ESSENZA Tech Specs (Technical Specifications)

Siemens ESSENZA 1.5 Tesla Magnet

- Configuration: Superconductive, short bore
- Strength: 1.5 T
- Homogeneity, ppm V-RMS: 7.5 (typical 6 ppm) ppm @ 45 x 45 x 30 cm DSV, 2.2 (typical 1.9) ppm @ 40 x 40 x 30 cm DSV, V-RMS (based on 24-plane plot)
- Dimensions of maximum useful FOV and homogeneity, (x, y, z): 45 x 45 x 30 cm
- Frequency drift, ppm/day:
- Shielding: Active, EIS (external interference shielding)
- Main magnet shimming: Active, passive
- Patient specific shimming: 3 linear terms (Standard) and second-order shim (Standard)
- Cryogen refill frequency: Refill typical 10 years; zero Helium boil-off technology

ESSENZA Gantry

- Bore diameter/height of patient opening: 60 cm
- Overall bore length: 145 cm, cover to cover
- Bore length with minimum opening: 103 cm
- In-bore patient comfort features: In-bore lighting (3 levels), in-bore ventilation (3 levels), in-bore intercom, look-out mirror, patient supervision monitor

RF / Gradient System

- Standard name: V engine
- Standard strength, z-axis, mT/m: 30 true each axis value; 52 vector summation
- Standard slew rate, z-axis, T/m/s: 100 true each axis value; 173 vector summation
- Cooling type: Water cooled for highest duty cycle
- Amplifier max power/axis, kW: 500 V engine
- Amplifier cooling type: Standard cooling, optional chiller

DICOM

- Modality worklist SCU: Standard
- MR Image Storage SCU: Standard
- Query/Retrieve SCU and SCP: Standard
- Storage commitment SCU: Standard
- Modality performed procedure step SCU: Standard
- IHE profiles supported: Standard

**ESSENZA Planning and Installation**

- Overall gantry dimensions (including covers), W x H x L: 2.11 x 1.31 x 2.14 meters (includes patient table)
- Minimum ceiling height: 2.4 m
- Extent of fringe field (0.5 mT, 5 gauss) in x, y, z directions: 2.5 m (x, y), 4 m (z)
- Total weight w/cooling, shielding, gradient/body coil: 4,350 kg (9,570 lb)
- Minimum dimensions of opening required for installation, W x H: 2.26 x 1.83 m
- Minimum installation area for magnet:
- Minimum total installation area for system:
- Total number of cabinets required: 2, can be placed against the wall or in corner

**Power Consumption**

- Line Voltage, VAC: 380, 400, 420, 440, 460, 480 V
- Kva: 45
- Clinical Use: Whole body

**Image processor**

- Clock speed, GHz: 2
- Operating system: Windows
- Dedicated RAM: 4 GB, 144 GB dedicated raw data capacity

**Image Reconstruction**

- Maximum number of 256 x 256 slices per acquisition sequence: 110,000 images at 512 x 512, uncompressed
- Number of slices per sec (256 matrix): =2773 recons/sec (256 x 256 FFT, 25% recFOV); =983 recons/sec (256 x 256 FFT, full FOV); simultaneous scan and reconstruction =8 data sets
- Maximum matrix: 1024 x 1024
- Minimum slice thickness 2-D/3-D: 0.1/0.05 mm
- Minimum FOV: 0.5 cm
- Maximum FOV: 45 cm, 30-35 cm typical in z
Quantitative image analysis tools

- Perfusion imaging: Standard calculation time-to-peak maps; optional inline perfusion (GBP, PBP, TTP)
- fMRI: FuncTool standard; standard calculation time-to-peak maps; optional inline perfusion (GBP, PBP, TTP)
- Diffusion imaging: Standard ADC map calculation; optional inline diffusion (real-time calculation trace and ADC maps)
- Diffusion tensor imaging: Standard MDDW, 6 and 12 directions; optional DTI sequence up to 256 directions
- Cardiac imaging: Standard with cardiac suite
- Cine: Standard
- Coronary artery: Optional
- Body imaging: Standard 1-D, 2-D PACE, dynamic analysis package includes addition, subtraction, division, multiplication, ADC maps, T1, T2, z-score, TTP, standard deviation
- 3-D image reconstruction: Standard MIP, targeted MIP, MPR (including curved reconstructions), surface shaded display, MinIP; optional image fusion, vessel view, 3-D VRT, fly through

Acoustic Noise

- Sound pressure level (SPL) at peak gradient amplitude and slew rate, dB(A): 93 V engine
- Reduction technology: Antivibration mounting, noise reduction, systems integration, whisper mode, others

ESSENZA Scanning Techniques

- Echo Planar Imaging: Yes, standard
- Single shot: Standard; SE, FID
- Multi shot: 2-D/3-D segmented; SE and FID
- EPI pulse sequences: Standard
- Maximum EPI factor: 256
- Neurologic imaging: Standard
- Perfusion: Standard
- Diffusion weighted imaging: Standard
- Functional MRI: Standard BOLD sequence; optional inline BOLD sequence, 3-D PACE
- Spectroscopy (nuclei of interest): Optional single voxel spectroscopy, CSI for hydrogen nuclei (STEAM, spin echo techniques)
- MRA: Standard
- Time of flight: Standard 2-D/3-D TOF, ceMRA
- Peripheral: Standard ceMRA protocols
- Bolus tracking: Standard bolus tracking protocols, Care Bolus
- Interventional MR: Optional
- Ecg gating: CG triggering
- Motion compensation: Yes
- Prospective respiratory gating: Standard 2-D PACE
- Maximum number of dimensions: Up to 6
- Additional (Alarms, high/low): Third-party compatible coils, CP head array

Siemens ESSENZA Coils

- Integrated body: Standard
- Type: Array, receive only, PA (peripheral angio) matrix
- Number of independent channels: 30-60 x 27
- Head: Standard
- Diameter, cm: Array, receive only, double loop
- Number of elements: Varied, can be combined with matrix coils
- Number of independent channels: 8
- Parallel imaging compatible: Yes, in combination with other coils
- Mirrors for patient head: Yes
- Tmj: Optional
- Number of element: Varied, can be combined with matrix coils
- Neck: Standard
- Coverage (head to foot): 19 cm
- Cardiac/abdomen: Standard
- CTL spine: Standard
- Dimensions, L x W, cm: 32 x 30 cm
- Coverage (head to foot), cm: Full fov
- Number of elements: Varied, can be combined with matrix coils
- Flexible: Yes
- Number of elements: varied, can be combined with matrix coils
- Shoulder: Optional
- Breast: Optional
- Bilateral: Yes
- Biopsy access: Yes
- Dimensions, L x W: 18 x 16.8 x 18.6 cm (H), small; 18 x 16.8 x 18.6 cm (H), large
- Circular general-purpose: Optional
- Whole abdomen: Optional
- Extremity: Lower: Optional; Upper: Standard
- Dimensions, L x W: 30 x 30 cm
- Number of elements: Varied, can be combined with matrix coils
- Endocavity: Optional
- Diameter: 17 x 36 cm, small; 21 x 52 cm, large: 27 x 29 cm
- Length: 40.5 cm
- Length: 17 x 36 cm, small; 21 x 52 cm, large
- Number of independent channels: 30-60 x 27
- Peripheral vascular: Optional
- Diameter: 30-60 cm x 27 cm
- Length: 97 cm
- Number of elements: 16
- Diameters available: 4 cm, 19 cm
- Dedicated parallel imaging: All coils iPAT compatible; dedicated coils not necessary
- Combined: All coils can be simultaneously combined
- Power output, kW: 15
- Amplifier type: Solid-state
- Standard number of channels: 8
- Receiver bandwidth, kHz: 1,000 per channel
- Location of coil connector (plug): Patient table
- Standard length of coil cables, m: Coil dependent
- Number of coil connectors (plugs): 4
- Coil tuning technique: Automatic

**Parallel imaging**

- Name: iPAT
- Technique: mSENSE and GRAPPA (image based and k-space based)
- Calibration Technique: Automatic
- Maximum parallel acquisition acceleration factor: Standard 4; optional 8, 12 with iPAT extensions

**Sequence Selection**

- Spin echo (Minimum TR ms)
- Minimum TR, 256 matrix, 30 cm FOV: 9.7 msec
- Minimum TR, 256 matrix, 30 cm FOV: 1.46 msec, 2-D/3-D GRE
- Minimum possible TE: 0.62 msec
- Minimum possible TI: 23 msec
- Fast-spin-echo max train length: 512
- Echo planar imaging max train length: 256

**Control Console Workflow**

- Standard user interface: syngo, multimodality user interface
- Local hard disk capacity: 145 GB
• RAM: 2 GB
• Removable media: CD/DVD
• Image protocol sharing: Phoenix: DICOM image-based method duplicates protocol via drag and drop
• Features designed to enhance workflow: Autoalign, Phoenix, scan assistant, inline technology, syngo, iPAT(Grappa), Tim assistant, utilization management reports, structured reporting, others

**ESSENZA Patient Table**

- Detachable: Optional
- Dimensions, L x W: 243 x 54 cm
- Horizontal speed: 20 cm/s
- Elevating: Standard free-floating
- Minimum height: 55 cm
- Limited mobility: 200 kg (440 lb)
- Fully mobile: 200 kg (440 lb)

**Other ESSENZA Attributes**

- FDA Clearance: Yes
- CE Mark (MDD): Yes