

# OEC® 9800 Plus

Technical Data Specifications for 60Hz Systems



# OEC<sup>®</sup> 9800 Plus

## Technical Data Specifications for 60Hz Systems

### X-ray System

#### Generator

- 60kHz high frequency
- 15kW power
- Up to 120kVp
- Up to 75mA for radiographic film exposure
- Continuous high level fluoro (HLF) up to 20mA
- Digital spot up to 75mA
- Digital cine pulse
  - 15 or 30 pulses per second
  - Up to 150mA
  - 10ms pulse width
- Full power from standard wall outlet
- Patented battery buffered design

#### X-ray Tube

- Rotating anode X-ray tube
- 0.3mm and 0.6mm focal spots
- Anode heat capacity: 300,000 HU (per IEC 60613)
- Anode cooling rate: 70,000 HU/min. (85,000 HU/min. motorized and cardiac)
- Housing heat capacity: 1,600,000 HU
- Housing cooling 15,000 HU/min.
- Auxiliary cooling system: 22,500 HU/min. (Standard on all vascular 15 fps, neurovascular, cardiac and 12 inch (31 cm) I.I. systems. Optional on all other systems.)
- 31,000 HU for Cardiac Super C and motorized C-arm only.

#### Digital Image Rotation

- Digitally adjusts image display
- Automatic image update
  - Image rotation
  - Image reversal (side-to-side)
  - Image invert (top-to-bottom)
- Image positioning without additional exposure

#### PreView™ Collimator

- On-screen collimator position indication
- PreView™ iris collimator
- PreView™ Tungsten rotatable double leaf collimator
- Adjusts collimators without X-ray exposure

#### Fluoro Mode

- kVp range: 40 - 120
- mA range: 0.2 - 10 normal mode  
1.0 - 20 HLF (high level fluoro)
- Auto and manual fluoro modes
- AutoTrak™ ABS varies mA, kVp, camera gain

#### Pulsed Fluoro Mode

- kVp range: 40 - 120
- mA range: 0.2 - 10

- Pulse rate: 1, 2, 4, 8
- Pulse Width: 25 or 50ms
- AutoTrak™ ABS, mA, kVp, camera gain
- Reduces X-ray dose to patient and operator

#### High Level Pulsed Fluoro

- kVp range: 40 - 120
- mA range: 1 - 40
- Pulse rate: 1, 2, 4, 8
- Pulse Width: 25 or 50ms
- AutoTrak™ ABS, mA, kVp, and camera gain

#### Digital Cine Pulse Mode

- kVp range: 40 - 120
- mA range: up to 150
- Pulse rate: 15 or 30pps (cardiac and neurovascular systems)  
15pps (vascular systems)
- Pulse width: 10ms
- AutoTrak™ ABS, mA, kVp, camera gain

#### Digital Spot Mode

- kVp range: 40 - 120
- mA range: Up to 75
- Automatically terminates exposure with automatic image save

#### Radiographic Mode

- mA range: up to 75
- mAs range: up to 300
- Computer controlled exposure time
- Optional film cassette holder
  - 10" x 12" (24cm x 30cm) for 9" I.I.
  - 14" x 14" (35cm x 35cm) for 12" I.I.

### Video Imaging System

#### 9" Image Intensifier

- Tri-mode 9"/6"/4.5" (23cm/15cm/11cm) image intensifier
- Minimum central resolution (at the monitor):
  - 9" (23cm): 2.1 lp/mm
  - 6" (15cm): 2.9 lp/mm
  - 4.5" (11cm): 3.4 lp/mm
- DQE: 65% (typical)

#### 12" Image Intensifier

- Tri-mode 12"/9"/6" (31cm/23cm/15cm) image intensifier
- Minimum central resolution (at monitor):
  - 12" (31cm): 1.5 lp/mm
  - 9" (23cm): 2.1 lp/mm
  - 6" (15cm): 2.6 lp/mm
- DQE: 65% (typical)

#### AutoTrak™

##### Automatic Brightness Stabilization

- Automatically seeks the subject anatomy anywhere within the imaging field and selects the optimum imaging technique

- Automatically adjusts to anatomical size and location
- Provides uniform image quality throughout entire image
- Simplifies operation

#### Image I.Q.

- Smart Window
  - Dynamically senses the collimator position and automatically adjusts brightness and contrast to produce high image quality
- Smart Metal
  - Allows user to adjust automatic brightness and contrast sensitivity levels to metal
  - Provides optimum image quality even when metal is introduced to the field
- Tungsten Collimator
  - Denser collimator limits X-ray exposure area
  - Reduces scatter radiation
  - Improves image detail

#### Video Camera

- High resolution 1k x 1k CCD camera
- Full frame capture
- Motorized rotation
- On-screen orientation indicator (real-time feedback without fluoro)
- Left-right image reversal
- Top-bottom image invert

#### Video Monitor

- Dual 16" (41cm) square monitors
- Anti-glare, progressive full frame scan monitor
- Touch screen system control
- 1,000 line high resolution monitors
- Ambient room-light compensation

### Image Processing

#### GSP Platform

- 1k x 1k x 16 bit image processing
- Noise filter with on-screen indicator
- MANRS (real-time Motion Artifact and Noise Reduction System)
- Real-time variable edge enhancement
- Automatic digital brightness and contrast control
- Manual digital brightness and contrast control
- Negate mode
- Save and auto-save feature
- Swap and auto-swap feature
- Patient information
  - Examination list
  - Customized patient information

- Customize functions
  - Workstation set-up
  - Mainframe set-up
  - Patient information set-up
  - Date/time set-up
  - DICOM 3.0 interface set-up (optional)
- Last image hold
- 63 image storage
- Removable PC diskette image transfer and archive (floppy disk)
  - 512 x 512 or 1k x 1k
  - BMP or OEC format

#### ESP Platform

Includes all the GSP features and:

- 400 image storage
- Zoom and roam function
- Image annotation
- Measurement software

#### ESP Platform with 8fps Digital Disk

Includes all the ESP features and:

- 8fps Dynamic digital disk
  - Recording /playback rate: 1, 2, 4, 8fps
  - Recording time: 2 minutes @ 8fps

#### PMCare Platform\*

Includes all the ESP 8fps features and:

- 8fps Digital subtraction (DSA) to visualize arterial & venous flow

#### ESP Platform with 15fps Digital Disk

Includes all the 8fps ESP features and:

- 15fps Dynamic digital disk
  - Recording/playback rate: 1, 2, 4, 8, 15fps
  - Automatic image playback capability
  - Frame-by-frame review
  - Recording time: 10 minutes @ 15fps

#### Basic Vascular Platform

Includes all the ESP features and:

- Real-time subtraction
- Roadmapping
- Peak opacification
- Re-registration
- Variable landmarking
- Mask save/recall
- Auto cine loop playback
- 8fps Dynamic digital disk
  - Recording/playback rate: 1, 2, 4, 8fps
  - Recording time: 5 minutes @ 8fps
  - Automatic image playback
  - Frame-by-frame review

#### Vascular Platform

Includes all the Basic Vascular features and:

- Digital cine pulse mode
  - 15 pulses/sec
  - Up to 150mA
  - 10ms pulse width
- 15fps Dynamic digital disk
  - Recording/playback rate: 1, 2, 4, 8, 15fps

- Recording time: 10 minutes @ 15fps (time depends on record frame rate)

- Auxiliary X-ray tube cooling

#### EPCare Platform\*

Includes all Vascular features and:

- Super C (Motorized only)
- Single leaf curved collimator
- 30 fps Dynamic digital disk
- Three pedal footswitch
- X-ray tube heat management

#### Neurovascular Platform

Includes all the Vascular features and:

- 30fps Dynamic digital disk
  - Recording/playback rate: 1, 2, 4, 8, 15, 30fps
  - Recording time: 10 minutes @ 30fps

#### Cardiac Platform with

Interventional Vascular Capability

Includes all the Neurovascular features and:

- Super“C”configuration (9°/23cm I.I. only)
- Single leaf curved collimator
- Removable dynamic image storage
  - 2G removable media
  - 1,500 images storage capacity
  - 1k x1k or 512 x 512 static image recording in BMP/OEC format
  - 1, 2, 4, 8, 15, 30 frame rate
- Integrated DICOM 3.0 interface
- Three pedal footswitch
- Cardiac menu
- X-ray tube heat management

#### Additional Features

9800 MD C-arm - 9” or 12” I.I.

- 9°/sec. Orbital Motorized Rotation
- 9°/sec. Lateral Motorized Rotation
- RUI (Remote User Interface - Table Side Control Panel)
  - All 9800 Mainframe Controls
  - Image Review Functions
  - C-arm Motion Joystick Control
  - Motorized Vertical Lift
- Contact/Collision Detection
- C-arm Angle Display - real-time and saved images
- X-ray tube heat management included with MD

X-ray Tube Heat Management Option - Super C only

- Improves Anode Target (X-ray Tube) cooling capacity
- Improves X-ray tube housing (cooling)
- Increased daily patient load

#### Other Image Storage Options

- Removable dynamic digital disk
- CD/DVD Writer digital interface (external)
- Integrated DICOM 3.0 interface (storage class/print class/query work-list)
- Analog memory options
  - Integrated S-VHS VCR with playback
  - DV CAM recorder

#### Hardcopy Options

- Integrated film/paper printer
  - No film developing required
  - 8" x 10" (20.3 cm x 25.5 cm) laser quality film/paper
  - Multi-format, 1, 2, 4 on 1
  - Multi-copy capability
- Thermal printers
- Integrated DICOM 3.0 Interface (storage class/print class/query work-list)

#### User Interface

- Entire system is computer controlled and software upgradeable
- Touchscreen control simplifies operation
- Automated system operation requires minimum operator interface
- Multi-functional controls
  - Footswitch
  - IR remote (optional)
  - Hand-held control
- Simplified keyboard
- Multi-purpose image directory
  - Retrieve and review images
  - Compose hardcopy films
  - Copy images
- X-ray dose summary

#### Electrical

- Input power (60Hz or 50Hz)
  - 9800 Plus (except Super C Cardiac)
    - 100V @ 20 A (Japan)
    - 120V @ 15 A
    - 200V, 220V, 230V, 240V @ 10A
  - 9800 MD 9" (23cm) and 12" (31cm) and 9800 Cardiac Super C
    - 120V @ 20 A (not available in Japan)
    - 200V (Japan)
    - 200V, 220V, 230V, 240V @ 10A
  - Super C cooling kit (non-motorized)
    - 120V @ 20 A (not available in Japan)
    - 200V (Japan)
    - 200V, 220V, 230V, 240V @ 10A

#### Available Languages for Operator Manuals

- English
- German
- French
- Spanish
- Italian
- Portuguese (Brazilian)
- Chinese
- Japanese

#### Regulatory Compliance

- U.S. 21 CFR Subchapter J
- NFPA 99
- UL 2601 (CSA/NRTL)
- IEC60601-1 (plus relevant Collateral and Particular Standards)
- CE Marking in accordance with 93/42/EEC (Medical Devices Directive)

\*PMCare & EPCare platforms are not available in all regions.

### High Resolution

Description	GSP	ESP	Basic 8fps	PMCare	Vascular	EPCare	Neuro	Cardiac
			Vascular	8fps	15fps	30fps	30fps	30fps
Standard C-Arm Assembly with 9"6"/4.5" (23/15/11cm) I.I.	●	●	●	●	●	●	●	
Standard C-Arm Assembly with 12"9"/6" (31/23/15cm) I.I.	■	■	■	■	■	■	■	
Super C-Arm Assembly with 9"6"/4.5" (23/15/11cm) I.I. <i>ONLY</i>	■	■	■	■	■	■	■	●
Motorized Super C-Arm Assembly with 9"6"/4.5" (23/15/11cm) I.I. <small>includes Heat Management</small>	■	■	■	■	■	■	■	■
Motorized C-Arm Assembly with 12"9"/6" (31/23/15cm) I.I. <small>includes Heat Management</small>	■	■	■	■	■	■	■	■
Super C Heat Management Kit	■	■	■	■	■	■	■	●
Rotating Anode X-ray Tube	●	●	●	●	●	●	●	●
Auxiliary X-Ray Tube Cooling	■	■	■	■	●	●	●	●
Tungsten Dual-Leaf Collimator	●	●	●	●	●	●	●	
Iris Collimator	●	●	●	●	●	●	●	●
Single-Leaf Curved Collimator							●	
Pulsed Fluoro (up to 8 PPS)	●	●	●	●	●	●	●	●
Digital Subtraction (DSA)			●	●	●	●	●	●
Roadmapping			●	●	●	●	●	●
Peak Opacification			●	●	●	●	●	
Re-Registration (Pixel Shift)			●	●	●	●	●	●
Variable Landmark			●	●	●	●	●	
Digital Cine Pulse (15 PPS, Up to 150mA)					●	●	●	●
Digital Cine Pulse (30 PPS, Up to 150mA)					●	●	●	
Digital Spot	●	●	●	●	●	●	●	●
High Level Pulsed Fluoro (Up to 40mA)	●	●	●	●	●	●	●	●
Radiographic Film Mode	●	●	●	●	●	●	●	●
1k x 1k x 16 Bit Image Processing	●	●	●	●	●	●	●	●
Image I.Q. (Smart Window/Smart Metal)	●	●	●	●	●	●	●	●
Measurement Software		●	●	●	●	●	●	●
Digital Image Rotation	●	●	●	●	●	●	●	●
Noise Filtering (Averaging)	●	●	●	●	●	●	●	●
Motion Artifact and Noise Reduction System	●	●	●	●	●	●	●	●
Digital Zoom & Roam	●	●	●	●	●	●	●	●
Real-Time Edge Enhancement	●	●	●	●	●	●	●	●
Image Annotation Function		●	●	●	●	●	●	●
Multi-Purpose Image Directory	●	●	●	●	●	●	●	●
X-ray Summary	●	●	●	●	●	●	●	●
Static Image Storage	63	400	400	400	400	400	400	400
Floppy Disk Drive (1.44MB)	●	●	●	●	●	●	●	●
8fps Dynamic Disk		■	●	●				
15fps Dynamic Disk		■			●	●		
30fps Dynamic Disk							●	●
Removable PC Memory Card	■	■	■	■	■	■	■	●
9" I.I. (23cm) Laser Aimer/Image Localizer (not available with Motorized C-arm)	■	■	■	■	■	■	■	■
12" I.I. (31cm) Laser Aimer/Image Localizer (not available with Motorized C-arm)	■	■	■	■	■	■	■	▲
IR Remote Control		■	■	■	■	■	■	■
Sony UP960 Thermal Printer (prints dose summary)	■	■	■	■	■	■	■	■
Sony UP980 Thermal Printer (prints dose summary)	■	■	■	■	■	■	■	■
Sony MD9500 S-VHS VCR*	■	■	■	■	■	■	■	■
Sony DV CAM	■	■	■	■	■	■	■	■
CD/DVD Writer (external)*	■	■	■	■	■	■	■	■
Instant Film/Paper Printer	■	■	■	■	■	■	■	■
Integrated DICOM 3.0 Interface	■	■	■	■	■	■	■	●
Two Pedal Footswitch	●	●	●	●	●	●	●	■
Three Pedal Footswitch						●		●
MedRad Injector Interface Capability			■	■	■	■	■	■
Room-In-Use Indicator Interface	●	●	●	●	●	●	●	●
Integrated Flat Panel Color Monitor with Articulating Arm	■	■	■	■	■	■	■	■

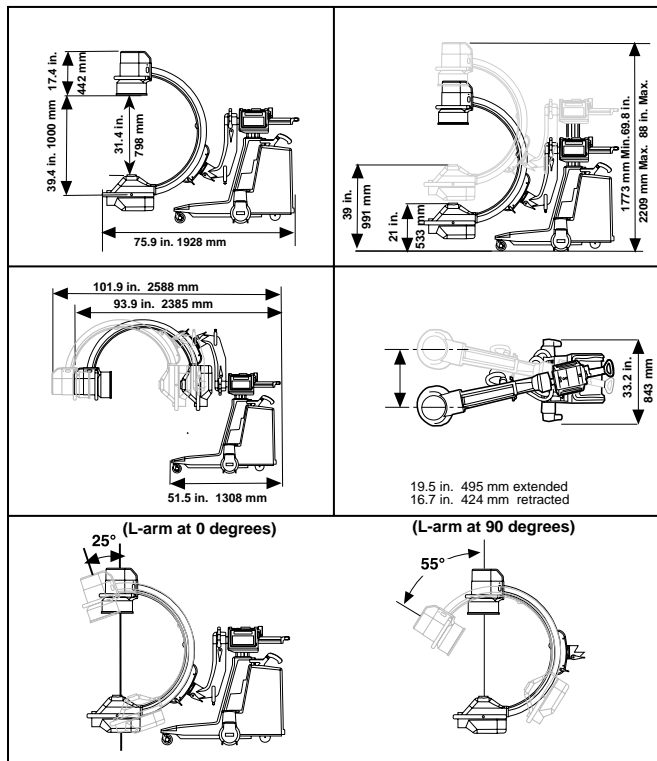
\* Sony MD9500 S-VHS, CD/DVD Burner or Instant film/paper printer can't be ordered in the same configuration.

● = Standard feature      ▲ = 12" (31 cm) I.I. is not available with non-motorized Super C  
 ■ = Optional feature      Blank = Feature not available

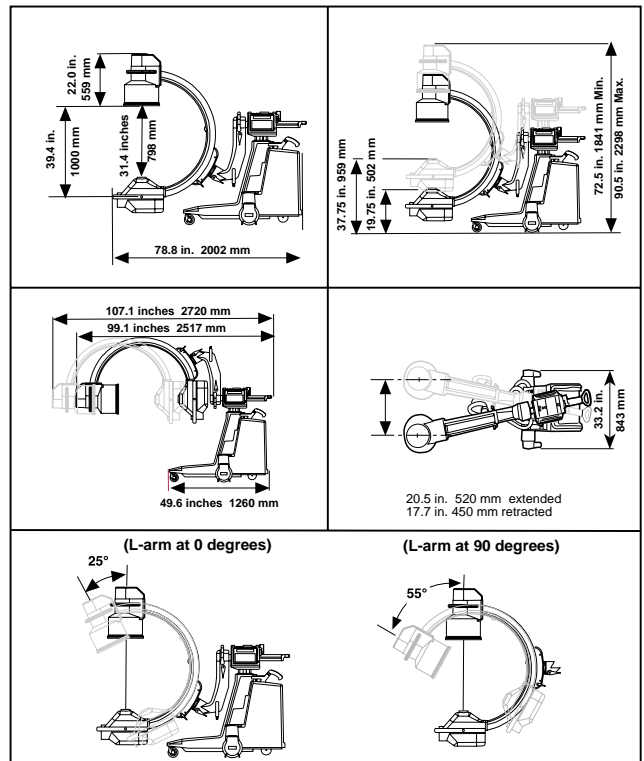
# Physical Specifications

	9" I.I. (23cm)	12" I.I. (31cm)	Super "C" (9" I.I.) (23cm)	Motorized Super C 9800 MD 9" I.I. (23cm)	Motorized C-arm 9800 MD 12" I.I. (31cm)
<b>Mainframe</b>					
System length	75.9" (193cm)	78.8" (200cm)	78.3" (199cm)	78.3" (199cm)	78.3" (199cm)
System height	69.8" (177cm)	72.5" (184cm)	70.5" (179cm)	71.25" (181cm)	71.25" (181cm)
System width	33" (84cm)	33" (84cm)	33" (84cm)	33" (84cm)	33" (84cm)
<b>C-arm</b>					
SID	39.4" (100cm)	39.4" (100cm)	39" (99cm)	39" (99cm)	39" (99cm)
Free space in arc	31" (79cm)	31" (79cm)	31" (79cm)	31" (79cm)	31" (79cm)
Depth in arc	26" (66cm)	28" (71cm)	33" (84cm)	33" (84cm)	33" (84cm)
Orbital rotation	115° (90°/25°)	115° (90°/25°)	148° (93°/55°)	142° (90°/52°)	123° (90°/33°)
Lateral rotation	360° (180°/180°)	360° (180°/180°)	360° (270°/90°)	360° (90°/270°)	360° (90°/270°)
Flip/flop	180°/90°	180°/90°	N/A	N/A	N/A
Wig/wag	20°	20°	20°	N/A	N/A
Horizontal travel	8" (20cm)	8" (20cm)	8" (20cm)	8" (20cm)	4" (10cm)
Vertical travel	18" (46cm)	18" (46cm)	18" (46cm)	15" (38cm)	15" (38cm)
<b>Workstation</b>					
Height	64" (163cm)	64" (163cm)	64" (163cm)	64" (163cm)	64" (163cm)
Width	27" (69cm)	27" (69cm)	27" (69cm)	27" (69cm)	27" (69cm)
Depth	27" (69cm)	27" (69cm)	27" (69cm)	27" (69cm)	27" (69cm)

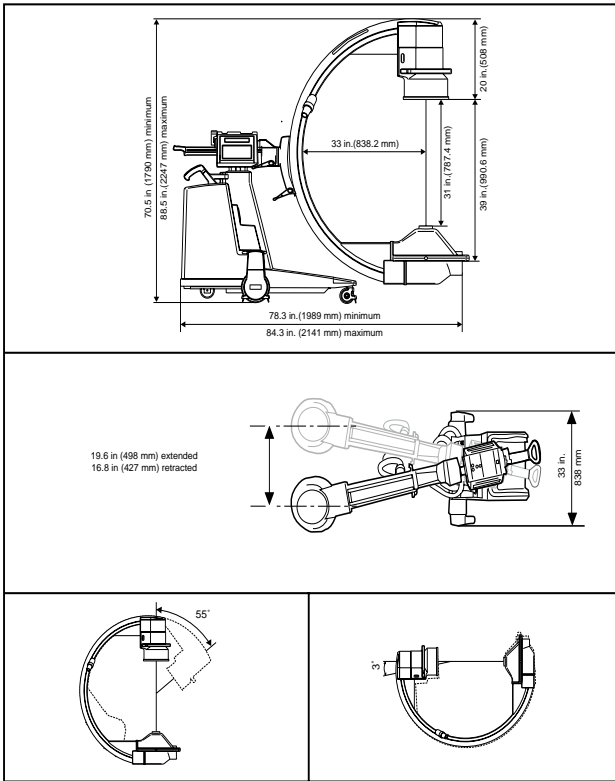
## Mobile C-arm (9", 23cm I.I.)



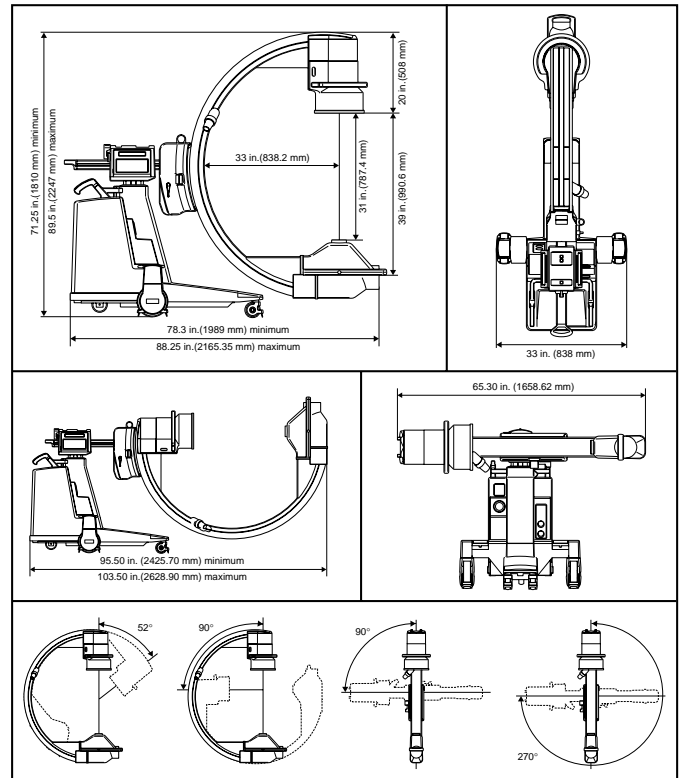
## Mobile C-arm (12", 31cm I.I.)



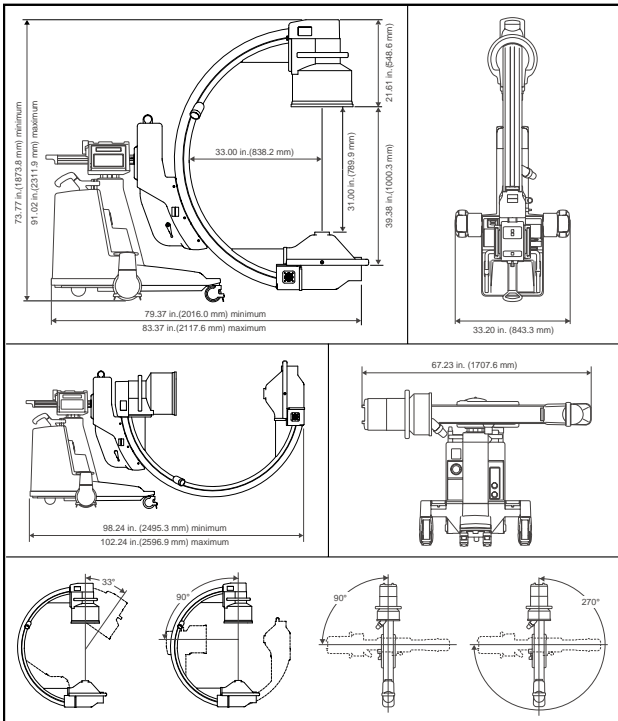
## Super C-arm



## Super C-arm (Motorized) 9" (23cm) I.I.



## Motorized C-arm 9800 MD 12" (31cm) I.I.



General Electric Company reserves the right to make changes in specifications and features shown herein, or discontinue the product described at any time without notice or obligation. Contact your GE representative for the most current information.

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**GE Healthcare**

www.gemedical.com  
 GE Healthcare, Surgery – Americas:  
 Phone 801-328-9300 Fax 801-328-4300  
 384 Wright Brothers Drive, Salt Lake City, Utah 84116 U.S.A.

GE Healthcare – Europe:  
 Paris, France – Fax 33-1-30-70-94-35

GE Healthcare – Asia:  
 Tokyo, Japan – Fax: +81-452-85-5490  
 Hong Kong – Fax: +852-2559-3588