compatible in all directions
- Hinged design of the upper part for quick and easy patient positioning
- Stabilization pads for comfortable positioning
- Holder allows off-center positioning to ensure a comfortable position for the patient
- No coil tuning
- 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

Applications

High resolution hand and wrist imaging



Hand / Wrist 16



Weight

Dimensions (L × W × H)

528 mm × 470 mm × 45 mm

Coil	approx. 2.8 kg	Coil	approx.
Base plate approx. 1.6 kg			332 mm × 245 mm × 128 mm
		Base plate	approx.

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer



siemens-healthineers.com/amira



General

- 16-channel coil with 16 integrated preamplifiers
- iPAT-compatible in all directions
- Boot-like coil design
- Cable-less coil with DirectConnect[™] technology
- Stabilization pads for comfortable patient positioning
- No coil tuning
- Dual-Density Signal Transfer enables ultra-high density coil designs by integrating key RF components into the local coil

Applications

High resolution foot and ankle imaging



Foot/Ankle 16



Weight

Dimensions (L × W × H)

Coil	3.2 kg	Coil	410 mm × 330 mm × 390 mm
Base plate	7.1 kg	Base plate	427 mm × 333 mm × 383 mm

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer



siemens-healthineers.com/amira



General

- A 16-channel coil with flexible wings to shape around small and large shoulder anatomy with 16-channel coil design with 16 integrated preamplifiers
- Includes pads for high patient comfort
- No coil tuning
- iPAT-compatible in all directions
- 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

Applications

- Best visualization of small anatomical structures (e.g. labrum)
- Higher SNR and better field homogeneity
- Reduced slice thickness and measurement times



Shoulder Shape 16

Weight

Opening

1.4 kg

160-270 mm

Dimensions $(L \times W \times H)$

262mm × 214 mm × 214 mm

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

iTX Extremity 18 Flare

siemens-healthineers.com/amira



General

- 18-channel inductive transmit/recieve coil
- Transmission layer integrated working as inductive coupled local transmit coil with body coil brings higher transmit efficiency and lower whole body SAR
- 18-channel coil with 18 integrated preamplifiers, elements arranged in 3 rungs by 6 elements
- iPAT-compatible in all directions
- Upper coil part removable
- Flared opening towards the thigh
- Holder allows off-center positioning to ensure a comfortable position for the patient
- Cushions for patient comfort and stabilization of the anatomy
- Cushions for patient comfort and stabilization of the anatomy
- No coil tuning
- One plug only
- SlideConnect[®] technology for easy coil set up

Applications

- Examinations of joints in the area of the lower extremities
- High resolution knee imaging



iTX Extremity 18 Flare



Weight

Minimum inner dimension

6.2 kg

170 mm; 190 mm flaring towards thigh

Dimensions $(L \times W \times H)$

282 mm × 528 mm × 262 mm (incl. baseplate)

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

4-Channel BI Breast Coil

siemens-healthineers.com/amira



General

- Frame
- 2-channel insert plate coil
- 2-channel patient pad coil
- Positioning cushion
- Head rest
- Biopsy plate
- Biopsy set: biopsy box; 2 fixation units (grid and post/pillar); positioning system including 2 needle adapter tubes and oil marker
- Tim Coil Interface 1.5 T needed to connect coil with scanner
- Spine 18 can remain on the table

Applications

- Simultaneous basic imaging of both breasts in all directions
- Biopsy imaging for lateral, medial, and craniocaudal access

Typically combined with

- BioMatrix Body 13
- Flex Large 4¹⁾
- Flex Small 4¹⁾



4-Channel BI Breast Coil



Weight

Dimensions (L × W × H)

10 kg

880 mm × 470 mm × 210 mm

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

Noras MRI products GmbH Leibnizstr. 4 97204 Höchberg, Germany Phone: +49 931 / 29 92 7-0 Fax: +49 931 / 29 92 7-20 www.noras.de



siemens-healthineers.com/amira



General

- 18-channel design with 4 frontal elements, 4 elements around the breast and 1 axillary element, for each side
- Height adjustable head rest
- Compact design
- Plug parking position
- Single plug connect
- Head or feet first measurement possible
- Support cushion with mechanical lock to coil
- Volume per breast 2200 ml

Applications

- Simultaneous imaging of both breasts in all directions
- Axillar imaging elements
- High-resolution 2D and 3D imaging
- For quantitative spectroscopy (GRACE) a reference bottle can be inserted

Typically combined with

- BioMatrix Body 13
- Flex Large 4¹⁾
- Flex Small 4¹⁾





Breast 18



Weight

Dimensions (L × W × H)

5.5 kg

575 mm x 410 mm x 205 mm

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer



siemens-healthineers.com/amira



General

- 4-channel
- iPAT compatible
- No coil tuning
- Connect via 4-channel Flex Coil Interface¹⁾

Applications

- Carotids
- Examinations with small Field-of-Views
- Small structures near the surface

Typically combined with

• Head / Neck 16



Special-Purpose 4



Weight

Dimensions $(L \times W \times H)^{1}$

300 g

94 mm × 127 mm × 51 mm

¹⁾ without cable

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

MEDRAD Endorectal Coil Kit

siemens-healthineers.com/amira



General

- The Endorectal Coil Kit includes the MEDRAD Endo Interface 1.5T¹⁾ and the Endo Adapter for MEDRAD 1.5T, and connects to MAGNETOM Amira A BioMatrix System via Flex Coil Interface 1.5T²⁾
- Interface device for connecting the disposable MEDRAD prostate, colon, or cervix receive coil¹⁾ (to be ordered separately)
- No coil tuning

Applications

- Excellent visualization of the prostate
- Non-invasive preoperative diagnostic evaluation and treatment planning

Typically combined with

- BioMatrix Body 13
- Spine 18

¹⁾ Manufacturer: DxTx Medical (639 Alpha Drive, Pittsburgh, PA, 15238, USA, dxtxmedical.com, Phone: +1-833-777-3989)





MEDRAD Endorectal Coil Kit



Weight

200 g

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com Manufacturer Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany

Free page for having the same presentation like in hard copy on the following pages





siemens-healthineers.com/amira





Application Packages

Quiet Suite

Quiet Suite enables complete, quiet examinations of the brain, spine and large joints. Quiet Suite includes QuietX, an algorithm which enables intelligent gradient optimization to substantially reduce noise without significant compromise to image quality or scan time.

In addition, Quiet Suite includes PETRA, a 3D T1-weighted sequence which is barely audible above background noise.

- Quiet prescan normalize and quiet localizers
- QuietX TSE, SE and GRE sequences for T1, T2, and DarkFluid contrasts
- QuietX SWI
- QuietX DWI
- PETRA (Pointwise Encoding Time Reduction with Radial Acquisition) for inaudible 3D T1-weighted imaging
- Optimized Quiet protocols for the brain, spine and large joints

FREEZEit+1)

FREEZEit+ facilitates high quality diagnostic body MR imaging. Based on the excellent soft tissue contrast that MRI inherently offers, FREEZEit+ now adds imaging speed and motion compensation to body MRI and beyond. This allows i.e. imaging the entire arterial phase of the liver with multiple 3D datasets within seconds while maintaining a high spatial image resolution. Furthermore, the motion compensation of FREEZEit+ enables contrast-enhanced MR imaging during free breathing. Next to that, FREEZEit+ includes the high spatiotemporal dynamic imaging of TWIST.

TWIST

TWIST is an advanced, very fast GRE acquisition technique for time-resolved (4D) MR angiography and dynamic imaging in general with high spatial and temporal resolution. TWIST supports comprehensive dynamic MR angio exams in all body regions.

TWIST-VIBE

TWIST-VIBE is a fast, high-resolution 4D imaging sequence for i.e. multi-arterial liver imaging and for thoracic, abdominal and pelvic application. It is a VIBE sequence with CAIPIRINHA capability providing high spatial resolution. The view-sharing mode provides temporal information to ensure the right contrast timing for different lesions. Dixon is used for fat-water separation.

StarVIBE

StarVIBE is a motion insensitive VIBE sequence using a stack-of-stars trajectory. It allows abdominal, head, head neck, spinal, thoracic and pelvic imaging in free breathing mode, providing a solution for patients without breath-hold capabilities.

FREEZEit+ combines the applications TWIST, TWIST-VIBE and StarVIBE.

¹⁾ Optional

Compressed Sensing GRASP-VIBE¹⁾

Compressed Sensing GRASP-VIBE (Golden-Angle RAdial Sparse Parallel) makes it possible to conduct dynamic contrast-enhanced abdominal exams in free breathing. Acquisition is performed in one continuous run, using a golden-angle stack-of-stars radial scheme that confers robustness towards motion and the flexibility to choose the temporal resolution at reconstruction time. The temporal resolution may even vary over the duration of the scan. Reconstruction is performed using a Compressed Sensing accelerated iterative algorithm with per-voxel through-time regularization. The algorithm also automatically recognizes the typical phases in liver dynamics and therefore has the capablilty to only reconstruct a subset of clinically relevant images with respective labeling.

Additional features:

- Auto Bolus Detection at reconstruction time
- Configuration of exam phases in terms of start time relative to the auto-detected bolus arrival, duration, temporal resolution, and pre-selection for export to PACS
- Self-gating for further reduction of residual motion blur
- Includes FREEZEit+

Compressed Sensing SPACE¹⁾

Highly accelerated 3D imaging based on the SPACE pulse sequence with Compressed Sensing and Iterative Reconstruction.

- Spatial and/or temporal resolution can be improved and scan time substantially reduced
- Optimized protocols are available for triggered and breath-hold 3D MRCP

Compressed Sensing ToF¹⁾

Highly accelerated MR angiography based on the BEAT pulse sequence with a combination of Time-of-Flight (ToF) MR angiography and Compressed Sensing and iterative reconstruction to reduce measurement time.

- Spatial and/or temporal resolution can be improved and scan time substantially reduced
- Optimized protocols are available for triggered and breath-hold 3D MRCP

Compressed Sensing SEMAC¹⁾

Highly accelerated musculoskeletal imaging in patients with whole joint replacements based on SEMAC (slice encoding for metal artifact correction) with Compressed Sensing and iterative reconstruction.

- SEMAC supports Compressed Sensing acceleration with fixed acceleration in addition to conventional GRAPPA acceleration with selectable acceleration factor
- SAR optimization feature is included, which reduces the energy applied by the SEMAC pulse sequence
- · Optimized protocols are offered for knee

¹⁾ Optional

Deep Resolve Gain¹⁾

Deep Resolve Gain is an intelligent reconstruction method to increase the SNR (signal-to-noise ratio). Noise detection and removal is performed optimized for the individual scan thus addressing spatially varying noise of the specific acquisition. The method allows to gain SNR which can be turned into either improved image quality with higher resolution or into higher productivity, for example by reducing the number of averages or by increasing the acceleration factor of the scan. Deep Resolve Gain can be combined with standard GRAPPA acceleration and is available for following sequences:

- TSE
- SE
- TSE Dixon

Deep Resolve Boost¹⁾

Deep Resolve Boost is a deep learning neural reconstruction network to improve acquisition durations. The neural network has been designed to reconstruct images from highly accelerated data with little noise. It has been trained on a large amount of fully sampled MR data to reconstruct high SNR images from retrospectively under sampled data. It can be seamlessly applied to data acquired with different contrast weightings and orientations. Deep Resolve Boost can be combined with Simultaneous Multi-Slice acceleration and Deep Resolve Sharp. It is available for following sequences:

• TSE

Deep Resolve Sharp¹⁾

Deep Resolve Sharp is a deep learning neural reconstruction network to improve image quality by increasing the sharpness and reducing Gibbs ringing. The neural network has been trained on a large amount of highresolution MR data to reconstruct sharp images from low resolution data. The reconstruction algorithm also reduces the Gibbs ringing which is present around edges. Consistency with the acquired raw data is ensured in the reconstruction process. It can be seamlessly applied to data acquired with different contrast weightings and orientations. Deep Resolve Sharp offers up to a factor of two in in-plane resolution. Deep Resolve Sharp can be combined with standard GRAPPA acceleration as well as Deep Resolve Gain and is available for following sequences:

- TSE
- SE
- TSE Dixon

¹⁾ Optional
LiverLab¹⁾ and myExam LiverLab Assist¹⁾

LiverLab is a system guided workflow to examine the hepatic fat and iron status. LiverLab is available as dedicated myExam Assist and also as part of the myExam Abdomen Assist program. The Inline First-Look Dixon sequence gives the user a first overview of possible fat and/or iron overload in the whole liver. Based on the resulting images, liver segmentation runs without user interaction. If further evaluation is needed, the user can choose from two methods:

- Multiecho Dixon VIBE is an image-based method to calculate maps such as water, fat, fat signal fraction, and R2*.
- HISTO is a single-breath-hold single-voxel spectroscopy method to calculate fat fraction as well as water R2^{*}.

Advanced WARP²⁾

Advanced WARP enables the reduction of gross metal artifacts (i.e. through-plane artifacts) caused by large orthopedic implants. It contains the 2D TSE based SEMAC technique and is especially useful in the case of hip and knee joint replacements. Available protocols include T1-weighted, T2-weighted, proton density and STIR contrast.

Advanced Diffusion

RESOLVE (Readout Segmentation Of Long Variable Echo-trains) delivers high-resolution low-distortion diffusion-weighted imaging (DWI) for accurate depiction of lesions. Additionally, this technique is largely insensitive to susceptibility effects, providing detailed anatomy-true diffusion imaging for brain, spine, breast and prostate. In combination with the DTI Tractography package, RESOLVE enables excellent white-matter tract imaging even in the most challenging areas, such as the cervical spine.

RESOLVE and QuietX DWI together make up the Advanced Diffusion package.

- Diffusion-weighted, readout-segmented (multi shot) EPI sequence for high-resolution susceptibilityinsensitive DWI
- Variable number of readout segments for greater flexibility
- 2D navigator-based phase correction for pulsation artifact reduction and automatic reacquisition of corrupted data
- Inline calculation of diffusion tensor (DTI) and diffusion parameter maps

¹⁾ Optional

²⁾ MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens Healthineers.

Tim Planning Suite

Easy planning of extended Field of View examinations in an efficient way using Set-n-Go protocols. It allows planning of several stations at once e.g. on composed localizer images. The overlap of slice groups can be adjusted. All stations can have independent parameter settings although they are displayed together. A special coupling mode allows easy positioning of all stations at once according to the patient's anatomy. Fully supports scan@center and Phoenix functionality.

- Tim Planning UI with optimized layout for slice positioning
- Ready to use Set-n-Go protocols for different clinical questions
- Integrated toolbar for fast advanced slice planning: FoV-Plus, FoV-Minus, AlignParallel, AlignFieldOfViews

GOBrain

GOBrain is a set of optimized protocols for diagnostic neuroimaging developed by the board-certified neuroradiologists at Massvachusetts General Hospital, USA. These protocols aim to achieve a diagnostic brain examination and are optimized for short acquisition times.

The following contrast and orientations are provided with this protocol:

- sagittal T1-weighted SE
- axial T2-weighted TSE
- axial T2 TSE FLAIR
- axial Diffusion-weighted single-shot EPI
- axial T2^{*}-weighted hemoscan

GOBrain+

GOBrain+ consists of GOBrain protocols (AutoAlign localizer, T1w Sag, T2w Ax, FLAIR Ax, DWI Ax) with two additional optimized protocols to assess contrast enhancement (T1w Ax, scanned pre and post contrast injection, and a 3D T1w MPRAGE).

The GOBrain+ MRI exam consists of these protocols administered in this order:

- 1. AutoAlign Head Localizier
- 2. T1 Sag
- 3. FLAIR Ax
- 4. T2* Ax
- 5. T1 Ax
- 6. Administration of contrast media
- 7. Diffusion Ax
- 8. T2 Ax
- 9. T1 Ax
- 10. 3D MPRAGE

These protocols are delivered in a fixed order during an examination that ensures an efficient workflow that also provides sufficient time for contrast uptake in the T1 post-contrast scans, while minimizing any impact of the contrast media on the native contrast of the other sequences.

MapIt

MapIt provides protocols and Inline calculation functionality to obtain parametric maps of T1, T2, T2^{*}, R2 and R2^{*} properties of the imaged tissue. The application range includes cartilage evaluation of joints and also the evaluation of other organs such as liver, kidney or prostate.

- 3D VIBE sequence for Inline T1 mapping
- Multi-echo spin echo sequence for Inline T2/ R2 mapping
- Multi-echo gradient echo sequence for Inline T2^{*}/ R2^{*} mapping
- Protocols for fully automated Inline parametric mapping

Wave-CAIPI SWI¹⁾²⁾

With the Wave technique, the sequence plays out sinusoidal gradients during readout. Applying these Wave readout gradients results in corkscrew k-space trajectories. This strategy combined with already existing parallel imaging acceleration technique CAIPIRINHA allows optimizing g-factor penalty during reconstruction which allows for higher acceleration factors and more homogeneous noise distribution. The optimized g-factor penalty enables higher acceleration factors with equivalent image quality (compared to standard CAIPIRINHA).

BLADE Diffusion¹⁾

Diffusion-weighted imaging with BLADE Diffusion supports imaging in regions with high BO field inhomogeneities, e.g. in the middle ear region due to the transition from air to tissue. This non-EPI-based acquisition technique fits well for this purpose. It is possible to combine this imaging technique with GRAPPA and SMS.

SWI (Susceptibility Weighted Imaging)

Siemens Healthineers-unique sequence technique for Susceptibility Weighted Imaging

- Visualization of local changes of the magnetic field due to tissue properties in general and due to the presence of deoxygenated blood or blood decomposition products
- 3D GRE sequence with full flow compensation to support venous angiography
- Enhanced susceptibility weighting of the magnitude images by phase images

¹⁾ Optional

²⁾ Prerequisite: SWI

Inline BOLD Imaging¹⁾ (Blood Oxygen Level Dependent)

Examination of intrinsic susceptibility changes in different areas of the brain, induced by external stimulation (e.g. motor or visual). Automatic real-time calculation of z-score (t-test) maps with Inline Technology, for variable paradigms.

- Compatible with single-shot EPI with high susceptibility contrast for fast multi-slice imaging
- ART (Advanced Retrospective Technique) for fully automatic 3D retrospective motion correction, for 6 degrees of freedom (3 translations and 3 rotations)
- Mosaic images for efficient storage and transfer of large data sets
- 3D spatial filtering
- Inline calculation of t-statistics (t-maps) based on a general linear model (GLM) including the hemodynamic response function and correcting for slow drifts
- Overlay of inline calculated statistical results on the EPI images

Simultaneous Multi-Slice (SMS)¹⁾

Simultaneous Multi-Slice is a revolutionary method to significantly reduce imaging times for diffusion with EPI (Echo-planar imaging) as well as RESOLVE, BOLD, TSE, TSE Dixon and BLADE Diffusion (based on TGSEsequence) imaging through excitation and readout of multiple slices simultaneously. It is the only acceleration technique that does not result in SNR-related losses due to sub-sampling. Implementation includes a multiband pulse coupled with the blipped CAIPIRINHA technique to minimize q-factor related SNR penalties.

- For diffusion-weighted imaging with EPI and RESOLVE, slice acceleration can be used to reduce scan time and/ or achieve higher spatial/diffusion resolution
- For BOLD, slice acceleration can be used to increase temporal sampling of BOLD data, for higher sensitivity to BOLD signal changes, and/or to increase slice coverage/resolution.
- For TSE and TSE Dixon pulse sequence, SMS is available for reducing scan time, and/or to increase slice coverage/resolution.
- SMS accelerated BOLD and diffusion-weighted protocols for the brain are provided
- SMS accelerated TSE and TSE Dixon protocols for MSK imaging are provided
- SMS accelerated RESOLVE protocols for various body regions (e.g. head, breast) are provided
- SMS accelerated BLADE Diffusion protocol for head is provided²⁾
- SMS Averaging, to acquire multiple slices simultaneously to reduce the measurement time and effectively increase SNR per unit time

²⁾ Prerequisite: BLADE Diffusion

Inline Perfusion¹⁾

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

DTI (Diffusion Tensor Imaging)¹⁾

Acquisition of data sets with multi-directional diffusion weighting to assess anisotropic diffusion properties of brain tissue

- Measurement of up to 256 directions of diffusion weighting with up to 16 different b-values
- Inline calculation of the diffusion tensor
- Inline calculation of Fractional Anisotropy (FA) maps (grey-scale as well as color-coded for principle diffusion direction), Apparent Diffusion Coefficient (ADC) maps and trace-weighted images based on the tensor
- Measurement of user defined diffusion directions (Free Mode)

Diffusion Spectrum Imaging (DSI) is a type of diffusion weighted imaging. This technique allows for more accurate fiber tracking than conventional diffusion techniques due to a higher sensitivity to intra-voxel diffusion caused by crossing fiber tracks. The DSI acquisition technique comes as part of the DTI package.

- · Cartesian sampling approach performed in q-space
- · Measure multiple directions with independent b-values
- Up to 514 different directions

Inline Composing

Automatic anatomical or angiographic composing of multiple adjacent coronal or sagittal images for presentation and further evaluation.

Composed images can be automatically loaded into Graphical Slice Positioning for planning purposes.

Angio Package¹⁾

Angio Package combines the applications TWIST and NATIVE.

NATIVE. TWIST contains a Siemens Healthineers-unique sequence and protocols for advanced time-resolved (4D) MR angiography and dynamic imaging in general with high spatial and temporal resolution. 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. TWIST can be combined with water excitation.

New reconstruction algorithms for iPAT² enable highly efficient multi-directional parallel imaging.

NATIVE is an integrated software package with sequences and protocols for non-contrast enhanced 3D MRA with high spatial resolution. NATIVE particularly enables imaging of abdominal and peripheral vessel

NATIVE offers:

- Non-contrast MRA
- Separate imaging of arteries and veins
- Visualization of e.g. renal arteries or peripheral
- vessels

The NATIVE package comprises:

- NATIVE TrueFISP
- NATIVE SPACE

QISS¹⁾

Software package for non-contrast enhanced peripheral MR angiography based on quiescent interval single-shot imaging.

- ECG triggered
- robust, 2D non-subtractive technology
- Set'n Go implementation (myExam AddIn) for workflow optimized application
- allows export of all images in one series (Combined View, CT-like)

ASL (Arterial Spin Labeling) 2D¹⁾

Arterial Spin Labeling (ASL) is an MR technique using the water in arterial blood as an endogenous contrast agent to evaluate perfusion noninvasively. ASL provides unique insight into human brain perfusion and function by giving information on relative cerebral blood flow.

ASL is capable of high spatial resolution perfusion imaging. ASL may also be useful in basic neuroscience, e.g. for studies of functional CBF changes.

- Fully compatible with iPAT
- Fully automated Inline calculation of relative blood flow color maps
- Supports the "Pulsed Arterial Spin Labeling" technique (PASL)
- Supports the "Pseudo Continuous Arterial Spin Labeling" – technique (PCASL)

ASL (Arterial Spin Labeling) 3D¹⁾

Arterial Spin Labeling (ASL) is an MR technique using the water in arterial blood as an endogenous contrast agent to evaluate perfusion noninvasively. ASL 3D enables the physician to qualitatively assess perfusion throughout the whole brain without the use of a contrast agent.

ASL 3D is capable of high spatial resolution brain perfusion-weighted images.

- Based on a 3D TGSE sequence for minimal low susceptibility and full brain coverage
- Higher SNR, optimized contrast uniformity and reduced motion sensitivity.
- Perfusion maps can be easily fused with anatomical images for detail evaluation in Neuro 3D¹⁾.
- Supports the "Pulsed Arterial Spin Labeling" technique (PASL)
- Supports the "Pseudo Continuous Arterial Spin Labeling" – technique (PCASL)
- Fully automated Inline calculation of relCBF color maps
- Multi-TI support and calculation of bolus arrival time maps

Advanced Cardiac Package including PSIR HeartFreeze¹⁾

This package contains special sequences and protocols for advanced cardiac imaging including 3D and 4D BEAT functionalities. It supports advanced techniques for ventricular function imaging, dynamic imaging, tissue characterization, coronary imaging, and more.

BEAT is a unique tool for fast and easy cardiovascular MR imaging. It provides 1-click switch from cine imaging to tagging for wall motion evaluation and 1-click switch from 2D to 3D imaging. BEAT automatically adjusts all parameters associated with the changes.

Cardiac and vessel morphology

- Multi echo technique thalassemia assessment
- 3D aortopathy imaging with free breathing (SPACE)

Morphology and global or regional ventricular wall motion analysis with BEAT

- 3D cine acquisition for full CT-like heart coverage
- 2D segmented FLASH for visualization of the regional wall motion using various tagging techniques (grid or stripes)

Dynamic myocardial imaging with BEAT

• Ultra-fast, high-SNR sequence for dynamic imaging with GRE EPI contrast for stress and rest exams

Tissue characterization with BEAT

- Robust myocardial tissue characterization with 3D PSIR (phase-sensitive inversion recovery)
- Fast and complete coverage of the myocardium with IR 3D FLASH and TrueFISP

PSIR HeartFreeze

• Motion correction/averaging of multiple measurements with iPAT or tPAT accelerated single-shot TrueFISP or GRE images of the heart, for free-breathing acquisition

Coronary imaging with BEAT

- 3D whole heart non-contrast coronary MRA
- 3D whole heart MRA with advanced free-breathing navigator compensating diaphragm shifts during the acquisition (motion-adaptive respiratory gating)

Compressed Sensing Cardiac Cine¹⁾

Highly accelerated functional Cardiac 2D Cine imaging based on the BEAT sequence with Compressed Sensing and Iterative Reconstruction

- Spatial and/or temporal resolution can be improved and scan time substantially reduced
- Real-time Cine or single breath-hold Cine for full heart coverage in patients with limited breath-hold capability or with arrhythmia
- Adaptive triggering is available to cover the full cardiac cycle.

MyoMaps¹⁾

On the basis of fully system guided HeartFreeze Inline Motion Correction, MyoMaps provides pixel-based T1, T2 and T2^{*} myocardial tissue quantification. Results are presented in fully system guided inline colored parametric maps of the heart.

- T1 Map based on Modified Look-Locker Inversion Recovery T1 mapping
- T2 Map based on T2-prepared single shot TrueFISP T2 mapping
- T2^{*} Map based on a multi-echo segmented gradient echo acquisition with black blood preparation

Flow Quantification

Special sequences for quantitative flow determination studies

- Non-invasive blood / CSF flow quantification
- ECG Triggered 2D phase contrast with iPAT support
- Retrospective reconstruction algorithms for full R-R interval coverage

High-bandwidth inversion recovery¹⁾

A high-bandwidth inversion pulse is included in inversion recovery sequences for tissue characterization with the aim to reduce susceptibility artifacts

Advanced Interactive Realtime¹⁾

Sequences for interactive real-time scanning

- Uses ultra-fast Gradient Echo sequences for high image contrast
- · Real-time reconstruction of the acquired data
- The user can navigate in all planes on-the-fly during data acquisition
- Real-time cardiac examinations
- Real-time interactive slice positioning and slice angulation for scan planning

Capability for multislice acquisition, definition of acquisition order, pausing, mosaic display, and skipping of the physiology trigger

Access-i¹⁾

Access-i provides an interface to enable the connection of a 3rd party workstation to the MR *syngo* Acquisition Workplace via a network router and secure local network connection.

Single Voxel Spectroscopy

Integrated software package with sequences and protocols for proton spectroscopy. Streamlined for easy push-button operation

- Matrix Spectroscopy phase-coherent signal combination from several coil elements for maximum SNR based on the Head / Neck coil
- Spectral suppression (user definable parameter) to avoid lipid superposition in order to reliably detect e.g. choline in the breast
- Up to 8 regional saturation (RSat) bands for outer volume suppression can be defined by the user
- Automatic reference scan to allow less evaluation time
- Physiological triggering (ECG, pulse, respiratory or external trigger) in order to avoid e.g. breathing artifacts.
- Spectroscopy can be combined with Free-Breath Prospective Acquisition Correction (2D-Phase navigator) when needed
- Spectroscopy relevant GRE-based shim protocols provided
- Clinical applications: brain, breast, prostate

SVS Techniques SE and STEAM

- Short TEs available
- Fully automated adjustments including localized shimming and adjustment of water suppression pulses
- Also available: Interactive adjustments and control of adjustments
- · Optimized protocols for brain applications

Includes GRACE (GeneRAlized breast speCtroscopy Exam), an SVS technique (spin echo sequence) optimized for breast spectroscopy. The technique contains a special spectral lipid suppression pulse (user definable) for lipid signal reduction.

- Siemens Healthineers unique water reference detection to visualize the normalized choline ratio.
- Online frequency shift correction for reduction of breathing related artifacts, Inline implementation no additional user interaction is required.

CSI Package¹⁾

Integrated software package with sequences and protocols for Chemical Shift Imaging (CSI)

Extension of the Single Voxel Spectroscopy (SVS) package, offering the same level of user-friendliness and automation

- Matrix Spectroscopy phase-coherent signal combination from several coil elements for maximum SNR with configurable prescan-based normalization for optimal homogeneity
- 2D Chemical Shift Imaging
- 3D Chemical Shift Imaging

- Hybrid CSI with combined volume selection and Field of View (FoV) encoding
- Short TEs available (30 ms for SE, 20 ms for STEAM)
- Automated shimming for optimal homogeneity of the larger CSI volumes
- Weighted acquisition, leading to a reduced examination time compared to full k-space coverage while keeping SNR and spatial resolution
- Outer Volume Suppression
- Spectral Suppression
- Semi-LASER sequence available for CSI examination of the brain
- Protocols for prostate spectroscopy

ZOOMit PRO¹⁾

ZOOMit PRO provides EPI diffusion imaging of small, "zoomed" areas of interest while avoiding signal from surrounding tissue and minimizing artifacts from metal implants.

- Confines the excited FOV to a given region of interest
- Method uses spatially selective RF pulses to only excite the tissue in the target region
- · Allows high resolution without infolding artifacts
- Protocols are provided for various body regions, for example pelvis, breast, brain, spine

syngo System Security Basic

This syngo software version provides security settings to protect the scanner against known security threats.

- User management with authentication to prohibit unauthorized access
- Privileges to grant rights and define functionality based on user/role
- Hardened operating system and restricted network communication
- Whitelisting (Embedded Control) against manipulation of scanner software
- Security Delivery process to frequently distribute security updates
- Option to protect customer pulse sequence trees against unauthorized modifications
- Audit trail to log system and data access by the defined users and service
- Support of customers to implement their security policy including compliance with HIPAA (Health Insurance and Accountability Act)

MR Elastography¹⁾

MR Elastography can be used to non-invasively assess variations in relative tissue stiffness.

MR Elastography includes pulse sequence and processing software. $^{2\mathrm{)}}$

• Sequence and protocols with 2D gradient-echo sequences with cyclic motion-encoding gradients (MEG)

Advanced Siemens Healthineers implementation

- iPAT enables shortened breathhold time
- Fully integrated processing of the elastogram at the scanner
- Completely automated calculation of wave images and corresponding elastograms
- Confidence map for reliability

Breast Biopsy Software¹⁾

The Breast Biopsy Software guides breast interventions such as vacuum-assisted biopsy and wire localization.

- Guidance for intervention planning and execution for both grid method and post/pillar method.
- Workflow guides through the process of marker identification and target selection
- Automatic extraction of coordinates for the selected target and calculation of required point of entry, angulation (for post/pillar method) and penetration depth.
- Projection of needle path on the planning images for control.
- Support of coil-specific guidance with graphical instructions on both the console and the touch display at the scanner.
- Typical, site-specific settings (e.g. grid method, biopsy device, marker position) can be set as default to minimize user interaction).
- Supported by myExam Breast Assist¹⁾
- Support of commonly used breast MR biopsy devices e.g. Bard EnCor, Bard Vacora, Hologic ATEC, Mammotome

²⁾ Please note that this functionality can only be used in combination with a dedicated hardware, which is not part of the MR Elastography package.

Expert-i

Interactive real-time access to imaging data and exam information from any PC within the hospital network during the MR exam.

Until now, radiologists or other experts had to stop what they were doing and go to the MR scanner to see the acquired images, help with the scan set-up, or answer an open question.

Now, questions can be addressed quickly and efficiently via remote PC.

MR protocols module¹⁾

Basic package

• For first installation by SHS service the Basic License of MR protocols module is required once and includes the first MRI scanner connected. It includes one installations and a connection to the first MRI scanner.

Additional scanner option

Benefits of Expert-i

- Excellent results right from the first examination
- Streamlined workflow and faster patient throughput
- Reduced repeat rates with a check on images while the patient is still in the examination room
- Reduced training effort by enabling expert assistance for specialized procedure

For every additional MRI scanner to be managed by the MR protocols module a Connect License is required.

Remote Assist¹⁾

Direct computer link to the local Siemens Healthineers service department or the Siemens Healthineers service centers (via router with telephone connection)

Image transfer for further evaluation

- Image and file transfer in batch mode
- Reading of entries in the error logbook
- Remote trouble shooting
- Remote access to service manuals written in easy-touse HTML format
- Remote access to Service Site Database
- Start of preventive maintenance and quality assurance routines.
- Remote access granted only with permission of the institution. Data security is ensured by secure access

¹⁾ In conjunction with a Siemens Healthineers service contract.

Application Packages

On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens Healthineers sales organization worldwide. Availability and packaging may vary by country and is subject to change without prior notice. Some/All of the features and products described herein may not be available in the United States.

The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which do not always have to be present in individual cases.

Siemens Healthineers reserves the right to modify the design, packaging, specifications, and options described herein without prior notice. Please contact your local Siemens Healthineers sales representative for the most current information.

Note: Any technical data contained in this document may vary within defined tolerances. Original images always lose a certain amount of detail when reproduced.

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customers' unique setting. Since there is no "typical" hospital and many variables exist (e.g. hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

Siemens Shenzhen Magnetic Resonance Ltd. Siemens MRI Center Gaoxin C. Ave. 2nd, Hi-Tech Industrial Park 518057 Shenzhen PEOPLE's REPUBLIC OF CHINA



MAGNETOM Amira – A BioMatrix System

Post-processing Applications & Features

siemens-healthineers.com/amira





Post-processing Applications & Features

MR relevant post-processing functionalities from *syngo*.via are available in *syngo* MR XA50 as well.

They are optional and medical devices (or parts of them) in their own rights.

If an MR Workplace (secondary console) is available an application can be flexibly used on one of the workplaces (Acquisition vs. MR Workplace).

In case a dual user package is available the application can be used in parallel (for different patients) on the two workplaces.

The integrated reporting, RadLex and trending support as known from *syngo*.via are not available in *syngo* MR XA50.

Post-processing results will be available as result images at remote DICOM nodes. $^{\mbox{\tiny 1)}}$

Applications & Features

- syngo.MR General
- syngo.MR Composing
- syngo.MR 3D Lesion Segmentation²⁾
- syngo.MR BreVis²⁾
- syngo.MR Oncology²⁾
- syngo.MR OncoTrend²⁾
- syngo.MR Spectro CSI²⁾
- syngo.MR Spectro SVS²⁾
- syngo.MR Spectro Extension²⁾
- syngo.MR Spectro Research²⁾
- syngo.MR Tissue 4D²⁾
- syngo.MR Prostate AI²⁾³⁾
- syngo.MR Brain Morphometry²⁾
- syngo.MR Neuro fMRI²⁾
- syngo.MR Neuro Perfusion²⁾
- syngo.MR Neuro Perfusion Mismatch²⁾
- syngo.MR Tractography²⁾
- syngo.MR Cardiac 4D Ventricular Function²⁾
- syngo.MR Cardiac Flow²⁾
- syngo.MR Cardiac Perfusion²⁾
- syngo.MR Vascular Analysis²⁾

¹⁾ Specical post-processing DICOM objects like segmentations or structured reports won't be sent out

²⁾ Optional

³⁾ syngo.MR Prostate AI is not commercially available in some countries. Due to regulatory reasons their future availability cannot be guaranteed. Please contact your local Siemens Healthineers organization for further details.

Post-processing Applications & Features

On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens Healthineers sales organization worldwide. Availability and packaging may vary by country and is subject to change without prior notice. Some/All of the features and products described herein may not be available in the United States.

The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which do not always have to be present in individual cases.

Siemens Healthineers reserves the right to modify the design, packaging, specifications, and options described herein without prior notice. Please contact your local Siemens Healthineers sales representative for the most current information.

Note: Any technical data contained in this document may vary within defined tolerances. Original images always lose a certain amount of detail when reproduced.

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customers' unique setting. Since there is no "typical" hospital and many variables exist (e.g. hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

Siemens Shenzhen Magnetic Resonance Ltd. Siemens MRI Center Gaoxin C. Ave. 2nd, Hi-Tech Industrial Park 518057 Shenzhen PEOPLE's REPUBLIC OF CHINA



MAGNETOM Amira – A BioMatrix System



siemens-healthineers.com/amira



Parts & Accessories

Patient Video Monitoring

Dedicated MAGNETOM Amira video camera for comprehensive patient observation in the examination room.

- Up to two in-room cameras for optimized patient observation from front end and rear-end
- Color 640 × 480 pixel LCD monitor may be positioned at the *syngo* Acquisition Workplace or at a convenient wall location

Remote Viewing Monitor

Color LCD monitor (1920×1200) to be connected in parallel to the Workplace monitor.

Data transfer via ethernet for high signal quality over a long distance allows the computer and user to be located anywhere on the 100 or 1000 Mbps network with full routing of data across routers, switches and subnets (1 Gbit/s recommended).

The system supports SSL (Secure Sockets Layer) via a TCP/IP connection. All media streams transferred in the network are encrypted.

syngo MR Workplace

Additional integrated Workplace connected to host computer for post-processing and image evaluation. Same user interface as the *syngo* Acquisition Workplace, except for scan control.

Shared database with *syngo* Acquisition Workplace, therefore eliminating image copy time.

Host Computer and LCD Monitor technical data: refer to "Computer System" section of the main data sheet.

Workplace Table

Ergonomically designed table for:

- Color monitor
- Keyboard
- Mouse
- Patient communication unit
- Patient supervision display

Patient Transport Stretcher

MR-compatible design on wheels for transporting a patient into the examination room.

- Non-ferromagnetic, height-adjustable design
- Trendelenburg positioning possible

Max. patient weight 160 kg (350 lbs)

System Start Timer

Timer clock that can be installed together with the MAGNETOM Amira to start the system automatically at user-definable times, eliminating waiting times during system boot up.

It allows the definition of three different startup times for different days.

Workplace Container

50 cm wide extra case for the *syngo* host computer with sliding front door to allow change of storagemedia

Coil Storage Cart

Specially designed non-ferromagnetic cart for easy storage of some of the most commonly used coils and accessories

May be rolled to convenient locations in the examination room					
Additional storage space on the inside of the doors when doors are opened					
Coil storage	Width	cart closed	140 cm (4'7")		
		cart opened	280 cm (9'2")		
	Depth		54 cm (1'9")		
	Height		121 cm (3'12")		
Upper drawer	Height		13.3 cm		
Tray	Height		9.0 cm		
Lower drawer	Height		24.0 cm		

> Additional optional accessories and consumables for MR: healthcare.siemens.com/accessories-oem-equipment



On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens Healthineers sales organization worldwide. Availability and packaging may vary by country and is subject to change without prior notice. Some/All of the features and products described herein may not be available in the United States.

The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which do not always have to be present in individual cases.

Siemens Healthineers reserves the right to modify the design, packaging, specifications, and options described herein without prior notice. Please contact your local Siemens Healthineers sales representative for the most current information.

Note: Any technical data contained in this document may vary within defined tolerances. Original images always lose a certain amount of detail when reproduced.

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customers' unique setting. Since there is no "typical" hospital and many variables exist (e.g. hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

Siemens Shenzhen Magnetic Resonance Ltd. Siemens MRI Center Gaoxin C. Ave. 2nd, Hi-Tech Industrial Park 518057 Shenzhen PEOPLE's REPUBLIC OF CHINA

Datasheet-box content XA50

Sales Project/Customer:_____

Part of tender	Document/ Title	Manufacturer	Printkey/ Document ID
	MAGNETOM Amira – A BioMatrix System – syngo MR XA50	SSMR	A91MR-421-21-7600 PA 1222 POD
	MAGNETOM Amira – Tim [96×16] XF Gradients, Tim [96×24] XF Gradients	SSMR	A91MR-421-22-7600 PA 1222 POD
	MAGNETOM Amira, Head/Neck 16	SSMR	A91MR-421-A201-7600 PA 1222 POD
	MAGNETOM Amira, Spine 18	SSMR	A91MR-421-A202-7600 PA 1222 POD
	MAGNETOM Amira, BioMatrix Body 13	SSMR	A91MR-421-A203-7600 PA 1222 POD
	MAGNETOM Amira, Flex Large 4 / Flex Small 4	SSMR	A91MR-421-A204-7600 PA 1222 POD
	MAGNETOM Amira, UltraFlex Large 18 / UltraFlex Small 18	SSMR	A91MR-421-A205-7600 PA 1222 POD
	MAGNETOM Amira, Peripheral Angio 16	SSMR	A91MR-421-A206-7600 PA 1222 POD
	MAGNETOM Amira, Hand/Wrist 16	SSMR	A91MR-421-A207-7600 PA 1222 POD
	MAGNETOM Amira, Foot/Ankle 16	SSMR	A91MR-421-A208-7600 PA 1222 POD
	MAGNETOM Amira, Shoulder Shape 16	SSMR	A91MR-421-A209-7600 PA 1222 POD
	MAGNETOM Amira, iTX Extremity 18 Flare	SSMR	A91MR-421-A210-7600 PA 1222 POD
	MAGNETOM Amira, 4-Channel BI Breast Coil	Noras	A91MR-421-A211-7600 PA 1222 POD
	MAGNETOM Amira, Breast 18	SSMR	A91MR-421-A212-7600 PA 1222 POD
	MAGNETOM Amira, Special-Purpose 4	SSMR	A91MR-421-A213-7600 PA 1222 POD
	MAGNETOM Amira, MEDRAD Endorectal Coil Kit	DxTx / SSMR	A91MR-421-A214-7600 PA 1222 POD
	MAGNETOM Amira, Application Packages	SSMR	A91MR-421-B2-7600 PA 1222 POD
	MAGNETOM Amira, Post-processing Packages	SSMR	A91MR-421-C2-7600 PA 1222 POD
	MAGNETOM Amira, Parts & Accessories	SSMR	A91MR-421-D2-7600 PA 1222 POD
	Backpage (Printnumber of Package)	SSMR	A91MR-421-20-7600 PA 1222 POD

On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens Healthineers sales organization worldwide. Availability and packaging may vary by country and is subject to change without prior notice. Some/All of the features and products described herein may not be available in the United States.

The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which do not always have to be present in individual cases.

Siemens Healthineers reserves the right to modify the design, packaging, specifications, and options described herein without prior notice. Please contact your local Siemens Healthineers sales representative for the most current information.

Note: Any technical data contained in this document may vary within defined tolerances. Original images always lose a certain amount of detail when reproduced.

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customers' unique setting. Since there is no "typical" hospital and many variables exist (e.g. hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

International version. Not for distribution or use in the U.S.

Siemens Healthineers Headquarters

Siemens Healthcare GmbH Henkestr. 127 91052 Erlangen, Germany Phone: +49 9131 84 0 siemens-healthineers.com

Manufacturer

Siemens Shenzhen Magnetic Resonance Ltd. Siemens MRI Center Gaoxin C. Ave. 2nd, Hi-Tech Industrial Park 518057 Shenzhen PEOPLE's REPUBLIC OF CHINA