

Dot Exam Strategies	Examinations can be easily personalized to the individual patient condition and clinical need. The Brain Dot Engine comes with the following predefined examination strategies, which the user can select according to patient conditions or change at any time during the workflow, when conditions change: <ul style="list-style-type: none"> • Standard: Standard examination with 2D protocols • Resolution focus: Examination with 3D protocols (e.g. SPACE) for detailed views • Speed focus: Examination with fast 2D protocols (e.g. HASTE) for further speeding up the exam • Motion-insensitive: Examination with BLADE protocols to minimize and correct for the effects of motion automatically
BLADE	Motion insensitive Turbo Spin Echo sequence. Improves image quality by correcting for the effects of motion during an MR acquisition. (Can be used in head, spine, and other body regions).
Rerun	A sequence inside the examination Queue can be selected and a rerun of the corresponding series can be triggered with identical sequences or parameters.
Inline MPRs	Automatic multiplanar reconstruction for 3D datasets. The Multi Planar Reconstruction (MPR) tool can be easily configured to automatically generate any required 2D images from high resolution 3D acquisitions by using the position information from the AutoAlign algorithm.
Inline Diffusion	Automatic calculation of trace-weighted images and ADC maps with Inline Technology.
Customization	The Brain Dot Engine can be easily modified by the user to their individual standard of care. <ul style="list-style-type: none"> • 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 • User-defined offsets to the standard positions delivered by AutoAlign • Customize within the Dot AddIn functionalities such as AutoCoverage, AutoFOV, InlineMPR reconstructions

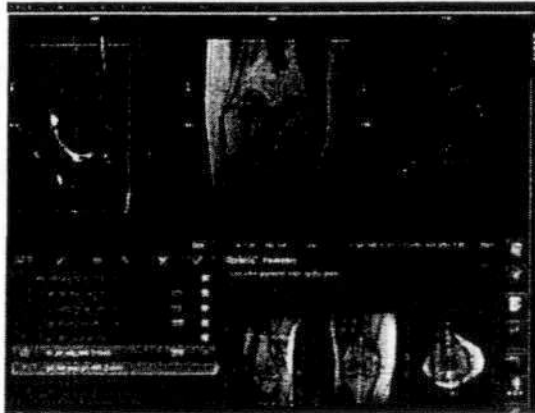


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คณะกรรมการพิจารณาผลการประกวดราคาอิเล็กทรอนิกส์
 ๑.ลงชื่อ.....*ชว*.....ประธานกรรมการ
 ๒.ลงชื่อ.....*ณัฐ*.....กรรมการ
 ๓.ลงชื่อ.....*อน*.....กรรมการ

Large Joint Dot Engine¹⁾

The 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 the greatest extent. The Large Joint Dot Engine features AutoAlign and AutoCoverage for knee, hip and shoulder. The WARP and Advanced WARP techniques (including high bandwidth protocols, VAT and SEMAC) provide susceptibility artifact reduction functionality (e.g. from MR Conditional metal²⁾ implants), and include optimized protocols for knee and hip examinations. High resolution 3D imaging programs together with user-configurable automatic Inline MPR (Multi Planar Reconstruction) calculations provide increased efficiency, reproducibility and ease of use.

AutoPosition	Accurate positioning of the anatomy in the isocenter without need for laser light positioning.
Patient View	Within the Patient View the user can easily tailor examinations to an individual patient. Dot Exam Strategies allow you to choose the most appropriate strategy with one mouse click, the complete scan setup is then automatically prepared.
Guidance View	Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each individual step of the scanning workflow to ensure perfect scanning even by novice operators. Both images and text are easily configurable by the user.
Parameter View	The new streamlined Parameter View displays a user-defined subset of parameters which are available for manual protocol optimization. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.



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¹⁾ Optional

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




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Dot Exam Strategies	<p>Examinations can be easily personalized to the individual patient condition and clinical need. The Large Joint Dot Engine comes with the following predefined examination strategies, which the user can select according to patient conditions or change at any time during the work-flow, when conditions change:</p> <ul style="list-style-type: none"> • Standard: Achieve highest image quality in a reasonable scan time with 2D and 3D protocols. • Speed focus: Examine patients in the shortest possible time with protocols being accelerated to the maximal extension. • Motion Insensitive (BLADE): Compensate for the effects of motion with motion insensitive BLADE protocols. • High Bandwidth (WARP): Optimized strategy for the reduction of susceptibility artifacts¹⁾.
AutoAlign	<p>Automated, positioning and alignment of slice groups to the anatomy, relying on multiple anatomical landmarks. Provides fast, easy, and reproducible patient scanning and facilitates the reading by consistently delivering high image quality with a standardized slice orientation.</p>
AutoCoverage	<p>Maximizes the speed of the examination by automatically setting the number of slices and the FoV to fully cover knee, hip or shoulder anatomy. This is performed based on the information delivered by AutoAlign, eliminating manual setting and the scanning of unnecessary slices. This feature is configurable.</p>

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Inline MPRs	Automatic multiplanar reconstruction for 3D datasets. The Multi Planar Reconstruction (MPR) tool can be easily configured to automatically generate any required 2D images from high resolution 3D acquisitions by using the position information from the AutoAlign algorithm.
WARP Susceptibility Artifact Reduction	WARP and advanced WARP (SEMAC) integrates different techniques tailored to reduce susceptibility artifacts caused by orthopedic MR-conditional ¹⁾ metal implants. 2D TSE sequence combining optimized high-bandwidth protocols and View Angle Tilting (VAT) technique, helps in evaluation of soft tissue in proximity of the implant. SEMAC (Slice Encoding for Metal Artifact Correction) is a technique to correct through-plane distortions by means of additional phase encoding in slice direction. It is especially useful in the case of hip and knee joint replacements. Available protocols can be found in the library.
Customization	The Large Joint Dot Engine can be easily modified by the user to their individual standard of care. <ul style="list-style-type: none"> • 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 User-defined offsets to the standard positions delivered by AutoAlign Customized inline MPR reconstructions







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

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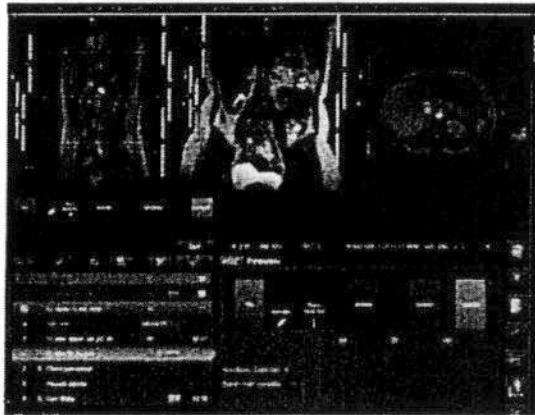
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Abdomen Dot Engine¹⁾



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

Patient View	Within the Patient View the user can easily tailor the exam to each individual patient. Several pre-defined Dot Exam Strategies can be integrated. The user just selects the appropriate strategy with one click, and the queue and the complete scan set-up are updated automatically. Furthermore protocols tailored for use of contrast media can be integrated.
Guidance View	Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user.
Parameter View	The new streamlined Parameter View displays the parameters that are really needed for the scan set-up. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.
AutoPosition	Accurate positioning of the anatomy in the isocenter without need for laser light positioning.
Automatic sequence scaling	According to physiological characteristic (AutoFoV, AutoNavigator, AutoCoverage breathhold adaptations)
AutoNavigator	Automatic breathing pattern detection and scaling of triggered scans
AutoFoV (automatic Field of View calculation)	Based on the localizer images the optimal FoV is automatically estimated. In case the patient moves during the examination, this step can be repeated at any time.
Abdomen Dot Library	A storage folder for individual sequences optimized with Dot functionality. StarVIBE ¹⁾ and TWIST-VIBE ¹⁾ protocols can be integrated into the Abdomen Dot library.

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๒. ลงชื่อ..... *Dr. P.* กรรมการ

๓. ลงชื่อ..... *ดร.* กรรมการ

¹⁾ Optional

Dot Exam Strategies	The workflow can be personalized to the individual patient's condition and clinical need. The following predefined strategies are included. They can be changed at any time during the workflow: <ul style="list-style-type: none"> • Breathhold (fast with robust image quality) • Respiratory Synchronized (using PACE triggering, high image resolution) • Motion-insensitive (fast, using BLADE and PACE triggering)
Dot Decisions	Decisions can be seamlessly integrated into the scanning workflow. The user just selects the queue, and the appropriate protocol or set of protocols are added automatically. For the abdomen, preconfigured decision points are offered for MRCP and Diffusion.
MRCP decision point	Dot provides comprehensive guidance, including positioning help. MRCP is measured and Inline Radial Ranges are generated in-line.
Timeline monitoring	For best overview of multi-phase breathhold examinations, the contrast media enhancement curve is visualized.
Automatic timing	Liver dynamics is done using the care bolus approach. Auto Bolus Detection enables the system to monitor the arrival of contrast agent in a user defined ROI. When "Auto Bolus Detection" is enabled, Auto ROI can be enabled in the patient view, which allows the system to perform an automatic ROI positioning on the descending aorta at the level of the diaphragm. The ROI positioning can be confirmed and adjusted by the user.
Bolus Timing	An alternative way of performing liver dynamics. The optimal time window for data acquisition is derived by the system after the application of a test bolus. Visual guidance and interactive evaluation during the setup provide ease-of-use.
AutoVoiceCommands	Seamlessly integrated into the scanning workflow. The system plays them automatically at the desired time point. This assists the user in providing the optimal timing of scanning, breathing and contrast media. The user can monitor which breathhold or pauses are actually played, and could add pauses between the automatic breathhold commands if necessary.
Inline Subtraction	Within the contrast-enhanced abdomen exam, multiple phases are acquired: native, arterial phase, portal-venous phase and late-phase. The scanner automatically subtracts the native measurement from the arterial, portal-venous and late phase.



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Inline Registration	For best visualization of lesions the system can be set to automatically perform a registration/alignment of the anatomy for the different dynamic phases. The importance of registration/correction can be seen when examining nodular enhancing pathologies.
Customization	<p>Taking full advantage of the new Dot configuration platform. Providing various guidance and customization options, featuring "AutoTiming", "Auto Coverage", "Local Voice Command", etc.</p> <p>Existing Dot Engines can be adapted by the user to their individual standard of care.</p> <ul style="list-style-type: none"> • Add/remove protocol steps • Change guidance content (images and text) • Change or add Dot Exam Strategies and Decision Points • Modify the Parameter View • Dot Library – alternative protocols with preconfigured add-ins. Only simple drag&drop needed.
LiverLab ¹⁾	<p>LiverLab is a system guided workflow to examine the hepatic fat and iron status, as part of the Abdomen Dot Engine.</p> <p>Main Features: The inline First Look Dixon sequence gives the user a first overview of possible fat and/or iron overload in the whole liver. Based on the resulting images, liver segmentation runs without user interaction.</p> <p>If further evaluation is needed, the user can choose from two methods:</p> <ul style="list-style-type: none"> • Multi-echo Dixon VIBE is an image based method to calculate maps such as water, fat, fat signal fraction, and R2*. • HISTO is a push-button single-breathhold single-voxel spectroscopy method to calculate fat signal fraction as well as water R2.



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¹⁾ Optional

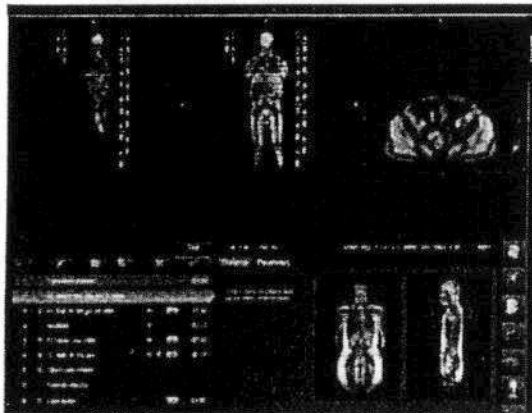
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TimCT Onco Dot Engine¹⁾



The TimCT Onco Dot Engine employs the revolutionary TimCT Continuous Table move technology for large Field of View applications with smooth workflow and excellent image quality. It is built on Tim technology as well as on a highly advanced patient table with high positioning accuracy and an RF shielded table drive. Simultaneous coverage of a large Field of View using local coils with a high signal-to-noise ratio enables excellent image quality and extremely fast imaging with iPAT. The TimCT Onco Dot Engine allows a CT-like MR examination:

- Definition of just the start and end point of the scan range
- No need to plan in multiple steps
- No need to plan overlapping areas
- No delay, no measurement pauses during table move
- No need for composing

The TimCT Onco Dot Engine makes the easy workflow of TimCT even easier by customizable guidance throughout the exam.

Guidance View	Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user.
Parameter View	The new streamlined Parameter View displays the parameters that are really needed for the scan set-up. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.
iPAT compatibility	Enabled by Tim 4G
Seamless scanning	Enables high image homogeneity and suppression of boundary artifacts

 
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¹⁾ Optional; Prerequisite: Abdomen Dot Engine and Tim Whole Body Suite, Tim (204 x 56) or Tim (204 x 64)

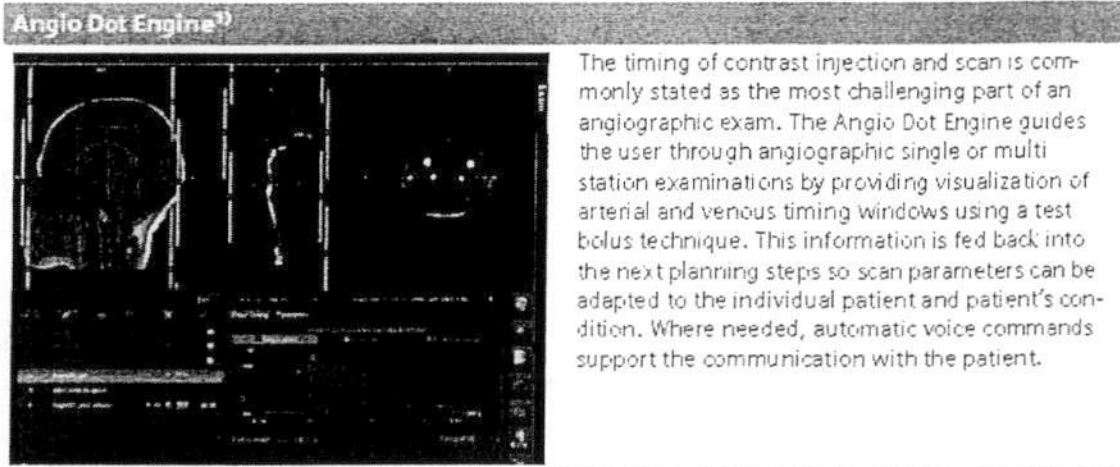
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Special features	The possibility of shorter examination times, the BLADE technique and the suppression of boundary artifacts.
Liver dynamics	Key functionalities of the Abdomen Dot Engine are integrated.
Techniques	The protocols are based on axial 2D T1-weighted FLASH- and T2-weighted imaging (TSE with and without BLADE and HASTE). The following fat saturation techniques are available: • T1 FLASH with FatSat, SPAIR or Dixon, 4 contrasts in one scan • T2 HASTE with FatSat, SPAIR or Inversion Recovery • T2 TSE (with and without BLADE) with FatSat, SPAIR or STIR
Customization	Existing Dot Engines can be adapted by the user to their individual standard of care. • Add/remove protocol steps • Change guidance content (images and text) • Change or add Dot Exam Strategies and Decision Points • Modify the Parameter View • Dot library (alternative sequences with preconfigured add-ins)






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

Guidance View	Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user
Parameter View	The new streamlined Parameter View displays the parameters that are really needed for the scan set-up. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.
Test bolus	Visual display of of arterial/venous timing window
Feedback of bolus timing information	Timing information is fed back into planning steps and parameters can be adapted automatically
AutoVoiceCommands	Integrated into the scanning workflow. The system plays them automatically at the right point in time. This ensures optimal timing of scanning, breathing and contrast media. The user can monitor which breathhold or pauses are actually played, and could add pauses between the automatic breathhold commands if necessary
Customization	Existing Dot Engines can be modified by the user to their individual standard of care. <ul style="list-style-type: none"> • Add/remove protocol steps • Change guidance content (images and text) • Change or add Dot Exam Strategies and Decision Points • Modify the Parameter View

 
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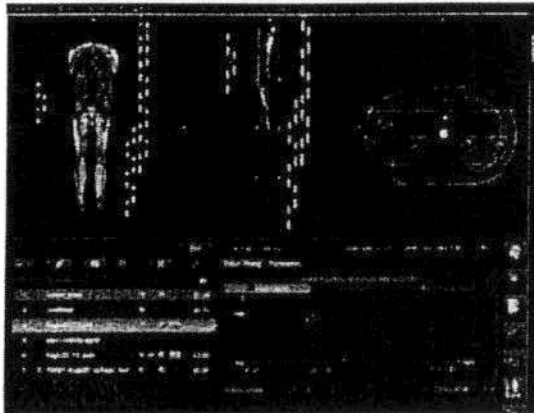
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TimCT Angio Dot Engine¹⁾



TimCT Angiography employs the revolutionary TimCT Continuous Table move technology for large Field of View angiographies with a smooth workflow and homogeneous image quality. TimCT Angiography is built on the Tim technology as well as on a highly advanced patient table with high positioning accuracy and an RF shielded table drive. TimCT Angio Dot Engine makes TimCT even easier with guidance throughout the exam and by providing a visual display of arterial and venous timing windows using a test bolus technique. This information is fed back into the next planning steps so scan parameters can be adapted to the individual patient and patient's condition. Where needed, automatic voice commands support the communication with the patient.

Guidance View	Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user
Parameter View	The new streamlined Parameter View displays the parameters that are really needed for the scan set-up. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.
AutoVoiceCommands	Integrated into the scanning workflow. The system plays them automatically at the right time point. This supports the synchronized timing of scanning, breathing and contrast media. The user can monitor which breathhold or pauses are actually played, and can add pauses between the automatic breathhold commands if necessary.
Test bolus	Automatic detection of arterial/venous timing window
Feedback of bolus timing information	Timing information is fed back into planning steps so parameters can be adapted automatically



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¹⁾ Optional; Prerequisite: Angio Dot Engine, Tim [204x48] or Tim [204x64]

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iPAT compatibility utilizing Tim's Matrix coils capabilities	
Inline subtraction and Inline MIP of complete peripheral run off images	
High image homogeneity and no boundary artifacts thanks to seamless TimCT scanning	
Max. FoV of TimCT (depending on the resolution)	205 cm (with Tim Whole Body Suite) 140 cm (without Tim Whole Body Suite)
Table speed during angio-graphic measurements	Up to 5 cm/s with patient weight up to 250 kg (550 lbs)
Fast examination time for TimCT peripheral angio-graphic exam	40-70 s depending on resolution
Customization	Existing Dot engines can be modified by the user to their individual standard of care. <ul style="list-style-type: none"> • Add/remove protocol steps • Change guidance content (images and text) • Change or add Dot Exam Strategies and Decision Points • Modify the Parameter View



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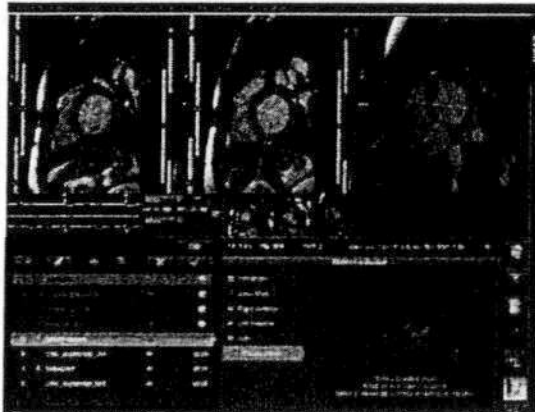
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๒.ลงชื่อ..... *ด.ด.ด.* กรรมการ

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Cardiac Dot Engine¹⁾



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

Different workflows are supported:

- Functional evaluation
- Ischaemic Heart Disease
- Myocarditis

Patient View	Within the Patient View the user can easily tailor the exam to each individual patient (e.g. patient with arrhythmia, breathhold capability). 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 to the users pre-defined standard of care.
Guidance View	Step-by-step user guidance is seamlessly integrated. Example images and guidance text are displayed for the individual steps of the scanning workflow. Both images and text are easily configurable by the user
AutoPosition	Accurate positioning of the anatomy in the isocenter without need for laser light positioning.
AutoFoV (automatic Field of View calculation)	Based on the localizer images the optimal FoV is automatically estimated. In case 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 (heart rate etc.)
AutoAlign Heart	Based on the localizer images, automatic detection of five cardiac landmarks is obtained and used to optimally plan cardiac exams without user interaction. The fully automatic planning process results in 2-, 3- and 4-chamber views and a stack of short axis views. In case the patient moves during the examination, this step can be repeated at any time.
Automated localization	Automated localization of short-axis views
Guided slice positioning	Easy way to match slice positions (short-axis) between cine, dynamic imaging, tissue characterization
Cardiac Views	Easy selection of cardiac views (e.g. 3 chamber view) during scan planning

¹⁾ Optional



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 ๒.ลงชื่อ.....
 ๓.ลงชื่อ.....



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๑.ลงชื่อ..... ประธานกรรมการ
 ๒.ลงชื่อ..... กรรมการ
 ๓.ลงชื่อ..... กรรมการ

Inline Ventricular Function Evaluation	Inline VF performs volumetric evaluation of cardiac cine data fully automatically right after image reconstruction. There is no user input necessary. If desired, the dataset for the inline calculated segmentation results can be loaded to 4D Ventricular Function Analysis for further review or processing
Inline Time Course Evaluation	Automatic, real-time and motion corrected calculation of parametric maps with inline technology
Cardiac specific layout for the Exam task	Automatically chosen layouts show the new physio display and are configured for every step of the exam
Automatic display of images	Automatic display of image in dedicated cardiac image orientations instead of the standard DICOM orientations.
Adaptive triggering	Acquisition adapts in realtime to heart rate variations for non-cine applications.
Automated Naming	Automated naming of series depending on cardiac views and contrast.
AutoVoiceCommands	AutoVoiceCommands are seamlessly integrated into the scanning workflow. The system plays them automatically at the desired time point. This ensures synchronized timing of scanning, breathing and contrast media. The user can monitor which breathhold or pauses are actually played, and could add pauses between the automatic breathhold commands if necessary.
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: <ul style="list-style-type: none"> • Standard: Segmented acquisition • Limited patient capabilities: switch to realtime and single shot imaging if breathhold is not possible or arrhythmias occur
Customization	Existing Dot engines can be modified by the user to their individual standard of care. <ul style="list-style-type: none"> • Add/remove protocol steps • Change guidance content (images and text) • Change or add Dot Exam Strategies and Decision Points • Modify the Parameter View



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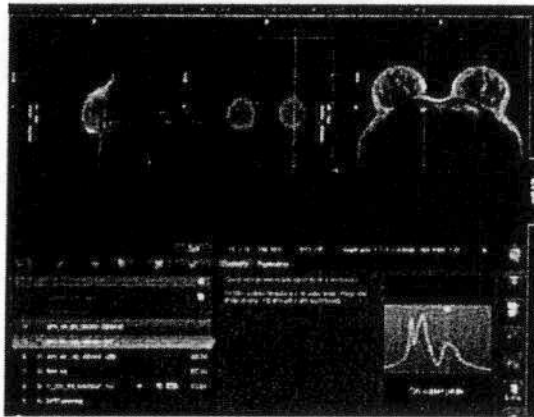
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๑.ลงชื่อ..... นสพ..... ประธานกรรมการ

๒.ลงชื่อ..... พยว..... กรรมการ

๓.ลงชื่อ..... อภ..... กรรมการ

Breast Dot Engine¹⁾



The Breast Dot Engine provides optimized protocols for tissue depiction, implant visualization, and breast biopsy. For ease of use, different examination strategies (FatSat, non-FatSat, feet-first/head-first positioning, InterVIEWS) are available for both high-channel coils and the 4ch BI coil. The following workflows are provided:

- High channel coils
- High channel coils CareBolus
- 4ch BI
- 4ch BI CareBolus
- Biopsy Sentinelle 2ch medial
- Biopsy Sentinelle 10/4ch medial
- Biopsy 4ch BI

Patient View	The user simply tailors the exam to the condition of each individual patient (e.g. patient with implants) and defines the examination approach (CareBolus, AutoCoverage, Frequency Adjustment Confirmation Mode, Silicone Protocols, Inline MPR).
Implant situation	Based on an implant type identification scan, the user can visually select or modify the exam dependent on the actual implant type and laterality. The system automatically modifies the scan queue accordingly, and the frequency adjustment setting of the protocols is changed (assuming dominant fat or silicone). The user may change these modifications.
Guidance View	Example images and a guidance text are displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user.
Parameter View	This view displays the parameters that are really needed for the examination at a glance. The displayed parameters are easily configurable by the user. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.
AutoPosition	Accurate positioning of the anatomy in the isocenter without need for laser light positioning.



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 ๓. ลงชื่อ.....*อ.ร.*..... กรรมการ

AutoCoverage	Based on the localizer data, an automatic segmentation is performed, which allows the estimation of the optimal FoV (entire FoV for both breasts, right or left breast, breast with chest) and which is used to automatically adapt the size of the adjust volume to the patient's anatomy. The user may modify this segmentation. The user can predefine for every protocol individually which parameters shall be automatically adjusted, e.g. whether time or slice thickness shall remain constant.
MPR Planning	For user-selected protocols, e.g. the high resolution "delayed VIEWS", adjustable MPRs are calculated automatically.
Biopsy support	Supporting interventions with the 2/4/8ch and 2/10/16ch Sentinelle Breast and 4ch BI Breast coils. In case Siemens' Breast Biopsy or BreVis Biopsy planning software is used, the targeting settings calculated by the software are displayed on the Dot Display at the scanner.
Single frequency adjust	The user can preselect to show the frequency adjustment dialogue only once for the exam queue. This preselection stays valid until a new coil combination or z-position is used.
Customization	Existing Dot engines can be modified by the user to their individual standard of care. <ul style="list-style-type: none"> • Add/remove protocol steps • Change guidance content (images and text) • Change or add Dot Exam Strategies and Decision Points • Modify the Parameter View



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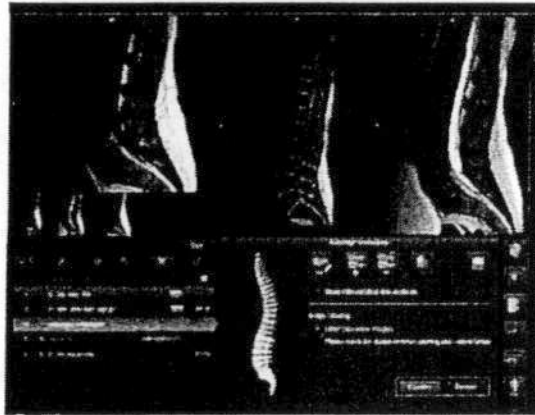
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๓.ลงชื่อ.....*นาย*.....กรรมการ

Spine Dot Engine[®]



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

Patient View	Within the Patient View the user can easily tailor examinations to an individual patient. Dot Exam Strategies allow you to choose the most appropriate strategy with one mouse click, the complete scan setup is then automatically prepared.
Guidance View	Step-by-step user guidance can be seamlessly integrated. Example images and guidance text are then displayed for each individual step of the scanning workflow to ensure reproducible scanning. Both images and text are easily configurable by the user.
Parameter View	The new streamlined Parameter View displays a user-defined subset of parameters which are available for manual protocol optimization. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.
Autoposition	The C, T or L spine of the patient is automatically placed at the isocenter without any laser marking required.



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[®] Optional

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AutoAlign Spine LS	Automated, positioning and alignment of slice groups to the spine anatomy, relying on multiple anatomical landmarks. Provides fast, easy, and reproducible patient scanning and facilitates the reading by consistently delivering high image quality with a standardized slice orientation, both for follow-ups and across patients. AutoAlign Spine LS automatically detects and labels vertebra and body disks, suggests and provides guided positioning for sagittal, coronal and double oblique axial slices in the spine. The anterior saturation band is automatically positioned to reduce imaging artifacts. All settings are open to user modifications.
AutoLabeling	Automatic labeling of vertebra for easier examination planning and faster reading
Interactive Snapping	Just drag the slide group over the sagittal plane. AutoAlign Spine LS delivers automatic double oblique positioning of axial slice groups to intervertebral disk layers.
AutoCoverage	Maximizes the speed of the examination by automatically setting the number of slices and the FoV to fully cover the C, T or L-spine. This is performed based on the information delivered by AutoAlign Spine LS, eliminating manual setting and the scanning of unnecessary slices.



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 ๓.ลงชื่อ.....*นพ*.....กรรมการ

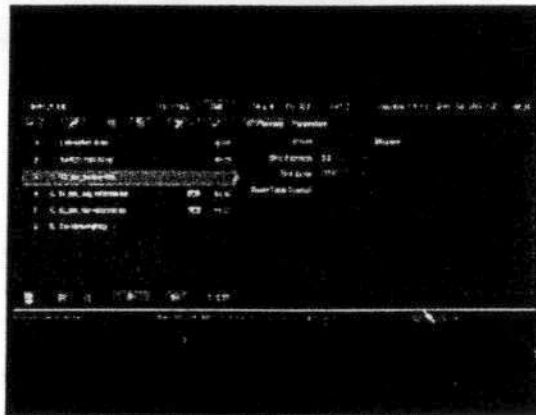
Dot Exam Strategies	Examinations can be easily personalized to the individual patient condition and clinical need. The Spine Dot Engine comes with the following predefined examination strategies, which the user can select according to patient conditions or change at any time during the workflow, when conditions change: <ul style="list-style-type: none"> • Standard: for fast routine spine examinations • Post surgery: for detailed evaluation of spine including fast saturation and DIXON techniques. • High Bandwidth (WARP) : Optimized strategy for the reduction of susceptibility artifacts¹⁾.
WARP Susceptibility Artifact Reduction	WARP integrates different techniques tailored to reduce susceptibility artifacts caused by orthopedic MR Conditional ¹⁾ metal implants. 2D TSE sequence combining optimized high-bandwidth protocols and View Angle Tilting (VAT) technique, helps in evaluation of soft tissue in proximity of the implant.
Rerun	An image inside the examination UI can be selected and a rerun of the corresponding series can be triggered with identical sequences or parameters.
Inline Curved reconstructions	Automatic curved reconstruction from 3D acquisitions by using the position information from the AutoAlign Spine LS algorithm.
Customization	The Spine Dot Engine can be easily modified by the user to their individual standard of care. <ul style="list-style-type: none"> • 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 • User-defined offsets to the standard positions delivered by AutoAlign Spine LS(also for the saturation region) • Customized inline curved and MPR reconstructions



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

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RT Dot Engine¹⁾



The RT Dot Engine supports the user in the acquisition of suitable RT planning images to be further processed in external RT applications. It provides guided and automated workflows customizable to the site-specific standards of care for RT imaging.

Dedicated protocols for RT Planning	• Brain • Head & Neck ²⁾
Patient View	Within the Patient View the user can easily tailor examinations to an individual patient. Dot Exam Strategies allow you to choose the most appropriate strategy with one mouse click; the complete scan setup is then automatically prepared.
Guidance View	Step-by-step user guidance can be seamlessly integrated. Example images and guidance text can be displayed for each individual step of the scanning workflow. Both images and text are easily configurable by the user.
Parameter View	The new streamlined Parameter View displays a user-defined subset of parameters that are available for manual protocol optimization. If desired, the user can switch to the conventional – fully loaded – parameter view at any time.
Laser offset consideration	If an external laser bridge (optional) is installed, this laser can be used for positioning. The marked position is automatically moved to the isocenter. No need to use the system laser in addition.
Geometric integrity control	The RT Dot Engine takes care of the MR data being acquired in the right format, with the appropriate orientation for import into the RT planning software. Whenever possible, it makes sure that distortion correction is activated during acquisition.
Customization	The imaging workflow can be personalized to the individual patient condition and clinical need. Several predefined strategies are included, which can be easily selected.
Further features:	<ul style="list-style-type: none"> • Negative distance factors, • Distortion correction (3D, 2D), • Axial reconstruction, • B1 value monitoring.

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¹⁾ Optional
²⁾ Tm [204]:48], Tm [204]:64]


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syngo MR Software

syngo MR Examination

AutoScout	<ul style="list-style-type: none"> • Automatic start of localizer scan with very short acquisition time • Arbitrary orientations (multi-slice multi-angle) • Automatically loads images into Graphical Slice Positioning
Graphical Slice Positioning	<p>Simultaneous use of three arbitrary localizer images from possibly different measurements for graphically positioning slices and sat regions. Interactive modification of measurement parameters (slice thickness, distance factor, oversampling etc.):</p> <ul style="list-style-type: none"> • Automatic selection of relevant coil elements • Graphical selection of coil elements • Off-center positioning (shift of FoV within the selected slice position) • True multi-slice multi-angle, e.g. simultaneous measurement of multiple images (stacks with different orientation) • Recall of previous slice and/or sat region positioning • Paging through all images during graphical positioning • Inline Movie, allowing positioning of slices on e.g. the beating heart • Loads images immediately when they are available, e.g. during image reconstruction • Allows quick overview via image stamps. Loads entire series of planning images with drag-and-drop • Slice positioning (GSP) on 3D reconstructed images • Slice positioning (GSP) on 2D and 3D distortion corrected images • Slice positioning (GSP) on composed images




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 ๒.ลงชื่อ.....*เพ็ญมา*.....กรรมการ
 ๓.ลงชื่อ.....*อนัน*.....กรรมการ

Image Display	<ul style="list-style-type: none"> • Various display layouts selectable • Up to 3 patients can be simultaneously active in the viewer • Image annotation and labeling • Non-interpolated display • Fast paging through up to 500 images with 15 images/s for full screen display
Windowing	<ul style="list-style-type: none"> • Freely selectable window width and center • Windowing on succeeding images • Auto-windowing for optimized contrast • Saves and sends window values
Automatic Movie for cine display	
Interactive movie paging by dragging the mouse or Automatic Movie mode by clicking the icon	
Evaluation	Parallel evaluation of up to 40 regions of interest <ul style="list-style-type: none"> • Circle • Rectangle • Freehand ROI • Pixel lens with position marker • Statistical evaluation • Area • Standard deviation • Mean value • Min/max values • Image scrolling • Magnification • Distance • Angle
2D Post-processing	Image manipulations <ul style="list-style-type: none"> • Reversal of gray-scale values • Image rotation by 90° or by user-defined angle • Flip horizontally/vertically • Image zoom and pan • Shutter • Annotation
Position display	Displays measured slice positions on localizer image and selected series.



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 ๒.ลงชื่อ.....*ค.น.*..... กรรมการ
 ๓.ลงชื่อ.....*อ.ร.*..... กรรมการ

Argus Viewer	<p>Viewing software for cardiac MR studies and large data sets</p> <ul style="list-style-type: none"> • Efficient cine review of cardiac and other dynamic data sets • Multiple sorting options • Single movie as well as 2, 4, or 8 simultaneous slices together in movie mode • Rapid avi creation of 1 to 8 slices simultaneously • Creates and edits DICOM structured reports 				
Mean Curve	<p>Time-intensity analysis for contrast-enhanced examinations</p> <ul style="list-style-type: none"> • Creates and edits DICOM structured reports 				
Filming	<ul style="list-style-type: none"> • Connection via DICOM Basic Print • Interactive filming • Filming parallel to other activities • Independent scanning and documentation – no wait time due to camera delays • Freely selectable positioning of images onto virtual film sheet • Selectable various film layouts • Mother-in-Child display • Windowing, image zoom and pan on film sheet • Configurable image text • Simultaneous handling of multiple film jobs • Up to 100 virtual film sheets 				
Dynamic Analysis	<p>Arithmetic operations on images and series (e.g. for evaluation of contrast media studies)</p> <ul style="list-style-type: none"> • Addition, subtraction, multiplication, division of single images and whole series • Arithmetic mean and standard deviation across a range of selected images • Calculation of T1 and T2, and logarithmic images • Differentiation/integration of selected images • Calculation of a mean slope image from a range of selected images • Calculation of z-score (t-test) images for evaluation of BOLD imaging data (Blood Oxygenation Level Dependent) • Time-to-peak evaluation (TTP) • ADC maps <p>Several evaluation functions may be started consecutively in the background</p>				
Printing on Paper	<p>Interface and software for printing images on paper (laser printer not included)</p> <table border="1" data-bbox="612 1675 1329 1749"> <tr> <td data-bbox="612 1682 802 1706">Supported printing</td> <td data-bbox="995 1682 1214 1706">Grey levels and color</td> </tr> <tr> <td data-bbox="612 1722 730 1747">Data format</td> <td data-bbox="995 1722 1182 1747">PostScript Level 2</td> </tr> </table>	Supported printing	Grey levels and color	Data format	PostScript Level 2
Supported printing	Grey levels and color				
Data format	PostScript Level 2				



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syngo MR 3D Post-processing

MPR – Multi-Planar Reconstruction	<p>Real-time multi-planar reformatting of secondary views</p> <ul style="list-style-type: none"> • Viewing perspectives: sagittal, coronal, axial, oblique, double oblique, curved (freehand) • Reconstruction along polygon and/or curved (freehand) cut lines • Reconstruction based on reconstructed planes possible • Reconstruction of user-defined ranges of parallel, radial or freehand cuts • Selectable slice thickness and slice increment of reconstructed images • Storing of post-processing protocols • Annotations and 2D evaluations such as distance and ROI
MIP – Maximum Intensity Projection	<p>3D reconstructions of vessels from a 3D data set, or a 2D sequential slice data set (acquired with dedicated MR Angiography sequences)</p> <ul style="list-style-type: none"> • Volume of Interest (Vol) defined to increase reconstruction speed and to improve image quality • Freehand MIP • Arbitrary views along any direction can be defined interactively with mouse-driven virtual trackball • Multiple view angles around any orthogonal axis • Projections displayed as single images, as interactive movie or by fast paging • MIP thin/MIP thick
MinIP – Minimum Intensity Projection	<p>Similar to MIP but reconstructs the minimum intensity (e.g. for Dark Blood techniques)</p>
SSD – Shaded Surface Display	<p>Three-dimensional display of surfaces, such as contrast-enhanced vessels</p> <ul style="list-style-type: none"> • Selectable variable threshold values • Multiple view angles around any orthogonal axis
Volumes of Interest (Vol)	<p>Rectangular and irregular Vol can be defined to improve image quality</p>



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syngo MR Network Communication

<p>DICOM Services (Digital Imaging and Communications in Medicine)</p>	<p>Interface for transmitting medical images and information in the DICOM 3.0 industrial standard. Allows for communication between devices from different manufacturers</p> <ul style="list-style-type: none"> • DICOM Send/Receive • DICOM Query/Retrieve • DICOM SC Storage commitment • DICOM Basic Print • DICOM Modality Worklist • DICOM MPPS Modality performed procedure steps. Communication back to information system • DICOM Structured Reports • DICOM Study Split 						
<p>DICOM Study Split</p>	<p>DICOM Study Split provides the mapping of one study acquired based on multiple requests to multiple studies directly at the scanner. For example, two requests for head and neck acquisition can be registered once, scanned once and immediately mapped to two separate studies for individual reading.</p> <p>Multiple requested procedures can be combined in a time saving manner by scanning a larger body region and then splitting them to individual billing relevant studies for separate reading.</p> <p>This package allows:</p> <ul style="list-style-type: none"> • Time saving simple mapping of multiple requested procedures to multiple acquired series with one scan • Simple creation of studies with individual billing based on one scan workflow • Improvement for departmental workflow by eliminating need to load/change and to request/execute splitting on a separate workstation after the scan • Immediate visual selection, check and correction of images to study assignments. • Overlapping region images can be copied to both studies 						
<p>syngo MR Network Communication</p>	<p>Exchange Media Storage of images and additional data (e.g. AVI files) on CD/DVD</p>						
<p>DICOM Viewer</p>	<p>A viewing tool which can be stored together with images on a DICOM CD/DVD to be handed out to the patient</p>						
<p>Virus Protection</p>	<ul style="list-style-type: none"> • Permanent scanning for malicious software in the background to provide maximum security • Via Remote Access over secure network connection the latest virus scanner updates and operating system hotfixes are installed automatically • Provided in conjunction with a service contract with Siemens (UPTIME Services) 						
<p>Image Transfer</p>	<table border="1"> <tr> <td>Local network</td> <td>Ethernet</td> </tr> <tr> <td>Data transfer rate</td> <td>Max. 1 Gbit/s</td> </tr> <tr> <td>Transfer rate (256x256 image)</td> <td>Approx. 60 images/s</td> </tr> </table>	Local network	Ethernet	Data transfer rate	Max. 1 Gbit/s	Transfer rate (256x256 image)	Approx. 60 images/s
Local network	Ethernet						
Data transfer rate	Max. 1 Gbit/s						
Transfer rate (256x256 image)	Approx. 60 images/s						

3.7.4

3.7.6

	<p>บริษัท อูร์นเมดิคอลซัพพลาย จำกัด UDORN MEDICAL SUPPLY CO., LTD.</p>		<p>ศูนย์บริการทางการแพทย์ที่โรงพยาบาลอเล็กซานเดอร์ ต.สิงขร อ.เมือง จ.อุบลราชธานี</p>
		<p>๑. ลงชื่อ.....ประธานกรรมการ</p>	
		<p>๒. ลงชื่อ.....กรรมการ</p>	
		<p>๓. ลงชื่อ.....กรรมการ</p>	

Computer System

synga Acquisition Workplace																												
General	Full multi-tasking for simultaneous functionality, e.g. on one or two monitors (see Dual Monitor Package): <ul style="list-style-type: none"> • Patient registration and pre-registration • Scanning • Reconstruction • Viewing • Post-processing • Filming • Data storage 																											
Color LCD Monitor	High resolution flicker-free flat-screen monitor Horizontally tiltable, forward and backward Automatic backlight control for long-term brightness stability Optional second monitor																											
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Screen size (diagonal)</td> <td>19"</td> <td style="text-align: right;">3.7.4</td> </tr> <tr> <td>Horizontal frequency</td> <td>30-100 kHz</td> <td></td> </tr> <tr> <td>Vertical frequency</td> <td>50-75 Hz</td> <td></td> </tr> <tr> <td>Screen matrix</td> <td>1280x1024</td> <td style="text-align: right;">3.7.4</td> </tr> </table>	Screen size (diagonal)	19"	3.7.4	Horizontal frequency	30-100 kHz		Vertical frequency	50-75 Hz		Screen matrix	1280x1024	3.7.4															
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Vertical frequency	50-75 Hz																											
Screen matrix	1280x1024	3.7.4																										
Dual Monitor Package	This option provides a dual monitor set up with 2 x 19" monitors for the acquisition workplace, both with the same technical specifications as the Color LCD Monitor (see above). The two identical monitors provide space for protocol planning and exam progress on the left monitor, as well as viewing and basic postprocessing functionalities on the right monitor using one mouse and one keyboard. The Dot Cockpit can be used on both monitors as a floating window. This work space allows to keep running patient examinations always in sight to allow for fast interactions.																											
Host computer	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Processor</td> <td>Intel Xeon ≥ E5-1620 QuadCore</td> <td></td> </tr> <tr> <td>Clock rate</td> <td>≥ 3.5 GHz, or comparable</td> <td style="text-align: right;">3.7.1</td> </tr> <tr> <td>RAM</td> <td>≥ 32 GB</td> <td style="text-align: right;">3.7.2</td> </tr> <tr> <td>1st hard disk (system SW)</td> <td>≥ 300 GB SAS</td> <td style="text-align: right;">3.7.3</td> </tr> <tr> <td>2nd hard disk (data base)</td> <td>≥ 300 GB SAS</td> <td style="text-align: right;">3.7.3</td> </tr> <tr> <td>3rd hard disk (images)</td> <td>≥ 300 GB SAS</td> <td style="text-align: right;">3.7.3</td> </tr> <tr> <td style="text-align: right;">3.7.5</td> <td>CD-R writer</td> <td>Approx. 4000 images 256² DICOM Standard, ISO 9660</td> </tr> <tr> <td style="text-align: right;">3.7.5</td> <td>DVD-R writer</td> <td>Approx. 25000 images 256² DICOM Standard, ISO 9660</td> </tr> <tr> <td></td> <td>Media drives</td> <td>CD/DVD drive</td> </tr> </table>	Processor	Intel Xeon ≥ E5-1620 QuadCore		Clock rate	≥ 3.5 GHz, or comparable	3.7.1	RAM	≥ 32 GB	3.7.2	1 st hard disk (system SW)	≥ 300 GB SAS	3.7.3	2 nd hard disk (data base)	≥ 300 GB SAS	3.7.3	3 rd hard disk (images)	≥ 300 GB SAS	3.7.3	3.7.5	CD-R writer	Approx. 4000 images 256 ² DICOM Standard, ISO 9660	3.7.5	DVD-R writer	Approx. 25000 images 256 ² DICOM Standard, ISO 9660		Media drives	CD/DVD drive
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	Media drives	CD/DVD drive																										



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 ๒. ลงชื่อ..... นพ..... กรรมการ
 ๓. ลงชื่อ..... นพ..... กรรมการ

Measurement and reconstruction system Tim [204x24]	Processor	Intel ≥ E3-1225 Quad-Core
	Clock rate	3.2 GHz, or comparable
	Main memory (RAM)	32 GB
	Hard disk for raw data	≥300 GB
	Hard disk for system software	≥100 GB
	Parallel Scan & Recon	Simultaneous scan and reconstruction of up to 12 data sets
	Reconstruction speed	12 987 recons per second (256 ² FFT, full FoV) 57 971 recons per second (256 ² FFT, 25% recFoV)
Measurement and reconstruction system Tim [204x48]	Processor	Intel ≥ E5-2620 2x6-Core
	Clock rate	2x2.0 GHz, or comparable
	Main memory (RAM)	48 GB
	Hard disk for raw data	≥300 GB
	Hard disk for system software	≥100 GB
	Parallel Scan & Recon	Simultaneous scan and reconstruction of up to 12 data sets
	Reconstruction speed	22 556 recons per second (256 ² FFT, full FoV) 88 889 recons per second (256 ² FFT, 25% recFoV)
Measurement and reconstruction system Standard for Tim [204x64], optional for Tim [204x48]	Processor	Intel Xeon E5-2658 2x8-Core
	Clock rate	≥2x2.1 GHz, or comparable
	Main memory (RAM)	64 GB
	Hard disk for raw data	≥400 GB
	Hard disk for system software	≥100 GB
	Reconstruction speed	31 128 recons per second (256 ² FFT, full FoV) 118 519 recons per second (256 ² FFT, 25% recFoV)
	Parallel Scan & Recon	Simultaneous scan and reconstruction of up to 12 data sets.
	GPGPU	1x Tesla K10



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 ๒. ลงชื่อ..... *pujan* กรรมการ
 ๓. ลงชื่อ..... *onw* กรรมการ

syngo MR Workplace³⁾

Color LCD Monitor	High resolution flicker-free flat-screen monitor Horizontally tiltable, forward and backward Automatic backlight control for long-term brightness stability Optional second monitor		
	Screen size (diagonal)	19"	3.10.5
	Horizontal frequency	30-85 kHz	
	Vertical frequency	50-75 Hz	
	Screen matrix	1280×1024	
	Host computer	Processor	Intel Xeon E5-1620 QuadCore
Clock rate		≥3.5 GHz	3.10.1
RAM		≥8 GB	3.10.2
1 st hard disk (system SW)		≥300 GB SAS	3.10.3
2 nd hard disk (data base)		≥300 GB SAS	
CD-R writer		Approx. 4000 images 256 ² DICOM Standard, ISO 9660	3.10.6
DVD-R writer		Approx. 25 000 images 256 ² DICOM Standard, ISO 9660	
Media drives		CD/DVD drive	
3.10.7			



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³⁾ Optional

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๓. ลงชื่อ.....*WAS*..... กรรมการ

Installation

Siting and Installation	
Short installation time due to integrated digital DirectRF technology	
Typical installation time	Less than 7 working days
Radio Frequency Shielding	
For shielding the examination room from external RF sources 4.1	
RF attenuation factor	>90 dB
Frequency range	15–65 MHz
Magnetic Shielding	
Room shielding	For additional reduction of the magnetic fringe field, suitable iron shielding can be installed in the walls of the examination room. The room shielding can be used to create a magnetic shielding enclosure
One-Floor Installation	A combination of active shielding and a special shielding (installed on the ceiling of the magnet room or below it) will keep the 0.5 mT line within the same floor as the MRI scanner installation, even in case of very low room heights
System Electronics Cabinets	
Two cabinets which may be placed directly against the wall or even in a corner	
Require service access only from the front, saving considerable space	
Integrated water cooling cabinet may eliminate the need for a dedicated computer room	
Power Requirements (XJ Gradients)	
Line voltage	380, 400, 420, 440, 460, 480 V
Stability tolerances	±10%
Line frequency	50/60 Hz, ±1 Hz
Connection value	63 kVA for 480 V/400 V, 62 kVA for 380 V



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Cooling (XG Gradients)

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

Separator option for connection to available cooling system	Water consumption	70l/min ¹⁾
	Heat dissipation to water	45kW
Eco Chiller option with automatic adaptation to the required cooling demands (e.g. different night/day mode) to decrease energy cost	GREEN Cooling Package ²⁾ : The Free Cooling Unit reduces energy consumption by up to 39%. It automatically starts if the surrounding temperature is 18°C (64°F) or less and reduces the chiller energy consumption. If the temperature is less than -3°C (27°F) the chiller is switched off ³⁾	

Power Consumption⁴⁾ (XG Gradients)

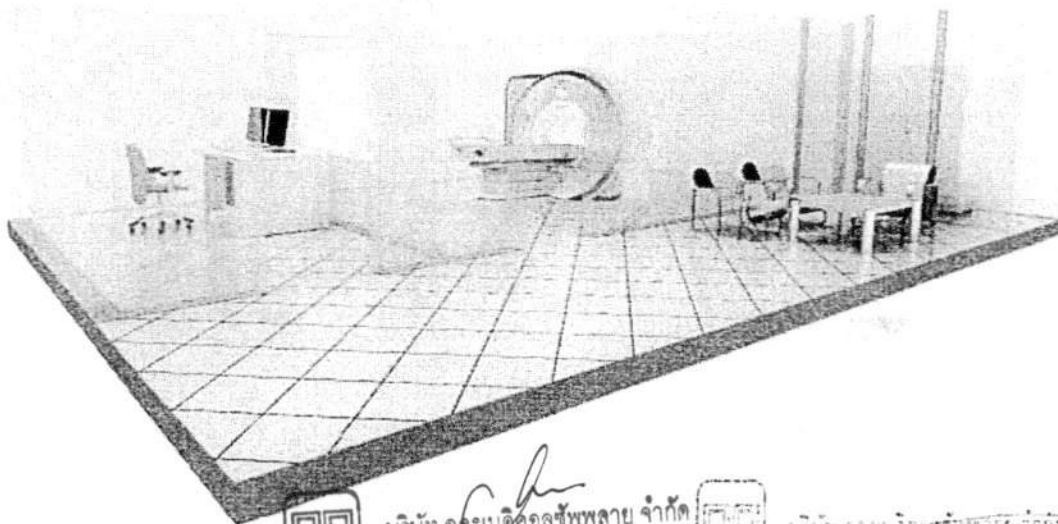
System off	6.1 kW
System ready to measure ⁴⁾	8.7 kW
Scan ⁴⁾	18.9 kW

All values are typical values, applicable for 400V/50Hz

Consumption for optional separator pump and other options not included

Space Requirements

Min. total space requirement (for magnet, electronics, and console room)	<30m ²
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¹⁾ Water temperature: 12°C/45°F

²⁾ optional; based on climatic data of Munich, data on file, results may vary

³⁾ In case of clinical routine measurement conditions

⁴⁾ The power consumption described herein is based on results that were achieved in a setting according to the COCIR methodology MRI - Measurement of the energy consumption (<http://www.cocir.org/index.php?id=46>). Since many variables impact power consumption (e.g. sequences used for scanning and sequence parameters, scan time), there can be no guarantee that each customer will achieve the same values.

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Dimensions					
		Width [cm]	Depth [cm]	Height [cm]	Weight [kg]
Examination Room	Magnet 1.5 Tesla AS (incl. Helium)	205	137	215	3118
	Magnet in operation, incl. gradient coil, body coil, Tim Table and covers	231	405 433 ¹⁾	219	4798
	Tim Table	76	249	52-102 ²⁾ +1.3 ²⁾	
	Required min. room height clearance			240 ⁴⁾	
	Min. transport dimensions	231	155	214	
Control Room	syngo Acquisition Workplace (table + monitor)	120	80	117 (72+45)	
	Host computer	22	46	47	
	syngo MR Workplace (optional)	120	80	117 (72+45)	
Equipment Room	Electronics cabinet, incl. system control, RF system, gradient power system, image processor	160	65	198 ⁵⁾	1500
	Heat dissipation	≤5 kW, only ventilation might be required			
	Cooling system	65	65	189	500

- ¹⁾ With Whole Body option
²⁾ Including Heightening Kit, if necessary
³⁾ Depending on the floor conditions
⁴⁾ Finished floor to finished ceiling
⁵⁾ Without attachments



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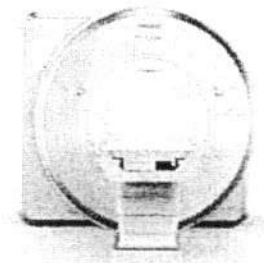
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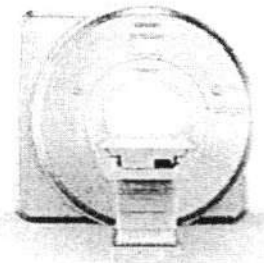
System Cover

Different design variants are available for customer specific needs

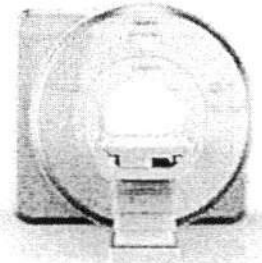
Standard variant:
Pure White Design with
brilliant front ring



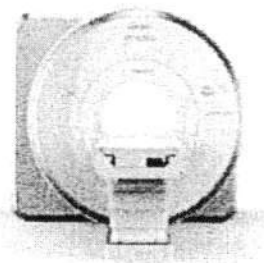
Optional color and
Illumination MoodLight™
variants with brilliant front
rings are available



Illumination MoodLight
with or without Customized
Logo with brilliant front ring



Light Green Design
with brilliant front ring



Water Blue Design
with brilliant front ring



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