Datasheet

CIARTIC Move

Mobile

siemens-healthineers.com/ciartic-move

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System specifications

C-arm	
C-arm base	Self driving platform with holonomic wheels for motorized movement (battery powered)
C-arm with electromagnetic brakes	yes
Orbital movement manual	± 100°
Orbital movement motorized	± 98° with 10°/s
Angulation manual	± 225°
Angulation motorized	± 221° with 10°/s
Horizontal movement	any distance by moving the motorized system in the room
Immersion depth	72.6 cm (28.6“)
Swivel range	any angle by moving the motorized system
Vertical travel	45 cm (17.7“), motorized
Source-detector distance	116 cm (45.8‘‘)
Free space	92.4 cm (36.3‘‘)
Moving around axis ‘Detector center to X-Ray source‘	360°
3D autonomous positioning in room	Moving the self driving C-arm autonomously to different pre-stored positions including recalling system parameter settings
Integrated Battery for electrical movement	960 Wh, 4 A (nominal)

System specifications

PC Hardware	
Image acquisition system	Intel 8th Generation Core i7-8700TE microprocessor, Windows 10, 64 bit, 16 GB RAM, SATA3 drives, USB 2.0, high-performance professional graphics card for image processing and interface cards for the detector/X-ray system
Acquisition memory on SSD	Storage and postprocessing of all acquired images in a common patient folder 300,000 images on SSD irrespective of matrix size
Storage-capacity	2 x 1 TB SSD SATA3
Power supply	Integrated, uninterruptible power supply helps ensure that image and patient data are secure in the event of a power outage

OpenApps PC Hardware [1)]	
OpenApps PC	Intel 8th Generation Core i7-8700TE microprocessor, Windows 10, 64 bit, 16 GB RAM, SATA3 drive, USB 2.0, high performance professional graphics card for image processing
Storage-capacity	1 TB SSD SATA3
Power supply	Integrated, uninterruptible power supply helps ensure that image and patient data are secure in the event of a power outage

[1)] Option

System specifications

X-ray generator/tube	
25 kW high-frequency generator	
Power output (IEC 60613)	25 kW
Inverter control frequency	18 kHz to 50 kHz
kV range	40 kV to 125 kV [3)]
mA range	3 mA to 250 mA [3)]
mAs range	0.015 mAs to 15 mAs [3) 4)]
Pulse width range	5 ms to 150 ms [3)]
Pulse rate range	0.5 p/s to 30 p/s [3)]
Nominal electric power [2)]	25 kW, 100 kV, 250 mA, 100 ms
Single Image	10 mA to 250 mA, 0.05 mAs to 15 mAs [4)], 5 ms to 150 ms pulse width
Fluoroscopy	3 mA to 224 mA (with ESU [1)] 250 mA), 0.5 p/s to 30 p/s, 5 ms to 13 ms pulse width
Power and dose management	Selection of suitable power and dose levels for each clinical application

[1)] Option; [2)] according IEC 60601-2-54 NOMINAL ELECTRIC POWER; [3)] depends on clinical settings; [4)] in service mode 25 mAs

System specifications

X-ray generator/tube	
X-ray tube assembly with dual-focus rotating-anode tube	
Focal spot nominal value (IEC 60336)	0.3 / 0.5
Nominal voltage	125 kV
Anode heat dissipation	70,000 J/min 91,000 HU/min
Anode heat storage capacity (IEC 60613)	270,000 J 380,000 HU
Optical anode angle	10°
Inherent filtration tube (IEC 60601)	3.00 mm Al with 75 kV
Additional filtration (IEC 60601)	3.95 mm Al with 75 kV (0.1 mm Cu, cover, DAP)
Leakage radiation (IEC 60601-1-3)	< 0.44 mGy/h at 125 kV/3.5 kW in 1 m distance
Anode drive	Up to 9,000 rpm (150 Hz)
X-ray tube assembly heat storage capacity	1,900,000 J 2,565,000 HU
Heat storage capacity minimum (with cooling)	4,000,000 J 5,300,000 HU
Heat capacity in clinical use simulation, max [2)]	8,000,000 J 10,800,000 HU
Cooling	The active cooling system integrated in the X-Ray tube assembly and C-arm ensures longer availability of the tube assembly during extensive fluoro times, e.g. during complex OR procedures
Continuous heat dissipation	300 W with cooling (value apply for X-Ray tube assembly without system environment)
Energy storage unit (ESU) [1)]	Reduction of acquisition kV value for the same image receptor dose Increased image receptor dose with the same kV value High-level application programs (maximum duration of a fluoro scene is limited to 30 s)
Total filtration system (IEC 60601)	6.95 mm Al 75 kV (X-Ray tube assembly, 0.1 mm Cu, DAP and cover)
Max. uninterrupted fluoro time	40 min at 600 W 60 min at 400 W

Collimator system	
Rectangular diaphragm (lead)	For concentric, radiation-free collimation
Rectangular diaphragm rotatable (lead)	For concentric, radiation-free collimation with unlimited rotation
Slot diaphragm (lead)	For symmetric and asymmetric, radiation-free collimation, with unlimited rotation

[1)] Option; [2)] Total 10 hours radiation time: Intervals of 10 minutes fluoro followed by 3 minute pause in radiation. Data on file.

System specifications

Flat detector 30 cm x 30 cm (12" x 12")			
CMOS (Complementary metal-oxide-semiconductor) flat detector based on indirect conversion technology			
High-performance digital imaging system			
Integrated collision sensor	Yes		
Input fields (active field)	Mag 0 (full format) 30 cm x 30 cm (12" x 12")	Mag 1 20 cm x 20 cm (8" x 8")	Mag 2 15 cm x 15 cm (6" x 6")
Material	CMOS with CsI scintillator		
Pixel size	152 µm		
Matrix	1952 x 1952 pixel		
Digitization depth	16 bit		
Detective Quantum Efficiency DQE(0), typical, RQA5	72 %		
Horizontal and vertical DQE, 1µGy, RQA5, 1x1 (measured in accordance with IEC 62220-1)	53 % at 1 lp/mm 41 % at 2 lp/mm		
Modulation Transfer Function (MTF), typical (measured in accordance with IEC 62220-1)	58 % at 1 lp/mm 25 % at 2 lp/mm		

System resolution on monitor		
Resolution on monitor with 30 x 30 FD (measured in accordance with DIN 6868-150)	Overview (Mag 0) – acquisition (without zoom) Overview (Mag 0) – acquisition (with zoom) Overview (Mag 0) – fluoroscopy Format switchover (Mag 1) – acquisition Format switchover (Mag 1) – fluoroscopy Format switchover (Mag 2) – acquisition Format switchover (Mag 2) – fluoroscopy	2.5 lp/mm 3.1 lp/mm 2.0 lp/mm 3.1 lp/mm 2.8 lp/mm 3.1 lp/mm 3.1 lp/mm

Grid	
Anti-scatter grid (detachable)	Pb 15 : 1, 80 lines/cm, f_0 = 115 cm

System specifications

X-ray release switches	
Smart Control wired	The wired hand control (1.8 m - 4.0 m spiral cable) allows advanced system interaction at the main unit (e.g., moving of C-arm, storing & recalling positions)
Smart Control wireless [2)]	The wireless hand control allows advanced system interaction from the sterile field (e.g., moving of C-arm, storing & recalling positions) Transmission: Bluetooth BT5.0 LT (EU: 2.402 GHz – 2.480 GHz without restrictions). Band support 2.4 GHz, 40 channels Supported 2.4 GHz radio modes: Bluetooth Low Energy IEEE 802.15.4 Encryption: LE Security Mode 1 Level 4 (LE Secure Connections) Battery type 4 x LR06 (Mignon) Battery lifetime min. 14 days with 1 h per day accumulated use and 2000 mAh battery capacity IP-class IPX5
Multifunctional footswitch	Multifunctional footswitch with advanced functionality, (5 m cable) Footswitch IP-class IPX8
Multifunctional footswitch wireless [1)]	Multifunctional footswitch wireless with advanced functionality Transmission: Bluetooth BT4.0 LT (EU: 2.402 GHz – 2.480 GHz without restrictions). Encryption: 128 bit AES-CCM. Battery type 3 x LR14 (Type C (Baby)) Battery lifetime min. 1 month with 4 h per day accumulated use and 8000 mAh battery capacity Footswitch IP-class IPX8

Touch based control	
User interface at C-arm main unit	Capacitive touch-based control unit (13.3“, 1920 x 1080 pixels) for operating the C-arm functions including preview image (max. 768 x 768 x 8 Bit)
Remote control unit [1)]	Resistive touch-based table side control unit (13.3“, 1920 x 1080 pixels) for operating the C-arm functions including preview image (max. 768 x 768 x 8 Bit) Cable length 6 m, protection class IP54 Mobile cart for Remote control unit
User interface at monitor cart	Capacitive touch-based control unit (13.3“, 1920 x 1080 pixels) for operating the C-arm functions including preview image (max. 768 x 768 x 8 Bit), protection class IP54
Large Display 32“ Monitor at monitor cart	Touch-surface front, protection class IP22

[1)] Option
[2)] Availability depending on country registration

System specifications

Monitor cart	
Display 32“ Monitor	
Characteristic [1)]	Anti-reflexion coated glass screen with touch function Single glass panel for high-contrast image quality
Size	31.5“
Backlight technology	LED
Resolution	3840 x 2160 pixels
Viewing angle	178° (typical), 170° (minimum)
Stabilized luminance	400cd/m² or 500cd/m² (selectable)
Contrast ratio	625 : 1
Surface	Anti-glare
Touch technology	P cap (projected capacitive touch screen)
Degree of protection	IP22

[1)] Din6868-157, IEC62563-1, IEC62563-2

System specifications

Monitor cart
Motorized display column Flex Plus
Allows for vertical display positioning independently of monitor cart position with a rotation angle of 240° (– 30° to + 210°)
Defined lock-in positions at 0°, 90° and 180°
Motorized height adjustment

Interfaces at Monitor Cart	
Imaging System USB Data interface	USB 2.0 (for mouse, keyboard, external storage device) Charging interface USB 2.0
OpenApps Workstation [1] USB Data interface	Data interface USB 2.0
LAN	2.5 Gigabit/s (max. 50 m with CAT6A or better category, w/o extra connectors)
WLAN [1] / WiFi [1]	Up to 150 Mbit/s IEEE 802.11 a, b, e, g, h, i, n
Power cable	Length 5.5 m
Monitor cart connection cable to C-arm	Length 7 m

Interfaces at C-arm	
Injector interface [1]	Unidirectional trigger output for a contrast agent injector Trigger signal (with radiation on) 24 V DC (e.g. to hook up Bluetooth connectors)
X-Ray release controls	Smart Control wired Smart Control wireless [2] Multifunctional footswitch (5 m cable) Multifunctional footswitch wireless [1]
HDMI Video out [1]	HDMI port for video output signal, it supports UHD (2160p, 60 Hz), Full HD (1080p, 60 Hz), HD (720p, 60 Hz)

[1] *Option*
[2] *Availability depending on country registration*

Clinical workflow

Patient data administration	
Patient registration	Retrieval of patient list and examination data from the hospital/ radiology information system (HIS/RIS) Emergency patient registration Study and image data administration Configurable patient registration

Exam preparation	
Applications Manager	Dedicated, application-related user programs Administration and selection of applications and application groups

Clinical workflow

Positioning	
Position Assist	Position the C-arm autonomously by recalling prestored positions. The system retrieves imaging parameters as well as zoom and collimation settings. Pre-view function available for stored positions. Positions can be stored and recalled only if a patient is registered.
Park Assist	Autonomously park the C-arm and bring it back to the OR table to the previous position
ISO Assist	Adjust the distance of the detector to the patient without losing the anatomical field of view.
Smart Control	Recall 3 stored positions + Park / Table / 0°/0°
Smart Control plus touch-based control unit	Recall 12 stored positions + Park / Table / 0°/0°
Touch-sense handle (chassis)	The touch-sense handle on the chassis allows motor-assisted effortless system positioning and moving.
Touch-sense handle (FD)	The touch-sense handle on the detector allows motor-assisted effortless and intuitive adjustments of the X-ray trajectory from within the sterile field.

Image acquisition	
Retina Imaging Chain	Transformation of X-ray beams into output image quality High sensitivity and low electronic noise levels, high temperature stability and detector responsiveness Automatic adjustment of brightness and contrast, detection of motion, enhancement of edges, and reduction of metal artifacts
Operating modes	Selection of application-specific fluoroscopy and radiography curves for the individual operating modes
Fluoroscopy	Image acquisition 0.5 p/s to 30 p/s Image storage: all images, selectable every nth image, nth = 1st -10th Digital filtration Image-sequence-weighted grey scale average value per image for excellent contrast with low dose Optimize gray-scale visualization based on image analysis
Fluoroscopy High Level Mode	Acquisition of moving objects with excellent image quality due to high temporal resolution Image acquisition 0.5 p/s to 30 p/s, up to 1000 W with ESU [1)] up to 3000 W (with DCM [1)] up to 4200 W) Image storage: all images, selectable every nth image, nth = 1st -10th Digital filtration Image-sequence-weighted grey scale average value per image for excellent contrast with low dose Optimize gray-scale visualization based on image analysis
Single Image	Digital filtration Optimize gray-scale visualization based on image analysis

[1)] Option

Clinical workflow

Image acquisition	
Subtraction/Roadmap [1)]	Image acquisition 3 p/s to 30 p/s Image storage: all images, selectable every nth image, nth = 1st -10th Subtraction angiography with Pixelshift, Remask, Peak Opacification for iodine contrast (MaxOp) and CO_2 contrast (MinOp) Anatomical landmarking from 0 % to 100 % Automatic and manual Pixelshift function to correct Subtraction runs Filtering of mask and fill images for contrast enhancement Simultaneous dual-channel output for image acquisition and postprocessing, simultaneous storage of fill image Roadmap technique, to position a catheter precisely in a blood vessel under fluoroscopy Roadmap on corrected subtraction Peak Opacification images to avoid additional contrast in angiography procedures Digital Subtraction Angiography [2)] (DSA) according to DIN 6868-150
DCM (Digital Cine Mode) [1)]	Pulsed digital serial radiography with a high pulse rate up to 30 p/s Loop for digital background storage and automatic playback of serial radiography scenes This specially developed exposure mode allows you to acquire rapidly moving objects with high image quality and high temporal resolution up to 15 sec scene This operating mode is particularly suited for displaying vessels
Target Pointer [1)]	Target Pointer extends k-wires and other devices virtually and helps to navigate to the target anatomy
SpotAdapt	SpotAdapt allows the user to specify a region of interest, on which relevant imaging parameters and post processing parameters like brightness and contrast should be optimized too, to receive an improved visualization of the selected anatomical area

[1)] Option
[2)] Only with ESU Option

Clinical workflow

CARE program (Combined Applications to Reduce Exposure)	
CARE is a Siemens Healthineers initiative to reduce radiation dose. CIARTIC Move is equipped with state-of-the-art features to reduce radiation dose to patients, surgeons and staff including automatic dose management.	
CAREVISION	Variety of dedicated Exam Sets to adjust the settings for the suitable dose Pulsed fluoroscopy with a pulse rate of up to 30 p/s Easy selection of dose levels and operating modes including dedicated low-dose programs
CAREPROFILE	Radiation-free positioning of primary collimators through graphical display in the LIH image on the image monitor
Dose optimization	Integrated dose measuring chamber with automatic transfer of the accumulated dose into a radiation report Selection of dose levels Detachable grid
Laser light localizer package (green)	The laser-light set [1)] consists of a flat detector laser, a single tank laser and a horizontal laser for determining the isocenter of the patient without radiation exposure. The laser set provides radiation-free positioning of the patient Laser can be activated via touch user interface or directly on the flat detector

[1)] *Class 1 (IEC 60825-1), green, 520 nm, ≤ 3 mW Output power*

Clinical workflow

Image display/processing	
Image display	Aspect ratio 16:9, corresponding to 3840 x 2160 matrix, 1896 x 1896 image content Split screen (1, 4 on 1, 16 on 1) Digital zoom, fixed zoom, roaming Magnification (detector zoom) Digital image rotation Movie function for playback of scenes and auto replay function Digital shutters Horizontal and vertical image flip Positive/negative image inversion LSH (Last Scene Hold)
Image processing	Application-specific lookup tables (LUTs) to optimize contrast and brightness Spatial frequency filtration for edge-enhanced image display Edge enhancement Noise reduction Motion detection with active noise reduction Metal correction With Subtraction option [1]: Manual and automatic Pixelshift, Remask, Landmark, recalculate Peak Opacification Measuring of angles and distances [1]
Digital Density Optimization (DDO)	Digital Density Optimization reduces the dynamic range of an image, allowing the contrast of structures to be emphasized without loss of information in bright and dark image areas
Text/graphic functions	Text: annotation, image comments, R/L marking Graphics: quantification [2] with distance and angle measurements
Live Graphical Overlay [1]	Digital drawing tool for enhanced visualization in all radiation modes (e.g. for marking vessels in AAA procedures)
OpenApps [1]	CIARTIC Move with OpenApps connects you to the Siemens Healthineers Digital Marketplace. Find compatible, certified apps to empower you and your C-arm during procedures Interface for hosting certified partner applications

[1] *Option*
[2] *Quantification requires the Subtraction option*

Clinical workflow

3D imaging	
Retina 3D	Retina 3D offers precise 3D visualizations: The Retina 3D scan technology uses up to 400 projections provided by the CMOS flat detector on a full 196° orbital iso-centric scan range. This isotropic volume data acquisition in the cone beam technique is used for a multiplanar 3D reconstruction. The 3D volume is presented at the monitor with the simultaneous display of 3 projections (transversal, coronal and sagittal views) and a 3D volume rendering (Volume Rendering Technique VRT) with a color coded visualization of e.g. bone, soft tissue and implants. A selection of different 3D scan protocols (100, 200 or 400 projections) with a standard scan speed of 30 s (60 s in extra power obese mode) is available. A dedicated protocol for obese patients is included. The fully automatic 3D scan without manual readjustment of the isocenter ensures an optimal workflow and precise image information.
Retina 3D Volume	16 cm x 16 cm x 16 cm (512 x 512 x 512 voxel)
3D volume for image-based registration of navigation markers	25 cm x 25 cm x 16 cm (800 x 800 x 512 voxel)
3D measurement [1)]	Measurement and display of angles and distances
Screw Scout [1)]	Screw Scout automatically [2)] localizes screws and prepares the optimized view of screws in the 3D dataset
Metal artefact reduction [1)]	CIARTIC Move provides a precise 3D visualization of anatomy and metallic objects with excellent image quality

[1)] Option
[2)] average finding rate > 90%

Clinical workflow

Data transfer and documentation	
DICOM network interfaces	
DICOM Send/Storage Commitment [1)]	DICOM interface for image data communication in a clinical network (PACS) based on the DICOM 3 standard Sending, receiving and storing of images Archiving confirmation from the image archive
DICOM Print [1)]	For printing within the network, on a DICOM-compatible camera or DICOM-compatible printer
DICOM Query/Retrieve [1)]	Retrieval of studies from a digital archive, a workstation, or other imaging systems: e.g. MR, CT Multi-modality viewing
DICOM Worklist/MPPS [1)]	Get Worklist function for importing patient data from a data management system (RIS/HIS). XA, CR and DX worklist entries supported, configurable Modality Performed Procedure Step (MPPS) function for sending examination statistics and dose information to a data management system
DICOM Dose Structured Report [1)]	Sending of dose values for each study to an archiving system
DICOM Advanced [1)]	DICOM Advanced contains all the functions of DICOM Dose Structured Report, plus: DICOM Send/Storage Commitment DICOM Print DICOM Query/Retrieve DICOM Worklist/MPPS
DICOM 3D object [1)]	Enhanced Multi-frame or Single-frame CT images
Data interfaces	
NaviLink 3D [1)]	Integrated 3D navigation interface for digital, lossless transfer with automatic registration of 3D Image Information to the navigation system NaviLink 3D supports transfer of 3D data of the standard or enlarged 3D volume
InstantLink [1)]	Transfer of X-Ray streams (NXS) Display of external video streams onto the trolley monitor (NGS), Remote control unit [1)], user interface at monitor cart and user interface at C-Arm chassis

Administration and service	
Administration [1)]	HIPAA [1)] X-ray passcode [1)]
Service [1)]	Remote Desktop

[1)] *Option*

Clinical workflow

Data transfer and documentation	
LAN	2.5 Gigabit/s (max. 50 m with CAT6A or better category, w/o extra connectors) for DICOM data transfer. 1 Gigabit/s (max. 80 m with CAT6A or better category, w/o extra connectors) for Navilink data transfer.
WLAN [1)]	WLAN client module for wireless transmission of DICOM image data, e.g. to a PACS Compatible with 802.11 a/b/e/g/h/i/n WLAN standards Operation within the 2.4 / 5 GHz frequency bands 802.11 i, 802.1 x, WPA/WPA2 WPA2 Enterprise supplicants EAP-TLS, EAP-TTLS, (MSCHAPv2), EAPP-EAP (MSCHAPv2) as security/authentication features Supports TKIP and AES for data encryption Supports DHCP client
Fluoro recording	Connect a USB 2.0 removable storage medium to the corresponding port to record fluoro scenes
Printer interface [1)]	Digital printers for printing on paper
USB export	For digital image storage to a USB device in DICOM, TIFF and AVI formats
HDMI-Output	UHD (3840 x 2160 pixel) Full HD (1920 x 1080 pixel) HD (1280 x 720 pixel)

[1)] *Option*

Room planning

Operating data	
Power requirements	100 V, 110 V, 120 V, 127 V, 200 V, 220 V, 230 V, 240 V, (± 10 %), 50/60 Hz (± 1 Hz)
Unit fuse protection (internal)	100 V to 127 V 20 A slow-blow fuse 200 V to 240 V 15 A slow-blow fuse
Maximum power consumption	2.4 kW
Standby power consumption	713 W
Voltage / Current values	Continuous 16 A (100 V) / 7 A (240 V) Short-time 23 A (100 V) / 10 A (240 V)
Internal line impedance	Ri max. 0.3 ohms for 100 V to 127 V Ri max. 0.8 ohms for 200 V to 240 V

Environmental conditions at customer site (operation and inhouse storage)	
Temperature range	+ 15°C to + 35°C
Relative humidity	15 % to 75 %, non-condensing
Barometric pressure	700 hPa to 1060 hPa

[1)] *Option*

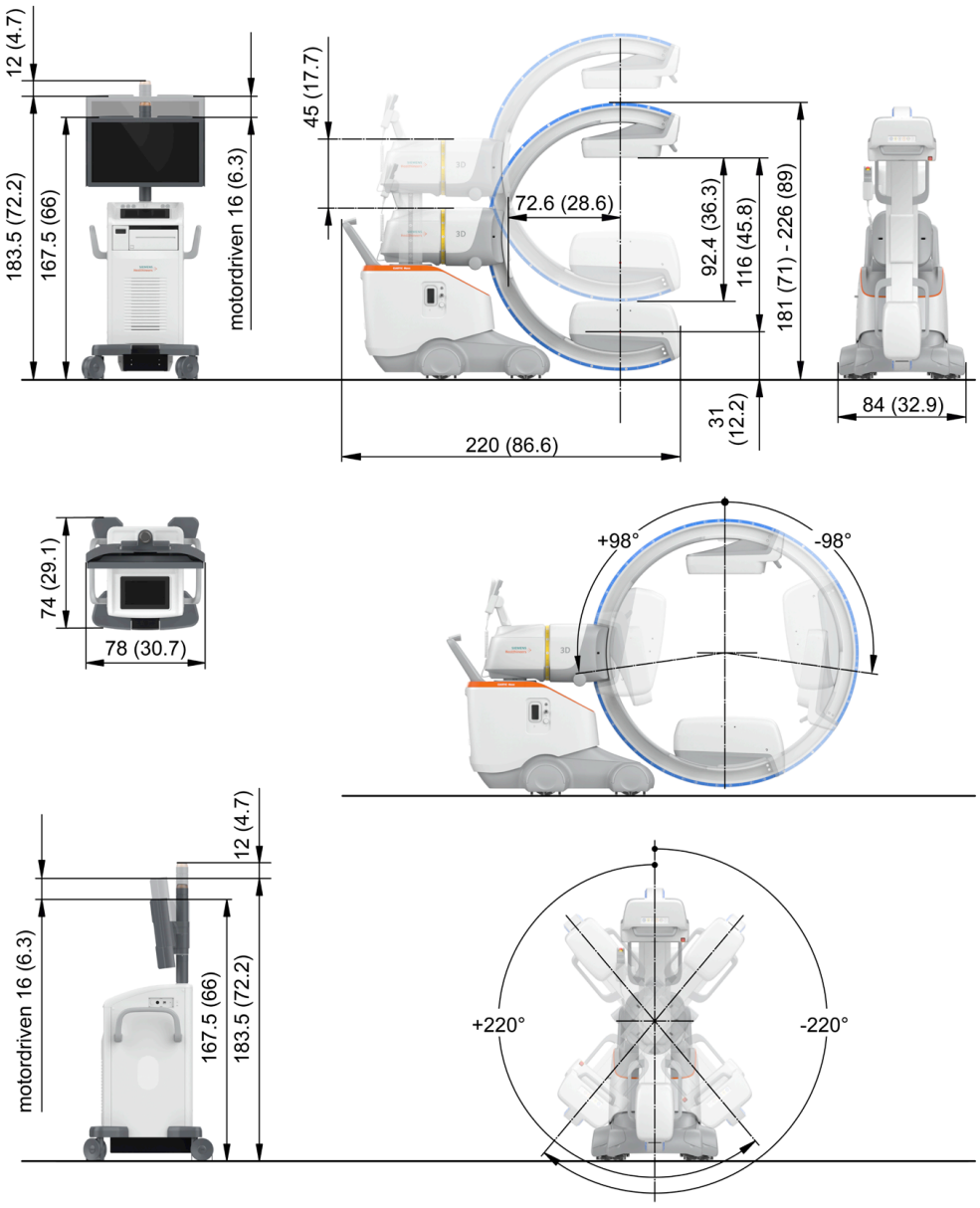
Room planning

Dimensions and weight	
Chassis (l x w x h)	220 cm x 84 cm x 181 cm (87.7'' x 33.1'' x 71.2'')
Monitor cart (l x w x h)	78 cm x 74 cm x (179 cm + 16 cm [1)]) (33.1''x 39.2 x (70.5'' + 6.3'' [1)]))
CIARTIC Move C-arm	480 kg (1058.2 lbs)
Monitor cart	227 kg (500.5 lbs) (including monitor, UPS)
Monitor cart	231 kg (509.3 lbs) (including monitor, UPS, Apphost-WS [1)])

[1)] *Option*

Room planning

Dimensions in cm (inches)



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