Product Data
No. MPDCT0821EAD

Multislice HELICAL CT SCANNER

Aquilion Lightning

APPLICATION

Aquilion Lightning is a multislice helical CT system that supports whole-body imaging. The system employs our innovative dose-reduction technologies and a fast reconstruction unit designed to minimize the patient exposure dose and the time required for diagnosis.
The wide range of advanced applications is designed for operators of all levels of experience, maximizing performance.

FEATURES

- **Trusted performance - Smart investment**
  Aquilion Lightning delivers premium performance in a compact system. It employs our latest technologies to optimize patient care and accelerate clinical decision making.
  – Advanced intelligent Clear-IQ Engine - integrated (AiCE-i)*1, *2
  Representing a paradigm shift in image reconstruction technology, Advanced intelligent Clear-IQ Engine (AiCE)*2 utilizes a deep learning neural network to bring you images that are sharp, clear, and distinct. Following our company philosophy of helping you achieve the best possible healthcare outcomes for all, AiCE has now been optimized and integrated as AiCE-i for Aquilion Lightning. AiCE-i is trained to reconstruct images to match the spatial resolution and low-noise properties of an advanced Model-Based Iterative Reconstruction (MBIR) method and store this knowledge within layers of a neural network. Applying this knowledge during image reconstruction makes AiCE-i extraordinarily efficient in routinely providing high spatial resolution and low noise in CT examinations that help improve your diagnostic confidence in every patient.
    - Is integrated into SUREExposure 3D, ensuring automatic dose reduction.
    - 82.9% dose reduction*3, *4, *5
    - 15% better low contrast detectability than Adaptive Iterative Dose Reduction 3D (AIDR 3D) for abdomen at same dose level
    - About 100% improved high contrast spatial resolution*6
    - More natural noise texture compared to MBIR*7
  – Efficient design for safety, reduced costs, and environmental performance

The gantry features design innovations to improve the scanning experience for patients as well as providing excellent operability and ensuring safety. The spacious 780 mm wide bore and 470 mm wide couch ensure comfortable scanning for even the largest patients. With a design also focusing on smaller installation space and power consumption, Aquilion Lightning requires a minimal footprint of (9.8 m^2 *8, *9), compact enough to meet even the most restrictive siting requirements. Innovative Adaptive Power Management technologies dramatically decrease energy requirements, reducing running costs and easing the environmental impact.

*1: The optional Reconstruction Processing System (CSAL-001A) is required.
*2: AiCE is not provided with a self-learning function that allows the CT system to modify its own programs. Therefore, training of AiCE algorithm is not performed at the end-user's site.
*3: Based on the detectability index performance metric, a measure of signal to noise that takes into account the magnitude and texture of both the signal and the noise for a given LCD task.
When the Dynamic volume CT upgrade kit (CGS-55A) is installed.
*4: A model observer evaluation showed that equivalent low contrast delectability to FBP (range from 0.62 - 0.68) can be achieved with 82.9% less dose using AiCE at Standard setting for thin (0.5 mm) reconstruction slice thickness in simulated body phantom (MITA-FDA phantom with a body ellipse surrounding it).
*5: In clinical practice, use of AiCE may reduce the CT patient dose depending on the clinical task, patient size, anatomical location and clinical practice. Please consult with a radiologist and a medical physicist to determine the appropriate dose for obtaining diagnostic image quality in the particular clinical task. The Area Under the Curve (AUC) detectability metric is a way to define image quality based on how well an observer can detect a signal in the image. The AUC ranges from 0.5 to 1. The larger the value is, the better the image quality. An AUC of 0.5 can be interpreted as random guessing (50% correct), while a detectability of 1 corresponds to perfect detection (100% correct).
*6: Compared to AIDR 3D with reduced noise for AiCE Body Sharp at MTF 10%
*7: Natural defined as kurtosis similar to filtered backprojection.
*8: Option
*9: For the 220 kg (485 lb) short patient couch version

– PUREViSION detector
Advances in manufacturing processes have led to improvements in the detector, comprising 80 individual 0.5 mm detector elements. Light output has been increased by 40%.
This is achieved by eliminating imperfections in traditional cutting processes, producing the scintillator from a solid ingot using precision cutting techniques. With these improvements, the PUREViSION detector offers dose savings.

– Integrated dose reduction – THAT WORKS
Our 4th generation iterative reconstruction AIDR 3D (Adaptive Iterative Dose Reduction 3D) Enhanced is fully integrated into the automatic tube current modulation software SUREExposure 3D, taking the guesswork out of optimizing patient dose. The exposure dose is automatically reduced by up to 75%. With SUREkV, the lowest kV will be selected based on patient size and SUREExposure settings for low kVp imaging.

– Adaptive diagnostics
SURESubtraction*1 and vHP*1 (Variable Helical Pitch) are unique Adaptive Diagnostic Scan modes that simplify complex protocols and provide excellent results.
SEMAR (Single Energy Metal Artifact Reduction) is the latest addition to the Adaptive Diagnostic suite of technologies. A sophisticated algorithm is utilized to virtually eliminate metal artifacts, improving visualization of implants and supporting bone and adjacent soft tissue for a clearer and more confident diagnosis.

COMPOSITION

Standard composition (Model: TSX-036A/7, /C)

Software version: V10.4

- Gantry 1
- Patient couch 1
- Console*2 ..... 1 set
- Power distributor 1
- Accessories ..... 1 set
  - Inter-unit cables
  - Manuals
  - Set of phantoms, phantom holder
  - Scan support accessories
  - Footswitch for the patient couch*3, *4
- Whole body X-ray CT scanner upgrade kit (CGS-55A)*5 1

Optional items

- Display console kit (CGS-72B*6/CGS-72C*7)
- Double slice kit (CSDS-002A)
- Fast scan kit (0.5 s scan kit) (CGS-67A)*8
- X-ray power-up kit (CXGS-016A)
- 4D Airways analysis (CSAA-001A)
- 4D Cerebral artery morphological analysis (CSAM-001A)*9
- Body organ perfusion (CSBP-002A)
- Cardiac function analysis software (CFA) (CSCF-002A)*9
- Cerebral blood-flow analysis system (CBP-study) (CSCP-002A)
- Colon view (CSCV-001A)
- Display system for dental application (CDP-07A)
- Dual Energy composition analysis (CSDC-001A)*9
- Dual Energy system (CSDE-001A)*9
- Fat index view (CSFM-001A)
- FlyThrough software (CFT-03A)
- Lung volume analysis (CSLV-001A)
- SURECardio scoring (CSCS-001A)
- SUREPlaque (CSPV-002A)*9
- SURESubtraction angio (CSSA-001A)
- SURESubtraction iodine mapping (CSSI-001A)
- SURESubtraction lung (CSSL-001A)
- SURESubtraction ortho (CSSO-001A)
- SURESubtraction scan system (CHSS-001A)
- Vessel view (CVV-001A)
- ECG-gated reconstruction system (CHEG-005B)*9
- ECG-gated scan system (CHEG-004D)
- Extended field of view (CSTC-005A)
- Injector synchronization system (CKIS-003A)
- Injector synchronization system, CAN protocol Class 1 (CKIS-004B)
- Injector synchronization system, CAN protocol Class 4 (CKIS-005A)
- Orbital synchronized scan system (CKOS-001A)
- Respiratory-gated scan system (CKRS-004A/CKRS-005A)
- Respiratory-gating system (CKRS-004B)
- vHP (Variable Helical Pitch) (CHVH-001A)
- Color printer interface (CCP-03A)
- DICOM® MPPS (COT-33D)
- DICOM MWM (COT-32D)
- DICOM PGP profile (COT-44A)
- DICOM Q/R SCP (COT-34D)
- DICOM Q/R SCU (COT-35D)
- DICOM storage commitment SCU (COT-41D)
- DICOM storage SCP (COT-30D)
- Fast image reconstruction kit (CCFR-010A)*10
- Multi language kit (CKKB-006A)
- CT Fluoroscopy (SUREFluoro) (TSXF-003I/TSXF-004A*3, *4)
- LCD monitor for SUREFluoro (48.1 cm (19 inch) type) (CMM-004B)
- SUREXtension (COT-49D)

*1: Option
*2: Desk not included.
*3: For the 315 kg (694 lb) long patient couch version
*4: For the 315 kg (694 lb) short patient couch version
*5: Mandatory option
*6: For TSX-036A/7
*7: For TSX-036A/C
*8: CXGS-016A is required.
*9: CXGS-016A, CGS-67A, and other options are required. Please check the option tree for more information.
*10: Pre-installed

- Protocol management (CSPM-001A)
- UPS connection kit (CEUC-001B)
- Couch footswitches (CAFS-008A)*1, *2
- Couch lateral movement unit (CALU-001A*3, *4)
- Flat couch top kit (CAFT-021A*3/CAFT-022A*1)
- Kit for widening the gap between the gantry and patient couch (CAZZ-004A)*3
- Rear footswitches (CAFS-007A)*3, *4
- Table-top stroke shortening kit (CBZH-010A*2/CBZH-011A*4)
- Reconstruction Processing System (CSAL-001A)

Note: Some options may not be available in your country or region. Please check with your sales representative.

PERFORMANCE SPECIFICATIONS

Scan parameters

- Gantry aperture: 780 mm in diameter
- Rotation: 360° continuous
- Tilt: ±30°
  Axial and helical scanning
  Gantry and remote controlled
- Rotation times

Unit: s

Half scan	0.32*5, 0.39*5, 0.48
Axial scan	0.5*5, 0.6*5, 0.75, 1.0, 1.5, 2.0, 3.0
Dynamic scan, Helical scan, SURE Start	0.5*5, 0.6*5, 0.75, 1.0, 1.5

- Time between scans
  – S & S: Min. 1.8 s (with 10 mm shift)
  – S & V: Min. 2 s
- Continuous scan: Max. 100 s
- Acquisition modes
  – Axial
  4 row scan: 1, 2, 3, 4, 5, 8 and 10 mm
  1 row scan: 1 mm
  – Axial, Helical
  80, 4 row scan: 0.5 mm
  40 row scan: 0.5 and 1 mm
  – Helical
  20 row scan: 0.5 and 1 mm
- Scan field
  – CT scan

Unit: mm

M	L
ϕ320	ϕ500

– Scanoscopy

Unit: mm

Axial direction	Longitudinal direction
Up to 500	Adjustable from 200 to 1780*1 (1480*2) 200 to 1950*3 (1450*4)

- Tube position for scanoscopy: 0°, 90°, 180° and 270°
  Any desired angle can be specified (in 5° increments).

Helical scan

- Continuous scan time: Max. 100 s
- Scan start time delay: Min. 3 s
  Setting is possible in increments of 0.1 s.
- Active Collimator: To reduce the exposure dose, the collimator operates at the start/end of scanning (except in the case of 4 row scanning).
- Scan length (with headrest)

Unit: mm

220 kg (485 lb) long patient couch version	1780
220 kg (485 lb) short patient couch version	1480, 1350*5, 1150*5, 950*5, 750*5
315 kg (694 lb) long patient couch version	1950
315 kg (694 lb) short patient couch version	1450, 1350*5, 1250*5

- Couch-top speed: 0.8 mm/s to 126 mm/s
- SURE Exposure 3D: Function for continuously varying the X-ray tube current to ensure the optimal X-ray dose during helical scanning.
- SURE kV: The effective kV will be automatically selected based on patient size and SURE Exposure settings.
- Image reconstruction time*6: Up to 50 images/s*7 with AIDR 3D (0.02 s/image)*7
- Real-time helical reconstruction time: 12 images/s (0.083 s/image) (1 slice, 512 × 512 matrix)
- Reconstruction position setting: In increments of a minimum of 0.1 mm by entering the couch-top position or using the scanogram.
- Reconstruction interval setting: In increments of a minimum of 0.1 mm.

*1: For the 220 kg (485 lb) long patient couch version
*2: For the 220 kg (485 lb) short patient couch version
*3: For the 315 kg (694 lb) long patient couch version
*4: For the 315 kg (694 lb) short patient couch version
*5: Option
*6: Depending on the scan and reconstruction conditions
*7: With the fast image reconstruction kit (pre-installed)

Dynamic volume scan

- Programmable time: Max. 1 hour/eXam Plan
- Number of programmable scans: Max. 20
  Max. 100 s/scan
- Scan plan
  – Scan interval: Min. 1 s in increments of 0.1 s.

  Note: When a scanning mode with patient couch movement is used, the minimum scan interval is limited by the time required for movement.
- Scan start delay time: Min. 0.5 s
  Setting is possible in increments of 0.1 s.
- Scan rate: Max. 133 scans/100 s
  (0.75 s scan, 133 rotations)
  Max. 200 scans*1/100 s
  (0.5 s scan*1, 200 rotations)
- Image reconstruction
  – Number of images: Max. 4 images/scan
  – Image interval: 0.05 s

SURE Start

- Scan start mode: Automatic
  Manual
- Continuous scan time: Max. 100 s
- Acquisition mode: Intermittent, continuous, combination
- Region of interest (ROI): Max. 3
- CT number measurement interval: 0.083 s
- Scan start delay time: Min. 3 s
- Display function: Mean CT number within the ROI, elapsed time

Voice-recorded instruction and scan system (VoiceLink)

As part of the eXam Plan, voice instructions to the patient can be recorded by the operator and automatically played back during scan sequences.

- Number of messages: Max. 200
- Recording time: Max. 30 s per message
- Delay time setting: The delay time between the end of the message and the start of scanning can be set for up to 10 s, in increments of 1 s.

Patient couch

Load (kg [lb])	Maximum	220*2 (485)		315*3 (694)	
Table type		Long	Short	Long	Short
Width (mm)		470			
Step feed (mm)	Range	0.5 - 600			
	Increments	0.5			
Height (mm)	Maximum	900			
	Minimum	312		332	
Stroke (mm)	Vertical	588		568	
	Horizontal	2190	1890 1760*1 1560*1 1360*1 1160*1	2390	1890 1790*1 1690*1
Scan range (with headrest) (mm)		1830	1530 1400*1 1200*1 1000*1 800*1	2030	1530 1400*1 1300*1
Horizontal reproducibility (mm)		± 0.25		± 0.25*4 ± 1.0*5	
Speed (mm/s)	Up	16 - 24 (50 Hz) 19 - 28 (60 Hz)		10 / 65	
	Down	20 - 30			
	Horizontal	10 / 130		10 / 200	
System driver	Vertical	Hydraulic		Motor	
	Horizontal	Motor / Manual			

X-ray generation

- X-ray exposure: Continuous
- X-ray tube voltage: 80, 100, 120 and 135 kV
- X-ray tube current: 10 mA to 300 mA*6
  10 mA to 420 mA*6, *7
- X-ray tube heat capacity: 5 MHU
  8 MHU equivalent with AIDR 3D
- X-ray tube cooling rate: Max. 864 kHU/min
- Focal spot size
  – IEC 60336: 2005
  nominal : 0.9 mm × 0.7 mm (small)
  1.4 mm × 1.4 mm (large)

*1: Option
*2: Patient weight Max. 205 kg (452 lb) + Accessories 15 kg (33 lb)
*3: Patient weight Max. 300 kg (661 lb) + Accessories 15 kg (33 lb)
*4: For patient weight < 230 kg
*5: For patient weight > 230 kg and < 300 kg
*6: kV dependent
*7: CXGS-016A is required.

X-ray detection

- Detection system: Solid-state detectors
- Main detector: 896 channels × 80 elements
- Number of elements: 71680
- Data acquisition: 896 channels × 80 rows
- Reference detector: 1 set
- View rate: Max. 1600 views/s
  Max. 2400 views/s*1

Data processing

- Reconstruction matrix: 512 × 512
- Picture element (pixel) size
  – CT image Unit: mm

Scan field	M	L
Pixel size	*to 0.63	*to 0.98

*: Depending on the Vari-Area or Zoom factor

  – Scanogram Unit: mm

Enlargement ratio (area)		Standard
Pixel size	LL	1.00
	L	
	M	
	S	0.50

- Dose reduction functions
  – AIDR 3D
  – AIDR 3D Enhanced
- Metal artifact reduction function
  – SEMAR (Single Energy Metal Artifact Reduction)
- Reconstruction filter functions
  – Abdomen with BHC
  – Abdomen without BHC
  – Head with BHC
  – Head without BHC
  – Inner ear and bone
  – Lung
  – High-resolution mode
  – Super-resolution mode for the inner ear, bone, and lung
  – Maintenance
- Reconstruction time: Min. 0.02 s/image*2
  (Up to 50 images/s)*2
- Real-time scanoscopy
- Data processing unit
  – CPU: 64 bit
  – Memory size: 32 GB or more
  – Magnetic disk unit: Raw data, 550 GB or more
  Image data, 365 GB or more

Data storage

- Magnetic disk
  – Raw data: Max. 4000 rotations
  – Image data: Max. 500000
- DVD-R: 4.7 GB
  – DICOM images: 7500

Image display

- Display monitor: 48.1 cm (19 inch color) LCD unit
- Monitor matrix: 1280 × 1024
- Image matrix: 1024 × 1024 (max.)
- CT number
  – Display range: From -1536 to +8191
  Note: The CT number measurement range is from -32768 to +32767.
- Window width/level: Continuously variable (adjustable at variable speed)
- Preset windows: 3/image
- Window types: Linear, non-linear (including user-programmable and double windows)
- Image retrieval
  – Method: On-screen menus and keyboard
  – Mode: Image, series, and patient
- Autoview function: Software control, function key
- Multi-frame display: Reduction/cutoff display, ROI processing
- Inset scanogram display
- Information display: User selectable
- Cine display: Variable speed
- Scanogram/CT image switching: Show/hide scano line, zoom
- Slice-feed playback (CineView): High-speed image feed using the mouse or keyboard

Image processing

- Scanogram processing
  – Slice position display (display of planned slice, preset slice, and last scanned slice)
  – Anatomical scale (display of position, relative to selected zero position)
  – Slice position setting
  – Enlargement
- CT image processing
  – ROI
    · Shape: Point, rectangular, polygonal, elliptical, irregular
    · Processing: Mean value, standard deviation, area, number of pixels, maximum value, minimum value
    · Display: Max. 10/image
    · Control: Size, position, rotation

*1: Option
*2: With the fast image reconstruction kit (pre-installed)

  – Measurement of distance and angle between two points
  – Profile (oblique profile also available)
  – Histogram
  – CT number display
  – Mark display (grid display, scale display)
  – Volume calculation
  – Enlargement, reduction, panning
  – Addition/subtraction between images
  – Band display (non-linear windowing)
  – Comment and arrow insertion
  – Top/bottom, right/left, black/white reversal of image
  – Image filtering
  – Image rotation (arbitrary rotation)
  – Screen save
  – High-speed axial interpolation
  – MultiView (Auto MPR)
  – Quantum denoising software (QDS)
  – Boost3D
  – Z-sharpening
- Raw data processing
  – Zooming reconstruction
  – Stack reconstruction
  – Protect/Unprotect
  – Half-view reconstruction of helical scan raw data
  – Play/Reverse reconstruction (helical and dynamic scan)
  – Priority reassignment in reconstruction queue

System management

- Warm-up function
- Calibration data acquisition
- Patient data input
- Patient appointment function
- Examination summary
- eXam Plan editing
- Modification of related information
- Operation environment settings
- Slice counter
- Sleep mode
- Access control (NEMA XR-26)
- White list type antivirus software

Dose management

- $CTDI_{vol}$ (or $CTDI_{w}$)/DLP/Geometric efficiency in z-direction
- Dose check (NEMA XR-25)
- DICOM SC Exposure summary
- DICOM SR compliant Dose report
- NEMA XR-29

3D color image processing

High-quality 3D images can be obtained rapidly and with easy operation.

- 3D surface rendering
  – Clipping, texture or non-texture
- 3D volume rendering
  – Maximum intensity projection (Max-IP)
  – Minimum intensity projection (Min-IP)
  – X-ray volume rendering
  – Intensity volume rendering
  – Shaded volume rendering
  (an arbitrary opacity curve can be set)
- Display/processing function
  Zooming, panning, measurement (distance, angle), annotation, cutting, drilling
- Cine display
- MPR
  3 orthogonal planes/oblique image
  Curved MPR
- Easy accurate bone elimination function
- High resolution mode

Image transfer

- 1000BASE-T, 100BASE-TX, 10BASE-T
- TSB protocol
- DICOM storage SCU
- Enhanced DICOM
- TIFF conversion

Filming

- Ethernet: TSB protocol
  DICOM PRINT SCU
- Sheet editing function using virtual film
- T-mode: Related information items such as the patient name are displayed in the footer area using a larger font.

Note: To use T-mode, the laser imager must support 2048 × 2404 pixels for a 1 × 1 frame layout.

- Auto filming in eXam Plans

IMAGE QUALITY

Noise	
Standard deviation	Less than 0.65%
Scan parameters	
Tube voltage	120 kV
Tube current	300 mA
Scan time	1 s
Slice thickness	8 mm (4 mm × 4 rows : 2 stack)
Reconstruction function	FC70
Scan field	M
Phantom	ϕ24 cm water

Spatial resolution	
Resolution	20.0 lp/cm at MTF 0%* 8.0 lp/cm at MTF 50% 14.5 lp/cm at MTF 2% (MTF calculation value) *For reference
Scan parameters	
Tube voltage	120 kV
Tube current	200 mA
Scan time	1 s
Slice thickness	2 mm (0.5 mm × 4 rows : 4 stack)
Reconstruction function	FC90
Scan field	M
Phantom	IRIS QA phantom

High contrast detectability	
X-Y plane	0.31 mm
Scan parameters	
Tube voltage	120 kV
Tube current	250 mA
Scan time	1.5 s
Slice thickness	0.5 mm
Reconstruction method	MUSCOT*
Reconstruction function	FC90
Scan field	M
Phantom	Catphan® 500 phantom (CTP528 module)
Z-direction	0.31 mm
Scan parameters	
Tube voltage	120 kV
Tube current	250 mA
Scan time	1.5 s
Slice thickness	0.5 mm
Reconstruction method	TCOT**+ with 0.5 mm SR
Reconstruction function	FC70
Scan field	M
Phantom	Catphan 500 phantom (CTP528 module)

*: Multi-slice Cone-beam Tomography
**: True Cone-beam Tomography

Low contrast detectability	
Object size (A)	2 mm at 0.3%
$CTDI_{vol}$	16.7 mGy
Object size (B)	3 mm at 0.3%
$CTDI_{vol}$	8.7 mGy
Object size (C)	5 mm at 0.3%
$CTDI_{vol}$	3.3 mGy
Scan parameters	10 mm (with AIDR 3D)
Phantom	Catphan 600 phantom (CTP515 module)

- $CTDI_{vol}$ (Volume $CTDI_w$, Unit: mGy/100 mAs)
  - Head mode: 16.0 mGy*
  - Body mode: 10.6 mGy*

*: Measured on standard head and body CTDI phantoms.

SYSTEM ENERGY CONSUMPTION

Daily energy consumption by 20 abdomen scans*

- Scenario Off 42.1 kWh
- Scenario Idle 65.5 kWh

*: Measurement according to "COCIR Self-Regulatory Initiative for medical imaging equipment- CT measurement of energy consumption – Revision V0"

SYSTEM COMPONENTS AND THEIR FUNCTIONS

Gantry

The gantry can be tilted forward and backward in order to perform tilted scanning. Three-dimensional alignment lights are provided for setting slice positions. Gantry and patient couch operating controls are provided on both sides of the front of the gantry housing.
The monitor (ⓘStation) indicates information to the operator and the patient, such as the patient name and the scan status.
The X-ray high-voltage generator is built into the gantry, and the system employs a high-frequency inverter for generating and stabilizing the high voltage supplied to the X-ray tube. The generator includes electronic circuits for controlling the speed of the rotating anode in the X-ray tube. Use of a high-frequency inverter system results in high power output combined with excellent stability. In addition, the system is compact and lightweight.

X-ray generator

This unit supplies stable high voltage to the X-ray tube unit. The high-frequency inverter method is employed, resulting in a light and compact design. This unit is incorporated in the gantry.

- Max. power: 50.4 kW
  Effective 112 kW max.
  equivalent with AIDR 3D

X-ray tube

This is a large-capacity, high-cooling-rate X-ray tube that is able to withstand continuous operation as in helical scanning.

- Heat capacity: 5 MHU
  8 MHU equivalent with AIDR 3D
- Cooling rate: Max. 864 kHU/min

Patient couch

The patient couch moves vertically, and the top moves longitudinally. In an emergency, the couch-top can be pulled out manually with very little effort. The couch-top can also be lowered to a minimum height of approx. 312 mm from the floor, facilitating transfer of the patient from a low bed or stretcher.

Console

The console is provided with a hybrid keyboard, a monitor, and a mouse.

- Functions for scanning
  - Selection of scan parameters
  - Scanoscope control
  - Scan control
  - Couch-top movement control
  - Gantry tilt control
- Functions for image processing
  - Window level and window width adjustment
  - Other mouse-operated image processing functions

OPERATING FEATURES

Patient handling and positioning

- The couch-top can be lowered to approx. 312 mm from the floor, facilitating transfer of the patient to and from a bed or stretcher.
- Alignment lights are provided in the gantry aperture for fast and accurate patient positioning.
- High-precision couch-top positioning is possible from the integrated console or by manual operation from the control panel, and clear digital readouts are provided on the gantry.
- The couch-top can be pulled out manually in an emergency.

Scanning

- Scanoscope function provides a projection image of the patient for high-precision advance planning of scan areas.
- On the scanogram, the length of the scan area can be adjusted over a range of up to 1950 mm*1, 1780 mm*2, 1450 mm*3, or 1480 mm*4. Because the images are reconstructed in real time, the scan can be aborted at any time. This allows the patient exposure dose to be minimized.
- The auto index function allows automatic incremental couch-top movement based on the slice positions determined through the scanogram.
- The eXam Plan function allows simple selection of pre-programmed scanning parameters for routine examinations, maximizing patient throughput.
- Protocol comments can be saved in each eXam Plan, providing interactive onscreen instructions for all studies, reducing the need to refer to a separate protocol book.
- The Vari-area function allows the user to preselect a region of interest for zooming using raw data, permitting immediate post-scan analysis. Zooming using raw data yields higher resolution than enlarging an image that has already been reconstructed.
- Dynamic and rapid-sequence scan modes are provided.
- Multislice helical scan acquires raw data by rotating the X-ray tube continuously while moving the patient continuously through the scanner. The acquired volume data can be used to reconstruct axial slices at any desired position. This scan mode is best used for rapid patient scanning during a single breath-hold and for high-definition three-dimensional and MPR imaging.
- Real-time helical reconstruction mode makes it possible to observe the images being scanned in real time at a maximum of 12 frames per second. This mode shows any shift in the slice position in real time and allows the operator to check the scan field on the image, contrast study timing, patient body motion, etc. The patient can therefore be released immediately after scanning.
- The SURE Start function allows the operator to start helical scanning at the timing of maximum enhancement in contrast studies. SURE Start monitors the CT number in real time to detect the arrival of contrast medium in the image. When the CT number reaches the predefined threshold, dynamic volume scan or helical scan automatically starts. This technique ensures optimal contrast enhancement, independent of individual differences in blood flow velocity, and at the same time minimizes the dose of contrast medium.

Data processing

- A variety of reconstruction algorithms are available and can be selected according to the anatomical region examined and the clinical objective of the study. These include algorithms for the abdomen, head, bones, lung, small structures, soft tissues, etc.

Image display and processing

- Reconstructed images are automatically displayed according to the window settings preset in the eXam Plan.
- The window save function allows the user to store an image with different window settings from those set in the eXam Plan.
- Filter parameters can be customized through simple on-screen menu selections. These parameters include the number of filtering passes, matrix size, and filter coefficients.

*1: For the 315 kg (694 lb) long patient couch version
*2: For the 220 kg (485 lb) long patient couch version
*3: For the 315 kg (694 lb) short patient couch version
*4: For the 220 kg (485 lb) short patient couch version

- Images can be rotated and reversed right/left, top/bottom, black/white.
- The Multi-frame feature allows up to 15 images to be retrieved and displayed simultaneously on the screen.
- The three-dimensional image display function allows color three-dimensional and MPR images in real-time to be generated from the volumetric scan data acquired by helical scanning. This results in higher definition and image quality than images reconstructed from conventional single-slice scanning. This is because helical scanning provides superior data continuity along the patient axis compared with conventional scanning.

Image filming

- Filming of images can be performed manually or automatically from the console.
- Automatic filming sends an entire study to the laser printer. Filming is performed in background mode so that other scanner and image processing functions can be performed without interruption or delay.
- When T-mode is used, related information items displayed together with an image (surrounding the image, in a small font) are displayed in the footer area using a larger font, permitting not only easier reading but also simpler film management.

Patient throughput

Patient throughput and cost effectiveness were major objectives in the design and production of the system.

- The system incorporates a 5.0 MHU X-ray tube with a fast cooling rate of 864 kHU/min in actual use.
- High-speed scans can be performed in as little as 0.75 (0.5*1) second per scan.
- Real-time scanoscopy.
- Ease of operation is ensured through the incorporation of a hybrid keyboard, mouse-driven menus, and a large color LCD screen.
- The couch-top can be lowered to a position close to the floor, facilitating patient transfer.

COMPLIANCE

Council Directive 93/42/EEC and subsequent amendments

IEC 60601-2-44: 2009+Amd.1: 2012+Amd.2: 2016
IEC 60601-1: 2005+Amd.1: 2012
IEC 60601-1-2: 2014
IEC 60601-1-3: 2008+Amd.1: 2013
IEC 60601-1-6: 2010+Amd.1: 2013
IEC 60601-1-9: 2007+Amd.1: 2013
IEC 60601-2-28: 2010
IEC 60601-2-28: 2017
IEC 60825-1: 2007
IEC 62366: 2007+Amd.1: 2014
IEC 62366-1: 2015+Amd.1: 2020
IEC 62304: 2006+Amd.1: 2015

DIMENSIONS AND MASS

Unit		Dimensions W × L × H mm (in)	Mass kg (lb)
Gantry		2050 × 960 × 1910 (80.7 × 37.8 × 75.2)	1450 (3197)
Patient couch	220 kg (485 lb) Long patient couch version	630 × 2690 × 450 (24.8 × 105.9 × 17.7)	485 (1069)
	315 kg (694 lb) Long patient couch version	660 × 2890 × 470 (26.0 × 113.8 × 18.5)	700 (1543)
	220 kg (485 lb) Short patient couch version	630 × 2390 × 450 (24.8 × 94.1 × 17.7)	455 (1003)
	315 kg (694 lb) Short patient couch version	660 × 2390 × 470 (26.0 × 94.1 × 18.5)	655 (1444)
Console	STNAVI BOX	197 × 308 × 349 (7.8 × 12.1 × 13.7)	12 (26)
	CON BOX	590 × 955 × 1363 (23.2 × 37.6 × 53.7)	255 (562)
Power distributor		700 × 695 × 973 (27.6 × 27.4 × 38.3)	470 (1036)

*1: Option

SITING REQUIREMENTS

Power requirements

- Phase: Three-phase
- Voltage: 380 V, 400 V, 415 V, 440 V, 460 V, 480 V*
- Frequency: 50 Hz or 60 Hz ±1 Hz
- Line capacity: 50 kVA (72 kVA*[1])
- Voltage fluctuation due to load variation: Less than 5%
- Power voltage fluctuation: Less than 10%**

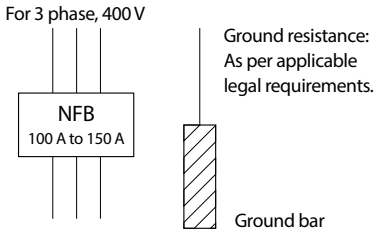
*: For other voltages or in the event of excessive power fluctuation, consult with your sales representative.

**: Represents the total voltage fluctuation due to load and power variation.

Grounding

Grounding must be provided in accordance with local regulations for medically used electrical equipment.

Power distribution board



Ambient conditions

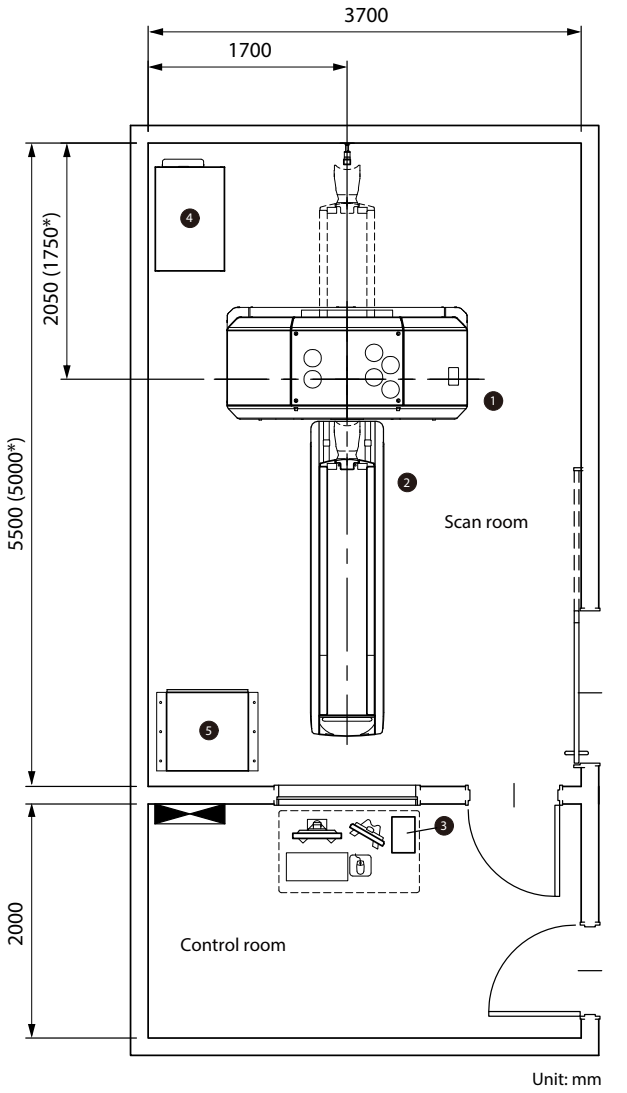
	Temperature	Humidity	Heat generation
Scan room			
Gantry (including Patient couch)	20°C to 26°C Tolerance: ±2°C	40% to 80% No condensation	Approx. 10800 kJ/h* 33870 kJ/h**
Console (CON BOX)	20°C to 26°C	40% to 80% No condensation	Approx. 6090 kJ/h
Power distributor	20°C to 26°C	40% to 80% No condensation	Approx. 2883 kJ/h* 6400 kJ/h**
Control room			
Console (STNAVI BOX)	16°C to 28°C	40% to 80% No condensation	Approx. 829 kJ/h

*: When scanning is not performed.

**: When scanning is performed continuously at the maximum rated output of the system.

*1: Option

Room layout example (For the 220 kg (485 lb) patient couch version)



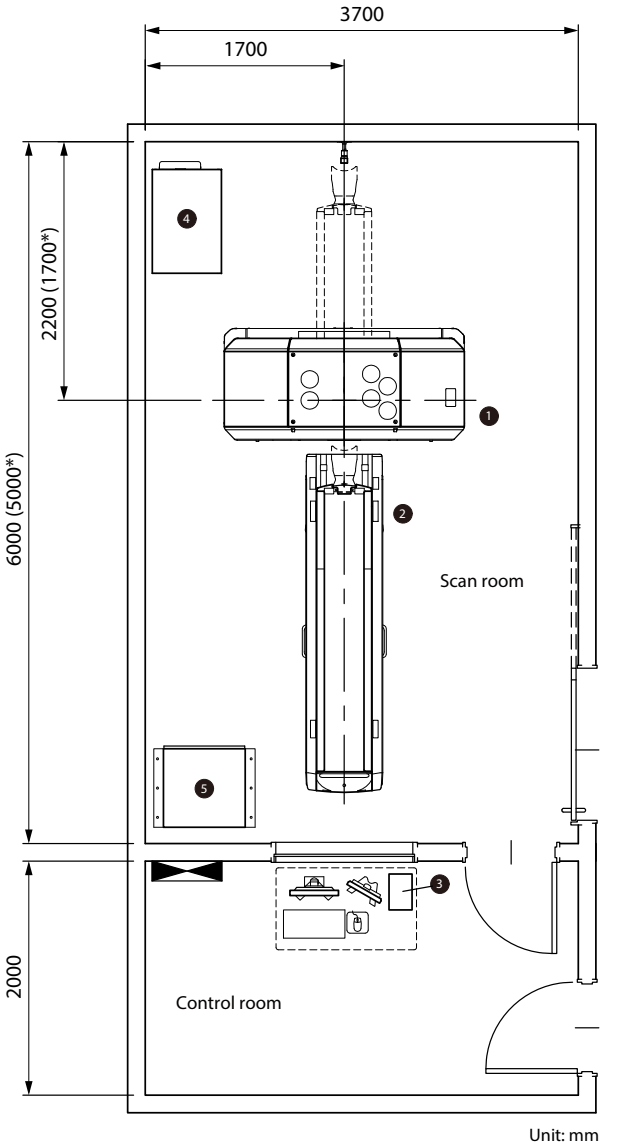
1 Gantry
2 Patient couch
3 Console (STNAVI BOX)
4 Console (CON BOX)
5 Power distributor

*: For the short patient couch version.

Minimum area for installation

Long patient couch version	18.3 m^2
Scan room area	12.6 m^2
Control room area	5.7 m^2
Short patient couch version	
Scannable range 800 mm*1	15.5 m^2
Scan room area	9.8 m^2
Control room area	5.7 m^2

Room layout example (For the 315 kg (694 lb) patient couch version)



1 Gantry
2 Patient couch
3 Console (STNAVI BOX)
4 Console (CON BOX)
5 Power distributor

*: For the short patient couch version.

Minimum area for installation

Long patient couch version	20.2 m^2
Scan room area	14.5 m^2
Control room area	5.7 m^2
Short patient couch version	
Scannable range 1300 mm*1	17.2 m^2
Scan room area	11.5 m^2
Control room area	5.7 m^2

*1: Option

Installation requirements

Scan room

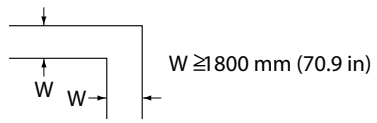
- Before installing the gantry, check the maximum permissible floor load.
- The scanner emits radiation. X-ray shielding must be provided around the scan room and the entrance in accordance with all local requirements and regulations.
- The ceiling height should be at least 2500 mm when a ceiling mounted contrast injector is installed.
- Wiring pits and ducts are required for routing cables that connect the various units.

Control room

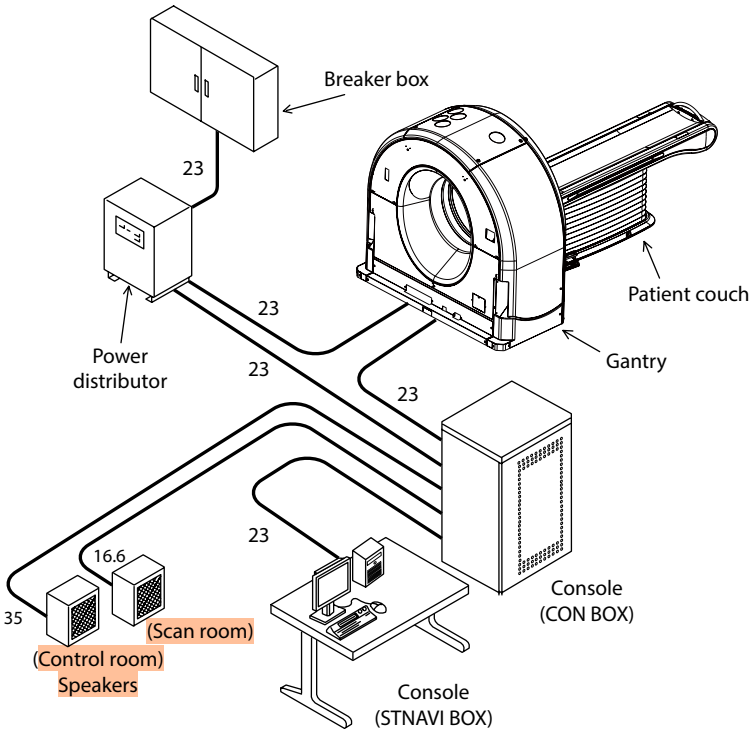
- An observation window is required for monitoring the scan room. X-ray shielding of the window glass must be provided in accordance with all local requirements and regulations.
- Wiring pits and ducts are required for routing cables that connect the various units.
- The control room should have entrances for access to the corridor and the scan room.

Checks before bringing-in the unit

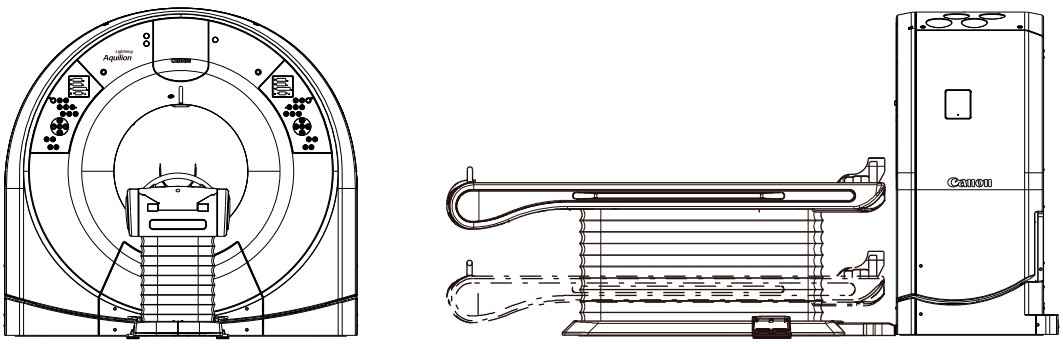
- Check in advance the width of the corridor, the dimensions of the entrance, and the dimensions and maximum allowable load of the stairs and elevators to ensure that it is possible to bring in the unit safely and without difficulty.
- The minimum dimensions of the entrance used for bringing in the unit are as follows
  – Width: 1060 mm (41.7 in)
  – Height: 2130 mm (83.9 in)
- The corners of corridors should be as illustrated below.
- Elevator load rating: At least 2000 kg (4400 lb)



Cable length between units in meters

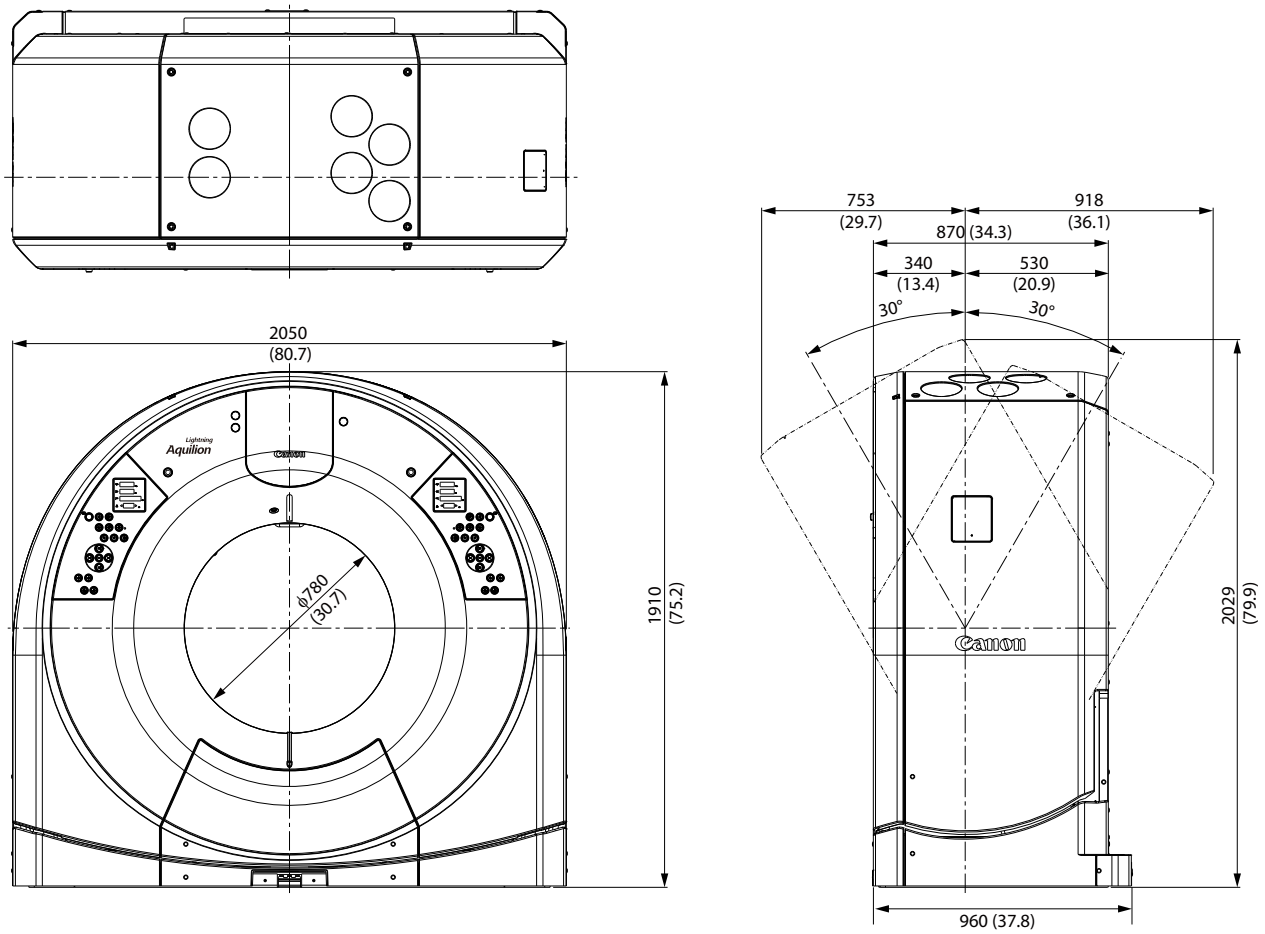


OUTLINE DRAWINGS



Gantry and patient couch

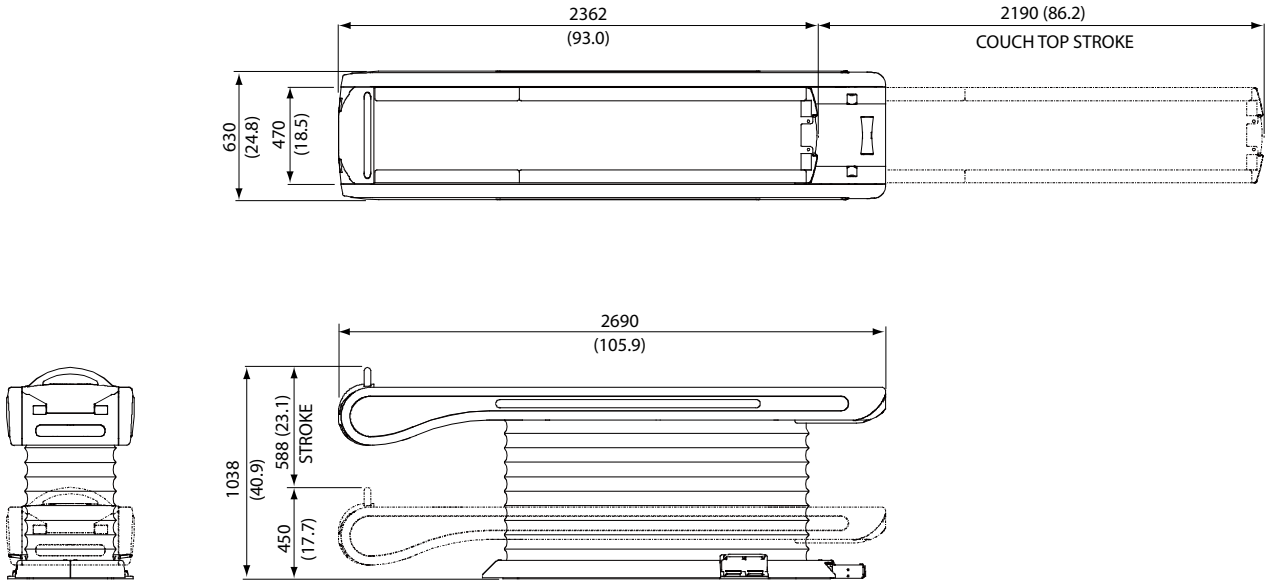
OUTLINE DRAWINGS



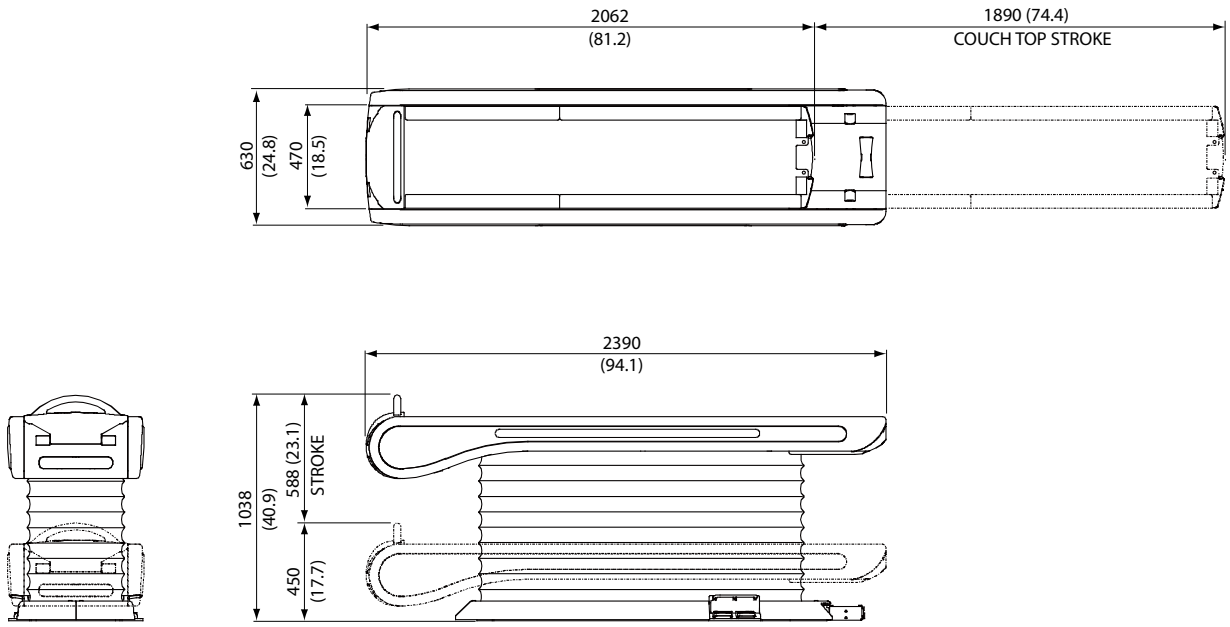
Gantry

Unit: mm (in)

OUTLINE DRAWINGS



Patient couch (for the 220 kg (485 lb) long patient couch version)

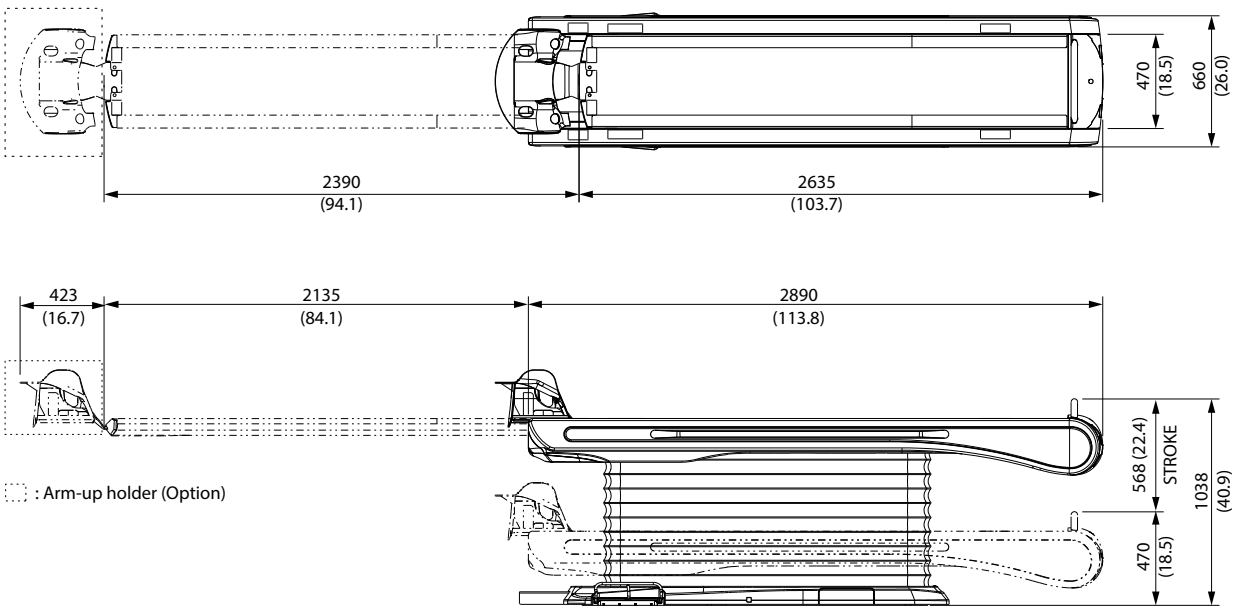


Patient couch (for the 220 kg (485 lb) short patient couch version)

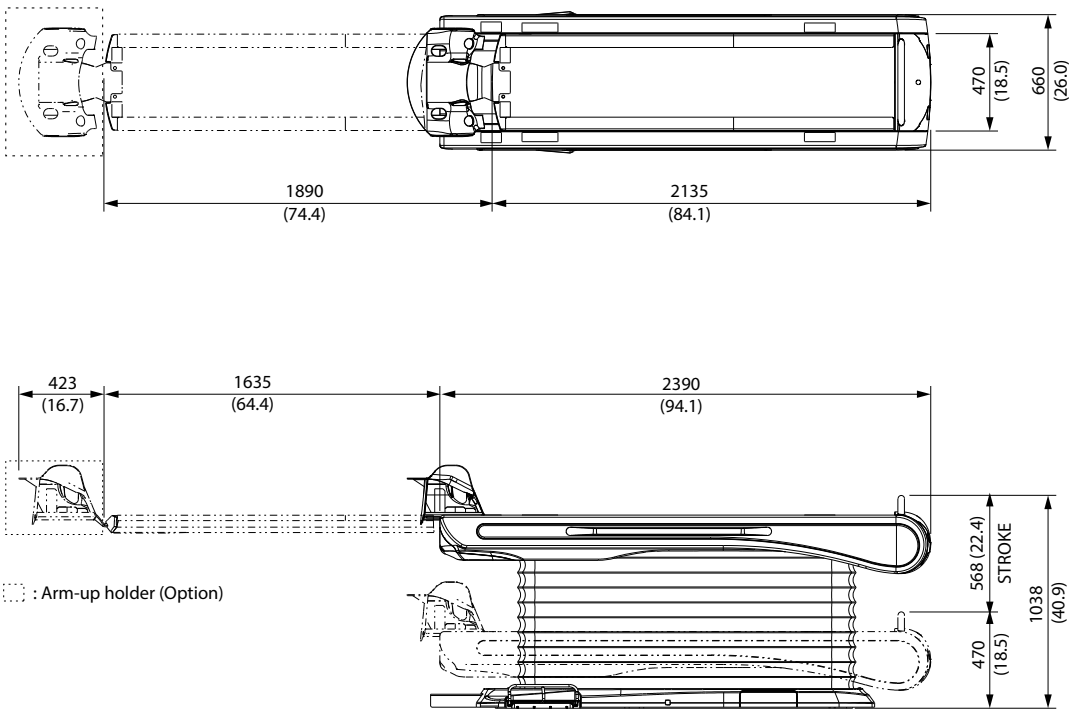
Note: The footswitch is not included in the standard configuration.

Unit: mm (in)

OUTLINE DRAWINGS



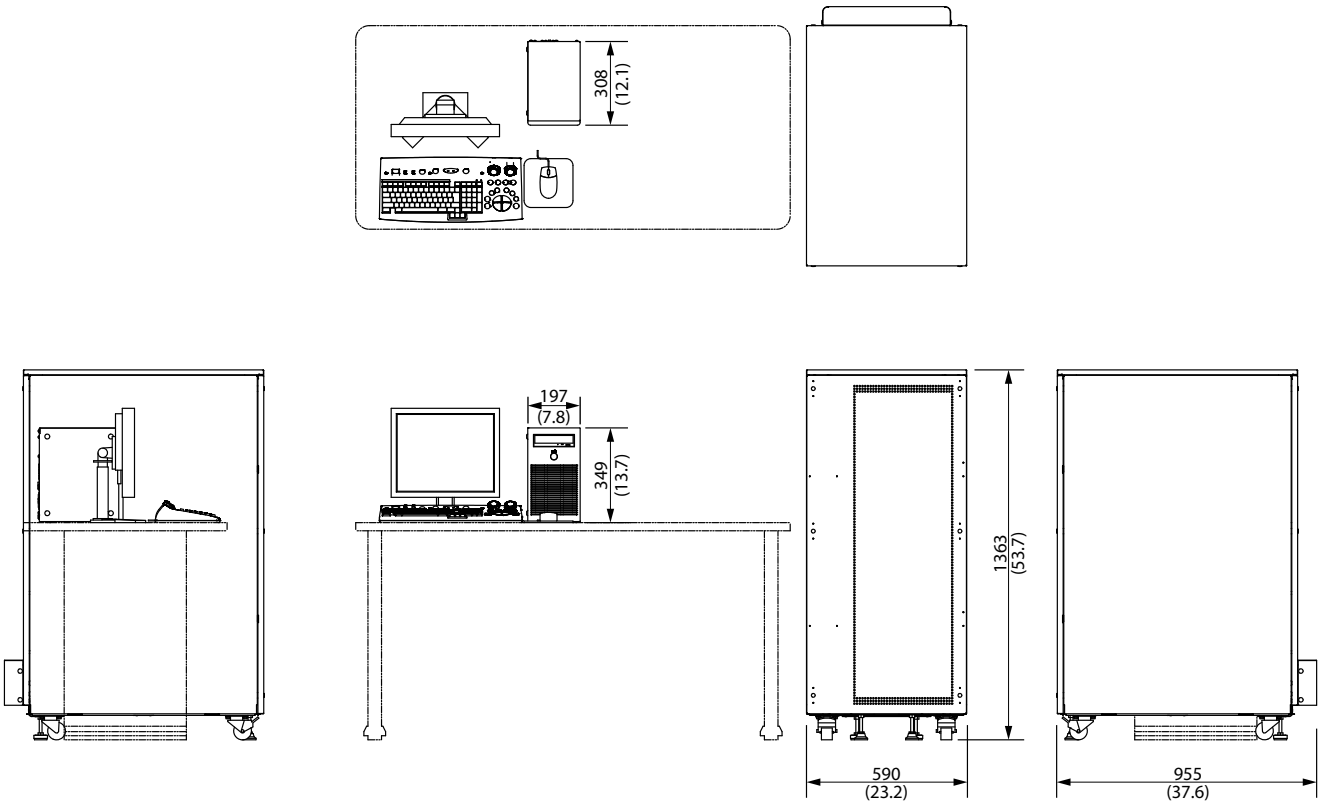
Patient couch (for the 315 kg (694 lb) long patient couch version)



Patient couch (for the 315 kg (694 lb) short patient couch version)

Unit: mm (in)

OUTLINE DRAWINGS

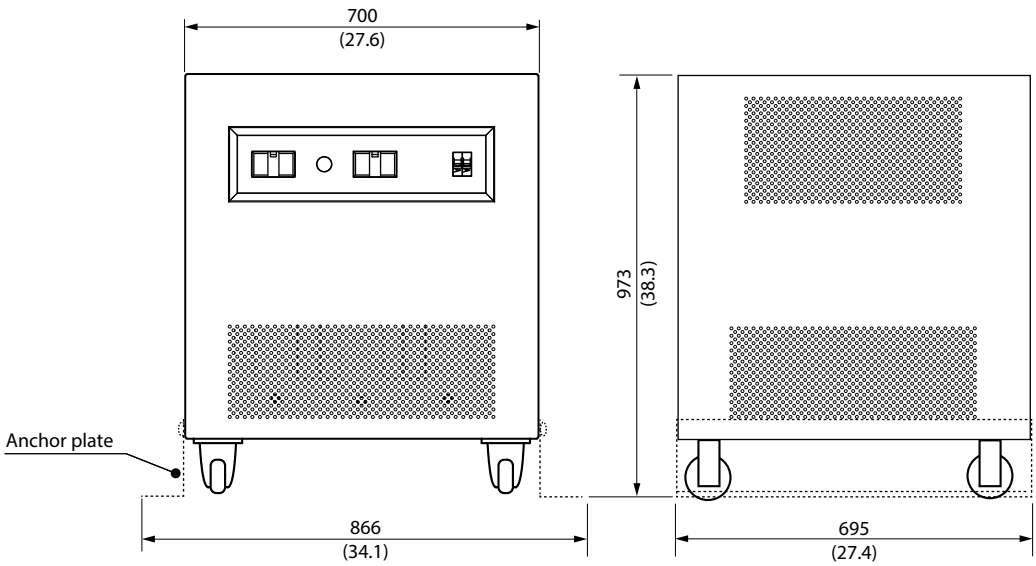


Console

Note: The console desk is not included in the standard composition.
Some of the units shown in the photograph on the front page differ from those shown in the drawings above.

Unit: mm (in)

OUTLINE DRAWINGS



Power distributor

Unit: mm (in)

CANON MEDICAL SYSTEMS CORPORATION
1385, Shimoishigami, Otawara-shi, Tochigi 324-8550, Japan
https://global.medical.canon

Model number: TSX-036A MPDCT0821EAD 2023-02 CMSC/Produced in Japan

Canon Medical Systems Corporation meets internationally recognized standards for Quality Management System ISO 9001, ISO 13485.
Canon Medical Systems Corporation meets the Environmental Management System standard ISO 14001.

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