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# *OASIS VELOCITY*

Specification Data



FUJIFILM



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# OASIS *VELOCITY*

## The highest field strength open MRI

OASIS Velocity 1.2T is about providing the optimal combination of patient-centric care and clinical performance. Built to handle the most challenging patients, with an unobstructed viewing angle, no other MRI system enables you to capture and retain as broad of a patient demographic as OASIS Velocity.

A unique achievement in high-field imaging, the open architecture of the OASIS Velocity features an advanced magnet design, Zenith RF technology, cutting edge deep learning reconstruction (Synergy DLR) and advanced imaging capabilities to handle all patients with confidence, without compromising on safety, performance, or efficiency.

### **Key Components and Specifications**

- Gradient System - 33mT/m and 100T/m/s
- 1.2T Fujifilm Open Superconducting Magnet
- Zenith™ RF System and Coils
- Synergy DLR (AI) and IP-RAPID enhanced image reconstruction included
- Patient-Centric Management System
- Vertex™ II Computer System
- Origin™ MRI Operating System
- Pulse Sequence and Acquisition Techniques
- Equipment Installation and Operational Details

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# Fully featured high-field performance with guaranteed Fujifilm reliability

## Magnet System

OASIS Velocity is the highest field strength, whole body vertical field magnet. Fujifilm expertise in vertical field magnet design and solenoid coil signal detection deliver outstanding image quality—with no compromise to patient comfort.

- Superconducting magnet
- Vertical field
- 1.2T field strength
- Homogeneity: 0.3 ppm @ 35 cm DSV (Vrms)
- Shimming
  - Computer-modeled passive shims placement
  - Per-patient Higher-Order Active Shim Technology (HOAST)
  - Active magnetic shielding
- 5-Gauss fringe field
- Horizontal 4.2 m (13'1")
- Vertical 3.3 m (10'9")
- Helium only cryogen
- Refill interval
- Two years with continuous power and Fujifilm-approved maintenance

## Gradient System

Innovative Fujifilm gradient amplifiers and vertical field gradient coils provide power to scan at high spatial resolution in shortened scan times. By employing 33 mT/m peak amplitude, small FOV's and thin slices can be combined, and large matrix datasets can be quickly acquired with slew rates of up to 100 T/m/sec.

- Peak amplitude: 33 mT/m
- Maximum slew rate: 100 T/m/s
- Active shielding
- Water cooling
- SoftSound acoustic noise reduction
  - Mechanical gradient noise dampening
  - Low noise sequences

## Radio-frequency System and Receiver Coils

The Fujifilm Zenith System is a powerful combination of multi-channel RF technology and exclusive Fujifilm Zenith RF coils. Zenith provides excellent image quality, seamless workflow, wide clinical capability and optimizes patient comfort. RAPID (Fujifilm's parallel imaging feature) reduces scan times and optimize the most comprehensive collection of vertical field RF coils.

- Solid state RF transmitter
  - Peak envelope power: 18 kW
- Digital receiver
  - 16 channels
  - 4 coil connection points
  - Ultra low noise preamplifiers
- Receiver coils
  - Integrated transmit/receive
  - Multipurpose
  - Micro coil
- WIT receiver coils
  - WIT Posterior Head/Neck
  - WIT Open Head Attachment
  - WIT Whole Heat Attachment
  - WIT Neck Attachment
  - WIT Torso A
  - WIT Torso B
  - WIT Spine
- Zenith receiver coils
  - RAPID Shoulder
  - RAPID Extremity
  - RAPID Wrist
  - RAPID Foot/Ankle
  - RAPID Breast



## Patient-Centric Management System

The asymmetric arrangement of the OASIS Velocity table and gantry offers each patient an unobstructed lateral view. The patient viewing angle makes even more expansive the truly open environment perfected by Fujifilm. Patient area lighting and two-way communication are standard patient amenities. Two tabletop coil connection points ensure operator convenience. The OASIS Velocity's 32" wide table lowers to 20" for easy patient access and offers 3 axis power driven lateral movement at iso-center.

- Patient aperture: 44 cm
- Weight limit: 660 lbs (300kg)
- Table width: 83 cm
- Table length: 252 cm
- Longitudinal motion: 20 cm/s
- Total longitudinal travel: >7 ft (223 cm)
- Vertical range: 50 - 89 cm
- Lateral range: 10 cm right to left
- Class II Laser Positioning
  - +/-1 mm accuracy
  - Automatic movement to iso-center
- Gantry control panels
  - Table control
    - Up/down
    - In/out
    - Right/left
    - Table position in mm
    - Move to iso-center control
    - Stop
    - Release
    - Laser on/off
    - Clear
    - Gantry illumination
- Scan control
  - Start/Abort/Pause
- Patient amenities
  - Patient communication
    - Two-way intercom
    - Operator alert system
  - Gantry illumination
  - Patient pads and immobilization straps
  - Emergency evacuation switch for immediate patient extraction



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# Patient focus means optimal, effortless workflow

## Vertex II Computer System

The OASIS Velocity computer architecture integrates an advanced scan/reconstruction engine and a dual core CPU configuration. This parallel processing design provides maximum workflow and patient throughput benefits that complement the advantage patient comfort offers in keeping scans on schedule.

### CPU:

- Xeon 3.5 GHz Processor
- 16 GB RAM
- Display
  - 24 in LCD color monitor
  - Display matrix 1920x1200
- Magnetic disk:
  - 500 GB storage capacity
  - Stores up to 400,000 images (256x256)
- DVD archive
  - Media capacity: 4.7 GB
  - Stores up to 30,000 images (256x256)
  - CD/DVD writer (includes auto-launching PC viewer software)\*

### Scan/Reconstruction Engine:

- Multiple processors
- Pulse sequence control
  - Digital receive
  - Image reconstruction
  - Post-image reconstruction
  - Simultaneous scan and reconstruction

## ORIGIN MRI Operating Software

Windows® based operating software serves as a familiar environment for moving easily through demanding clinical applications and protocols. From patient registration through scan set-up to image archiving, ORIGIN mouse-driven operating software is easy to learn and use.

- Log-on security features
  - Login with password
  - Normal and Audit user privileges
  - Timeout
  - Audit log
- MRI software launcher
- Patient information management
  - Registration window
    - User-defined data fields
    - Automated study ID assignment
    - Rapid registration mode
  - Registration from HIS/RIS
  - Patient data correction feature
- Patient directory
  - Patient/study view
  - Modality Worklist Management
  - Search capability
- Patient scanning
  - Protocol library organized by anatomical groups
    - Fujifilm provided
    - User-defined protocols
  - Graphical selection
  - Exam window
    - Multiple viewports for easy setup
    - 2-point and 3-point positioning
    - Multi-angle positioning
    - Image centering function
    - Interactive scan
    - Easy sequence selection and parameter adjustment
    - Basic and advanced parameter screens
    - Preview window for quick review of completed scans
    - Independent patient windows

- Processing tasks
  - Max/Min Intensity Projection (MIP/minIP)
  - Multi-Planar Reconstruction (MPR)
  - Vascular Volume Rendering
  - Signal Intensity Ratio Map (SIR Map)
  - Addition/subtraction
  - T1- and T2- calculated Images
  - T2 RelaxMap
  - Dynamic analysis
  - Perfusion analysis
  - Diffusion analysis
  - Single direction analysis
  - Multi direction analysis
- ADC trace
- DWI trace
- Tensor analysis
  - Mean Diffusivity (MD)
  - Fractional Anisotropy (FA)
  - DWI trace
- Post-Reconstruction functions
  - Filtering
- Spectroscopy analysis (single and dual)
- Film, Archive, and Network Function
  - Flexible filming options
  - DICOM 3.0 Compliant
    - Print
    - Query/Retrieve
    - Storage
    - Storage Commitment
    - Modality Worklist Management
    - Modality Performed Procedure Step
- Image review tools
  - WW/WL
  - Magnify
  - Pan
  - ROI
  - Image Rotation
  - Measurement
  - Cine
  - Comment/Label
  - Statistics
- Sentinel™ Remote Customer Support
  - Remote system and cryogen monitoring
  - Remote desktop
  - Remote diagnostics
  - Remote image review



# Advanced applications. Outstanding clinical utility.

## Pulse Sequence and Acquisition Techniques

The powerful, cutting edge OASIS Velocity imaging architecture delivers outstanding clinical imaging benefits through the Imaging Suites. The OASIS Velocity standard Imaging Suites include a broad range of acquisition sequences, sequence enhancements, and post processing tools. Scanning and processing features are available to meet the clinical challenge in Neuro, Orthopedic, Body, Breast, Vascular, and Cardiac imaging.

## Pulse Sequences

General to advanced, the acquisition sequences you need to meet your clinical challenge.

- Spin Echo (SE)
  - Up to 4 echoes
  - RADAR™ SE—for motion compensated T1 weighted imaging
- Inversion Recovery (IR)
  - FLAIR
  - STIR
  - Magnitude and Real (Real-IR) reconstruction
- 2D/3D Fast Spin Echo (FSE)
  - Echo Factors (ETL): 2 - 256
  - User defined inter-echo time
  - User defined echo allocation
    - Centric
    - Anti-centric
    - ADA
    - Sequential
  - Single Shot FSE—ultra fast acquisition
    - Ultrahigh Echo Factor for MRCP, MRI Urography, and MRI Myelography
  - Driven Equilibrium—Increases SNR and contrast over conventional FSE without increasing TR
  - RADAR radial k-space acquisition
- primeFSE—user selectable receiver bandwidth
- isoFSE—3D isotropic acquisition (T1, T2, PD, IR)
- Fast Inversion Recovery (FIR)
  - Echo Factors: 2 - 256
  - Inversion Time: 20 - 8,000
  - Driven Equilibrium
  - primeFIR
  - Double and Triple IR Black Blood acquisitions
  - RADAR radial k-space acquisition
- 2D/3D Gradient Echo (GE) and Multi-Echo Gradient Echo
- ADAGE—combined echo imaging for high T2\* contrast
- 3D GEIR—combined with an IR pulse for an isotropic acquisition
- TIGRE™—3D T1 weighted volume gradient echo with RF fat saturation
- FatSep 2D/3D
- 2D/3D Steady-State Acquisition Rewound Gradient Echo (SARGE or SG)
  - RF-Spoiled SG (RSSG)—provides T1 weighted imaging
  - Rephased SG—flow compensation for reduced artifacts
  - Balanced SG (BASG)—provides high SNR and bright fluids
    - RF fat saturation
    - RADAR radial k-space acquisition
  - Phase-cycled fat suppression cardiac imaging
  - Time Reversed SG (TRSG)—T2 weighted fluoro acquisition
- Diffusion Weighted Imaging (DWI)
  - Single Shot SE EPI
    - B-Factor: 0 - 2,000
    - RF fat saturation
    - IR pulse
- Diffusion Tensor—up to 21 axes
- BSI (3D multi-shot gradient echo EPI)
  - Contrast from tissue susceptibility differences
- 2D/3D TOF
- FLUTE™—fluoro triggered MRA
- TRAQ™—time resolved MRA
- Phase Contrast MRA (PC-MRA)
  - Velocity encode: 5 - 400cm/sec, increment 1cm/sec
- Non-Contrast MRA
  - VASC™ (BASG sequence for patients with renal insufficiency)
  - VASC ASL (arterial spin labeling method)
  - VASC FSE (gated acquisition)



## Acquisition Features and Protocol Enhancements

Scan fast and deliver excellent results using these pulse sequence enhancements and features designed to minimize artifacts and increase ease-of-use.

- Image plane selection
  - Transverse, Sagittal, and Coronal
  - Single and Double Oblique
  - Multi-slice, Multi-angle
  - Radial for simplified MRCP, Knee acquisition planning
  - Multi-plane for combined Sagittal, Coronal, Axial acquisition (SC, SCA, CA, or SA)
  - Interactive Scan Control (I-Scan) enables efficient imaging plane selection and real-time image collection with slice position and scan parameter change and update during MRI Fluoro acquisition
  - AutoPose: Automatic slice planning for brain imaging
- Prescan
  - RF power adjustment
  - Center frequency
  - Volume shim adjust
- User defined regional shim
- Motion compensation
  - RADAR radial acquisition (FSE, FIR, FLAIR, SE, primeFSE, BASG)
  - Gradient rephasing
  - Presaturation pulses-up to eight
  - Walking presaturation
  - Cardiac gating with arrhythmia rejection
  - Peripheral Pulse Gating with arrhythmia rejection
  - Respiratory gating
- Diaphragm Navigation Echo
- Intermittent presaturation
- Fat suppression techniques
  - SINC RF fat saturation (conventional SINC pulse)
  - H-SINC RF fat saturation (Light mode for lipid only, Heavy mode for lipid and olefinic suppression)
  - FatSep
  - Water Excitation (Binomial technique)
  - STIR, Fast STIR (FIR)
  - In/out of phase GE
- User defined variable bandwidth
- Dual Slice acquisition
- Rectangular Field of View
- Anti-aliasing
- User defined inter-echo spacing
- Half Scan and 3/4 scan
- Half Echo
- Asymmetric Measurement Imaging (AMI)
- Real-time image quality indicator (relative SNR, CNR)
- Real-time spatial resolution update shows impact of parameter changes prior to scanning
- Image centering: Places center of prescribed slab at magnet iso-center automatically for best image quality
- Auto voice
- NATURAL™ image quality enhancement algorithm
- Dynamic scan time table window provides graphical review of dynamic scan procedure (steps and timing) for easy and efficient study planning

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## Imaging Parameters

IOASIS Velocity subsystems deliver outstanding performance. 1.2T field strength, powerful gradients and the Zenith RF electronics allow sub-millimeter slice thicknesses and short echo and inter-echo times.

- Slice thickness
  - 2D: 0.7 - 100 mm
  - 3D: 0.05 - 5 mm
- TE
  - FSE: 5.4 - 120 msec
  - RSSG: 0.6 - 50 msec
- Flip angle (FA)
  - SE: 3 - 120
  - GE: 3 - 90
- Maximum number of 3D slices
  - 512 (512 x 512)
- FOV: 5 - 45 cm
- Signals averaged: 1 - 99
- Acquisition matrices
  - Up to 1024 x 1024
- TR
  - FSE: 200 - 20,000 msec
  - RSSG: 1.4 - 10,000 msec
- Inter-echo time (IET)
  - FSE: 5.4 - 30 msec
  - EPI-DWI: 0.45 - 7 msec
- 3D multi-slab: 32
- Maximum number of 2D slices
  - 256 (512 x 512)
- Reconstruction matrices
  - 2048 x 2048
  - Flexible Recon Matrix

# Cost effective installation. Flexible design options.

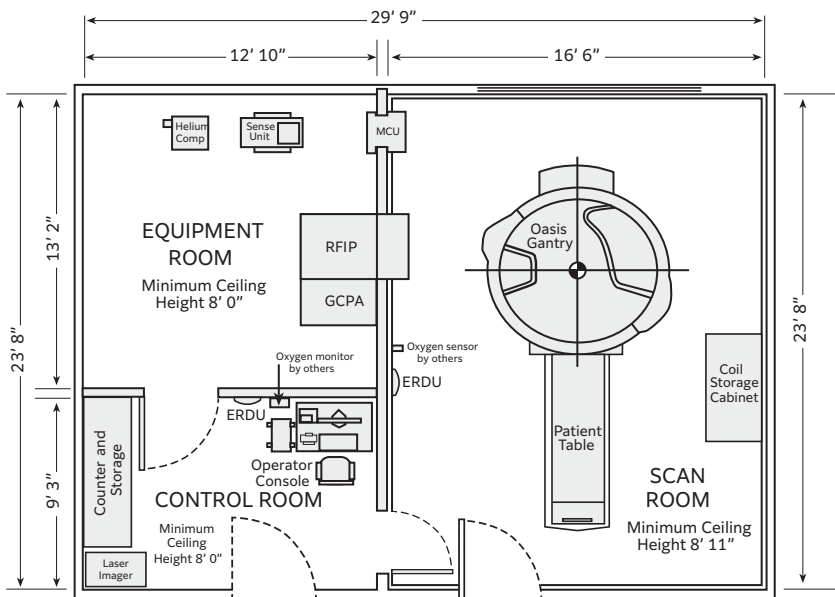
An OASIS Velocity installation in a new space or as a replacement system is addressed with easy siting requirements. In the typical floor plan of a conventional 1.5T imager, OASIS Velocity may require only a small amount of additional magnetic shielding, depending on the scan room dimensions.

## Component Dimensions

- Gantry
  - Length: 2730 mm
  - Width: 2535 mm
  - Height: 2160 mm
  - Weight: 34,100 lbs
- Patient table
  - Length: 2520 mm
  - Width: 830 mm
  - Height: 897 mm
- Computer
  - QWERTY keyboard
  - 2-button scroll mouse
  - CPU Tower
  - Intercom
  - 24in. LCD monitor
- Gradient Amplifier Cabinet
  - Depth: 945 mm
  - Width: 665 mm
  - Height: 1880 mm
- IRCP unit
  - Depth: 1000 mm
  - Width: 820 mm
  - Height: 1880 mm
- SENSE unit
  - Depth: 800 mm
  - Width: 400 mm
  - Height: 1050 mm
- Helium compressor
  - Depth: 529 mm
  - Width: 443 mm
  - Height: 567 mm

## Siting Considerations

- RF-shielded scan room
  - RF noise <0dBμV/m from 10-70 MHz
- Air conditioning
  - Scan room
    - Ambient operating temp: 20-24°C (68 - 75°F)
    - Max. allowable temp change: 2.5°C/hr
  - Equipment and Control rooms
    - Ambient operating temp: 20-28°C (68 - 82°F)
- AC power
  - Voltage
    - 3-phase AC 480 V (60Hz)
  - Frequency 60 Hz +/- 1% or less
  - Capacity 75 kVA
- Typical room size
  - Scan room
    - 23'8" x 16'6"
    - Min. ceiling height: 8'11"
  - Equipment room
    - 12'10" x 13'2"
    - Minimum ceiling height: 8'
  - Control room
    - 12'10" x 9'3"
    - Minimum ceiling height: 8'
- 5-Gauss line magnetic leakage flux
  - Horizontal: 13'1" (radial)
  - Vertical: 10'9" (axial)



Common Site Layout (not to scale)

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# Expand your Fujifilm ownership experience

Fujifilm offers a wide range of MR, CT, X-ray, Ultrasound and IT solutions. Each delivering superior diagnostic quality, lower dose, positive patient experience and excellent value over the life of the product.

With periodic software and application training updates and a 99% MRI uptime guarantee included with your warranty and full service contract, you can be sure that Fujifilm will be with you every step of the way to enhance your MRI systems utilization with a lower lifetime cost.





Fujifilm, driven by our legacy of pioneering diagnostic imaging technologies, is committed to driving future innovations and the highest quality patient care. We offer *real* solutions to meet your *real* needs, enhancing financial, operational, and clinical outcomes through exceptional image quality, increased patient safety, improved workflow, and better ROI.

This is true “value from innovation” and what we offer every day.