



Understanding you

Philips BV Pulsera mobile C-arm specifications

PHILIPS
sense and simplicity

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Introduction

If you are looking for more power and flexibility to perform challenging interventions, the BV Pulsera is right for you. This mobile fluoroscopy system is our interventional powerhouse. It is ideal for performing long minimally invasive cardiovascular, orthopedic, and neurosurgical procedures as well as routine pain management and thoracic surgery interventions.

Key benefits

- Versatile system with choice between 9" or 12" image intensifier for advanced interventions as well as routine and special procedures
- Extended angulation up to 135° for increased projection flexibility (optional)
- SmartVision technology combined with DoseWise provides excellent image quality using an efficient X-ray dose
- Compliance with DICOM and IHE (optional)
- Compact Mobile View Station with optimal viewing capabilities
- Three dimensional imaging with 3D-RX (optional)



1 System overview

The BV Pulsera is a counterbalanced mobile C-arm system. The system consists of a C-arm stand with a compact foot and rear-wheel steering for easy maneuverability and positioning. The intelligent design of the Mobile View Station provides the user with easy transportation, easy system set-up and optimal viewing and connectivity capabilities.

Easy workflow

- Preset application-specific programs to enable high-quality images

Image intensifier

- 1K² 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)



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 to reduce motion artifacts



Monitors

- 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

Archiving and documentation

- Fully integrated DICOM solution (optional)
- Medical DVD recorder (optional)
- Printer (optional)
- USB image storage

Connectivity

- Video-in to display external video signals such as ultrasound or endoscopy
- Digital video out (optional) to display BV Pulsera images on separate monitors (such as ceiling suspended monitors)

2 Image detection

Experience a whole new way of working with the Philips BV Pulsera. Compact and flexible, this surgical imaging system is versatile to use, easy to move, and can handle a wide range of demanding procedures.



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'

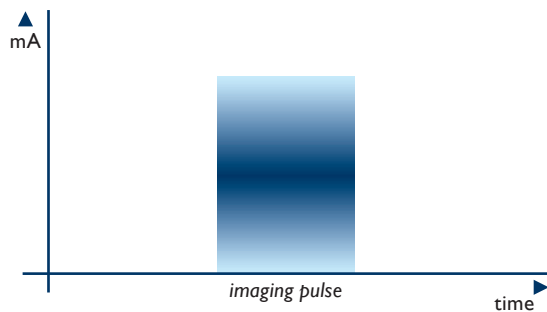
3 X-ray generation

The powerful pulsed technology and exceptional heat management capabilities of BV Pulsera allow you to go the distance in your long cardiovascular and interventional procedures. Its rotating anode technology and 15 kW generator give you the power to see through virtually any normal or obese patient and to see fine details in steep projections.

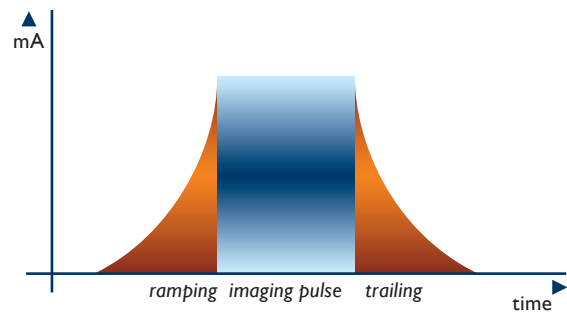
3.1 X-ray generator

BV Pulsera uses a monoblock architecture where the high-tension transformer is located in the X-ray tank. There's no need to transmit pulses over high voltage cables, which can result in a ramping up and ramping down effect, due to the electrical impedance of the cables. The BV Pulsera monoblock generator produces very sharp, well-defined pulses that reduce motion artifacts and provide crisp images.

Monoblock



Without monoblock



The BV Pulsera monoblock generator produces sharper pulses for crisp images.

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-powered generator with excellent heat management to perform the most demanding interventional procedures.



X-ray tube

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

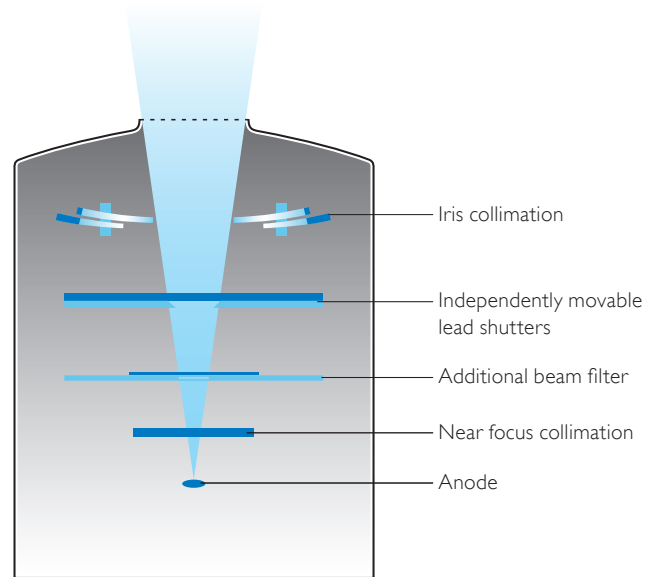
Operating values Quarter Dose Fluoroscopy	
kV range	40 - 120 kV
mA range	0.4 - 12 mA
Pulse width	11 - 37 ms
Pulse rate	6.25 pps

Operating 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

3.3 X-ray collimation

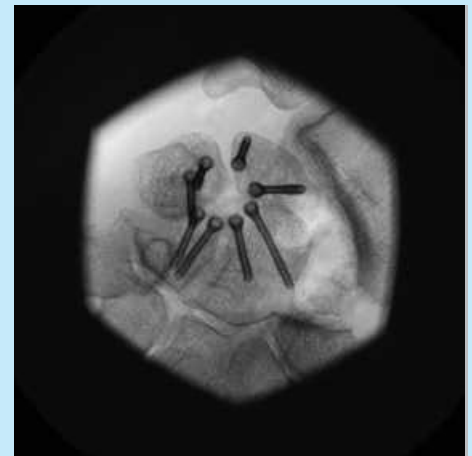
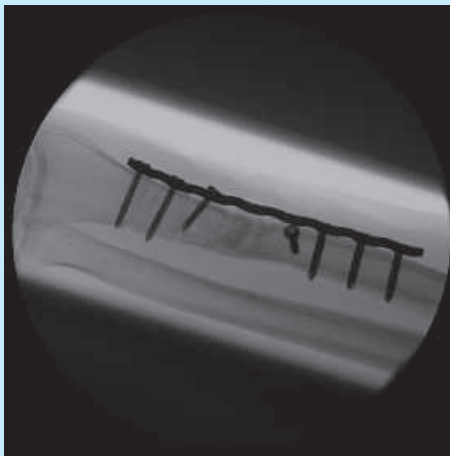
Collimation reduces scatter radiation and enhances image quality. BV Pulsera makes collimation easy. Its full lead shutters can be rotated and moved independently, and the unique Philips Automatic Shutter Positioning (ASP) feature automatically positions shutters for high image quality at the touch of 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.



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 Positioning	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 Mobile View Station

The compact Mobile View Station fits perfectly in the surgical workflow. The intelligent design of the Mobile View Station provides you with easy system set-up, optimal viewing capabilities, and easy transportation. Its unique design also makes it easy to clean.

- Video in allows you to conveniently display external video signals such as endoscopy or ultrasound on the right C-arm 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.

4.2 Connectivity

- Analog video out (left monitor).
- Digital video out (optional) displays left and right images on separate monitors (such as ceiling suspended monitors).

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 an optimal viewing angle, 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

4.3 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



4.4 Touchscreen MVS

The touchscreen on the left 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.

4.5 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 DICOM Secondary 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.



5 Imaging

The BV Pulsera offers you a combination of advanced imaging technologies across the imaging chain that result in high quality image using an 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 optimal images.
- Automatic Shutter Positioning (ASP) positions shutters around the anatomy of interest for excellent image quality at the touch of a button.
- You can optimize the contrast and brightness automatically in real time, or adjust them manually for the desired effect.
- Unique dynamic movement detection minimizes 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 crisp, virtually noise-free images.

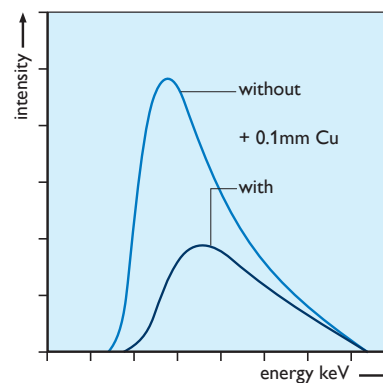


Body smart automatically identifies the anatomy anywhere in the image and selects the optimum settings.

5.2 DoseWise

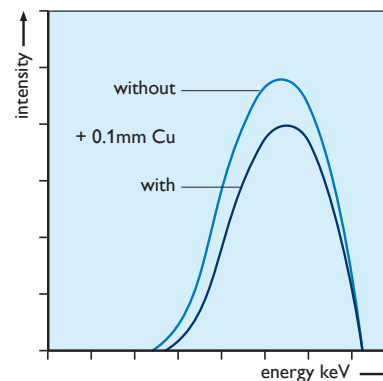
- Philips unique beam filters reduce patient skin X-ray dose by approximately 40% when compared to conventional filters.
 - Modes ranging from low X-ray dose to Boost, enabling dose savings when desired or improved image quality when necessary.
 - Pulsed fluoro modes ($\frac{1}{2}$ or $\frac{1}{4}$ pulse rate) can reduce X-ray dose significantly.
- 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



Additional beam filter reduces soft radiation that does not contribute to the image.

Detector dose



5.3 Anatomical programs

Preset application-specific programs apply 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):

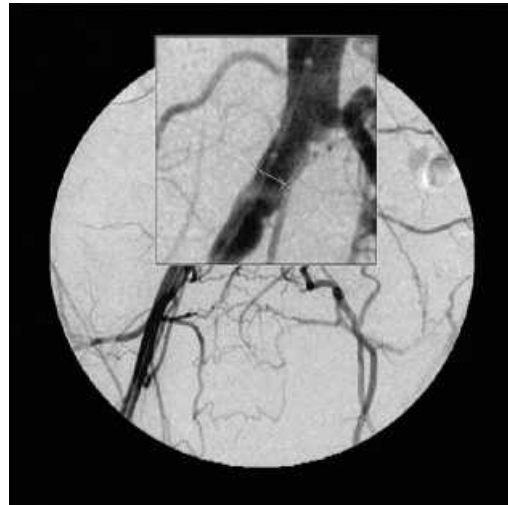
- Low Dose Fluoroscopy
- Fluoroscopy
- High Definition Fluoroscopy
- Pulsed exposure mode to produce high-quality images of virtually every patient
- Digital exposure, for extra-sharp, single snapshot images

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 (Sony UP-970AD)	Thermal printer to print video images from the live (left) monitor onto paper during or after examinations.
Video Paper/transparency printer (Sony UP-990AD)	Thermal printer to print video images from the live (left) monitor onto paper or transparencies during or after examinations.
Multi modality workstation (Built-in ViewForum)	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	<ul style="list-style-type: none"> • 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 • Procedure Reporting Package – sends images and patient data to user-customizable MS-Word reporting template
Vascular package	<ul style="list-style-type: none"> • Subtracted fluoroscopy mode • Trace-mode shows the maximum 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 • Smart Mask reduces the X-ray dose and contrast medium usage by re-using previously acquired mask images for roadmapping • 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 • CO₂ mode for subtraction, trace white and roadmap with Smart Mask
Advanced Vascular package	<ul style="list-style-type: none"> • Pulsed exposure at a maximum pulse rate of 15 pps, with max. 60 mA • All vascular package features
Ortho plus	<ul style="list-style-type: none"> • Extra examination type to obtain low noise images in dense patients • 12.5 pps, with max. 60mA
Cardiac package	<ul style="list-style-type: none"> • Three dedicated APF sets for cardiac procedures, advanced pacemaker placements, and electrophysiology • 8, 15 and 30 pps, with max. 60 mA
3D-RX	<ul style="list-style-type: none"> • Combination of conventional 2D-flexibility and top-quality 3D imaging in a single compact BV Pulsera 12" system • BV Pulsera image memory of 20,000 images

7 Application configurations

The BV Pulsera is a versatile imaging system that can support a wide variety of applications. A number of application-specific configurations are available to adapt the system to your specific needs.

Application configurations	Extended angulation	High Brightness Color LCD monitors	LCD touchscreen (left monitor)	LCD monitor height adjustment	10,000 image memory	20,000 image memory	Basic DICOM	Advanced DICOM/IHE	Extended processing	Vascular package	Advanced Vascular package	Ortho plus	Cardiac package	3D-RX	DVI-OUT	Laser Aiming Device I.I.	Laser Aiming Device at X-ray tank	Remote control
Orthopedic BV Pulsera 9"	•	•	•		•	•												
Orthopedic Expert BV Pulsera 9"	•	•	•	•	•	•	•	•		•					•		•	
Pain Management BV Pulsera 9"	•	•	•		•	•	•	•										•
Pain Management Expert BV Pulsera 9"	•	•	•	•	•	•	•	•	•							•		•
Vascular BV Pulsera 9"		•	•	•	•	•	•	•										•
Vascular Expert BV Pulsera 12"	•	•	•		•	•	•	•	•									•
Endoscopic BV Pulsera 9"	•		•		•	•		•										
Endoscopic Expert BV Pulsera 12"	•	•	•	•	•	•	•	•				•						•
Cardiac Expert BV Pulsera 9"	•	•	•	•	•	•	•	•			•		•			•		•
3D Expert BV Pulsera 12"	•	•	•		•	•	•	•		•		•	•	•	•	•	•	•



8 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.

8.1 C-arm stand

Feature	Specification
Longitudinal movement	20 cm (7.9") – with 3D-RX 17 cm (6.6")
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° – with 3D-RX +90°, -22°
Extended angulation (optional)	+90°, -45° for increased projection flexibility (not in combination with 3D-RX)
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")

8.2 Mobile View Station

Feature	Specification
Mobile view station depth	70 cm (27.6")
Mobile view station width	94 cm (37.1")
Mobile view station height	70 cm (27.6") monitors folded
Weight (including options)	187 cm (73.6")
Monitor rotation	195 kg (429 lbs)
Monitor height movement	180°
	23 cm (9")



BV Pulsera and MVS movements

9 Service



Our global presence provides that no matter where you are, Philips is there for you. Whether you want to reduce your operational risk and equipment downtime, leverage your in-house service capabilities, or use your system more effectively. You choose the support that is the right fit for your facility. 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

- Philips Medical Capital Financing Solutions
- System Installation Project Management
- Room Design Services

Start-up

- Clinical Application Education
- In-house Service Training
- Online Learning Center

Peak Usage

- Comprehensive, cooperative and flexible service agreements
- Remote Services
- Service Information Portal

Renewal

- Installed Base Programs
- System Relocation Services
- Refurbished Systems

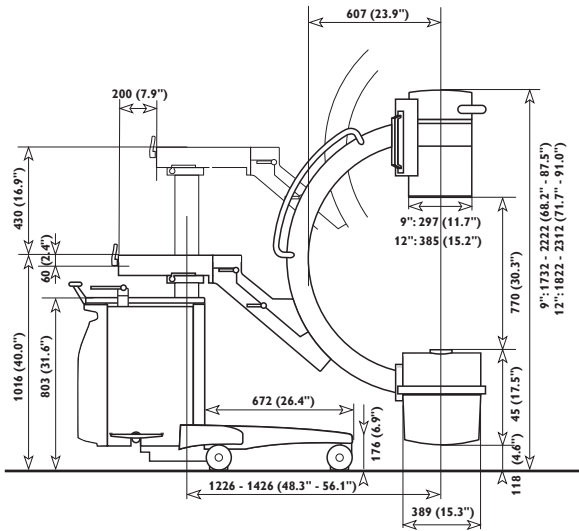
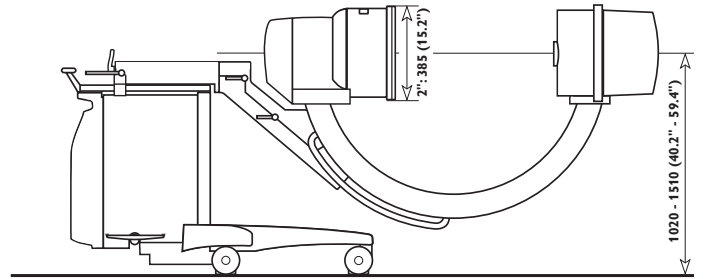
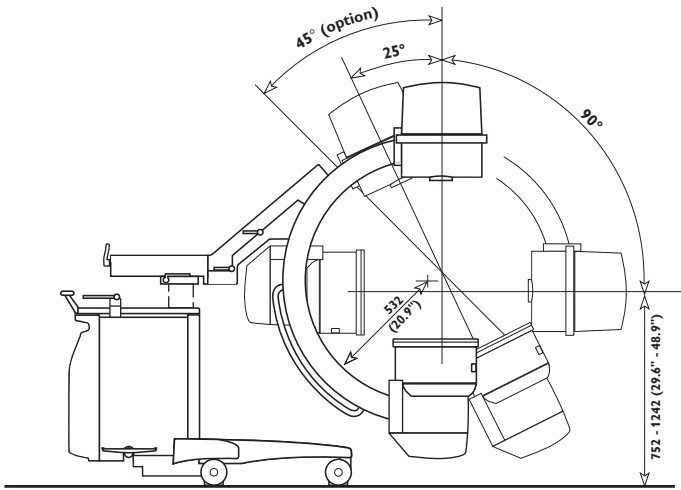
Remote Proactive Support

One valuable feature in our Service Agreements is Remote Proactive Support. It helps you get the most from your imaging system and maintain its peak performance every day. Philips Remote Services is an advanced, secure network that links your BV Pulsera to our Global Remote Services Customer Care Centers. Services that formerly required on-site visits are now available by connecting to our remote experts.

Continuous system analysis allows our experts to detect anomalies before they impact equipment performance – protecting you against lengthy downtime and unexpected costs. If a deteriorating situation is detected, corrective action can be carried out quickly and effectively, often with no interruption to your busy schedule. A global platform for system communication certifies that all service data is handled via best-in-class encrypted transmission technology.

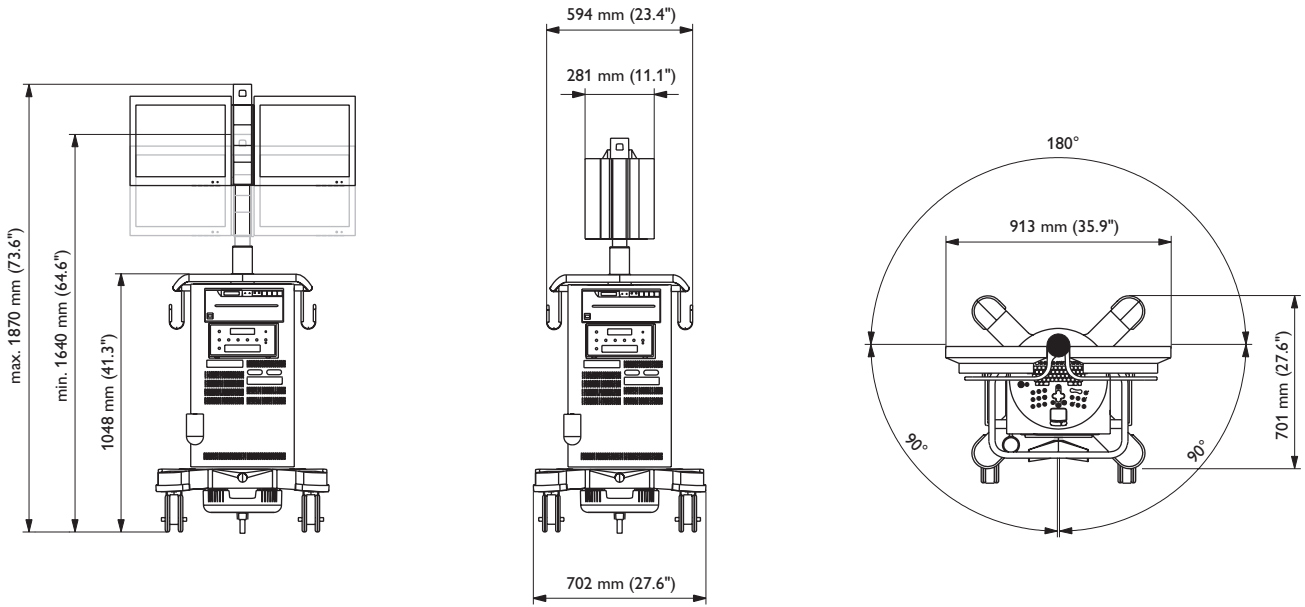
10 Dimensions

10.1 C-arm stand



All dimensions are in millimeters (inches)

10.2 Mobile View Station



Easy transport with folded monitors in lowest position

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