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Qty

Item Description

1

MAGNETOM Prisma - System

MAGNETOM Prisma is the 3T PowerPack for exploration.

Based on a unique 3T platform to help you tackle the most demanding clinical and research challenges of today and tomorrow, you have the power to outperform in the most ambitious projects. With exciting new applications delivering higher anatomical detail and opening new areas of research, you have the power to explore and enter new areas of research. You and your collaborators will benefit from the reproducibility standards of Dot, giving you the power to succeed and set the future trends in imaging.

System Design

- Unmatched, whole-body superconductive Zero Helium Boil-Off 3T magnet
- XR 80/200 gradient system
- Higher Order shim, delivering 5A/channel
- Parallel transmit with TimTX TrueShape technology
- High-performance measurement and reconstruction system, with 2 GPGPUs standard
- Tim 4G (Total imaging matrix in the 4th generation) for excellent image quality and speed
- Siemens unique DirectRF(tm) technology enabling the all digital-in/ digital-out design
- Dual-Density Signal Transfer Technology
- Head/Neck 20 DirectConnect
- Spine 32 DirectConnect
- Body 18
- Flex Large 4
- Flex Small 4
- Flex Coil interface
- Tim Coil interface

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

- Dot Display
- Dot Control Centers
- Brain Dot Engine

Tim Application Suite allowing excellent head-to-toe imaging

- Neuro Suite
- Angio Suite
- Cardiac Suite
- Body Suite

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Item Description

- Onco Suite
- Breast Suite
- Ortho Suite
- Pediatric Suite
- Scientific Suite

Further included

- High performance host computer
- Siemens uniqueTimCT FastView localizer and CAIPIRINHA
- syngo MR software including
- 1D/2D PACE
- BLADE
- iPAT²
- Phoenix
- Inline Diffusion
- WARP
- MDDW (Multiple Direction Diffusion Weighting)
- CISS
- DESS
- ZOOMit

The system (magnet, electronics and control room) can be installed in 33 sqm space. For system cooling either Eco Chiller

1

Tim [204x64] XR Gradients #P

Tim [204x64] XR gradients performance level

Tim 4G's RF system and innovative coil architecture enables high resolution imaging and increased throughput. Up to 204 simultaneously connected coil elements allow in combination with the fully integrated 64 independent RF channels for the most flexible parallel imaging and support the most demanding applications. Maximum SNR is ensured through the new Tim 4G matrix coil technology.

XR gradients

The XR 80/200 gradients are the most powerful commercially available gradients of any clinical scanner currently on the market. The XR gradients combine a maximum gradient amplitude of 80 mT/m with a 200 T/m/s slew rate, capable of driving higher SNR throughout all regions of the body. Even under high stress conditions, the XR gradients bring excellent performance thanks to a rock-solid design. Dedicated force compensation on each axis yields low vibrations and low acoustic noise while the high-performance cooling for each individual axis allows full duty cycle over long-term measurements with outstanding stability. The XR 80/200 gradients push the limits of performance to a new level.

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PC Keyboard US english #Tim

Standard PC keyboard with 101 keys.

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Tim Dockable Table #P

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

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

1

Advanced Dot Imaging Package #T+D

The following components are already included in the DotGO Advanced Package:

- Angio Dot Engine
- Abdomen Dot Engine

The Angio and Abdomen Dot Engine offer a comprehensive set of guidance and automation,

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Item Description

so that robust image quality can be achieved efficiently and consistently for Vascular and Abdominal MR imaging.

Angio Dot Engine

The timing of contrast injection and scan is widely considered the most challenging part of an angiographic exam. Angio Dot guides the user through angiographic single or multi station examinations by providing semi-automatic detection of arterial and venous timing windows using a test bolus technique. This information is fed back into the next planning steps automatically adapting scan parameters to the individual patient and patient's condition.

Where needed, AutoVoiceCommands support the communication with the patient and ensure optimal timing of breathing, scanning and contrast media. All steps of contrast injection are presented in a simple, automated graphic on the monitor.

syngo Inline Composing and the Tim Planning Suite are included.

Abdomen Dot Engine provides:

- Personalized Exam Strategies
- Guidance
- Automatic sequence scaling
- Auto Navigator
- Auto-FoV
- Timeline setup and monitoring
- Automatic Voice Commands
- Auto Bolus Detection
- Inline radial range calculation for MRCP
- Inline Subtraction
- Inline Registration

1

Spine Dot Engine #T+D

The Spine Dot Engine provides optimized cervical, thoracic and lumbar spine imaging. Amongst various features to support streamlined spine workflow is Labeling of the vertebrae suggested by the system, Tim Planning Suite and In-line Composing. syngo WARP with View Angle Tilting (VAT) technique is provided for reducing in-plane geometric distortions syngo WARP can be used throughout the body.

1

Native syngo #Tim

Integrated software package with sequences and protocols for non-contrast enhanced 3D MRA with high spatial resolution. syngo NATIVE particularly enables imaging of abdominal and peripheral vessels and is an alternative to MR angiography techniques with contrast medium, especially for patients with severe renal insufficiency.

1

Cardiac Dot Engine, USA #T+D

Cardiac examinations: Dot Cardiac - Customized workflows that are easier to repeat. Using anatomical landmarks, standard views of the heart (such as dedicated long axis and short-axis views), are easily generated and can easily be reproduced using different scanning techniques. Scan parameters are adjusted to the patient's heart rate and automatic voice commands are given.

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Flow Quantification #Tim

Special sequences for quantitative assessment of flow.

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Argus Flow

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Advanced Cardiac Package #T+D

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

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Argus 4D Ventr.Function syngo #Tim

syngo Argus 4D Ventricular Function software processes MR cine images of the heart and generates quantitative results for physicians in the diagnostic process.

| Qty | Item Description |
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| 1 | <p>Large Joint Dot Engine #T+D</p> <p>Large Joint Dot Engine optimizes image quality 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 a great extent. The Large Joint Dot Engine features AutoAlign and AutoCoverage for knee, hip and shoulder, syngo WARP with VAT (View Angle Tilting), and Inline MPR.</p> |
| 1 | <p>Inline Perfusion #3T</p> <p>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.</p> |
| 1 | <p>Neuro Perfusion Evaluation,USA #T+D</p> <p>Neuro Perfusion Evaluation syngo provides a task card for detailed post-processing of brain perfusion data sets. Color display of the relative Mean Transit Time (relMTT), relative Cerebral Blood Volume (relCBV), corrected rel CBV, and relative Cerebral Blood Flow (relCBF) is supported. Flexible selection of the Arterial Input Function (AIF). Furthermore a calculation of maps using the pre-selected local Arterial Input Functions (AIF) is provided. The detailed evaluation of brain perfusion data sets generates parameter maps for TTP and PBP and for the hemodynamic parameters relMTT, relCBV, rel CBVcor and relCBF.</p> |
| 1 | <p>DTI Package #P</p> <p>The DTI Package is a bundle of:</p> <ul style="list-style-type: none"> - Diffusion Tensor Imaging - DTI Evaluation and - DTI Tractography syngo <p>The bundle comprehends all acquisition and postprocessing tools for comprehensive DTI exams.</p> |
| 1 | <p>RESOLVE #T+D</p> <p>RESOLVE is a diffusion-weighted, readout-segmented EPI sequence optimized towards high resolution imaging with reduced distortions. The sequence uses a very short echo-spacing compared to single-shot EPI, substantially reducing susceptibility effects. A 2D-navigator correction is applied to avoid artefacts due to motion-induced phase errors. This combination allows diffusion weighted imaging of the breast, prostate, brain and spine with a high level of detail and spatial precision.</p> |
| 1 | <p>Arterial Spin Labeling 3D #T+D</p> <p>3D acquisition of non-contrast enhanced brain perfusion with a TGSE sequence for minimal susceptibility and full brain coverage. Higher SNR, optimized contrast uniformity and reduced motion sensitivity. Inline calculation of PWI (perfusion weighted images) for a qualitative assessment of brain perfusion.</p> |
| 1 | <p>SWI #Tim</p> <p>Susceptibility Weighted Imaging is a high-resolution 3D imaging technique for the brain with ultra-high sensitivity for microscopic magnetic field inhomogeneities caused by deoxygenated blood, products of blood decomposition and microscopic iron deposits. Among other things, the method allows for the highly sensitive proof of cerebral hemorrhages and the high-resolution display of venous cerebral blood vessels.</p> |
| 1 | <p>Spectroscopy Package #T+D</p> <p>The Spectroscopy Package is a comprehensive software package which bundles Single Voxel Spectroscopy, 2D Chemical Shift Imaging, 3D Chemical Shift Imaging and syngo Spectroscopy Evaluation.</p> <p>Sequences and protocols for proton spectroscopy, 2D and 3D proton chemical shift imaging (2D CSI and 3D CSI) to examine metabolic changes in the brain (e.g. in tumors and degenerative diseases) and in the prostate are included. Furthermore included is the comprehensive syngo Spectroscopy Evaluation Software which enables fast evaluation of spectroscopy data on the syngo Acquisition Workplace.</p> |
| 1 | <p>TWIST syngo #Tim</p> <p>This package contains a Siemens unique sequence and protocols for time-resolved (4D) MR</p> |

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Item Description

angiographic and dynamic imaging in general with high spatial and temporal resolution. syngo TWIST supports comprehensive dynamic MR angio exams in all body regions. It offers temporal information of vessel filling in addition to conventional static MR angiography, which can be beneficial in detecting or evaluating malformations such as shunts. In case of general dynamic imaging, for example an increase in spatial resolution by a factor of up to 2 at 60 seconds temporal resolution (compared to conventional dynamic imaging) is possible due to intelligent k-space sampling strategies. Alternatively, increased temporal resolution at constant spatial resolution is possible.

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Shoulder 16 Coil Kit #Sk

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

1

Foot/Ankle 16 #Sk

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

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

1

Tx/Rx 15-channel Knee Coil DDST #Sk

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

Main features :

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

1

Head/Neck 64 #P,Sk

Tim 4G coil technology with Dual Density Signal Transfer and DirectConnect Technology combines key benefits translating into excellent image quality: highest SNR, extreme iPAT performance, high patient comfort, and unmatched flexibility.

The 64-channel head/neck coil with its 64 integrated pre-amplifiers ensures an outstanding signal-to-noise ratio. The unique DirectConnect and SlideConnect technologies allow users to connect 64 coil elements of the Head/Neck 64 with just one cable. The very open design ensures its patients will feel comfortable, while the anatomic design ensures highest signal-to-noise.

The Head /Neck 64 features:

- 64-element design with 64 integrated preamplifiers, 40 elements in the head region 24 elements in the neck region.
- Integrated SlideConnect and DirectConnect technology
- Combined head/neck coil for an optimized workflow
- Upper coil part removable
- Lower coil part usable without upper part for highly claustrophobic patients
- Smoothly integrates into the patient table with Spine 32
- Open patient-friendly design
- Cushioned head stabilizers (removable)
- No coil tuning
- iPAT-compatible in all directions
- Optimized for sequences using iPAT²

Qty**Item Description**

- Dual-Density Signal Transfer enables ultrahigh density coil designs by integrating key RF components into the local coil
- Rear opening for up to 128 EEG electrode leads
- Detachable look-out mirror

Applications:

- Head examination
- Neck examination
- Cervical spine examination
- MR Head Angiography, also time-resolved
- MR Neck Angiography
- Combined head/ neck examination
- TMJ (temporo mandibular joints)

Typically combined with:

Spine 32, Body 18, Peripheral Angio 36 (during whole body imaging) or flexible coils such as Flex Large 4

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MR Workplace Table 1.2m

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

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MR Workplace Container, 50cm

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

1

Patient Supervision TV #T+D

The supervision solution is customizable and designed to address different site specific requirements. Up to 4 cameras can be optionally connected for patient supervision in the examination or waiting room.

This package contains a special video camera for monitoring the patient during an MR examination, conveniently mounted on the wall of the examination room. The information is displayed on an LCD monitor in the control room, included in this kit.

1

Patient TV wall support

Wall mount for the patient monitor.

1

Coil Storage Cart #T+D

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

1

UPS Cable #Tim

Power cable for connecting the UPS Powerware PW 9130-3000i (14413662) to the ACC of MAGNETOM Tim and MAGNETOM Tim+Dot systems for backing up the computer.

Standard cable length: 9 m.

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UPS Powerware PW9130G-3000T-XLEU

UPS system Eaton PW9130G-3000T-XLEU for MAGNETOM Tim, MAGNETOM Tim+Dot and MAGNETOM Symphony systems for safeguarding computers.

Power output: 3.0 kVA / 2.7 kW

Bridge time: 5 min full load / 14 min half load

Input voltage: 230 VAC

1

UPS Battery module

UPS battery module Eaton PW 9130N-3000T-EBM for all MAGNETOM Tim, MAGNETOM Tim+Dot and MAGNETOM Symphony systems for safeguarding computers.

Extension for: PW9130i-3000T

| Qty | Item Description |
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| | <p>Battery type: Closed, maintenance-free</p> <p>Extension of the bridge time to: 24 minutes with a module</p> <p>Dimensions (H x W x D): Battery module: 346 x 214 x 412 mm</p> <p>incl. bracket set</p> <p>Weight: approx. 50 kg</p> |
| 1 | <p>Additional Set of Manuals</p> <p>Additional set of manuals for the above selected MR system.</p> |
| 1 | <p>MR_GOV_RIG_INSTL</p> |
| 1 | <p>T+D Preinstall kit for dockable table</p> |
| 1 | <p>Standard Cryogenics</p> |
| 1 | <p>MR Project Management</p> <p>A Siemens Project Manager (PM) will be the single point of contact for the implementation of your Siemens equipment. The assigned PM will work with the customer's facilities management, architect or building contractor to assist you in ensuring that your site is ready for installation. Your PM will provide initial and final drawings and will coordinate the scheduling of the equipment, installation, and rigging, as well as the initiation of on-site clinical education.</p> |
| 1 | <p>Initial onsite training 32 hrs</p> <p>Up to (32) hours of on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Training will cover agenda items on the ASRT approved checklist. Uptime Clinical Education phone support is provided during the warranty period for specified posted hours. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p> |
| 1 | <p>Follow-up training 32 hrs</p> <p>Up to (32) hours of follow-up on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Uptime Clinical Education phone support is provided during the warranty period for specified posted hours. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p> |
| 1 | <p>MR Dot Govt. Training Class (No T&L)</p> <p>Tuition for (1) government attendee to attend a Classroom Course of choice at one of the Siemens training centers. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p> |
| 4 | <p>Additional onsite training 32 hours</p> <p>Up to (32) hours of on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Training will cover agenda items on the ASRT approved checklist if applicable. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p> |
| 1 | <p>e.learning CEU subscription (12 mths)</p> <p>This (12) month multi-modality e.learning subscription will provide access for (10) imaging professionals at the customer site to utilize up to (50 CEUs).</p> <p>This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p> |
| 1 | <p>Offset for Initial onsite train 32 hrs</p> |
| 1 | <p>Armrest #MR</p> |

Qty**Item Description**

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KKT ECOCHILLER 133L

The KKT ECO 133 -L chiller is a dedicated 20°C cooling system for MAGNETOM Aera and MAGNETOM Skyra which automatically adapts to the different cooling requirements (e.g. system in operation, standby, ...) to reduce the energy consumption for cooling.

The cooling system must be used in combination with the IFP (Interface Panel), if there is no on-site chilled water supply at all.

The IFP is included in the scope of supply.

1

Kraus Start-up and Warranty

1

Elastography hardware

RESOUNDANT Hardware starter set for Elastography

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

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

The active driver, which creates the mechanical waves

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

Long and short plastic tubings for mechanical wave transfer from active to passive driver

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

Cords and cables for connecting the trigger box with the active driver and the components with the scanner electronics

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

Customer is responsible for hardware installation.

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

The system price includes two years parts warranty through Mayo.

1

Peripheral Angio 36 #Sk

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

- 36 channels

- Dual Density Signal Transfer

- Ultra light-weight

- SlideConnect Technology

The 36-channel coil includes 36 integrated pre-amplifiers for excellent signal-to-noise ratio.

The single SlideConnect Plug allows for fast and easy patient preparation.

The Peripheral Angio 36 features:

- 36-element design with 36 integrated preamplifiers, distributed over 6 planes with 6 elements each

- Operates in an integrated fashion with Body 18 coils and with the Spine 32 . For Whole-Body examinations also with the Head/ Neck 20

- Automatic table feed and active coil switch

- Can be utilized head and feet first

- Both legs are independently covered with coil elements, maximizing the coil filling factor and the signal-to-noise ratio

- No coil tuning

- iPAT-compatible

- Dual-Density Signal Transfer enables ultra-high density coil designs by integrating key RF components into the local coil

- SlideConnect technology for easy coil set up

| Qty | Item Description |
|-----|---|
| | <ul style="list-style-type: none"> - One cable only for easy handling - Includes special non-ferromagnetic coil cart for safe, user-friendly storage <p>Applications:</p> <ul style="list-style-type: none"> - High-resolution angiography of both legs incl. Pelvis (by additional use of the Body 18) with highest signal-to-noise ratio - Visualization of the iliac arteries and aorta in combination with Body 18 - Bilateral examinations of long bones of the legs <p>Typically combined with:</p> <p>Head/ Neck 20, Body 18, Spine 32, and all flexible coils such as Flex Large 4 or Flex Small 4</p> |
| 1 | <p>Hand/Wrist 16 #Sk</p> <p>The new Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility.</p> <p>Hand/Wrist 16 for examinations of the left or right hand and wrist region consists of a base plate and an iPAT compatible 16-channel coil and allows high resolution imaging of the wrist and the hand within one examination. Hand/Wrist 16 will be connected via a SlideConnect plug for fast and easy patient preparation.</p> |
| 1 | <p>MR Elastography #T+D</p> <p>MR Elastography offers a new diagnostic tool for all Tim+Dot systems that allows identifying variations in liver tissue stiffness.</p> <p>The MR Elastography package consists of new protocols and sequences, new reconstruction algorithms and inline reconstruction.</p> |
| 1 | <p>fMRI Trigger Converter</p> <p>An optical trigger signal is available to trigger external stimulation devices in fMRI experiments.</p> <p>With the "fMRI Trigger Converter" this signal can be converted to an electrical signal (TTL/BNC and RS 232 interface for PC; modes: toggle or impulse).</p> |

Offset Part MR_FOLLOWUP_32 Follow-up training 32 hrs

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

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

Offset Part 14407354 Additional Set of Manuals

Detailed Technical Specifications

Description

MAGNETOM Prisma - The 3T PowerPack for exploration - integrates our most recent innovations in MRI, enabling the power to outperform, the power to explore and the power to succeed.

The system includes:

The Benchmark in 3T magnets

- Whole-body superconductive 3T magnet with active shielding (AS) technology with counter coils
- Zero Helium Boil-off Technology
- External Interference Shielding (E.I.S.)
- Excellent homogeneity enabled magnet design which allows for a cylindrically optimized homogeneity volume resulting in higher image quality (50 × 50 × 50 cm³ DSV, typ. 1.1 ppm based on the 24-plane plot method)
- The magnet has a helium capacity of approximately 933l liters and a typical Helium boil-off rate of 0 l/yr during typical, undisturbed clinical operation depending on the sequences used and examination time, and provided the system is serviced in regular intervals.
- It has an integrated magnet cooling system.
- The combination of standard active shim with 3 linear channels (1st order) and 5 non linear channels (2nd order) and passive shim allows for maximized magnetic field homogeneity and consistently high image quality for a wide range of applications

XR Gradients: an unmatched gradient system

- Maximum amplitude of 80 mT/m and maximum slew rate of 200 T/m/s on each axis simultaneously
- Actively shielded water-cooled with dedicated cooling for each gradient axis
- All axes force compensated for lowest vibrations and acoustic performance
- Outstanding performance and stability for long duration scans

TimTX TrueShape

TimTX TrueShape is Siemens' architecture for parallel transmit (pTX) technology. TimTX TrueShape allows dynamic parallel transmission of radio frequency (RF) pulses, shaping the RF excitation field locally and thus enabling selective excitation.

It enables benefits for MR imaging and spectroscopy applications through optimized image homogeneity or efficient selective excitation.

TimTX TrueShape Applications

- *syngo* ZOOMit is the first application utilizing TimTX TrueShape. It allows "zooming into" a part of the image.
- ZOOMit EPI realized by selective excitation, i.e. avoiding infolding artifacts in phase encoding directions, improving image quality locally with fewer distortions and speeding up acquisition time by lowering the requirements on spatial encoding.
- ZOOMit SPACE realized by inner volume excitation.

Tim 4G+Dot

Tim 4G provides increased patient comfort and optimized workflow efficiency. Only one patient setup, no repositioning, no changing of coils. Ultra-light-weighted coils with high density of coil elements for maximized patient comfort and increased SNR. Feet-first positioning for almost all examinations possible reduces anxiety and claustrophobia.

Tim 4G is 4G flexibility, accuracy and speed and brings image quality and acquisition speed to a new level.

Dot takes away the complexity in MRI scanning and provides consistent reproducible results by patient personalization, user guidance and process automation. Optimized scan strategies can be selected based on patient condition, which allows for high quality exams even when conditions change. Integrated decision points allows the user to easily add or remove one or a group of protocols with one click. Step by step real-time on board guidance guides novice users even through the most complicated exams. Process automation allows optimal timing for breathing, scanning, planning or contrast arrival. Dot can be easily customized to follow the individual standards of care.

Description

Dot is personalized, guided and automated and designed to improve workflow efficiency and image consistency.

DirectRF - RF Transmit/Receive System:

- Fully integrated Transmit- and Receive path in the magnet housing including extremely compact water-cooled solid state amplifier with 50kW peak power
- High dynamic range
- Real time feedback loop for inline sequence adaptation
- Integrated no tune transmit/receive Body Coil

The revolutionary Tim 4G technology allows connecting up to 204 coil elements simultaneously enabling higher SNR and iPAT in all directions. No repositioning of patients is needed even for large Field of View examinations.

- Dual-Density Signal transfer enables ultra-high density coil design by integrating key RF components into the local coil.

Tim 4G Coils:

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

Excellent image quality, high patient comfort, and unmatched flexibility

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

AutoCoilSelect for dynamic, automatic, or interactive selection of the coil elements within the Field of View fastens the exam preparation at the host.

All coils are time-saving "no-tune" coils.

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

- Head/Neck 20

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

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

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

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

- Body 18

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

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

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

The Body 18 is typically used in combination with the Spine 32 for examinations of the thorax, abdomen, pelvis or hip and operates as a 30 channel body coil (3 rings 10 elements). The Body 18 can also be used for cardiac or vascular applications. Through its perfect combinability with the Spine 32, further Body 18

Description

(optional), the Peripheral Angio 36 (optional), but also the Head/Neck 20 and all flexible coils (e.g. Flex Large 4, Flex Small 4) it contributes for a broad range of indications up to whole-body imaging.

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

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

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

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

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

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

Tim Table

- The maximum scan range of the Tim Table is 280 cm.
- The maximum patient weight of 250 kg (550 lbs) is valid for horizontal and vertical movements, which ensures maximized patient comfort for obese patients.
- The patient table can be lowered to a minimum height of 64 cm from the floor, for easier patient positioning and better accessibility for geriatric, pediatric or immobile patients. An infusion stand is integrated to ensure fast patient set up also for critical patients.
- Multiple Tim4G coils can be connected at once for efficient and patient friendly examinations.
- The Tim Table can be moved with two clicks into the isocenter - one click to the upmost position and one click into the isocenter.

Dot (Day Optimizing Throughput) Engine

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

Dot Control Centers and Dot Display

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

Dot Technology

Dot makes it easy to get the best possible results for virtually any type of patient. Dot gives uniquely tailored, optimized scans configurable to patient condition or clinical question.

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

Brain Dot Engine

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

Description

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

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

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.

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

AutoAlign Head allows automatically slice positioning and aligns on the anatomically derived sagittal, coronal, and axial slices of the localizer. The operator-free alignment and anatomical marking are consistent, independently of patient age, head position, or disease.

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

Easy rerun or repeat with functionality allows for reduced table time even in case of patients with pain or claustrophobia. An image inside the examination UI can be selected and a rerun of the corresponding series can be triggered with identical sequences or parameters. Alternatively an exam can be repeated with a changed strategy.

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

Tim Application Suite

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

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

syngo TimCT FastView

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

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

Neuro Suite

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

Description

- EPI sequences and protocols for diffusion, perfusion and fMRI for advanced neurological applications. Diffusion weighted imaging is possible with up to 16 b-values in the orthogonal directions. Dynamic Analysis software (included in standard configuration) enables calculation of:
 - ADC maps
 - t-test maps from the EPI images for fMRI
 - Time-to-Peak maps for perfusion analysis.
- Whole spine protocols acquire in multiple steps via software controlled table movement in a single click.
- 3D isotropic resolution volume imaging using T1 3D MPRAGE / 3D FLASH, SPACE DarkFluid, T2 SPACE and 3D TSE
- T2-weighted high resolution 3D Restore protocols optimized for inner ear examinations
- Whole-spine protocols in multiple steps with software controlled table movement
- 2D and 3D MEDIC protocols for T2-weighted imaging, particularly for C-spine examinations in axial orientation where reproducibility is difficult due to CSF pulsations and blood flow artifacts
- 3D Myelograms with 3D HASTE and 3D True-FISP for anatomical details
- Dynamic sacro-iliac joint imaging after contrast administration using a fast T1-weighted FLASH 2D sequence
- Spine diffusion protocols to differentiate osteoporosis versus tumor infiltration and post-radiotherapy changes versus residual tumor with PSIF sequence
- Precision filter for high spatial accuracy e.g. for neuro intra-operative imaging and stereotactic planning
- 3D CISS (Constructive Interference in Steady State) for excellent visualization of fine structures such as cranial nerves. High resolution imaging of inner ear and spine
- AutoAlign Head LS providing a fast, easy, standardized, and reproducible patient scanning supporting reading by delivering a higher and more standardized image quality

Angio Suite

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

Contrast-enhanced MRA

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

Non-contrast-MRA and venography

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

Image processing tools

- MPR, MIP, MinIP, and 3D SSD
- 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.

Description

syngo BEAT

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

Visualization of structural cardiovascular pathologies with CMR - syngo BEAT

- Breath-hold and free breathing techniques for strong contrast between the blood and vascular structures. Dark Blood TSE and HASTE imaging are available for the structural evaluation of the 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 for use in diseases such as myocarditis (inflammation / hyperaemia), ARVD (fibrous-fatty degeneration) or acute myocardial infarction (edema)
- Dark-blood TSE with motion compensation for high-quality vessel wall imaging in small or large vessels

Tools for rapid evaluation of left or right ventricular function

- Acquisition of a stack of short-axis slices (standard segmented FLASH, or advanced segmented TrueFISP)
- Automatic adjustment of the acquisition window to the current heart rate
- Use of the Inline ECG for graphical ECG triggering setup
- Retrospective gating with cine sequences (TrueFISP, FLASH)
- Protocols for whole-heart coverage
- iPAT integration for highest temporal and spatial resolution
- Real-time imaging in case the patient is not able to hold his breath

Dynamic imaging and tissue characterization with syngo BEAT

- Protocols for high-contrast and high-resolution tissue characterization
- Protocols for stress and rest imaging with TrueFISP or TurboFLASH contrast support the acquisition of multiple slices with high resolution and arbitrarily adjustable slice orientation for each slice
- T-PAT with mSENSE and GRAPPA for advanced parallel imaging provides fast high-resolution dynamic imaging
- Segmented IR TrueFISP / FLASH with T1 scout for optimization of tissue contrast
- Advanced tissue characterization with 2D phase-sensitive IR (PSIR) sequences TrueFISP and FLASH contrast. Magnitude and phase-sensitive images with one acquisition
- Simple: no adjustment of inversion time (TI) necessary with PSIR technique
- Ungated single-shot PSIR imaging for tissue characterization under difficult conditions: free-breathing technique that can be applied even in case of arrhythmia

Physiological Measurement Unit (PMU) - Wireless Physio Control

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

ECG Triggering:

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

Description

the examination room

- Interface for trigger input from external sources (e.g. pulse generator, trigger sources for fMRI) outside the examination room
- Optical trigger output for fMRI
- Retrospective gating for ECG, peripheral pulse, and external trigger input

Breast Suite

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

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

This package includes:

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

The Breast Suite also includes:

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

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

Body Suite

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

This package includes:

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

ABDOMEN:

2D:

- T1w (FLASH) breath-hold scans +/- Fat Sat (SPAIR, Q-FatSat, in-/opp-phase)
- T2w (HASTE, TSE/BLADE, EPI) breath-hold scans +/- Fat Sat (SPAIR, FatSat, STIR)

Description

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

3D:

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

PELVIS:

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

Onco Suite

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

This package includes:

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

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

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

Ortho Suite

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

This package includes:

- 2D TSE protocols for PD, T1 and T2-weighted contrast with high in-plane resolution and thin slices
- 3D MEDIC, 3D TrueFISP protocols with water excitation for T2-weighted imaging with high in-plane resolution and thin slices
- High resolution 3D VIBE protocol for MR arthrography (knee, shoulder and hip)
- 3D MEDIC, 3D TrueFISP, 3D VIBE protocols with water excitation having high isotropic resolution, optimized for 3D post-processing
- PD SPACE with fat saturation and T2 SPACE with high isotropic resolution optimized for 3D post-processing
- Whole spine single-step or multi-step protocols
- Excellent fat suppression in off-center positions, e.g. in the shoulder due to high magnet homogeneity
- Dynamic TMJ and ilio-sacral joint protocol

Description

- Susceptibility-insensitive protocols for imaging in the presence of a prosthesis
- Multi-Echo SE sequence with up to 32 echoes for the calculation of T2 time maps (calculation included in the Scientific Suite)
- High resolution 3D DESS (Double Echo Steady State): T2 / T1-weighted imaging for excellent fluid-cartilage differentiation
syngo WARP Susceptibility Artifact Reduction
- 2D TSE sequences with high bandwidth protocols tailored to reduce susceptibility artifacts. Available protocols include T1-weighted, T2-weighted, proton density and STIR contrast.

Pediatric* Suite

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

- MR scanning has not been established as safe for imaging fetuses and infants under two years of age. The responsible physician must evaluate the benefits of the MR examination compared to those of other imaging procedures.

Scientific Suite

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

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

Whole Body Suite

Tim and the Tim Whole Body Suite enable for true whole body MR scanning for head-to-toe imaging. Whole body imaging with highest image quality without patient repositioning and without the need to change a single coil, not even once, this means whole body imaging without compromise.

- The all-new Tim Table or Tim Dockable Table enable a full Field-of-View with coverage up to 280 cm (6' 9"). The table top has the same length as the standard system without whole body capabilities. Additional free space is required at the rear part of the magnet to ensure, that the table movement is not limited by the rear wall.
- Table movement to its full extent can be remotely controlled from the operator console either by the operator or by sequence protocols.
- Protocols and programs for whole body MR angiography and morphology e.g. for metastasis visualization and preventive care examinations.
- Whole body MR Angiography is possible with high speed, high resolution and high image contrast on the entire volume combining high speed gradients and iPAT.
- The large FoV of 205 cm supports the assessment of metastases distribution in the body with sequences such as TIRM (Turbo Inversion Recovery).

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

Sequences

Spin Echo family of sequences:

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

Description

- SPACE for 3D imaging with high isotropic resolution with T1, T2, PD, and DarkFluid Contrast

Gradient Echo family of sequences:

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

Standard Fat/Water Imaging:

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

Standard Techniques:

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

Description

Standard techniques for Flow Artifact reductions:

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

Standard Motion Correction:

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

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

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

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

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

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

Patient Communication

- The intercom system includes an ergonomically designed patient communication unit for desktop positioning on the *syngo* Acquisition Workplace and pneumatic headphones for the patient.
- Active Noise Cancellation allows for increased user comfort in the control room combined with comprehensive patient supervision.
- Control features include an emergency table stop, volume control of speaker and headphones in the examination room, volume control of speaker in the control room, response to the patient's activation of the assistance-call button and provides a connection to an external audio system for music playback (external audio system is not included in the basic unit) .

Computer system

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

High-performance measurement and reconstruction system

- Two Intel Quadcore Processors \geq E 5690
- Clock rate of $\geq 2 \times 3.46$ GHz
- Main memory (RAM) ≥ 128 GB,
- Hard disk for raw data ≥ 750 GB
- Hard disk for system software ≥ 100 GB
- Parallel Scanning and Reconstruction of up to 8 data sets

GPU driven image reconstruction system with 2x Tesla C2075 GPGPU:

- Single Precision Performance: 515 GFLOPS
- Double Precision Performance: 1030 GFLOPS
- Memory Bandwidth: 148 GB/s

Description

- Memory size: 6 GB GDDR5
- CUDA Cores: 448
- Reconstruction speed
 - 20,761 recons per second (256 x 256 FFT, full FoV)
 - 100,000 recons per second (256 x 256 FFT, 25 % recFoV)

High-performance host computer

- Intel Xeon processor \geq W3520 QuadCore
- clock rate \geq 2.66 GHz
- Main Memory (RAM) \geq 6 GB
- three hard disks
 - system SW \geq 300 GB SAS
 - data base \geq 300 GB SAS
 - images \geq 300 GB SAS
- DVD-R writer for CD-R (approx. 4000 images 256² DICOM Standard, ISO 9660) and DVD-R (approx. 25 000 images 256² DICOM Standard, ISO 9660) storage of DICOM data or other data like AVI files
 - DVD-ROM drive
 - Mouse.
- The combination of host computer and the measurement and reconstruction system offers a truly powerful imaging system designed for large image matrix sizes of up to 1024 x 1024. The unrestricted multitasking capability allows time-saving parallel scanning and reconstruction.
- High-resolution 19" color LCD flatscreen monitor with 1280 x 1024 pixel display, integrated gamma correction for optimum display of radiographic grayscale images and automatic backlight control for longterm brightness stability.

Installation:

- The compact integrated design allows for short installation times and reduces the required space to less than 33 sqm (334 sq. ft.) for the entire installation. The necessary room height clearance is 273 cm.
- MAGNETOM Prisma allows siting of the system without a dedicated computer room - no additional cooling or floor requirements.
- MAGNETOM Prisma combines state-of-the-art performance with peace of mind. High system availability is ensured by the expert, highly trained Siemens MR service engineers;
- Your Siemens service contract (not included in the basic unit) offers a comprehensive range of benefits such as Uptime Remote Diagnostics for improved productivity and maximum uptime.

Tim 4G offers DirectRF - a completely redesigned RF architecture. This new all digital-in/ digital-out design integrates all RF transmit and receive components at the magnet, eliminating analog cables for true signal purity. This compact and efficient design enables an dynamic feedback control for temporal stability and power linearity. The all-new innovative coil architecture packs more coil elements in a smaller space and allows for simultaneous connection of up to 204 coil elements. Combined with the 64 independent RF channels advanced iPAT capabilities and SNR are enabled.

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

XR gradients

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

The XR gradients have:

- Maximum gradient amplitude of 80 mT/m, per axis, i.e. 139 mT/m vector summation gradient performance,
- Maximum slew rate 200 T/m/s per axis, i.e. 346 T/m/s vector summation,
- Minimal rise time 400 μ s, from 0 to 80 mT/m amplitude
- Maximum output voltage for each of the gradient axes 2250 V
- Maximum output current for each of the gradient axes 900 A

Description

- Separate cooling channels that simultaneously cool primary and secondary coils allow the application of extremely gradient intensive techniques in a new class of performance.
- 100% duty cycle for fast and demanding techniques such as ultra-short TE MRA in continuous operation, thin slice single
- breath-hold liver studies and EPI imaging techniques (all optional in appropriate clinical packages).
- Variable Field-of-View selection from 0.5 cm to 50 cm for optimal coverage and highest spatial resolution in diagnostic. The minimum slice thickness in 2D and 3D is 0.1 mm and 0.05 mm, respectively.
- Acquisition of sagittal, transverse, coronal, single oblique and double oblique slices with highest resolution.
- The extremely compact water-cooled gradient amplifier features a modular expandable design with excellent linearity and pulse reproducibility. It is digitally controlled and has very low switching losses due to ultrafast solid state technology.

The keys of the numerical key panel are assigned to syngo-specific functions and labeled with the corresponding syngo icons. The keyboard supports the country specific special characters.

The Tim Dockable Table with its light appealing design allows for a fast patient preparation and maximized patient comfort.

It provides unobstructed foot space for attending staff and direct access to the patient. The patient table can be lowered to a minimum height of 56 cm (18.5") from the floor, for easier moving of immobile patients and better access for geriatric, pediatric patients or immobile patients. The Tim DockableTable can be moved with two clicks into the isocenter - one click to the upmost position and one click into the isocenter. The tabletop travels beyond the rear end of the system, enabling additional patient access.

Multiple Tim 4G coils can be connected at once for efficient patient set up and patient friendly examinations. The seamless integration of multiple Tim4G coils is possible via 4 SlideConnect and 4 DirectConnect connector slots, which are embedded in the table. This allows for comprehensive examinations without the need of repositioning.

The Tim Dockable Table is easily adjustable for height even in the undocked state. A minimum height of 61 cm allows for easy wheelchair access or easy patient movement to the hospital bed.

The integrated infusion stand and arm rests allow for fast patient set up anywhere and also for critical patients

Angio Dot Engine

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

Test bolus

- Automatic detection of arterial / venous timing window

Feedback of bolus timing information

- Timing information is fed back into planning steps and parameters are adapted automatically

Auto Voice Commands

- 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 hold or pauses are actually played, and could add pauses between the automatic breath hold commands if necessary

Customization

Existing Dot engines 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 Dot Exam Strategies and Decision Points

Description

- Modify the Parameter View

Application Packages:

syngo Inline Composing

- Automatic anatomical or angiographic composing of multiple adjacent coronal or sagittal images
- Composed images can be automatically loaded into Graphical Slice Positioning for scan planning purposes

Tim Planning Suite

With the Tim Planning Suite, multiple regions in the entire body can be examined in a minimum of time through measurement planning on a single FoV of any desired size.

Abdomen Dot Engine

Patient View

- Within the Patient View the user can easily tailor the exam to each individual patient.
- Several pre-defined Dot Exam Strategies are 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 are integrated.

Dot Exam Strategies allows personalizing the workflow to the individual patient condition and clinical need. The following predefined strategies are included:

- Standard with breath-hold
- Standard with PACE triggering
- Limited patient capabilities using *syngo* BLADE and PACE triggering.

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

- This new view displays the parameters that are really needed for this scan set-up.
- This reduced set of protocol parameters allows the user to concentrate on the essentials.
- The Parameter View can be opened at any time during an examination

Additional functionalities:

Automatic sequence scaling according to physiological characteristic. (Auto FoV, AutoNavigator, breath-hold adaptations).

Auto Navigator based automatic breathing pattern detection and scaling of triggered scans.

Automatic FoV: the optimal FoV is automatically estimated based on the localizer images.

Dot Decisions

Decisions are seamlessly integrated into the scanning workflow. The user just selects the queue and the appropriate protocol or set of protocols are automatically added. For the abdomen MRCP and Diffusion decision points are offered.

Timeline setup and monitoring for best overview of multi-phase breath-hold examinations and CM enhancement curve visualization.

Auto Voice Commands

The system plays them automatically at the right time point. This ensures optimal 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.

Auto Bolus Detection initiates automatically the dynamic upper abdomen examination based on bolus detection. The user can override this function.

Description

Inline radial range calculation for MRCP

MRCP is measured and Inline Radial Ranges are automatically generated.

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 automatically performs 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

Existing Dot engines 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 Dot Exam Strategies and Decision Points
- Modify the Parameter View

The Spine Dot Engine provides optimized cervical, thoracic and lumbar spine imaging for patients of all conditions.

Spine Dot Engine provides the functionality to simplify your spine workflow by providing tools to reduce examination times, achieve optimal image quality, and assist you during reading.

- User guidance step-by-step
- AutoPosition
- AutoAlign Spine with intervertebral disc detection
- AutoCoverage
- AutoSatPosition
- Initial and interactive snapping
- AutoLabeling of vertebrae
- Automatic curved multiplanar reconstructions of 3D datasets

The Spine Dot Engine includes:

- Tim Planning Suite license
- In-line Composing license
- syngo WARP - high bandwidth protocols tailored to reduce susceptibility artifacts. Available protocols include T1-weighted, T2-weighted, proton density and STIR contrast. View Angle Tilting (VAT) technique is provided for reducing in-plane geometric distortions syngo WARP can be used throughout the body.

The Spine Dot Engine does not support whole spine imaging in its first release.

syngo NATIVE offers:

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

The syngo NATIVE package comprises:

- syngo NATIVE TrueFISP
- syngo NATIVE SPACE

Cardiac Dot Engine

Guidance View

- Step-by-step user guidance is seamlessly integrated.

Description

- 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

Patient View

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

AutoFoV (automatic Field of View calculation)

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

Automated parameter adaptation

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

Novel heart localization method

- On-board guidance visually facilitates anatomic landmark settings which are used for calculation
- Automated localization
- Automated localization of short-axis views

Cardiac Views

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

Inline Ventricular Function Evaluation

- syngo Inline VF performs volumetric evaluation of cardiac cine data fully automatically right after image reconstruction.
- If desired, inline calculated segmentation results can be loaded to 4D Ventricular Function Analysis for further review or processing

Cardiac specific layout for the Exam task

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

Automated Naming

- Automated naming of series depending on cardiac views and sequence type

Auto Voice Commands

- Seamlessly integrated into scanning workflow.
- Played automatically
- The user controls breath-hold or pauses are actually played
- Ability to add pauses between automatic breath-holds

Dot 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:** Segmented acquisition techniques
- **Limited patient capabilities:** switch to real-time and single shot imaging if breath-hold is not possible or arrhythmias occur

Customization

Existing Dot Engines 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 Dot Exam Strategies and Decision Points
- Modify the Parameter View

Description

Flow Quantification enables the acquisition of flow encoded images and the evaluation of blood as well as of cerebro-spinal fluid (CSF).

Sequences include:

- ECG triggered 2D phase contrast with iPAT support
- Retrospective reconstruction algorithms for full R-R interval coverage
- Maxwell Term Compensation

The combination of automated contouring and easy-to-use editing tools, provides users with a rapid way to quantify flow parameters.

Argus Flow includes:

- Calculation of flow and velocity parameters(e.g. mean and max velocity, mean, cumulative, prograde, retrograde flow) for large and small vessels.
- Semi-automatic detection of regions of interest over time
- Color-coded display of velocity values
- Calculation of flow and velocity parameters (e.g. peak velocity, average velocity, flow, integral flow)
- Graphical and tabular display of the results (e.g. flow-time curves)
- Integration of the results in Argus structured report and storage in DICOM format for documentation.

Combining the unique advantages of Tim and *syngo* BEAT with iPAT and powerful gradients, it allows performing cardiac MR examinations without compromise in image resolution or acquisition speed.

syngo 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. *syngo* BEAT automatically adjusts all parameters associated with the changes.

Cardiac and Vessel Morphology

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

Global or Regional Wall Motion Analysis with *syngo* 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 *syngo* BEAT

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

Tissue characterization with *syngo* BEAT

- Robust myocardial tissue characterization with 3D PSIR (phase-sensitive inversion recovery), e.g. after myocardial infarction or for differentiation of cardiomyopathies
- Fast and complete coverage of the myocardium with IR 3D FLASH and TrueFISP

Coronary imaging with *syngo* 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)

This package includes Argus Function as well as Argus 4D Ventricular Function.

Argus Function:

- Automatic, semi-automatic, or manual segmentation of the left and semi-automatic or manual segmentation of the right ventricle.
- Volumetric analysis and wall thickness analysis.
- Output of parametric results, volume-time curves and bull's-eye plots.

Description

- DICOM Structured Reporting.

Argus 4D Ventricular Function:

- Calculation of volumetric cardiac data of a given patient very quickly and easily.
- Parametric results and volume-time curves are calculated upon automatic creation and adaptation of a 4D model of the left ventricle.
- The resulting 4D model of the patient's heart can be visualized superimposed to anatomical images as a reference.

Dot Exam Strategies

The workflow can be personalized to the individual patient condition and clinical need. The Large Joint Dot Engine 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:

- Image quality: Achieve high image quality in a reasonable scan time with 2D and 3D protocols.
- Speed focus: Examine patients in a short time frame with protocols being accelerated to the maximal extent.
- Motion artifact reduction: Compensate for the effects of motion, e.g. with motion insensitive *syngo* BLADE protocols.
- Artifacts reduction: Reduce susceptibility artifacts, using *syngo* WARP.

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.

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 required 2D images from high resolution 3D acquisitions.

syngo WARP Susceptibility Artifact Reduction

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

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

Customization

The Large Joint Dot Engine 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 Dot exam strategies
- Add clinical decision points
- Add/remove parameters in the parameter viewing card

Inline Technology – Processing Instead of Post-processing.

Inline Technology helps to streamline the clinical workflow by automating post-processing steps before image viewing. This facilitates getting clinical results immediately. This package integrates Inline technology with perfusion imaging. Automatic real-time calculation of Global Bolus Plot (GBP), Percentage of Baseline at map (PBP) and Time-to-Peak map (TTP) with Inline technology is possible.

An optimized EPI sequence for perfusion-diagnostics is included in the standard Tim Application Suite. With this package real-time calculations are done of anatomical images and, in addition, of a global bolus plot and a Time-to-Peak map for visualizing the time dependence of tissue perfusion.

Description

Post-processing features:

- Flexible selection of the Arterial Input Function (AIF) by the user.
- Pixelwise calculation of the hemodynamic parameters relative Mean Transit Time (relMTT), relative Cerebral Blood Volume (relCBV), relative Cerebral Blood Flow (relCBF), corrected relative Cerebral and Blood Flow (relCBF) for compensation of blood brain barrier leakage.
- Pixelwise calculation of maximum signal loss due to contrast agent enhancement (Percentage of Baseline at Peak, PBP) and of the time to the maximum signal loss (Time-To-Peak, TTP).
- Display of the global signal time course (averaged over all slices) to assess the quality of the exam.
- Predefined post-processing protocols available, user definable post-processing protocol are possible.

Visualization features:

- Colored display of relMTT-, relCBV-, relCBF-, relCBFcor, PBP- and TTP-maps.
- Zoom, pan, annotate.
- Colored images can be saved as DICOM images.

Diffusion Tensor Imaging

Diffusion Tensor Imaging allows for a complete description of the diffusion properties of the brain within the scope of the tensor diffusion model, both for anisotropic and isotropic diffusion. Efficient diffusion direction schemes are pre-defined to allow for optimal diffusion directional resolution. Schemes with up to 256 directions can be selected. Inline technology enables automatic and immediate calculation of the diffusion tensor, including grey-scale and colored "fractional anisotropy" (FA) map derived from it.

With the addition of DSI, it is possible to acquire diffusion data in up to 514 different directions each with independent b-values.

Details:

- Measurements with up to 256 different directions and with up to 16 different b-values
- Inline calculation of tensor, grey-scale and colored FA map, ADC map and trace-weighted image
- Support of parallel imaging (iPAT)
- Clinical protocols with full head coverage, incl. inline calculation of tensor, FA, ADC and trace-weighted images in 4 minutes.

DTI Tractography *syngo*

syngo DTI Tractography is optimized for the clinical use by providing advanced 3D visualization of white matter tracts in the context of 2D or 3D anatomical datasets and DTI datasets. DTI data sets can be explored fast and intuitively using the interactive QuickTracking. QuickTracking instantaneously displays the tract originating from the mouse pointer position while moving over the DTI data set. This also allows identifying qualified regions to place seeding ROIs. Seed points can be set to assess connectivity by tracking with single ROI and with multiple ROIs. Furthermore they can be placed in fused views displaying the anatomical reference and e.g. the colored FA map simultaneously.

Texture Diffusion, a highly versatile in-plane visualization of white matter tracts, allows to display and read DTI Tractography results on PACS reading stations and in the OR.

At the same time the package provides the scientific user with the flexibility to configure the tracking algorithm and to change display settings for the tracts. Tract and seeding ROI statistics are included to support publications (e.g. mean/max FA value, min/mean/max ADC value).

All views can be exported as DICOM images or bitmaps. Tract and seeding ROI statistics can be exported as html files.

DTI Evaluation

Clinical applications are supported by a dedicated DTI evaluation mode to support diagnostics of white matter diseases (e.g. multiple sclerosis and brain maturation disorders). Based on the tensor, in addition to the already inline-calculated parameter maps, further maps characterizing the anisotropy of diffusion properties can be calculated and stored. Multiple diffusion parameter maps (e.g. Fractional Anisotropy, ADC, b=0) and an anatomical image are displayed next to each other in the same slice position for comparison. The images can be evaluated together based on ROIs and the results can be documented in a table. The display options include 2D and 3D tensor graphics, colour-coded images and overlay images on the anatomical images.

In addition, the package offers the scientific user full flexibility of 2- and 3-dimensional visualization of the diffusion tensor with measures of isotropic and anisotropic (fractional and relative) diffusion, Eigen vectors (E1, E2, E3) of the diffusion tensor and shape-descriptive measures of the diffusion tensor (linear, planar, spherical).

Description

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

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

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

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

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

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

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

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

The Susceptibility Weighted Imaging package includes:

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

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

Prerequisite: Software syngo MR B13

The Single Voxel Spectroscopy option is used to measure proton spectra from single voxels. The spectra may show alterations in brain metabolism e.g. in brain tumors, in degenerative changes of the brain and in metabolic diseases. The possibility of automatic adjustment, measurement and evaluation permits near automatic spectroscopy measurements. The whole procedure, including the evaluation of the spectra using the mandatory spectroscopy evaluation option, takes approx. 6 minutes and can be done by doctors or technologists.

The 2D Chemical Shift Imaging option is used to measure 2D proton spectroscopic data to generate metabolite images e.g. in brain tumors, metabolic diseases of the brain and degenerative changes in brain metabolism. The whole procedure, including the generation of metabolite images using the spectroscopy evaluation takes approximately 8 minutes.

The 3D Chemical Shift Imaging option is used to measure 3D proton spectroscopic data and allows for the evaluation of the spectra in measured volumes and the generation of metabolite images and spectral maps, e.g. in cases of brain tumors, metabolic diseases of the brain and degenerative changes in brain metabolism. The whole procedure, including the generation of metabolite images using the spectroscopy evaluation takes approximately 10-16 minutes

Optimized protocols for 3D CSI in the prostate are also included.

The evaluation software is fully integrated in syngo MR.

Evaluation protocols adapted to the scan protocols carry out a complete and automatic evaluation of the measured data.

The following functions are included:

- Subsequent water suppression with optional phase correction
- Apodization

| Description |
|--|
| <ul style="list-style-type: none"> - Zero filling - Fourier transformation - Base line correction - Automatic or manual phase correction - Curve fitting and peak labeling - Summaries in tabular form of the essential results specifying the metabolites, their position, integrals and signal ratios in relation to a selectable reference. - Capability of exporting spectroscopy header information and data into a documented external format. - Automated peak normalization to tissue, water or reference. <p>For CSI the following functions are included:</p> <ul style="list-style-type: none"> - Spectra of selected voxels are automatically calculated, corrected for possible B0 deviations and displayed. - Spectral fit is automatically optimized for each voxel. - CSI data can be represented as spectral maps and colored metabolite images that can be superposed onto anatomical images. |
| <p><i>syngo</i> TWIST provides:</p> <ul style="list-style-type: none"> - Visualization of contrast agent dynamics in the vessel system of interest with maximum flexibility. - Needs only a low amount of contrast agent. - Imaging in all body regions, e.g. carotids, pulmonary and peripheral vessels with brilliant spatial and temporal resolution. - Clear separation of the arterial and venous phase. - High speed acquisition by intelligent k-space strategies and use of iPAT, powered by Tim. - <i>syngo</i> TWIST provides fat suppression using water selective excitation. - Inline technologies, such as subtraction and MIP are provided for optimal workflow. - In case of very high spatial resolution <i>syngo</i> TWIST may even replace conventional static MR angio. Moreover, <i>syngo</i> TWIST does not require any bolus timing - just inject and go. |
| <p>The iPAT compatible Shoulder 16 Large and Shoulder 16 Small are ergonomically designed and adapted to the shape of the shoulder.</p> <p>The different sizes obtain maximum image quality for different body sizes:</p> <ul style="list-style-type: none"> - 165 mm (6.5 in) diameter for small and medium sized shoulders - 200 mm (7.9 in) diameter for large shoulders <p>The coils can be used either for left or right shoulders. It features sliding attachments to the base plate and can easily be adjusted for comfortable positioning. The coils excels in highest resolution imaging with exceptional signal/noise ratio.</p> |
| <p>The 16-element coil with 16 integrated pre-amplifiers excels in highest resolution imaging with exceptional signal/noise ratio, while taking full advantage of iPAT in all directions.</p> <p>Foot/Ankle 16 is ergonomically designed and features a boot-like coil design. Together with the included stabilization pads the coil allows easy, fast and comfortable patient positioning.</p> |
| <p>Thanks to its 15-channel design this coil is perfectly suited for high-resolution images with excellent SNR. With the arrangement of the antennas in three rings of 5 elements each, the coil is specially designed for parallel imaging with high acceleration factors.</p> <p>The coil is positioned on a laterally movable support and therefore allows for comfortable patient positioning of both legs for off-center examinations. SlideConnect Technology allows for fast and easy patient preparation, resulting in less table time. Furthermore, the upper part can be removed for easier patient positioning. Additional cushions allow for optimum patient immobilization.</p> <p>The integrated transmission function makes volume-sensitive excitation with greatly reduced RF power possible on the one hand and, on the other, prevents aliasing artifacts (e.g. due to the other knee).</p> |

Description

The Head /Neck 64 supports high quality imaging with an 64-element design and 64 integrated preamplifiers. The DirectConnect and SlideConnect technology enables fast and easy patient set up.

The open and light design of the upper coil part increases patient comfort and is removable for easy patient handling.

The lower coil part may remain on the table for most of the examinations can be used without the upper part.

The Head/Neck 64 and Spine 32 coils are smoothly integrated into the patient table, thus enabling high flexibility in imaging and facilitating fewer coil changes and easy handling when switching patients.

The Head /Neck 64 coil is equipped with two removable cushioned head stabilizers for stable and comfortable patient positioning. A detachable look-out mirror for increased patient comfort. The double mirror design shows all objects in their correct up/down and left/right orientation. It might also be used for visual fMRI studies. The open design is great for claustrophobic patients and allows for easy integration of the coil with existing stimulation devices e.g., NNL goggles. It attaches to the upper part of the coil and enables the patient to look outside even when his head is in the center of the magnet. No tuning of the fully iPAT-compatible Head/Neck 64 is necessary. The coil is equipped with a rear opening to accommodate up to 128 electrode leads for use in a combo MR/EEG examination.

The Head/Neck 64 can be used for applications like head examinations, neck examinations, MR Angiography, combined head/neck examinations (or for imaging of the TMJ (temporo mandibular joints). Typically combined with the Spine 32 and Body 18 or Peripheral Angio 36. Furthermore the combination of flexible coils like the Flex Large 4 is possible. The improvements in neck imaging (C spine) will be clearly visible due to the aggressively tailored anatomical design of the coil.

The dimensions of the Head/Neck 64 are 435 mm x 395 mm x 350 mm (L x W x H), its weight is less than 5.2 kg (11 lbs).

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

- Width 120 cm
- Depth 80 cm
- Height 72 cm

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

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

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

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

Special video camera for monitoring the patient during an MR examination.

Color 640 x 480 pixel LCD monitor may be positioned at the *syngo* Acquisition Workplace or at a convenient wall location (wall support not included in scope of delivery) in the control room.

The cart may be rolled to convenient locations in the examination room and can be opened up to work like a shelf. The coil storage cart has multiple drawers and trays as well as many other storage spaces for coils, cushions and miscellaneous items.

Its dimensions are: Width 140 cm (4' 7") when closed and 280 cm (9' 12") when opened, depth 54 cm (1' 9") and height 121 cm (3' 12").

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

| |
|---|
| <p>Description</p> <p>computer and imager.</p> <p>Configuration includes connection box.</p> <p>The standard cable length is 9 m.</p> |
| <p>Voltage range: 180 - 276 V Input frequency: 50 / 60 Hz Output voltage: 230 VAC Dimensions (H x W x D): UPS 346 x 214 x 412 mm incl. UPS bracket set Weight: approx. 36 kg</p> |
| <p>An MR-compatible arm rest that supports the patient's arm on the magnet patient table when starting intravenous lines. The board is removed after the IV is inserted.</p> <p>This product has been tested and verified for compatibility with the following Siemens' products: MAGNETOM Trio, Verio, Espree, Essenza, Avanto, Symphony, Area Skyra and Biograph mMR. Compatibility with other products cannot be assured and may void service contracts and/or system warranties.</p> |
| <p>Chiller KKT ECO 133 - L Function: Supplies dedicated primary chilled water in cases where no chilled water supply is available on site. Air-cooled version, for outdoor installation up to a maximum distance of 25 m for connection to the IFP, incl. 50 m FOC for control. The cooling capacity of the chiller is 60 kW, the chilled water temperature is 20°C, the water flow is 130 l/min. Ambient temperature: -20 to +48°C Connection rating: 28 kW Voltage: 3/PE 400 V to 480 V / 50/60 Hz Fuse rate: 80 A Power consumption: 66 A Dimensions: 2000 mm x 1100 mm x 2100 mm (height x width x depth). Weight: 760 kg Noise level at a distance of 10 m at outside temperatures of: 21°C 47 dB(A) 32°C 52 dB(A) 48°C 58 dB(A)</p> <p>IFP (Interface Panel) Main functions of the IFP: - Interface function between the KKT chiller and the MR cabinet. - Water supply for MREF, MBB, CBB and TX box. Additional devices such as integrated differential pressure control, a pressure gage, and a filter are used in order to guarantee the precise functioning of the cooling circuit, especially for the cold head compressor (MREF). The connection must be made locally with 2" lines up to a maximum distance of 25 m. Dimensions: 800 mm x 1150 mm x 210 mm (height x width x depth). Weight: 67 kg</p> |
| <p>The Peripheral Angio 36 has a 36-element design with 36 integrated preamplifiers distributed over 6 planes with 6 elements each. A uniquely designed non-ferromagnetic coil cart for safe coil storage is included. The PA Matrix Coil is also shipped with a set of positioning cushions for proper handling.</p> <p>No tuning of the fully iPAT-compatible Peripheral Angio 36 is required.</p> <p>With a length of about 1m both legs are covered from the iliac artery level down to the foot arch vessels using multiple, flexible wings. For the visualization of the abdominal aorta and the iliac bifurcation it can be combined with the Body 18 and Spine 32. For larger body coverage eg whole body with up to 205 cm possible coverage, it can be combined with Head/Neck20 or a further Body18 to allow for large Field of View examinations with high patient comfort. Patient set up is done once and no repositioning is necessary For peripheral Angiography the PA Matrix coil will be typically used in feet-first position, but also head-first positioning for whole-body examinations is possible (optional Tim Whole Body Suite required).</p> |

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| Description |
| <p>The dimensions of the Peripheral Angio 36 are: 860 mm x 300 - 640 mm x 280 mm</p> |
| <p>The 16-element coil with 16 integrated pre-amplifiers excels in highest resolution imaging with exceptional signal/noise ratio, while taking full advantage of iPAT in all directions.</p> <p>Hand/Wrist 16 is ergonomically designed and adapted to the shape of the hand/wrist region. The coil features a hinged design of the upper part and slidable attachment to the base plate. Together with the included stabilization pads the coil allows easy, fast and comfortable patient positioning.</p> |