



**SSM Health St. Joseph Hospital – Lake Saint  
Louis  
Replacement MRI**

**Project # 6168 HT**

December 2024



Certificate of Need Program  
**EQUIPMENT REPLACEMENT APPLICATION**  
 Applicant's Completeness Checklist and Table of Contents

Project Name: SSM Health St. Joseph Lake Saint Louis Replacement MRI Project No: 6168 HT

Project Description: Replace MRI

Done Page N/A Description

**Divider I. Application Summary:**

- ✓ 3 1. Applicant Identification and Certification (Form MO 580-1861)
- ✓ 4 2. Representative Registration (From MO 580-1869)
- ✓ 5 3. Proposed Project Budget (Form MO 580-1863) and detail sheet with documentation of costs.

**Divider II. Proposal Description:**

- ✓ 7 1. Provide a complete detailed project description, CON project number of the existing equipment (if prev. CON approved), and include the type/brand of both the existing equipment and the replacement equipment.
- ✓ 11 2. Provide a listing with itemized costs of the medical equipment to be acquired and bid quotes.
- ✓ 7 3. Provide a timeline of events for the project, from CON issuance through project completion.

**Divider III. Service Specific Criteria and Standards:**

- ✓ 135 1. Describe the financial rationale for the proposed replacement equipment.
- ✓ 135 2. Document if the existing equipment has exceeded its useful life.
- ✓ 135 3. Describe the effect the replacement unit would have on quality of care.
- ✓ 135 4. Document if the existing equipment is in constant need of repair.
- ✓ 135 5. Document if the lease on the current unit has expired.
- ✓ 135 6. Describe the technological advances provided by the new unit.
- ✓ 135 7. Describe how patient satisfaction would be improved.
- ✓ 135 8. Describe how patient outcomes would be improved.
- ✓ 135 9. Describe what impact the new unit would have on utilization.
- ✓ 135 10. Describe any new capabilities that the new unit would provide.
- ✓ 136 11. By what percent will this replacement increase patient charges.

*(If replacement equipment was not previously approved, also complete Divider IV below.)*

**Divider IV. Financial Feasibility Review Criteria and Standards:**

- ✓ 138 1. Document that sufficient financing is available by providing a letter from a financial institution or an auditor's statement indicating that sufficient funds are available.
- ✓ 138 2. Provide Service-Specific Revenues and Expenses (Form MO 580-1865) projected through three (3) **FULL** years beyond project completion.
- ✓ 139 3. Document how patient charges are derived.
- ✓ 139 4. Document responsiveness to the needs of the medically indigent.



Certificate of Need Program

**APPLICANT IDENTIFICATION AND CERTIFICATION**

<p><i>The information provided must match the Letter of Intent for this project, without exception.</i></p>		
<p><b>1. Project Location</b> <i>(Attach additional pages as necessary to identify multiple project sites.)</i></p>		
<p>Title of Proposed Project SSM Health St. Joseph Lake Saint Louis Replacement MRI</p>		<p>Project Number 6168 HT</p>
<p>Project Address <i>(Street/City/State/Zip Code)</i> 100 Medical Plaza, Lake St. Louis, MO 63367</p>		<p>County St. Charles</p>
<p><b>2. Applicant Identification</b> <i>(Information must agree with previously submitted Letter of Intent.)</i></p>		
<p><b>List All Owner(s):</b> <i>(List corporate entity.)</i> Address <i>(Street/City/State/Zip Code)</i> Telephone Number</p>		
SSM Health St. Joseph Hospital Lake Saint Louis	100 Medical Plaza, Lake St. Louis, MO 63367	(636) 625-5200
<p><i>(List entity to be licensed or certified.)</i></p>		
<p><b>List All Operator(s):</b> <i>(List entity to be licensed or certified.)</i> Address <i>(Street/City/State/Zip Code)</i> Telephone Number</p>		
SSM Health St. Joseph Hospital Lake Saint Louis	100 Medical Plaza, Lake St. Louis, MO 63367	(636) 625-5200
<p><b>3. Ownership</b> <i>(Check applicable category.)</i></p>		
<p> <input checked="" type="checkbox"/> Nonprofit Corporation              <input type="checkbox"/> Individual              <input type="checkbox"/> City              <input type="checkbox"/> District  <input type="checkbox"/> Partnership              <input type="checkbox"/> Corporation              <input type="checkbox"/> County              <input type="checkbox"/> Other _____       </p>		
<p><b>4. Certification</b></p> <p>In submitting this project application, the applicant understands that:</p> <p>(A) The review will be made as to the community need for the proposed beds or equipment in this application;</p> <p>(B) In determining community need, the Missouri Health Facilities Review Committee (Committee) will consider all similar beds or equipment within the service area;</p> <p>(C) The issuance of a Certificate of Need (CON) by the Committee depends on conformance with its Rules and CON statute;</p> <p>(D) A CON shall be subject to forfeiture for failure to incur an expenditure on any approved project six (6) months after the date of issuance, unless obligated or extended by the Committee for an additional six (6) months;</p> <p>(E) Notification will be provided to the CON Program staff if and when the project is abandoned; and</p> <p>(F) A CON, if issued, may not be transferred, relocated, or modified except with the consent of the Committee.</p> <p>We certify the information and date in this application as accurate to the best of our knowledge and belief by our representative's signature below:</p>		
<p><b>5. Authorized Contact Person</b> <i>(Attach a Contact Person Correction Form if different from the Letter of Intent.)</i></p>		
<p>Name of Contact Person Mitch Miller</p>		<p>Title Director Strategy and Business Development</p>
<p>Telephone Number 314-989-6329</p>	<p>Fax Number</p>	<p>E-mail Address mitchell.miller@ssmhealth.com</p>
<p>Signature of Contact Person <i>Mitch Miller</i></p>		<p>Date of Signature 11/13/24</p>



Certificate of Need Program

REPRESENTATIVE REGISTRATION

*(A registration form must be completed for each project presented.)*

Project Name SSM Health St. Joseph Lake Saint Louis   MRI Replacement		Number 6168 HT		
<i>(Please type or print legibly.)</i>				
Name of Representative Mitch Miller		Title Director Strategy and Business Development		
Firm/Corporation/Association of Representative (may be different from below, e.g., law firm, consultant, other) SSM Health		Telephone Number 314-989-6329		
Address (Street/City/State/Zip Code) 100 Medical Plaza, Lake St. Louis, MO 63367				
Who's interests are being represented? <i>(If more than one, submit a separate Representative Registration Form for each.)</i>				
Name of Individual/Agency/Corporation/Organization being Represented		Telephone Number		
Address (Street/City/State/Zip Code)				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Check one. Do you:</p> <p><input checked="" type="checkbox"/> Support</p> <p><input type="checkbox"/> Oppose</p> <p><input type="checkbox"/> Neutral</p> <p>Other Information:</p> <p>_____</p> <p>_____</p> </td> <td style="width: 50%; vertical-align: top;"> <p>Relationship to Project:</p> <p><input type="checkbox"/> None</p> <p><input checked="" type="checkbox"/> Employee</p> <p><input type="checkbox"/> Legal Counsel</p> <p><input type="checkbox"/> Consultant</p> <p><input type="checkbox"/> Lobbyist</p> <p><input type="checkbox"/> Other (explain):</p> <p>_____</p> <p>_____</p> </td> </tr> </table>			<p>Check one. Do you:</p> <p><input checked="" type="checkbox"/> Support</p> <p><input type="checkbox"/> Oppose</p> <p><input type="checkbox"/> Neutral</p> <p>Other Information:</p> <p>_____</p> <p>_____</p>	<p>Relationship to Project:</p> <p><input type="checkbox"/> None</p> <p><input checked="" type="checkbox"/> Employee</p> <p><input type="checkbox"/> Legal Counsel</p> <p><input type="checkbox"/> Consultant</p> <p><input type="checkbox"/> Lobbyist</p> <p><input type="checkbox"/> Other (explain):</p> <p>_____</p> <p>_____</p>
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<p>I attest that to the best of my belief and knowledge the testimony and information presented by me is truthful, represents factual information, and is in compliance with §197.326.1 RSMo which says: <i>Any person who is paid either as part of his normal employment or as a lobbyist to support or oppose any project before the health facilities review committee shall register as a lobbyist pursuant to chapter 105 RSMo, and shall also register with the staff of the health facilities review committee for every project in which such person has an interest and indicate whether such person supports or opposes the named project. The registration shall also include the names and addresses of any person, firm, corporation or association that the person registering represents in relation to the named project. Any person violating the provisions of this subsection shall be subject to the penalties specified in § 105.478, RSMo.</i></p>				
Original Signature 		Date 11/13/24		

MO 500-1869 (11/01)



Certificate of Need Program

**PROPOSED PROJECT BUDGET**

<u>Description</u>	<u>Dollars</u>								
<b>COSTS:*</b>	<i>(Fill in every line, even if the amount is "\$0".)</i>								
1. New Construction Costs ***	\$1,166,022								
2. Renovation Costs ***	_____								
3. <b>Subtotal Construction Costs (#1 plus #2)</b>	<b>\$1,166,022</b>								
4. Architectural/Engineering Fees	_____								
5. Other Equipment (not in construction contract)	_____								
6. Major Medical Equipment	\$2,144,515								
7. Land Acquisition Costs ***	_____								
8. Consultants' Fees/Legal Fees ***	_____								
9. Interest During Construction (net of interest earned) ***	_____								
10. Other Costs ***	_____								
11. <b>Subtotal Non-Construction Costs (sum of #4 through #10)</b>	<b>\$2,144,515</b>								
12. <b>Total Project Development Costs (#3 plus #11)</b>	<b>\$3,310,537 **</b>								
 <b>FINANCING:</b>									
13. Unrestricted Funds	\$3,310,537								
14. Bonds	_____								
15. Loans	_____								
16. Other Methods (specify)	_____								
17. <b>Total Project Financing (sum of #13 through #16)</b>	<b>\$3,310,537 **</b>								
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">18. New Construction Total Square Footage</td> <td style="width: 20%;">_____</td> </tr> <tr> <td>19. New Construction Costs Per Square Foot *****</td> <td>_____</td> </tr> <tr> <td>20. Renovated Space Total Square Footage</td> <td>_____</td> </tr> <tr> <td>21. Renovated Space Costs Per Square Foot *****</td> <td>_____</td> </tr> </table>		18. New Construction Total Square Footage	_____	19. New Construction Costs Per Square Foot *****	_____	20. Renovated Space Total Square Footage	_____	21. Renovated Space Costs Per Square Foot *****	_____
18. New Construction Total Square Footage	_____								
19. New Construction Costs Per Square Foot *****	_____								
20. Renovated Space Total Square Footage	_____								
21. Renovated Space Costs Per Square Foot *****	_____								

\* Attach additional page(s) detailing how each line item was determined, including all methods and assumptions used. Provide documentation of all major costs.

\*\* These amounts should be the same.

\*\*\* Capitalizable items to be recognized as capital expenditures after project completion.

\*\*\*\* Include as Other Costs the following: other costs of financing; the value of existing lands, buildings and equipment not previously used for health care services, such as a renovated house converted to residential care, determined by original cost, fair market value, or appraised value; or the fair market value of any leased equipment or building, or the cost of beds to be purchased.

\*\*\*\*\* Divide new construction costs by total new construction square footage.

\*\*\*\*\* Divide renovation costs by total renovation square footage.

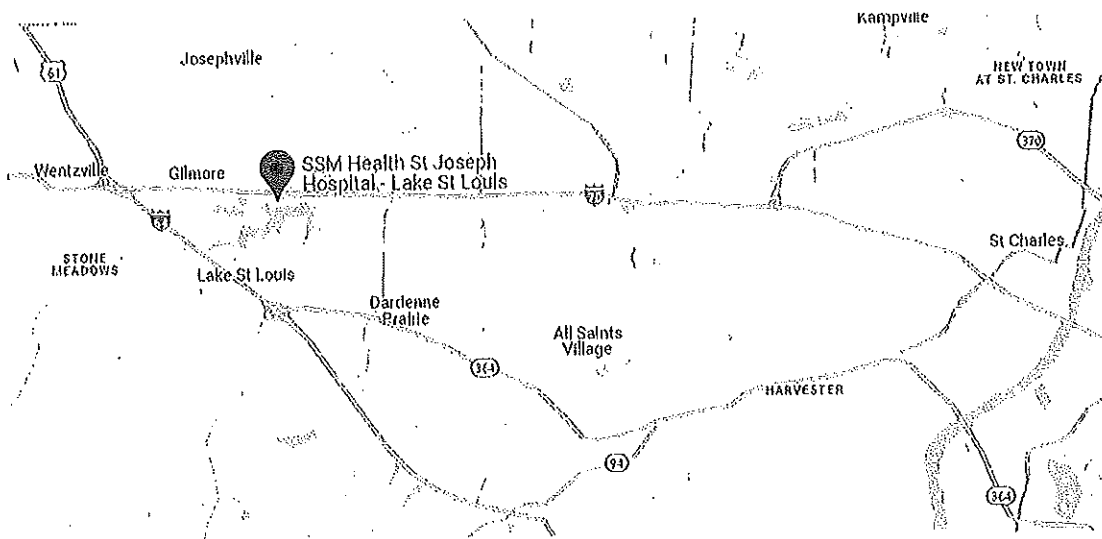
**Divider II**  
**Proposal Description**

1. Provide a complete detailed project description and include equipment bid quotes  
SSM Health St. Joseph Hospital – Lake Saint Louis is requesting replacement of our MRI scanner.

See attached quote

2. Provide a timeline of events for the project, from CON issuance through project completion
  - Equipment arrival and installation: 1/2025
  - First case: Q1 2025
  - Invoice received: 10/30/2024
  - Payment cleared: Payment terms are as follows: 0% Down 80% Delivery 20% Installation, nothing has been nor will be paid until delivery.

3. Provide a legible city or county map showing the exact location of the project



4. Define the community to be served

SSM Health St. Joseph Hospital – Lake Saint Louis is one of 7 SSM Health hospitals in the greater St. Louis region. SSM Health Medical Group and SLUCare Medical Group offices are widely spread throughout the entire region.

SSM Health St. Joseph Hospital – Lake Saint Louis primary and secondary service areas are home to a diverse population. Patients choose the location they prefer for health services typically based on proximity to their home and/or physician's office location.

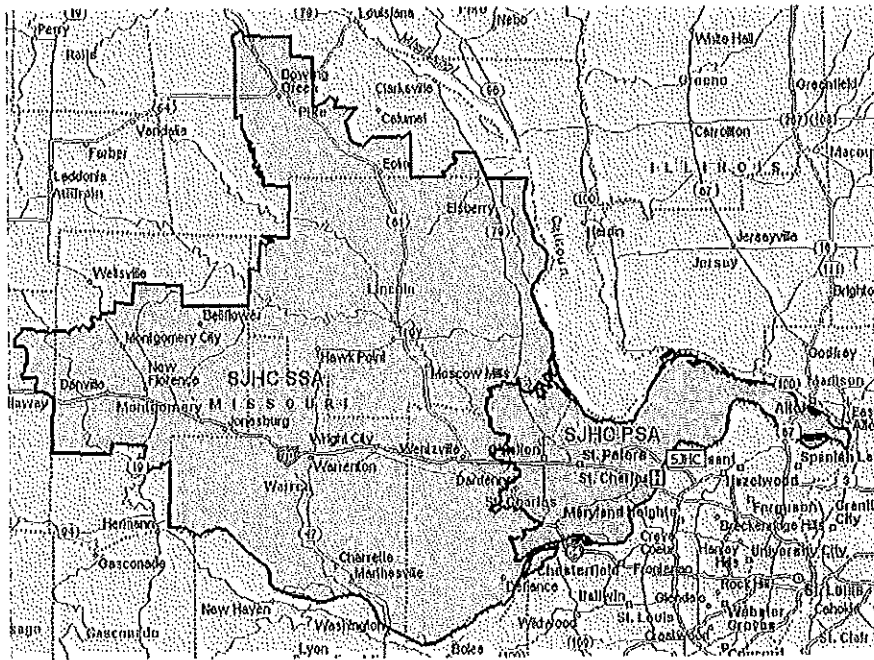
	2000	%	2005	%	2010	%
Chinese at Home	1,711	0.35%	1,701	0.35%	4,09%	1.12%
Only English at Home	469,669	95.21%	469,627	95.21%	4,33%	78.25%
Other Asian-Pacific Lang at Home	2,236	0.46%	2,327	0.46%	4,07%	0.99%
Other Indo-European Lang at Home	2,680	0.55%	2,794	0.55%	4,26%	1.89%
Spanish at Home	10,000	2.07%	10,413	2.06%	4,13%	13.39%
All Others	6,544	1.35%	6,839	1.35%	4,51%	4.36%
Total	463,840	100.00%	461,701	100.00%	4,83%	100.00%
<b>Income</b>						
<\$15K	7,862	4.06%	7,220	3.52%	(9.32 %)	6.03%
\$16-25K	8,282	4.21%	7,104	3.46%	(14.02 %)	7.49%
\$26-50K	28,823	14.63%	24,410	11.09%	(15.29 %)	18.81%
\$50-75K	29,696	15.23%	29,269	14.27%	(2.00 %)	16.13%
\$76-100K	28,436	14.49%	26,624	12.97%	(6.37 %)	12.80%
\$100K-200K	67,329	34.31%	73,618	35.06%	9.34%	25.15%
>\$200K	25,540	13.01%	37,033	18.04%	45.00%	11.26%
Total	194,261	100.00%	205,317	100.00%	10.62 %	100.00 %
<b>Education</b>						
Less than High School	5,746	1.63%	6,996	1.64%	5.57%	4.09%
Some High School	16,555	4.60%	17,404	4.70%	5.13%	6.64%
High School Degree	95,393	26.88%	100,133	27.07%	4.97%	26.93%
Some College/Assoc. Degree	113,802	32.13%	110,022	32.12%	4.59%	30.85%
Bachelor's Degree or Greater	122,226	34.57%	127,539	34.47%	4.35%	30.60%
Total	353,622	100.00%	369,084	100.00%	4.65 %	100.00 %

5. Provide population projections for the proposed geographic service area  
The 5-year projected population growth is 4.19%



6. Provide other statistics to document the size and validity of any user-defined geographic service area

Please see map below of our primary and secondary service areas. St. Charles County is the specific service area.



7. Identify specific community problems or unmet needs the proposal would address.

MRI access is limited in St. Charles County, as the population continues to grow in this region the current imaging infrastructure is unable to accommodate the healthcare needs of the growing community. Current state SSM is experiencing a 23-day backlog for MRI appointments across the MRI Scanners in St Charles County. This replacement MRI unit will assist SSM with providing timely care to our community. This replacement MRI will have advanced imaging technologies such as cardiac MRI allowing patients the ability to stay within St Charles County for their imaging needs.

8. Provide the historical utilization for each of the past three years and utilization projections through the first three (3) FULL years of operation of the new equipment  
Based on market growth we anticipate similar volumes at this new MRI department.

2021: 4,957  
 2022: 4,659  
 2023: 4,516  
 2024 YTD: 4,105

2025: 4600

2026: 4700

2027: 4800

9. Provide the methods and assumptions used to project utilization.

We used current volumes as baseline then added in new provider recruits and new services growth strategies to model future utilization assumptions.

10. Document that consumer needs and preferences have been included in planning this project and describe how consumers had an opportunity to provide input

N/A

11. Provide copies of any petitions, letters of support, or opposition received.

N/A



Siemens Medical Solutions USA, Inc.  
40 Liberty Boulevard, Malvern, PA 19355

SIEMENS REPRESENTATIVE  
Gregory Thudium - +1 (314) 604-8452  
gregory.thudium@siemens-healthineers.com

Customer Number: 0000010313

Date: 10/12/2024

SSM HEALTH ST JOSEPH HOSPITAL  
100 MEDICAL PLAZA  
LAKE SAINT LOUIS, MO 63367

Siemens Medical Solutions USA, Inc. is pleased to submit the following quotation for the products and services described herein at the stated prices and terms, subject to your acceptance of the terms and conditions on the face and back hereof, and on any attachment hereto.

<u>Table of Contents</u>	<u>Page</u>
MAGNETOM Sola - System (Quote Nr. CPQ-1126103 Rev. 0).....	2
OPTIONS for MAGNETOM Sola - System (Quote Nr. CPQ-1126103 Rev. 0) .....	16
Detailed Technical Specifications .....	18

**Contract Total: \$ 2,144,515**  
*(total does not include any Optional or Alternate components which may be selected)*

Proposal valid until 06/27/2024



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40 Liberty Boulevard, Malvern, PA 19355

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PRELIMINARY PROPOSAL

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Quote Nr: CPQ-1126103 Rev. 0

Terms of Payment: Note in order Text Terms of payment  
Free On Board: Destination

Purchasing Agreement: IDN - SSM HEALTH PARTNERSHIP

IDN - SSM HEALTH PARTNERSHIP terms and conditions apply to Quote Nr CPQ-1126103

Customer certifies, and Siemens relies upon such certification, that : (a) VIZIENT MRI XR0885 is the sole GPO for the purchases described in this Quotation, and (b) the person signing this Quotation is fully authorized under the Customer's policies to choose and indicate for Customer such appropriate GPO.

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**MAGNETOM Sola - System**

All items listed below are included for this system:

Qty	Part No.	Item Description
1	14460300	<p><b>MAGNETOM Sola - System</b> MAGNETOM Sola - the first 1.6T BioMatrix system - leverages the intelligent combination of Tim 4G and Siemens unique BioMatrix technology to embrace the unique challenges that every patient brings to the MRI exam.</p> <p>System Design - Short and open appearance (167 cm total system length cover-to-cover and 70 cm Open Bore Design) to reduce patient anxiety and claustrophobia</p> <p>- Whole-body superconductive Zero Helium Boil-Off 1.6T magnet - Weight-optimized magnet technology based on high performance 3T and 7T magnet design - Actively shielded water-cooled Siemens gradient system for maximum performance</p> <p>BioMatrix Technology to address intrinsic biovariability in humans. Built on three technological pillars: - BioMatrix Sensors: anticipate challenges before they happen with respiratory sensors, which measure a patient's respiratory signal as soon as the patient lies on the table. - BioMatrix Tuners: adapt and correct field inhomogeneities induced by patient anatomy with CoilShim and SliceAdjust. - BioMatrix Interfaces: easily manage any type of patient with intelligent interfaces like Select&amp;GO to accelerate workflow.</p> <p>Tim 4G (Total Imaging matrix in the 4th generation) for excellent image quality and speed - Siemens unique DirectRX technology enabling all digital-in/digital-out design - Dual-Density Signal Transfer Technology</p> <p>Push-button exams with GO technologies</p>



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PRELIMINARY PROPOSAL

Qty	Part No.	Item Description
		Select&GO Do!GO Recon&GO MR View&GO  Tim Application Suite enabling excellent head-to-toe imaging - Neuro Suite - Angio Suite - Cardiac Suite - Body Suite - Onco Suite - Breast Suite - Ortho Suite - Pediatric Suite - Scientific Suite  Further included: - High performance host computer and measurement and reconstruction system - Patient communication including headphones - Turbo Suite Essential - syngo MR software including: - 1D/2D PACE - BLADE - Phoenix - Inline Diffusion - MDDW (Multiple Direction Diffusion Weighting) - CISS - DESS - TGSE - Offline Composing
1	14460161	<b>MR General Engine #VI</b> syngo.MR General Engine extends Numinis/X by adding dedicated workflows and tools for routine and advanced reading of MR examinations. A generic MR Basic workflow is provided, as well as specific MR Neurology, MR Prostate Reading, MR Breast Reading, and MR Cardio-Vascular workflows.
1	14475308	<b>myExam Brain Assist</b> myExam Brain Assist provides guided and flexible workflows. Optimized scan strategies are provided and can be selected based on the patient's condition, which allows for reproducible, high image quality and time efficient exams. The built-in flexibility allows users to change predefined strategies at any time during the brain workflow, and to personalize to the individual patient's condition and clinical need. myExam Brain Assist is customizable to the site-specific standards of care.
1	14475309	<b>myExam Spine Assist</b> myExam Spine Assist provides guided and flexible workflows for cervical, thoracic and lumbar spine. Optimized scan strategies are provided and can be selected based on the patient's condition, which allows for reproducible, high image quality and time efficient exams. The built-in flexibility allows users to change predefined strategies at any time during the spine workflow, and to personalize to the individual patient's condition and clinical need. myExam Spine Assist is customizable to the site-specific standards of care.
1	14475310	<b>myExam Large Joint Assist</b> myExam Large Joint Assist provides guided and flexible workflows for knee, hip and shoulder. Optimized scan strategies are provided and can be selected based on the patient's condition, which allows for reproducible, high image quality and time efficient exams. The built-in flexibility allows users to change predefined strategies at any time during the scan workflow, and to personalize to the individual patient's condition and clinical need. myExam Large Joint Assist is customizable to the site-specific standards of care.

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PRELIMINARY PROPOSAL

Qty	Part No.	Item Description
1	14482834	<p><b>myExam Brain Autopilot</b> myExam Brain Autopilot enables less experienced staff to scan brain MRI at high quality with just a few simple clicks. By using automation and AI, it takes away burdensome routine tasks for all technologists. Predefined automated protocols allow users to scan with no manual adjustments. A new and intuitive user interface simplifies scanning so that exams can be performed, or strategies can be changed easily. This new approach to operate MRI helps any user to generate consistent, comprehensive results. myExam Brain Autopilot is customizable to the site-specific standards of care.</p>
1	14482835	<p><b>myExam Knee Autopilot</b> myExam Knee Autopilot enables less experienced staff to scan knee MRI at high quality with just a few simple clicks. By using automation and AI, it takes away burdensome routine tasks for all technologists. Predefined automated protocols allow users to scan with no manual adjustments.</p> <p>A new and intuitive user interface simplifies scanning so that exams can be performed, or strategies can be easily changed. This new approach to operate MRI helps any user to generate consistent, comprehensive results.</p> <p>myExam Knee Autopilot is customizable to the site-specific standards of care.</p>
1	14483029	<p><b>myExam Implant Suite</b> myExam Implant Suite supports in examinations of patients with a wide range of active or passive MR Conditional Implants. Limits for B1+ rms or SAR (Head and whole body) as specified by the Implant manufacturer may be set by the operator and will not be exceeded during the exam.</p>
1	14441748	<p><b>Quiet Suite #T+D</b> Quiet Suite enables complete, quiet examinations for neurology and orthopedics with at least 70% reduction in sound pressure levels.</p>
1	14460162	<p><b>Tim Whole Body Suite #VI</b> Tim Whole Body Suite puts it all together. This suite enables table movement for imaging of up to 205 cm (8' 9") FoV without compromise. In combination with Tim's newly designed ultra-high density array higher spatial and temporal resolution can be achieved along with unmatched flexibility of any coverage up to Whole Body. For faster exams and greater diagnostic confidence.</p>
1	14460227	<p><b>Tim Planning Suite #VI</b> 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.</p>
1	14456329	<p><b>syngo TimCT FastView #VI</b> TimCT FastView is the "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. Transverse, coronal and sagittal reformats of the volume are calculated inline and displayed for planning subsequent exams.</p> <ul style="list-style-type: none"> <li>- Inline reconstruction of the localizer images during the scan.</li> <li>- Localizing images in three planes over the maximum Field of View available for subsequent planning in all orientations.</li> <li>- TimCT FastView runs without laser light positioning to further streamline the workflow for several indications.</li> </ul>
1	14460160	<p><b>Advanced Diffusion #VI</b> QuietX DWI and RESOLVE together make up the Advanced Diffusion package.</p> <p>QuietX DWI enables quieter diffusion-weighted imaging of the brain with up to 70% reduction in sound pressure relative to conventional diffusion-weighted imaging. RESOLVE (Readout Segmentation Of Long Variable Echo-trains) is a multi-shot, readout segmented EPI sequence for high-resolution, low-distortion diffusion-weighted imaging (DWI). This technique is largely insensitive to susceptibility</p>

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PRELIMINARY PROPOSAL

Qty	Part No.	Item Description
		effects, providing anatomically accurate diffusion imaging for the brain, spine, breast and prostate. In combination with syngo.MR Tractography, RESOLVE enables excellent white-matter tract imaging even in regions of high susceptibility, such as the spine.
1	14456327	<b>WARP &amp; Advanced WARP #VI</b> WARP and Advanced WARP (SEMAC) integrates different techniques tailored to reduce susceptibility artifacts caused by orthopedic MR-conditional metal implants.
1	14456237	<b>Advanced Cardiac Incl. PSIR #VI</b> This package contains special sequences and protocols for advanced cardiac imaging including 3D and 4D BEAT functionalities. It supports advanced techniques for ventricular function imaging, dynamic imaging, tissue characterization, coronary imaging, and more.
1	14456323	<b>Inline Composing syngo #Se</b> Automatic anatomical or angiographic composing of multiple adjacent coronal or sagittal images for presentation and further evaluation. Composed images can be automatically loaded into Graphical Slice Positioning for scan planning purposes.
1	14482913	<b>syngo Expert-! XA60/XA61</b> This software application enables remote access to the system (connected via local area network) for planning and processing.
1	14460306	<b>Standard Coil Package, 48-ch #So</b> This package includes (if not exchanged with different variants via respective quote items): - BioMatrix Head/Neck 20 tiltable with CoilShim - BioMatrix Spine 32 with Respiratory Sensors - Body 18 - Flex Large 4 - Flex Small 4 - Flex Coil Interface
1	14456328	<b>BioMatrix Technology #VI</b> The new and unique BioMatrix technology addresses the different aspects of patient bio-variability. It is based on three technological clusters: - BioMatrix Sensors address patient physiology, in order to anticipate challenges - BioMatrix Tuners address patient anatomy, in order to adapt to all patients, especially critical ones. - BioMatrix Interfaces address user interaction with the patient, to accelerate the workflow in the face of patient variability.
1	14470783	<b>BioMatrix Respiratory Sensors #VI, So</b> Highly integrated BioMatrix Respiratory sensors measure the patient's breathing cycle in head-first and feet-first orientation.
1	14470785	<b>BioMatrix Beat Sensor #VI, So</b> The BioMatrix Beat Sensor measures the motion of the heart and enables Cardiac triggering without the need of ECG triggering.
1	14470792	<b>BioMatrix Coil Shim #VI, So</b> BioMatrix CoilShim helps to reduce patient induced strongly localized B0 inhomogeneities by dedicated local shim channels.
1	14470794	<b>BioMatrix SliceAdjust #BM</b> BioMatrix SliceAdjust helps to avoid station boundaries and apparent broken spine artifacts as well as to preserve the SNR for whole-body diffusion.
1	14460415	<b>BioMatrix Dock. Table w/ eDrive #So</b> The BioMatrix Dockable Table with eDrive is designed for maximum patient comfort and smooth patient preparation. The BioMatrix Dockable Table with eDrive can support up to 260 kg (560 lbs) without restricting the vertical or horizontal movement. The BioMatrix eDrive provides motorized assistance for easy maneuverability of the table.

PRELIMINARY PROPOSAL

Qty	Part No.	Item Description
1	14470795	<b>BioMatrix Select &amp; GO #VI,So</b> The BioMatrix Select&GO interface enables fast and easy single-touch patient positioning from both sides of the patient table. The interfaces are integrated left and right into the front covers. Correct positioning saves unnecessary wasted time for repositioning and additional adjustments, therefore shortening the total room time.
1	14460410	<b>Silver &amp; White Design #So</b> MAGNETOM Sola is available in two different light and appealing design variants which perfectly integrate into different environments. The Silver & White Design Variant comprises a brilliant white front design ring with integrated unique Select&GO panels. The smoothly embracing deco area on the left side and the outer rings in the front and the back of the system is colored in brilliant silver. The table cover is presented also in the same color and material selection.
1	14456270	<b>PC Keyboard US English #VI</b> Standard PC keyboard with 105 keys.
1	14460419	<b>High-End Computing [204x48] #So</b> Tim 4G power computing upgrade for MAGNETOM Sola/ Sola Fit Tim [204x48]. This upgrade brings a high-end image reconstruction computer to the Tim [204x48] configuration.
1	14456238	<b>Peripheral Pulse Unit #VI</b> Peripheral Pulse Unit for Pulse Triggering
1	14460313	<b>Dual Monitor Package #BM</b> The Dual Monitor Package provides a second 24" LCD monitor for the acquisition workplace, identical to the system main host monitor. The two monitors provide space for protocol planning and exam progress on the left monitor, as well as viewing and post-processing functionalities on the right monitor. The Dot Cockpit can be used on both monitors as a floating window. This improves the MR examination workflow by a smoother and more comfortable work space that avoids interruptions between planning, scanning, viewing and post-processing. It allows to keep running patient examinations always in sight to allow for fast interactions.
1	14446651	<b>In-Ear Headset #T+D</b> In-Ear Headphone for easy communication with patient while using the head coil.
1	14482959	<b>SW syngo MR XA61A</b> syngo MR XA61A is the new software platform, bringing the latest features and functionality for daily clinical excellence. syngo MR XA61A guides and enables the user throughout the entire workflow: from patient registration; patient set up with guided workflows on the Select&GO; protocol management and selection; image acquisition and viewing; data handling; and post processing and reporting. This software together with the hardware enables diagnostic excellence for your daily clinical needs.  The syngo MR XA61A platform offers myExam Companion which introduces a new MRI operation philosophy by providing built-in expertise and automation for users and clinical questions. myExam Companion provides different workflow modes for tailored assistance: myExam Autopilot, myExam Assist and myExam Cockpit. No matter the user or patient, myExam Companion helps generate consistent, comprehensive results.
1	14460171	<b>syngo.MR Neuro Perfusion Engine #1</b> syngo.MR Neuro Perfusion Engine extends the MR Neurology workflow with a complete package for advanced processing and evaluation of brain perfusion datasets
1	14460183	<b>syngo.MR Cardio Engine #1</b> The syngo.MR Cardio Engine bundles the following features for Cardiac evaluation: - syngo.MR Cardiac 4D Ventricular Function - syngo.MR Cardiac Flow



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PRELIMINARY PROPOSAL

Qty	Part No.	Item Description
1	14461619	<b>Turbo Suite Essential #BM</b> Turbo Suite Essential comprises established acceleration techniques to maximize productivity for all contrasts, orientations and all routine imaging applications from head-to-toe.
1	14482917	<b>Deep Resolve Pro Package</b> The Deep Resolve Pro Package combines the three applications Deep Resolve Gain, Deep Resolve Sharp and Deep Resolve Boost which use intelligent reconstruction algorithms and Deep Learning networks to reconstruct accelerated images with higher signal to noise ratio and better image sharpness.
1	14402527	<b>SWI #T1m</b> 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.
1	14470965	<b>High bandwidth inversion recovery</b> High bandwidth inversion recovery for reduction of susceptibility-induced artifacts.
1	14441747	<b>MyoMaps #T+D</b> This package contains special sequences and protocols for Inline T1, T2 and T2* calculation at the heart. The generation of T1 and T2 parametric maps is enhanced by the use of motion correction. T1, T2 and T2* parametric maps could be used to support assessment of cardiovascular disease.
1	08464740	<b>Flow Quantification #T1m</b> Special sequences for quantitative assessment of flow I
1	14469199	<b>Body 18 -&gt; BioMatrix Body 18</b> This option exchanges the Body 18 coil from the standard coil configuration for the improved BioMatrix Body 18. Beside the same technical key benefits from the Body 18 coil, this coil has a new highly flexible and light-weight design.

The BioMatrix Body 18 features:

- 18-element design with 18 integrated preamplifiers (3 clusters of 6 elements each)
- Operates in an integrated fashion with the system's spine coil
- Can be combined with further Body 18 or BM Body 18 coils for larger coverage
- Can be positioned in different orientations (0°, 90°, 180°, 270°) for patient specific adaptations
- Requires no coil tuning
- iPAT compatible in all directions

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

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

The BioMatrix Body 18 is typically combined with:

- BM Head/Neck 20
- BM Spine coil
- Additional Body 18 coil(s) or BM Body 18 coils (optional)
- Peripheral Angio 36 (optional)
- Flex Large 4
- Flex Small 4
- UltraFlex Large 18 (depending on availability, optional)
- UltraFlex Small 18 (depending on availability, optional)
- Loop coils (optional)
- Endorectal coil (optional)

PRELIMINARY PROPOSAL

Qty	Part No.	Item Description
1	14460315	<p><b>Shoulder Shape 16 #So</b></p> <p>The Shoulder Shape 16 combines the known benefits of Tim 4G coil technology with new highly flexible materials, resulting in unmatched image quality, high patient comfort and easy handling. The Shoulder Shape 16 for examinations of the left or right shoulder consists of an IPAT-compatible 16-channel shoulder coil in a flexible shoulder cup that can be shaped around small and large shoulders. An L-shaped cushion for easy positioning of the patient is included. The 16-element coil with 16 integrated pre-amplifiers ensures maximum signal-to-noise ratio. Shoulder Shape 16 will be connected via a SlideConnect plug for fast and easy coil set-up and patient preparation.</p>
1	14480423	<p><b>Tx/Rx Knee 18 #So</b></p> <p>New 18-channel transmit/receive coil optimized for knee imaging. The spacious design with a flared opening towards the thigh allows scanning even of large and swollen knees with exceptional image quality and signal to noise ratio.</p> <p>Main features :</p> <ul style="list-style-type: none"> <li>- 18-element design (3x6 coil elements) with 18 integrated preamplifiers</li> <li>- IPAT-compatible</li> <li>- SlideConnect Technology</li> </ul>
1	14416982	<p><b>Foot/Ankle 16 #Ae</b></p> <p>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.</p> <p>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.</p>
1	14469229	<p><b>Flex -&gt; UltraFlex Upgrade #1.5T</b></p> <p>This option exchanges the Flex Small &amp; Large 4 coils incl. the Flex Coil Interface from the standard coil configuration for the superior UltraFlex Small &amp; Large 10. These are two lightweight, IPAT compatible, 18-element no-tune receive coils made of highly flexible and soft material.</p> <p><b>UltraFlex Large 18</b> Ideal for examinations of larger extremities (e.g. medium to large shoulder, hip, knee, ankle and hand) and for abdominal examinations. Dedicated positioning aids for larger extremities are delivered with the coil.</p> <p><b>UltraFlex Small 18</b> Ideal for examinations of smaller extremities (e.g. small to medium shoulder, smaller ankle, elbow and hand) and for abdominal examinations. Dedicated positioning aids for smaller extremities are delivered with the coil.</p>
1	14456282	<p><b>Positioning Aids Shoulder&amp;Ankle #VI</b></p> <p>This package contains additional positioning aids that can be used for the UltraFlex Large 18 and UltraFlex Small 18.</p>
1	14456241	<p><b>Separator 60kW/75kW #VI</b></p> <p>The SEP (Separation cabinet) has to be used if a central hospital chilled water supply is available or if a chiller of any brand/type is already available. The SEP is the interface between the on-site water chiller (of any brand or type) or the interface to the central hospital cooling water supply. For the above-mentioned cases the SEP is mandatory!</p> <p>In these cases, the primary water specifications must fulfill the requirements: XJ: 45kW; water temperature: 6 - 14°C XQ: 60kW; water temperature: 6 - 14°C XT: 75kW; water temperature: 6 - 12°C</p> <p>For all gradient systems: Flow: 100+-10l/min; pH value 6-8; max working pressure 6 bar.</p>



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PRELIMINARY PROPOSAL

Qty	Part No.	Item Description
1	14460249	<p>Dimensions: 1950mm x 650mm x 650mm (height x width x depth) Weight: approx. 350kg</p> <p><b>UPS system #VI</b> UPS system Liebert GXT5 3000IRT2UXLE for MAGNETOM NumX systems for safeguarding computers. Including Power Cable of 9 m for connecting the UPS. Power output: 3.0 kVA / 3 kW Bridge time: 3 min full load / 12 min half load Input voltage: 230 VAC</p>
1	14466316	<p><b>UPS Battery module (Liebert GXT4 BATT)</b> UPS battery module Liebert GXT5 72VBATTE for MAGNETOM Aera, Skyra, Prisma, ESSENZA, Amira, Spectra, CI for safeguarding computers. Extension for: Liebert GXT5 3000IRT2UXLE (14456315) Battery type: Closed, maintenance-free Extension of the bridge time to: 21 minutes full load / 48 min half load with one module Dimensions (H x D x W): Battery module: 430 x 540 x 85 mm</p> <p>Weight: approx. 30 kg</p>
1	14466228	<p><b>System Start Timer #Vj</b> Timer clock that can be installed together with the MAGNETOM MR system to start the system automatically at user-definable times, eliminating waiting times during system boot up.</p>
1	14460303	<p><b>Tim [204x48] XQ Gradient #So</b> Tim [204x48] XQ-gradients performance level Tim 4G's RF system and innovative coil architecture enables high-resolution imaging and increased throughput. The system provides a maximum number of 204 channels (coil elements) that can be connected simultaneously. Flexible parallel imaging is achieved by the standard 48 independent RF channels that can be used simultaneously in one single scan and in one single FOV, each generating an independent partial image. This option includes also Advanced High Order Shim.</p> <p>XQ - gradients Max. amplitude: 78 mT/m (Actual 45 mT/m for every gradient axis) Max. slew rate: 346 T/m/s (Actual 200 T/m/s for every gradient axis) Min. rise time from 0 to 78 mT/m: 226 µs</p> <p>Note: max. amplitude and max. slew rate achieved through vector addition of all three gradient axes simultaneously, actual maximum amplitude of 45 mT/m and actual maximum slew rate of 200 T/m/s are achievable simultaneously along each axis.</p> <p>The XQ gradients are designed for high performance and linearity to support clinical whole body imaging at 1.5T. The force compensated gradient system minimizes vibration levels and acoustic noise.</p> <p>High-performance measurement and reconstruction system.</p>
1	14475450	<p><b>myExam Assist XL Package USA</b> The myExam Assist XL Package Includes: - myExam Angio Assist - myExam Abdomen Assist - myExam Cardio Assist - myExam Breast Assist</p> <p>The myExam Assist XL package offers a comprehensive set myExam Companions for the maximum coverage of MR examination requests. Robust image quality can</p>

PRELIMINARY PROPOSAL

Qty	Part No.	Item Description
		be achieved efficiently and consistently in the clinical areas of Neuro, MSK, Vascular, Cardiac and Oncology.
		The myExam Angio Assist provides semi-automatic detection of arterial and venous timing windows using a test bolus technique. This information is feedback for next planning steps automatically adapting scan parameters to the individual patient and patient's condition.
		The myExam Abdomen Assist offers intuitive guidance and a high level of automation. It allows automatic sequence scaling according to physiological characteristics.
		The myExam Cardiac Assist uses anatomical landmarks, standard views of the heart, such as dedicated long axis and short-axis views - easily generated and reproduced.
		The myExam Breast Assist provides lesion detection, implant evaluation and breast biopsy. The myExam Companions support various breast coils, head-first or optional feet-first positioning and examination approaches (fatsat, nonfatsat).
1	14469015	<b>Turbo Suite Elite #BM</b> Turbo Suite Elite comprises cutting edge Compressed Sensing applications for advanced abdominal and cardio-vascular imaging with dynamic 2D and dynamic 3D applications to significantly reduce scan times, counter patient motion and expanding the patient population eligible for MRI.
1	14469016	<b>Turbo Suite Elite Support #BM</b> Turbo Suite Elite Support provides Future Security for Turbo Suite Elite: - In consideration of Customer's purchase of the MAGNETOM MR scanner and simultaneous purchase of a 4 year point of sale Service Agreement with Evolve, and should such Evolve Upgrade installed during the term of the Service Agreement enable operation of dynamic Compressed Sensing options and/or Simultaneous Multi-Slice options, then Customer may choose to receive one such dynamic Compressed Sensing or Simultaneous Multi-Slice application option at no additional cost.
1	14475508	<b>Turbo Suite Excelerate</b> Turbo Suite Excelerate comprises access to cutting edge acceleration techniques such as Simultaneous Multi-Slice, Compressed Sensing and Wave-CAIPI for static 2D and static 3D imaging applications in Neuro, MSK and Body MRI.
1	14416946	<b>Neuro Perfusion Package #T+D</b> The Neuro Perfusion Package helps to streamline the clinical workflow by inline post-processing in dynamic susceptibility contrast (DSC) based perfusion imaging. This makes it possible to see perfusion maps immediately.  Perfusion parameter maps are based on a Local Arterial Input function. A corrected rCBV map calculation and motion correction is provided.
1	14475462	<b>myExam LiverLab Assist</b> myExam LiverLab Assist is a system guided workflow to examine the hepatic fat and iron status.
1	14409198	<b>Native syngo #Tim</b> Integrated software package with sequences and protocols for non-contrast-enhanced 3D MRA with high spatial resolution. syngo NATIVE particularly enables imaging of abdominal and peripheral vessels and is an alternative to MR angiography techniques with contrast medium, especially for patients with severe renal insufficiency.
1	14441813	<b>QISS #T+D</b> Software package with QISS sequence, protocols and Dot AddIn for non-contrast-enhanced peripheral MRA. QISS particularly enables higher reproducibility than existing methods and is an alternative to MR angiography techniques with contrast



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Qty	Part No.	Item Description
		medium, especially for patients with severe renal insufficiency.
1	14416961	<p><b>Hand/Wrist 16 #Ae</b> 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	14416958	<p><b>Peripheral Anglo 36 #Ae</b> The new Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility:</p> <ul style="list-style-type: none"> <li>- 36 channels</li> <li>- Dual Density Signal Transfer</li> <li>- Ultra light-weight</li> <li>- SlideConnect Technology</li> </ul> <p>The 36-channel coil includes 36 integrated pre-amplifiers for excellent signal-to-noise ratio. The single SlideConnect Plug allows for fast and easy patient preparation.</p> <p>The Peripheral Anglo 36 features:</p> <ul style="list-style-type: none"> <li>- 36-element design with 36 integrated preamplifiers, distributed over 6 planes with 6 elements each</li> <li>- Operates in an integrated fashion with Body 18 coils and with the Spine 32. For Whole-Body examinations also with the Head/ Neck 20</li> <li>- Automatic table feed and active coil switch</li> <li>- Can be utilized head and feet first</li> <li>- Both legs are independently covered with coil elements, maximizing the coil filling factor and the signal-to-noise ratio</li> <li>- No coil tuning</li> <li>- IPAT-compatible</li> <li>- Dual-Density Signal Transfer enables ultra-high density coil designs by integrating key RF components into the local coil</li> <li>- SlideConnect technology for easy coil set up</li> <li>- One cable only for easy handling</li> <li>- Includes special non-ferromagnetic coil cart for safe, user-friendly storage</li> </ul> <p>Applications:</p> <ul style="list-style-type: none"> <li>- High-resolution angiography of both legs incl. Pelvis (by additional use of the Body 18) with highest signal-to-noise ratio</li> <li>- Visualization of the iliac arteries and aorta in combination with Body 18</li> <li>- Bilateral examinations of long bones of the legs</li> </ul> <p>Typically combined with: Head/ Neck 20, Body 18, Spine 32, and all flexible coils such as Flex Large 4 or Flex Small 4</p>
1	14426332	<p><b>Tx/Rx CP Head Coil #Ae</b> Circularly polarized no-tune transmit/receive coil with an open patient-friendly design. The integrated transmit mode allows volume selective excitation. Integrated, extremely low-noise pre-amplifiers permit very high signal-to-noise ratio. Furthermore, the coil is outfit with SlideConnect Technology, allowing for easier patient preparation and less table time for the patient.</p>
1	14416952	<p><b>Coil Storage Cart #T+D</b> Specially designed non-ferromagnetic cart for easy storage of the most commonly used coils and accessories.</p>
1	14407259	<p><b>MR Workplace Table, height adjust.</b></p>



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Qty	Part No.	Item Description
1	14407261	<p>The table is suitable for the syngo Acquisition Workplace and the syngo MR Workplace based on syngo hardware. This 110V version has motorized table height adjustment.</p> <p><b>MR Workplace Container, 50cm</b> 50 cm wide extra case for the syngo host computer with sliding front door to allow change of storage media (CD/DVD/USB).</p>
1	MR_STD_RIG_1 NST	<p><b>MR Standard Rigging and Installation</b> MR Standard Rigging and Installation</p> <p>This quotation includes standard rigging and installation of your new MAGNETOM system</p> <p>Standard rigging into a room on ground floor level of the building during standard working hours (Mon. – Fri./ 8 a.m. to 5 p.m.) It remains the responsibility of the Customer to prepare the room in accordance with the SIEMENS planning documents Any rigging requiring a crane over 80 tons and/or special site requirements (e.g. removal of existing systems, etc.) is an incremental cost and the responsibility of the Customer. All other "out of scope" charges (not covered by the standard rigging and installation) will be identified during the site assessment and remain the responsibility of the Customer.</p>
1	MR_BTL_INSTA LL	<b>MR Standard Rigging &amp; Install</b>
1	MR_PREINST_ DOCK	<b>T+D Preinstall kit for dockable table</b>
1	MR_CRYO	<b>Standard Cryogens</b>
1	MR_PM	<p><b>MR Project Management</b> 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	HASKRISFG230 41	<p><b>Haskris OPC24 Chiller- 63kW</b> The Haskris outdoor, air-cooled, water/glycol chiller has been specially designed for medical applications to provide stable, fully dedicated cooling to a single MR system.</p> <p>The Haskris chiller must be used in combination with a Siemens SEP cabinet.</p> <p>The Haskris chiller is suitable for use in all siting conditions: normal, coastal, low-ambient, and/or OSHPD-compliant locations.</p> <p>Specifications Cooling Capacity: 63kW Fluid Supply Temp: 43°F (6°C) to 59°F (15°C) Pump Capacity: 32 GPM (120 LPM) Condenser: Air-cooled (heat dissipated into ambient air) Outdoor ambient air temperature: -40°F (-40°C) to 122°F (50°C) Electrical: 480V-3Ø-60Hz Dimensions: 77"W x 40"D x 74"H (196cm x 102cm x 188cm)</p> <p>Siemens' Pricing Also Includes: Delivery Chiller Start-Up (Post installation)</p>



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**PRELIMINARY PROPOSAL**

Qty	Part No.	Item Description
		1x Preventative Maintenance Service Visit Remote Monitoring Panel with 1-Year Cellular Connectivity and Cloud Service
		Installation: Customer is responsible for the rigging and installation of the chiller. Customer is responsible for providing a 35% solution of propylene glycol with water; 26 gal (95 L) for the chiller plus 1 gal (3.8 L) per 10 ft (3m) external pipe run assuming 1 1/2" pipe diameter.
		Warranty: 12 months from date of Start-Up
1	HASKRIS_STAR TUP	<b>Haskris Chiller Start-Up</b> Chiller start-up by Haskris vendor after installation of chiller and completion of paperwork.
1	MR_GOKNEE3 D	<b>GOKnee3D</b> GOKnee3D is a 10-minute, push-button examination for diagnostic imaging of the knee developed and clinically validated by the US board certified MSK radiologists at John Hopkins University Hospital. GOKnee3D exam consists of AutoAlign localizer in the knee, PD weighted contrast and T2 weighted contrast with fat suppression. The AutoAlign technology provides a push-button functionality and ensures consistency in imaging. The 3D protocols are high resolution and isotropic, enabled by SPACE sequence with CAIPIRINHA technique. Examination time for 3T system is 10 minutes, for a 1.5T system is up to 11 minutes. All given examination times are examination only, adjustments have been excluded. When using GOKnee3D one of two software and coil combinations is required. Measurements made with GOKnee3D using the 15 channel knee coil require software version syngo MR E11C AP04 or higher. Measurements made with GOKnee3D using the 18 channel knee coil require software version syngo MR Numaris VA11A or higher.
1	MR_GOBRAIN	<b>GOBrain</b> GOBrain delivers reliable quality at exceptional speed. It enables clinically validated, push-button brain exams, with multiple orientations and all relevant contrasts. This fast exam is more tolerable for patients, and helps reduce motion-related artifacts and the need for rescans and sedation. As a result, GOBrain potentially doubles throughput and reduces costs per scan. Supported by our T1m 4G technology and DotGO, it delivers consistently high quality and maximizes the productivity of your MRI scanner - while improving patient care.
1	MR_GREEN_PK G	<b>MR Green Package</b> MRI Green Package Enhances environmental sustainability of equipment by reducing emissions.  Eco Power Mode reduces power consumption by up to 12% with Eco Power Mode alone.  Eco Gradient Mode reduces scope 2 emissions by up to 7%.  System Start-Up Timer reduces scope 2 emissions in non-productive times.  Zero Helium Boil-Off technology - No helium refill for a lifetime and up to 37 % reduction in helium inventory compared to the previous scanner generation.  Environmental Product Declaration provides environmental relevant information of product and packaging material, operating, cleaning and disposal data as well as life cycle impact information.  Results were achieved by Siemens Healthineers using both standard and optional features. There can be no 'typical' hospital setting (case mix, system type, etc.) and so results by users may vary with no guarantee that the same results can be achieved.



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Qty	Part No.	Item Description
1	MRIMAB_100	<b>MRI Armboard w/ Pad</b>
1	ML11685	<b>MR Wall sign -English</b> Highly durable 1mm PVC wall signs with high-tack, double-back tape. Sticks to most any surface. English. 12" x 18".
1	MRISMNS0001	<b>MRI Patient Audio System</b> The MRI Patient Audio System is to be installed in the technologist room and is connected to the Siemens intercom system. The package provides the following benefits:  <ul style="list-style-type: none"> <li>• Create custom, commercial-free radio stations based on artist, song or genre preferences</li> <li>• Avoid any AM/FM tuning issues that may occur in RF-shielded rooms</li> <li>• Compatible with all popular audio apps</li> </ul> <p>Includes all cables and adapters; Bose Companion 2 technologist speakers; 3.5 mm to RCA cable; and customized IPAD Mini with all original accessories and IPad stand.</p> <p>The MR Stereo can play internet radio (depending on quality of and access to Wi-Fi signals) and device (IPAD) stored audio content. Optimal performance requires access to Wi-Fi signal for internet radio through the facility's wireless network.</p> <p>The audio system is not MR safe and is only intended for use outside the MRI suite.</p> <p>Installation is not included unless purchased with the Siemens system.</p> <p>Includes 3 year limited liability warranty on all system components through MRI Med.</p>
1	MR14400428	<b>ACR Phantom Holder (USA)</b> An MR compatible cradle device used to consistently and precisely position the American College of Radiology (ACR) MRI Accreditation phantom, for use with Siemens MAGNETOM standard Head Coil during test measurements for ACR system accreditation or QA testing
1	MR_BUDG_AD DL_RIG	<b>Budgetary Add'l/Out of Scope Rigging</b>
1	MR_TRADE_IN_ ALLOW	<b>MR Trade-in-Allowance</b>
1	MR_EP1_28	<b>Essential Training PH 1 (Onsite-28) MR</b> Up to (28) 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
1	MR_EP2_28	<b>Essential Training PH 2 (Onsite-28) MR</b> Up to (28) 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
1	MR_EP2_24	<b>Essential Training PH 2 (Onsite-24) MR</b> Up to (24) hours of on-site clinical education training, scheduled consecutively (Monday – Friday) during standard business hours for a maximum of (4) imaging professionals. Training will cover agenda items on the ASRT approved checklist if





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Qty	Part No.	Item Description
1	MR_EP2_16	<p>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> <p><b>Essential Training PH 2 (Onsite-16) MR</b> Up to (16) 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	MR_BUND_LV2	<p><b>MR EDU Bundle - New to System or 3T/7T</b> This flexible Essential Education Bundle is designed to support you as an existing customer with a Siemens MAGNETOM system in your facility but may be new to system/software. This bundle of training elements launches with a Customer &amp; Clinical Education Specialist (CES) Consultation. This CES will be your point of contact &amp; act as a Conclerge throughout your 1st year of the system's lifecycle to ensure the following:</p> <ul style="list-style-type: none"> <li>•Development of a full training plan for delivery during year 1 of system installation</li> <li>•Ensure all training goals/objectives are met</li> <li>•Full support for all your education needs with regular touchpoints throughout the year</li> <li>•All education sold with your system is delivered using the most appropriate method</li> <li>•Advice on additional education that will be valuable to you beyond year 1</li> </ul> <p>The elements in this bundle are designed to be flexible &amp; provide the right balance/blend of delivery methods to meet the training needs/goals set during the initial consultation. Depending on the goals &amp; experience levels of your staff, education will be delivered using a variety of methods including e-learning, In-person/virtual classroom or workshop, &amp; onsite/live remote training. Bundled items include:</p> <ul style="list-style-type: none"> <li>•Customized Education Planning &amp; Consultation</li> <li>•12-Month e-learning Subscription</li> <li>•Dedicated Protocol Optimization</li> <li>•FlexEd(x2) – Choose 1 from Classroom, Live Remote Support (12-hours), Customized Workshop (4-hours), Innovations for Imaging Education Symposium Ticket, or e-learning</li> <li>•Onsite Initial Training(Up to 28 Hours)</li> <li>•Onsite Follow-up Training(Up to 24 Hours)</li> <li>•Remote System Follow-Up Training(Up to 8 Hours)</li> <li>•Virtual Trainer(x2) – 2-hour didactic training or scanning session</li> <li>•Ongoing Clinical Check-ins by your Clinical Consultation Specialist</li> </ul> <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>

**System Total                    \$ 2,097,164**



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PRELIMINARY PROPOSAL

OPTIONS on Quote Nr : CPQ-1126103 Rev. 0

OPTIONS for MAGNETOM Sola - System

All items listed below are OPTIONS and will be included on this system ONLY if Initialed: (See Detailed Technical Specifications at end of Proposal.)

Qty	Part No.	Item Description	Extended Price
		<b>Optional parts</b>	
1	BMRXP200	<b>BAYER MEDRAD MRXperion</b> The MRXperion injector has the following features: Streamlined Injection Workflow Enhanced Point of Care - On-board eGFR and Weight Based Dosing Calculators, an Injection Pressure Graph, and Independent Test Inject and KVO functions. Informatics-ready - Connect with the Radimetrics Enterprise Platform for automated documentation, advanced analytics and viewable patient histories to facilitate standardized injection protocols and enhanced operational consistency. Maximized Uptime Support - Connect to VirtualCare Remote Support for advanced injector system diagnostics, seamless software updates, and fast repairs.  Price includes installation, training and one year warranty through Bayer Healthcare.	+ \$ 45,336
1	BMRXPENPNL	<b>MRXperion penetration panel</b> Includes penetration panel and installation by Bayer.  To be selected only if the customer has no wall outlets in the MR suite and requires the power to be sourced from outside the room.	+ \$ 2,015
1	NC149030	<b>NeoCoil Breast Coil, 1.5T</b> The NeoCoil 16ch Breast Coil is a phased array coil for imaging structures of the breast, axilla and chest wall. The 16ch Breast Coil includes a coil support structure, patient support structure, biopsy components and comfort pads. The 16ch Breast Coil supports both diagnostic and biopsy imaging modalities while accommodating various anatomic shapes and sizes.  Coil Coverage: 36cm R/L, 20cm A/P, 24cm S/I Kit Includes: Medial Array, Lateral Array Left, Lateral Array Right, Baseplate Assy including system cable, Pad Kit, Accessories Kit Installation: Installation quoted separately Warranty: 1-year warranty through NeoCoil	+ \$ 70,850
1	NC_INSTALL_APPS	<b>NeoCoil Breast Coil Install, Basic Apps</b> On-site installation and basic Applications training for the 16-Channel NeoCoil Breast Coil including: installation of the coil file on the scanner, a quality check of the coil, and demonstration on coil setup and patient positioning. Includes all travel expenses. Continental US only.	+ \$ 4,250



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**FINANCING:** The equipment listed above may be financed through one of our financing partners. Ask us about our full range of financial products that can be tailored to meet your business and cash flow requirements. For further information, please contact your local Sales Representative.

Siemens Healthineers is pleased to submit this Preliminary Pricing Proposal. A Preliminary Pricing Proposal is provided for planning purposes only; it is not contractually binding. To receive a contractually binding proposal for the Products listed above, inclusive of Terms, Conditions, and Warranty coverage, please contact your Siemens Healthineers Sales Representative.

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PRELIMINARY PROPOSAL

**Detailed Technical Specifications**

**MAGNETOM Sola - System**

Part No./Product	Description
<p>14460300 MAGNETOM Sola - System</p>	<p>MAGNETOM Sola - the first 1.5T BioMatrix system - leverages the intelligent combination of Tim 4G and Siemens unique BioMatrix technology to embrace the unique challenges that every patient brings to the MRI exam.</p> <p>System Design</p> <ul style="list-style-type: none"> <li>- Short and open appearance (157 cm total system length cover-to-cover and 70 cm Open Bore Design)</li> <li>to reduce patient anxiety and claustrophobia</li> <li>- Whole-body superconductive Zero Helium Boil-Off 1.5T magnet</li> <li>- Weight-optimized magnet technology based on high performance 3T and 7T magnet design</li> <li>- Actively Shielded water-cooled Siemens gradient system for maximum performance</li> </ul> <p>BioMatrix Technology to address intrinsic biovariability in humans. Built on three technological pillars:</p> <ul style="list-style-type: none"> <li>- BioMatrix Sensors: anticipate challenges before they happen with respiratory sensors, which measure a patient's respiratory signal as soon as the patient lies on the table.</li> <li>- BioMatrix Tuners: adapt and correct field inhomogeneities induced by patient anatomy with CoilShim and SliceAdjust.</li> <li>- BioMatrix Interfaces: easily manage any type of patient with intelligent interfaces like Select&amp;GO to accelerate workflow.</li> </ul> <p>Tim 4G (Total Imaging matrix in the 4th generation) for excellent image quality and speed</p> <ul style="list-style-type: none"> <li>- Siemens unique DirectRX technology enabling all digital-in/digital-out design</li> <li>- Dual-Density Signal Transfer Technology</li> </ul> <p>Push-button exams with GO technologies</p> <ul style="list-style-type: none"> <li>Select&amp;GO</li> <li>DotGO</li> <li>Recon&amp;GO</li> <li>MR View&amp;GO</li> </ul> <p>Tim Application Suite enabling excellent head-to-toe imaging</p> <ul style="list-style-type: none"> <li>- Neuro Suite</li> <li>- Angio Suite</li> <li>- Cardiac Suite</li> <li>- Body Suite</li> <li>- Onco Suite</li> <li>- Breast Suite</li> <li>- Ortho Suite</li> <li>- Pediatric Suite</li> <li>- Scientific Suite</li> </ul> <p>Further Included:</p> <ul style="list-style-type: none"> <li>- High performance host computer and measurement and reconstruction system</li> <li>- Patient communication including headphones</li> </ul>

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**PRELIMINARY PROPOSAL**

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	<ul style="list-style-type: none"> <li>- Turbo Suite Essential</li> <li>- syngo MR software including:</li> <li>- 1D/2D PACE</li> <li>- BLADE</li> <li>- Phoenix</li> <li>- Inline Diffusion</li> <li>- MDDW (Multiple Direction Diffusion Weighting)</li> <li>- CISS</li> <li>- DESS</li> <li>- TGSE</li> <li>- Offline Composing</li> </ul> <p>MAGNETOM Sola - the first 1.5T BioMatrix system - leverages the intelligent combination of Tim 4G and the Siemens unique BioMatrix technology to be ready to embrace the unique set of challenges that each and every patient brings to the MRI exam.</p> <p>The system includes:</p> <p><b>BioMatrix Technology</b> In order to meet the requirements of the changing healthcare market, Tim® is now further enhanced with the ability to address patient biovariability: Evolving from Total Imaging matrix, BioMatrix® technology addresses the intrinsic biovariability in humans.</p> <p>BioMatrix can anticipate challenges in MR examinations, for example, the limited ability to hold one's breath, to manage growing patient populations and increasing exam complexity in MRI.</p> <p>BioMatrix can adapt to all patients and their anatomic individuality, even the critical ones, to make MRI more predictable and consistent for all patients, even critical ones. BioMatrix can accelerate the workflow, without compromising quality of care by assisting interactions between the patient and the user, to improve MRI cost-effectiveness and patient outcomes.</p> <p>BioMatrix anticipates, adapts and accelerates to embrace human nature.</p> <p><b>Tim 4G</b> Tim 4G provides excellent image quality and speed in MRI combined with 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 reduces claustrophobia. Tim 4G with its 4G flexibility, 4G accuracy and 4G speed brings image quality and acquisition speed to a new level.</p> <p><b>Magnet:</b></p> <ul style="list-style-type: none"> <li>- Short 145 cm long (157 cm with covers), whole-body superconductive 1.5T magnet with active shielding (AS) technology with counter coils</li> <li>- External Interference Shielding (E.I.S.)</li> <li>- Excellent homogeneity enabled magnet design which allows for a cylindrically optimized homogeneously volume resulting in higher image quality (50 x 50 x 45 cm<sup>3</sup> DEV, typ. 2,8 ppm based on the 24-plane plot method)</li> <li>- Temperature sensors with real time correction algorithm for unmatched long-term stability at 70 cm</li> <li>- The magnet has 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.</li> <li>- It has an integrated magnet cooling system.</li> </ul>



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	<ul style="list-style-type: none"> <li>- The combination of standard active shim and passive shim allows for maximized magnetic field homogeneity and consistent high image quality for a wide range of applications</li> <li>- Integrated Eco-Power technology to save around 30% of energy during standby of the system.</li> </ul> <p><b>Gradient system:</b></p> <ul style="list-style-type: none"> <li>- Actively shielded water-cooled world-class gradient system</li> <li>- All axes force compensated for lowest vibrations and acoustic performance</li> </ul> <p><b>DirectRF - RF Transmit/Receive System:</b></p> <ul style="list-style-type: none"> <li>- Fully integrated Transmit- and Receive path in the magnet housing including extremely compact water-cooled solid state amplifier with 37.5 kW peak power</li> <li>- High dynamic range</li> <li>- Immediate feedback loop for real-time sequence adaptation</li> <li>- Integrated no tune transmit/receive Body Coil</li> <li>- The revolutionary Tim 4G technology allows connecting 204 channels (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.</li> </ul> <p><b>GO technologies</b></p> <p><b>Select&amp;GO</b> The Select&amp;GO interface enables fast and easy single-touch patient positioning. Correct positioning saves unnecessary wasted time for repositioning and additional adjustments, therefore shortening the total room time.</p> <ul style="list-style-type: none"> <li>- The ergonomically designed Select&amp;GO touch panels are integrated into the front cover on each side of the patient tunnel for controlling table movement, guidance for patient setup and comfort features. They are well illuminated for easy visual recognition.</li> <li>- Automated table move to upmost position, to center position or Home position facilitate smooth patient preparation and will reduce table time</li> <li>- Variable (6 levels) ventilation and lighting inside the magnet bore or volume adjustments are possible for increased patient comfort. The Select&amp;GO touch panels provide 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.</li> <li>- Almost all table control functions, including ventilation and illumination of the magnet bore, can be also controlled from the operator console for convenient operation.</li> </ul> <p><b>DotGO</b> Go for consistent results, efficiently with Dot Engines. Dot offers a customizable framework for patient personalization, user guidance and exam automation. Optimized scan strategies are provided and can be selected based on patient condition, which allow for high quality exams even when conditions change. Integrated decision points allow the user to easily add or remove one or a group of protocols with one click. Step by step image and text guidance guides novice users even through the most complicated exams. Exam automation allows optimal timing for breathing, scanning, planning or contrast arrival. Dot can be easily customized to follow the individual standards of care. Dot is personalized, guided and automated and designed to improve workflow efficiency and image consistency.</p> <p><b>Dot Cockpit</b> The central tool to continuously build knowledge into standardized exams strategies and to make those available for every user in the MRI department. Dot Cockpit is the new starting point for every</p>

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Part No./Product	Description
	<p>exam. Recon&amp;GO The Recon&amp;GO technology encompasses a wide range of in-line functionalities automizing reconstruction and post-processing steps to provide ready-to-read results for the radiologist. Examples are InLine ADC calculation, InLine subtraction of dynamic contrastenhanced series, up to InLine Launch of advanced post-processing applications.</p> <p>MR View&amp;GO MR View&amp;GO is MAGNETOM Sola's all-in-one viewing and reading solution for fast and intuitive quality check and result distribution. It receives the images directly as they come on the scanner, giving the user a clear overview of the quality of images scanned, without being distracted by constant context switches. Once the images have been checked for acceptable quality, they can easily be sent to the PACS with minimal user interaction. Beyond that, MR View&amp;GO offers the additional advantage to perform extended post-processing, directly at the scanner. In-line launching of post-processing applications makes it possible to fully automate the evaluation of, for example, perfusion maps, permeability or cardiac function, all without additional user interaction. This makes it possible to save radiologist time by delivering quantitative, ready-to-read results, directly to the PACS.</p> <p><b>Tim Application Suite</b> The Tim Application Suite offers a complete range of clinically optimized examinations for all regions. The Tim Application Suite -allowing excellent head-to-toe imaging - is provided standard on MAGNETOM Sola.</p> <ul style="list-style-type: none"> <li>- Neuro Suite</li> <li>- Anglo Suite</li> <li>- Cardiac Suite</li> <li>- Body Suite</li> <li>- Onco Suite</li> <li>- Breast Suite</li> <li>- Ortho Suite</li> <li>- Pediatric* Suite</li> <li>- Scientific Suite</li> </ul> <p>* MR scanning has not been established as safe for imaging fetuses and infants less than two years of age. The responsible physician must evaluate the benefits of the MR examination compared to those of other imaging procedures.</p> <p><b>Neuro Suite</b> Comprehensive head and spine examinations can be performed with dedicated programs. High-resolution pulse sequences and motion-insensitive pulse sequences for patients which have difficulties to lay still are provided. The Neuro Suite also includes pulse sequences for diffusion imaging, perfusion imaging, and fMRI. It includes for example:</p> <ul style="list-style-type: none"> <li>- Fast 2D imaging with SE, TSE, GRE pulse sequences for high-resolution imaging</li> <li>- BLADE for motion-insensitive TSE imaging EPI pulse sequences and protocols for diffusion imaging, perfusion imaging, and fMRI for advanced neuro applications. Diffusionweighted imaging is possible with up to 16 b-values in the orthogonal directions. For reduced distortions and homogeneous signal intensity even in the presence of challenging susceptibility interfaces and at station boundaries, SliceAdjust (slice-by-slice adjustments) can be selected.</li> <li>- 3D TOF for non-contrast enhanced angiography</li> <li>- 3D Isotropic resolution volume imaging using T1 3D MPRAGE / 3D</li> </ul>

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Part No./Product	Description
	<ul style="list-style-type: none"> <li>- FLASH, SPACE DarkFluid, T1 SPACE and T2 SPACE pulse sequences</li> <li>- High-resolution T2 SPACE pulse sequence optimized for inner ear examinations</li> <li>- Double Inversion Recovery 3D pulse sequences (DIR SPACE) with two user-selectable inversion pulses for the simultaneous suppression of e.g. cerebro-spinal fluid and white matter</li> <li>- MP2RAGE (Magnetization Prepared 2 Rapid Acquisition Gradient Echoes) provides homogeneous tissue contrast for segmentation and applications such as voxel-based morphometry. In combination with MapIt*, it also provides T1 mapping functionality.</li> <li>- Whole-spine pulse sequences in multiple steps with software controlled table movement</li> <li>- 2D and 3D MEDIC pulse sequences for T2-weighted imaging, particularly for C-spine examinations in axial orientation where reproducibility is difficult due to CSF pulsations and blood flow artifacts</li> <li>- RESOLVE (Readout Segmentation Of Long Variable Echo-trains) delivers high-resolution, low-distortion diffusion-weighted imaging (DWI) for accurate depiction of lesions.</li> <li>- BloMatrix's CoilShim helps to reduce patient induced strongly localized B0 inhomogeneities as may arise, e.g., in the neck region.</li> <li>- 3D Myelo with 3D HASTE for anatomical details</li> <li>- 3D CISS (Constructive Interference in Steady State) for excellent visualization of fine structures such as cranial nerves. High-resolution imaging of inner ear</li> <li>- TGSE sequence used primarily for T2-weighted imaging for shorter measurement time, decreased RF power deposition, and high-resolution imaging of the brain</li> <li>- AutoAlign Head LS providing a fast, easy, standardized, and reproducible patient scanning supporting reading by delivering a higher and more standardized image quality.</li> </ul> <p><b>Angio Suite</b> Excellent MR Angiography can be performed to visualize arteries and veins with or without contrast agent.</p> <ul style="list-style-type: none"> <li>- 3D MRA pulse sequences for carotid arteries, abdominal arteries, and peripheral arteries, with short TR and TE. The strong gradients make it possible to separate the arterial phase from the venous phase.</li> <li>- Dynamic MRA for 3D imaging over time Signal from Respiratory Sensor can be selected to actively trigger MR image acquisition, e.g. with NATIVE*.</li> </ul> <p><b>Contrast-enhanced MRA</b> 3D contrast-enhanced MRA pulse sequences for dynamic carotid, abdominal, and peripheral arteries, shortest TR and TE. The strong gradients make it possible to separate the arterial phase from the venous phase</p> <ul style="list-style-type: none"> <li>- TestBolus workflow for optimal bolus timing and excellent image quality</li> <li>- CareBolus functionality for accurate determination of the bolus arrival time and the "Stop and Continue" of the 3D ce-MRA pulse sequence after the 2D bolus control scan</li> <li>- Dynamic ce-MRA for 3D imaging over time</li> </ul> <p><b>Non-contrast-MRA and venography</b></p> <ul style="list-style-type: none"> <li>- Time-of-Flight (ToF) pulse sequences for MRA for the Circle of Willis, carotids and neck vessels; can be adapted for venography, and Breath-hold protocols for abdominal vessels</li> <li>- Triggered 2D ToF sequences for non-contrast MRA in the legs MR venography and arteriography with Phase-Contrast</li> <li>- TONE (Tilted optimized non-saturating excitation) techniques for improved</li> <li>- Contrast-to-Noise Ratio (CNR)</li> </ul> <p><b>Image processing tools</b></p> <ul style="list-style-type: none"> <li>- Inline MIP for immediate results</li> </ul>



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Part No./Product	Description
	<ul style="list-style-type: none"> <li>- Inline subtraction of pre- and post-contrast measurements</li> <li>- Inline standard deviation maps of Phase-Contrast measurements for delineation of arteries and veins</li> </ul> <p><b>Cardiac Suite</b> The cardiac suite covers comprehensive 2D routine cardiac applications, ranging from morphology and ventricular function to tissue characterization. It moreover features BEAT 2D in conjunction with iPAT, T-PAT and e-PAT techniques.</p> <p><b>Cardiac views</b></p> <ul style="list-style-type: none"> <li>- Fast acquisition of the basic cardiac orientations for further examination planning</li> <li>- 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.</li> </ul> <p><b>BEAT</b></p> <ul style="list-style-type: none"> <li>- Unique tool for fast and easy cardiovascular MR imaging</li> <li>- E.g. 1 click change from FLASH to TrueFISP for easy contrast optimization</li> <li>- 1-click to switch arrhythmia rejection on / off</li> <li>- 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</li> </ul> <p><b>Visualization of structural cardiovascular pathologies with CMRBEAT</b></p> <ul style="list-style-type: none"> <li>- 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 &amp; TrueFISP) for high-resolution valve evaluation.</li> <li>- 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)</li> <li>- Dark-blood TSE with motion compensation for high-quality vessel wall imaging in small or large vessels</li> </ul> <p><b>Tools for rapid evaluation of left or right ventricular function</b></p> <ul style="list-style-type: none"> <li>- Acquisition of a stack of short-axis slices (standard: advanced segmented TrueFISP)</li> <li>- Automatic adjustment of the acquisition window to the current heart rate</li> <li>- Use of the inline ECG for graphical ECG triggering setup</li> <li>- Retrospective gating with cine sequences (TrueFISP, FLASH)</li> <li>- Pulse sequences for whole-heart coverage</li> <li>- Integration of Compressed Sensing Cardiac Cine (optional) for highest temporal and spatial resolution (segmented and realtime pulse sequences)</li> <li>- Real-time imaging in case the patient is not able to hold his breath</li> </ul> <p><b>4D imaging and tissue characterization with BEAT; pulse sequences for high-contrast and high-resolution tissue characterization</b></p> <ul style="list-style-type: none"> <li>- Pulse sequences for stress and rest imaging with TurboFLASH contrast support the acquisition of multiple slices with high resolution and arbitrarily adjustable slice orientation for each slice T-PAT and e-PAT with mSENSE and GRAPPA for advanced parallel imaging provides fast high-resolution dynamic imaging</li> <li>- Segmented IR TrueFISP / FLASH with T1 scout for optimization of tissue contrast</li> <li>- Advanced tissue characterization with 2D phase-sensitive iR (PSIR) pulse sequences with TrueFISP and FLASH contrast. Magnitude and phase-sensitive images with one acquisition.</li> <li>- Simple: no adjustment of inversion time (TI) necessary with PSIR technique</li> <li>- Motion correction/averaging of multiple measurements with iPAT or tPAT accelerated single-shot TrueFISP or GRE images of the heart, for free-breathing acquisition.</li> </ul>

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PRELIMINARY PROPOSAL

Part No./Product	Description
	<p>Physiological Measurement Unit (PMU) - Wireless Physio Control</p> <ul style="list-style-type: none"> <li>- Synchronizes the measurement with the physiological cycles (triggering to minimize motion artifacts caused by cardiac and respiratory movements)</li> <li>- Wireless Sensors</li> <li>- Wireless Vector ECG / respiration for physiologically synchronized imaging, rechargeable battery-powered - for optimized patient handling</li> <li>- Physiological Signals Display</li> <li>- ECG (3 channels)</li> <li>- Respiration</li> <li>- External Trigger Input Display</li> </ul> <p>ECG Triggering:</p> <ul style="list-style-type: none"> <li>- Acquisition of multiple slices, e.g. of the heart, at different phases of the cardiac cycle</li> <li>- Excellent image quality by synchronizing data acquisition with cardiac motion</li> <li>- Respiratory Triggering: Excellent image quality by synchronizing data acquisition with the respiratory motion</li> <li>- External Triggering: Interface for trigger input from external sources (e.g. Patient Monitoring System) inside the examination room</li> <li>- Interface for trigger input from external sources (e.g. pulse generator, trigger sources for fMRI) outside the examination room</li> <li>- Optical trigger output for fMRI</li> <li>- Retrospective gating for ECG, peripheral pulse, and external trigger input</li> </ul> <p><b>Breast Suite</b></p> <p>MR imaging provides excellent tissue contrast that may be useful in the evaluation of the breasts. Extremely high spatial and temporal resolution can be achieved in very short acquisition times by using IPAT with GRAPPA and CAIPIRINHA. Customized pulse sequences (e.g. with fat saturation or water excitation or silicone excitation), as well as flexible multiplanar visualization allow a fast, simple and reproducible evaluation of MR breast examinations.</p> <p>This package includes:</p> <ul style="list-style-type: none"> <li>- High-resolution 2D pulse sequences for morphology evaluation</li> <li>- High-resolution 3D pulse sequences covering both breasts simultaneously</li> <li>- Pulse sequences to support interventions (fine needle and vacuum biopsies, wire localization)</li> <li>- Pulse sequences for evaluating breasts with silicone implants</li> <li>- Automatic and manual frequency adjustment, taking into account the silicone signal</li> <li>- 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</li> <li>- SPAIR - robust fat sat (robust fat suppression using an adiabatic frequency selective inversion pulse)</li> <li>- 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</li> <li>- IPAT<sup>2</sup> with CAIPIRINHA that allows state-of-the-art sagittal breast imaging and further improvement of the temporal resolution in dynamic scans while maintaining spatial resolution</li> <li>- Inline subtraction and MIP display</li> <li>- Offline subtraction, MPR and MIP display</li> <li>- REVEAL: diffusion imaging for breast exams. In pulse sequences with multiple b-values individual numbers of averages may be specified per b-value.</li> <li>- RESOLVE: Diffusion-weighted, readout-segmented (multi shot) EPI sequence for high-resolution susceptibility-insensitive DWI of the breast</li> </ul>



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Part No./Product	Description
	<ul style="list-style-type: none"> <li>- RADIANT: Ultrasound-like reconstruction around the nipple</li> </ul> <p>The Breast Suite also includes: <b>syngo VIEWS (Volume Imaging with Enhanced Water Signal)</b></p> <ul style="list-style-type: none"> <li>- Bilateral - both breasts are examined simultaneously</li> <li>- Axial - the milk ducts are directly displayed</li> <li>- fat-saturated or water-excited - fat complicates clinical evaluation and is suppressed</li> <li>- Near-isotropic 3D measurement - the same voxel size in all three directions for reconstruction in any slice direction</li> <li>- Submillimeter voxel - highest resolution for precise evaluation</li> </ul> <p><b>Body Suite</b> The Body Suite is dedicated to clinical body applications. Ultra-fast high-resolution 2D and 3D pulse sequences are provided for abdomen, pelvis, MR Colonography, MRCP, dynamic kidney, and MR Urography applications. 2D PACE technique makes body imaging easy, allowing for multibreath-hold examinations as well as free breathing during the scans. Motion artifacts are greatly reduced with 2D PACE Inline technology. This package includes:</p> <ul style="list-style-type: none"> <li>- Free breathing 2D PACE applications with 2D HASTE (RESTORE) and 2D / 3D TSE- It is possible to use a phase navigator, which measures respiratory induced off-resonance effects. The positioning can be done automatically for most pulse sequences.</li> <li>- Optimized fast single shot HASTE pulse sequences and high-resolution</li> <li>- 3D pulse sequences based on SPACE and TSE for MRCP and MR Urography examinations</li> <li>- REVEAL: diffusion imaging for abdomen and whole body exams.</li> <li>- For reduced distortions and homogeneous signal intensity even in the presence of challenging susceptibility interfaces and at station boundaries, SliceAdjust (slice-by-slice adjustments) can be selected.</li> <li>- In pulse sequences with multiple b-values, individual numbers of averages may be specified per b-value. Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline calculation (extrapolation) of high b-values (up to <math>b=5000 \text{ s/mm}^2</math>) is possible.</li> <li>- Signal from Respiratory Sensor can be selected to actively trigger MR image acquisition.</li> </ul> <p><b>ABDOMEN:</b> <b>2D:</b></p> <ul style="list-style-type: none"> <li>- T1 (FLASH) breath-hold scans with and without FatSat (SPAIR, Quick FatSat, In- / opp-phase)</li> <li>- T2 (HASTE, TSE / BLADE, EPI) breath-hold scans with and without FatSat (SPAIR, FatSat, STIR)</li> <li>- T1 (TFL) triggered scans (2D PACE free breathing) In- / opp-phase T2 (HASTE, TSE / BLADE, EPI) triggered scans (2D PACE free breathing) with and without FatSat (SPAIR, FatSat, STIR) as well as HASTE- and TSE-multi-echo</li> <li>- Optimized fast single-shot HASTE pulse sequences and high-resolution pulse sequences based on SPACE and TSE for MRCP and MR urography examinations</li> </ul> <p><b>3D:</b></p> <ul style="list-style-type: none"> <li>- Dixon (VIBE 2pt-Dixon) breathhold scans, following contrasts can be obtained: In-phase, opposed phase, fat and water image</li> <li>- Dynamic (VIBE and Quick-FatSat) pulse sequences with inline motion correction for visualization of focal lesions with high spatial and temporal resolution</li> <li>- Colonography dark lumen with T1-weighted VIBE</li> <li>- REVEAL: Diffusion-weighted imaging of the prostate, cervix, rectum and other organs with multiple b-values. Inline calculation of</li> <li>- ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline</li> </ul>



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	<p>calculation (extrapolation) of high b-values (up to <math>b=5000 \text{ s/mm}^2</math>) is possible.</p> <p><b>PELVIS:</b></p> <ul style="list-style-type: none"> <li>- High-resolution T1, T2 pelvic imaging</li> <li>- Isotropic T2 SPACE 3D pulse sequences</li> <li>- Dynamic volume examinations with 3D VIBE</li> </ul> <p><b>THORAX:</b></p> <ul style="list-style-type: none"> <li>- High-resolution T1, T2 thorax imaging</li> <li>- Motion-Insensitive pulse sequences (BLADE, HASTE)</li> <li>- TrueFISP pulse sequences for imaging of respiratory mechanics</li> <li>- Dynamic imaging with TWIST (optional), TWIST-VIBE (optional)</li> <li>- Non-contrast-enhanced vessel visualization with SPACE pulse sequences</li> <li>- STIR pulse sequences for the evaluation of lymph nodes</li> <li>- Diffusion-weighted imaging with REVEAL</li> </ul> <p><b>Onco Suite</b> MR imaging provides excellent soft-tissue differentiation, multiplanar capabilities, and the possibility of selectively suppressing specific tissue, e.g. fat or water. The Onco Suite features a collection of pulse sequences and evaluation tools that may be used for a detailed assessment of a variety of oncological conditions.</p> <p><b>General features:</b></p> <ul style="list-style-type: none"> <li>- STIR TSE, HASTE, and FLASH in-phase and opposed-phase pulse sequences for highly sensitive visualization of focal lesions</li> <li>- Dynamic imaging pulse sequences for assessment of the kinetic behavior of tissue</li> <li>- Quantitative evaluation and fast analysis of the data with colorized</li> <li>- Wash-in, Wash-out, Time-To-Peak, Postive-Enhancement- Integral, MIP-time and combination maps with Inline technology</li> <li>- Display and analysis of the temporal behavior in selected regions of interest with the Included MeanCurve postprocessing application.</li> <li>- This includes the capability of using additional datasets as a guide for defining regions of interest even faster and easier than before.</li> <li>- REVEAL: Diffusion-weighted imaging with multiple b-values. In pulse sequences with multiple b-values, individual numbers of averages may be specified per b-value. Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline calculation (extrapolation) of high b-values (up to <math>b = 5000 \text{ s / mm}^2</math>) is possible. For reduced distortions and homogeneous signal intensity even in the presence of challenging susceptibility interfaces and at station boundaries,</li> <li>- SliceAdjust (slice-by-slice adjustments) can be selected.</li> <li>- RESOLVE: high-resolution, low-distortion diffusion-weighted imaging (DWI). In pulse sequences with multiple b-values, individual numbers of averages may be specified per b-value. Inline calculation of ADC maps, exponential ADC maps and inverted bvalue images can be selected. Inline calculation (extrapolation) of high b-values (up to <math>b=5000 \text{ s / mm}^2</math>) is possible.</li> </ul> <p><b>Prostate:</b></p> <ul style="list-style-type: none"> <li>- Dedicated prostate pulse sequences for a variety of clinical scenarios</li> <li>- T1-weighted 3D VIBE pulse sequences with high temporal resolution (VIBE, TWIST (optional) and TWIST-VIBE (optional)) allow time course evaluation</li> <li>- Prostate spectroscopy (3D CSI (optional) volume scan) with up to 8 sat bands (suppression of water and fat signal)</li> </ul> <p>Whole-body imaging:</p>

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	<ul style="list-style-type: none"> <li>- TSE STIR pulse sequences for head-to-toe and head-to-pelvis imaging</li> <li>- Dedicated pulse sequences for focus regions head, neck, thorax, abdomen and pelvis</li> <li>- Diffusion-weighted imaging with REVEAL Including SliceAdjust</li> </ul> <p><b>OrthoSuite</b> Ortho Suite is a comprehensive collection of pulse sequences for joint and spine imaging.</p> <p>This package includes:</p> <ul style="list-style-type: none"> <li>- 2D TSE pulse sequences for PD, T1, and T2-weighted contrast with high in-plane resolution and thin slices</li> <li>- 3D MEDIC, 3D TrueFISP pulse sequences with water excitation for T2-weighted imaging with high in-plane resolution and thin slices</li> <li>- High-resolution 3D VIBE pulse sequences for MR Arthrography (knee, shoulder, and hip)</li> <li>- 3D MEDIC, 3D TrueFISP, 3D VIBE pulse sequences with Water Excitation having high Isotropic resolution optimized for 3D postprocessing</li> <li>- T1 and PD SPACE 3D imaging with high Isotropic resolution, optimized for post-processing Single-step, and multi-step pulse sequences</li> <li>- Excellent fat suppression in off-center positions, e.g. in the shoulder due to high magnet homogeneity</li> <li>- Dynamic TMJ pulse sequence (different joint positions)</li> <li>- Multi Echo SE sequence with up to 32 echoes for T2 mapping</li> <li>- High-resolution 3D DESS (Double Echo Steady State): T2 / T1- weighted imaging for excellent fluid-cartilage differentiation</li> <li>- 2-point Dixon technique for fat and water separation - Turbo Spin Echo sequence</li> <li>- WARP - 2D TSE sequence combining optimized high-bandwidth pulse sequences and View Angle Tilting (VAT), tailored to reduce susceptibility artifacts caused by orthopedic MRConditional implants. This helps in evaluation of soft tissue in proximity of the implants. Available pulse sequences include T1- weighted, T2-weighted, proton density and STIR contrast.</li> <li>- Advanced WARP enables the reduction of gross artifacts (i.e. through-plane artifacts) caused by large MR-Conditional* implants. It contains the 2D TSE based SEMAC technique and is especially useful in the case of hip and knee joint replacements.</li> <li>- Available pulse sequences include T1-weighted, proton density and T2 TSE STIR contrast.</li> </ul> <p><b>*Pediatric Suite</b> Tissue relaxation times and examination conditions in pediatrics are very different compared to those of adults. The reasons for these differences range from developing tissues, body size and faster heart rates to non-compliance with breathhold commands. Pulse sequences can be easily adapted for imaging infants.</p> <p>* MR scanning has not been established as safe for imaging fetuses and infants less than two years of age. The responsible physician must evaluate the benefits of the MR examination compared to those of other imaging procedures.</p> <p><b>Scientific Suite</b> MAGNETOM Sola - the first 1.5T BioMatrix system - leverages the intelligent combination of Tim 4G and the Siemens unique BioMatrix technology to be ready to embrace the unique set of challenges that each and every patient brings to the MRI exam. The system includes:</p> <p><b>BioMatrix Technology</b> In order to meet the requirements of the changing healthcare market, Tim® is now further enhanced with the ability to address patient biovariability: Evolving from Total Imaging matrix, BioMatrix®</p>



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	<p>technology addresses the intrinsic biovariability in humans.</p> <p>BioMatrix can anticipate challenges in MR examinations, for example, the limited ability to hold one's breath, to manage growing patient populations and increasing exam complexity in MRI.</p> <p>BioMatrix can adapt to all patients and their anatomic individuality, even the critical ones, to make MRI more predictable and consistent for all patients, even critical ones. BioMatrix can accelerate the workflow, without compromising quality of care by assisting interactions between the patient and the user, to improve MRI cost-effectiveness and patient outcomes.</p> <p>BioMatrix anticipates, adapts and accelerates to embrace human nature.</p> <p><b>Tim 4G</b> Tim 4G provides excellent image quality and speed in MRI combined with 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 reduces claustrophobia. Tim 4G with its 4G flexibility, 4G accuracy and 4G speed brings image quality and acquisition speed to a new level.</p> <p><b>Magnet:</b></p> <ul style="list-style-type: none"> <li>- Short 145 cm long (157 cm with covers), whole-body superconductive 1.5T magnet with active shielding (AS) technology with counter coils</li> <li>- External Interference Shielding (E.I.S.)</li> <li>- Excellent homogeneity enabled magnet design which allows for a cylindrically optimized homogeneity volume resulting in higher image quality (50 x 50 x 45 cm<sup>3</sup> DEV, typ. 2,8 ppm based on the 24-plane plot method)</li> <li>- Temperature sensors with real time correction algorithm for unmatched long-term stability at 70 cm</li> <li>- The magnet has 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.</li> <li>- It has an integrated magnet cooling system.</li> <li>- The combination of standard active shim and passive shim allows for maximized magnetic field homogeneity and consistent high image quality for a wide range of applications</li> <li>- Integrated Eco-Power technology to save around 30% of energy during standby of the system.</li> </ul> <p><b>Gradient system:</b></p> <ul style="list-style-type: none"> <li>- Actively shielded water-cooled world-class gradient system</li> <li>- All axes force compensated for lowest vibrations and acoustic performance</li> </ul> <p><b>DirectRF - RF Transmit/Receive System:</b></p> <ul style="list-style-type: none"> <li>- Fully integrated Transmit- and Receive path in the magnet housing including extremely compact water-cooled solid state amplifier with 37.5 kW peak power</li> <li>- High dynamic range</li> <li>- Immediate feedback loop for real-time sequence adaptation</li> <li>- Integrated no tune transmit/receive Body Coil</li> <li>- The revolutionary Tim 4G technology allows connecting 204 channels (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.</li> </ul>

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	<p><b>GO technologies</b></p> <p><b>Select&amp;GO</b> The Select&amp;GO interface enables fast and easy single-touch patient positioning. Correct positioning saves unnecessary wasted time for repositioning and additional adjustments, therefore shortening the total room time.</p> <ul style="list-style-type: none"> <li>- The ergonomically designed Select&amp;GO touch panels are integrated into the front cover on each side of the patient tunnel for controlling table movement, guidance for patient setup and comfort features. They are well illuminated for easy visual recognition.</li> <li>- Automated table move to utmost position, to center position or Home position facilitate smooth patient preparation and will reduce table time</li> <li>- Variable (6 levels) ventilation and lighting inside the magnet bore or volume adjustments are possible for increased patient comfort The Select&amp;GO touch panels provide 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.</li> <li>- Almost all table control functions, including ventilation and illumination of the magnet bore, can be also controlled from the operator console for convenient operation.</li> </ul> <p><b>DotGO</b> Go for consistent results, efficiently with Dot Engines. Dot offers a customizable framework for patient personalization, user guidance and exam automation. Optimized scan strategies are provided and can be selected based on patient condition, which allow for high quality exams even when conditions change. Integrated decision points allow the user to easily add or remove one or a group of protocols with one click. Step by step image and text guidance guides novice users even through the most complicated exams. Exam automation allows optimal timing for breathing, scanning, planning or contrast arrival. Dot can be easily customized to follow the individual standards of care. Dot is personalized, guided and automated and designed to improve workflow efficiency and image consistency.</p> <p><b>Dot Cockpit</b> The central tool to continuously build knowledge into standardized exams strategies and to make those available for every user in the MRI department. Dot Cockpit is the new starting point for every exam.</p> <p><b>Recon&amp;GO</b> The Recon&amp;GO technology encompasses a wide range of in-line functionalities automizing reconstruction and post-processing steps to provide ready-to-read results for the radiologist. Examples are inline ADC calculation, inline subtraction of dynamic contrast enhanced series, up to inline Launch of advanced post-processing applications.</p> <p><b>MR View&amp;GO</b> MR View&amp;GO is MAGNETOM Sola's all-in-one viewing and reading solution for fast and intuitive quality check and result distribution. It receives the images directly as they come on the scanner, giving the user a clear overview of the quality of images scanned, without being distracted by constant context switches. Once the images have been checked for acceptable quality, they can easily be sent to the PACS with minimal user interaction. Beyond that, MR View&amp;GO offers the additional advantage to perform extended post-processing, directly at the scanner. In-line launching of post-processing applications makes it possible to fully automate the evaluation of, for example, perfusion maps, permeability or cardiac function, all without additional user interaction. This makes it possible to save radiologist time by delivering quantitative, ready-to-read results, directly to the PACS.</p>



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	<p><b>Tim Application Suite</b> The Tim Application Suite offers a complete range of clinically optimized examinations for all regions. The Tim Application Suite -allowing excellent head-to-toe imaging - is provided standard on MAGNETOM Sola.</p> <ul style="list-style-type: none"> <li>- Neuro Suite</li> <li>- Angio Suite</li> <li>- Cardiac Suite</li> <li>- Body Suite</li> <li>- Onco Suite</li> <li>- Breast Suite</li> <li>- Ortho Suite</li> <li>- Pediatric* Suite</li> <li>- Scientific Suite</li> </ul> <p>* MR scanning has not been established as safe for imaging fetuses and infants less than two years of age. The responsible physician must evaluate the benefits of the MR examination compared to those of other imaging procedures.</p> <p><b>Neuro Suite</b> Comprehensive head and spine examinations can be performed with dedicated programs. High-resolution pulse sequences and motion-insensitive pulse sequences for patients which have difficulties to lay still are provided. The Neuro Suite also includes pulse sequences for diffusion imaging, perfusion imaging, and fMRI. It includes for example:</p> <ul style="list-style-type: none"> <li>- Fast 2D Imaging with SE, TSE, GRE pulse sequences for high-resolution imaging</li> <li>- BLADE for motion-insensitive TSE imaging EPI pulse sequences and protocols for diffusion imaging, perfusion imaging, and fMRI for advanced neuro applications. Diffusionweighted imaging is possible with up to 16 b-values in the orthogonal directions. For reduced distortions and homogeneous signal intensity even in the presence of challenging susceptibility interfaces and at station boundaries, SliceAdjust (slice-by-slice adjustments) can be selected.</li> <li>- 3D TOF for non-contrast enhanced angiography</li> <li>- 3D Isotropic resolution volume imaging using T1 3D MPRAGE / 3D</li> <li>- FLASH, SPACE DarkFluid, T1 SPACE and T2 SPACE pulse sequences</li> <li>- High-resolution T2 SPACE pulse sequence optimized for inner ear examinations</li> <li>- Double Inversion Recovery 3D pulse sequences (DIR SPACE) with two user-selectable inversion pulses for the simultaneous suppression of e.g. cerebro-spinal fluid and white matter</li> <li>- MP2RAGE (Magnetization Prepared 2 Rapid Acquisition Gradient Echoes) provides homogeneous tissue contrast for segmentation and applications such as voxel-based morphometry. In combination with MapIt*, it also provides T1 mapping functionality.</li> <li>- Whole-spine pulse sequences in multiple steps with software controlled table movement</li> <li>- 2D and 3D MEDIC pulse sequences for T2-weighted imaging, particularly for C-spine examinations in axial orientation where reproducibility is difficult due to CSF pulsations and blood flow artifacts</li> <li>- RESOLVE (Readout Segmentation Of Long Variable Echo-trains) delivers high-resolution, low-distortion diffusion-weighted imaging (DWI) for accurate depiction of lesions.</li> <li>- BioMatrix's CoilShim helps to reduce patient induced strongly localized B0 inhomogeneities as may arise, e.g., in the neck region.</li> <li>- 3D Myelo with 3D HASTE for anatomical details</li> <li>- 3D CISS (Constructive Interference In Steady State) for excellent</li> </ul>



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	<ul style="list-style-type: none"> <li>- visualization of fine structures such as cranial nerves. High-resolution Imaging of inner ear</li> <li>- TGSE sequence used primarily for T2-weighted imaging for shorter measurement time, decreased RF power deposition, and high-resolution imaging of the brain</li> <li>- AutoAlign Head LS providing a fast, easy, standardized, and reproducible patient scanning supporting reading by delivering a higher and more standardized image quality.</li> </ul> <p><b>Angio Suite</b> Excellent MR Angiography can be performed to visualize arteries and veins with or without contrast agent.</p> <ul style="list-style-type: none"> <li>- 3D MRA pulse sequences for carotid arteries, abdominal arteries, and peripheral arteries, with short TR and TE. The strong gradients make it possible to separate the arterial phase from the venous phase.</li> <li>- Dynamic MRA for 3D imaging over time. Signal from Respiratory Sensor can be selected to actively trigger MR image acquisition, e.g. with NATIVE<sup>+</sup>.</li> </ul> <p><i>Contrast-enhanced MRA</i> 3D contrast-enhanced MRA pulse sequences for dynamic carotid, abdominal, and peripheral arteries, shortest TR and TE. The strong gradients make it possible to separate the arterial phase from the venous phase</p> <ul style="list-style-type: none"> <li>- TestBolus workflow for optimal bolus timing and excellent image quality</li> <li>- CareBolus functionality for accurate determination of the bolus arrival time and the "Stop and Continue" of the 3D ce-MRA pulse sequence after the 2D bolus control scan</li> <li>- Dynamic ce-MRA for 3D imaging over time</li> </ul> <p><i>Non-contrast-MRA and venography</i></p> <ul style="list-style-type: none"> <li>- Time-of-Flight (ToF) pulse sequences for MRA for the Circle of Willis, carotids and neck vessels; can be adapted for venography, and Breath-hold protocols for abdominal vessels</li> <li>- Triggered 2D ToF sequences for non-contrast MRA in the legs MR venography and arteriography with Phase-Contrast</li> <li>- TONE (Tilted optimized non-saturating excitation) techniques for improved</li> <li>- Contrast-to-Noise Ratio (CNR)</li> </ul> <p><i>Image processing tools</i></p> <ul style="list-style-type: none"> <li>- Inline MIP for immediate results</li> <li>- Inline subtraction of pre- and post-contrast measurements</li> <li>- Inline standard deviation maps of Phase-Contrast measurements for delineation of arteries and veins</li> </ul> <p><b>Cardiac Suite</b> The cardiac suite covers comprehensive 2D routine cardiac applications, ranging from morphology and ventricular function to tissue characterization. It moreover features BEAT 2D in conjunction with iPAT, T-PAT and e-PAT techniques.</p> <p><i>Cardiac views</i></p> <ul style="list-style-type: none"> <li>- Fast acquisition of the basic cardiac orientations for further examination planning</li> <li>- 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.</li> </ul> <p><b>BEAT</b></p> <ul style="list-style-type: none"> <li>- Unique tool for fast and easy cardiovascular MR imaging</li> <li>- E.g. 1 click change from FLASH to TrueFISP for easy contrast optimization</li> <li>- 1-click to switch arrhythmia rejection on / off</li> </ul>

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	<ul style="list-style-type: none"> <li>- 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</li> </ul> <p><i>Visualization of structural cardiovascular pathologies with CMRBEAT</i></p> <ul style="list-style-type: none"> <li>- 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 &amp; TrueFISP) for high-resolution valve evaluation.</li> <li>- 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)</li> <li>- Dark-blood TSE with motion compensation for high-quality vessel wall imaging in small or large vessels</li> </ul> <p><i>Tools for rapid evaluation of left or right ventricular function</i></p> <ul style="list-style-type: none"> <li>- Acquisition of a stack of short-axis slices (standard; advanced segmented TrueFISP)</li> <li>- Automatic adjustment of the acquisition window to the current heart rate</li> <li>- Use of the inline ECG for graphical ECG triggering setup</li> <li>- Retrospective gating with cine sequences (TrueFISP, FLASH)</li> <li>- Pulse sequences for whole-heart coverage</li> <li>- Integration of Compressed Sensing Cardiac Cine (optional) for highest temporal and spatial resolution (segmented and realtime pulse sequences)</li> <li>- Real-time imaging in case the patient is not able to hold his breath</li> </ul> <p><i>4D imaging and tissue characterization with BEAT; pulse sequences for high-contrast and high-resolution tissue characterization</i></p> <ul style="list-style-type: none"> <li>- Pulse sequences for stress and rest imaging with TurboFLASH contrast support the acquisition of multiple slices with high resolution and arbitrarily adjustable slice orientation for each slice T-PAT and e-PAT with mSENSE and GRAPPA for advanced parallel imaging provides fast high-resolution dynamic imaging</li> <li>- Segmented IR TrueFISP / FLASH with T1 scout for optimization of tissue contrast</li> <li>- Advanced tissue characterization with 2D phase-sensitive IR (PSIR) pulse sequences with TrueFISP and FLASH contrast. Magnitude and phase-sensitive images with one acquisition.</li> <li>- Simple: no adjustment of inversion time (TI) necessary with PSIR technique</li> <li>- Motion correction/averaging of multiple measurements with iPAT or tPAT accelerated single-shot TrueFISP or GRE images of the heart, for free-breathing acquisition.</li> </ul> <p><i>Physiological Measurement Unit (PMU) - Wireless Physio Control</i></p> <ul style="list-style-type: none"> <li>- Synchronizes the measurement with the physiological cycles (triggering to minimize motion artifacts caused by cardiac and respiratory movements)</li> <li>- Wireless Sensors</li> <li>- Wireless Vector ECG / respiration for physiologically synchronized imaging, rechargeable battery-powered - for optimized patient handling</li> <li>- Physiological Signals Display</li> <li>- ECG (3 channels)</li> <li>- Respiration</li> <li>- External Trigger Input Display</li> </ul> <p><i>ECG Triggering:</i></p> <ul style="list-style-type: none"> <li>- Acquisition of multiple slices, e.g. of the heart, at different phases of the cardiac cycle</li> <li>- Excellent image quality by synchronizing data acquisition with cardiac motion</li> <li>- Respiratory Triggering: Excellent image quality by synchronizing data acquisition with the respiratory motion</li> </ul>

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	<ul style="list-style-type: none"> <li>- External Triggering: Interface for trigger input from external sources (e.g. Patient Monitoring System) inside the examination room</li> <li>- Interface for trigger input from external sources (e.g. pulse generator, trigger sources for fMRI) outside the examination room</li> <li>- Optical trigger output for fMRI</li> <li>- Retrospective gating for ECG, peripheral pulse, and external trigger input</li> </ul> <p><b>Breast Suite</b> MR imaging provides excellent tissue contrast that may be useful in the evaluation of the breasts. Extremely high spatial and temporal resolution can be achieved in very short acquisition times by using IPAT with GRAPPA and CAIPIRINHA. Customized pulse sequences (e.g. with fat saturation or water excitation or silicone excitation), as well as flexible multiplanar visualization allow a fast, simple and reproducible evaluation of MR breast examinations.</p> <p>This package includes:</p> <ul style="list-style-type: none"> <li>- High-resolution 2D pulse sequences for morphology evaluation</li> <li>- High-resolution 3D pulse sequences covering both breasts simultaneously</li> <li>- Pulse sequences to support interventions (fine needle and vacuum biopsies, wire localization)</li> <li>- Pulse sequences for evaluating breasts with silicone implants</li> <li>- Automatic and manual frequency adjustment, taking into account the silicone signal</li> <li>- 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</li> <li>- SPAIR - robust fat sat (robust fat suppression using an adiabatic frequency selective inversion pulse)</li> <li>- 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</li> <li>- IPAT with CAIPIRINHA that allows state-of-the-art sagittal breast imaging and further improvement of the temporal resolution in dynamic scans while maintaining spatial resolution</li> <li>- Inline subtraction and MIP display</li> <li>- Offline subtraction, MPR and MIP display</li> <li>- REVEAL: diffusion imaging for breast exams. In pulse sequences with multiple b-values individual numbers of averages may be specified per b-value.</li> <li>- RESOLVE: Diffusion-weighted, readout-segmented (multishot) EPI sequence for high-resolution susceptibility-insensitive DWI of the breast</li> <li>- RADIANT: Ultrasound-like reconstruction around the nipple</li> </ul> <p>The Breast Suite also includes: <b>syngo VIEWS (Volume Imaging with Enhanced Water Signal)</b></p> <ul style="list-style-type: none"> <li>- Bilateral - both breasts are examined simultaneously</li> <li>- Axial - the milk ducts are directly displayed</li> <li>- fat-saturated or water-excited - fat complicates clinical evaluation and is suppressed</li> <li>- Near-isotropic 3D measurement - the same voxel size in all three directions for reconstruction in any slice direction</li> <li>- Submillimeter voxel - highest resolution for precise evaluation</li> </ul> <p><b>Body Suite</b> The Body Suite is dedicated to clinical body applications. Ultra-fast high-resolution 2D and 3D pulse sequences are provided for abdomen, pelvis, MR Colonography, MRCP, dynamic kidney, and MR Urography applications. 2D PACE technique makes body imaging easy, allowing for multibreath-hold examinations as well as free breathing during the scans. Motion artifacts are greatly reduced with 2D PACE Inline technology.</p>

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	<p>This package includes:</p> <ul style="list-style-type: none"> <li>- Free breathing 2D PACE applications with 2D HASTE (RESTORE) and 2D / 3D TSE- it is possible to use a phase navigator, which measures respiratory induced off-resonance effects. The positioning can be done automatically for most pulse sequences.</li> <li>- Optimized fast single shot HASTE pulse sequences and high-resolution 3D pulse sequences based on SPACE and TSE for MRCP and MR Urography examinations</li> <li>- REVEAL: diffusion imaging for abdomen and whole body exams.</li> <li>- For reduced distortions and homogeneous signal intensity even in the presence of challenging susceptibility interfaces and at station boundaries, SliceAdjust (slice-by-slice adjustments) can be selected.</li> <li>- In pulse sequences with multiple b-values, individual numbers of averages may be specified per b-value. Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline calculation (extrapolation) of high b-values (up to b=5000 s/mm<sup>2</sup>) is possible.</li> <li>- Signal from Respiratory Sensor can be selected to actively trigger MR image acquisition.</li> </ul> <p><b>ABDOMEN:</b></p> <p><b>2D:</b></p> <ul style="list-style-type: none"> <li>- T1 (FLASH) breath-hold scans with and without FatSat (SPAIR, Quick FatSat, In- / opp-phase)</li> <li>- T2 (HASTE, TSE / BLADE, EPI) breath-hold scans with and without FatSat (SPAIR, FatSat, STIR)</li> <li>- T1 (TFL) triggered scans (2D PACE free breathing) In- / opp-phase T2 (HASTE, TSE / BLADE, EPI) triggered scans (2D PACE free breathing) with and without FatSat (SPAIR, FatSat, STIR) as well as HASTE- and TSE-mull-echo</li> <li>- Optimized fast single-shot HASTE pulse sequences and high-resolution pulse sequences based on SPACE and TSE for MRCP and MR urography examinations</li> </ul> <p><b>3D:</b></p> <ul style="list-style-type: none"> <li>- Dixon (VIBE 2pt-Dixon) breathhold scans, following contrasts can be obtained: In-phase, opposed phase, fat and water image</li> <li>- Dynamic (VIBE and Quick-FatSat) pulse sequences with inline motion correction for visualization of focal lesions with high spatial and temporal resolution</li> <li>- Colonography dark lumen with T1-weighted VIBE</li> <li>- REVEAL: Diffusion-weighted imaging of the prostate, cervix, rectum and other organs with multiple b-values. Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline calculation (extrapolation) of high bvalues (up to b=5000 s/mm<sup>2</sup>) is possible.</li> </ul> <p><b>PELVIS:</b></p> <ul style="list-style-type: none"> <li>- High-resolution T1, T2 pelvic imaging</li> <li>- Isotropic T2 SPACE 3D pulse sequences</li> <li>- Dynamic volume examinations with 3D VIBE</li> </ul> <p><b>THORAX:</b></p> <ul style="list-style-type: none"> <li>- High-resolution T1, T2 thorax imaging</li> <li>- Motion-insensitive pulse sequences (BLADE, HASTE)</li> <li>- TrueFISP pulse sequences for imaging of respiratory mechanics</li> <li>- Dynamic imaging with TWIST (optional), TWIST-VIBE (optional)</li> <li>- Non-contrast-enhanced vessel visualization with SPACE pulse sequences</li> <li>- STIR pulse sequences for the evaluation of lymph nodes</li> <li>- Diffusion-weighted imaging with REVEAL</li> </ul> <p>Onco Suite MR imaging provides excellent soft-tissue differentiation, multiplanar capabilities,</p>

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	<p>and the possibility of selectively suppressing specific tissue, e.g. fat or water. The Onco Suite features a collection of pulse sequences and evaluation tools that may be used for a detailed assessment of a variety of oncological conditions.</p> <p>General features:</p> <ul style="list-style-type: none"> <li>- STIR TSE, HASTE, and FLASH in-phase and opposed-phase pulse sequences for highly sensitive visualization of focal lesions</li> <li>- Dynamic imaging pulse sequences for assessment of the kinetic behavior of tissue</li> <li>- Quantitative evaluation and fast analysis of the data with colorized</li> <li>- Wash-In, Wash-out, Time-To-Peak, Positive-Enhancement- Integral, MIP-time and combination maps with Inline technology</li> <li>- Display and analysis of the temporal behavior in selected regions of interest with the included MeanCurve postprocessing application.</li> <li>- This includes the capability of using additional datasets as a guide for defining regions of interest even faster and easier than before.</li> <li>- REVEAL: Diffusion-weighted imaging with multiple b-values. In pulse sequences with multiple b-values, individual numbers of averages may be specified per b-value. Inline calculation of ADC maps, exponential ADC maps and inverted b-value images can be selected. Inline calculation (extrapolation) of high b-values (up to <math>b = 5000 \text{ s / mm}^2</math>) is possible. For reduced distortions and homogeneous signal intensity even in the presence of challenging susceptibility interfaces and at station boundaries,</li> <li>- SliceAdjust (slice-by-slice adjustments) can be selected.</li> <li>- RESOLVE: high-resolution, low-distortion diffusion-weighted imaging (DWI). In pulse sequences with multiple b-values, individual numbers of averages may be specified per b-value. Inline calculation of ADC maps, exponential ADC maps and inverted bvalue images can be selected. Inline calculation (extrapolation) of high b-values (up to <math>b=5000 \text{ s / mm}^2</math>) is possible.</li> </ul> <p>Prostate:</p> <ul style="list-style-type: none"> <li>- Dedicated prostate pulse sequences for a variety of clinical scenarios</li> <li>- T1-weighted 3D VIBE pulse sequences with high temporal resolution (VIBE, TWIST (optional) and TWIST-VIBE (optional)) allow time course evaluation</li> <li>- Prostate spectroscopy (3D CSI (optional) volume scan) with up to 8 sat bands (suppression of water and fat signal)</li> </ul> <p>Whole-body imaging:</p> <ul style="list-style-type: none"> <li>- TSE STIR pulse sequences for head-to-toe and head-to-pelvis imaging</li> <li>- Dedicated pulse sequences for focus regions head, neck, thorax, abdomen and pelvis</li> <li>- Diffusion-weighted imaging with REVEAL including SliceAdjust</li> </ul> <p>OrthoSuite Ortho Suite is a comprehensive collection of pulse sequences for joint and spine imaging.</p> <p>This package includes:</p> <ul style="list-style-type: none"> <li>- 2D TSE pulse sequences for PD, T1, and T2-weighted contrast with high in-plane resolution and thin slices</li> <li>- 3D MEDIC, 3D TrueFISP pulse sequences with water excitation for T2-weighted imaging with high in-plane resolution and thin slices</li> <li>- High-resolution 3D VIBE pulse sequences for MR Arthrography (knee, shoulder, and hip)</li> <li>- 3D MEDIC, 3D TrueFISP, 3D VIBE pulse sequences with Water Excitation having high Isotropic resolution optimized for 3D postprocessing</li> <li>- T1 and PD SPACE 3D imaging with high Isotropic resolution, optimized for post-processing Single-step, and multi-step pulse sequences</li> </ul>

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	<ul style="list-style-type: none"> <li>- Excellent fat suppression in off-center positions, e.g. in the shoulder due to high magnet homogeneity</li> <li>- Dynamic TMJ pulse sequence (different joint positions)</li> <li>- Multi Echo SE sequence with up to 32 echoes for T2 mapping</li> <li>- High-resolution 3D DESS (Double Echo Steady State); T2 / T1- weighted Imaging for excellent fluid-cartilage differentiation</li> <li>- 2-point Dixon technique for fat and water separation - Turbo Spin Echo sequence</li> <li>- WARP - 2D TSE sequence combining optimized high-bandwidth pulse sequences and View Angle Tiling (VAT), tailored to reduce susceptibility artifacts caused by orthopedic MRConditional implants. This helps in evaluation of soft tissue in proximity of the implants. Available pulse sequences include T1- weighted, T2-weighted, proton density and STIR contrast.</li> <li>- Advanced WARP enables the reduction of gross artifacts (i.e. through-plane artifacts) caused by large MR-Conditional* implants. It contains the 2D TSE based SEMAC technique and is especially useful in the case of hip and knee joint replacements.</li> <li>- Available pulse sequences include T1-weighted, proton density and T2 TSE STIR contrast.</li> </ul> <p><b>*Pediatric Suite</b> Tissue relaxation times and examination conditions in pediatrics are very different compared to those of adults. The reasons for these differences range from developing tissues, body size and faster heart rates to non-compliance with breathhold commands. Pulse sequences can be easily adapted for imaging infants.</p> <p>* MR scanning has not been established as safe for imaging fetuses and infants less than two years of age. The responsible physician must evaluate the benefits of the MR examination compared to those of other imaging procedures.</p> <p><b>Scientific Suite</b> The Scientific Suite supports scientific users by providing easy access to application-specific data for further processing and advanced image calculus.</p> <ul style="list-style-type: none"> <li>- Support of USB Memory sticks</li> <li>- Anonymization of patient data</li> <li>- Easy creation of AVIs and screen snapshots to include in presentations or teaching videos</li> <li>- Export of tables, statistics and signal time courses to communal exchange formats like e.g. tabulated text files (MeanCurve, Spectroscopy evaluation, DTI evaluation)</li> <li>- Advanced Image calculus including, addition, subtraction, multiplication, and division of images</li> </ul> <p>This syngo software version provides security settings to protect the scanner against known security threats.</p> <ul style="list-style-type: none"> <li>- User management with authentication to prohibit unauthorized access</li> <li>- Privileges to grant rights and define functionality based on user/role Hardened operating system and restricted network communication</li> <li>- Whitelisting (Embedded Control) against manipulation of scanner software</li> <li>- Security Delivery process to frequently distribute security updates Option to protect customer pulse sequences trees against unauthorized modifications</li> <li>- Audit trail to log system and data access by the defined users and service</li> <li>- Support of customers to implement their security policy including compliance with HIPAA (Health Insurance and Accountability Act)</li> </ul> <p>The sequences, features and techniques for acquisition and reconstruction included in the T1m Application Suite are described in detail below.</p> <p><b>Sequences</b></p>



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	<p>Spin Echo family of sequences:</p> <ul style="list-style-type: none"> <li>- Spin Echo (SE) - Single, Double, and Multi Echo (up to 32 echoes); Inversion Recovery (IR)</li> <li>- 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</li> <li>- 2D TSE with multiple average - it is possible to acquire T2-weighted TSE images during shallow breathing, in a time efficient manner</li> <li>- 2D / 3D HASTE (Half-Fourier Acquisition with Single-Shot Turbo Spin Echo) - Inversion Recovery for STIR and DarkFluid contrast</li> <li>- SPACE for 3D imaging with high isotropic resolution with T1, T2, PD, and DarkFluid Contrast</li> <li>- 2D Optimized high bandwidth TSE (T1, T2, and PD weighted and STIR) with WARP for the reduction of susceptibility artifacts caused by MR Conditional metal* implants.</li> </ul> <p>Gradient Echo family of sequences:</p> <ul style="list-style-type: none"> <li>- 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</li> <li>- 2D / 3D MEDIC (Multi Echo Data Image Combination) for high-resolution T2 weighted orthopedic imaging and excellent contrast</li> <li>- 2D / 3D TurboFLASH - 3D MPRAGE; single shot T1 weighted imaging e.g. for abdominal imaging during free breathing</li> <li>- 3D GRE for field mapping</li> <li>- 2D / 3D FISP (Fast Imaging with Steady State Precession)</li> <li>- 2D / 3D PSIF - PSIF Diffusion</li> <li>- 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)</li> <li>- RESOLVE (Readout Segmentation Of Long Variable Echo-trains) delivers high-resolution, low-distortion diffusion-weighted imaging (DWI) for accurate depiction of lesions.</li> <li>- ce-MRA sequence with Inline subtraction and Inline MIP</li> <li>- 2D / 3D Time-of-Flight (ToF) Angiography - single slab and multi slab; triggered and segmented</li> <li>- 2D / 3D Phase Contrast Angiography</li> <li>- BEAT Tool - TrueFISP segmented; 2D FLASH segmented; Magnetization-prepared TrueFISP (IR, SR, FS); IR T1 scout; Retrogating</li> </ul> <p>Standard Fat/Water Imaging</p> <ul style="list-style-type: none"> <li>- Fat and Water Saturation. Additional frequency selective RF pulses used to suppress bright signal from fatty tissue. Two selectable modes: weak, strong</li> <li>- Quick FatSat</li> <li>- SPAIR: robust fat suppression for body imaging using a frequency selective inversion pulse</li> <li>- Fat / Water Excitation. Spectral selective RF pulses for exclusive fat / water excitation</li> <li>- Dixon technique for fat and water separation - available both based on VIBE (2 point Dixon)</li> </ul> <p>Standard Techniques</p> <ul style="list-style-type: none"> <li>- True Inversion Recovery to obtain strong T1-weighted contrast</li> <li>- Dark Blood Inversion recovery technique that nulls fluid blood signal</li> <li>- Saturation Recovery for 2D TurboFLASH, gradient echo, and T1-weighted 3D TurboFLASH with short scan time (e.g. MPRAGE)</li> <li>- Freely adjustable receiver bandwidth, permitting studies with increased signal-to-noise ratio</li> <li>- Freely adjustable flip angle. Optimized RF pulses for image contrast enhancement and increased signal-to-noise ratio</li> <li>- MTC (Magnetization Transfer Contrast). Off-resonance RF pulses to suppress signal from certain tissues, thus enhancing the contrast. Used e.g. in MRA</li> </ul>



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	<ul style="list-style-type: none"> <li>- Analysis Tools for addition, subtraction, division, multiplication, calculations of ADC maps and b-value images</li> <li>- Image Filter</li> <li>- 3D post-processing MPR, MIP, MinIP, VRT</li> <li>- Data storage of images on CD / DVD with DICOM viewer</li> <li>- Export of cine AVI files on external media</li> <li>- Selectable centric elliptical phase reordering via the user interface</li> <li>- Inversion Recovery to nullify the signal of fat, fluid or any other tissue</li> <li>- Multiple Direction Diffusion Weighting (MDDW) - diffusion tensor imaging measurements can be done with multiple diffusion-weightings and up to 12 directions for generating data sets for diffusion tensor imaging.</li> <li>- WARP - 2D TSE sequence combining optimized high-bandwidth protocols and View Angle Tiltting (VAT), tailored to reduce susceptibility artifacts caused by orthopedic MR-Conditional* implants.</li> <li>- Advanced WARP - 2D TSE based Slice Encoding for Metal Artifact Correction (SEMAC) technique for the reduction of through-plane distortions from large MR conditional* implants.</li> </ul> <p>Standard techniques for Flow Artifact reductions</p> <ul style="list-style-type: none"> <li>- LOTA (LongTerm Data Averaging) technique to reduce motion and flow artifacts</li> <li>- Pre-saturation techniques using RF saturation pulses to suppress flow and motion artifacts</li> <li>- Tracking SAT bands maintain constant saturation of venous and/or arterial blood flow eg. for 2D/3D sequential MRA</li> <li>- TONE (Tilted Optimized Non-saturating Excitation - variable excitation flip angle to compensate inflow saturation effects in 3D</li> <li>- MRA - selectable on desired flow direction and speed GMR (Gradient Motion Rephasing). Sequences with additional bipolar gradient pulses, permitting effective reduction of flow artifacts</li> </ul> <p>Standard Motion Correction</p> <ul style="list-style-type: none"> <li>- 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</li> <li>- 1D PACE (Prospective Acquisition Correction) allows examination of patients with free breathing</li> <li>- 2D PACE (Precise Motion Correction) detects and corrects respiratory motion eg of the heart or liver</li> <li>- PSIR HeartFreeze (Phase-Sensitive Inversion Recovery) - Motion correction/averaging of multiple measurements with IPAT or tPAT accelerated single-shot TrueFISP or GRE images of the heart, for free-breathing acquisition</li> </ul> <p>MAGNETOM Sola runs on syngo MR XA11 software that offers an acquisition workplace with a large 16:10 24" monitors, one keyboard and one mouse, The MR acquisition workplace provides environments for scheduling, scanning and basic quality assurance as well as viewing, basic and advanced post-processing, and data handling (Export, Import, Transfer, Record to media). The acquisition workplace can host one MR View&amp;GO for viewing, basic postprocessing, and data distribution and up to three post-processing applications in parallel. For faster data transfer and reduced storage demand syngo MR XA11 uses the DICOM Enhanced MR Image format for its scanning result. Features like Online Help, DICOM MPPS autocomplete, inline technologies, and scan@center additionally support the workflow.</p> <p>Patient Communication</p> <ul style="list-style-type: none"> <li>- The intercom system includes an ergonomically designed patient</li> <li>- communication unit for desktop positioning on the syngo</li> <li>- Acquisition Workplace and pneumatic headphones for the</li> </ul>



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	<ul style="list-style-type: none"> <li>- patient.</li> <li>- It controls emergency table stop, volume control of speaker and headphones in the examination room, volume control of speaker in the control room, response to the patient's activation of the assistance-call button and provides a connection to an external audio system (external audio system is not included in the basic unit) for music playback.</li> </ul> <p><b>Computer System</b> The PC-based computer system uses the intuitive <i>syngo</i> MR user interface and allows the usage of up to 3 advanced <i>syngo</i>.via applications at the scanner workplace. High-performance host computer:</p> <ul style="list-style-type: none"> <li>- Intel Xeon processor ≥ E5-1650 (6 core)</li> <li>- Clock rate ≥ 3.5 GHz</li> <li>- Main Memory (RAM) ≥ 64 GB</li> <li>- SSD ≥ 480GB</li> <li>- 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</li> <li>- DVD-ROM drive</li> <li>- Electronic mouse</li> <li>- One high-resolution 24" color LCD flatscreen monitors with 1920 x 1200 pixel display, integrated gamma correction for optimum display of radiographic grayscale images and automatic backlight control for longterm brightness stability.</li> </ul> <p><b>Installation</b></p> <ul style="list-style-type: none"> <li>- The relatively light-weight design of MAGNETOM Sola eliminates in most cases the need for structural building reinforcements and also facilitates installation in upper floors.</li> <li>- The compact integrated design allows for short installation times and reduces the required space to less than 28 sqm (302 sq. ft.) for the entire installation. The minimum room height clearance is only 2.40 m (7' 10").</li> <li>- MAGNETOM Sola allows siting of the system without a dedicated computer room - no additional cooling or floor requirements.</li> <li>- MAGNETOM Sola combines state-of-the-art performance with peace of mind. High system availability is ensured by the expert - highly trained Siemens MR service engineers</li> <li>- 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.</li> </ul>
<p>14460161 MR General Engine #VI</p>	<p><i>syngo</i>.MR General Engine extends Numaris/X by adding dedicated workflows and tools for routine and advanced reading of MR examinations. A generic MR Basic workflow is provided, as well as specific MR Neurology, MR Prostate Reading, MR Breast Reading, and MR Cardio-Vascular workflows. Main functionalities of <i>syngo</i>.MR General Engine:</p> <ul style="list-style-type: none"> <li>- MR Basic workflow with <u>Easy Reading mode</u> for easy, fast, and intuitive MR reading, based on single-click and drag&amp;drop interactions:             <ul style="list-style-type: none"> <li>- single-click interaction to navigate through the series</li> <li>- intelligent layout adaptation to compare series together</li> <li>- single-click fusion between different contrasts</li> </ul> </li> <li>- <u>MR Cardio-Vascular Workflows</u>: Cardiac Reading, Angio Single Station, Angio Multi Station, Angio TimCT and Angio TWIST</li> <li>- <u>MR Evaluation tools</u>: Subtraction, MeanCurve, Image Filter, 2D/3D Distortion Correction, ADC and b-value tool (for extrapolated b-values), Multiplication, Division, Addition, Elastic Motion Correction. Workflow optimized report templates.</li> </ul>

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	<p>Scope of delivery: syngo.MR General Engine software package with MR Radiology workflows, MR Cardio-Vascular workflows and MR Evaluation for a workstation-based server.</p>
<p>14475308 myExam Brain Assist</p>	<p>myExam Brain Assist provides guided and flexible workflows. Optimized scan strategies are provided and can be selected based on the patient's condition, which allows for reproducible, high image quality and time efficient exams. The built-in flexibility allows users to change predefined strategies at any time during the brain workflow, and to personalize to the individual patient's condition and clinical need. myExam Brain Assist is customizable to the site-specific standards of care. myExam Brain Assist incorporates step-by-step user guidance which is seamlessly integrated into the exam. Example images and guidance texts are displayed for each individual step of the scanning workflow and are easily configurable by the user.</p> <p>AutoAlign Head uses AI to provide automated positioning and alignment of slice groups to the anatomy, relying on multiple anatomical landmarks. This provides fast, easy, and reproducible patient scanning to consistently deliver high image quality with a standardized slice orientation.</p> <p>AutoAlign Head can also automatically position and align for other structures within the head, such as the inner ear, orbits and optic nerve.</p> <p>Inline Diffusion automatically calculates trace-weighted images and ADC maps in real time.</p>
<p>14475309 myExam Spine Assist</p>	<p>myExam Spine Assist provides guided and flexible workflows for cervical, thoracic and lumbar spine. Optimized scan strategies are provided and can be selected based on the patient's condition, which allows for reproducible, high image quality and time efficient exams. The built-in flexibility allows users to change predefined strategies at any time during the spine workflow, and to personalize to the individual patient's condition and clinical need. myExam Spine Assist is customizable to the site-specific standards of care. myExam Spine Assist incorporates step-by-step user guidance which is seamlessly integrated into the exam. Example images and guidance texts are displayed throughout the scanning workflow and are easily configurable by the user.</p> <p>AutoAlign Spine, with intervertebral disc detection, uses AI to provide automated positioning and alignment of slice groups to the anatomy, relying on multiple anatomical landmarks. This provides fast, easy, and reproducible patient scanning to consistently deliver high image quality with a standardized slice orientation.</p> <p>Furthermore, it includes AutoCoverage, AutoSatPosition, as well as Initial and interactive snapping. Users gain efficiency with AutoLabeling of vertebrae, automatic curved multiplanar reconstructions of 3D datasets and Inline Composing.</p>
<p>14475310 myExam Large Joint Assist</p>	<p>myExam Large Joint Assist provides guided and flexible workflows for knee, hip and shoulder. Optimized scan strategies are provided and can be selected based on the patient's condition, which allows for reproducible, high image quality and time efficient exams. The built-in flexibility allows users to change predefined strategies at any time during the scan workflow, and to personalize to the individual patient's condition and clinical need. myExam Large Joint Assist is customizable to the site-specific standards of care. myExam Large Joint Assist incorporates step-by-step user guidance which is seamlessly integrated into the exam. Example images and guidance texts are displayed throughout the scanning workflow and are easily configurable by the user.</p> <p>AutoAlign uses AI to automate the positioning and alignment of slice groups to the anatomy, relying on multiple anatomical landmarks. This provides fast, easy, and reproducible patient scanning by consistently delivering high image quality with a standardized slice orientation. AutoCoverage maximizes the speed of the examination by automatically setting the number of slices and the FoV to</p>

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	<p>fully cover knee, hip or shoulder anatomy.</p> <p>Inline Multi Planar Reconstruction (MPR) can be easily configured to automatically generate any required 2D Images from high-resolution 3D acquisitions using the position information from the AutoAlign algorithm. For Knee and Hip, examinations using protocols with WARP to reduce artefacts caused by large orthopedic implants are included.</p>
<p>14482834 myExam Brain Autopilot</p>	<p>myExam Brain Autopilot enables less experienced staff to scan brain MRI at high quality with just a few simple clicks. By using automation and AI, it takes away burdensome routine tasks for all technologists. Predefined automated protocols allow users to scan with no manual adjustments. A new and intuitive user interface simplifies scanning so that exams can be performed, or strategies can be changed easily. This new approach to operate MRI helps any user to generate consistent, comprehensive results. myExam Brain Autopilot is customizable to the site-specific standards of care. myExam Brain Autopilot uses AutoAlign Head with AI to provide automated positioning and alignment of slice groups to the anatomy, relying on multiple anatomical landmarks. This provides fast, easy, and reproducible patient scanning and consistently delivers high image quality with standardized slice orientations.</p> <p>AutoAlign Head can also automatically position and align for other brain structures such as the inner ear, the orbits and the optic nerve. Automatic real-time calculation of trace-weighted images and ADC maps with Inline Diffusion Technology is performed on the fly.</p> <p>Users can switch to myExam Assist at any time to personalize the exam to the individual patient.</p>
<p>14482835 myExam Knee Autopilot</p>	<p>myExam Knee Autopilot enables less experienced staff to scan knee MRI at high quality with just a few simple clicks. By using automation and AI, it takes away burdensome routine tasks for all technologists. Predefined automated protocols allow users to scan with no manual adjustments.</p> <p>A new and intuitive user interface simplifies scanning so that exams can be performed, or strategies can be easily changed. This new approach to operate MRI helps any user to generate consistent, comprehensive results.</p> <p>myExam Knee Autopilot is customizable to the site-specific standards of care. myExam Knee Autopilot uses AutoAlign with AI to provide automated positioning and alignment of slice groups to the anatomy, relying on multiple anatomical landmarks. This provides fast, easy, and reproducible patient scanning and consistently delivers high image quality with standardized slice orientations.</p> <p>Furthermore, it provides AutoCoverage for consistent coverage of the patient's anatomy by automatically setting the number of slices and the FoV to fully cover knee.</p> <p>Users can switch to myExam Assist at any time to further personalize the exam to the individual patient.</p>
<p>14483029 myExam Implant Suite</p>	<p>myExam Implant Suite supports in examinations of patients with a wide range of active or passive MR Conditional implants. Limits for B1+ rms or SAR (Head and whole body) as specified by the implant manufacturer may be set by the operator and will not be exceeded during the exam. myExam Implant Suite provides a guided workflow for scanning of active and passive MR conditional implants that require limitations of B1+ rms or SAR (head or whole body). Therefore, it is possible to provide access to MRI for patients with these implants even if they require limitations below IEC normal mode.</p> <p>The myExam Implant Suite comes with the following features:</p> <ul style="list-style-type: none"> <li>- The MR operator is able to set limits for MR parameters in examinations of patients that are registered as patients with an MR Conditional Implant.</li> </ul>



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	<ul style="list-style-type: none"> <li>- Within a guided workflow the user may limit the RF-specific parameters specific absorption rate (SAR) for head and whole body or the B1+ magnetic field intensity (rms) to not exceed maximum values required by the implant manufacturer.</li> <li>- Additionally the user may enter a maximum scan time. The system will show a warning dialogue before the maximum scan time is expired.</li> <li>- During the MR examination the selected limits may be reviewed any time.</li> <li>- The system will make sure that only coils supported for implant scanning are plugged if an implant patient is registered.</li> </ul>
<p>14441748 Quiet Suite #T+D</p>	<p>Quiet Suite enables complete, quiet examinations for neurology and orthopedics with at least 70% reduction in sound pressure levels. Effective noise reduction is achieved through Quiet Suite by targeting the main source of MRI noise - rapid switching in the gradient coils. Quiet Suite consists of QuietX, an intelligent algorithm which effectively reduces noise through summation of gradients and reduction of slew rates while keeping timing parameters within the same range. QuietX has been enabled for TSE, SE and GRE sequences for T1, T2 and DarkFluid contrasts. Within the TSE-sequence, the parameter "Echo-spacing" allows the user to further lower the gradient slew-rates. QuietX has also been enabled for susceptibility and diffusion-weighted imaging and these sequences are available with the SWI and Advanced Diffusion licenses (not available for MAGNETOM ESSENZA), respectively. The automated algorithm runs in parallel to normal protocol handling. All features and contrasts of the TSE, SE, and GRE sequences remain available.</p> <p>In addition, Quiet Suite contains PETRA, a 3D T1 UTE sequence. The PETRA sequence allows for even lower gradient switching. With its unique gradient trajectories, no acoustic noise associated with gradient switching is generated during a PETRA scan. Residual noise may arise due to radio frequency switching.</p> <p>With Quiet Suite, optimized quiet protocols for imaging the brain and large joints are also provided.</p>
<p>14460162 Tim Whole Body Suite #V1</p>	<p>Tim Whole Body Suite puts it all together. This suite enables table movement for imaging of up to 205 cm (6' 9") FoV without compromise. In combination with Tim's newly designed ultra-high density array higher spatial and temporal resolution can be achieved along with unmatched flexibility of any coverage up to Whole Body.</p> <p>For faster exams and greater diagnostic confidence, 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.</p> <p>The Tim Whole Body Suite features:</p> <ul style="list-style-type: none"> <li>- The all-new Tim Table or Tim Dockable Table enable a full Field-of-View with coverage up to 205 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.</li> <li>- Table movement to its full extent can be remotely controlled from the operator console either by the operator or by sequence protocols.</li> <li>- Protocols and programs for whole body MR angiography and morphology e.g. for metastasis visualization and preventive care examinations.</li> <li>- 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.</li> <li>- The large FoV of 205 cm supports the assessment of metastases distribution in the body with sequences such as TIRM (Turbo Inversion Recovery).</li> </ul>
<p>14460227</p>	<p>With the Tim Planning Suite, multiple regions in the entire body can be examined in a minimum of</p>

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<p>Tim Planning Suite #VI</p>	<p>Time through measurement planning on a single FoV of any desired size. The dedicated Tim Planning Suite user interface has been optimized for these comprehensive measurement requirements. Set-n-Go protocols for entirely automated examinations in each body region in one work step are available. For example, for orthopedic, oncological or angiographic imaging.</p> <ul style="list-style-type: none"> <li>- Easy planning on a FoV of any desired size (up to 205 cm).</li> <li>- Planning of multiple steps simultaneously, e.g. on a whole-body image, with only one Set-n-Go protocol - which includes several steps.</li> <li>- Tim Planning Suite UI: Dedicated user interface and exclusive tools for effective and smooth working on a large FoV.</li> <li>- Multiple slice groups with their overlap are displayed together and can be easily arranged.</li> <li>- All steps can have independent sets of parameters.</li> <li>- All steps are displayed together with a single mouse click.</li> <li>- Easy positioning of all steps, for example, through Align FoV.</li> <li>- Full support of Phoenix, thus maximum reproducibility, for example, for follow-up studies, multi-centric studies or exchange of experiences across different institutions.</li> <li>- Dedicated protocols are provided for the Tim Planning Suite, for example, for orthopedic, oncological or angiographic indications.</li> <li>- It is highly recommendable to order application training!</li> </ul>
<p>14460160 Advanced Diffusion #VI</p>	<p>QuietX DWI and RESOLVE together make up the Advanced Diffusion package.</p> <p>QuietX DWI enables quieter diffusion-weighted imaging of the brain with up to 70% reduction in sound pressure relative to conventional diffusion-weighted imaging.</p> <p>RESOLVE (Readout Segmentation Of Long Variable Echo-trains) is a multi-shot, readout segmented EPI sequence for high-resolution, low-distortion diffusion-weighted imaging (DWI). This technique is largely insensitive to susceptibility effects, providing anatomically accurate diffusion imaging for the brain, spine, breast and prostate. In combination with syngo.MR Tractography, RESOLVE enables excellent white-matter tract imaging even in regions of high susceptibility, such as the spine.</p> <p>RESOLVE is a diffusion-weighted, readout-segmented EPI sequence optimized towards high-resolution imaging with reduced distortions.</p> <p>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 (SEEt sequence for prostate DWI), brain and spine with a high level of detail and spatial precision.</p> <p>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.</p> <p>QuietX DWI protocols for the brain utilize QuietX, an intelligent algorithm which effectively reduces noise through summation of gradients and reduction of slew rates while keeping timing parameters within the same range. All features and contrasts of DWI remain available, delivering image quality comparable to a conventional single shot diffusion sequence, while providing at least 70% sound pressure reduction for increased patient comfort.</p>
<p>14456327 WARP &amp; Advanced WARP #VI</p>	<p>WARP and Advanced WARP (SEMAC) integrates different techniques tailored to reduce susceptibility artifacts caused by orthopedic MR-conditional metal implants.</p> <p>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.</p>

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	<p>WARP and Advanced WARP help in evaluation of soft tissue in proximity of the implant. Available protocols include T1-weighted, T2-weighted, proton density and STIR contrast.</p> <p>Main Features:</p> <ul style="list-style-type: none"> <li>- Can be switched on in the standard TSE sequences</li> <li>- For each slice, additional phase encoding is performed to better characterize the distortion</li> <li>- Distorted signals are corrected by dedicated inline processing</li> </ul>
<p>14456237 Advanced Cardiac Incl. PSIR #VI</p>	<p>This package contains special sequences and protocols for advanced cardiac imaging including 3D and 4D BEAT functionalities. It supports advanced techniques for ventricular function imaging, dynamic imaging, tissue characterization, coronary imaging, and more. Combining the unique advantages of Tim and BEAT with IPAT and powerful gradients, it allows performing cardiac MR examinations without compromise in image resolution or acquisition speed. BEAT is a unique tool for fast and easy cardiovascular MR imaging. It provides 1-click switch from cine imaging to tagging for wall motion evaluation and 1-click switch from 2D to 3D imaging. BEAT automatically adjusts all parameters associated with the changes.</p> <p><b>Cardiac and Vessel Morphology</b></p> <ul style="list-style-type: none"> <li>- 3D aortopathy imaging with free breathing (SPACE)</li> </ul> <p><b>Global or Regional Wall Motion Analysis with BEAT</b></p> <ul style="list-style-type: none"> <li>- 3D cine acquisition for full CT-like heart coverage</li> <li>- 2D segmented FLASH for visualization of the regional wall motion using various tagging techniques (grid or stripes)</li> </ul> <p><b>Dynamic myocardial imaging with BEAT</b></p> <ul style="list-style-type: none"> <li>- Ultra-fast, high-SNR sequence for dynamic imaging with GRE EPI contrast for stress and rest exams</li> </ul> <p><b>Tissue characterization with BEAT</b></p> <ul style="list-style-type: none"> <li>- Robust myocardial tissue characterization with 3D PSIR (phase-sensitive inversion recovery)</li> <li>- Fast and complete coverage of the myocardium with IR 3D FLASH and TrueFISP</li> <li>- Including PSIR HeartFreeze (motion correction) for free-breathing measurements</li> </ul> <p><b>Coronary imaging with BEAT</b></p> <ul style="list-style-type: none"> <li>- 3D Whole-Heart non-contrast Coronary MRA</li> <li>- 3D Whole-Heart MRA with advanced free-breathing navigator compensating diaphragm shifts during the acquisition (motion-adaptive respiratory gating)</li> </ul>
<p>14456323 Inline Composing syngo #Se</p>	<p>Automatic anatomical or angiographic composing of multiple adjacent coronal or sagittal images for presentation and further evaluation. Composed images can be automatically loaded into Graphical Slice Positioning for scan planning purposes.</p> <p><b>Inline Technology - Processing Instead of Post-processing</b></p> <p>The Inline Composing option includes the following functions:</p> <ul style="list-style-type: none"> <li>- Inline calculation of full-format images of the spine, the central nervous system or the vessel tree, for example, combined from multiple overlapping steps.</li> <li>- Dedicated composing algorithms, optimized for the generation of anatomical or angiographic full-format images.</li> <li>- Data sets with different FoV, resolution, matrix and slice thickness can be combined.</li> <li>- Generation of full-format images from inline-computed MIPs.</li> </ul> <p>Different inline functions can be combined; e.g. in case of multiple-step angios, inline subtraction, inline MIP and inline Composing can be performed fully automatically.</p>

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	Full-format acquisitions from Inline Composing are ideal for further measurement planning on large FoV, e.g. with the Tim Planning Suite.
14482913 syngo Expert-I XA60/XA61	<p>This software application enables remote access to the system (connected via local area network) for planning and processing.</p> <p>The option is integrated in the <i>syngo</i> user interface thus enables easy access to the user interface of the <i>syngo</i> Acquisition Workplace for planning and processing support purposes.</p> <p>The access is protected by appropriate security mechanisms (active enabling prior to every connection through the user present on site, password protection), in order to prevent unwanted connections.</p> <p>The client software can be operated on any commercial PC with the following specification:</p> <ul style="list-style-type: none"> <li>- Operating system: Windows 7/8.1/10</li> <li>- .NET Framework version 4.5 or higher</li> </ul>
14460306 Standard Coil Package, 40-ch #So	<p>This package includes (if not exchanged with different variants via respective quote items):</p> <ul style="list-style-type: none"> <li>- BioMatrix Head/Neck 20 tilttable with CoilShim</li> <li>- BioMatrix Spine 32 with Respiratory Sensors</li> <li>- Body 18</li> <li>- Flex Large 4</li> <li>- Flex Small 4</li> <li>- Flex Coil Interface</li> </ul> <p><b>Tim 4G &amp; BioMatrix Coils</b></p> <p>The coils in the standard coil package combine the new BioMatrix functionalities CoilShim and Respiratory Sensor with the Tim 4G coil technology with Dual-Density Signal Transfer, DirectConnect and SlideConnect technology. The results are key imaging benefits: Excellent image quality, high patient comfort, and unmatched flexibility.</p> <p>The Tim 4G &amp; BioMatrix coils are designed for highest image quality combined with easy handling. BioMatrix's CoilShim helps to reduce patient induced localized B0 inhomogeneities. Respiratory sensors, embedded in the BioMatrix Spine 32, detect the breathing pattern of the patient as soon as he/she is on the table. The high coil element density increases SNR and reduces examination times. DirectConnect and SlideConnect™ technology reduce patient set up time significantly.</p> <p>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.</p> <p>AutoCoilSelect for dynamic, automatic, or interactive selection of the coil elements within the Field of View fastens the exam preparation at the host.</p> <p>All coils are time-saving "no-tune" coils.</p> <p>A comprehensive set of pads for comfortable and stable patient positioning together with safety straps are included.</p> <p><b>BioMatrix Head/Neck 20 tilttable with CoilShim</b></p> <p>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 possibility to tilt the coil in 3 different positions together with 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.</p> <p>The open and light design of the upper coil part increases patient comfort and is removable for easy patient handling. The integrated CoilShim is located in the lower coil part which may remain on the table for most of the examinations and can be used without the upper part. The BioMatrix Head/Neck 20 and BioMatrix 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 BioMatrix</p>

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	<p>Head/Neck 20 coil is equipped with two removable cushioned head stabilizers for stable and comfortable patient positioning. The BioMatrix 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 BioMatrix Spine 32 and Body 18 but also other combinations e.g. with flexible coils like the Flex Large 4 are possible. Whole-body set ups from Head to Toe are possible with the combination of BioMatrix Head/Neck 20, BioMatrix Spine 32, Body 18 coils, and Peripheral Angio 36 in one MR examination.</p> <p><b>BioMatrix Spine 32 with Respiratory Sensors</b> The 32-channel coil with its 32 integrated pre-amplifiers ensures maximum signal-to-noise ratio. The unique integrated BioMatrix Respiratory Sensors measure the patient's respiratory signal in head-first and feet-first position. The DirectConnect technology allows connecting the 32 coil elements of the BioMatrix 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 BioMatrix Spine 32 can remain on the patient table for nearly all exams. The BioMatrix Spine 32 is typically combined with Body 18, BioMatrix Head/Neck 20, Peripheral Angio 36 (optional) or Flex Large 4, Flex Small 4.</p> <p><b>Body 18</b> 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 BioMatrix Spine 32 resulting in a 30 channel body imaging setup. Body 18 can be combined with further Body 18 coils for larger coverage and can be positioned in different orientations (0°, 90°, 180°, 270°) for patient specific adaptations. The Body 18 is typically used in combination with the BioMatrix 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 the perfect combinability of the BioMatrix Spine 32, further Body 18 Coils (optional), the Peripheral Angio 36 (optional), but also the BioMatrix Head/Neck 20 and all flexible coils (e.g. Flex Large 4, Flex Small 4, UltraFlex Large 18 (optional) or UltraFlex Small 18 (optional)) a broad range of indications up to whole-body imaging are covered.</p> <p><b>Flex Large 4/ Flex Small 4</b> Light-weight, 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.</p>
<p>14456328 BioMatrix Technology #VI</p>	<p>The new and unique BioMatrix technology addresses the different aspects of patient bio-variability. It is based on three technological clusters:</p> <ul style="list-style-type: none"> <li>- BioMatrix Sensors address patient physiology, in order to anticipate challenges</li> <li>- BioMatrix Tuners address patient anatomy, in order to adapt to all patients, especially critical ones.</li> <li>- BioMatrix Interfaces address user interaction with the patient, to accelerate the workflow in the face of patient variability.</li> </ul> <p><b>BioMatrix Sensors anticipate challenges before they happen.</b></p>





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	<p>Respiratory sensors are integrated in the BioMatrix Spine coils and measure the patient's respiratory signal in head-first and feet-first position. The sensor loops measure the change in impedance resulting from the shift of the tissue and organs during the inhaled and exhaled phase of the patient's respiration as soon as the patient is lying on the table.</p> <p><b>BioMatrix Tuners – adapt to all patients, even critical ones.</b> The BioMatrix Tuners are CoilShim and SliceAdjust. BioMatrix's CoilShim helps to reduce patient induced strongly localized B0 inhomogeneities by generating the respective anatomy-specific B0 field with 4 independent shim channels built into the system. Calculation and fine-tuning of local CoilShim currents integrated into global shim algorithm. BioMatrix Head/Neck 20 tiltable with CoilShim and the Head/Neck 64 with CoilShim have local shim elements integrated into the posterior part, addressing patient induced B0 distortions in the neck region. BioMatrix SliceAdjust enables precise slice-by-slice tuning of resonance frequency, transmitter voltage, and first order B0-shim and B1-shim. For whole-body diffusion, the SliceAdjust technology helps to avoid station boundaries and apparent broken spine artifacts as well as to preserve the SNR for whole-body diffusion.</p> <p><b>BioMatrix Interfaces – accelerate workflow without compromising quality of care</b> The BioMatrix body model, leveraged by the Select&amp;GO panel on the front of the system, is able to derive the precise location of the organs based on the patient's individual characteristics. With a single touch, the technologist can quickly position the body part of interest at the isocenter and start the examination. To simplify and speed up patient transportation, the BioMatrix table with eDrive (optional) and AutoDocking (optional) functionalities is motorized, making patient management easy in all situations: no matter their size or strength, all technologists can handle all patients. By facilitating patient transport and accelerating patient positioning using individual characteristics, the BioMatrix Interfaces accelerate the complete workflow without compromising image quality.</p>
<p>14470783 BioMatrix Respiratory Sensors #VI, So</p>	<p>Highly integrated BioMatrix Respiratory sensors measure the patient's breathing cycle in head-first and feet-first orientation. Respiratory sensors are integrated in the BioMatrix Spine coils and measure the patient's breathing cycle in head-first and feet-first orientation. The sensor loops measure the change in impedance resulting from the shift of the patient's tissue and organs during the inhalation and exhalation phase of the breathing cycle. They do not require preparation and are active as soon as the patient is lying down on the coil.</p>
<p>14470785 BioMatrix Beat Sensor #VI, So</p>	<p>The BioMatrix Beat Sensor measures the motion of the heart and enables cardiac triggering without the need of ECG triggering. The BioMatrix Beat Sensor is seamlessly integrated into the BioMatrix Body 12 and BioMatrix Body 18 coil. When positioning these coils on the patient's chest, the Beat Sensor extracts a heart motion signal that can be used to trigger cardiac sequences to the cardiac cycle in order to minimize heart motion artifacts.</p> <p>Please note that in versions XA31 and XA50 only cardiac cine sequences are supported. From version XA51 a full cardiac exam is supported.</p>
<p>14470792 BioMatrix Coil Shim #VI, So</p>	<p>BioMatrix CoilShim helps to reduce patient induced strongly localized B0 inhomogeneities by dedicated local shim channels. BioMatrix CoilShim helps to reduce patient induced strongly localized B0 inhomogeneities by generating the respective anatomy-specific B0 field with 4 independent shim channels built into the system. Calculation and fine-tuning of local CoilShim currents is integrated into the global shim algorithm.</p>
<p>14470794 BioMatrix SliceAdjust</p>	<p>BioMatrix SliceAdjust helps to avoid station boundaries and apparent broken spine artifacts as well as to preserve the SNR for whole-body diffusion.</p>

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#BM	BioMatrix SliceAdjust enables precise slice-by-slice tuning of resonance frequency, transmitter voltage, and first order B0-shim and B1-shim. For whole-body diffusion, the SliceAdjust technology helps to avoid station boundaries and apparent broken spine artifacts as well as to preserve the SNR for whole-body diffusion.
14460415 BioMatrix Dock. Table w/ eDrive #So	<p>The BioMatrix Dockable Table with eDrive is designed for maximum patient comfort and smooth patient preparation. The BioMatrix Dockable Table with eDrive can support up to 250 kg (550 lbs) without restricting the vertical or horizontal movement. The BioMatrix eDrive provides motorized assistance for easy maneuverability of the table.</p> <p>The new BioMatrix Dockable Table with eDrive with its light appealing design allows for a fast patient preparation and maximized patient comfort. The BioMatrix eDrive provides motorized assistance for easy maneuverability of the table making patient transportation easy in all situations. The user only needs to apply slight pressure to the table grip in order to start propulsion support. The table can adjust its speed based on the pressure applied by the user. With its newly designed AutoDocking functionality the table can be smoothly docked and undocked with just one click on the BioMatrix table interface.</p> <p>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 BioMatrix Dockable Table with eDrive 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.</p> <p>Multiple Tim 4G and BioMatrix coils can be connected at once for efficient patient set up and patient friendly examinations. The seamless integration of multiple Tim 4G and BioMatrix 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.</p> <p>The BioMatrix Dockable Table with eDrive is easily adjustable for height even in the undocked state. A minimum height of 56 cm allows for easy wheelchair access or easy patient movement to the hospital bed.</p> <p>The integrated infusion stand and arm rests allow for fast patient set up anywhere and also for critical patients.</p>
14470796 BioMatrix Select & GO #VI,So	<p>The BioMatrix Select&amp;GO Interface enables fast and easy single-touch patient positioning from both sides of the patient table. The interfaces are integrated left and right into the front covers. Correct positioning saves unnecessary wasted time for repositioning and additional adjustments, therefore shortening the total room time.</p> <p>The two BioMatrix Select&amp;GO interface enables fast and easy single-touch patient positioning from both sides of the patient table. The interfaces are integrated left and right into the front covers. Correct positioning saves unnecessary wasted time for repositioning and additional adjustments, therefore shortening the total room time.</p> <ul style="list-style-type: none"> <li>- The ergonomically designed Select&amp;GO touch panels are integrated into the front cover on each side of the patient tunnel for controlling table movement, guidance for patient setup and comfort features. They are well illuminated for easy visual recognition.</li> <li>- Automated table move to upmost position, to center position or Home position facilitate smooth patient preparation and will reduce table time</li> <li>- Variable (6 levels) ventilation and lighting inside the magnet bore or volume adjustments are possible for increased patient comfort The Select&amp;GO touch panels provide 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.</li> <li>- Almost all table control functions, including ventilation and illumination of the magnet bore, can be also controlled from the operator console for convenient operation</li> </ul>
14460410	MAGNETOM Sola is available in two different light and appealing design variants which perfectly

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Silver & White Design #So	Integrate into different environments. The Silver & White Design Variant comprises a brilliant white front design ring with integrated unique Select&GO panels. The smoothly embracing deco area on the left side and the outer rings in the front and the back of the system is colored in brilliant silver. The table cover is presented also in the same color and material selection. The unique color and material selection enhances the visual appeal of the new system design, thereby creating an enticing, patient friendly impression. The unique Select&GO panels are neatly integrated into the front design ring. The aesthetically pleasing and ergonomically designed control elements are well illuminated for easy visual recognition. In particular, the table cover and the smoothly embracing colored system cover parts have been designed to promote a modern visual appearance. This combination of ingenuity and practical design as presented with the "Silver & White" design with its brilliant white and silver makes MAGNETOM Sola an overall visually appealing system and creates a patient-friendly environment.
14456270 PC Keyboard US English #VI	Standard PC keyboard with 105 keys. The keys of the numerical key panel are assigned to <i>syngo</i> -specific functions and labeled with the corresponding <i>syngo</i> icons. The keyboard supports the country specific special characters.
14460419 High-End Computing [204x48] #So	Tim 4G power computing upgrade for MAGNETOM Sola/ Sola Fit Tim [204x48]. This upgrade brings a high-end image reconstruction computer to the Tim [204x48] configuration. The high-end computing option brings high-end image reconstruction performance to the MAGNETOM Sola/ Sola Fit Tim [204x48]. The high-end image reconstruction computer offers faster processing power for intensive algorithms, high amount of data storage for large data sets acquired over long-term measurements, a large amount of main memory for fast processing of measurement data, and a general purpose graphic processing unit for highly intensive computational calculations. The specifications of the high-end image reconstruction computer can be found within the data sheet.
14466238 Peripheral Pulse Unit #VI	Peripheral Pulse Unit for Pulse Triggering Peripheral Pulse Unit for Pulse Triggering: - Reduces flow artifacts caused by pulsatile blood flow. - Excellent image quality by synchronizing data acquisition to the pulsatile blood flow.
14460313 Dual Monitor Package #BM	The Dual Monitor Package provides a second 24" LCD monitor for the acquisition workplace, identical to the system main host monitor. The two monitors provide space for protocol planning and exam progress on the left monitor, as well as viewing and post-processing functionalities on the right monitor. The Dot Cockpit can be used on both monitors as a floating window. This improves the MR examination workflow by a smoother and more comfortable work space that avoids interruptions between planning, scanning, viewing and post-processing. It allows to keep running patient examinations always in sight to allow for fast interactions.
14446661 In-Ear Headset #T+D	In-Ear Headphone for easy communication with patient while using the head coil. - Each headset comes with a 2.5 meters long cable that can be plugged into the headphone plug - The set is fitted with (2x)10 disposable pairs of earplugs. The disposable ear plugs come in two different sizes that fit all patients. - The user can communicate better with the patient during the exam. - The patient can listen to music.
14482959 SW syngo MR XA61A	syngo MR XA61A is the new software platform, bringing the latest features and functionality for daily clinical excellence. syngo MR XA61A guides and enables the user throughout the entire workflow: from patient registration; patient set up with guided workflows on the Select&GO; protocol management and selection; image acquisition and viewing; data handling; and post processing and reporting. This software together with the hardware enables diagnostic excellence for your daily clinical needs.

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	<p>The syngo MR XA61A platform offers myExam Companion which introduces a new MRI operation philosophy by providing built-in expertise and automation for users and clinical questions. myExam Companion provides different workflow modes for tailored assistance; myExam Autopilot, myExam Assist and myExam Cockpit. No matter the user or patient, myExam Companion helps generate consistent, comprehensive results.</p> <p>syngo MR XA61A provides environments for: scheduling; scanning and basic quality assurance as well as viewing; basic and advanced post-processing; and data handling (Export, Import, Transfer, Record to media). For faster data transfer and reduced storage demand syngo MR XA61A uses the DICOM Enhanced MR Image format for its scanning result. Features like Online Help, DICOM MPPS autocomplete and Inline technologies additionally support the workflow.</p> <p>For scanning, myExam Companion provides tailored assistance enabling consistent image quality regardless of the operator's experience:</p> <ul style="list-style-type: none"> <li>- myExam Autopilot helps users to automate intelligently. It enables less trained staff to scan with just a few simple clicks. By using automation and AI, it takes away burdensome routine tasks for all technologists (available for Sola and Altea).</li> <li>- myExam Assist provides guided and flexible workflows. Optimized scan strategies are provided and can be selected or flexibly adapted based on the patient's condition.</li> <li>- myExam Cockpit provides a central workspace for protocol management and customization. Users can set up and maintain protocols intuitively, build knowledge into standardized exams and make those continuously available for every user.</li> <li>- myExam Implant Suite supports in examinations of patients with a wide range of active or passive MR Conditional Implants.</li> </ul>
<p>14460171 syngo.MR Neuro Perfusion Engine #1</p>	<p>syngo.MR Neuro Perfusion Engine extends the MR Neurology workflow with a complete package for advanced processing and evaluation of brain perfusion datasets</p> <p>Main functionalities of syngo.MR Neuro Perfusion Engine:</p> <ul style="list-style-type: none"> <li>- Rigid Motion Correction and spatial filter</li> <li>- Computation of relative Mean Transit Time (relMTT), relative Cerebral Blood Volume (relCBV), relative Cerebral Blood Flow (relCBF), Time to Peak (TTP) and Percentage of Baseline at Peak (PBP)</li> <li>- Global AIF, Global AIF with delay correction, local AIF, and local AIF with T1 correction for perfusion maps generation.</li> <li>- Preprocessing functionality for map generation using local AIF methods</li> <li>- Dedicated stripes layout for perfusion map reading</li> <li>- Mean curve evaluation with up to 10 ROIs</li> <li>- One-click mirror ROIs on the contralateral side with ratio computation</li> <li>- Summary table displaying the results with .CSV export functionality</li> <li>- Mismatch evaluation between any series with same frame of reference</li> <li>- Evaluation based on ROIs or combination of ROIs</li> <li>- Summary table displaying results with .CSV export functionality</li> </ul> <p>Scope of delivery:</p> <ul style="list-style-type: none"> <li>- 1 x syngo.MR Neuro Perfusion Engine software package with</li> <li>- MR Neuro Perfusion Evaluation</li> <li>- MR Neuro Perfusion AIF</li> <li>- MR Neuro Perfusion Mismatch</li> </ul>
<p>14460183 syngo.MR Cardio Engine #1</p>	<p>The syngo.MR Cardio Engine bundles the following features for Cardiac evaluation:</p> <ul style="list-style-type: none"> <li>- syngo.MR Cardiac 4D Ventricular Function</li> <li>- syngo.MR Cardiac Flow</li> </ul>

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	<p>Features of <i>syngo</i>.MR Cardiac Engine:</p> <p><i>syngo</i>.MR Cardiac 4D Ventricular Function processes MR cine images of the heart and generates quantitative results for physicians in the diagnostic process.</p> <p><i>syngo</i>.MR Cardiac Flow processes velocity-encoded MR images to evaluate blood flow dynamics e.g. in the heart and the great vessels. The application generates quantitative results for physicians in the diagnostic process.</p> <p>The MR cardiac interactive reporting template is included.</p> <p>Scope of delivery:</p> <ul style="list-style-type: none"> <li>- 1 x <i>syngo</i>.MR Cardiac Engine software package with</li> <li>- Cardiac 4D Ventricular Function and</li> <li>- Cardiac Flow evaluation</li> </ul>
<p>14461619 Turbo Suite Essential #BM</p>	<p>Turbo Suite Essential comprises established acceleration techniques to maximize productivity for all contrasts, orientations and all routine imaging applications from head-to-toe.</p> <p>Turbo Suite Essential contains:</p> <ul style="list-style-type: none"> <li>- IPAT and IPAT<sup>2</sup> parallel imaging capabilities for all contrasts, orientations and body regions</li> <li>- T-PAT (temporal IPAT) for advanced parallel imaging provides fast high-resolution dynamic imaging in cardiac exams by distributing reference scans over time</li> <li>- CAIPIRINHA for advanced IPAT<sup>2</sup> is a unique k-space reordering scheme that improves the g-factor significantly and therefore improves the SNR, which can be translated into higher imaging speed.</li> <li>- CAIPIRINHA SPACE -- high-resolution, fast 3D imaging with isotropic, sub-millimeter resolution, all contrasts. Protocols optimized for joints are provided.</li> <li>- CAIPIRINHA VIBE -- T1 weighted 3D imaging for high-resolution imaging throughout the body and significantly shortened breath-hold scans.</li> </ul>
<p>14482917 Deep Resolve Pro Package</p>	<p>The Deep Resolve Pro Package combines the three applications Deep Resolve Gain, Deep Resolve Sharp and Deep Resolve Boost which use intelligent reconstruction algorithms and Deep Learning networks to reconstruct accelerated images with higher signal to noise ratio and better image sharpness.</p> <p>With the Deep Resolve Pro Package you get access to our advanced image reconstruction environment which features deep learning methods.</p> <p>Deep Resolve Gain uses a targeted algorithm to detect and remove noise in the image. Noise detection and removal is performed optimized for the individual scan thus addressing spatially varying noise of the specific acquisition. The method allows to gain SNR which can be turned into either improved resolution or into higher productivity, e.g. by reducing the number of averages or by increasing the acceleration factor of the scan. Deep Resolve Gain can be combined with standard GRAPPA and SMS acceleration and is available for following sequences:</p> <ul style="list-style-type: none"> <li>- TSE, TSE DIXON, SE</li> </ul> <p>Deep Resolve Boost is a deep learning reconstruction algorithm, which has been trained on a large amount of data sets to reconstruct high signal to noise ratio images from under-sampled raw data. The network has been optimized to work on highly accelerated scans, thus enabling fast acquisitions. It can be seamlessly applied to data acquired from head-to-toe with different contrast weightings and orientations. Deep Resolve Boost shows highest potential when combined with GRAPPA and SMS acceleration (if supported) and is available for following sequences:</p> <ul style="list-style-type: none"> <li>- TSE, ap2d_diff, HASTE</li> </ul>

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	<p>Deep Resolve Sharp is a deep neural network, which has been trained on a large amount of high-resolution MR data to reconstruct sharp images from low resolution data. The reconstruction algorithm also reduces the Gibbs ringing which is present around edges. Consistency with the acquired raw data is ensured in the reconstruction process. It can be seamlessly applied to data acquired with different contrast weightings and orientations. Deep Resolve Sharp offers up to a factor of two in in-plane resolution. Deep Resolve Sharp can be combined with Deep Resolve Gain or Deep Resolve Boost and is available for following sequences:</p> <ul style="list-style-type: none"> <li>- TSE, TSE DIXON, SE, ep2d_diff, HASTE</li> </ul>
<p>14402527 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> <p>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).</p> <p>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.</p> <p>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.</p> <p>Interesting measuring times for the ultra-high-resolution 3D protocols are achieved through parallel imaging with IPAT (GRAPPA).</p> <p>The Susceptibility Weighted Imaging package includes:</p> <ul style="list-style-type: none"> <li>- SWI measuring sequence, IPAT compatible</li> <li>- optimized measuring protocols for the head</li> <li>- inline-postprocessing for automatic calculation of relevant images within the scope of image reconstruction: <ul style="list-style-type: none"> <li>- calculation of susceptibility-weighted images</li> <li>- venous angiography: MIP of a thin slice block</li> </ul> </li> </ul> <p>SWI has been optimized for clinical use to support diagnostics with cerebrovascular diseases (e.g. cerebral insult), venous malformation, brain trauma and tumors.</p> <p><i>Prerequisite: Software syngo MR B13</i></p>
<p>14470966 High bandwidth Inversion recovery</p>	<p>High bandwidth inversion recovery for reduction of susceptibility-induced artifacts. This option enables a high bandwidth inversion pulse in inversion recovery sequences for tissue characterization with the aim to reduce susceptibility artifacts.</p>
<p>14441747 MyoMaps #T+D</p>	<p>This package contains special sequences and protocols for inline T1, T2 and T2* calculation at the heart. The generation of T1 and T2 parametric maps is enhanced by the use of motion correction. T1, T2 and T2* parametric maps could be used to support assessment of cardiovascular disease. The MyoMaps package enables the calculation of quantitative T1, T2 and T2* parametric maps at the heart. The calculation is available shortly after the measurement is finished without the need of post-processing.</p> <p><b>T1 Parametric Map</b></p> <ul style="list-style-type: none"> <li>- Acquisition based on ECG triggered modified look-locker inversion recovery (MOLL)</li> <li>- T1 parametric maps could be used to enhance the characterization of both ischemic and non-</li> </ul>

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	<p>Ischemic heart disease.</p> <p><b>T2 Parametric Map</b></p> <ul style="list-style-type: none"> <li>- Acquisition based on T2-prepared TrueFISP sequence</li> <li>- T2 parametric maps could be used to enhance the evaluation of myocarditis and heart transplant rejection.</li> </ul> <p><b>T2* Parametric Map</b></p> <ul style="list-style-type: none"> <li>- Acquisition based on multi-echo GRE sequence</li> <li>- T2* parametric maps could be used in the evaluation of iron overload for hemochromatosis patients.</li> </ul>
<p><b>08464740</b> <b>Flow Quantification</b> <b>#TIm</b></p>	<p>Special sequences for quantitative assessment of flow   Flow Quantification enables the acquisition of flow encoded images and the evaluation of blood as well as of cerebro-spinal fluid (CSF).</p> <p>Sequences include:</p> <ul style="list-style-type: none"> <li>- ECG triggered 2D phase contrast with iPAT support</li> <li>- Retrospective reconstruction algorithms for full R-R interval coverage</li> <li>- Maxwell Term Compensation</li> <li>- 4D Flow protocols including retrospective triggering and navigator based respiratory gating for free-breathing 4D Flow acquisitions.</li> </ul>
<p><b>14469199</b> <b>Body 18 -&gt; BioMatrix</b> <b>Body 18</b></p>	<p>This option exchanges the Body 18 coil from the standard coil configuration for the improved BioMatrix Body 18. Beside the same technical key benefits from the Body 18 coil, this coil has a new highly flexible and light-weight design.</p> <p>The BioMatrix Body 18 features:</p> <ul style="list-style-type: none"> <li>- 18-element design with 18 integrated preamplifiers (3 clusters of 6 elements each)</li> <li>- Operates in an integrated fashion with the system's spine coil</li> <li>- Can be combined with further Body 18 or BM Body 18 coils for larger coverage</li> <li>- Can be positioned in different orientations (0°, 90°, 180°, 270°) for patient specific adaptations</li> <li>- Requires no coil tuning</li> <li>- iPAT compatible in all directions</li> </ul> <p>The highly flexible design enables a wide variety of applications including:</p> <ul style="list-style-type: none"> <li>- Thorax (incl. heart)</li> <li>- Abdomen</li> <li>- Pelvis</li> <li>- Hip</li> <li>- Vascular</li> </ul> <p>The BioMatrix Body 18 is typically combined with:</p> <ul style="list-style-type: none"> <li>- BM Head/Neck 20</li> <li>- BM Spine coil</li> <li>- Additional Body 18 coil(s) or BM Body 18 coils (optional)</li> <li>- Peripheral Angio 36 (optional)</li> <li>- Flex Large 4</li> <li>- Flex Small 4</li> <li>- UltraFlex Large 18 (depending on availability, optional)</li> <li>- UltraFlex Small 18 (depending on availability, optional)</li> <li>- Loop coils (optional)</li> <li>- Endorectal coil (optional)</li> </ul>

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	<p>The BioMatrix Body 18 has an 18-element design with 18 integrated preamplifiers that are arranged in 3 clusters of 6 coil elements each. The BioMatrix Body 18 will be typically used together with the system's BM Spine coil with which it operates in an integrated fashion as a 30-element coil, resulting in 3 rings of 10 elements each for highest SNR and fast imaging. It can be positioned in different orientations and addresses the requirement range for the examinations of obese patient to pediatric patients. The highly flexible and light weight coil improves patient comfort and can be easily connected via SlideConnect technology. No tuning of the fully iPAT-compatible BioMatrix Body 18 is necessary, allowing for an efficient and patient friendly set-up.</p> <p>For examinations requiring larger anatomical coverage, up to four BM Body 18 can be used simultaneously. Typically two BM Body 18 will be used for coverage of the entire abdomen or in the case of large patients.</p> <p>The BioMatrix Body 18 is typically used in combination with a BM Spine coil for examinations of the thorax, abdomen, pelvis or hip and is also well suited for cardiac or vascular applications. In addition, the BM Body 18 can be combined with further BM Body 18 (optional) or Body 18 (optional), the Peripheral Angio 36 (optional), but also the BM Head/Neck20, the 4-channel flex coils (e.g. Flex Large 4, Flex Small 4) and the 18-channel UltraFlex coils (e.g. UltraFlex Large 18, UltraFlex Small 18, depending on availability, optional).</p> <p>The dimensions of the BioMatrix Body 18 are 385 mm x 590 mm x 65 mm (L x W x H). Its weight is about 2 kg (4.5 lbs), whereas the patient feels as little weight as 1kg (2,25 lbs).</p>
<p>14460316 Shoulder Shape 16 #So</p>	<p>The Shoulder Shape 16 combines the known benefits of Tim 4G coil technology with new highly flexible materials, resulting in unmatched image quality, high patient comfort and easy handling. The Shoulder Shape 16 for examinations of the left or right shoulder consists of an iPAT-compatible 16-channel shoulder coil in a flexible shoulder cup that can be shaped around small and large shoulders. An L-shaped cushion for easy positioning of the patient is included. The 16-element coil with 16 integrated pre-amplifiers ensures maximum signal-to-noise ratio. Shoulder Shape 16 will be connected via a SlideConnect plug for fast and easy coil set-up and patient preparation. The iPAT compatible Shoulder Shape 16 is ergonomically designed and adapted to the shape of the shoulder.</p> <p>The flexibility in size obtains maximum image quality for different body sizes. The opening of the coil can be adjusted between 16 cm - 27 cm to cover small, medium and large shoulders.</p> <p>The coil can be used either for left or right shoulders. It features an L-shaped cushion than can easily be placed for comfortable positioning. The coil excels in highest resolution imaging with exceptional signal-to-noise ratio.</p>
<p>14460423 Tx/Rx Knee 18 #So</p>	<p>New 18-channel transmit/receive coil optimized for knee imaging. The spacious design with a flared opening towards the thigh allows scanning even of large and swollen knees with exceptional image quality and signal to noise ratio.</p> <p>Main features :</p> <ul style="list-style-type: none"> <li>- 18-element design (3x6 coil elements) with 18 integrated preamplifiers</li> <li>- iPAT-compatible</li> <li>- SlideConnect Technology</li> </ul> <p>Thanks to its 18-channel design this coil is perfectly suited for high-resolution images with excellent SNR. With the arrangement of the antennas in three rings of 6 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>



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	The housing of this coil has a flared opening towards the patient's thigh, as well as an easy coil sliding and opening mechanism.
14416962 Foot/Ankle 16 #Ae	<p>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.</p> <p>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.</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>
14469229 Flex -> UltraFlex Upgrade #1.5T	<p>This option exchanges the Flex Small &amp; Large 4 coils incl. the Flex Coil Interface from the standard coil configuration for the superior UltraFlex Small &amp; Large 18. These are two lightweight, iPAT compatible, 18-element no-tune receive coils made of highly flexible and soft material.</p> <p><b>UltraFlex Large 18</b> Ideal for examinations of larger extremities (e.g. medium to large shoulder, hip, knee, ankle and hand) and for abdominal examinations. Dedicated positioning aids for larger extremities are delivered with the coil.</p> <p><b>UltraFlex Small 18</b> Ideal for examinations of smaller extremities (e.g. small to medium shoulder, smaller ankle, elbow and hand) and for abdominal examinations. Dedicated positioning aids for smaller extremities are delivered with the coil.</p> <p>This option exchanges the Flex Small &amp; Large 4 coils incl. the Flex Coil Interface from the standard coil configuration for the superior UltraFlex Small &amp; Large 18.</p> <p><b>UltraFlex Large 18</b> The UltraFlex Large 18 can be wrapped around or placed flat on top of the area of interest. This rectangular coil measures approx. 29 cm x 59 cm and connects with only one SlideConnect plug which allows for fast and easy patient preparation. The positioning aids that come with the coil enhance positioning flexibility and help minimize involuntary patient motion artifacts.</p> <p><b>UltraFlex Small 18</b> The UltraFlex Small 18 can be wrapped around or placed flat on top of the area of interest. This rectangular coil measures approx. 19 cm x 41 cm and connects with only one SlideConnect plug which allows for fast and easy patient preparation. The positioning aids that come with the coil enhance positioning flexibility and help minimize involuntary patient motion artifacts.</p>
14466282 Positioning Aids Shoulder&Ankle #VI	<p>This package contains additional positioning aids that can be used for the UltraFlex Large 18 and UltraFlex Small 18.</p> <p>This package contains a wedge shaped cushion that can be used together with the UltraFlex Large 18 or UltraFlex Small 18, e.g. for shoulder imaging and an L-shaped holder that can be used together with the coil holder of the UltraFlex Small 18 or UltraFlex Large 18 for ankle imaging to achieve a 90° angle of the patient's ankle.</p>
14466241 Separator 60kW/76kW #VI	<p>The SEP (Separation cabinet) has to be used if a central hospital chilled water supply is available or if a chiller of any brand/type is already available.</p> <p>The SEP is the interface between the on-site water chiller (of any brand or type) or the interface to the central hospital cooling water supply.</p> <p>For the above-mentioned cases the SEP is mandatory!</p>



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	<p>In these cases, the primary water specifications must fulfill the requirements: XJ: 45kW; water temperature: 6 - 14°C XQ: 60kW; water temperature: 6 - 14°C XT: 75kW; water temperature: 6 - 12°C</p> <p>For all gradient systems: Flow: 100+-10l/min; pH value 6-8; max working pressure 6 bar.</p> <p>Dimensions: 1950mm x 650mm x 650mm (height x width x depth) Weight: approx. 350kg Function: - Interface between the on-site water chiller (of any brand/type) or - Interface to the central hospital chilled water supply.</p> <p>Delivery volume: - Separator - Two 3.0 m hoses (forward and return) for connecting the SEP to the local cooling water supply system - Separation cabinet - With the SEP configuration, the helium compressor is built into the SEP cabinet and connected internally - Regional specific adapter for connection to the hospital installation</p>
<p>14460249 UPS system #VI</p>	<p>UPS system Liebert GXT5 3000IRT2UXLE for MAGNETOM NumX systems for safeguarding computers. Including Power Cable of 9 m for connecting the UPS. Power output: 3.0 kVA / 3 kW Bridge time: 3 min full load / 12 min half load Input voltage: 230 VAC Voltage range: 115 - 230 V Input frequency: 40 / 70 Hz Output voltage: 230 VAC Dimensions (H x D x W): UPS 430 x 540 x 85 mm Incl. 9 m Power Cable Weight: approx. 30 kg</p>
<p>14466228 System Start Timer #VI</p>	<p>Timer clock that can be installed together with the MAGNETOM MR system to start the system automatically at user-definable times, eliminating waiting times during system boot up. The System Start Timer allows the user to define three different startup times for different days. The time switch can be programmed one year in advance. A programmed weekly schedule is repeated unless it is modified or suspended.</p>
<p>14460303 Tim [204x48] XQ Gradient #So</p>	<p>Tim [204x48] XQ-gradients performance level Tim 4G's RF system and innovative coil architecture enables high-resolution imaging and increased throughput. The system provides a maximum number of 204 channels (coil elements) that can be connected simultaneously. Flexible parallel imaging is achieved by the standard 48 independent RF channels that can be used simultaneously in one single scan and in one single FOV, each generating an independent partial image. This option includes also Advanced High Order ShIm.</p> <p>XQ - gradients Max. amplitude: 78 mT/m (Actual 45 mT/m for every gradient axis) Max. slew rate: 346 T/m/s (Actual 200 T/m/s for every gradient axis)</p>

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	<p>Min. rise time from 0 to 78 mT/m: 225 <math>\mu</math>s</p> <p>Note: max. amplitude and max. slew rate achieved through vector addition of all three gradient axes simultaneously, actual maximum amplitude of 45 mT/m and actual maximum slew rate of 200 T/m/s are achievable simultaneously along each axis.</p> <p>The XQ gradients are designed for high performance and linearity to support clinical whole body imaging at 1.5T. The force compensated gradient system minimizes vibration levels and acoustic noise.</p> <p>High-performance measurement and reconstruction system. <b>Tim [204x48] performance level</b> BioMatrix builds on DirectRF - The 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 a dynamic feedback control for temporal stability and power linearity. The innovative architecture packs more coil elements in a smaller space and the system provides a maximum number of 204 channels (coil elements) that can be connected simultaneously. Advanced iPAT capabilities and SNR are enabled by the 32 independent RF channels that can be used simultaneously in one single scan and in one single FOV, each generating an independent partial image. 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.</p> <p><b>XQ gradients</b> Siemens XQ gradients provide actively shielded, water cooled world-class gradients. All axes are force-compensated. The XQ gradients have:</p> <ul style="list-style-type: none"> <li>- Max. amplitude: 78 mT/m (Actual 45 mT/m for every gradient axis)</li> <li>- Max. slew rate: 346 T/m/s (Actual 200 T/m/s for every gradient axis)</li> <li>- Min. rise time from 0 to 78 mT/m: 225 <math>\mu</math>s</li> <li>- Note: max. amplitude and max. slew rate achieved through vector addition of all three gradient axes simultaneously, actual maximum amplitude of 45 mT/m and actual maximum slew rate of 200 T/m/s are achievable simultaneously along each axis.</li> <li>- Maximum output voltage for each of the gradient axes 2250 V</li> <li>- Maximum output current for each of the gradient axes 900 A</li> <li>- Separate cooling channels that simultaneously cool primary and secondary coils allow the application of extremely gradient intensive techniques in a new class of performance.</li> <li>- 100% duty cycle for fast and demanding techniques such as ultrashort TE MRA in continuous operation, thin slice single breath-hold liver studies and EPI imaging techniques (all optional in appropriate clinical packages).</li> <li>- Variable Field-of-View selection from 0.5 cm to 50 cm (up to 50 cm in z direction) for optimal coverage and highest spatial resolution in diagnostic imaging. The minimum slice thickness in 2D and 3D is 0.1 mm and 0.05 mm, respectively.</li> <li>- Acquisition of sagittal, transverse, coronal, single oblique and double oblique slices with highest resolution.</li> <li>- 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.</li> </ul> <p><b>Computer system</b> The specifications of the high-performance measurement and reconstruction computer can be found</p>

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	<p>within the data sheet.</p> <p>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.</p>
<p>14475450 myExam Assist XL Package USA</p>	<p>The myExam Assist XL Package Includes:</p> <ul style="list-style-type: none"> <li>- myExam Angio Assist</li> <li>- myExam Abdomen Assist</li> <li>- myExam Cardiac Assist</li> <li>- myExam Breast Assist</li> </ul> <p>The myExam Assist XL package offers a comprehensive set myExam Companions for the maximum coverage of MR examination requests. Robust image quality can be achieved efficiently and consistently in the clinical areas of Neuro, MSK, Vascular, Cardiac and Oncology.</p> <p>The myExam Angio Assist provides semi-automatic detection of arterial and venous timing windows using a test bolus technique. This information is feedback for next planning steps automatically adapting scan parameters to the individual patient and patient's condition.</p> <p>The myExam Abdomen Assist offers intuitive guidance and a high level of automation. It allows automatic sequence scaling according to physiological characteristic.</p> <p>The myExam Cardiac Assist uses anatomical landmarks, standard views of the heart, such as dedicated long axis and short-axis views - easily generated and reproduced.</p> <p>The myExam Breast Assist provides lesion detection, implant evaluation and breast biopsy. The myExam Companions support various breast coils, head-first or optional feet-first positioning and examination approaches (fatsat, nonfatsat).</p> <p><b>myExam Angio Assist</b> myExam Angio Assist 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.</p> <p><i>Guidance View</i></p> <ul style="list-style-type: none"> <li>- Step-by-step user guidance is seamlessly integrated.</li> <li>- Example images and guidance text are displayed for each individual step of the scanning workflow.</li> <li>- Both images and text are easily configurable by the user</li> </ul> <p><i>Test bolus</i></p> <ul style="list-style-type: none"> <li>- Automatic detection of arterial / venous timing window</li> </ul> <p><i>Feedback of bolus timing information</i></p> <ul style="list-style-type: none"> <li>- Timing information is fed back into planning steps and parameters are adapted automatically</li> </ul> <p><i>Auto Bolus Detection</i></p> <ul style="list-style-type: none"> <li>- Optionally selectable functionality for easy interaction and operator-independent timing of the dynamic scan.</li> <li>- Determination of the bolus arrival time in the heart (by Care Bolus sequence) and automatic initiation of the dynamic protocol.</li> <li>- Visual monitoring of signal intensity allows manual override function.</li> </ul>

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	<p><i>Auto Voice Commands</i></p> <ul style="list-style-type: none"> <li>- Integrated into the scanning workflow.</li> <li>- The system plays them automatically at the right point in time.</li> <li>- This ensures optimal timing of scanning, breathing and contrast media.</li> <li>- The user can monitor which breath hold or pauses are actually played, and could add pauses between the automatic breath hold commands if necessary</li> </ul> <p><i>Customization</i></p> <p>Existing myExam Companions can be modified by the user to their individual standard of care.</p> <ul style="list-style-type: none"> <li>- Add/remove protocol steps</li> <li>- Change guidance content (images and text)</li> <li>- Change or add myExam Strategies and Decision Points</li> <li>- Modify the Parameter View</li> </ul> <p><i>Application Packages:</i></p> <p><i>syngo Inline Composing</i></p> <ul style="list-style-type: none"> <li>- Automatic anatomical or angiographic composing of multiple adjacent coronal or sagittal images</li> <li>- Composed images can be automatically loaded into Graphical Slice Positioning for scan planning purposes</li> </ul> <p><i>Tim Planning Suite</i></p> <p>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.</p> <p><i>myExam Abdomen Assist</i></p> <p>The myExam Abdomen Assist offers a comprehensive set of guidance and automation, so that robust image quality can be achieved fast and independently from the user.</p> <p><i>Patient View</i></p> <ul style="list-style-type: none"> <li>- Within the Patient View the user can easily tailor the exam to each individual patient.</li> <li>- Several pre-defined myExam 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.</li> </ul> <p>myExam Strategies allows personalizing the workflow to the individual patient condition and clinical need. The following predefined strategies are included:</p> <ul style="list-style-type: none"> <li>- Standard with breath-hold</li> <li>- Standard with PACE triggering</li> <li>- Limited patient capabilities using syngo BLADE and PACE triggering.</li> </ul> <p><i>Guidance view</i></p> <ul style="list-style-type: none"> <li>- Step-by-step user guidance is seamlessly integrated.</li> <li>- Example images and guidance text are displayed for each individual step of the scanning workflow.</li> <li>- Both images and text are easily configurable by the user</li> </ul> <p><i>Parameter View</i></p> <ul style="list-style-type: none"> <li>- This new view displays the parameters that are really needed for this scan set-up.</li> <li>- This reduced set of protocol parameters allows the user to concentrate on the essentials.</li> </ul>

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	<p>- The Parameter View can be opened at any time during an examination</p> <p>Additional functionalities: Automatic sequence scaling according to physiological characteristic. (Auto FoV, AutoNavigator, breath-hold adaptations).</p> <p>Auto Navigator based automatic breathing pattern detection and scaling of triggered scans.</p> <p>Automatic FoV: the optimal FoV is automatically estimated based on the localizer images.</p> <p><i>myExam Decisions</i> Decisions are seamlessly integrated into the scanning workflow. The user just selects the queue and the appropriate pulse sequences are added automatically. For the abdomen MRCP and Diffusion decision points are offered.</p> <p>Timeline setup and monitoring for best overview of multi-phase breath-hold examinations and CM enhancement curve visualization.</p> <p><i>Auto Voice Commands</i> 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.</p> <p>Auto Bolus Detection initiates automatically the dynamic upper abdomen examination based on bolus detection. The user can override this function.</p> <p><i>Inline radial range calculation for MRCP</i> MRCP is measured and Inline Radial Ranges are automatically generated.</p> <p><i>Inline Subtraction</i> 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.</p> <p><i>Inline Registration</i> 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.</p> <p><i>Customization</i> Existing myExam Companions can be modified by the user to their individual standard of care.</p> <ul style="list-style-type: none"> <li>- Add / remove protocol steps</li> <li>- Change guidance content (images and text)</li> <li>- Change or add myExam Strategies and Decision Points</li> <li>- Modify the Parameter View</li> </ul> <p><i>myExam Cardiac Assist:</i> myExam Cardiac Assist supports the user in many ways. Using anatomical landmarks, standard views of the heart, such as dedicated long axis and short-axis views, are easily generated and can easily be reproduced using different scanning techniques. Scan parameters are adjusted to the patient's heart rate and automatic voice commands are given.</p> <p><i>Guidance View</i></p>



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	<ul style="list-style-type: none"> <li>- Step-by-step user guidance is seamlessly integrated.</li> <li>- Example images and guidance text are displayed for the individual steps of the scanning workflow.</li> <li>- Both images and text are easily configurable by the user</li> </ul> <p><i>Patient View</i></p> <ul style="list-style-type: none"> <li>- Within the Patient View the user can easily tailor the exam to each individual patient (e.g. patient with arrhythmia, breath hold capability).</li> <li>- Pre-defined myExam 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</li> </ul> <p><i>AutoFoV (automatic Field of View calculation)</i></p> <ul style="list-style-type: none"> <li>- Based on the localizer images the optimal FoV is automatically estimated.</li> <li>- In case the patient moves during the examination, this step can be repeated at any time</li> </ul> <p><i>Automated parameter adaptation</i></p> <ul style="list-style-type: none"> <li>- Scan parameters are automatically adapted to the patient's condition (e.g. heart rate)</li> </ul> <p><i>Novel heart localization method</i></p> <ul style="list-style-type: none"> <li>- On-board guidance visually facilitates anatomic landmark settings which are used for calculation</li> <li>- Automated localization</li> <li>- Automated localization of short-axis views</li> </ul> <p><i>Guided slice positioning</i></p> <ul style="list-style-type: none"> <li>- Easy way to match slice positions (short-axis) between different types of cardiac sequences. (e.g. function, morphology and tissue characterization.)</li> </ul> <p><i>Cardiac Views</i></p> <ul style="list-style-type: none"> <li>- Easy selection of cardiac views (e.g. 3 chamber view) during scan planning</li> </ul> <p><i>Inline Ventricular Function Evaluation</i></p> <ul style="list-style-type: none"> <li>- syngo Inline VF performs volumetric evaluation of cardiac cine data fully automatically right after image reconstruction.</li> <li>- No user input necessary. If desired, inline calculated segmentation results can be loaded to 4D Ventricular Function Analysis for further review or processing</li> </ul> <p><i>Inline Time Course Evaluation</i></p> <ul style="list-style-type: none"> <li>- Automatic, real-time and motion corrected calculation of parametric maps with inline technology</li> </ul> <p><i>Cardiac specific layout for the Exam task</i></p> <ul style="list-style-type: none"> <li>- Automatically chosen layouts show the new physio display and are configured for every step of the exam</li> <li>- Automatic display of images</li> <li>- Automatic display of images in dedicated cardiac image orientations in contrast to standard DICOM orientations</li> </ul> <p><i>Adaptive triggering</i></p> <ul style="list-style-type: none"> <li>- Acquisition adapts in real-time to heart rate variations for non cine applications</li> </ul> <p><i>Automated Naming</i></p>

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Part No./Product	Description
	<ul style="list-style-type: none"> <li>- Automated naming of series depending on cardiac views and contrast</li> </ul> <p><i>Auto Voice Commands</i></p> <ul style="list-style-type: none"> <li>- Auto Voice Commands are seamlessly integrated into the scanning workflow. 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</li> </ul> <p><i>myExam Strategies</i></p> <p>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:</p> <ul style="list-style-type: none"> <li>- Standard: Segmented acquisition techniques</li> <li>- Limited patient capabilities: switch to realtime and single shot imaging if breath-hold is not possible or arrhythmias occur</li> </ul> <p><i>Customization</i></p> <p>Existing myExam Companions can be modified by the user to their individual standard of care.</p> <ul style="list-style-type: none"> <li>- Add/remove protocol steps</li> <li>- Change guidance content (Images and text)</li> <li>- Change or add myExam Strategies and Decision Points</li> <li>- Modify the Parameter View</li> </ul> <p><b>myExam Breast Assist:</b></p> <p>A set of pre-defined myExam Breast Assists are provided for lesion detection, implant evaluation and breast biopsy. The myExam Companions support various breast coils, head-first or optional feet-first positioning and examination approaches (fatsat, nonfatsat).</p> <p>The following myExam Breast Assist configurations will be provided:</p> <ul style="list-style-type: none"> <li>- 4-channel coils</li> <li>- 4-channel coils Care Bolus</li> <li>- BI 4ch</li> <li>- BI 4ch Care Bolus</li> <li>- Biopsy 4ch BI</li> </ul> <p><i>Patient View</i></p> <ul style="list-style-type: none"> <li>- Within the Patient View the user can easily tailor the exam to individual patient conditions ( e.g. patient with breast implants) and define the examination approach (Carebolus, Autocoverage, frequency adjustment confirmation mode).</li> </ul> <p><i>Implant Type/ Implant Situation</i></p> <ul style="list-style-type: none"> <li>- Based on an "Implant type identification" scan, the user can visually select or modify the exam dependent on the actual implant type and laterally. The system automatically modifies the scan queue and the frequency adjustment setting of the protocols is changed (assume dominant fat or silicone).</li> </ul> <p><i>Guidance View</i></p> <ul style="list-style-type: none"> <li>- Example images and guidance text are displayed for individual steps of the scanning workflow. They are configurable by the user.</li> </ul> <p><i>Parameter View</i></p> <ul style="list-style-type: none"> <li>- This view displays the parameters that are really needed for the examination at a glance. The</li> </ul>



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Part No./Product	Description
	<p>displayed parameters are easily configurable by the user.</p> <p><i>Auto Coverage</i></p> <ul style="list-style-type: none"> <li>- 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).</li> <li>- The user can predefine for every protocol individually which parameters shall be automatically adjusted, e.g. whether time or slice thickness shall remain constant.</li> </ul> <p>Additional functionalities:</p> <p><i>Inline MPR Planning</i></p> <ul style="list-style-type: none"> <li>- For user-selected protocols, e.g. the high-resolution "delayed VIEWS", adjustable MPRs are automatically calculated.</li> </ul> <p><i>Biopsy support</i></p> <ul style="list-style-type: none"> <li>- Two Biopsy myExam Companions support interventions with 4-ch BI Breast coils. The target coordinates of the lesion are displayed on the display at the scanner (In case a Siemens biopsy planning software is used).</li> </ul> <p><i>Customization</i></p> <p>The myExam Breast Assists can be modified by the user to their individual standard of care.</p> <ul style="list-style-type: none"> <li>- Add / remove protocol steps</li> <li>- Change guidance content (images and text)</li> <li>- Change or add myExam Strategies and Decision Points</li> <li>- Modify the Parameter View</li> </ul>
<p>14469015 Turbo Suite Elite #BM</p>	<p>Turbo Suite Elite comprises cutting edge Compressed Sensing applications for advanced abdominal and cardio-vascular imaging with dynamic 2D and dynamic 3D applications to significantly reduce scan times, counter patient motion and expanding the patient population eligible for MRI.</p> <p><b>Turbo Suite Elite contains:</b></p> <ul style="list-style-type: none"> <li>- CS Cardiac Cine with incoherent subsampling and iterative through-time regularization captures the full cardiac cycle and provides functional assessment within one short breathhold. It is robust against arrhythmia and breathing artifacts.</li> <li>- TWIST is a Siemens unique sequence for time-resolved (4D) MR angiographic and dynamic imaging in general with high spatial and temporal resolution.</li> <li>- TWIST-VIBE is a fast, high-resolution 4D imaging sequence, e.g. for multi-phase arterial liver imaging.</li> <li>- StarVIBE is a motion-insensitive VIBE sequence using a stack-of-stars trajectory.</li> <li>- CS GRASP-VIBE with incoherent subsampling and iterative through-time regularization extends the patient population suitable for dynamic liver MRI through free-breathing exams for patients who cannot reliably hold their breath.</li> </ul>
<p>14469016 Turbo Suite Elite Support #BM</p>	<p>Turbo Suite Elite Support provides Future Security for Turbo Suite Elite:</p> <ul style="list-style-type: none"> <li>- In consideration of Customer's purchase of the MAGNETOM MR scanner and simultaneous purchase of a 4 year point of sale Service Agreement with Evolve, and should such Evolve Upgrade installed during the term of the Service Agreement enable operation of dynamic Compressed Sensing options and/or Simultaneous Multi-Slice options, then Customer may choose to receive one such dynamic Compressed Sensing or Simultaneous Multi-Slice application option at no additional cost.</li> </ul> <p><b>Turbo Suite Elite Support provides Future Security for Turbo Suite Elite:</b></p> <ul style="list-style-type: none"> <li>- In consideration of Customer's purchase of the MAGNETOM MR scanner and simultaneous purchase of a 4 year point of sale Service Agreement with Evolve, and should such Evolve Upgrade installed during the term of the Service Agreement enable operation of dynamic Compressed Sensing options and/or Simultaneous Multi-Slice options, then Customer may</li> </ul>

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	choose to receive one such dynamic Compressed Sensing or Simultaneous Multi-Slice application option at no additional cost.
<p>14475508 Turbo Suite Excelerate</p>	<p>Turbo Suite Excelerate comprises access to cutting edge acceleration techniques such as Simultaneous Multi-Slice, Compressed Sensing and Wave-CAIPI for static 2D and static 3D imaging applications in Neuro, MSK and Body MRI. Turbo Suite Excelerate contains:</p> <ul style="list-style-type: none"> <li>- Simultaneous Multi-Slice (SMS) acceleration               <ul style="list-style-type: none"> <li>- SMS DWI / DTI helps bringing advanced DWI applications into routine neuro, breast, liver and pelvic imaging. It can be seamlessly combined with iPAT to achieve total acceleration factors of up to 8.</li> <li>- SMS TSE for up to 46% faster routine MSK exams, supporting all TSE contrasts and orientations. It can be seamlessly combined with iPAT to achieve total acceleration factors of 4-6.</li> <li>- SMS RESOLVE enables high resolution distortion free DWI with up to 50% time savings.</li> <li>- SMS BOLD can enable increased temporal sampling of BOLD data acquisitions and/or improved slice coverage/resolution (prerequisite inline BOLD license).</li> <li>- SMS TSE DIXON for faster routine MSK exams, supporting all TSE DIXON contrasts and orientations. It can be seamlessly combined with iPAT to achieve total acceleration factors of 4-6.</li> </ul> </li> <li>- Compressed Sensing (CS) static imaging               <ul style="list-style-type: none"> <li>- CS TOF with incoherent subsampling is designed to accelerate Time-of-Flight imaging by up to 50% without compromising diagnostic quality.</li> <li>- CS SPACE with incoherent subsampling is designed to significantly accelerate SPACE imaging for neuro and body application. CS SPACE is designed to enable high-resolution 3D MRCP scans in one breath-hold and isotropic, high-resolution imaging of the brain, such as T1 DIR SPACE in 3 minutes.</li> <li>- CS SEMAC with incoherent subsampling is designed to significantly accelerate imaging of MR conditional implants with time savings up to 50%.</li> </ul> </li> <li>- Wave-CAIPI acceleration: Wave-CAIPI SWI is a new sequence technique that improves head imaging with SWI contrast. With the Wave-technique, the sequence plays out sinusoidal gradients during readout. Applying these Wave readout gradients results in corkscrew k-space trajectories. This strategy combined with already existing parallel imaging acceleration technique CAIPIRINHA allows optimizing g-factor penalty during reconstruction which allows for higher acceleration factors and more homogeneous noise distribution. Prerequisite for Wave-CAIPI SWI is the SWI license.</li> </ul>
<p>14416946 Neuro Perfusion Package #T+D</p>	<p>The Neuro Perfusion Package helps to streamline the clinical workflow by inline post-processing in dynamic susceptibility contrast (DSC) based perfusion imaging. This makes it possible to see perfusion maps immediately.</p> <p>Perfusion parameter maps are based on a Local Arterial Input function. A corrected rCBV map calculation and motion correction is provided.</p> <p>Neuro Perfusion Package provides a modified sequence and image reconstruction for motion correction and post-processing in dynamic susceptibility contrast (DSC) based perfusion imaging. Depending on whether motion correction is switched on, the following uncorrected or motion corrected perfusion maps can be calculated: time-to-peak (TTP), relative cerebral blood volume (rCBV), relative cerebral blood flow (rCBF), relative mean transit time (MTT), relative corrected cerebral blood volume (rCCBV) and bolus plots.</p> <p>Perfusion parameter maps are calculated based on a Local Arterial Input Function. The algorithm</p>

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	selects many AIFs per slice and volume based on a number of built-in criteria. This removes the need for manual selection of AIF voxels to calculate the cerebral perfusion parameters and allows the calculation to be performed in-line at the end of the measurement. It also minimizes deconvolution errors due to the effects of delay and dispersion of the contrast agent bolus. Additionally, in cases of contrast extravasations due to a disrupted blood-brain barrier, the postprocessing allows a correction to be applied during calculation of the rCBV maps.
14475452 myExam LiverLab Assist	myExam LiverLab Assist is a system guided workflow to examine the hepatic fat and iron status. Main Features: <ul style="list-style-type: none"> <li>- The inline screening Dixon sequence gives the user a first overview of possible fat and/or iron overload in the whole liver.</li> <li>- Based on the result images, liver segmentation runs without user interaction.</li> <li>- If further evaluation is needed, the user can choose from two methods: <ol style="list-style-type: none"> <li>1. HISTO is a pushbutton single breath-hold single voxel spectroscopy method to calculate fat fraction as well as water R2.</li> <li>2. Multi-echo Dixon is an image based method to calculate maps such as water, fat, fat signal percentage, and R2*.</li> </ol> </li> </ul>
14409198 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. syngo NATIVE offers: <ul style="list-style-type: none"> <li>- Non-contrast-enhanced MRA</li> <li>- Separate imaging of arteries and veins</li> <li>- Visualization of - e.g. - renal arteries or peripheral vessels</li> </ul> <p>The syngo NATIVE package comprises:</p> <ul style="list-style-type: none"> <li>- syngo NATIVE TrueFISP</li> <li>- syngo NATIVE SPACE</li> </ul>
14441813 QISS #T+D	Software package with QISS sequence, protocols and Dot AddIn for non-contrast-enhanced peripheral MRA. QISS particularly enables higher reproducibility than existing methods and is an alternative to MR angiography techniques with contrast medium, especially for patients with severe renal insufficiency. QISS offers: <ul style="list-style-type: none"> <li>- Non-contrast-enhanced peripheral MRA</li> <li>- Higher robustness when compared to other non-contrast-enhanced peripheral MRA methods</li> <li>- Improved usability provided by the Dot AddIn which enables easier multi-stage planning</li> </ul> <p>The QISS package comprises:</p> <ul style="list-style-type: none"> <li>- QISS sequence</li> <li>- QISS Dot AddIn</li> <li>- Non-contrast-enhanced peripheral vessels protocols</li> </ul>
14416961 Hand/Wrist 16 #Ae	The new Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility.  Hand/Wrist 16 for examinations of the left or right hand and wrist region consists of a base plate and an IPAT compatible 16-channel coil and allows high-resolution imaging of the wrist and the hand within one examination. Hand/Wrist 16 will be connected via a SlideConnect plug for fast and easy patient preparation.

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	<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>
<p>14416958 Peripheral Anglo 36 #Ae</p>	<p>The new Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility:</p> <ul style="list-style-type: none"> <li>- 36 channels</li> <li>- Dual Density Signal Transfer</li> <li>- Ultra light-weight</li> <li>- SlideConnect Technology</li> </ul> <p>The 36-channel coil includes 36 integrated pre-amplifiers for excellent signal-to-noise ratio. The single SlideConnect Plug allows for fast and easy patient preparation.</p> <p>The Peripheral Anglo 36 features:</p> <ul style="list-style-type: none"> <li>- 36-element design with 36 integrated preamplifiers, distributed over 6 planes with 6 elements each</li> <li>- Operates in an integrated fashion with Body 18 coils and with the Spine 32. For Whole-Body examinations also with the Head/ Neck 20</li> <li>- Automatic table feed and active coil switch</li> <li>- Can be utilized head and feet first</li> <li>- Both legs are independently covered with coil elements, maximizing the coil filling factor and the signal-to-noise ratio</li> <li>- No coil tuning</li> <li>- iPAT-compatible</li> <li>- Dual-Density Signal Transfer enables ultra-high density coil designs by integrating key RF components into the local coil</li> <li>- SlideConnect technology for easy coil set up</li> <li>- One cable only for easy handling</li> <li>- Includes special non-ferromagnetic coil cart for safe, user-friendly storage</li> </ul> <p>Applications:</p> <ul style="list-style-type: none"> <li>- High-resolution angiography of both legs incl. Pelvis (by additional use of the Body 18) with highest signal-to-noise ratio</li> <li>- Visualization of the iliac arteries and aorta in combination with Body 18</li> <li>- Bilateral examinations of long bones of the legs</li> </ul> <p>Typically combined with: Head/ Neck 20, Body 18, Spine 32, and all flexible coils such as Flex Large 4 or Flex Small 4</p> <p>The Peripheral Anglo 36 has a 36-element design with 36 integrated preamplifiers distributed over 6 planes with 6 elements each.</p> <p>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 Anglo 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</p>

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	<p>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> <p>The dimensions of the Peripheral Angio 36 are: 860 mm x 300 - 640 mm x 280 mm</p>
14426332 Tx/Rx CP Head Coil #Ae	<p>Circularly polarized no-tune transmit/receive coil with an open patient-friendly design. The integrated transmit mode allows volume selective excitation. Integrated, extremely low-noise pre-amplifiers permit very high signal-to-noise ratio. Furthermore, the coil is outfit with SlideConnect Technology, allowing for easier patient preparation and less table time for the patient.</p> <p>This enables studies with very high spatial resolution and very short scan time. The upper part of the coil is detachable and can be fitted with a mirror allowing the patient a rear view out of the magnet. Displaceable cushions are provided with the coil for positioning. The coil is suited for head proton imaging and brain spectroscopy.</p>
14416952 Coil Storage Cart #T+D	<p>Specially designed non-ferromagnetic cart for easy storage of the most commonly used coils and accessories.</p> <p>The cart may be rolled to convenient locations in the examination room and can be opened up to work like a shelf.</p> <p>The coil storage cart has multiple drawers and trays as well as many other storage spaces for coils, cushions and miscellaneous items.</p> <p>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").</p>
14407259 MR Workplace Table, height adjust.	<p>The table is suitable for the syngo Acquisition Workplace and the syngo MR Workplace based on syngo hardware.</p> <p>This 110V version has motorized table height adjustment.</p> <p>The table design matches the MED-wide uniform design with silver-finished rim, use of friendly colors for MAGNETOM and SOMATOM.</p> <p>This table can electrically be adjusted to the ergonomically most suitable height via buttons at the front.</p> <ul style="list-style-type: none"> <li>- Width 138 cm</li> <li>- Depth 80 cm</li> <li>- Height electrically adjustable between 71 cm and 110 cm</li> </ul>
14407261 MR Workplace Container, 50cm	<p>50 cm wide extra case for the syngo host computer with sliding front door to allow change of storage media (CD/DVD/USB).</p> <p>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.</p> <p>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.</p> <ul style="list-style-type: none"> <li>- Width 50 cm</li> <li>- Depth 80 cm</li> <li>- Height 72 cm</li> </ul> <p>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).</p>



## **Divider III**

# **Service Specific Criteria & Standards**

1. Describe the financial rational for the proposed replacement equipment.

This is our only MRI scanner at the facility, we are priced at FMV rate for a replacement and have to purchase.

2. Document if the exiting equipment has exceeded its useful life.

The current equipment is 18 years old and has exceeded useful life.

3. Describe the effect the replacement unit would have on quality of care.

This replacement unit will allow for better image quality which impacts the patient's quality of care and potentially reduce the need for additional testing where applicable.

4. Document if the exiting equipment is in constant need of repair.

The existing equipment has had over 300 hours of downtime alone in 2024.

5. Document if the lease on the current unit has expired.

The current equipment does not have a lease.

6. Describe the technological advance provided by the new unit

The new unit will have the capability to perform cardiac MRI which is currently not provided in St Charles County. The new unit has the ability to scan a variety of different implants that could not otherwise be scanned on our current unit. The new unit has a boost software that allows for reduced scan times. Reduced scan times improve patient satisfaction and reduce image motion. Reduced motion on images decreases the need for repeat imaging.

7. Describe how patient satisfaction would be improved.

The new unit will have reduced scan times which will increase patient satisfaction as the patient will not be in the scanner for as long as the old unit imaging. Patient satisfaction will also increase as patients will not have to drive into St Louis City for Cardiac MRI capabilities.

8. Describe how patient outcomes would be improved.

The quality of images with the new unit would allow for more definitive diagnosis which could decrease the need for additional testing. Decreased scan times allow for more patients, inpatient and outpatient, to be completed over the course of a day. This increases patient access to MRI testing.

9. Describe what impact the new unit would have on utilization.

The new unit will increase utilization by decreasing scan times as well as reducing the need for repeat imaging scans. The new unit will also reduce downtime.

10. Describe any new capabilities that the new unit would provide.

The new unit will have Cardiac MRI capabilities. The new unit will allow for patients with implants that are not currently able to have an MRI have one due to the ability to manipulate scan parameters.



11. By what percent will this replacement increase patient charges.

Patient charges will not increase as a result of the MRI replacement.

## **Divider IV**

# **Financial Feasibility Review Criteria and Standards**

# SSM Health

Consolidated Financial Statements as of and  
for the Years Ended December 31, 2023 and  
2022 and Independent Auditor's Report

# SSM HEALTH

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## INDEPENDENT AUDITOR'S REPORT

To the Board of Directors of  
SSM Health Care Corporation  
St. Louis, Missouri

### Opinion

We have audited the consolidated financial statements of SSM Health Care Corporation and subsidiaries (doing business as SSM Health) (SSMH), which comprise the consolidated balance sheets as of December 31, 2023 and 2022, and the related consolidated statements of operations and changes in net assets and cash flows for the years then ended, and the related notes to the consolidated financial statements (collectively referred to as the "financial statements").

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of SSMH as of December 31, 2023 and 2022, and the results of its operations and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

### Basis for Opinion

We conducted our audits in accordance with auditing standards generally accepted in the United States of America (GAAS). Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of SSMH and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audits. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

### Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about SSMH's ability to continue as a going concern for one year after the date that the financial statements are issued.

### Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS will always detect a material misstatement when it exists. The risk of not detecting a material misstatement

resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of SSMH's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about SSMH's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

*Deloitte & Touche LLP*

March 20, 2024

## SSM HEALTH

### CONSOLIDATED BALANCE SHEETS AS OF DECEMBER 31, 2023 AND 2022 (In thousands)

	2023	2022
<b>ASSETS</b>		
<b>CURRENT ASSETS:</b>		
Cash and cash equivalents	\$ 640,816	\$ 574,339
Investments	20,479	112,203
Current portion of assets limited as to use or restricted	519,413	454,838
Patient accounts receivable	934,411	976,730
Pharmacy claims and rebates receivable	1,196,998	900,547
Other receivables	125,745	151,393
Inventories, prepaid expenses, and other	269,311	274,458
Estimated third-party payor settlements	75,288	7,812
Assets held for sale	25,650	-
	<u>3,808,111</u>	<u>3,452,320</u>
Total current assets		
ASSETS LIMITED AS TO USE OR RESTRICTED—Excluding current portion	<u>3,499,206</u>	<u>3,232,722</u>
PROPERTY AND EQUIPMENT—Net	<u>2,841,331</u>	<u>2,860,691</u>
OPERATING RIGHT-OF-USE ASSETS	<u>221,142</u>	<u>194,735</u>
<b>OTHER ASSETS:</b>		
Goodwill	528,949	289,661
Intangible assets—net	328,907	179,751
Investments in unconsolidated entities	328,563	383,567
Other	53,482	35,557
	<u>1,239,901</u>	<u>888,536</u>
Total other assets		
<b>TOTAL</b>	<u>\$ 11,609,691</u>	<u>\$ 10,629,004</u>

(Continued)

## SSM HEALTH

### CONSOLIDATED BALANCE SHEETS AS OF DECEMBER 31, 2023 AND 2022 (In thousands)

	2023	2022
<b>LIABILITIES AND NET ASSETS</b>		
<b>CURRENT LIABILITIES:</b>		
Revolving line of credit	\$ 97,410	\$ -
Current portion of long-term debt and finance lease obligations	57,931	602,034
Accounts payable and accrued expenses	3,043,994	2,529,080
Short-term borrowings	665,180	443,580
Deferred revenue	24,385	19,961
Estimated third-party payor settlements	108,969	126,390
Other current liabilities	<u>234,822</u>	<u>255,404</u>
Total current liabilities	4,232,691	3,976,449
LONG-TERM DEBT—Excluding current portion	1,590,813	1,354,142
ESTIMATED SELF-INSURANCE OBLIGATIONS	119,012	117,239
OPERATING LEASE OBLIGATIONS—Excluding current portion	201,018	164,641
FINANCE LEASE OBLIGATIONS—Excluding current portion	16,006	14,640
PENSION LIABILITY	173,536	173,266
OTHER LIABILITIES	<u>405,793</u>	<u>324,640</u>
Total liabilities	<u>6,738,869</u>	<u>6,125,017</u>
<b>NET ASSETS:</b>		
Without donor restrictions:		
SSM Health net assets without donor restrictions	4,497,191	4,286,657
Noncontrolling interest in subsidiaries	<u>185,488</u>	<u>74,297</u>
Total net assets without donor restrictions	4,682,679	4,360,954
With donor restrictions	<u>188,143</u>	<u>143,033</u>
Total net assets	<u>4,870,822</u>	<u>4,503,987</u>
<b>TOTAL</b>	<u><u>\$ 11,609,691</u></u>	<u><u>\$ 10,629,004</u></u>

See notes to consolidated financial statements.

(Concluded)



## SSIM HEALTH

### CONSOLIDATED STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS FOR THE YEARS ENDED DECEMBER 31, 2023 AND 2022 (In thousands)

	2023	2022
OPERATING REVENUES AND OTHER SUPPORT:		
Net patient service revenues	\$ 6,435,624	\$ 6,054,963
Capitation revenues	1,287,760	1,187,447
Pharmacy benefit manager revenue	1,716,343	1,452,577
Investment income (loss)	59,760	(69,547)
Income from unconsolidated entities—net	139,039	13,822
Other revenue	881,156	659,163
Net assets released from restrictions	16,548	8,796
Total operating revenues and other support	<u>10,536,230</u>	<u>9,307,221</u>
OPERATING EXPENSES:		
Salaries and benefits	4,485,653	4,081,423
Medical claims	624,843	520,249
Supplies	1,670,978	1,465,798
Pharmacy benefit manager supplies	1,464,877	1,222,826
Professional fees and other	1,946,655	1,876,904
Interest	80,670	80,284
Depreciation and amortization	288,949	308,641
Total operating expenses	<u>10,562,625</u>	<u>9,556,125</u>
LOSS FROM OPERATIONS BEFORE OTHER ITEMS	(26,395)	(248,904)
OTHER ITEMS:		
Long-lived asset impairment	(33,096)	-
OPERATING LOSS AFTER OTHER ITEMS	<u>(59,491)</u>	<u>(248,904)</u>
NONOPERATING GAINS AND (LOSSES):		
Investment income (loss)	321,583	(375,041)
Loss from early extinguishment of debt		(2,075)
Net periodic pension income (cost)	24,645	(3,454)
Change in fair value of interest rate swaps	25,646	165,200
Other—net	(20,257)	266
Total nonoperating gains (losses)—net	<u>351,617</u>	<u>(215,104)</u>
EXCESS (DEFICIT) OF REVENUES OVER EXPENSES	292,126	(464,008)
EXCESS OF REVENUES OVER EXPENSES ATTRIBUTABLE TO NONCONTROLLING INTEREST	<u>39,511</u>	<u>612</u>
EXCESS (DEFICIT) OF REVENUES OVER EXPENSES—Net of noncontrolling interest	<u>\$ 252,615</u>	<u>\$ (464,620)</u>

(Continued)

## SSM HEALTH

### CONSOLIDATED STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS FOR THE YEARS ENDED DECEMBER 31, 2023 AND 2022 (In thousands)

	2023	2022
NET ASSETS WITHOUT DONOR RESTRICTIONS:		
SSM Health net assets without donor restrictions:		
Excess (Deficit) of revenues over expenses	\$ 252,615	\$ (464,620)
Pension-related changes other than net periodic pension cost	(54,783)	323,592
Net assets released from restrictions for property acquisitions	3,536	113
Purchase of interest in subsidiaries	-	(35,754)
Other—net	<u>9,166</u>	<u>(6,470)</u>
Increase (Decrease) in SSM Health net assets without donor restrictions	<u>210,534</u>	<u>(183,139)</u>
Noncontrolling interest in subsidiaries net assets without donor restrictions:		
Excess of revenues over expenses	39,511	612
Distributions to noncontrolling owners	(13,425)	(5,689)
Purchase of noncontrolling interest in subsidiary	<u>85,105</u>	<u>(132,295)</u>
Increase (Decrease) in noncontrolling interest in subsidiaries net assets without donor restrictions	<u>111,191</u>	<u>(137,372)</u>
NET ASSETS WITH DONOR RESTRICTIONS:		
Contributions for charity care, property acquisitions, and other programs	55,576	27,087
Gains (Losses) on investments—net	9,628	(9,880)
Net assets with donor restrictions released from restrictions for operations	(16,551)	(8,573)
Net assets with donor restrictions released from restrictions for property acquisitions	(3,536)	(113)
Other—net	<u>(7)</u>	<u>2,243</u>
Increase in net assets with donor restrictions	<u>45,110</u>	<u>10,764</u>
CHANGE IN NET ASSETS	366,835	(309,747)
NET ASSETS—Beginning of year	<u>4,503,987</u>	<u>4,813,734</u>
NET ASSETS—End of year	<u>\$ 4,870,822</u>	<u>\$ 4,503,987</u>

See notes to consolidated financial statements.

(Concluded)

## SSM HEALTH

### CONSOLIDATED STATEMENTS OF CASH FLOWS FOR THE YEARS ENDED DECEMBER 31, 2023 AND 2022 (In thousands)

	2023	2022
CASH FLOWS FROM OPERATING ACTIVITIES:		
Change in net assets	\$ 366,835	\$ (309,747)
Adjustments to reconcile change in net assets to net cash provided by operating activities:		
Pension-related changes other than net periodic pension cost	54,783	(323,592)
Depreciation and amortization	288,949	308,641
Loss on early extinguishment of debt	-	2,075
Loss on impairment	33,096	-
Amortization of debt premium	(3,783)	(19,501)
Contributions for long-term investment	(902)	(9,143)
Distributions to noncontrolling owners—net	13,425	5,689
(Gains) losses on investments—net	(308,277)	528,794
Income from unconsolidated entities—net	(139,039)	(13,823)
Change in fair value of interest rate swaps	(25,646)	(165,200)
Loss on disposal of assets	1,921	9,810
Inherent contributions related to acquisition	-	(16,162)
Distributions from unconsolidated entities	24,315	17,766
Payments for acquisition of noncontrolling interest in subsidiary	-	164,100
Purchase of noncontrolling interest in subsidiary	(85,270)	-
Medicare advanced payments under CARES Act	-	(302,359)
Changes in assets and liabilities:		
Investments	90,485	4,774
Patient accounts receivable	42,319	(119,217)
Pharmacy claims and rebates receivable	(237,936)	(341,838)
Other receivables, inventories, prepaid expenses, and other	83,107	115,486
Operating right-of-use assets	45,752	50,423
Accounts payable, accrued expenses, and other liabilities	530,076	391,374
Other changes to pension liability	(56,231)	(50,910)
Operating lease obligations	(46,911)	(51,686)
Estimated self-insurance obligations	4,412	8,256
Net cash provided by (used in) operating activities	<u>675,480</u>	<u>(115,990)</u>

## SSM HEALTH

### CONSOLIDATED STATEMENTS OF CASH FLOWS FOR THE YEARS ENDED DECEMBER 31, 2023 AND 2022 (In thousands)

	2023	2022
CASH FLOWS FROM INVESTING ACTIVITIES:		
Purchase of property and equipment	\$ (280,090)	\$ (309,103)
Proceeds from disposal of property and equipment and sales of other assets	570	7,096
Purchase of assets limited as to use or restricted and short-term investments	(3,074,105)	(2,712,400)
Proceeds from sales of assets limited as to use or restricted and short-term investments	2,893,312	3,290,515
Contributions to unconsolidated entities	(3,775)	(10,480)
Acquisitions, net of cash acquired	(117,290)	(143,855)
Purchases of other assets	(26,569)	(28,389)
Net cash (used in) provided by investing activities	<u>(607,947)</u>	<u>93,384</u>
CASH FLOWS FROM FINANCING ACTIVITIES:		
Payments for acquisition of noncontrolling interest in subsidiary	-	(164,100)
Proceeds from issuance of long-term debt	389,760	354,654
Payments on long-term debt	(690,169)	(294,525)
Contributions for long-term investment	902	9,143
Distributions to noncontrolling owners—net	(13,425)	(5,689)
Debt issuance costs	(3,626)	(1,194)
Proceeds from patient loans	5,871	11,204
Payments on patient loans	(9,379)	(13,175)
Proceeds from short-term borrowings	224,600	167,277
Payments on short-term borrowings	(3,000)	(171,322)
Proceeds from revolving line of credit	97,410	-
Payments on revolving line of credit	-	(60,000)
Net cash used in financing activities	<u>(1,056)</u>	<u>(167,727)</u>
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	66,477	(190,333)
CASH AND CASH EQUIVALENTS—Beginning of year	<u>574,339</u>	<u>764,672</u>
CASH AND CASH EQUIVALENTS—End of year	<u>\$ 640,816</u>	<u>\$ 574,339</u>

See notes to consolidated financial statements.

(Concluded)

## SSM HEALTH

### NOTES TO CONSOLIDATED FINANCIAL STATEMENTS AS OF AND FOR THE YEARS ENDED DECEMBER 31, 2023 AND 2022 (Dollars in thousands)

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#### 1. ORGANIZATION

SSM Health (SSMH) is a centrally managed, fully integrated health care delivery system with its headquarters based in St. Louis, Missouri. SSM Health Care Corporation (SSMHCC) (doing business as SSMH) is the principal not-for-profit corporation and has been established as the parent corporation. SSMH owns and operates 22 adult hospitals, one pediatric hospital, thirteen post-acute care facilities, a national pharmacy benefit management company (PBM), an extensive network of physician practice operations, and other health care businesses. SSMH's hospital operations are located primarily in Missouri, Wisconsin, Oklahoma and Illinois, and its related businesses provide health related services in 50 states. SSMH's mission statement is as follows:

*Through our exceptional health care services, we reveal the healing presence of God.*

SSMHCC and most of its affiliated subsidiary corporations have been granted exemption from federal income tax as charitable organizations under Section 501(c)(3) of the Internal Revenue Code (IRC). Certain subsidiaries of SSMH are for-profit entities that are taxable under the IRC.

SSMH is sponsored by SSM Health Ministries, an independent ten-member body composed of two Franciscan Sisters of Mary, one Sister of St. Agnes, one Jesuit priest, one Franciscan priest, and five lay persons who collectively hold certain reserved powers over SSMH.

#### 2. SSMH SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

**Principles of Consolidation**—The accompanying consolidated financial statements include the accounts of SSMH and its subsidiaries. Intercompany accounts and transactions are eliminated in consolidation.

**Use of Estimates**—The preparation of financial statements in conformity with accounting principles generally accepted in the United States (GAAP), requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

**Cash and Cash Equivalents**—Cash and cash equivalents consist primarily of cash and liquid marketable securities with an original maturity of three months or less and carrying amounts approximate their fair value.

**Inventories**—Inventories, primarily consisting of supplies and pharmaceuticals, are stated at the lower of cost or net realizable value, determined principally using the first-in, first-out method. SSMH held inventories in the amount of \$177,094 and \$166,366 at December 31, 2023 and 2022, respectively. These amounts are included in inventories, prepaid expenses, and other on the consolidated balance sheets.

**Investments**—Investments with original maturities at time of purchase of greater than three months are measured at fair value.

**Financial Instruments**—Management's estimates of the fair value of financial instruments are described elsewhere (See Note 8—Fair Value Measurements for additional information). Due to the volatility of the U.S. economy and the financial markets, there is uncertainty regarding the long-term impact that market conditions will have on SSMH's investment portfolio.

**Assets Held for Sale**—SSMH classifies certain assets as assets held for sale in the consolidated balance sheets when the assets have met applicable criteria for this classification (See Note 12—Ministry Activities for additional information).

**Assets Limited as to Use or Restricted**—Assets limited as to use include investments and other assets set aside by the Board of Directors or management at their discretion for future long-term purposes, including capital improvements, medical insurance claims or for other purposes, and assets held in trust under bond indentures and self-insurance agreements. Assets restricted as to use include investments and other assets whose use is restricted by donors. Additionally, under the terms of the indentures for various bond issues, funds held by trustees have been established and legally designated for debt service.

**Securities Lending Program**—SSMH participates in securities lending transactions with its custodian whereby SSMH lends a portion of its investments to various brokers in exchange for collateral for the securities loaned, usually on a short-term basis. SSMH maintains effective control of the loaned securities through its custodian during the term of the arrangement in that they may be recalled at any time. Collateral received from brokers must equal at least 102% of the market value of the securities on loan, and is subsequently adjusted daily for market fluctuations. SSMH must return to the borrower the value of collateral received regardless of the impact of market fluctuations. All collateral is in the form of United States Treasury securities, which can be re-invested in a pool maintained by the custodian. Under the terms of the agreement, the borrower must return the same, or substantially the same, investments that were borrowed.

The securities on loan under this program are recorded within assets limited as to use (See Note 7—Assets Limited As To Use for additional information). The market value of collateral held for loaned securities is reported as collateral held under a securities lending program and an obligation is recorded in current liabilities for repayment of collateral upon settlement of the lending transaction. The fees received for these transactions are recorded in investment income.

**Centralized Investment Program**—SSMH holds the majority of its investments in a Centralized Investment Program (CIP), which also includes the investments of SSMH's defined benefit plans. The earnings are allocated proportionately according to ownership percentages as defined in CIP agreements.

SSMH has elected the fair value option for financial investments in limited partnerships and limited liability corporations made through its CIP that would otherwise be recorded using the equity method. SSMH made this election to ensure that the accounting treatment of these investments was comparable between categories, regardless of the current organizational structure of the various investments. Interest and dividend income on investments for which the fair value option has been elected is included in either operating or nonoperating investment income depending on various factors as described in SSMH's investment income accounting policy below.

Alternative investments are generally not marketable and many alternative investments have underlying investments that may not have quoted market values. The estimated value of such investments is subject to uncertainty. SSMH's risk is limited to its capital investment in each investment and capital call commitments (See Note 8—Fair Value Measurements for additional information).

**Derivative Instruments**—SSMH's policy seeks to provide sound stewardship of financial resources by effectively managing both the level of outstanding debt and the proportion of variable to fixed rate debt. Accordingly, SSMH periodically enters into derivative arrangements to manage interest rate risk. SSMH may also enter into various exchange-traded and over-the-counter derivative contracts for economic hedging purposes, including futures, options, swaps and forward contracts.

SSMH records derivative instruments as either an asset or liability measured at its fair value (See Note 8—Fair Value Measurements for additional information). The estimated fair value of all derivative instruments has been determined using available market information and valuation methodologies, primarily discounted cash flows. Interest rate swap derivatives are reported in other noncurrent assets or other noncurrent liabilities and investment asset derivatives are disclosed within assets limited as to use or restricted. SSMH does not offset fair value amounts recognized for derivative instruments and fair value amounts recognized for cash collateral posted.

The net change in the fair value of interest rate swap derivatives is recorded as a nonoperating gain or loss. The difference between the actual amount paid and the actual amount received on all interest rate swap derivatives is accrued and recognized as an adjustment to interest expense (See Note 18—Derivative Instruments for additional information).

**Investments in Unconsolidated Entities**—Investments in unconsolidated entities, other than limited partnerships and limited liability corporations in CIP, are accounted for under the equity method of accounting, as appropriate. If SSMH has at least 20%, but not more than 50%, or has the ability to exercise significant influence over the investee, the investment is accounted for under the equity method, and the income, loss and any gain related to equity method investments are reflected in income from unconsolidated entities—net (See Note 11—Investments in Unconsolidated Entities for additional information).

**Investment Income**—Most investment income is reported as nonoperating gains or losses. Investment income on funds held in trust for self-insurance purposes and funds without donor restrictions held by foundations is included in operating investment income. The cost of investments sold is based on the specific-identification method.

Investment income on investments of donor-restricted funds, other than endowments, is included in excess of revenues over expenses unless the income or loss is restricted by donors. Investment income that is restricted by the donor is recorded directly to net assets with donor restrictions, in accordance with the donor-imposed restrictions.

SSMH values commingled funds, hedge funds, certain limited partnership and REIT (Real Estate Investment Trust) interests at net asset value. Limited partnership interests not recorded at net asset value are recorded at fair value as determined by external fund managers based on factors described (See Note 8—Fair Value Measurements for additional information). Gains and losses on these investments are included in nonoperating investment income unless restricted by donors.

**Property and Equipment**—Property and equipment acquisitions are recorded at cost or, if donated or impaired, at fair value at the date of receipt or impairment. Depreciation expense is determined using the straight-line method over the estimated useful life of the asset: 5 to 25 years for land improvements, 5 to 40 years for buildings, and 3 to 20 years for equipment. The remaining useful lives of assets are reviewed and may be adjusted by management from time to time. Equipment under finance leases is amortized using the straight-line method over the shorter of the lease term or the estimated useful life of the equipment. Such amortization is included in depreciation and amortization expense. Interest costs incurred on borrowed funds during construction periods are capitalized as a component of the asset cost.

SSMH periodically evaluates property and equipment to determine whether assets may have been impaired. Such analyses include comparing the estimates of undiscounted future cash flows to the carrying values of the related assets. (See Note 9—Property and Equipment for additional information).

**Leases**—SSMH records the rights and obligations arising from lease contracts with durations greater than twelve months on the balance sheet (See Note 16—Leases for additional information). Right-of-use assets and lease liabilities are recognized at commencement date based on the present value of lease payments over the lease term. SSMH uses an estimated incremental borrowing rate, which is derived from information available at the lease commencement date, in determining the present value of lease payments. The discount rate is based on a collateralized basis for similar terms and economic environments.

SSMH's leases typically contain rent escalations over the lease term. These leases are expensed on a straight-line basis over the lease term. Additionally, certain leases contain incentives, such as tenant improvement allowances from landlords and/or rent abatements after taking possession of the leased property. These incentives reduce SSMH's right-of-use asset related to the lease and are amortized through the right-of-use asset as reductions of expense over the lease term.

SSMH accounts for all fixed lease and non-lease components as a single component for certain classes of assets. Therefore, the lease payments used to measure the lease liability for these leases include fixed minimum rentals along with fixed operating costs such as common area maintenance and utilities. Certain lease agreements include payments based on actual common area maintenance expenses and others include rental payments adjusted periodically for inflation. These variable lease payments are recognized in professional fees and other on the consolidated statements of operations and changes in net assets, but are not included in the right-of-use asset or liability balances.

SSMH's leases relate primarily to medical and office spaces. Most office leases have a five to ten-year base period and include renewal options to extend the lease term beyond the initial base period. The renewal options are not included in the measurement of the right-of-use assets and lease liabilities unless SSMH is reasonably certain to exercise the optional renewal periods. SSMH's lease agreements do not contain any material residual value guarantees or material restrictive covenants.

**Goodwill**—Goodwill represents the future economic benefits arising from assets acquired in business combinations that are not individually identified and separately recognized. Goodwill is evaluated for possible impairment at the reporting unit level at least annually or whenever events or changes in circumstances indicate that the carrying amount of such assets may not be recoverable. Fair value of a reporting unit is estimated using a combination of income-based and market-based valuation methodologies. An impairment is recorded if the carrying value of the goodwill exceeds its implied fair value. There were no goodwill impairments identified during 2023 or 2022.



**Intangible Assets—Net**—Intangible assets include capitalized computer software costs, tradenames, noncompete agreements, and other intangible assets acquired from independent parties. Intangible assets with a definite life are amortized on a straight-line basis, with estimated useful lives ranging from one to 20 years. Amortization of intangible assets is included in depreciation and amortization expense. SSMH reviews the carrying value of its amortizable intangible assets only when impairment indicators are present. SSMH evaluates intangible assets for impairment by comparing the estimates of undiscounted future cash flows to the carrying values of the related assets. Indefinite-lived intangible assets are evaluated for possible impairment at least annually or whenever events or changes in circumstances indicate the asset might be impaired. There were no material intangible asset impairments identified during 2023 or 2022.

**Software Costs**—Capitalized computer software costs include internally developed software. Costs incurred in developing and installing internal use software are expensed or capitalized depending on whether they are incurred in the preliminary project stage, application development stage, or post implementation stage. Capitalized software costs and related accumulated amortization expenses are included in intangible assets—net on the consolidated balance sheets (See Note 10—Goodwill and Other Intangible Assets for additional information).

**Pension Liability**—Pension liability represents the value of the projected benefit obligation of SSMH's pension plans over the fair value of the plans' assets. The pension plan obligations and plan assets are measured annually as of December 31 (See Note 14—Pension and Other Postretirement Benefit Plans for additional information).

**Other Liabilities**—Other liabilities include various deferred compensation plans, the fair value of interest rate swaps, and various other noncurrent liabilities.

**Net Patient Service Revenues and Patient Accounts Receivable**—Net patient service revenues relate to contracts with patients and in most cases involves a third-party payor (e.g. managed care insurance companies, Medicare and Medicaid) in which SSMH's performance obligations are to provide patient care. Net patient service revenues are recorded at expected collectible amounts over the time in which obligations to provide patient care are satisfied. Revenues are accrued to estimate the amount of revenue earned to date for patients who have not been discharged and whose care services are not complete as of the reporting period. Substantially all of SSMH's performance obligations are satisfied within one year.

SSMH determines the transaction price based on gross charges for goods and services provided, reduced by contractual adjustments provided to third-party payors, discounts provided to uninsured and underinsured patients in accordance with SSMH's policies, and implicit price concessions provided to patients. Patients who have health care insurance may also have discounts applied related to their copayment or deductible. SSMH determines its estimates of contractual adjustments and discounts based on contractual agreements, its discount policies, and historical experience using the portfolio approach. SSMH determines its estimate of implicit price concessions based on its historical collection experience with classes of patients using a portfolio approach and records these as a direct reduction to net patient service revenue. Management continually reviews the contractual estimation process to consider and incorporate updates to laws and regulations and frequent changes in managed care and commercial contractual terms resulting from contract negotiations and renewals.

A significant portion of SSMH's revenue is generated under agreements with Medicare and Medicaid. Payments for services covered by Medicare are based on federal regulations specific to the type of service provided. Medicaid pays for most services at prospective rates which are determined by the

regulations of the state in which the beneficiaries reside. Hospital facilities that meet certain requirements receive additional funds in partial payment for the cost of medical education and caring for the indigent. Laws and regulations governing Medicare and Medicaid programs are complex and subject to varying interpretation. As a result, there is at least a reasonable possibility that recorded estimates will change by a material amount.

Included in net patient service revenues are Medicaid supplemental payments which are funded through state financial arrangements commonly referred to as provider taxes. Under provider tax arrangements, states collect taxes from healthcare providers and then use the revenue to pay the providers as a Medicaid expenditure, which allows the states to then claim additional federal matching funds. Current federal law provides for a cap on the maximum allowable provider tax as a percentage of the provider's total revenue. There can be no assurance that federal law will continue to provide matching federal funds on state Medicaid expenditures funded through provider taxes, or that the current caps on provider taxes will not be reduced. SSMH participates in assessment programs in the four states in which it operates. For the year ended December 31, 2023, SSMH recognized \$283,600 in revenue and \$196,960 in expenses relating to these programs. For the year ended December 31, 2022, SSMH recognized \$352,754 in revenue and \$190,898 in expenses relating to these programs.

Further, SSMH has negotiated contracts with certain other third-party payors. Revenues under these contracts are based primarily on payment terms involving predetermined rates per admission, per diem rates, discounted fee-for-service rates, value-based payments and other similar contractual arrangements. SSMH estimates the discounts for contractual allowances at the individual hospital level utilizing billing data on an individual patient basis. On a monthly basis, an estimate is made of the expected reimbursement for patients of managed care plans based on the applicable contract terms. In addition, the contracts SSMH has with commercial payors also provide for retroactive audit and review of claims.

Settlements with third-party payors for retroactive adjustments due to audits, reviews or investigations are considered variable consideration and are included in the determination of the estimated transaction price for providing patient care. SSMH uses the expected value method of calculating estimated revenue, receivables and liabilities as it relates to third-party settlements. These settlements are estimated based on the terms of the payment agreement with the payor, correspondence from the payor and SSMH's historical settlement activity, including an assessment to ensure that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the retroactive adjustment is subsequently resolved. Estimated settlements are adjusted in future periods as adjustments become known (i.e. new information becomes available), or as years are settled or are no longer subject to such audits, reviews, and investigations. In 2023 and 2022, net patient service revenues increased by \$121,778 and \$57,859, respectively, relating to changes in estimates for prior years' settlements from Medicare, Medicaid and other programs.

SSMH also provides services to uninsured patients and offers discounts from standard charges. The discount varies by geographical location, primarily based on the discounts negotiated with the local private third-party payors.

Consistent with SSMH's mission, care is provided to patients regardless of their ability to pay. Therefore, SSMH has determined it will provide implicit price concessions to uninsured patients and patients with other balances (e.g. copays and deductibles). The implicit price concessions included in estimating the transaction price represent the difference between amounts billed to patients and the amounts SSMH expects to collect based on its collection history with those patients.

After all payments, discounts, and reasonable collection efforts have been exhausted, SSMH follows established guidelines for placing certain past-due patient balances with collection agencies, subject to the terms of certain restrictions on collection efforts as determined by SSMH. Accounts placed with collection agencies are written off and excluded from patient accounts receivable.

**Estimated Third-Party Payor Receivable and Payable Settlements**—SSMH has agreements with payors that provide for payments at amounts different from established charges. These estimated amounts are subject to further adjustments upon review by third-party payors (See Note 21—Commitments and Contingent Liabilities for additional information).

**Capitation Revenue**—SSMH receives capitation insurance premiums based on the demographic characteristics of covered members in exchange for providing comprehensive medical services for those members. Most of this revenue is from Medica, a health insurance plan provider, which SSMH has a 45% interest in and therefore is a related party. SSMH recorded capitated revenue from Medica on the consolidated statement of operations in the amount of \$1,276,485 and \$1,178,264 for the years ended December 31, 2023 and 2022, respectively.

**Pharmacy Benefit Manager Revenue, Pharmacy Claims and Rebates Receivable**—Pharmacy product revenue and other revenues are recognized by SSMH's national PBM company, Navitus Health Solutions, LLC (NHS), which provides pharmacy benefit administration services to a variety of clients. Revenue is recognized when the product is shipped.

Pharmacy claims and rebates receivable consist of amounts due from clients for pharmacy and member claims and rebates receivable from pharmaceutical manufacturers. SSMH assumes no risk for payment of the claims and considers these accounts to be fully collectible.

**Other Revenue and Other Receivables**—Other revenue is recorded at amounts SSMH expects to collect in exchange for providing goods or services not directly associated with patient care and recorded over time in which obligations are satisfied. Other receivables consist primarily of amounts due from retail pharmacies, premium receivables, and accrued interest receivable. Other revenue also includes Public Health and Social Services Emergency Fund (Relief Fund) and Employee Retention Credits (See note 3—COVID-19 Pandemic and CARES Act Funding).

**Deferred Revenue**—Deferred revenue on the consolidated balance sheets primarily consists of insurance premiums billed and due in advance of a coverage period as well as certain funds received under the federal government's Coronavirus Aid, Relief and Economic Security (CARES) Act.

**Medical Claims**—Medical claims consist of payments to health care providers and are accrued as of the date of service and reported net of recoveries. Those amounts are \$82,148 and \$85,716 for the years ended December 31, 2023 and 2022, respectively. Recoveries consist mainly of drug company volume discounts, reinsurance, and government program risk-sharing and subsidies.

Changes in estimates of claims costs resulting from an ongoing review process and differences between estimates and payments for claims are recognized in the period in which the change in estimate is identified or payments are made. The liability for unpaid medical claims for medical services purchased, which is included in accounts payable on the consolidated balance sheets, is based on known amounts of reported claims and an estimate of incurred but not reported claims using past experience adjusted for current trends.

**Contributions**—Contributions, including unconditional promises to give, are recognized at their fair value at the time of receipt. Certain contributions have restrictions placed on their use by the donors.

For example, if the gift is restricted to property and equipment purchases, it is recorded initially within net assets with donor restrictions. When the restrictions have been met, these restricted contributions are recorded as net assets released from restrictions for property acquisitions. Contributions for which donors have not stipulated restrictions are reported as other revenue on the consolidated statements of operations and changes in net assets.

Endowment assets include donor-restricted funds that SSMH must hold in perpetuity or for a donor-specified period. SSMH retains in perpetuity the original value of initial and subsequent gift amounts donated to the endowment and any accumulations to the endowment made in accordance with the applicable donor gift instrument. Donor-restricted amounts not retained in perpetuity are classified as net assets with donor restrictions until those amounts are appropriated for expenditure by the SSMH ministry that received the donation. SSMH considers the following factors in making determinations to appropriate or accumulate donor-restricted endowment funds:

- a. State law;
- b. The duration and preservation of the fund;
- c. The purposes of the donor-restricted endowment funds within SSMH's communities;
- d. General economic conditions, including the possible effects of inflation and deflation;
- e. The expected total return from income and the appreciation of investments;
- f. The investment policies of the ministry; and
- g. Other resources available to the ministry and its beneficiary, if applicable.

**Performance Indicator**—The performance indicator is excess of revenues over expenses. Changes in net assets without donor restrictions that are excluded from the performance indicator include: permanent transfers of assets to and from affiliates for other than goods and services; contributions of long-lived assets (including assets acquired using contributions that by donor restriction were to be used for the purpose of acquiring such assets); noncontrolling interests related to acquisitions and changes in ownership while retaining controlling financial interests; distributions to noncontrolling owners; and pension-related changes other than the net periodic pension cost.

**Net Assets**—Resources are classified for reporting purposes as net assets without donor restrictions and net assets with donor restrictions, according to the absence or existence of donor-imposed restrictions. The Board of Directors has designated, from net assets without donor restrictions, net assets for future use as described (See Note 7—Assets Limited As to Use or Restricted for additional information). Net assets with donor restrictions are those assets, including contributions and accumulated investment returns, whose use has been limited by donors for a specific purpose or time period or are those for which donors require the principal of the gifts to be maintained in perpetuity to provide a permanent source of income.

**Noncontrolling Interests**—The consolidated financial statements include all assets, liabilities, revenues and expenses of entities, controlled by SSMH and less than 100% owned, and therefore consolidated. Accordingly, SSMH has reflected a noncontrolling interest for the portion of net assets not owned or controlled by SSMH separately on the consolidated balance sheets.

**Consolidated Statements of Operations**—For the purpose of display, transactions deemed by management to be ongoing, major, or central to the provision of patient care and related services are reported as operating revenues and expenses. Peripheral or incidental transactions are reported as nonoperating gains and losses.

**Other Items**—Other Items Includes long-lived asset impairment after an evaluation of certain assets, which were then adjusted to their net realizable value for the year ended December 31, 2023 (See Note 12—Ministry Activities for additional information).

**Advertising Costs**—SSMH expenses advertising costs as they are incurred. Advertising expenses were \$19,320 and \$17,552 for the years ended December 31, 2023 and 2022, respectively, and are included in professional fees and other on the consolidated statements of operations and changes in net assets.

**Income Taxes**—SSMH is generally not subject to federal or state income taxes. However, SSMH is subject to income taxes on net income derived from a trade or business, regularly carried on, which does not further the organization's exempt purpose. For the years ended December 31, 2023 and 2022, management has determined that no significant income tax provisions are required and as such none have been recorded in the consolidated financial statements.

SSMH's for-profit subsidiaries recognize deferred tax assets and liabilities for temporary differences between the financial reporting basis and the tax basis of their assets and liabilities along with net operating losses that meet the more likely than not recognition criteria. Changes in recognition or measurement are reflected in the period in which the change in judgment occurs. Penalties and interest incurred on income tax liabilities, if any, are included in nonoperating gains and (losses) other—net on the consolidated statements of operations and changes in net assets.

A tax benefit from an uncertain tax position may be recognized when it is more likely than not that the position will be sustained upon examination, including resolutions of any related appeals or litigation processes, based on the technical merits. SSMH did not record uncertain tax positions in 2023 or 2022.

**Non-Cash Transactions**—During the years ended December 31, 2023 and 2022, SSMH had the following non-cash transactions:

	2023	2022
Decrease in securities lending program	\$ 20,223	\$ 80,598
Property and equipment purchases financed through accounts payable and other purchases	13,947	9,780
Operating right-of-use assets obtained in exchange for new operating lease obligations	78,067	45,536
Finance leases additions	1,751	-
Notes payable acquired in purchase accounting	-	68,108

### 3. COVID-19 PANDEMIC AND CARES ACT FUNDING

On March 11, 2020, the World Health Organization designated COVID-19 as a global pandemic which impacted SSMH's patients, communities and employees. Federal, state, and local governments issued emergency declarations that resulted in a substantial portion of the population remaining at home. On March 18, 2020, CMS released guidance that all elective surgeries and non-essential medical procedures be delayed during the COVID-19 pandemic, with many states issuing temporary bans on providing these services, including states where SSMH operates.

In response to COVID-19 and its economic impact, the federal government's Coronavirus Aid, Relief, and Economic Security (CARES) Act was signed into law on March 27, 2020. The CARES Act authorized funding to healthcare providers to be distributed through the Public Health and Social Services Emergency Fund (Relief Fund). Payments in the form of grants from the Relief Fund were to be used to

reimburse the recipient for health care related expenses or lost revenues attributable to COVID-19. These grants are not required to be repaid, provided the recipients attest to and comply with the terms and conditions.

For the years ended December 31, 2023 and 2022, \$36,952 and \$65,439, respectively, Relief Funds have been included in Other revenue on the consolidated statements of operations and changes in net assets. Management will continue to monitor the terms and conditions of the Relief Fund and the impact of COVID-19 on SSMH's revenues and expenses. These funds are not required to be repaid upon attestation and compliance with certain terms and conditions.

The CARES Act permitted employers to defer payment of the 6.2% employer Social Security tax beginning March 27, 2020 through December 31, 2020. Deferred tax amounts were required to be paid in equal amounts over two years, with payments due December 2021 and December 2022. At December 31, 2022 all deferred tax amounts had been repaid.

For the years ended December 31, 2023 and 2022, \$49,943 and \$39,521, respectively, has been recorded of Employee Retention Credit (ERC) revenue. These payroll tax credits relate to qualified wages and are recorded in Other revenue on the consolidated statements of operations and changes in net assets.

#### 4. COMMUNITY BENEFIT MINISTRY

In line with its mission, SSMH provides health care services to patients without regard to their ability to pay for those services. For some of its patient services, SSMH receives no payment or payment that is less than the full cost of providing the care.

SSMH voluntarily provides free or discounted care to patients who are unable to pay for all or part of their health care expenses as determined by SSMH's criteria for financial assistance. Because SSMH does not pursue the collection of amounts determined to qualify as charity care, they are not reported as patient service revenues.

SSMH also commits significant time and resources to activities and critical services that address unmet community needs. Many of these activities are sponsored with the knowledge that they will not be self-supporting or financially viable. The following summary has been prepared in accordance with Internal Revenue Service Form 990, Schedule H and the Catholic Health Association of the United States' publication, *A Guide for Planning & Reporting Community Benefit, 2015 Edition*.

The estimated costs of SSMH's community benefit ministry for the years ended December 31, 2023 and 2022, are as follows:

	2023	2022
Financial Assistance and Means-tested Government Programs:		
Charity care at cost	\$ 101,844	\$ 58,014
Unpaid costs of Medicaid	214,626	255,496
Costs of other means-tested government programs	<u>30,330</u>	<u>17,465</u>
 Total Financial Assistance and Means-tested Government Programs	 <u>346,800</u>	 <u>330,975</u>
 Other community benefits:		
Community health improvement services	14,199	10,126
Health professions education	89,721	114,995
Subsidized health services	13,858	5,468
Research	15	28
Financial contributions	5,250	2,602
Community building activities	<u>174</u>	<u>109</u>
 Total other community benefits	 <u>123,217</u>	 <u>133,328</u>
 Total community benefit ministry	 <u>\$ 470,017</u>	 <u>\$ 464,303</u>

The estimated costs are calculated using a cost-to-charge approach. The costs of providing patient care are divided by gross patient service revenue. This cost-to-charge ratio is then applied to the gross charity, Medicaid, and other means-tested government programs charges to determine estimated costs.

*Charity care at cost* represents the cost of services provided to patients who cannot afford to pay and who meet the eligibility criteria of SSMH's financial assistance policy (See Note 6—Concentration of Credit Risk for additional information). Financial assistance is reported in terms of costs, not charges.

*Unpaid costs of Medicaid* represents the shortfall created when costs of providing services to beneficiaries of Medicaid exceed the governmental payments.

*Costs of other means-tested government programs* represents the shortfall created when costs of providing services to beneficiaries of other government programs exceed the payments received. These programs include State Children's Health Insurance Program and state and local indigent care medical programs for low-income or medically indigent persons ineligible for Medicaid.

*Community health improvement services* are activities and services carried out to improve community health beyond patient care activities and do not generate patient care bills. Some examples include community health education, health screenings for underinsured and uninsured persons and support groups.

*Health profession education* includes the unreimbursed costs of educational programs for health care professionals such as physicians, interns and residents, medical students, and nurses.

*Subsidized health services* are clinical programs that SSMH provides despite a financial loss so significant that negative margins remain after removing the effects of financial assistance and Medicaid shortfalls. SSMH continues to provide these services because they meet an identified community need and, if no longer offered, would either be unavailable or fall to the responsibility of government or another not-for-profit organization.

*Research* includes clinical and community health research, as well as studies on health care delivery that are generalizable and shared with the public.

*Financial contributions* include funds donated to community organizations or to the community at large for a community benefit purpose as well as certain in-kind donations such as medical supplies.

*Community building activities* represent the cost of activities which improve the community's health and safety by addressing the root causes of health problems, such as poverty, homelessness, and environmental hazards.

#### 5. NET PATIENT SERVICE REVENUES

The composition of net patient service revenues by payor and service line for the years ended December 31, 2023 and 2022, is as follows:

	2023	2022
Medicare	20 %	20 %
Medicare managed care	16	15
Medicaid	6	10
Medicaid managed care	11	8
Managed care	41	38
Commercial, self-pay and other	<u>6</u>	<u>9</u>
Total net patient service revenues percentage by payor	<u>100 %</u>	<u>100 %</u>
	2023	2022
Hospital operations	\$ 5,431,838	\$ 5,003,843
Physician operations	861,161	928,532
Home health	74,595	72,394
Skilled nursing	<u>68,030</u>	<u>50,194</u>
Total net patient service revenues by service line	<u>\$ 6,435,624</u>	<u>\$ 6,054,963</u>

Net patient service revenues does not include payment for services provided to patients covered under SSMH's claims pools. These revenues are eliminated upon consolidation and have been excluded from the above tables. Revenues from services provided to SSMH's claims pools amounted to \$801,327 and \$761,965 for the years ended December 31, 2023 and 2022, respectively.

#### 6. CONCENTRATION OF CREDIT RISK

SSMH provides health care services through its inpatient and outpatient care facilities located in its respective communities. SSMH attempts to collect amounts due from patients, including co-payments and deductibles for patients with insurance, at the time of service, while complying with all federal and



state laws and regulations, including the Emergency Medical Treatment and Active Labor Act (EMTALA). Generally, as required by EMTALA, patients may not be denied emergency treatment due to the inability to pay. In nonemergency circumstances or for elective procedures, SSMH's policy is to verify insurance prior to treatment; however, exceptions can occur. SSMH generally does not require collateral or other security in extending credit to patients; however, it routinely obtains assignment of (or is otherwise entitled to receive) patients' benefits payable under their health insurance programs, plans, or policies (e.g., Medicare, Medicaid, managed care, and commercial insurance policies).

SSMH reviews its financial assistance and billing policies on a regular basis to ensure compliance with IRS 501(r) regulations in accordance with the Affordable Care Act.

The mix of net receivables from patients and third-party payors as of December 31, 2023 and 2022, is as follows:

	2023	2022
Medicare	14 %	16 %
Medicare managed care	20	18
Medicaid	6	9
Medicaid managed care	11	11
Managed care	35	39
Commercial and other	<u>14</u>	<u>7</u>
Total net receivables from patients and third-party payors percentage	<u>100 %</u>	<u>100 %</u>

#### 7. ASSETS LIMITED AS TO USE OR RESTRICTED

A summary of assets limited as to use or restricted as of December 31, 2023 and 2022, is as follows:

	2023	2022
Board designated:		
Unrestricted board designated assets	\$ 3,256,674	\$ 2,998,636
Other restricted board designated assets	295,259	258,651
Held by trustee:		
Project and bond funds	2,994	2,988
Self-insurance (Note 15)	194,780	200,085
Collateral held under securities lending agreements	<u>61,394</u>	<u>81,617</u>
Total held by trustee	259,168	284,690
Assets restricted by donor as to use	<u>207,518</u>	<u>145,583</u>
Total assets limited as to use or restricted	4,018,619	3,687,560
Less current portion	<u>519,413</u>	<u>454,838</u>
Noncurrent portion	<u>\$ 3,499,206</u>	<u>\$ 3,232,722</u>

A summary of investment income (loss) for the years ended December 31, 2023 and 2022, is as follows:

	2023	2022
Interest and dividends—net of investment fees	\$ 82,694	\$ 74,326
Net realized gains (losses) on investments	60,338	(35,094)
Net unrealized gains (losses) on investments	<u>247,939</u>	<u>(493,700)</u>
	<u>\$ 390,971</u>	<u>\$ (454,468)</u>

The change in net unrealized gain (loss) on investments, including changes in value of restricted net assets, held at December 31, 2023 and 2022, was \$247,939 and \$(493,700), respectively.

Investment income (losses) is reported as follows:

	2023	2022
Operating Investment Income (loss)	\$ 59,760	\$ (69,547)
Nonoperating Investment Income (loss)	321,583	(375,041)
Gains (losses) on investments—net—net assets with donor restrictions	<u>9,628</u>	<u>(9,880)</u>
Total Income (loss)	<u>\$ 390,971</u>	<u>\$ (454,468)</u>

The amounts in the security lending program are included in the following classifications:

	2023	2022
Equity securities	\$ 41,215	\$ 70,849
Government securities	2,055	-
Corporate obligations	<u>15,918</u>	<u>8,642</u>
Total	<u>\$ 59,188</u>	<u>\$ 79,491</u>

## 8. FAIR VALUE MEASUREMENTS

SSMH defines fair value as the price that would be received upon the sale of an asset or paid upon the transfer of a liability in an orderly transaction between market participants at the measurement date and in the principal or most advantageous market for that asset or liability. The fair value should be calculated based on assumptions that market participants would use in pricing the asset or liability, not on assumptions specific to the ministry. In addition, the fair value of liabilities should include consideration of nonperformance risk, including SSMH's own credit risk.

The fair value of all assets and liabilities recognized or disclosed at fair value are classified based on the lowest level of significant inputs. SSMH used the following methods to determine fair value:

**Level 1**—Quoted prices (unadjusted) in active markets for identical assets or liabilities that SSMH has the ability to access on the report date.

**Level 2**—inputs (financial matrices, models, valuation techniques) other than quoted market prices included in Level 1, that are observable for the asset or liability, either directly or indirectly. If the asset or liability has a specified (contractual) term, a Level 2 input must be observable for substantially the

full term of the asset or liability. Such observable inputs include benchmarking prices for similar assets in active, liquid markets, quoted prices in markets that are not active and observable yields, and spreads in the market.

**Level 3**—Inputs (such as professional appraisals, quoted prices from inactive markets that require adjustment based on significant assumptions or data that is not current, or data from independent sources) that are unobservable for the asset or liability.

Assets and liabilities measured at fair value on a recurring basis as listed in the following tables use the following valuation methodologies:

**Cash and Cash Equivalents**—Cash equivalents that trade on a regular basis in active markets are classified as Level 1 in the fair value hierarchy. Those that do not meet these criteria are classified as Level 2.

**Corporate Obligations**—Corporate obligations are valued using quoted market prices and/or other market data for the same or comparable securities and transactions in establishing the prices, discounted cash flow models, and other pricing methods. These models are primarily industry-standard models that consider various assumptions, including time value and yield curve, as well as other relevant economic measures. Due to the nature of pricing methods utilized, corporate obligations are classified as Level 2 within the fair value hierarchy.

**Government Securities**—Government securities are valued using quoted market prices and/or other market data for the same or comparable securities and transactions in establishing the prices, discounted cash flow models, and other pricing methods. These models are primarily industry-standard models that consider various assumptions, including time value and yield curve, as well as other relevant economic measures. Due to the nature of pricing methods utilized, government securities are classified as Level 2 within the fair value hierarchy.

**Mutual Funds**—Mutual funds are valued using the underlying net assets owned by the fund and are classified as Level 1 within the fair value hierarchy.

**Equities**—Equity securities are valued at the closing price reported on the applicable exchange on which the security is traded and are classified as Level 1 within the fair value hierarchy.

**Trading Derivatives and Interest Rate Swaps**—Trading derivatives consist of interest rate swaps and options, credit default swaps, and futures, for which fair values are estimated based on quoted market prices and/or other market data for the same or comparable instruments and transactions in establishing the prices. These derivatives are classified as Level 2 within the fair value hierarchy. Trading derivatives in active markets are classified as Level 1 in the fair value hierarchy.

**Guaranteed Fixed Funds**—Guaranteed fixed funds are valued using quoted market prices and/or other market data for the same or comparable securities and transactions in establishing the prices, discounted cash flow models, and other pricing methods. These models are primarily industry-standard models that consider various assumptions, including time value and yield curve, as well as other relevant economic measures. Due to the nature of pricing methods utilized, guaranteed fixed funds are classified as Level 2 within the fair value hierarchy.

**Hedge Funds**—Hedge funds are valued primarily using net asset values, which approximate fair value, as determined by an external fund manager based on quoted market prices, operating results, balance sheet stability, growth, and other business and market sector fundamentals. As investments in hedge

funds are measured at net asset value, they are included separately from the fair value hierarchy in the table below.

**Limited Liability Companies (LLC), Limited Partnerships (LP) and Real Estate Investment Trust (REIT) Interests**—LLC, LP and REIT Interests are primarily valued based on the most current financial statements issued by each fund adjusted for cash flow to and from the fund subsequent to the financial statement reporting date. The underlying investments are valued in accordance with the corresponding valuation method for the investments held. The prices used to generate these valuations are unobservable and therefore are classified as Level 3 within the fair value hierarchy. Limited liability companies and limited partnership interests whose underlying securities are publicly traded are valued at the closing price reported on the applicable exchange on which the underlying securities are traded and are classified as Level 2 within the fair value hierarchy. A portion of LLC, LP and REIT Interests are valued using net asset values, which approximate fair value, as determined by an external fund manager based on quoted market prices, operating results, balance sheet stability, growth and other business and market sector fundamentals.

**Commingled Funds**—Commingled funds are valued using the net asset value based on the value of the underlying assets owned by the fund, minus liabilities, multiplied by the current percentage ownership of the fund. The underlying investments are valued in accordance with the corresponding valuation method for the investments held. As commingled funds are measured at net asset value, they are included separately from the fair value hierarchy in the table below.

**Securities Lending**—The security lending collateral is invested in a Northern Trust-sponsored commingled collateral fund, which is composed primarily of short-term securities. The fair value of the commingled collateral fund is determined using the calculated net asset value per share (or its equivalent) for the fund with the underlying securities valued using techniques similar to those used for marketable securities. As security lending is measured at net asset value, it is included separately from the fair value hierarchy in the table below.

SSMH may be required, from time to time, to measure certain assets at fair value on a nonrecurring basis in accordance with GAAP. The following describes assets measured at fair value on a nonrecurring basis:

**Cash Surrender Value of Life Insurance**—Cash surrender value of life insurance is valued based on the underlying investments and represents the guaranteed value that would be received upon surrender of the policies. It is classified as Level 2 within the fair value hierarchy.

**Assets Held for Sale**—The fair value of assets held for sale is determined based on valuation methodologies using management assumptions, including estimates of future cash flows and would generally be considered Level 3 inputs (See Note 12—Ministry Activities for additional information).

**Impaired Property and Equipment**—The fair value of impaired property and equipment is determined based on valuation methodologies as described in Note 2—SSMH Summary of Significant Accounting Policies which would generally be considered Level 3 inputs (See Note 9—Property and Equipment for additional information).

The methods described above may produce a fair value calculation that may not be indicative of net realizable value or reflective of future fair values. Furthermore, while SSMH believes that its methods are appropriate and consistent with other market participants, the use of different methodologies or

assumptions to determine the fair value of certain financial instruments could result in a different estimate of fair value at the reporting date.

SSMH holds the majority of its financial assets in CIP, which also includes the investments of its defined benefit plans. The tables below do not reflect actual securities owned by SSMH. The values below represent SSMH's allocated non-pension share of CIP as well as investments in non-CIP assets.

The following tables summarize assets and liabilities measured at fair value on a recurring basis and nonrecurring basis by the level of significant input:

December 31, 2023	Level 1	Level 2	Level 3	Total
Recurring fair value measurements:				
Assets:				
Cash and cash equivalents	\$ 109,802	\$ 64,331	\$ -	\$ 174,133
Corporate obligations	-	382,189	-	382,189
Government securities	-	582,418	-	582,418
Mutual funds:				
Domestic equities	153,654	-	-	153,654
International equities	62,295	-	-	62,295
Fixed Income	64,721	-	-	64,721
Equities—domestic	656,325	-	-	656,325
Trading derivatives	-	1,019	-	1,019
Interest rate swaps	-	30,820	-	30,820
LLC and LP Interests	-	162,793	1,112,089	1,274,882
Guaranteed fixed funds	-	445	-	445
Cash surrender value of life insurance	-	61,389	-	61,389
	<u>\$ 1,046,797</u>	<u>\$ 1,285,404</u>	<u>\$ 1,112,089</u>	<u>\$ 3,444,290</u>
Investments measured at net asset value:				
Commingled funds:				
Securities lending				61,394
International equities				191,860
Fixed Income				34,793
Hedge funds				176,070
LLC, LP, and REIT Interests				<u>111,546</u>
Total assets				<u>4,019,953</u>
Liabilities—Interest rate swaps	\$ -	\$ 14,041	\$ -	\$ 14,041
Liabilities—trading derivatives	<u>1,648</u>	<u>-</u>	<u>-</u>	<u>1,648</u>
Total liabilities	<u>\$ 1,648</u>	<u>\$ 14,041</u>	<u>\$ -</u>	<u>\$ 15,689</u>

December 31, 2022	Level 1	Level 2	Level 3	Total
Recurring fair value measurements:				
Assets:				
Cash and cash equivalents	\$ 88,301	\$ 48,492	\$ -	\$ 136,793
Corporate obligations	-	398,591	-	398,591
Government securities	-	472,446	-	472,446
Mutual funds:				
Domestic equities	74,630	-	-	74,630
International equities	51,191	-	-	51,191
Fixed Income	22,719	-	-	22,719
Equities—domestic	661,787	-	-	661,787
Trading derivatives	3,847	2,356	-	6,203
Interest rate swaps	-	16,009	-	16,009
LLC and LP Interests	-	205,857	938,036	1,143,893
Guaranteed fixed funds	-	1,432	-	1,432
Cash surrender value of life insurance	-	55,148	-	55,148
	<u>\$ 902,475</u>	<u>\$ 1,200,331</u>	<u>\$ 938,036</u>	3,040,842
Subtotal				
Investments measured at net asset value:				
Commingled funds:				
Securities lending				81,617
International equities				217,872
Fixed Income				144,994
Hedge funds				120,240
LLC, LP, and REIT Interests				<u>177,364</u>
Total assets				<u>\$ 3,782,929</u>
Liabilities—interest rate swaps	<u>\$ -</u>	<u>\$ 24,876</u>	<u>\$ -</u>	<u>\$ 24,876</u>
Total liabilities	<u>\$ -</u>	<u>\$ 24,876</u>	<u>\$ -</u>	<u>\$ 24,876</u>

The following table reconciles the information about the fair value of SSMH's financial instruments measured at fair value on a recurring basis presented in the table above to amounts presented in the consolidated balance sheets as of December 31, 2023 and 2022:

	2023	2022
Assets:		
Investments	\$ 20,479	\$ 112,203
Assets limited as to use or restricted—current portion	519,413	454,838
Assets limited as to use or restricted—excluding current portion	3,499,206	3,232,722
Interest rate swaps recorded as other assets—other	30,820	16,009
Less Items not recorded at fair value:		
Unconditional promises to give—net	(35,716)	(16,839)
Other	<u>(14,249)</u>	<u>(16,004)</u>
Total assets	<u>\$ 4,019,953</u>	<u>\$ 3,782,929</u>

The values below represent SSMH's defined benefit plan's allocated proportionate share of CIP by the level of significant input:

December 31, 2023	Level 1	Level 2	Level 3	Total
<b>Assets:</b>				
Cash equivalents	\$ 18,766	\$ 28,339	\$ -	\$ 47,105
Corporate obligations	-	160,601	-	160,601
Government securities	-	250,084	-	250,084
Mutual funds—International equities	21,545	-	-	21,545
Mutual funds—fixed income	11,412	-	-	11,412
Equities—domestic	316,149	-	-	316,149
Trading derivatives	-	371	-	371
LLC and LP interests	-	81,425	340,959	422,384
<b>Subtotal</b>	<u>\$ 367,872</u>	<u>\$ 520,820</u>	<u>\$ 340,959</u>	\$ 1,229,651
<b>Investments measured at net asset value:</b>				
<b>Commingled funds:</b>				
Securities lending				30,785
International equities				95,475
Fixed income				17,617
Hedge funds				85,264
LLC, LP and REIT interests				<u>115,609</u>
<b>Total assets</b>				1,574,401
Accrued income				4,859
Payable under security lending agreement				<u>(30,785)</u>
<b>Fair value of plan assets</b>				<u>\$ 1,548,475</u>
Liabilities—trading derivatives	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ 450</u>



December 31, 2022	Level 1	Level 2	Level 3	Total
<b>Assets:</b>				
Cash equivalents	\$ 36,487	\$ 12,431	\$ -	\$ 48,918
Corporate obligations	-	141,126	-	141,126
Government securities	-	151,996	-	151,996
Mutual funds—international equities	20,756	-	-	20,756
Equities—domestic	303,235	-	-	303,235
Trading derivatives	-	686	-	686
LLC and LP interests	-	102,078	390,489	492,567
Subtotal	<u>\$ 360,478</u>	<u>\$ 408,317</u>	<u>\$ 390,489</u>	1,159,284
<b>Investments measured at net asset value:</b>				
<b>Commingled funds:</b>				
Securities lending				40,080
International equities				111,514
Fixed income				64,702
Hedge funds				65,180
LLC, LP and REIT interests				100,326
Total assets				1,541,086
Accrued income				3,464
Payable under security lending agreement				(40,080)
Fair value of plan assets				<u>\$ 1,504,470</u>
Liabilities—trading derivatives	<u>\$ 862</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ 862</u>

The following disclosures for level 3 and net asset value investments includes SSMH investments and the investments of its defined benefit plans.

The allocated shares of level 3 assets for the years ended December 31, 2023 and 2022, are as follows:

	SSMH Investments	SSMH's Defined Benefit Plan Assets	Total
December 31, 2023	\$ 1,112,089	\$ 340,959	\$ 1,453,048
December 31, 2022	938,036	390,489	1,328,525

It is SSMH's policy that transfers between levels will occur when revised information regarding the lowest level of significant inputs becomes available. There were no transfers between levels during 2023 or 2022.

Changes related to the fair values based on Level 3 inputs for the years ended December 31, 2023 and 2022, are summarized as follows:

	LLC and LP Interests
Ending balance as of January 1, 2022	\$ 1,026,600
Realized gains	39,229
Unrealized gains	51,285
Purchases	307,899
Sales	<u>(96,488)</u>
Ending balance as of December 31, 2022	1,328,525
Realized gains	73,033
Unrealized gains	45,524
Purchases	219,329
Sales	<u>(213,363)</u>
Ending balance as of December 31, 2023	<u>\$ 1,453,048</u>

The allocated shares of CIP assets measured at net asset value for the years ended December 31, 2023 and 2022, are as follows:

	SSMH Investments	SSMH's Defined Benefit Plan Assets	Total
December 31, 2023:			
Commingled funds	\$ 288,047	\$ 143,877	\$ 431,924
Hedge funds	176,070	85,264	261,334
LLC, LP and REIT interests	<u>111,546</u>	<u>115,609</u>	<u>227,155</u>
Total	<u>\$ 575,663</u>	<u>\$ 344,750</u>	<u>\$ 920,413</u>
December 31, 2022:			
Commingled funds	\$ 444,483	\$ 216,296	\$ 660,779
Hedge funds	120,240	65,180	185,420
LLC, LP and REIT Interests	<u>177,364</u>	<u>100,326</u>	<u>277,690</u>
Total	<u>\$ 742,087</u>	<u>\$ 381,802</u>	<u>\$ 1,123,889</u>

The commingled funds, hedge funds, and certain LLC, LP, and REIT interests are redeemable at net asset value under the original terms of the agreements. However, it is possible that these redemption rights may be restricted or eliminated by the funds in the future in accordance with the underlying fund agreements. Assets recorded at net asset value at December 31, 2023 and 2022, are as follows:

December 31, 2023	Fair Value	Redemption Frequency	Redemption Notice Period
Commingled funds <sup>(a)</sup>	\$ 431,924	Daily, semi-monthly, monthly	0-10 days
Hedge funds <sup>(b)</sup>	261,334	Monthly, quarterly, semi-annual	30-90 days
LLC, LP and REIT interests <sup>(c)</sup>	<u>227,155</u>	Quarterly	45-90 days
Total	<u>\$ 920,413</u>		

December 31, 2022	Fair Value	Redemption Frequency	Redemption Notice Period
Commingled funds <sup>(a)</sup>	\$ 660,779	Daily, semi-monthly, monthly	0-10 days
Hedge funds <sup>(b)</sup>	185,420	Monthly, quarterly	30-90 days
LLC, LP and REIT interests <sup>(c)</sup>	<u>277,690</u>	Quarterly, semi-annual	45-90 days
Total	<u>\$ 1,123,889</u>		

<sup>(a)</sup> This category includes investments in commingled funds that primarily invest in financial instruments of US and non-US entities, bonds, notes, bills, currencies, and interest rate and derivative products.

<sup>(b)</sup> This category includes investments in hedge funds that maintain positions in long-short equity, credit, currency and derivative securities.

<sup>(c)</sup> This category includes investments in certain limited liability companies, limited partnerships and REIT interests that invest in the following: high-quality properties in major metropolitan areas; participating mortgages secured by core real estate properties; and core infrastructure investments. Investments in this category are primarily valued based upon independent appraisals using a cost approach, market approach, or income approach, as well as consideration of other third-party evidence.

SSMH's unfunded commitments to purchase limited partnership interests is reported as follows:

	Unfunded Commitments	SSMH Investments	SSMH's Defined Benefit Plan Assets
December 31, 2023	\$ 446,980	72 %	28 %
December 31, 2022	476,480	65	35

## 9. PROPERTY AND EQUIPMENT

A summary of property and equipment at December 31, 2023 and 2022, is as follows:

	2023	2022
Land and improvements	\$ 240,956	\$ 243,935
Buildings	3,783,867	3,768,792
Equipment	<u>1,773,662</u>	<u>1,640,783</u>
Total gross depreciable property and equipment	5,798,485	5,653,510
Less accumulated depreciation	<u>3,195,413</u>	<u>2,990,827</u>
Total net depreciable property and equipment	2,603,072	2,662,683
Real estate held for future development	3,985	3,985
Construction in process	<u>234,274</u>	<u>194,023</u>
Total	<u>\$ 2,841,331</u>	<u>\$ 2,860,691</u>

Depreciation expense for the years ended December 31, 2023 and 2022, totaled \$259,368 and \$271,229, respectively.

The book value of equipment under finance lease obligations at December 31, 2023 and 2022, totaled \$27,205 and \$26,316, respectively. The related accumulated depreciation totaled \$17,037 and \$15,473 at December 31, 2023 and 2022, respectively. These amounts are included in the above summary of property and equipment.

SSMH determined that indicators existed that there was potential impairment of certain property and equipment totalling \$18,109 for the year ended December 31, 2023 (See Note 12—Ministry Activities for additional information).

## 10. GOODWILL AND OTHER INTANGIBLE ASSETS

A summary of Goodwill at December 31, 2023 and 2022, is as follows:

	Gross	Accumulated Impairment Loss	Net
Balance at January 1, 2022	\$ 189,496	\$ (38,303)	\$ 151,193
Acquired (See Note 12)	<u>138,468</u>	<u>-</u>	<u>138,468</u>
Balance at December 31, 2022	327,964	(38,303)	289,661
Acquired (See Note 12)	<u>239,288</u>	<u>-</u>	<u>239,288</u>
Balance at December 31, 2023	<u>\$ 567,252</u>	<u>\$ (38,303)</u>	<u>\$ 528,949</u>

The following table provides information regarding other intangible assets for the years ended December 31, 2023 and 2022:

	2023			2022		
	Gross Carrying Amount	Accumulated Amortization	Net Intangible Assets	Gross Carrying Amount	Accumulated Amortization	Net Intangible Assets
Amortized intangible assets:						
Software	\$ 483,626	\$ 308,785	\$ 174,841	\$ 347,352	\$ 285,406	\$ 61,946
Trade name	108,563	71,215	37,348	104,900	64,000	40,900
Customer contracts	151,980	38,750	113,230	111,621	36,444	75,177
Other	<u>5,257</u>	<u>1,769</u>	<u>3,488</u>	<u>5,368</u>	<u>3,640</u>	<u>1,728</u>
Total	<u>\$ 749,426</u>	<u>\$ 420,519</u>	<u>\$ 328,907</u>	<u>\$ 569,241</u>	<u>\$ 389,490</u>	<u>\$ 179,751</u>

The weighted-average amortization period for the intangible assets subject to amortization acquired during the year ended December 31, 2023 is approximately 3.4 years. There are no expected residual values related to these intangible assets.

Amortization expense on these intangible assets was \$29,581 and \$37,572 during the years ended December 31, 2023 and 2022, respectively.

The estimated future amortization of intangible assets with finite useful lives as of December 31, 2023, is as follows:

Years Ending December 31	
2024	\$ 41,585
2025	39,925
2026	35,406
2027	30,166
2028	25,905
Thereafter	<u>155,920</u>
Total	<u>\$ 328,907</u>

#### 11. INVESTMENTS IN UNCONSOLIDATED ENTITIES

Investments in entities where SSMH does not have operating control, but is considered to be able to exert influence, are recorded under the equity method of accounting. SSMH included the following income from operations from equity method investments for the years ended December 31, 2023 and 2022, as operating revenues:

	2023	2022
Income and gain from operations (See Note 12)	\$ 140,518	\$ 28,692
Losses from operations	<u>(1,479)</u>	<u>(14,869)</u>
Income from unconsolidated entities—net	<u>\$ 139,039</u>	<u>\$ 13,823</u>

## 12. MINISTRY ACTIVITIES

SSMH entered into the following significant activities during the years ended December 31, 2023 and 2022:

**Navitus Health Solutions**—Throughout 2022 and 2023, NHS held a 45% interest in Archimedes, LLC (Archimedes), a specialty drug management company that focuses primarily on specialty drug management solutions for health plans, third party administrators, employers, labor groups, and other plan sponsors. On December 29, 2023, NHS acquired an additional 35.1% ownership interest in Archimedes, making NHS an 80.1% majority and controlling owner.

In accordance with ASC 805, *Business Combinations*, the transaction was accounted for as a business combination and acquired assets and liabilities were recorded at fair values while Archimedes became a consolidated subsidiary of NHS on the date of acquisition. Previously, Archimedes had been accounted for as equity method investment with NHS's share of earnings in income from unconsolidated entities—net on the consolidated statement of operations and changes in net assets and recorded as an investment in unconsolidated entities on the balance sheet of SSMH.

During the years ended December 31, 2023 and 2022, SSM recognized revenues from Archimedes' equity method earnings totaling \$9,392 and \$1,964, respectively, in income from unconsolidated entities—net. As part of the purchase accounting, the investment in Archimedes was adjusted to its acquisition date fair value of \$170,780, which resulted in a gain of \$101,099 recorded in income from unconsolidated entities—net in December 2023. Total assets acquired related to the Archimedes acquisition of \$470,120 includes \$18,370 of cash and cash equivalents, \$58,515 of pharmacy claims and rebates receivable, \$843 of inventory, prepaids, and other, \$239,288 of goodwill and \$151,000 of other intangible assets—net, property and equipment—net of \$1,412, and operating right of use assets of \$692. Total liabilities assumed of \$78,411 is made up solely of \$75,086 of accounts payable and accrued expenses, \$709 of deferred revenue, \$384 of operating lease obligations—excluding current portion, and \$2,232 of other long-term liabilities.

**SLUCare Physician Group**—On May 6, 2022, SSM Health and its various subsidiaries entered into an Asset Transfer/Membership Interest Redemption Agreement with Saint Louis University that was effective as of July 1, 2022. Under the terms of the agreement, SSM Health Care Group acquired in a cash transaction substantially all of the operating assets and assumed certain liabilities of SLUCare Physician Group ("SLUCare") from Saint Louis University. The agreement formally brings together the academic medical expertise of SLUCare with SSM Health's high-quality, community-based care model so that patients will have access to all levels of care, including highly specialized procedures and clinical trials. The SLUCare transaction was accounted for as a business combination as of July 1, 2022 and acquired assets and liabilities were recorded at fair values. Total assets acquired of \$144,400 includes \$7,672 of tangible assets, \$138,451 of Goodwill, and \$10,072 of other intangible assets—net. Total liabilities assumed were \$11,795. In addition, as part of this transaction, SSM Health redeemed Saint Louis University's 15% membership interest in SSM Health St. Louis in a cash transaction as displayed in the consolidated statement of cash flows. SSM Health recognized annual revenues from SLUCare totaling \$171,783 during the year ended December 31, 2023 and revenues totaling \$93,391 for the six months ended December 31, 2022.

**Impairments and assets held for sale**—As of December 31, 2023, a \$33,096 impairment loss was taken on the consolidated statement of operations and changes in net assets to adjust certain assets to their net realizable value related to the abandonment of certain contracts and facilities that are being repurposed or relocated. In addition, certain property and equipment assets were adjusted to their

approximate fair value, less cost to sell that are now classified as held for sale. These impairments impacted the following balance sheet line items: property and equipment – net for \$18,109, operating right-of-use assets for \$6,600, and other non-current assets for \$8,387. The assets classified as assets held for sale as of December 31, 2023 were \$25,650.

### 13. DEBT AND FINANCE LEASE OBLIGATIONS

Debt as of December 31, 2023 and 2022, consists of the following:

	2023	2022
Fixed rate:		
Series 2023A Bonds fixed rate debt, due 2039 with a put option June 2028, 5.00% interest rate, plus net unamortized premium of \$6,926 at December 31, 2023	\$ 88,911	\$ -
Series 2014A, 2016 Sarah Community, 2017A, 2017 Agnesian, 2018, 2018A, 2018B, 2018C, 2019 Sarah Community, 2019A, 2019B, 2022A and 2023 Bonds fixed rate debt, due through 2052, interest rates from 2.65% to 5.00% plus net unamortized premium of \$35,017 and \$40,389 at December 31, 2023 and 2022, respectively	<u>1,500,832</u>	<u>1,836,214</u>
Total fixed rate debt	<u>1,589,743</u>	<u>1,836,214</u>
Variable rate:		
Series 2019C Variable Rate Direct Loans Issued July 2019, 4.73% at December 31, 2023, with put option July 2025, and maturing June 2029.	21,035	25,465
Series 2014B-G, Series 2018D-F, and 2023B Variable Rate Demand Bonds, 3.50% to 5.33% at December 31, 2023, due serially through 2053	<u>665,180</u>	<u>443,580</u>
Total variable rate debt	<u>686,215</u>	<u>469,045</u>
Revolving line of credit	<u>97,410</u>	<u>-</u>
Deferred financing costs	<u>(9,528)</u>	<u>(7,899)</u>
Commercial paper, 5.44% at December 31, 2023	175,000	175,000
Note payable due through 2024, plus net unamortized discount of \$404 and \$1,215 at December 31, 2023 and 2022, respectively. Collateralized by certain real estate	23,762	47,118
Unsecured note payable due through 2025	21,842	52,763
Notes payable, due at various dates through 2028, interest at 8.00% to 8.25%, unsecured	163	436
Finance lease obligations, at varying rates from 3.00% to 13.31% collateralized by leased equipment and property	<u>17,733</u>	<u>16,719</u>
Total debt and finance lease obligations	2,602,340	2,589,396
Less commercial paper-recorded in other current liabilities	175,000	175,000
Less revolving line of credit	97,410	-
Less finance lease obligations, excluding current portion	16,006	14,640
Less short-term borrowings	665,180	443,580
Less current portion of long-term debt and finance lease obligations	<u>57,931</u>	<u>602,034</u>
Total long-term debt	<u>\$ 1,590,813</u>	<u>\$ 1,354,142</u>

**SSM Health Master Indenture**—SSMHCC is a member of the SSM Health Credit Group (Credit Group) and the only obligated group member pursuant to a master trust indenture (amended and restated) dated May 15, 1998. The Credit Group also includes certain SSMH's affiliates referred to as "Designated Affiliates" under the master trust indenture. SSMH corporations not included in the Credit Group include NHS and Lumicera Health Services, as well as a variety of entities consisting primarily of foundations, medical office building corporations, employed physician practices, and various other corporations involved in activities supporting SSMH. The net assets of the Designated Affiliates are available to SSMHCC to service all obligations under the master indenture. Various issuing authorities have issued tax-exempt revenue bonds under the master trust indenture. All debt under the master trust indenture is uninsured, but is subject to certain debt covenants, including the maintenance of a minimum debt service coverage ratio.

During 2022, SSMH assumed control of a not-for-profit faith-based retirement community, which included all assets and liabilities of the entity as well as assuming its debt. This entity became a fully consolidated subsidiary outside of the Credit Group. The debt, which sits outside the credit group, is guaranteed by SSMHCC and consists of two fixed rate bond series totaling approximately \$19,000 and \$21,000 as of December 31, 2023 and 2022, respectively. Additionally, in 2023 SSMHC closed on \$381,985 of 2023 and 2023A fixed rate notes along with \$224,570 of 2023B variable rate on demand bonds and in turn, paid down the \$614,325 outstanding on the 2018, 2018B and 2018C bonds. As of December 31, 2022, approximately \$524,435 million of 2018 Notes, that were refinanced in 2023, were outstanding in the current portion of long-term debt balance sheet line.

**Variable Rate Bonds**—The debt includes \$686,215 and \$469,045 at December 31, 2023 and 2022, respectively, of variable rate bonds. The interest rates on these bonds are reset at daily or longer intervals. The Series 2014B-G, Series 2018D-F, and 2023B variable rate demand bonds are supported through self-liquidity. The remaining variable rate bonds were issued as funded direct placements that do not require liquidity support. These series are classified as short-term borrowings based upon these accelerated terms. The contingent payments in the Contractual and Contingent Principal Repayments table below reflect these accelerated terms. However, SSMH's contractual payments do not reflect these accelerated terms. If any of these agreements are terminated and not replaced, extended, or renewed, SSMH can be required to purchase the tendered bonds at the specified bank rate in a specified period.



**Contractual and Contingent Principal Repayments**—Contractual and contingent principal repayments on debt and finance lease obligations of SSMH are as follows:

	Debt Contractual Payments	Contingent Payments	Finance Lease Obligations
2024	\$ 59,189	\$ 721,384	\$ 3,742
2025	34,933	44,763	2,856
2026	29,713	18,568	2,560
2027	530,005	519,190	2,622
2028	330,121	401,556	2,701
Thereafter	<u>1,296,225</u>	<u>574,725</u>	<u>11,075</u>
	2,280,186	2,280,186	25,556
Plus amount representing net premium	41,539	41,539	
Less amount representing interest under finance lease obligations			<u>(7,823)</u>
Plus finance lease principal payments	17,733	17,733	<u>\$ 17,733</u>
Plus commercial paper	175,000	175,000	
Plus revolving line of credit	97,410	97,410	
Less deferred financing costs	<u>(9,528)</u>	<u>(9,528)</u>	
Total debt and finance lease obligations	<u>\$ 2,602,340</u>	<u>\$ 2,602,340</u>	

**Other Notes Payable**—In 2022, SSMH purchased a group of real estate properties that were partially financed with a \$48.3 million promissory note due to the seller of the properties. The note is secured by the properties and payable in equal installments with a final maturity date in 2024.

**Commercial Paper**—SSMH utilizes commercial paper supported by self-liquidity for general corporate purposes. Under the program, SSMH is registered to issue up to \$400,000. At December 31, 2023 and 2022, \$175,000 of commercial paper was issued and is included in other current liabilities on the consolidated balance sheets.

**Revolving Line of Credit**—SSMH utilizes revolving lines of credit for general corporate purposes. On June 23, 2022, SSMH entered into a \$500,000 364-day revolving line of credit agreement. This agreement was amended and restated on June 22, 2023 to expand the facility size to \$700,000. All other terms remain the same. The revolver is secured under SSMH's existing master trust indenture. NHS also maintains an unsecured \$200,000 364-day revolving line of credit. As of December 31, 2023, no balance was outstanding on SSMH's revolving line of credit, while NHS' line of credit had a balance outstanding of \$97,410.

**Deferred Financing Costs, Debt Premiums, and Discounts**—Deferred financing costs and any premium or discount are amortized using the effective interest rate method over the term of the related obligation (or call date when applicable).

Cash Paid for Interest—Cash paid for interest totaled \$85,027 and \$84,502 for the years ended December 31, 2023 and 2022, respectively. SSMH capitalized interest costs in the amounts of \$611 and \$373 for the years ended December 31, 2023 and 2022, respectively.

#### 14. PENSION AND OTHER POSTRETIREMENT BENEFIT PLANS

SSMH administers several qualified and nonqualified pension plans for its employees. As of January 1, 2021, all benefits of the pension plans are frozen.

The following table summarizes the benefit obligations, the fair value of plan assets, and the funded status at December 31, 2023 and 2022:

	2023	2022
Change in projected benefit obligation:		
Projected benefit obligation—beginning of period	\$ 1,681,475	\$ 2,324,828
Interest costs on projected benefit obligation	89,764	66,362
Actuarial loss (gain)	106,980	(551,906)
Settlements	(15,695)	(7,281)
Benefits paid	<u>(137,332)</u>	<u>(150,528)</u>
Projected benefit obligation—end of period	<u>1,725,192</u>	<u>1,681,475</u>
Change in plan assets:		
Fair value of plan assets—beginning of period	1,503,609	1,772,426
Actual return on plan assets	165,856	(165,440)
Employer contributions	27,224	50,000
Settlements	(15,695)	(7,281)
Benefits paid	<u>(132,969)</u>	<u>(146,097)</u>
Fair value of plan assets—end of period	<u>1,548,025</u>	<u>1,503,609</u>
Net amount recognized at end of period and funded status	<u>\$ (177,167)</u>	<u>\$ (177,867)</u>
Accumulated benefit obligation—end of period	<u>\$ 1,725,192</u>	<u>\$ 1,681,475</u>

The actuarial loss on the benefit obligation for the year ended December 31, 2023 was primarily attributable to the decrease in discount rate from 5.58% to 5.25%. The actuarial gain on the benefit obligation for the year ended December 31, 2022 was primarily attributable to the increase in discount rate from 2.95% to 5.58%.

SSMH holds the majority of the plans financial assets in CIP, which also includes the investments included in investments and assets whose use is limited. For a summary of the plans allocated proportionate share of CIP, including fair value leveling see Note 8—Fair Value Measurements.

Under accounting guidelines non-qualified pension plan liabilities are included as plan liabilities, but the investments are not considered to be plan assets. Accordingly, the table above does not include investments with a fair value of \$42,573 and \$42,364 as of December 31, 2023 and 2022, respectively, which are included as assets limited as to use or restricted on SSMH's consolidated balance sheets.

The following is a summary of the amounts recognized in the consolidated balance sheets for the years ended December 31, 2023 and 2022:

	2023	2022
Amounts recognized in the consolidated balance sheets consist of:		
Accounts payable and accrued expenses	\$ (3,633)	\$ (4,601)
Long-term pension liability	<u>(173,536)</u>	<u>(173,266)</u>
Net amount recognized	<u>\$ (177,169)</u>	<u>\$ (177,867)</u>
Amounts recognized in unrestricted net assets consist of:		
Beginning of year balance	\$ 171,377	\$ 494,494
Arising during current year--net actuarial loss (gain)	59,166	(265,869)
Actuarial gain recognized due to settlement	(3,100)	(741)
Reclassified into net periodic benefit cost:		
Net actuarial gain (loss)	60	(55,913)
Prior service credit	<u>(594)</u>	<u>(594)</u>
End-of-year balance	<u>\$ 226,909</u>	<u>\$ 171,377</u>

The following is a summary of the components of net periodic pension cost recognized in Nonoperating Gains and (Losses) for the years ended December 31, 2023 and 2022:

	2023	2022
Interest costs on projected benefit obligation	\$ 89,764	\$ 66,362
Expected return on plan assets	(118,043)	(120,156)
Amortization of unrecognized:		
Prior service cost	594	594
Net loss	<u>(60)</u>	<u>55,913</u>
Net periodic pension cost	(27,745)	2,713
Settlement	<u>3,100</u>	<u>741</u>
Total cost	<u>\$ (24,645)</u>	<u>\$ 3,454</u>

The following are the actuarial assumptions used by the pension plans to develop the components of pension expense for the years ended December 31, 2023 and 2022:

	2023	2022
Discount rates	5.58 %	2.95 %
Return on plan assets	7.50	7.50

The following are the actuarial assumptions used by the pension plans to develop the components of the pension projected benefit obligation as of December 31, 2023 and 2022:

	2023	2022
Weighted average discount rates	5.25 %	5.58 %

SSMH is not expecting to contribute to its pension plans in 2024.

Estimated Future Benefit Payments—The following benefit payments are expected to be paid:

	Pension Benefits
2024	\$ 133,474
2025	135,103
2026	136,198
2027	138,614
2028	136,079
Years 2029–2033	627,978

The actual plan asset allocations and the allocation goals comprise the following investment classifications at December 31, 2023 and 2022:

	2023	2022	Allocation Goals
Cash, cash equivalents, and short-term investments	0 %	1 %	1 %
Equities	32	36	37
Fixed income	27	22	21
Core real estate	7	7	7
Real asset investments	6	6	6
Private credit	6	6	6
Hedge funds	5	5	5
Volatility risk premium	5	5	5
Private equity	<u>12</u>	<u>12</u>	<u>12</u>
	<u>100 %</u>	<u>100 %</u>	<u>100 %</u>

SSMH's investment objective with respect to pension plans is to produce sufficient current income and capital growth through a portfolio of diversified public and private investments, which together with appropriate employer contributions is sufficient to provide for the pension benefit obligations. Within the real asset, private credit, and private equity categories are investments in limited liability companies, limited partnerships and REIT interests. The assumed return on plan assets is intended to be a long-term rate expected on funds invested or to be invested in accordance with SSMH's asset allocation policy to provide for benefits reflected in the plans' projected benefit obligation. In developing the assumptions, SSMH evaluates input from its actuary and pension fund investment advisors. Pension assets are managed by outside investment managers in accordance with the investment policies and guidelines established by the pension trustees, and are diversified by investment style, asset category, sector, industry, issuer, geographical location, and maturity. Pension assets are rebalanced each quarter per the plan's asset allocation guidelines. SSMH anticipates that its

Investment managers will continue to generate long-term returns equal to or in excess of its assumed rates.

**Defined Contribution Plans**—SSMH contributes to a defined contribution plan for eligible employees based upon a percentage of employee compensation. The expense for this plan was \$86,010 and \$71,109 for 2023 and 2022, respectively, and is included in salaries and benefits on the consolidated statements of operations and changes in net assets. SSMH also sponsors defined contribution plans covering employees who participate in the voluntary tax deferred annuity program and other defined contribution plans and who meet age and service requirements. SSMH's contributions to these plans are based on a percentage of employee compensation or employee contributions. The defined contribution pension expense for these plans was \$72,423 and \$57,456 for 2023 and 2022, respectively, and is included in salaries and benefits on the consolidated statements of operations and changes in net assets.

**15. SELF-INSURANCE**

**Professional and General Liability Insurance**—A majority of the members of SSMH participate in the SSMH Liability Trust I or SSMH Liability Trust II (the "Trusts"). Both Trusts are revocable grantor trusts. These Trusts, which cover primary limits of professional and general liability, require annual contributions by participating entities at actuarially determined amounts.

SSMH's underlying self-insured retention for professional liability claims is as follows:

	January 1, 2023 to December 31, 2023
Per occurrence limits—Missouri, Oklahoma and Illinois	\$ 10,000
Per occurrence limits—Missouri, (Select Locations)	\$ 15,000
Annual aggregate—Missouri, Oklahoma and Illinois	None

SSMH's hospitals and physicians located in Wisconsin are qualified health care providers as defined by Wisconsin state statutes regarding professional liability coverage and participate in the State of Wisconsin Injured Patients and Families Compensation Fund (PCF). As defined by Wisconsin state statute, these hospitals and physicians have separate professional liability limits of \$1,000 per claim and a \$3,000 annual aggregate applied to each qualified provider. Losses in excess of these amounts are fully covered through mandatory participation in the PCF. SSMH is commercially insured up to these limits for these hospitals and physicians. For any Wisconsin operation not qualified to participate in the PCF, separate commercial limits of liability are purchased; limits and coverages are evaluated annually.

SSMH's underlying self-insured retention for general liability claims is as follows:

	2023
Per occurrence limits—Missouri, Oklahoma, Wisconsin and Illinois	\$3,000
Annual aggregate—Missouri, Oklahoma, Wisconsin and Illinois	None

SSMH maintains reinsurance through a wholly owned captive for professional and general liability claims exceeding the underlying self-insured retention. The reinsurance provides coverage (based on specific policy terms, conditions and limitations) up to the limits in the following table. The sublimits that apply are part of and not in addition to the overall policy aggregate limits.

All Locations	January 1, 2023 to December 31, 2023
Each loss event	\$ 145,000
Annual aggregate	145,000

The estimated professional and general liability obligation is recorded in the consolidated financial statements at the present value of future cash payments for both asserted and unasserted claims, using a discount rate of 3% at December 31, 2023 and 2022. The liability for self-insured reserves represents estimates of the ultimate net cost of all losses and related expenses, which are incurred but not paid at the balance sheet date based on an actuarial valuation. This estimated obligation is \$141,813 and \$139,335 at December 31, 2023 and 2022, respectively, of which \$43,622 and \$41,099 is recorded in accounts payable and accrued expenses on the consolidated balance sheets at December 31, 2023 and 2022, respectively.

The accumulated assets of the Trusts are not available to participating members except to pay covered professional liability claims or to reduce future contributions when warranted by claims experience. In the event the Trusts are ever depleted, the participating members would be required to fund deficiencies based on future actuarial determinations.

Dean Health Services (DHS) retains deductible levels with respect to its professional liability program. For professional liability claims reported on or after July 1, 2004, the per-occurrence deductible level is \$1,000 per defendant, and the annual aggregate deductible level is \$3,000. DHS is contractually obligated to reimburse its insurance carriers for all claims paid under the professional liability policies. The PCF also provides unlimited insurance for amounts in excess of the deductibles. DHS recognized a liability of \$7,836 and \$7,367 at December 31, 2023 and 2022, respectively, of which \$1,786 and \$1,317 is recorded in accounts payable and accrued expenses on the consolidated balance sheets at December 31, 2023 and 2022, respectively.

**Workers' Compensation**—A majority of the members of SSMH participate in SSMH's centralized self-insured workers' compensation program. Claims in excess of certain liability limitations are covered by commercial insurance. The estimated workers' compensation liability obligation is actuarially determined. SSMH records these amounts in accounts payable and accrued expenses and in other long-term liabilities on the consolidated balance sheets at the present value of future cash payments for both asserted and unasserted claims, using a discount rate of 1% at December 31, 2023 and 2022.

Employee Health Insurance—Effective January 1, 2020, all members of SSMH participate in the SSM Employee Health Care Plan as well as other self-funded plans (the Plans). Each participating member funds an actuarially determined amount for payment of covered benefits and related expenses, which are subject to certain limitations. Claims paid by the Plans are included in salaries and benefits expense other on the consolidated statements of operations and changes in net assets and include claims paid by the Plans to SSMH ministries of \$238,563 and \$224,198 for the years ended December 31, 2023 and 2022, respectively. SSMH recorded on the consolidated balance sheets, in accounts payable and accrued expenses, a reserve for incurred but not reported claims of \$49,032 and \$45,514 for the years ended December 31, 2023 and 2022, respectively.

#### 16. LEASES

As of December 31, 2023, SSMH has \$43,835 of current operating lease obligations included in accounts payable and accrued expenses and \$201,018 of long-term lease obligations on the consolidated balance sheet. As of December 31, 2022, SSMH has \$43,624 of current operating lease obligations included in accounts payable and accrued expenses and \$164,583 of long-term lease obligations on the consolidated balance sheet.

The following table presents certain information related to the lease costs for operating leases for the years ended December 31, 2023 and 2022.

	2023	2022
Operating lease costs	\$ 78,443	\$ 82,954
Short-term lease costs	14,004	12,976
Variable lease costs	<u>13,583</u>	<u>10,396</u>
Total operating lease costs	<u>\$ 106,030</u>	<u>\$ 106,326</u>

As of December 31, 2023 and 2022, the weighted average remaining operating lease term was 6.5 years and 6.8 years with a weighted average discount rate of 3.5% and 3.7%, respectively.

Commitments related to noncancelable operating lease obligations for each of the next five years and thereafter are as follows:

2024	\$ 50,997
2025	40,173
2026	35,820
2027	32,086
2028	28,392
Thereafter	<u>113,036</u>
Total undiscounted minimum lease payments	300,504
Less amount of lease payments representing interest	<u>55,651</u>
Present value of future minimum lease payments	244,853
Less current obligations under accounts payable and accrued expenses	<u>43,835</u>
Long-term lease obligations	<u>\$ 201,018</u>

17. NET ASSETS AND ENDOWMENTS

Net assets with donor restrictions were available for the following purposes for the years ended December 31, 2023 and 2022:

	2023	2022
Subject to expenditure for healthcare operations	\$ 120,319	\$ 81,665
Endowments subject to the SSMH Foundations' endowment spending policies and appropriation	<u>67,824</u>	<u>61,368</u>
Net assets with donor restrictions	<u>\$ 188,143</u>	<u>\$ 143,033</u>

Net assets without donor restrictions were as follows for the years ended December 31, 2023 and 2022:

	2023	2022
Undesignated	<u>\$ 4,305,961</u>	<u>\$ 4,128,298</u>
Board-designated for:		
Foundation assets designated for hospital operations and other	163,296	133,952
Endowments	<u>27,934</u>	<u>24,407</u>
	<u>191,230</u>	<u>158,359</u>
Net assets without donor restrictions	<u>\$ 4,497,191</u>	<u>\$ 4,286,657</u>

Endowments consist of approximately 150 individual funds established for a variety of purposes. They include both donor-restricted endowment funds and funds designated by the boards of trustees or governors of each of its foundations to function as endowments (board-designated endowment funds).

Changes in Endowment Net Assets	Without		Total
	Donor Restrictions	With Donor Restrictions	
Endowment net assets—January 1, 2022	\$ 29,852	\$ 58,666	\$ 88,518
Investment return—net loss	(3,833)	(6,762)	(10,595)
Contributions	669	10,427	11,096
Transfers to create board designated endowment funds	(825)	825	-
Appropriation of endowment assets for expenditure	<u>(1,456)</u>	<u>(1,788)</u>	<u>(3,244)</u>
Endowment net assets—December 31, 2022	24,407	61,368	85,775
Investment return—net gain	3,916	7,127	11,043
Contributions	341	1,400	1,741
Appropriation of endowment assets for expenditure	<u>(730)</u>	<u>(2,071)</u>	<u>(2,801)</u>
Endowment net assets—December 31, 2023	<u>\$ 27,934</u>	<u>\$ 67,824</u>	<u>\$ 95,758</u>



**Funds with Deficiencies**—From time to time, the fair value of assets associated with individual donor-restricted endowment funds may fall below the level that the donor or current law requires SSMH to retain as a fund of perpetual duration (underwater endowments). SSMH has interpreted applicable law to permit spending from underwater funds in accordance with the prudent measures required under the law. SSMH Foundations' policies allows spending from underwater endowment funds, unless otherwise precluded by donor intent or relevant laws and regulations. As of December 31, 2023, an immaterial deficiency existed in two endowments across the system. As of December 31, 2022, an immaterial deficiency existed in seven endowments across the system.

**Return Objectives and Risk Parameters**—SSMH Foundations have investment and spending practices for endowment assets that intend to provide a predictable stream of funding to programs supported by its endowment while seeking to maintain the purchasing power of the endowment assets. Endowment assets include those assets of donor-restricted funds that SSMH Foundations must hold in perpetuity or for a donor-specified period(s) as well as board-designated funds. The policy allows the endowment assets to be invested in a manner that is intended to produce results that exceed the price and yield results of the allocation index while assuming a moderate level of investment risk. SSMH expects its endowment funds to provide a rate of return that preserves the gift and generates earnings to achieve the endowment purpose.

**Strategies Employed for Achieving Objectives**—To satisfy its long-term rate-of-return objectives, SSMH relies on a total return strategy in which investment returns are achieved through both capital appreciation (realized and unrealized) and interest and dividend income. SSMH uses a diversified asset allocation to achieve its long-term return objectives within prudent risk constraints to preserve capital.

**Spending Policy and Investment Objectives**—SSMH Foundations have a practice of distributing the major portion of current-year earnings on the endowment funds, if the restrictions have been met. Some of the donor-restricted endowments require a portion of the earnings to increase the corpus of the endowment. This is consistent with the organization's objective to maintain the purchasing power of the endowment assets held in perpetuity as well as to provide additional real growth through new gifts and investment return.

## 18. DERIVATIVE INSTRUMENTS

SSMH utilizes various interest rate swap contracts to manage interest cost and debt duration. None of these swaps have been designated as hedges of the interest payments on outstanding debt obligations for accounting purposes.

At December 31, 2023, SSMH had seven floating-to-fixed interest rate swaps, two fixed-to-floating interest rate swaps, four fixed spread basis swaps and two total return swaps. At December 31, 2022, SSMH had six floating-to-fixed interest rate swaps while the other swap types were the same as 2023.

Under all the outstanding floating-to-fixed interest rate swaps with the exception of two, SSMH receives LIBOR or a percentage of LIBOR plus a spread of 0.12% and pays a fixed rate. LIBOR was officially removed as an official index on June 20, 2023, at which time SSMH's counterparties converted to utilizing a one-month lookback rate for existing LIBOR-based swaps. Under the remaining floating-to-fixed interest rate swaps, SSMH receives a portion of SOFR and pays a fixed rate. Under the fixed-to-floating interest rate swaps, SSMH receives a fixed rate and pays Securities Industry and Financial Markets Association Municipal Swap Index (SIFMA). Under the fixed spread basis swaps, SSMH pays a rate based on SIFMA and receives a percentage of LIBOR plus a spread ranging from 0.40% and 0.62%. Under the total return swaps, SSMH pays both a fixed rate equal to the coupon interest rate on the

underlying bond or direct placement loan, as well as a variable rate based on SIFMA plus a spread, then receives the same fixed rate equal to the coupon interest rate on the underlying bond or direct placement loan. Counterparties to SSMH's swaps are diversified and include JP Morgan, Citibank, Wells Fargo, BNY Mellon, Barclays, RBC, and PNC Bank.

Certain swap agreements require SSMH to provide collateral if SSMH's liability, determined on a mark-to-market basis, exceeds a specified threshold. SSMH's interest rate swap agreements allow for net settlements of payment in the normal course of business as well as offsetting of all contracts with a given counterparty in the event of default or bankruptcy of one of the two parties of the transaction. As of December 31, 2023 and 2022, SSMH had posted \$0 in collateral for the benefit of the counterparties.

As part of CIP, SSMH holds investments in interest rate swaps and options, credit default swaps and futures. This economic hedging is based on investment portfolio exposure to long-only equities, foreign exchange and fixed income. No leverage is utilized for this hedging activity.

The following table shows the outstanding notional amount of derivative instruments measured at fair value as reported in other liabilities and assets whose use is limited in the consolidated balance sheets as of December 31, 2023 and 2022:

December 31, 2023	Recorded on Balance Sheet	Maturity Date of Derivatives	Fixed Rate	Notional Amount Outstanding	Fair Value
Derivatives not designated as hedges—interest rate swaps	Other assets	2028-2053	2.17%–3.17%	<u>\$1,111,400</u>	<u>\$ 30,820</u>
Derivatives not designated as hedges—interest rate swaps	Other liabilities	2034–2045		<u>475,150</u>	<u>(14,041)</u>
Derivatives not designated as hedges—trading derivatives: Futures Options	Assets limited as to use or restricted	2024		1,511	1,121
		2024		<u>679,186</u>	<u>(1,751)</u>
				<u>680,697</u>	<u>(630)</u>
Total				<u>\$2,267,247</u>	<u>\$ 16,149</u>

December 31, 2022	Recorded on Balance Sheet	Maturity Date of Derivatives	Fixed Rate	Notional Amount Outstanding	Fair Value
Derivatives not designated as hedges—Interest rate swaps	Other liabilities	2023–2044	2.17%–3.00%	\$ 972,370	\$ (24,876)
Derivatives not designated as hedges—Interest rate swaps	Other assets	2035–2050		377,180	16,009
Derivatives not designated as hedges—trading derivatives:	Assets limited as to use or restricted				
Credit default swaps		2023–2026		16,906	(6)
Futures		2023		79,264	8,618
Interest rate swaps		2023–2030	1.00%–2.00%	44,598	(296)
Options		2023		316,354	(2,113)
				457,122	6,203
Total				\$1,806,672	\$ (2,664)

Fair value is based on Instruments trading in active markets (Level 1) and significant other observable inputs (Level 2) at December 31, 2023 and 2022. The gains and losses related to trading derivative instruments have been included in the disclosures reported in Note 7—Assets Limited as to Use or Restricted.

SSMH's credit derivative Instruments are under a master agreement that provides the ability to close out and net the total exposure to a counterparty in the event of a default or other termination events. Counterparty risk is managed by requiring high credit standards for SSMH's counterparties as well as collateral posting requirements. As of December 31, 2023 and 2022, SSMH posted \$632,054 and \$316,552, respectively, of collateral for the credit and equity trading derivative Instruments allocated to SSMH from CIP.

The net presentation of SSMH's financial instruments subject to rights of offset are summarized as follows:

Offsetting of Financial and Derivative Assets

Description	Gross Amounts of Recognized Assets	Gross Amounts Offset in the Consolidated Balance Sheets	Net Amounts Presented in the Consolidated Balance Sheets	Gross Amounts not Offset in the Consolidated Balance Sheets	Net Amount
As of December 31, 2023—					
Asset derivatives:					
Interest rate swaps	<u>\$ 30,820</u>	<u>\$ -</u>	<u>\$ 30,820</u>	<u>\$ (14,041)</u>	<u>\$ 16,779</u>
Trading derivatives:					
Futures	\$ 1,121	\$ -	\$ 1,121	\$ -	\$ 1,121
Options	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
	<u>\$ 1,121</u>	<u>\$ -</u>	<u>\$ 1,121</u>	<u>\$ -</u>	<u>\$ 1,121</u>
As of December 31, 2022—					
Asset derivatives:					
Interest rate swaps	<u>\$ 16,009</u>	<u>\$ -</u>	<u>\$ 16,009</u>	<u>\$ -</u>	<u>\$ 16,009</u>
Trading derivatives:					
Credit default swap	\$ 19	\$ (25)	\$ (6)	\$ -	\$ (6)
Futures	8,618	-	8,618	-	8,618
Interest rate swaps	1,451	(1,747)	(296)	-	(296)
Options	<u>2,669</u>	<u>(4,782)</u>	<u>(2,113)</u>	<u>-</u>	<u>(2,113)</u>
	<u>\$ 12,757</u>	<u>\$ (6,554)</u>	<u>\$ 6,203</u>	<u>\$ -</u>	<u>\$ 6,203</u>

Offsetting of Financial and  
Derivative Liabilities

Description	Gross Amounts of Recognized Liabilities	Gross Amounts Offset in the Consolidated Balance Sheets	Net Amounts Presented in the Consolidated Balance Sheets	Gross Amounts not Offset in the Consolidated Balance Sheets	Net Amount
As of December 31, 2023—					
Asset derivatives—					
Trading derivatives:					
Futures	\$ -	\$ -	\$ -	\$ -	\$ -
Options	<u>(1,751)</u>	<u>-</u>	<u>(1,751)</u>	<u>-</u>	<u>(1,751)</u>
	<u>\$ (1,751)</u>	<u>\$ -</u>	<u>\$ (1,751)</u>	<u>\$ -</u>	<u>\$ (1,751)</u>
Liability derivatives—Interest rate swaps					
	<u>\$ 14,041</u>	<u>\$ -</u>	<u>\$ 14,041</u>	<u>\$ -</u>	<u>\$ 14,041</u>
As of December 31, 2022—					
Asset derivatives—					
Trading derivatives:					
Credit default swap	\$ 25	\$ (25)	\$ -	\$ -	\$ -
Futures	-	-	-	-	-
Interest rate swaps	1,747	(1,747)	-	-	-
Options	<u>4,782</u>	<u>(4,782)</u>	<u>-</u>	<u>-</u>	<u>-</u>
	<u>\$ 6,554</u>	<u>\$ (6,554)</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
Liability derivatives—Interest rate swaps					
	<u>\$ 24,876</u>	<u>\$ -</u>	<u>\$ 24,876</u>	<u>\$ (16,009)</u>	<u>\$ 8,867</u>

19. INCOME TAXES

The components of income tax expense included in other-net nonoperating gains and (losses) on the consolidated statements of operations and changes in net assets for the years ended December 31, 2023 and 2022, are as follows:

	2023	2022
Current tax expense:		
Federal	\$ 792	\$ 1,618
State	<u>453</u>	<u>4,171</u>
Income tax expense	<u>\$ 1,245</u>	<u>\$ 5,789</u>

The components of deferred taxes are as follows:

	2023	2022
Assets:		
Net operating loss and credit carryforwards	\$ 249,256	\$ 471,607
Accrued employee compensation	6,725	5,817
Other nondeductible liabilities	42,518	6,340
Uncollectible accounts	1,304	4
Other	<u>2,273</u>	<u>(2,467)</u>
<b>Total assets</b>	<u>302,076</u>	<u>481,301</u>
Liabilities:		
Depreciable and amortizable assets	(48,784)	(33,221)
Investment in subsidiaries	(22,409)	(8,887)
Other	<u>(3,525)</u>	<u>(422)</u>
<b>Total liabilities</b>	<u>(74,718)</u>	<u>(42,530)</u>
Valuation allowance	<u>(227,358)</u>	<u>(438,771)</u>
<b>Net deferred income tax assets</b>	<u>\$ ..</u>	<u>\$ ..</u>

As of December 31, 2023 and 2022, the deferred income tax benefits were recorded net of a valuation allowance of \$227,358 and \$438,771, respectively, primarily due to net operating loss carryforwards available related to its for-profit subsidiaries, which expire between 2021 and 2037. A valuation allowance was provided because it is more likely than not that the net operating losses will expire unutilized. During the year ended December 31, 2023, SSMH decreased the valuation allowance by \$211,412 based on 2023 net incomes. During the year ended December 31, 2022, SSMH increased the valuation allowance by \$72,722 based on 2022 net losses.

The provision for federal income taxes incurred is different from that which would be obtained by applying the statutory federal income tax rate of 21% to net income before taxes. The significant items causing this difference are the net income of tax-exempt subsidiaries, changes in valuation allowances on deferred tax assets, and nondeductible compensation.

SSMH files income tax returns in the U.S. federal jurisdiction and in various state jurisdictions. SSMH is no longer subject to U.S. or state income tax examinations by tax authorities for the years before 2017.

**Cash Paid for Income Taxes**—Cash paid for income taxes totaled \$4,016 and \$7,931 for the years ended December 31, 2023 and 2022, respectively.

## 20. FUNCTIONAL EXPENSES

SSMH provides general health care services to residents within its geographic locations. Expenses by functional classification for the year ended December 31, 2023, are as follows:

	Health Care Services	General/ Administrative	Pharmacy Benefit Mgmt	Total
Salaries and benefits	\$3,523,068	\$ 770,000	\$ 192,585	\$ 4,485,653
Medical claims	624,843	-	-	624,843
Supplies	1,663,771	7,207	-	1,670,978
PBM Supplies	-	-	1,464,877	1,464,877
Professional fees and other	1,327,390	539,015	80,250	1,946,655
Interest	1,697	86,862	(7,889)	80,670
Depreciation and amortization	191,067	88,089	9,793	288,949
Impairment losses	33,096	-	-	33,096
	<u>\$7,364,932</u>	<u>\$1,491,173</u>	<u>\$1,739,616</u>	<u>\$ 10,595,721</u>

Expenses by functional classification for the year ended December 31, 2022, are as follows:

	Health Care Services	General/ Administrative	Pharmacy Benefit Mgmt	Total
Salaries and benefits	\$3,203,375	\$ 737,546	\$ 140,502	\$ 4,081,423
Medical claims	520,249	-	-	520,249
Supplies	1,460,532	5,266	-	1,465,798
PBM Supplies	-	-	1,222,826	1,222,826
Professional fees and other	1,328,999	475,863	72,042	1,876,904
Interest	1,545	77,854	885	80,284
Depreciation and amortization	207,276	91,572	9,793	308,641
	<u>\$6,721,976</u>	<u>\$1,388,101</u>	<u>\$1,446,048</u>	<u>\$ 9,556,125</u>

The financial statements report certain categories of expenses that are attributable to more than one program or supporting function. Therefore, these expenses require allocation on a reasonable basis that is consistently applied. The expenses that are allocated include human resources, finance, treasury, legal, technology services and other functions. These expenses are allocated to healthcare services and general and administrative services based on the functional department for which they are incurred. Departmental expenses may include allocations of costs based on direct assignment, expenses or other methods.

## 21. COMMITMENTS AND CONTINGENT LIABILITIES

SSMH has outstanding letters of credit of \$24,415 and \$20,873 at December 31, 2023 and 2022, respectively. There were no outstanding draws on these letters of credit.

As of December 31, 2023, SSMH has entered construction projects for new facilities and capital improvements to existing facilities. As of December 31, 2023, SSMH has unmet commitments of approximately \$140,674, which will be financed with board-designated assets, project funds, or cash generated from operations. As part of acquisition agreements in Wisconsin, SSMH has an outstanding commitment of approximately \$50,000 for strategic and routine capital to be paid through 2028.

SSMH has entered certain other guarantees with outside entities to be paid out from 2023 through 2024, which totaled \$15,390 at December 31, 2023.

During a periodic cost report audit performed by the Medicare Administrative Contractor (MAC) in Oklahoma, the MAC identified potential issues with the calculation of the disproportionate share hospital (DSH) payments paid to SSMH's Oklahoma facility (the Hospital). In 2013, the CMS rendered a ruling for full repayment of the DSH payments attributable to the adolescent psychiatric program for the year ended December 31, 2006. As of December 31, 2023 and 2022, \$28,300 and \$28,300, respectively, was included in estimated third-party payor settlements payables other on the consolidated balance sheets related to this ruling. SSMH appealed to the Provider Reimbursement Review Board (PRRB). In January 2018, PRRB ruled in favor of the Hospital for the 2006 DSH settlement, which was remanded back to the PRRB for further review. In 2022, the final PRRB determination was not ruled in favor of the Hospital. SSMH is continuing the litigation process.

See Notes 8—Fair Value Measurements, 13—Debt and Finance Lease Obligations, and 16—Leases for additional information regarding commitments.

Outside of the matters described above, SSMH is involved in litigation and regulatory investigations arising in the normal course of business. After consultation with legal counsel, it is management's opinion that these matters will be resolved without a material adverse effect on SSMH's consolidated financial position or consolidated results of operations.

## 22. FINANCIAL ASSETS AND LIQUIDITY RESOURCES

As of December 31, 2023, financial assets and liquidity resources available within one year for general expenditure, such as operating expenses, scheduled principal payments on debt and capital expenditures not financed with debt were as follows:

Financial assets:	
Cash and cash equivalents	\$ 640,816
Investments	20,479
Patient accounts receivable	934,411
Pharmacy claims and rebates receivable	1,196,998
Other receivables	125,745
Assets limited as to use	<u>3,153,904</u>
Total financial assets	6,072,353
Liquidity resources:	
Unused commercial paper	225,000
Unused line of credit	<u>802,590</u>
Total financial assets and liquidity resources available within one year	<u>\$ 7,099,943</u>

SSMH considers board designated assets limited as to use to be available within one year for general expenditure except for those assets designated for pharmacy benefit claims, long-term employee benefit plans and board designated endowments.

SSMH utilizes an internally managed investment fund to meet cash needs for general expenditures of the organization. On a daily basis, either (i) excess funds generated from SSMH's operations are transferred to the internally managed investment fund, or (ii) liquidity needs for general expenditures



are sourced from the investment fund. The level of cash kept in the fund is based on management's determination of future working capital needs, debt service requirements, fixed capital needs, and other cash outflows of the organization.

On a quarterly basis, SSMH calculates the amount of its cash and investments that are available within certain time frames. As of December 31, 2023, the majority of SSMH's cash and short-term investments was available in three days or less. Of the remainder availability to receive proceeds ranges from one month or less to a year.

### 23. SUBSEQUENT EVENTS

For the year ended December 31, 2023, SSMH has evaluated subsequent events for potential recognition and disclosure through March 20, 2024, the date the financial statements were issued, noting no such events occurred.

\* \* \* \* \*



Certificate of Need Program

**SERVICE-SPECIFIC REVENUES AND EXPENSES**

**Project Title:** SSM Health St. Joseph Hospital - Lab **Project #:** 6168 HT

**Historical Financial Data for Latest Three Full Years plus Projections Through Three Full Years Beyond Project Completion**

*Use an individual form for each affected service with a sufficient number of copies of this form to cover entire period, and fill in the years in the appropriate blanks.*

	<b>Year</b>		
	<u>2025</u>	<u>2026</u>	<u>2027</u>
<b>Amount of Utilization:*</b>	4,600	4,700	4,800
<b>Revenue:</b>			
Average Charge**	\$3,655	\$3,728	\$3,802
Gross Revenue	<u>\$16,810,976</u>	<u>\$17,519,955</u>	<u>\$18,250,608</u>
Revenue Deductions	<u>14,103,401</u>	<u>14,385,469</u>	<u>14,673,179</u>
Operating Revenue	<u>2,707,575</u>	<u>3,134,486</u>	<u>2,436,766</u>
Other Revenue	<u>0</u>	<u>0</u>	<u>0</u>
<b>TOTAL REVENUE</b>	<u>\$2,707,575</u>	<u>\$3,134,486</u>	<u>\$2,436,766</u>
<b>Expenses:</b>			
Direct Expenses			
Salaries	<u>690,162</u>	<u>717,768</u>	<u>746,479</u>
Fees	<u>0</u>	<u>0</u>	<u>0</u>
Supplies	<u>82,376</u>	<u>85,671</u>	<u>89,098</u>
Other	<u>296,141</u>	<u>307,986</u>	<u>320,306</u>
<b>TOTAL DIRECT</b>	<u>\$1,068,679</u>	<u>\$1,111,425</u>	<u>\$1,155,883</u>
Indirect Expenses			
Depreciation	<u>0</u>	<u>0</u>	<u>0</u>
Interest***	<u>0</u>	<u>0</u>	<u>0</u>
Rent/Lease	<u>0</u>	<u>0</u>	<u>0</u>
Overhead****	<u>0</u>	<u>0</u>	<u>0</u>
<b>TOTAL INDIRECT</b>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
<b>TOTAL EXPENSES</b>	<u>\$1,068,679</u>	<u>\$1,111,425</u>	<u>\$1,155,883</u>
<b>NET INCOME (LOSS):</b>	<u>\$1,638,896</u>	<u>\$2,023,061</u>	<u>\$1,280,883</u>

\*Utilization will be measured in "patient days" for licensed beds, "procedures" for equipment, or other appropriate units of measure specific to the service affected.

\*\*Indicate how the average charge/procedure was calculated.

\*\*\*Only on long term debt, not construction.

\*\*\*\*Indicate how overhead was calculated.

1. Document that sufficient financing is available by providing a letter from a financial institution or an auditor's statement indicating that sufficient funds are available  
See attached
2. Provide Service-Specific Revenues and Expenses projected through three (3) FULL years beyond project completion

Volume	4,600	4,700	4,800
Avg Charge	3,654.56	3,727.65	3,802.21
Deductions	14,416,810	15,024,823	15,651,391
Net Revenue	2,394,175	2,495,146	2,599,199
Salaries	705,498	749,669	796,244
Supplies	84,207	89,479	95,038
Other	302,722	321,675	341,660
Total Expenses	1,092,427	1,160,822	1,232,941
Net Income	1,301,748	1,334,324	1,366,258

3. Document how patient charges are derived.

SSM Health employs a market-based hospital pricing strategy to align and remain competitive with Hospital IP & OP services. Ancillary Procedures (Technical/Facility Component) charges will be computed using the local peer competitor price data when available. The Medicare OPSS APC Wage Index Adjusted Payment Rate will be used as a benchmark comparison when available. The Contracting Analytics team will provide input for charges affected by payor contract fee schedules.

4. Document responsiveness to the needs of the medical indigent

SSM Health (SSM) is committed to providing financial assistance to people who are without insurance, underinsured, ineligible for a government program, or otherwise unable to pay for medically necessary care. SSM Health will provide care of emergency medical conditions to individuals regardless of their ability to pay.

Financial assistance is based on need and determined by Federal Poverty Levels, which includes income and number of family members. Financial need does not consider age, gender, race, social, or immigrant status, sexual orientation, or religious affiliation. SSM Health limits the amount charged for emergency and medically necessary care provided to patients who are eligible for financial assistance under this policy to not more than gross charges for the care multiplied by the amounts generally billed percentage.

SSM Health St. Joseph – Lake Saint Louis provided \$4,903,775 in charity care for the year of 2023.