

specifications

Acuity iX The next dimension in treatment planning, simulation, and verification





Acuity iX Acuity iX is a fully integrated digital imaging device that includes all features necessary for accurate and efficient simulation and verification.

Varian Acuity The next dimension in treatment planning, simulation, and verification

Acuity™ combines 2D and 3D imaging into a single system supporting planning, simulation, and verification. From simple to complex and IGRT to brachytherapy, Acuity is the optimal integrated solution.

Plan Verification supporting Efficiency in New Starts

Acuity's integration with Eclipse™ Integrated Treatment Planning means planned fields can be set up automatically on Acuity, reducing data entry and setup errors. Plan evaluation including DRR and image comparison and motion analysis is easily accomplished with a number of tools available on the system. Finally, the correct table parameters can be captured for treatment field completion.

Efficiency in Simulation

A standard feature on Acuity is Image Controlled Simulation. With this feature you can adjust field position, field size, and collimator angle directly on the image. The integrated design means that these changes are immediately made to the system for re-imaging of the new positions. This procedure speeds up the process of simulation and can decrease the exposure time to the patient.



Mechanical Specifications

1.0 Gantry

- 1.1 Isocenter accuracy:
 - ≤ 1 mm diameter sphere with no accessory load
 - ≤ 2 mm diameter sphere with accessory load of 20 kg
- 1.2 Isocenter height 123 cm
- 1.3 Isocenter height of 127 cm when using the Ximatron adapter plate on existing Ximatron baseframe
- 1.4 Rotation: $\pm 185^\circ$
- 1.5 Speeds: Variable up to $360^\circ/\text{min}$.
- 1.6 Readouts:
 - Type: Digital and quadrant mechanical
 - Location: Local and remote
 - Digital Accuracy: $\pm 0.5^\circ$
 - Digital Resolution: 0.1°
- 1.7 Control: Local and remote
- 1.8 Software and hardware collision management system

2.0 SSD, Table Top and Imager Distance

- 2.1 FAD 100 cm, software driven 80 cm as an option
- 2.2 Maximum AP focus to tabletop distance: 160 cm
- 2.3 Maximum focus to imager distance: 180 cm
- 2.4 Source to skin distance indicator:
 - Type: Optical
 - Range: 75 - 150 cm
 - Accuracy: ± 2 mm over 80 - 120 cm

3.0 Collimator

- 3.1 Rotation: $\pm 185^\circ$
- 3.2 Speeds:
 - Local: Variable up to $720^\circ/\text{min}$.
 - Remote: Variable up to $720^\circ/\text{min}$.

- 3.3 Readouts:
 - Type: Digital and quadrant mechanical
 - Digital accuracy: $\pm 0.2^\circ$
 - Digital resolution: $\pm 0.1^\circ$
- 3.4 Controls: Local and remote

4.0 Field Size - Delineator Wires

- 4.1 Tungsten wires
 - 4.1.1 Field size: 0.5 cm x 0.5 cm to 44 cm x 44 cm
 - 4.1.2 Independent mode: Travel range: -22.5 to +19.5 cm
 - 4.1.3 Speeds:
 - Local: Variable up to 180 cm/min.
 - Remote: Variable up to 180 cm/min.
 - 4.1.4 Readouts:
 - Type: Digital
 - Location: Local and remote
 - Wire delineator field size accuracy: ± 1 mm
 - Wire delineator position accuracy: ± 0.5 mm/wire
 - Resolution: 1 mm
 - Control: Local and remote

5.0 X ray Field Collimators (Blades)

- 5.1 Field size: 0.5 cm x 0.5 cm to 50 cm x 50 cm
- 5.2 Independent mode: Travel range: -23 cm to +25 cm
- 5.3 Tracking: Restricts the blade field size to within the imager size.
- 5.4 Paired mode: Blades and wires will automatically move in a predefined distance from each other. This distance between the wires and blades is fully configurable.
- 5.5 Speeds:
 - Local: Variable up to 180 cm/min.
 - Remote: Variable up to 180 cm/min.
- 5.6 Readouts:
 - Type: Digital
 - Location: Local and remote
- 5.7 Control: Local and remote

Imager

1.0 Imager Longitudinal Movement

- 1.1 Range: Total travel 40 cm
- 1.2 Auto centering: Center imager function
- 1.3 Auto setup: Retract and last position
- 1.4 Speeds: Variable up to 240 cm/min.
- 1.5 Readouts:
 - Type: Digital
 - Location: Local and remote
 - Accuracy: +/- 3 mm
 - Reproducibility: +/- 0.5 mm
 - Resolution: 1 mm
- 1.6 Control: Local and remote

2.0 Imager Lateral Movement

- 2.1 Range: Total travel 35 cm
- 2.2 Auto centering: Center imager function
- 2.3 Auto setup: Retract and last position
- 2.4 Speeds: Variable up to 240 cm/min.
- 2.5 Readouts:
 - Type: Digital
 - Location: Local and remote
 - Accuracy: +/- 3 mm
 - Reproducibility: +/- 0.5 mm
 - Resolution: 1 mm
- 2.6 Control: Local and remote

3.0 Imager Vertical Movement

- 3.1 Range: Total travel 75 cm
- 3.2 Auto centering: Center imager function
- 3.3 Auto setup: Retract and last position
- 3.4 Speeds: Variable up to 240 cm/min.
- 3.5 Readouts:
 - Type: Digital
 - Location: Local and remote
 - Accuracy: +/- 3 mm
 - Reproducibility: +/- 0.5 mm
 - Resolution: 1 mm
- 3.6 Control: Local and remote

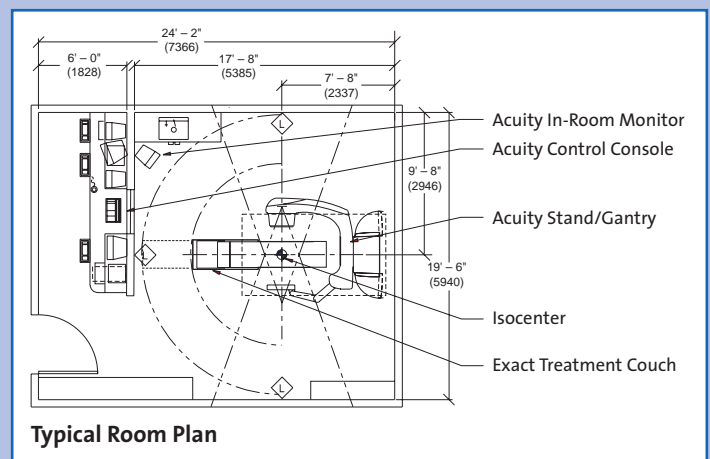
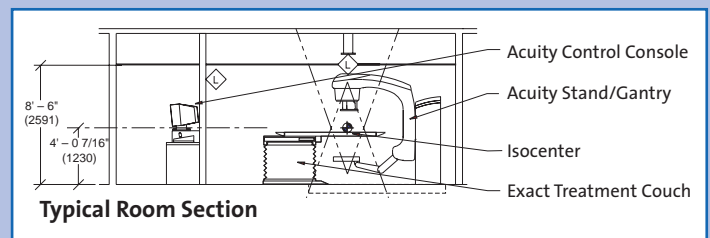
4.0 Imager Size

40 x 30 cm landscape

Facility Requirements

1.0 Typical Acuity Facility Requirements

- 1.1 Varian offers facility planning support to Acuity customers. Please contact your local Sales Office to obtain planning support.
- 1.2 Input voltage typical: 400-480 VAC, 50 or 60 Hz, line-to-line, 3-phase, 4-wire plus ground, 100KVA load line voltage.
- 1.3 Ventilation requirements: Sufficient to remove 3.2 kW from Acuity Room and 2.3 kW from control console.
- 1.4 For typical facilities requirements, refer to the Installation Data Package.



The Exact™ Couch

1.0 Patient Table

- 1.1 Type: Surface mounted with 7.5" (19 cm) pit depth
- 1.2 Capacity: 440 lbs. (200 kg)

2.0 Patient Table Floor Rotation

- 2.1 Rotation range: $\pm 100^\circ$ about isocenter
- 2.2 Speed:
 - Local: Variable up to $180^\circ/\text{min}$.
 - Remote: Variable up to $180^\circ/\text{min}$.
- 2.3 Readouts:
 - Type: Analog and mechanical
 - Location: Local and remote
 - Digital accuracy: $\pm 1^\circ$
 - Digital resolution: 0.1°
- 2.4 Controls: Local and remote

3.0 Patient Table Vertical

- 3.1 Range: 63 cm - 170 cm
- 3.2 Auto setup

- 3.3 Speeds:
 - Local: Variable up to 120 cm/min.
 - Remote: Variable up to 120 cm/min.

- 3.4 Readouts:
 - Type: Analog
 - Location: Local and remote
 - Accuracy: ± 2 mm
 - Resolution: 1 mm

- 3.5 Control: Local and remote

4.0 Patient Table Longitudinal

- 4.1 Range: 1 cm to 144 cm
- 4.2 Auto setup
- 4.3 Speeds:
 - Local: Variable up to 200 cm/min.
 - Remote: Variable up to 200 cm/min.
- 4.4 Readouts:
 - Type: Analog
 - Location: Local and remote
 - Accuracy: ± 2 mm
 - Resolution: 1 mm
- 4.5 Control: Local and remote



The Exact Couch

The Exact Couch gives precise patient positioning and immobilization consistent with any Clinac® and certain CT scanners.



Dose Planning Simplified

Simple plans can be created for all field sizes. Use Acuity's integrated 2D planning module to calculate dose to any designated point within the prescribed fields. (This calculation feature is optional on Acuity iX.)

5.0 Patient Table Lateral

- 5.1 Range: ± 25 cm
- 5.2 Auto setup
- 5.3 Speeds:
 - Local: Variable up to 200 cm/min.
 - Remote: Variable up to 200 cm/min.
- 5.4 Readouts:
 - Type: Analog
 - Location: Local and remote
 - Accuracy: ± 2 mm
 - Resolution: 1 mm
- 5.5 Control: Local and remote

6.0 Patient Table Top

- 6.1 Type: Carbon fiber with moveable side rails, Indexed Immobilization™ feature, and removable head/foot panels
- 6.2 Size: 53 cm x 183.1 cm (without removable head or footrest)
- 6.3 Transmission: 1 mm Al equivalent
- 6.4 Deflection: 5 mm at isocenter with 180 lbs. (82 kg) equally distributed with a 50 cm square area about isocenter with table top fully forward

Power Requirements

1.0 Power Specifications

- 1.1 Input Voltage: 400/440/480 Vac $\pm 10\%$
3 phase with neutral and earth
- 1.2 Frequency: 50 or 60 Hz ± 1 Hz
- 1.3 Input impedance: < 0.1 ohm
- 1.4 Power requirements:
 - Intermittent 60 kVA
 - Continuous 6 kVA

X Ray Specifications

1.0 High-Frequency Generator (built into the simulator stand)

- 1.1 Radiographic specifications
 - 1.1.1 Max output: 32 kW
 - 1.1.2 kVp control: 40 - 150 kVp in 1 kV steps
 - 1.1.3 mA control: 50 - 320 mA
 - 1.1.4 mAs control: 1 - 630 mAs
- 1.2 Fluoroscopic specifications
 - 1.2.1 Ratings: kVp control 40 - 125 kVp in 1 kV steps
 - 1.2.2 mA control: 1 - 20 mA in steps of 1 mA
 - 1.2.3 Pulsed mode
 - 1.2.4 Range: 25 - 80 mA
 - 1.2.5 Exposure range: 4 - 250 msec
 - 1.2.6 Auto brightness control

2.0 Fluoroscopic Imaging System

- 2.1 Amorphous silicon panel
 - 2.1.1 Receptor type: Amorphous silicon TFT
Scintillator: Crystal Caesium Iodide
 - 2.1.2 Imaging area size: 397 mm x 298 mm
 - 2.1.3 Pixel matrix: Full input area
2048 x 1536
 - 2.1.4 Maximum frame rate: 15 fps
 - 2.1.5 Limiting resolution digital rad mode:
2.6 lp/mm
 - 2.1.6 Limiting resolution fluoroscopic mode:
1.3 lp/mm
 - 2.1.7 Contrast ratio: Large area $< 1\%$
 - 2.1.8 Digital image data-output signal format:
16-bit digital video
 - 2.1.9 A/D conversion: 14-bit

3.0 X Ray Tube

3.1 Tube insert

- 3.1.1 Target angle: 14°
- 3.1.2 Focal spot size (NEMA STD):
 - Small: 0.4 mm
 - Large: 0.8 mm
- 3.1.3 Anode rotation:
 - High speed: 180 Hz 10,000 RPM
 - Regular speed: 60 Hz 3,000 RPM
- 3.1.4 Electrical rating:
 - Anode to cathode: 150 kVp
 - Anode/cathode to ground: 75 kVp
- 3.1.5 Anode heat storage: 600,000 HU
- 3.1.6 Anode heat dissipation: 140,000 HU/min.
- 3.1.7 Anode diameter: 4"

- 3.1.8 Anode material:
Tungsten rhenium molybdenum graphite
- 3.1.9 Tube housing: Housing heat storage capacity 2,000,000 HU
- 3.1.10 Housing cooling rate with heat exchanger 36,000 HU/min.
- 3.1.11 Inherent filtration: 0.7 mm/min.

Standard and Optional Features

1.0 Standard Features

- 1.1 Live fluoroscopy image viewing
- 1.2 Storage of image and Acuity parameters
- 1.3 Patient name and ID
- 1.4 Image controlled simulation
- 1.5 Digital field wires
- 1.6 Window/level
- 1.7 Annotation in region of interest overlays
- 1.8 Image enhancement
- 1.9 Measurement of distance, area and angle
- 1.10 Cine mode acquisition and playback
- 1.11 Two view fluoro
- 1.12 Quad image merge
- 1.13 Dual image merge
- 1.14 MLC planning and display





Block Verification

The Clinac Accessory mount and gridded graticule make block verification fast and convenient. These are available as options to the Acuity for those departments that require this functionality. Certain third-party accessory mounts are also available.

- 1.15 Image import and export
- 1.16 Match and review
- 1.17 RT Chart
- 1.18 DICOM print license

2.0 Hardware Specifications

- 2.1 Pentium®-class computer
- 2.2 Minimum 1 GB RAM
- 2.3 Minimum 20 GB hard disk
- 2.4 Ethernet card
- 2.5 Two 19" flat panel monitors

3.0 Standard Software Features

- 3.1 Auto gotos
- 3.2 Delta gotos
- 3.3 Auto setups
- 3.4 Pair mode
- 3.5 Mirror mode
- 3.6 Track mode
- 3.7 Image controlled simulation
- 3.8 Integrated generator control
- 3.9 Automatic brightness control
- 3.10 Asymmetric to symmetric mode
- 3.11 Integration with Varian's VARiS Vision and/or Eclipse Integrated Treatment Planning

4.0 Optional Software Features

- 4.1 DICOM 3 query retrieve
- 4.2 DICOM RT license
- 4.3 2D planning module
 - 4.3.1 2D irregular field planning software
 - 4.3.2 Field and image access from Acuity
 - 4.3.3 Photon beam calculation from 1 MV to 50 MV
 - 4.3.4 Fast point dose calculation for multiple reference points
 - 4.3.5 Fast MU calculation
 - 4.3.6 Plan report
- 4.4 80 cm software-driven simulation mode

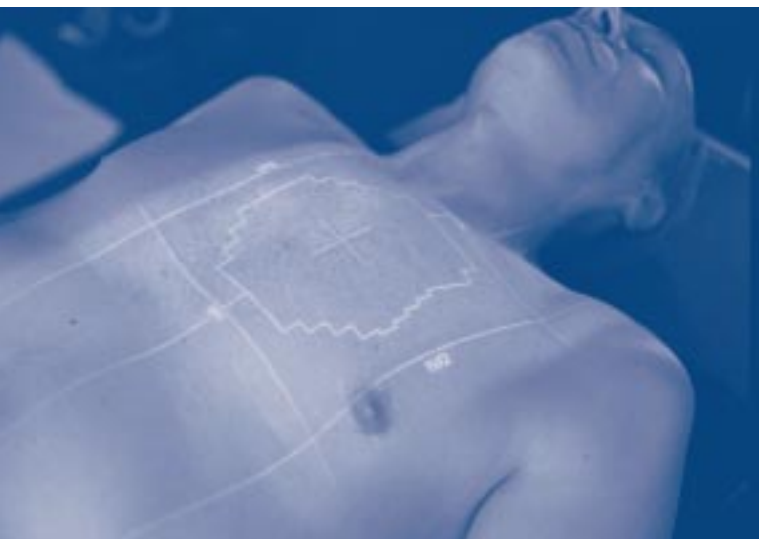
5.0 Standard Accessories

- 5.1 Mechanical and X ray basic spares kit
- 5.2 Mechanical front pointer for calibration of the source to skin distance indicator

Optional Accessories

1.0 Digital Shape Projector

- 1.1 Liquid crystal (LCD) micro-display
- 1.2 Resolution: $\geq 1280 \times 1024$
- 1.3 Lamp specifications: Metal halide
- 1.4 Optical coincidence:
 - 20 x 20 cm field size: ± 1 mm of the X ray beam
 - Image size: 42 x 42 cm at 100 cm
- 1.5 Light intensity: ≥ 50 lux
- 1.6 Depth of focus: Range: < 2 mm for SAD 80 to 140 cm
- 1.7 Central axis alignment: 0.5° of perpendicular
- 1.8 Coincidence of optical and beam axis ± 1 mm



MLC Verification

Acuity's optional Digital Shape Projector (DSP) is an integral part of the collimator design. This feature completes the verification process, allowing for block and MLC verification.

2.0 Radiographic Cassette Holder

- 2.1 Automatic cassette ejection
- 2.2 Film size: 43 x 35 cm
- 2.3 Accommodates grid
- 2.4 Anti-collision: Mechanical touch guard
- 2.5 8:1 parallel radiographic grid, 32 lines/cm

3.0 Mechanical Accessories

- 3.1 Additional 18" or 20" flat panel monitor (wall-mounted) for in-room display of Acuity parameters
- 3.2 Varian lead block tray mounting system (for 100 cm Clinacs) allows full weight treatment block verification.
- 3.3 Other manufacturer's lead block tray mounting system allows treatment block verification to 20 kg /44 lbs. (Specify manufacturer.)
- 3.4 Simulator electron applicator assembly for Varian Clinac includes 6 x 6 cm or 10 x 10 cm, 15 x 15 cm, 20 x 20 cm, and/or 25 x 25 cm electron applicators.
- 3.5 Printer for hard copy of machine parameters and/or images
- 3.6 Laser patient alignment system
- 3.7 Backpointer laser alignment system
- 3.8 Mechanical system extended spare parts kit
- 3.9 X ray system extended spare parts kit
- 3.10 Ximatron baseframe adapter kit
- 3.11 Battery-controlled couch lowering device
- 3.12 Gridded graticule providing 1 cm markings at 100 cm FAD
- 3.13 80 cm gridded graticule

Specifications subject to change without notice.

All other company and product names mentioned are used for identification purposes only and may be trademarks or registered trademarks of their respective owners.

VARIAN

medical systems

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mator		Gantry	
(cm)	0.0 deg	Rtn	359.8 deg
X	16.3	Wire (cm)	
	-7.4	Field X	18.5
		X1	

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