It's all about you

Philips BV Endura mobile C-arm specifications

PHILIPS

sense and simplicity

Contents

Introduction

The BV Endura is a versatile surgical imaging workhorse, engineered to handle a wide range of surgical procedures including vascular. You get superb quality images to support critical decisions across diverse applications. Compact and flexible, it provides cost-effective and reliable imaging wherever it's needed.

Key benefits
- Versatile system with choice between 9" or 12" image intensifier for a wide range of applications including vascular 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

1 System overview

The BV Endura 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 optimal viewing and connectivity capabilities.

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

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)

X-ray tank
- Pulsed monoblock generator
- Stationary anode tube with active heat management

Monitors
- 19" Color LCD
- Contrast ratio >500:1
  (Optional: HiBri >700:1)
- Convenient touch screen 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
  like ultrasound or endoscopy
- Digital video out (optional) to display
  BV Endura images on separate monitors
  (such as ceiling suspended monitors)

2 Image detection

Experience a whole new way of working with the Philips BV Endura. 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 Endura 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 BV Endura uses a fixed anode X-ray tube with an excellent cooling rate for lengthy procedures.

3.1 X-ray generator

The BV Endura utilizes a microprocessor-controlled X-ray generator. The tank unit is designed for maximum cooling capacity, allowing lengthy procedures.

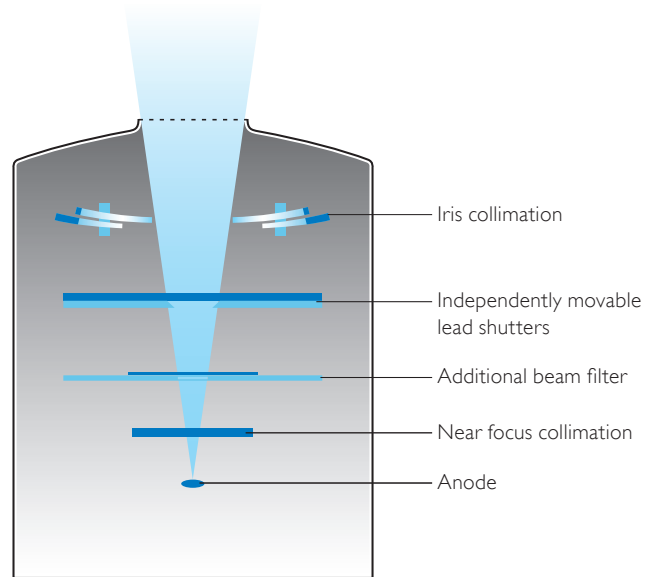| Feature	Specification
Generator type	DC converter, micro-processor controlled
Max. generator output	3.15 kW
Max. X-ray tube voltage	110 kV
Max. X-ray tube current	30 mA

3.2 X-ray tube

The BV Endura uses a fixed anode tube. The tank unit has a 0.6/1.4 IEC dual focus, supporting different types of applications. An integrated beam-filter helps to reduce patient skin dose. Automatic settings (APF) provide consistent image quality for every examination.

X-ray tube/tank unit	
Feature	**Specification**
Tube type	Fixed anode
Nominal focal spot values (IEC 336)	0.6 IEC and 1.4 IEC
Nominal X-ray tube voltage	110 kV
Maximum anode heat content	35.5 kJ = 50 kHU
Anode cooling capacity	21.6 kJ/min. = 30.6 kHU/min.
Maximum housing heat content	840 kJ = 1200 kHU
Inherent filtration	3.0 mm Al eq.
Additional filtration	1.0 mm Al eq. + 0.1 mm Cu

| Operating values	
Continuous fluoroscopy	
kV range	40 – 110 kV
mA range for Low Dose Fluoroscopy mode	0.10 – 3.00 mA (up to 7.20 mA during Auto High Penetration)
mA range for High Definition Fluoroscopy mode	0.24 – 7.20 mA
Half Dose Fluoroscopy	
kV range	40 – 110 kV
mA range	0.10 – 3.00 mA (up to 7.20 during Auto High Penetration)
Pulse widths	40 ms
Pulse rate	12.5 pulses/second
Quarter Dose Fluoroscopy	
kV range	40 – 110 kV
mA range	0.10 – 3.00 mA (up to 7.20 during Auto High Penetration)
Pulse width	40 ms
Pulse rate	6.25 pulses/second

3.3 X-ray collimation

Collimation reduces scatter radiation and enhances image quality. BV Endura 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.

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
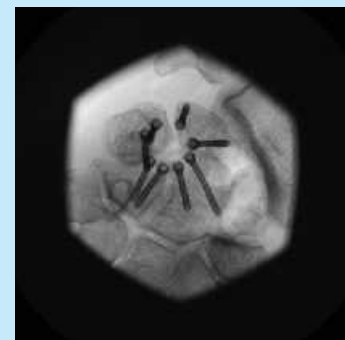
Iris collimation

4 Workflow

The BV Endura combines intelligent, ergonomic design with workflow-friendly features. From transport to setup to operation, the BV Endura 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 the user with easy system set-up, optimal viewing capabilities, and easy transportation. Its unique design also makes it easy to clean.

4.2 Connectivity
• Analog video out (left monitor).
• Digital video out (optional) to display 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 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.

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 touch screen

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 Touch screen MVS

The touch screen 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 utilizes advanced infra-red technology in the touch screen, it delivers the same image quality as non-touch screen monitors.

4.5 DICOM and IHE

BV Endura can be equipped with the Philips Integrated DICOM solution, which transfers images from the BV Endura 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 Endura supports DICOM Structured Dose Reporting.

5 Imaging

The BV Endura offers you a combination of advanced imaging technologies across the imaging chain that result in high quality images 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.
- Users 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.

5.2 DoseWise

- Philips unique beam filters reduce patient skin X-ray dose by approximately 40% when compared to conventional filters.
  - Pulsed fluoro modes (½ or ¼ 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

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

Patient Entrance dose
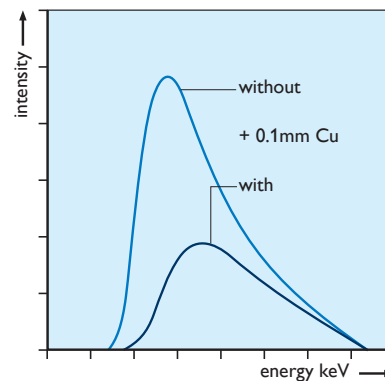
Additional beam filter reduces soft radiation that does not contribute to the image

Detector dose
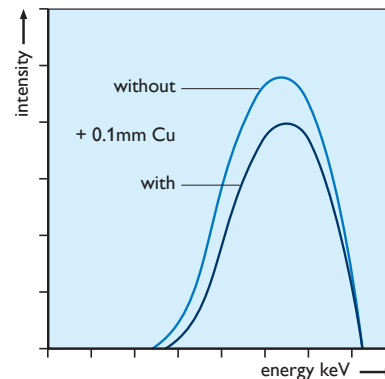
5.3 Anatomical programs

Preset application-specific programs apply fluoroscopy settings to obtain a high quality image for the anatomy of interest.

• Fluoroscopy
• High Definition Fluoroscopy

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
Touch screen (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	Laser positioning device for use at the image intensifier side.
Medical DVD Recorder	Recording of static and dynamic live fluoroscopy on 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	• 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	• 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 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 Smart Mask

The BV Endura 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 touch screen (left monitor)	LCD monitor height adjustment	10,000 image memory	Basic DICOM	Advanced DICOM/IHE	Extended processing	Vascular package	Laser aiming device II	Remote control
Orthopedic BV Endura 9"				●		●		●			
Orthopedic Expert BV Endura 9"	●	●	●	●	●	●	●	●		●	●
Pain Management BV Endura 9"				●		●		●			
Pain Management Expert BV Endura 9"	●	●	●	●	●	●	●	●	●	●	●
Vascular BV Endura 9"				●	●	●		●	●		●
Vascular Expert BV Endura 12"		●	●	●	●	●	●	●	●		●
Endoscopic Expert BV Endura 12"	●	●	●	●	●	●	●	●			●

8 Geometry

The BV Endura 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")
Panning movement (swivel)	± 10°
Vertical movement	49 cm (+43 cm/-6 cm) (+16.9"/-2.4") motorized
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 (40.0")
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	188 cm (74.0")
C-arm stand width	81 cm (31.9")
C-arm stand height	9": 168 cm; (66.1") – 12": 177 cm (69.7")

8.2 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	187 cm (73.6")
Weight (including options)	195 kg (429 lbs)
Monitor rotation	180°
Monitor height movement	23 cm (9")

BV Endura 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
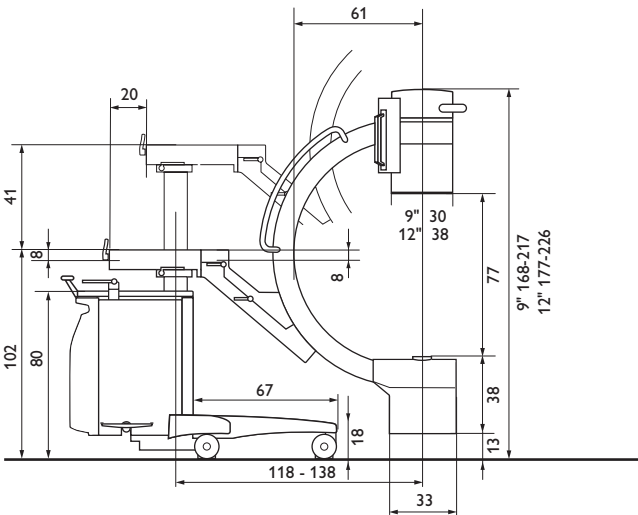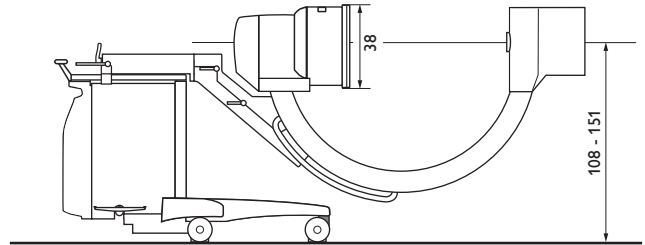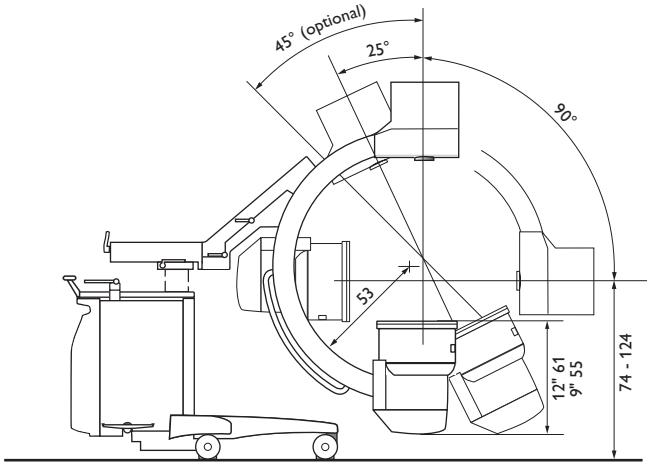- System Relocation Services
- Refurbished Systems

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 Endura 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.
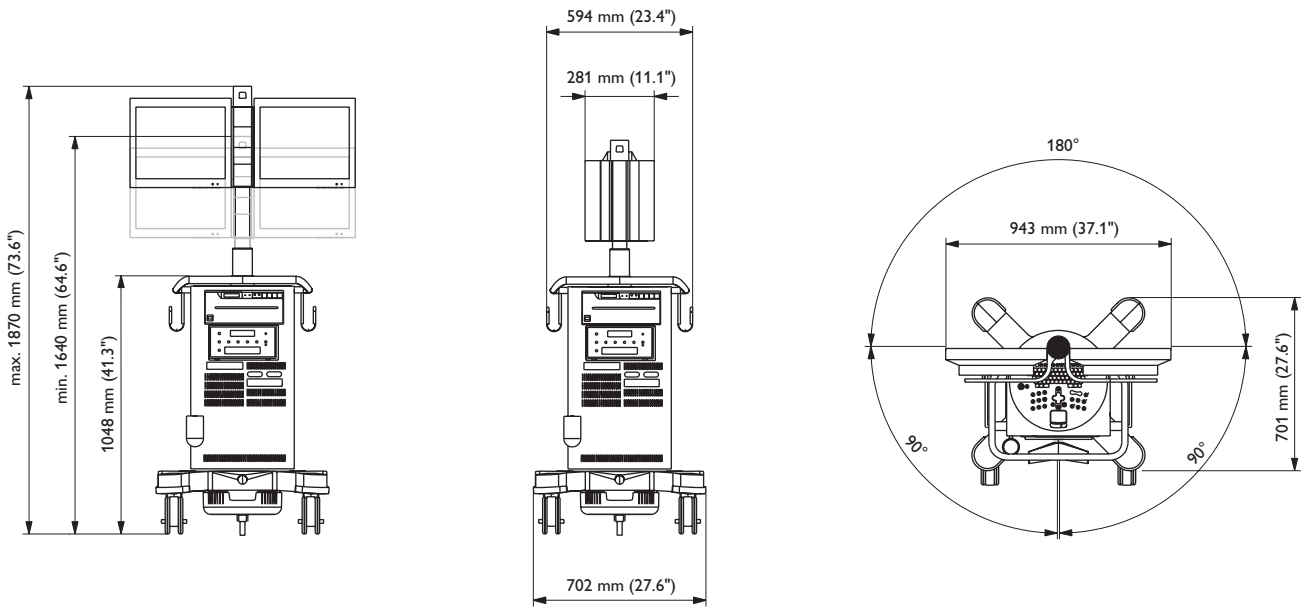
10 Dimensions

10.1   C-arm stand

All dimensions are in millimeters (inches)

10.2   Mobile View Station

max. 1870 mm (73.6")
min. 1640 mm (64.6")
1048 mm (41.3")

594 mm (23.4")
281 mm (11.1")
702 mm (27.6")

180°
943 mm (37.1")
701 mm (27.6")
90°   90°

Easy transport with folded monitors in
lowest position

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How to reach us
www.philips.com/healthcare
healthcare@philips.com

Asia
+49 7031 463 2254

Europe, Middle East, Africa
+49 7031 463 2254

Latin America
+55 11 2125 0744

North America
+1 425 487 7000
800 285 5585 (toll free, US only)

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