PHILIPS

Surgery

BV Pulsera

Making the difference
with Live Image Guidance

BV Pulsera mobile C-arm system specifications

Key benefits

- Powerful system with choice of 9" or 12" image intensifier to perform a wide range of routine and challenging applications

- Ortho Plus – applies extra X-ray power to visualize challenging regions of interest with normal or obese patients

- Single user vascular workflow – tap the footswitch once to perform Subtraction, Trace, or Roadmap

- Pulsed exposure mode visualizes fast moving anatomy with outstanding image quality for a virtually unlimited amount of time

- Compact Mobile View Station with exceptional viewing flexibility

The BV Pulsera mobile C-arm solution provides the power and superb visualizations to support a variety of challenging interventions. From open to minimally invasive, from Abdominal Aortic Aneurysms (AAA) to pacemaker implants. From spinal to hip surgery.

This counter-balanced system can be positioned quickly and easily. It provides the extra power to image obese patients or technically difficult projections.

Contents

1 System overview

The BV Pulsera is a counterbalanced mobile C-arm system. Its C-arm stand has a compact foot and rear-wheel steering for easy maneuverability and positioning. The intelligent design of the Mobile View Station supports easy transport and set-up, ergonomic viewing and full connectivity capabilities.

1 Easy workflow
· Automatic Programmed
  Fluoroscopy (APF) programs
  are fine-tuned for each clinical
  application to enable high
  quality visualizations

2 Image intensifier
· 1K^2 high resolution imaging chain
· 9" or 12" triple-mode image
  intensifier
· 9/7/5" (23/17/13 cm)
· 12/9/7" (31/23/17 cm)

3 High power X-ray tank
· 15 kW rotating anode power for
  demanding procedures
· Excellent heat management
  for lengthy interventional
  procedures
· Monoblock architecture delivers
  sharp defined pulses

4 Monitors
· C-arm stand:
  12" stand monitor (optional)
· Mobile View Station:
  19" color LCD
· Contrast ratio >500:1
  (optional: HiBri >700:1)
· Convenient touchscreen user
  interface (optional)
· Flexible monitor positioning:
  stepless height adjustment and
  180° rotation
· Foldable for easy transport and
  storage

5 Archiving and documentation
· Fully integrated DICOM solution
  (optional)
· Medical DVD recorder (optional)
· Printer (optional)
· USB image storage

6 Connectivity
· Video-in to display external
  video signals such as ultrasound
  or endoscopy displayed on
  reference monitor
· Digital video out (optional) and
  analog video out (standard)
  to display BV Pulsera images
  on separate monitors (such as
  ceiling suspended monitors)

2 Image detection

Designed to handle a variety of routine and complex procedures,
this surgical imaging system is compact, flexible and easy to move.

Choose either a 9″ or 12″ triple-mode image intensifier, to match your applicational requirements.

2.1 Image intensifier
The BV Pulsera comes with a 9″ or 12″ image intensifier
and can go wherever you need it – surgery, intensive
care and the emergency room.

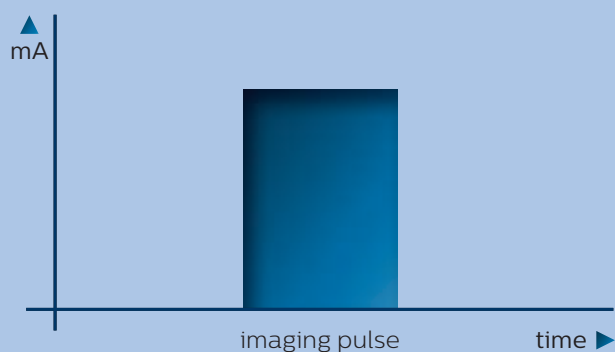| Feature	Specification
Image intensifier type	Triple-mode 9″ HRC / Triple-mode 12″
Nominal II formats	31, 23, and 17 cm (12″, 9″, and 7″) 23, 17, and 13 cm (9″, 7″, and 5″)
Entrance screen	Cesium Iodine
Grid type	Circular, carbon fiber; 60 lines/cm Ratio = 1:10 SID = 100 cm
TV camera type	CCD; high-resolution 1k^2
Image rotation	Digital, live and on LIH
Image reversal	Yes
Mirror up/down	Digital, live and on LIH
Mirror left/right	Digital, live and on LIH
Automatic anatomical measuring field	Yes with 'BodySmart'

3 X-ray generation

The rotating anode technology and 15 kW generator of the BV Pulsera provide the power to see through virtually any normal or obese patient and visualize fine details in steep projections.
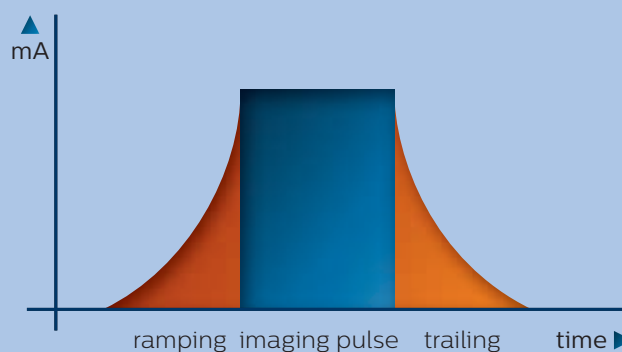
3.1 X-ray generator

BV Pulsera uses a Monoblock concept with the high-tension transformer in the X-ray tank. This means pulses do not have to be transmitted over high voltage cables, which can result in ramping up and trailing down effects, due to the electrical impedance of the cables. The BV Pulsera Monoblock generator produces immediate pulse rise so all radiation is in the useful spectrum. The result is excellent quality images with less soft radiation and long fluoro times.

Monoblock	Without monoblock

The BV Pulsera Monoblock concept decreases blurring and soft radiation

Feature	Specification
X-ray generator type	Monoblock 80 kHz high-frequency generator microprocessor controlled
Max. generator output	15 kW
Max. X-ray tube voltage	120 kV
Max. X-ray tube current	125 mA

3.2 X-ray tube

BV Pulsera has a rotating anode and high power generator with excellent heat management to perform demanding interventional procedures. An integrated beam filter helps to reduce patient skin dose[1]. Automatic Programmed Fluoroscopy (APF) provides provide consistent image quality for every examination.

Feature	Specification
Tube type	Rotating anode X-ray tube
Nominal X-ray tube voltage	120 kV
Nominal focal spot values	0.3 IEC and 0.6 IEC
Maximum anode heat content	311 kHU
Maximum heat dissipation	73 kHU/min
Cooling method	Active oil-circulation cooling
Inherent filtration	1.0 mm Al eq.
Additional filtration	3.0 mm Al eq. + 0.1 mm Cu

Operating values Continuous Fluoroscopy

kV range	40 – 120 kV
mA range for Low Dose Fluoroscopy mode	0.10 – 8.33 mA (up to 10 mA during Auto High Penetration)
mA range for High Definition Fluoroscopy mode	0.24 – 20 mA

Operating values Half Dose Fluoroscopy

kV range	40 – 120 kV
mA range	0.4 – 12 mA
Pulse width	11 – 37 ms
Pulse rate	12.5 pps

Operating values Quarter Dose Fluoroscopy

kV range	40 – 120 kV
mA range	0.4 – 12 mA
Pulse width	11 – 37 ms
Pulse rate	6.25 pps

Rating values Pulsed Exposure

|	
kV range	40 – 110 kV
mA range	2.0 – 60 mA
Pulse width	8.0, 9.5 and 11.1 ms
Pulse rate	3, 5, 8 pps (optional 15, 30 pps)

Operating values Digital Exposure

kV range	40 – 110 kV
mA range	1.5 – 75 mA
Pulse width	120 – 440 ms

1. Compared to conventional filtration of 3 millimeters aluminium as required by IEC 60601-2-43, 2010.

3.3 X-ray collimation

Collimation reduces exposure dose by reducing the radiated surface and enhances image quality. BV Pulsera makes collimation easy. Its full lead (assymetric) shutters can be rotated and moved independently, and the unique Philips Automatic Shutter Positioning (ASP) feature automatically positions shutters for high image quality at the touch of a button. You can position shutters or adjust the iris on the last X-ray image (Last Image Hold), eliminating additional X-ray dose during collimation.

Iris collimation

Independently movable lead shutters

Additional beam filter

Near focus collimation

Anode
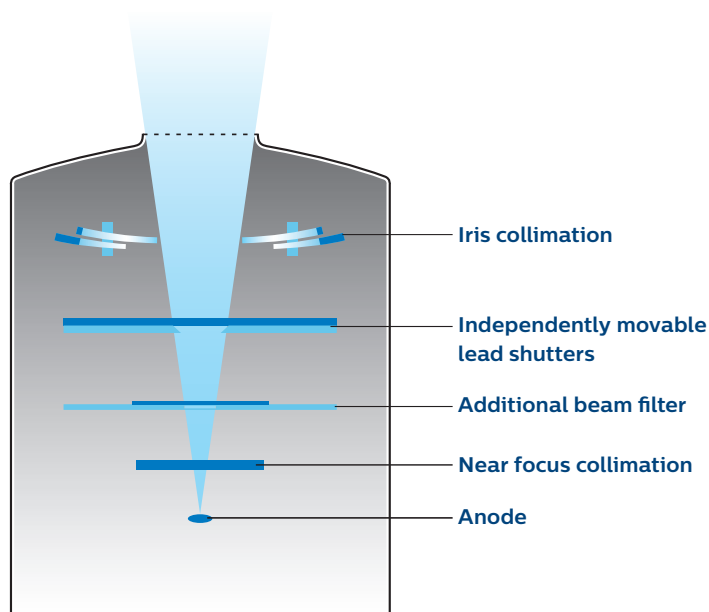
Feature	Specification
Shutters	Two independent lead shutters with steel wedge: shutters can be coupled for rotation and translation, or moved individually for asymmetric collimation
Automatic Shutter Postioning	Automatic shutter placement based on image content
Shutter material	3 mm Pb
Wedge material	0.2 to 2.5 mm stainless steel
Adjustment	Stepless
Rotation	360°
Minimal iris diameter	< 50 mm on II entrance
Position indication	On screen and also on LIH without radiation

At a touch of a button, Automatic Shutter Positioning (ASP) places shutters in the optimal position
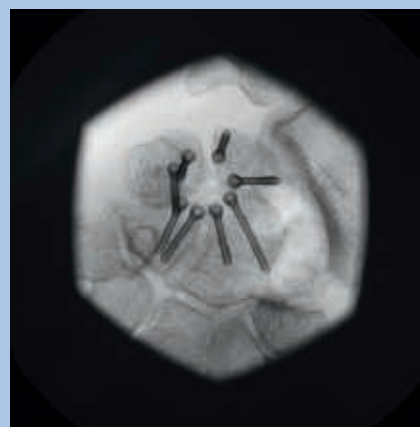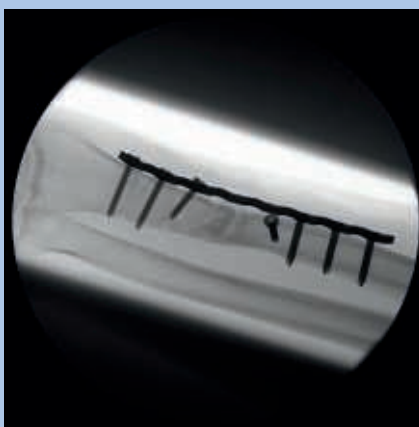
Iris collimation

4 Workflow

The BV Pulsera combines intelligent, ergonomic design with workflow-friendly features. From transport to setup to operation, the BV Pulsera is a system built for the way you want to work.

4.1 C-arm stand
Smooth, form fitting handles and responsive movements make the C-arm easy to transport and position. Its easy steering and lightweight design allow it to be quickly moved through crowded hallways and into position in the OR.

The intuitive user interface is designed so that trained staff can easily operate the BV Pulsera. Controls are laid out in a logical fashion with a minimum of functions and menus to streamline operations. For more procedure control at table side, the remote control and footswitch can be added as an option.

4.2 Mobile View Station
The compact Mobile View Station (MVS) fits perfectly in the surgical workflow. Its intelligent design supports easy system set up and fast transportation. To provide ergonomic viewing for different medical staff, the MVS can be placed close to the operating table. The height and angles of the monitors can be adjusted to comfortable viewing positions. The smooth, sealed controls simplify cleaning.

4.3 Connectivity
- Analog video out (left Examination monitor).
- Digital video out (optional) displays left and right images on separate monitors (such as ceiling suspended monitors).
- Video in allows you to conveniently display external video signals such as endoscopy or ultrasound on the right Reference monitor, so all the information you need is in one place.
- USB storage provides a convenient way to store images for use in reports or presentations.

Feature	Specification
Analog video out	1 BNC connector left monitor
Digital Video out (optional)	2 DVI connectors left and right monitor
Video in	S-Video
USB storage	bmp format

Enter patient demographics and connect to PACS/RIS/HIS conveniently using the handy touchscreen.

For ergonomic viewing, the LCD monitors can be rotated 180° and adjusted in height (23 cm/9″).

For easy transport and storage, simply fold the monitors and move them to their lowest position.

Optional

You can quickly display previous images on the fly during a procedure using the remote control.

4.4 Handheld remote control

The remote control unit is a handheld infrared keypad used to control the main image handling functions. For sterile operation, it can be used in a transparent sterile plastic cover. The functions include:
· Run loop
· Overview run/exam
· Retrieve previous image/run
· Retrieve next image/run
· Park image on Reference monitor
· Retrieve image from Reference monitor
· Protect image/release image
· SmartMask
· Fluoroscopy mode selection
· II-format selection
· Subtraction on/off
· Image grab

4.5 Examination monitor

The touchscreen on the Examination monitor of the Mobile View Station makes it easy to access the system's graphical user interface. It's all at your fingertips. You can intuitively set up an exam, post-process images, or export a case to PACS. Because Philips uses advanced infra-red technology in the touchscreen, it delivers the same image quality as non-touchscreen monitors.

4.6 DICOM and IHE

BV Pulsera can be equipped with the Philips Integrated
DICOM solution, which transfers images from the BV Pulsera onto the hospital network in a Seconary Capture DICOM SC or a DICOM XA format. The Basic DICOM package supports DICOM Print and DICOM Store.

The advanced DICOM/IHE package (optional) supports:
· Modality Worklist Management
· Modality Performed Procedure Step
· Storage Commit
· Full compliance to the IHE Scheduled Workflow integration profile as an Acquisition Modality Actor
· The BV Pulsera supports DICOM Structured Dose Reporting
· Query/Retrieve (ViewForum option)

4.7 Stand monitor

In a busy operating room, monitors are positioned for optimal viewing by the surgeon. BV Pulsera gives visual control to the operator by providing an extra 12" LCD monitor on the C-arm. The extra stand monitor can be rotated and tilted to the angle needed for the operator to follow the procedure, all without compromising the view of the surgeon. The extra monitor displays the live image, enabling accurate positioning of the C-arm.

Stand monitor can be rotated and tilted to improve the viewing position

5 Imaging

The BV Pulsera offers you a combination of advanced imaging technologies across the imaging chain that result in high quality image using efficient X-ray dose.

5.1 SmartVision

Unique BodySmart software allows free positioning of the anatomy, even at the edge of the image detector. BodySmart detects the anatomy and adjusts
the technique and image processing to produce high quality images.
· Automatic Shutter Positioning (ASP) positions shutters around the anatomy of interest for excellent image quality at the touch of a button.
· Users can enhance the contrast and brightness automatically in real time, or adjust them manually for the preferred Image quality.
· Unique dynamic movement detection reduces motion artifacts. Millions of calculations are made every second to apply the appropriate level of noise reduction to every pixel in the image. Less noise reduction is applied to dynamic structures to reduce motion artifacts. More integration is applied to static structures to produce high quality images that are virtually free of noise.


BodySmart automatically identifies the anatomy anywhere in the image and adjusts the settings to produce high quality images.

5.2 DoseWise

· Efficient beam filters with an additional 0.1 mm of copper and 1 mm of aluminum increase the quality of the X-ray beam, allowing a 40% reduction in skin entrance dose rate compared to the minimum filtering required by international standards.*
  – Pulsed fluoro modes ($1/2$ or $1/4$ pulse rate) to reduce X-ray exposure dose.
· Collimation:
  – Shutters and image orientation on Last Image Hold without applying radiation
  – Real lead asymmetrical shutters
  – Independent shutter positioning
· Dose reporting, dose display and an alert when exceeding a pre-defined procedure dose-level contribute to an increased dose awareness

Patient Entrance dose

without
+ 0.1mm Cu
with

intensity → / energy keV →
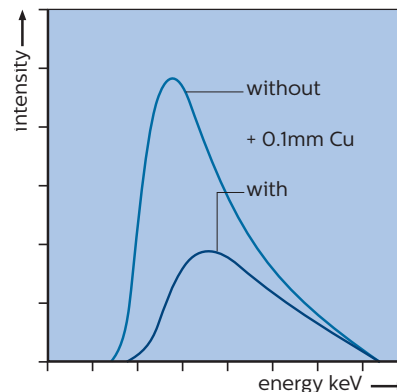
Additional beam filter reduces soft radiation that does not contribute to the image

Detector dose

without
+ 0.1mm Cu
with

intensity → / energy keV →
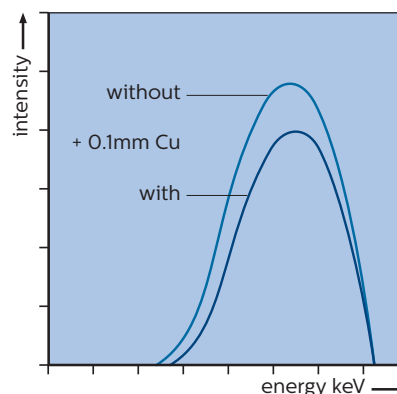
* IEC 60601-2-43: 2010 specifies minimum filtering of 3 mm aluminum. Data was obtained from non-clinical testing using PMMA phantoms.

5.3 Automatic Programmed Fluoroscopy programs

The Automatic Programmed Fluoroscopy (APF) programs apply pre-set application-specific fluoroscopy settings to obtain a high quality image for the anatomy of interest.

Within each program there are different X-ray modes available (depending on region):
· Low Dose Fluoroscopy
· Fluoroscopy
· High Definition Fluoroscopy
· Pulsed exposure mode to produce high quality images of virtually every patient
· Digital exposure, for extra-sharp, single snapshot images

5.4 Real time processing functions

Feature
360˚ digital rotation, mirror left/right and up/down without radiation
(Automatic) contrast and brightness
Dynamic noise reduction (Adaptive temporal recursive noise reduction)
Adaptive 2D edge enhancement
White compression
Image disk storage: 2,000/10,000/20,000 images

5.5 Post processing functions

Feature
360° digital rotation, mirror left/right and up/down
Contrast and brightness
Annotation (for a single image or all images in an examination)
Video invert
Zoom and roam (factor 2x real-time magnification, freely movable to any section of an image)
Measurement (to quantify lengths and angles in images)
Electronic shutters

Digital zoom that can be easily moved over the image

5.6 Mobile View Station monitors

Two 19" Color LCD monitors for diagnostic image quality display.

Feature	Specification
Resolution	1280 x 1024 pixels
Contrast ratio	>500:1 >700:1 (optional 19" High Brightness monitor)
Viewing angle	170˚ in horizontal and vertical direction
Touchscreen (optional for left monitor)	Offers easy access to post-processing of acquired images, patient demographics as well as PACS

6 Options

Feature	Specification
Tank laser aiming device	Laser projects a crosshair towards the image intensifier, indicating the center of the X-ray beam and enabling alignment of the C-arm without X-ray
II laser aiming device	Positioning device for use at the image intensifier side
Medical DVD Recorder	Recording of static and dynamic live fluoroscopy on a DVD (up to 2 hours)
Video Paper printer	Thermal printer to print video images from the Examination (left) monitor onto paper during or after examinations.
Video Paper/transparency printer	Thermal printer to print video images from the Examination (left) monitor onto paper or transparencies during or after examinations.
Multi modality workstation (ViewForum option)	Intuitive multi-purpose platform for retrieving and handling images from different modalities. Allows comparison of pre-operative images side-by-side with live fluoroscopy images.
ViewForum options	• MIP/MPR – maximum intensity projection singles out high intensity areas for optimized 2D projection of a 3D volume • DVD DICOM Store – record DICOM images onto a DVD
Vascular package	• Subtracted fluoroscopy mode • Trace-mode shows opacification of the vessels in real time • Roadmap images support catheter guidance • Remask lets you reselect the best image in a run as a new mask image • SmartMask uses previously acquired mask images for roadmapping to support efficient use of X-ray dose and contrast medium • Landmarking provides a non-subtracted background for anatomical reference • Real-time pixel shift compensates for movement artifacts • Subtraction on/off simplifies the orientation for subtracted images during roadmap procedures • View Trace creates a trace image in post-processing • CO_2 mode for subtraction, trace white and roadmap with SmartMask
Advanced Vascular package	• Pulsed exposure at a maximum pulse rate of 15 pps, with max. 60 mA • All vascular package features
Ortho plus	• Extra examination type to obtain low noise images in dense patients • 12.5 pps, with max. 60mA
Cardiac package	• Three dedicated APF sets for cardiac procedures, advanced pacemaker placements, and electrophysiology • Pulsed exposure at 8, 15 and 30 pps, with max. 60 mA
Stand monitor	12" LCD monitor on C-arm stand

7 Geometry

The BV Pulsera consists of a mobile C-arm stand with monitor for image acquisition and a Mobile View Station with two LCD monitors for image processing, review, archiving and display.

7.1 C-arm stand

Feature	Specification
Longitudinal movement	20 cm (7.9")
Panning movement	(swivel) ± 10°
Vertical movement	Motorized 49 cm (+43 cm / –6 cm) (19.3", +16.9", –2.4")
Rotation	± 180°, with safety stop at ± 135°
Angulation	+90°, –25°
Extended angulation (optional)	+90°, –45° for increased projection flexibility
Source to Image Distance	98 cm (38.7")
Free space within C-arm	77 cm (30.3")
C-arm depth	61 cm (24.0")
Lowest lateral working position	102 cm (40.2")
Brakes for all movements	Yes, manual
Steering	Rear wheel
Parallel movement	Dedicated parallel movement via rear wheel control
Cable deflectors	Yes
C-arm stand weight	9": 310 kg (683 lbs) – 12": 305 kg (672 lbs)
C-arm stand length	196 cm (77.2")
C-arm stand width	81 cm (31.9")
C-arm stand height	9": 173 cm (68.2") – 12": 182 cm (71.7")

7.2 Mobile View Station

Feature	Specification
Mobile view station depth	70 cm (27.6")
Mobile view station width	94 cm (37.1") 70 cm (27.6") monitors folded
Mobile view station height	Max height is 185 cm or higher (72.8")*
Weight (including options)	195 kg or lower (313 lbs)*
Monitor rotation	180°
Monitor height movement	23 cm (9")

BV Pulsera and MVS movements

* depending on configuration

8 Service

Count on us as your patients count on you

Staying on top of today's complex and ever changing healthcare environment is challenging enough. The last thing you need to be concerned with is keeping your care systems up and running smoothly.

At Philips, we work as one with your teams. We share their dedication to solve issues before they start and their drive to keep going day and night until the job is done. With us taking care of your systems you can focus on what really matters — delivering better care, to more people, at lower cost. Together we can create a healthier future.

Services – a full lifecycle solution
The success of your organization depends on people. Philips Services are designed with that in mind— creating healing environments, developing your staff, improving your organization's performance, and increasing patient satisfaction. Rely on us. The resources, training, and support we offer, enable you to focus on what's most important - your patients. Philips provides a full lifecycle solution designed around your patients, your people, and your organization. We help you succeed in every phase of system ownership, from planning to start-up, through peak usage and renewal.

Planning
Understand how and when the right equipment and services contribute to enhanced patient care and economics.

Start-up
Make the most of your system as quickly as possible.

Peak Usage
Extract maximum utility out of your system day to day.

Renewal
We'll help you make smart decisions on upgrading or transitioning to a new system.
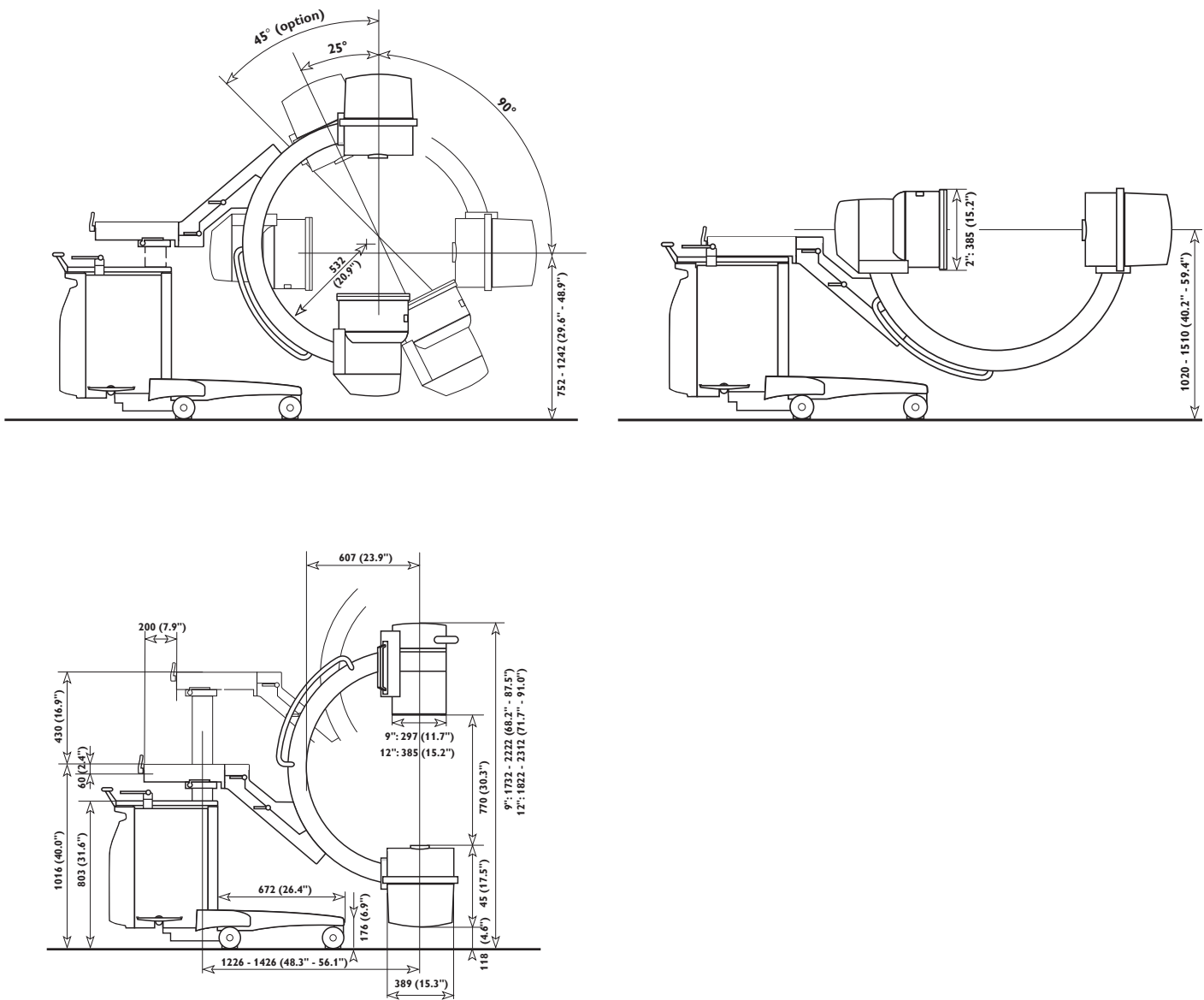
First-rate care
Philips global service network, our highly qualified service engineers, the individual attention of our service technicians, and the international availability of spare parts combine to provide our seamless service support.
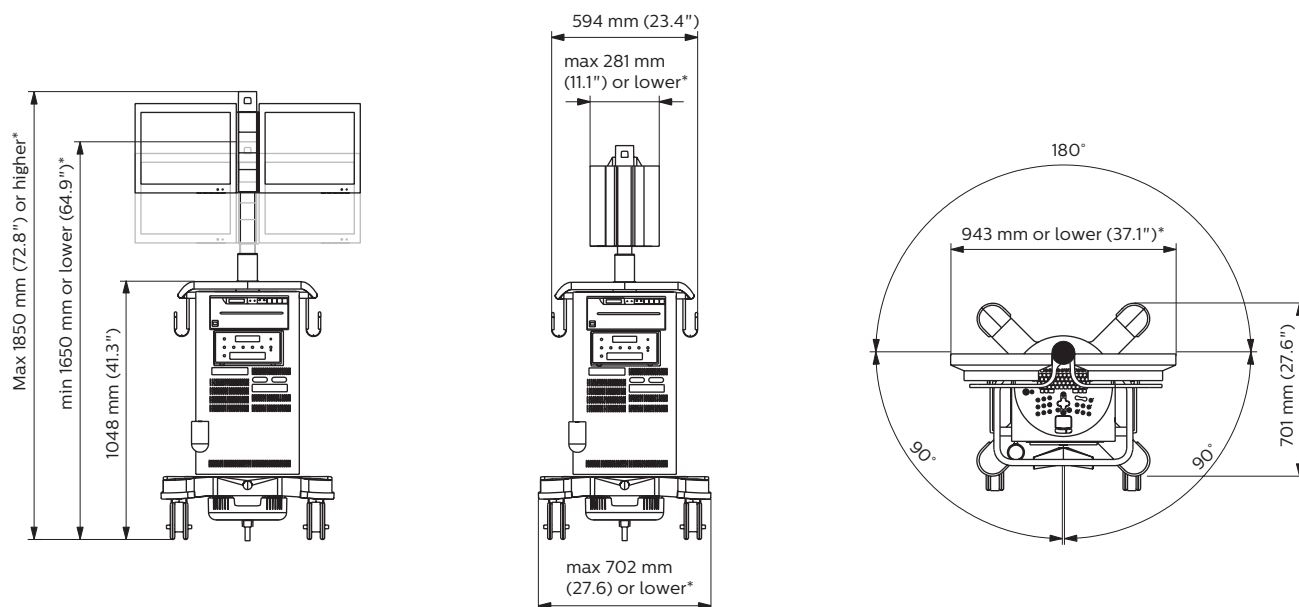
9 Dimensions

8.1 C-arm stand

45° (option)
25°
90°
532 (20.9")
752 - 1242 (29.6" - 48.9")

2": 385 (15.2")
1020 - 1510 (40.2" - 59.4")

607 (23.9")
200 (7.9")
430 (16.9")
60 (2.4")
1016 (40.0")
803 (31.6")
672 (26.4")
176 (6.9")
1226 - 1426 (48.3" - 56.1")
389 (15.3")
9": 297 (11.7")
12": 385 (15.2")
770 (30.3")
45 (17.5")
118 (4.6")
9": 1732 - 2222 (68.2" - 87.5")
12": 1822 - 2312 (71.7" - 91.0")

All dimensions are in millimeters (inches)

8.2 Mobile View Station

Max 1850 mm (72.8") or higher*

min 1650 mm or lower (64.9")*

1048 mm (41.3")

594 mm (23.4")

max 281 mm (11.1") or lower*

max 702 mm (27.6) or lower*

180°

943 mm or lower (37.1")*

701 mm (27.6")

90°

90°

* depending on configuration

PHILIPS

How to reach us
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