PHILIPS

*Combi**Diagnost R90***

Digital radiography and
fluoroscopy solutions

Experience
the best of both worlds

Philips CombiDiagnost R90 premium cross-functional system
Specifications

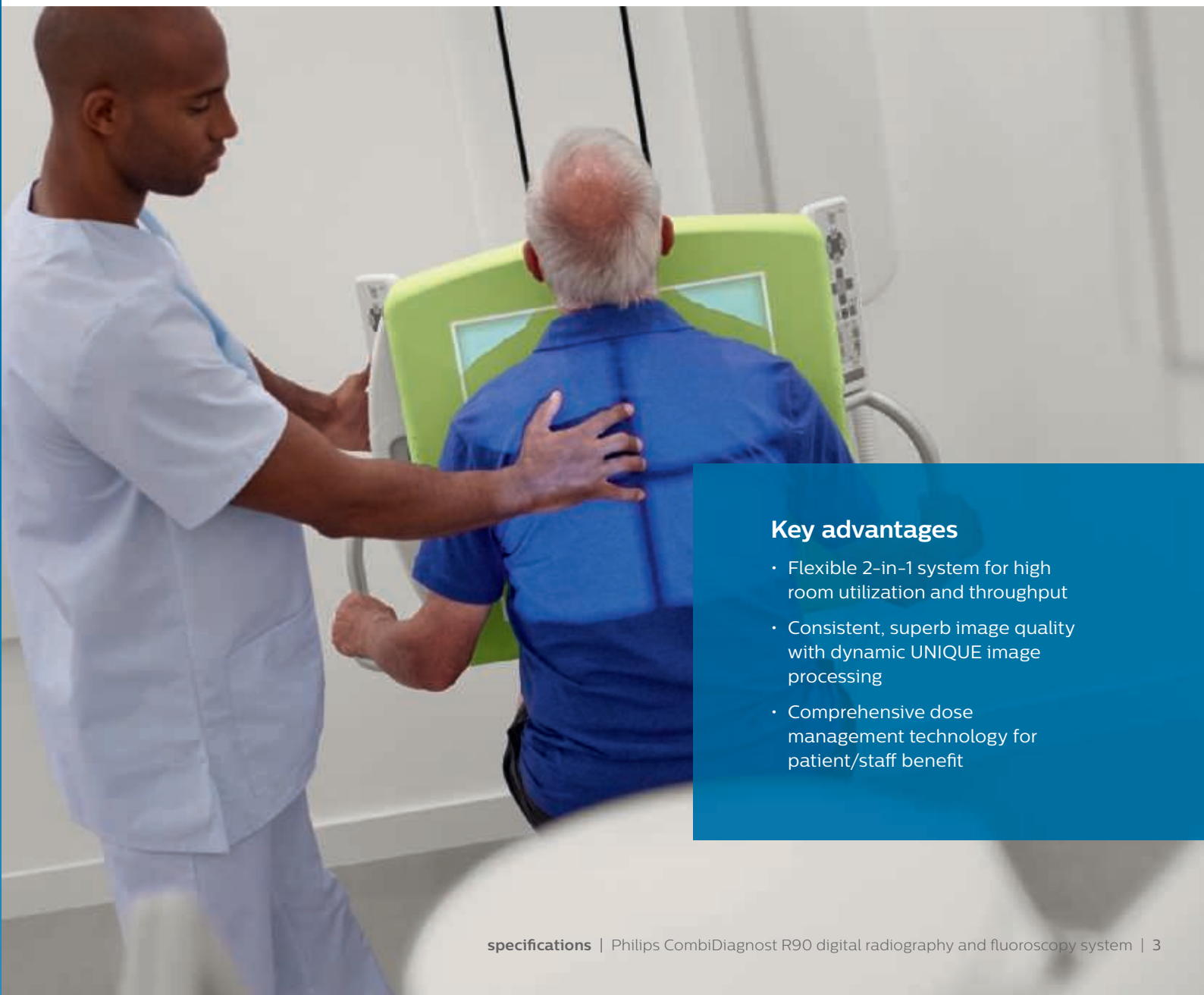
Content

Introduction	**3**
System overview	**4**
Table geometry	**6**
Table	6
Table top	6
Tube column – detector assembly	6
Grid	**7**
Ceiling suspension CSM	**8**
Fixed vertical stand VS	**10**
X-ray generation	**14**
General	14
Generator specifications	14
Intelligent exposure IQX	14
Grid Controlled Fluoroscopy GCF	14
Tubes	15
Collimator	16
Imaging	16
Detectors	**17**
SkyPlate detectors	17
Intuitive interface	17
SkyPlate detector family	**18**
Eleva Workspot	**20**
Intuitive interface	20
Specifications	20
Dicom	20
Optional	20
Eleva	21
Applications	**22**
Automatic image stitching	22
Main benefits at a glance	22
Optional accessories	22
SkyFlow	**23**
Exceptional procedures	23
Exceptional image quality	23
All patient types	23
Main benefits at a glance	23
Digital Workflow	23
Accessories	**25**
Room layouts	**26**
Dimensions	**28**
Standard scope of delivery	**30**
Always there, always on	**32**

Conformity
CombiDiagnost R90, manufactured by Philips Healthcare, complies with the provisions of the Medical Device Directive 93/42/EEC, as amended by 2007/47/EC,(CE mark) and satisfies the applicable IEC standards.

Introduction

CombiDiagnost R90 is a remote controlled fluoroscopy system in combination with high-end digital radiography, designed to improve room utilization in a cost effective manner. Enjoy fast, confident diagnoses with In-Pulse control and Grid Controlled Fluoroscopy as well as premium DR. It is a consistent performer for all your DRF studies. Convert your traditional fluoroscopy room with this high throughput 2-in-1 solution.



Key advantages

- Flexible 2-in-1 system for high room utilization and throughput
- Consistent, superb image quality with dynamic UNIQUE image processing
- Comprehensive dose management technology for patient/staff benefit

System overview

Experience a highly efficient workflow and flexible geometry movements with the robust CombiDiagnost R90. From the easy-to-use Eleva interface to Intelligent Exposure Technology (IQX) and automatic grid selection, you'll move quickly through exams. Optimized dynamic UNIQUE post processing delivers fast time-to-display of images ideally suited for a broad range of fluoroscopy and radiography applications.

User interface
- Patient data management
- Pre-defined parameters according to the selected exam
- Patient type selection

Touch-screen console
- Ergonomically designed user interface to control movements
- Manual overwrite of some acquisition parameters

Height-adjustable table
- - 90° / + 90° tilt range
- 284 kg (626 lbs) patient weight to facilitate bariatric procedures
- Automatic Grid selection

Digital flat detector
- 43 cm x 43 cm (17" x 17")
- 148 µm spatial resolution
- 50 % larger field of view compared to a 15" image intensifier
- distortion-free quality image
- one image receptor for all applications

Column
- SID adjustment from 113 cm (44") to 183 cm (72"), allowing a broad range of exams on the table
- -/+ 40 angulation, with automatic detector centering

X-ray tube and collimator
- Choice of two tubes
- Automatic collimation
- Programmable additional filtration

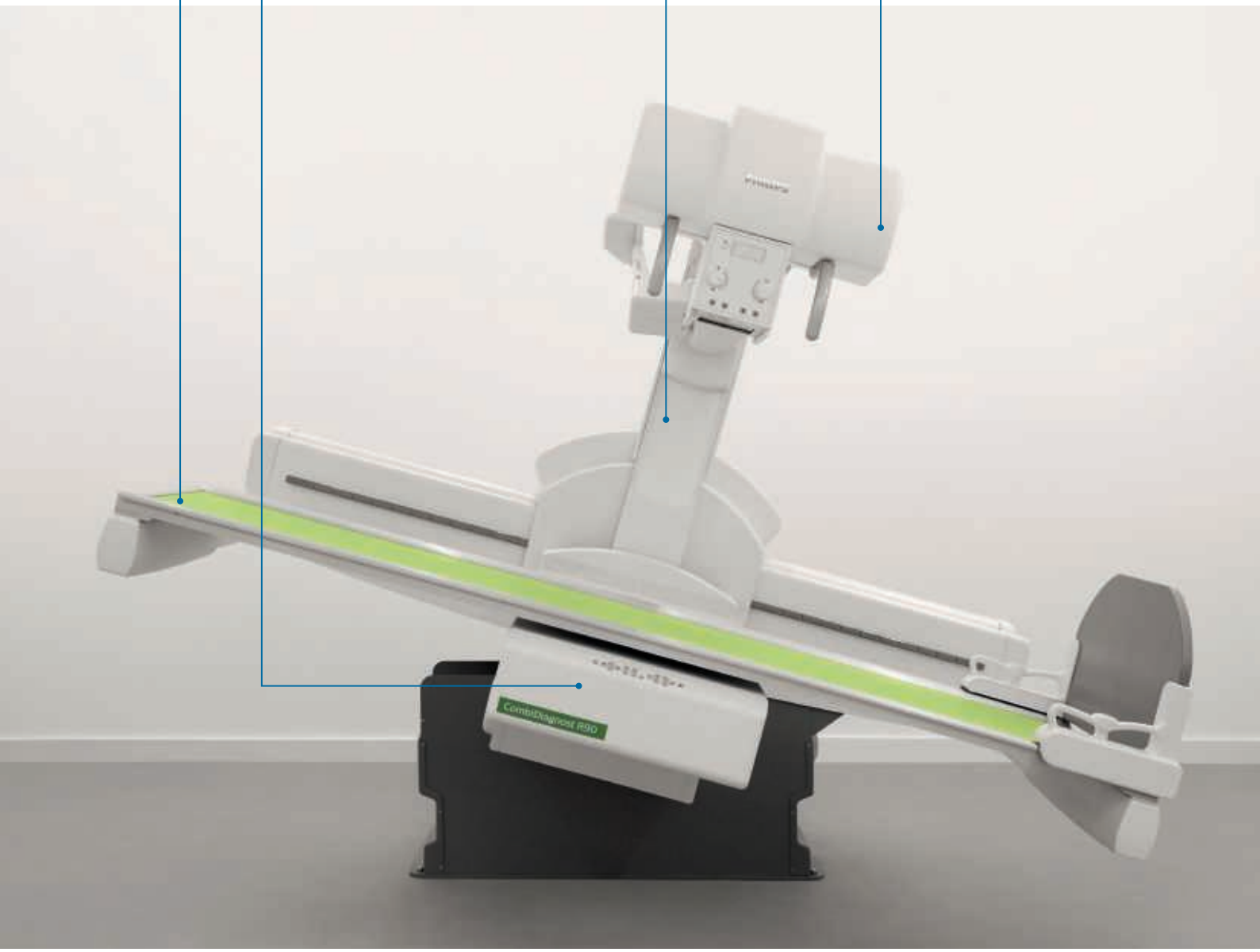


Table geometry

The remote controlled tiltable table (-90° to +90°) is ideal for all standard fluoroscopy studies. A tilting tube column mechanism enables angled projections in any table position. The intuitive touchscreen controls geometry movements and fluoroscopy parameters. Additionally, the tabletop can hold a patient weighing up to 284 kg (626 lbs.) without restricting movement.

Table

Dimensions	
Table height	65.0 cm - 133.3 cm (25.6" - 52.5"), +/- 1.5 cm (0.6"), elevating, motorized
Elevation range	68.3 cm (26.9")
Elevation speed	2.5 cm/s (1"/s)
Movements	
Tilt angle	- 90° to + 90°
Tilt speed	2 speeds, 4.5°/s and 6.5°/s
Automatic stop	In horizontal position

Table top

Dimensions	
Total dimensions	73.8 cm x 235.6 cm (29" x 92.8")
Radiolucent area	221.4 cm x 55.4 cm (87.2" x 21.8")
Table top to detector distance	12.5 cm (4.9")
Shape	Flat
Material	Micro sandwich of laminate, carbon and foam
X-ray attenuation	0.6 mm (0.02") Al (at 100 kVp, HVL = 2.7 mm (0.1") Al)
Maximum patient weight without limitations in movements	284 kg (626 lbs)
Movements	
Lateral	32 cm (12.6") = (± 16 cm (6.3"))
Longitudinal	Only detector movements to improve patient comfort
Movement speed	
Lateral	5 cm/s (1.9"/s), soft start and stop Auto centering
Longitudinal	Detector movement 3 cm/s – 20 cm/s (1.2"/s - 7.9"/s)

Tube column – detector assembly

Movements	
Range	148 cm (58.3") longitudinal, motorized
Speed	Variable, slow for positioning, high for travel maximum speed from 3 cm – 20 cm/s (1.2"/s – 7.9"/s)
Patient coverage	193 cm (76"), without patient movement
Angulation	
Movements	Motorized
Range	± 40°
Speed	11.2°/s
Supporting functions	Automatic centering of target organ during oblique projections in fluoroscopy
	Oblique exposures at both ends of tabletop possible
Source image distance	
Range	113 cm – 183 cm (44" – 72")
Movements	Motorized
Speed	4.1 cm/s (1.6"/s)
Focal spot to floor distance (in 90° position)	51.5 cm – 211.5 cm (20.3" – 83.3") (without angulation)
Tube rotation	Manual
Range	- 90°/ + 180°
Stop position	- 90°/ - 50°/ - 40°/ 0°/ + 40°/ + 50°/ + 90°/ + 180°

203 cm (79.9") scan range without table-top movement enables examinations without repositioning for increased patient comfort

An extensive range of radiography exams can be taken with SID up to 183 cm (72")

With the touch screen console you can control the geometry movements

Compressor	
Movements	Motorized
Activation	Remote controlled
Compression force	Variable, 3 kg – 15 kg (6.6 lbs – 33 lbs) in 0.5 kg (1.1 lbs) steps
Distance to table top in use	13.8 cm – 38.8 cm (5.4" – 15.3")
Compressor parking	Automatic, behind tube stand
Cone	Removable

Grid

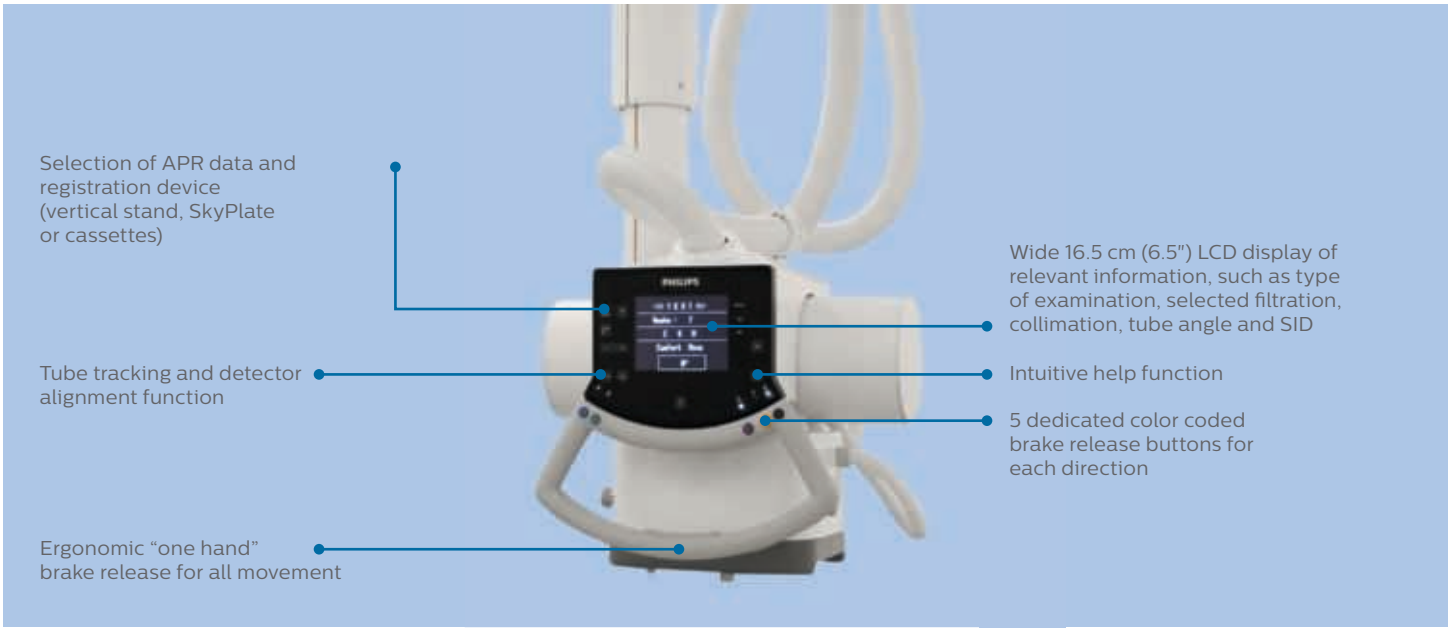
Stationary Grid	
Material	Carbon fiber
Ratio	8:1 or 12:1
Lines	44 lines/cm
Focus (FO)	120 cm (47.2") and 180 cm (70.9")
Multi grid system	Automatic selection of Grid according to SID and programmed examination plus motorized removal of grids. Fully automatic, no grid handling necessary.
Grid transmission factor	Tp = 64 %

Ceiling suspension CSM

The ceiling suspended tube moves horizontally along the two ceiling rails, vertically up and down the telescopic column, while two further rotations are available directly at the tube. This 5-axes motion and rotation flexibility supports all your DR exams. Tube tracking, auto-collimation of the tube and alignment of tube and detector allow you to give patients center stage.

Column	
Type	Four-part aluminium telescopic column with spring counter balanced holder for X-ray tube assembly; adaptable to individual room heights
Ceiling height at source image distance 110 cm (44")	2.83 m to 3.21 m (8′ 8.3″ to 10′ 5.9″)
Movements	
Longitudinal travel with Comfort Track and Comfort Move	3.44 m (11′ 3.4″)
Transverse travel Short Long	 1.50 m (4′ 11″) 3.22 m (10′ 6.7″)
Tube assembly	
Minimum ceiling source distance	87.1 cm (34.3″)
Possible room height adjustment	37.5 cm (14.8″)
Lowest tube position	30 cm (11.8″) measured from center of beam to the floor
Tube assembly rotation around vertical axis around horizontal axis	 360° (±180°) with lock position every 45° ±125°, lock positions 0° and ±90°

Collimator	
Type	• Motorized automatic collimation • Manual overrule possible • With light field indicator
Angle of aperture and rotation	2 x 15°, ±45°, depending on the collimator (see type number plate)
Timer switch	up to 30 s
Inherent filter value	< 0.3 mm at 100 kV, depending on the collimator
Added filters	• 2 mm Al or • 1 mm Al + 0.1 mm Cu or • 1 mm Al + 0.2 mm Cu
Source-image distance measurement tape	
Rail system	
Hardware	Ceiling rail system made of anodized aluminium for long service life
Length of rails	4.3 m (14′ 1.3″)

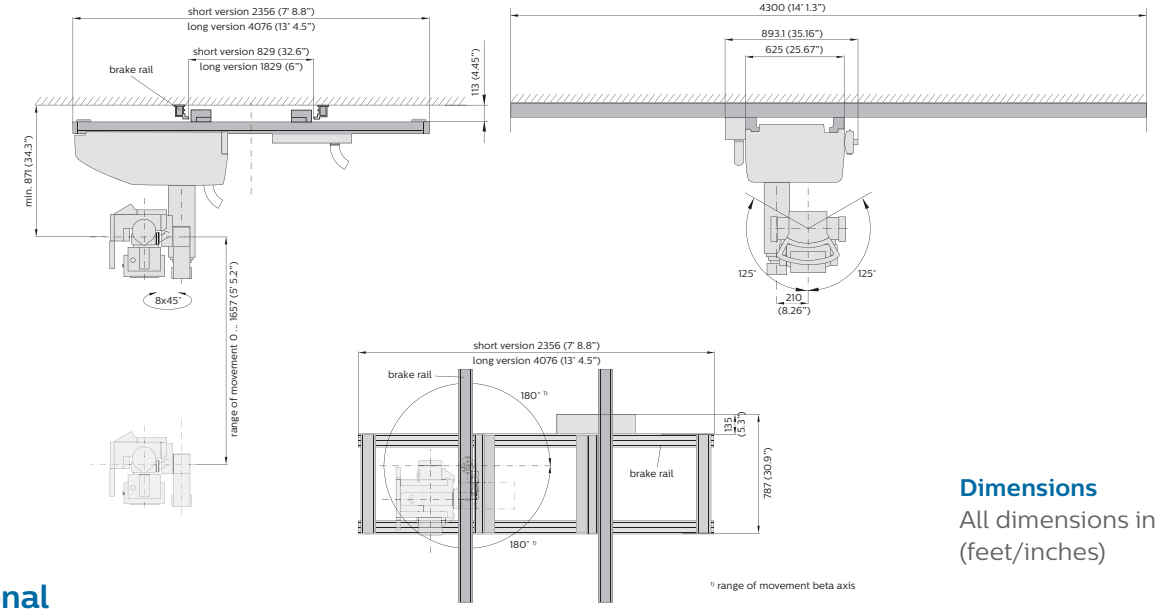


Choose your level of room motorization

- Comfort Track: Elaborated vertical stand, and ceiling suspended tube motorization level including tube tracking
- Comfort Move: Advanced room motorization level including move-to-position of vertical stand (option)

The ceiling suspension CSM consists of

- Four-part telescopic column
- X-ray tube assembly with collimator
- Control handle with buttons and LCD screen
- Rail system
- Installation cables and high voltage cables
- Set of markers for preferred source-image distance



Dimensions

All dimensions in mm (feet/inches)

Optional

Extended longitudinal travel	
Longitudinal travel with Comfort Track and Comfort Move	6.14 m (20' 1.7")
Second laser	
Second laser for fixed source-image distance	

Fixed vertical stand VS

Stand	
Hardware	Counterbalanced rugged column for motorized and manual vertical movement of the detector
Vertical travel	30 cm to 180 cm (11.8" to 5' 11"), measured at center of detector
Installation	Floor and wall attachment or floor only (optional)
Detector unit	
Dimension (w x h)	59.6 cm x 57.5 cm (23.5" x 22.6")
Automatic exposure control (AEC)	5 AEC measuring fields
Operating	2 user interfaces (left & right)
Grid storage	For up to 2 grids within the detector unit
Grips	Patient grips arranged on the left and the right of the detector unit
Brakes	All movements are locked when system is switched off
Detector	
Removable SkyPlate 35 cm x 43 cm (14" x 17")*	

*System may be configured at installation with either right or left loading of the SkyPlate.

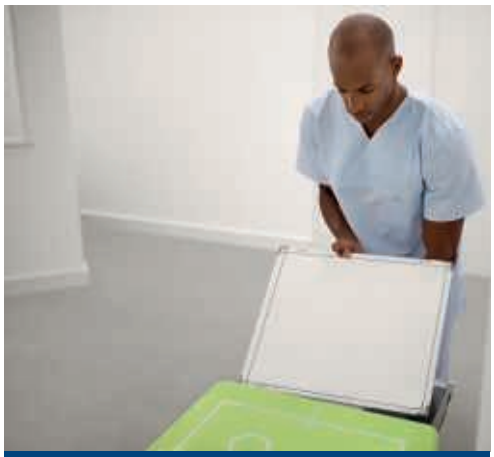
Optional

Motorized tilting	
Tilt angle, horizontal axis	- 20° to + 90°
Patient stretch grip	
Patient stretch grip	• Arranged on the top left or right of the detector unit • Rotatable

Specification			
Color code	Ration (r)	SID (ro)	SID range
Purple	8	110 cm (44")	90 to 142 cm (35 to 56")
Yellow	8	140 cm (55")	109 to 197 cm (43 to 77")
Dark blue	8	180 cm (71")	131 to 386 cm (52 to 112")
Red	12	110 cm (44")	96 to 130 cm (38 to 51")
Light blue	12	140 cm (55")	118 to 173 cm (46 to 68")
Green	12	180 cm (71")	144 to 239 cm (57 to 94")

All grids have 40 lines per cm.

Grids	
Type	Removable carbon fiber grids for SkyPlate tray
Weight	1.7 kg (3.7 lbs)



SkyPlate insertion in vertical stand Bucky tray

Fixed stand VS with removable SkyPlate

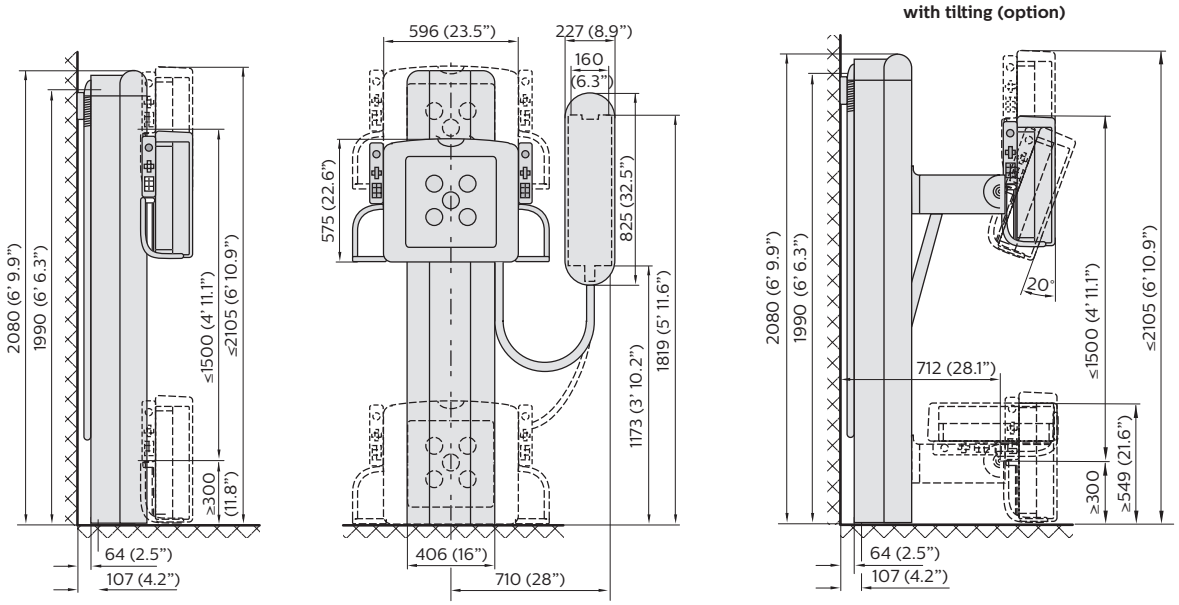
The digital vertical stand VS consists of

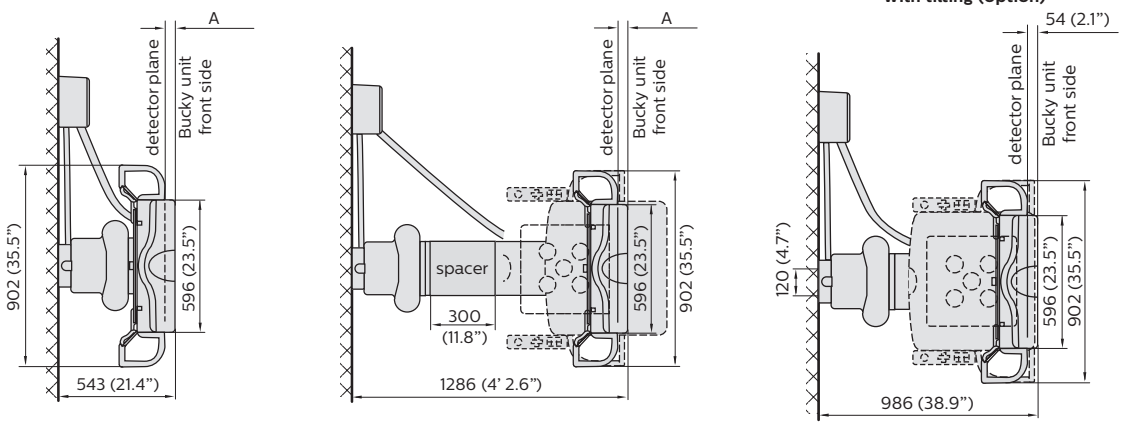
- Stand
- Detector unit
- Grid
- 2 user interfaces (left & right)
- 2 patient grips (left & right)
- Vertical stand LCD display (option)

Dimensions

All dimensions in mm (feet/inches)

	A
SkyPlate	49.4 (1.9")





Trolleys and monitor supports

Single monitor ceiling suspension
Single monitor ceiling suspension for one, up to 21.3" medical monitor, articulated, height adjustable.

Dual monitor ceiling suspension
Dual monitor ceiling suspension for two, up to 21.3" medical monitors, articulated, height adjustable.

Single monitor trolley
Single monitor trolley for one, up to 21.3" medical monitor.

Specifications (including monitor)
- Dimensions
  - Width: approx. 555 mm (21.9")
  - Height: approx. 1622 mm (63.9")
  - Depth: approx. 686 mm (27")
- Weight: approx. 26 kg (57.2 lbs)

Dual monitor trolley
Dual monitor trolley for two, up to 21.3" medical monitors.

Specifications (including monitors)
- Dimensions
  - Width: approx. 985 mm (38.8")
  - Height: approx. 1637 mm (64.4")
  - Depth: approx. 686 mm (27")
- Weight: approx. 37 kg (81.4 lbs)

Nearby control trolley
Trolley for in-room control of imaging and geometry parameters, including touchscreen geometry control console, footswitch for fluoroscopy and exposure and sealed waterproof keyboard with touchpad.

Specifications
- Trolley (including geometry control console, keyboard and footswitches)
  - Dimensions
    - Width: approx. 555 mm (21.9")
    - Height: approx. 992 mm (39.1")
    - Depth: approx. 686 mm (27")
  - Weight: approx. 26 kg (57.2 lbs)
- Keyboard
  - Type: alphanumeric, including numeric keypad, function keys and touchpad
  - Sealed, waterproof, protection rating IP68
  - Surface: silicon rubber, 100% latex free

Single monitor trolley

Dual monitor trolley

Nearby control trolley

Dual monitor ceiling suspension

284 kg (626 lbs) maximum patient weight without limitations in movements

X-ray generation

A number of benefits make the X-ray generation more efficient. Automatic exposure control regulates the amount of radiation passing through the patient and projecting onto the detector. When executing fluoroscopy you can flexibly choose between: a Grid Controlled (option), a pulsed and a continuous mode. Additionally, fluoro grab and collimation without X-ray are designed with dose savings in mind.

Generator (for both 65 and 80 kW)

Main benefits at a glance

- Designed for radiography and fluoroscopy work
- Wide range of applications possible
- Manual and automatic modes
- Intelligent Exposure IQX for optimized exposure image quality and dose, independent from body thickness
- Continuous and pulsed fluoroscopy with in-pulse control
- Optional Grid Controlled Fluoroscopy GCF for superb fluoroscopy image quality at low dose with every single pulse and dedicated pediatric fluoroscopy curves
- Small footprint

Exposure output power

- kV 40 - 150 kV (Second beam table and wall Bucky)
- 40 - 125 kV (dynamic exposures)
- 1 - 900 mA / 1 - 1100 mA
- 1 ms - 4 s with AEC (Automatic Exposure Control)
- 1 ms - 16 s without AEC

Manual mode

- Two-factor technique (kV - mAs)
- Three-factor technique (kV - mA – s)

Automatic mode

- One-factor falling load (kV)
- Two-factor constant load (kV/mA)
- Automatic kV reduction
- IQX Intelligent exposure

Fluoroscopy techniques

For enhanced image quality and dose management, the generator supports continuous fluoroscopy, Pulsed Fluoroscopy techniques and Grid Controlled Fluoroscopy GCF (option).

Fluoroscopy output power

- kV 40 - 110 kV
- mA 0.2 - 6 mA

Area dose and entrance dose calculation.

Automatic mains adaptation.

Intelligent exposure IQX (standard, for both 65 and 80 kW)

IQX provides excellent, reliable and consistent image quality for digital exposures, both in static and dynamic fluoroscopy studies. IQX controls and adapts the exposure parameters within the X-ray pulse. The automatic and fast regulation of kV during each exposure leads to high image quality for all types of studies, for all patients.

IQX highlights

- Short exposure times eliminates motion blur
- Exposure times are kept within an application-dependent customizable time range. This allows every single image to be correctly exposed and free from motion blur, even with rapidly changing density
- Automatic kV-optimization
- Automatically adjusts the settings, relative to the standard kV-value. Thus the settings are optimized for the actual object density and the needs of the examination.
- Fast, in-pulse adaptation to (changes in) density, kV-adjustment takes place within the first millisecond of the exposure, enabling adaptation to sudden changes in object density (e.g. during dynamic studies)
- Controlling range: customizable from -15 kV relative to a defined start value up to 125 kV

Pulsed Fluoroscopy (standard, for both 65 and 80 kW)

Pulsed Fluoroscopy is defined as a full automatic technique with in-pulse regulation. It stands for low dose with no compromise on image quality. This is achieved by a unique integrated control system which handles the dose parameters kV, mA and time within each single pulse (in-pulse control).

Main benefits at a glance

- Outstanding fluoroscopy image quality due to in-pulse control
- Low frequencies for dose management
- lock-in mode to maintain image quality during abrupt variations in absorption e.g. bringing lead gloves in the beam to position a patient
- Adaptive measuring fields maintain a constantly high image quality even when the field of interest is limited by shutters moving in

Specifications

- Pulse time: 10 to 20 ms
- Pulse frequency: 0.5 fps to 6 fps

Grid Controlled Fluoroscopy GCF (option, for both 65 and 80 kW)

Grid Controlled Fluoroscopy (GCF) is an exclusive Philips technology of pulsed fluoroscopy, providing superb image quality at low dose. This is achieved by the use of a grid-switched X-ray tube and the control of X-ray parameters kV, mA and time within each single pulse (in-pulse control).

Main benefits at a glance

- Excellent image quality for fluoroscopy with each single pulse
- Low dose, therefore recommended for pediatrics
- On the fly selection of three different pulse rates (user programmable between 0.5 to 30 frame per second) and continuous fluoroscopy for maximum user flexibility
- Dedicated and proprietary pediatric settings with a further decreased pulse time and an optimized kV/mA-curve
- GCF lock-in mode to maintain image quality during abrupt variations in absorption e.g. bringing lead gloves in the beam to position a patient
- Adaptive measuring fields maintain a constantly high image quality even when the field of interest is limited by shutters moving

Specifications

- Pulse time: 5 to 20 ms
- Pulse frequency: 0.5 fps to 30 fps

Tubes

	SRO 33100 ROT380	SRM 0608 ROT GS 505	SRO 33100 ROT380 (for CSM)
Focal spot (small / large)	0.6 / 1.2	0.6 / 0.8	0.6 / 1.2
Min. anode speed	8,000 to 10,000 revolutions/minute	9,000 to 10,800 revolutions/minute	8,000 to 10,000 revolutions/minute
Anode angle	13°	12°	13°
Anode heat storage capacity	300 kHU (220 kJ)	800 kHU (593 kJ)	300 kHU (220 kJ)
Maximum voltage	150 kV	125 kV (110 kV with GCF)	150 kV
Nominal anode input power 20 W equivalent	33 kW / 100 kW	44 kW / 64 kW	33 kW / 100 kW
Nominal radiographic anode input power	30 kW / 85 kW	37 kW / 54 kW	30 kW / 85 kW
Double tube overload protection	Yes	Yes	Yes
Max. heat content of assembly	1.700 kHU (1.260 kJ)	2.300 kHU (1.700 kJ)	1.700 kHU (1.260 kJ)
Total filtration minimum	2.5 mm Al (IEC 60522, 75 kV)	2.5 mm Al (IEC 60522, 75 kV)	2.5 mm Al (IEC 60522, 75 kV)
Compatible with pulsed fluoroscopy	Yes	Yes	No
Compatible with Grid Controlled Fluoroscopy (GCF)	No	Yes	No
Total weight	approx. 26 kg	29 kg	approx. 26 kg

Touch-screen console

Collimator

Automatic and motorized collimator	
Collimation	Square and rectangular
Number of shutters	4 pairs of shutters, including near focus shutters
Light source	LED cluster (160 lux at 1 m (39,4"))
Adjustment	Automatic SID compensation
Additional filtration	
Selection	Motorized, automatic and manual
Values of added filtration	0.1 mm Cu + 1 mm Al 0.2 mm Cu + 1 mm Al (1.5 mm Cu for calibration)
Total filtration	≥ 2.7 mm Al eq. at 100 k
Integrated dose calculation	

Imaging

Imaging modes	
Pulsed fluoroscopy	generator pulsing up to 6 fps, GCF up to 30 fps
Continuous fluoroscopy	Up to 30 images per second (depending on field size)
Dynamic fluoro grab	Storing of sequences during live fluoroscopy (on user request or programmed)
Last image hold	
Collimation without X-ray	Collimation on the basis of the last image without further radiation

Detectors

The 43 x 43 cm (17" x 17") dynamic flat panel detector covers 50 % more than a 15" image intensifier. Its large size allows convenient patient care. The detector facilitates high-resolution radiography and high-speed fluoroscopy with its 148 µm pixel pitch and frame rates of up to 30 frames per second.

Flat detector

Dynamic flat detector (CsI/Cesium Iodide)	
Detector size	43 cm x 43 cm (17" x 17")
Active area	42.0 cm x 42.5 cm (16.5" x 16.7")
Frame rate	Up to 30 frames per second
Image matrix	2880 x 2881 pixels
Pixel size	148 µm
Bit depth	16 bits
DQE	65 % at 0.05 lp/mm
MTF	55 % at 1 lp/mm
Nyquist frequency	3.4 lp/mm
DQE at Nyquist frequency	19 %
MTF at Nyquist frequency	7 %
Exposure dose	0.1 – 10 µGy
Cooling	Automatic internal air cooling system

Acquisition modes

Acquisition modes	Detector format	Matrix (pixel)	max. framerate (fps)
Radiography	43 cm x 43 cm (17" x 17")	2840 x 2875	4
		1420 x 1437	8
	30 cm x 30 cm (11,8" x 11,8")	2048 x 2049	4
		1024 x 1025	8
	20 cm x 20 cm (7,9" x 7,9")	1352 x 1351	4
		680 x 681	8
	15 cm x 15 cm (5,9" x 5,9")	1024 x 1025	8
Pulsed Fluoroscopy (with GCF)*	43 cm x 43 cm (17" x 17")	1420 x 1437	8
		947 x 957	23
	30 cm x 30 cm (11,8" x 11,8")	1024 x 1025	12
		683 x 683	28
	20 cm x 20 cm (7,9" x 7,9")	1352 x 1351	8
		680 x 681	15
		451 x 453	30
	15 cm x 15 cm (5,9" x 5,9")	1024 x 1025	8
		512 x 513	30
Continuous Fluoroscopy	43 cm x 43 cm (17" x 17")	947 x 957	18
	30 cm x 30 cm (11,8" x 11,8")	683 x 683	30
	20 cm x 20 cm (7,9" x 7,9")	673 x 673	30
	15 cm x 15 cm (5,9" x 5,9")	512 x 513	30

* With PCF (generator pulsing): restricted to max. 6 fps

SkyPlate detectors

Optional SkyPlate wireless portable detectors are extremely lightweight to allow for comfortable positioning. Both large (35 cm x 43 cm / 14" x 17") and small (24 cm x 30 cm / approx. 10" x 12").

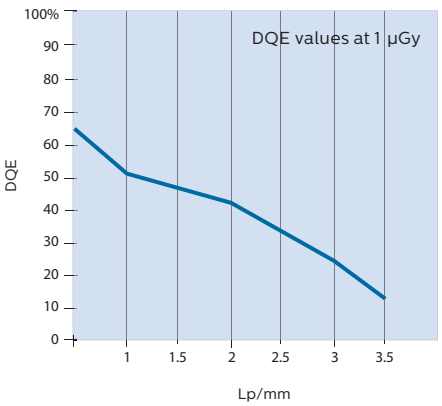
SkyPlates can be shared between compatible Philips systems including the latest releases of DigitalDiagnost, MobileDiagnost wDR, DuraDiagnost, and the analog-to-digital upgrade ProGrade, which may lower your cost of ownership.

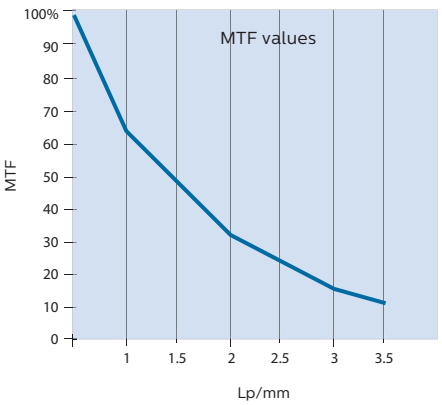
SkyPlate detector family

	Small		Large	
Type	Digital CsI (Cesium Iodide) flat detector		Digital CsI (Cesium Iodide) flat detector	
Housing material	Carbon fiber		Carbon fiber	
Sensor protection material	Carbon fiber		Carbon fiber	
Detector size	24 cm x 30 cm (approx. 10" x 12")		35 cm x 43 cm (14" x 17")	
Active area	22.2 cm x 28.4 cm (8.7" x 11.2")		34.48 cm x 42.12 cm (13.6" x 16.6")	
Image matrix size	1,500 x 1,920 pixel		2,330 x 2,846 pixel	
Dimensons according to ISO 4090				
Min	266.5 mm x 326.5 mm (10.5" x 12.9")		382.5 mm x 458.5 mm (15.1" x 18.1")	
Target	267.5 mm x 327.5 mm (10.5" x 12.9")		383.5 mm x 459.5 mm (15.1" x 18.1")	
Max	268.5 mm x 328.5 mm (10.5" x 12.9")		384.5 mm x 460.5 mm (15.1" x 18.1")	
Thickness	15 mm (0.59")		15 mm (0.59")	
Thickness Tolerance	+1 mm/ -2 mm (+0.04"/ -0.08")		+1 mm/ -2 mm (+0.04"/ -0.08")	
Detector pixels	2.9 Megapixel		6.6 Megapixel	
Pixel size	148 µm		148 µm	
Image resolution	up to 3.38 Lp/mm		up to 3.38 Lp/mm	
DQE and MTF values at 2 µGy	DQE (%)	MTF (%)	DQE (%)	MTF (%)
0.05 Lp/mm	66	98.5	66	98.5
1.0 Lp/mm	50	61	50	61
2.0 Lp/mm	40	30	40	30
3.0 Lp/mm	24	15	24	15
Energy range (kVp)	40 – 150		40 – 150	
A/D Conversion (bits)	16		16	
Weight (incl battery)	1.6 kg (3.5 lbs)		2.8 kg (6.2 lb) except USA and China 3.0 kg (6.6 lb)	
Max. patient weight	100 kg (220 lbs) on 4 cm disk for weight bearing examinations 135 kg (298 lbs) for distributed load, e. g. chest examinations in bed			
WLAN network standard	WiFi standard IEEE 802.11 a, b, g or n (configurable)			
Encryption	Default WPA2 encryption according to IEE 802.11i			

Typical DQE and MTF of SkyPlates

RQA 5 - according to IEC62220-1-1





Battery	
Technology	Exchangeable lithium ion battery
Size	64 mm x 248 mm x 71 mm (2.5" x 9.8" x 2.8")
Battery charging time	4 hours max. for 100% charge
Bar charge status color indication per battery	0 - 25 %; 25 - 50 %; 50 - 75 %, 75 - 100
Autonomy operation mode	3.5 hours / 525 images; one image every 20 seconds
Autonomy listen mode	6 hours without image acquisition
Charging slots	3
User-replaceable battery	(no tools required)

Click-on carbon fiber grids for portable use						
Type*/Orientation	Ratio (r)	SID (fo)	SID range	Weight	Dimensions	Comments
Large SkyPlate portrait, 44 lines/cm (112 lines/inch)	8	130 cm (51")	96 to 203 (38 to 80")	1.9 kg (4.2 lbs)	46.8 x 47.6 x 2.5 cm (18.4 x 18.8 x 1")	Includes a handle
Large SkyPlate landscape, 40 lines/cm (100 lines/inch)	8	130 cm (51")	100 to 185 (39 to 73")	1.9 kg (4.2 lbs)	46.8 x 47.6 x 2.5 cm (18.4 x 18.8 x 1")	Includes a handle
Small SkyPlate portrait, 40 lines/cm (100 lines/inch)	8	130 cm (51")	84 to 291 (33 to 115")	0.95 kg (2.1 lbs)	35.4 x 28 x 2.5 cm (13.9 x 11 x 1")	No handle

Optional

SkyPlate sharing for systems without SkyPlate
SkyPlate cable 7 m (23') and holder
Handle frame for large SkyPlate – Weight 1 kg (2.2 lbs)
SkyPlate protector
Movable and bed holders
Detector and grid storage
Add. batteries
Add. battery charger
Accident protection program

* For use in SkyPlate tray please refer to grids listed on page 10

Eleva workspot

Intuitive interface

CombiDiagnost R90 employs our Eleva user interface to provide all the tools and controls necessary for seamless procedures. This one common platform is easy to learn and easy to use, and is highly suitable for streamlining your radiography department. It is the same harmonized user interface found across our radiography portfolio.

The high quality dual-monitor display provides superb images and a touchscreen user interface on the left monitor.

Innovative dynamic UNIQUE fluoroscopy processing
Thanks to Philips outstanding dynamic UNIQUE (UNified Image QUality Enhancement) advanced multi-resolution image processing, all radiography images and fluoroscopy sequences are always displayed fully processed in real-time. During fluoroscopy runs, dynamic UNIQUE performs instant de-noising from the first frame onwards, avoiding the need to wait some frames before getting a stable and acceptable de-noising, resulting in time saving. Dynamic UNIQUE provides an exceptional contrast harmonization with enhanced details, while the overall impression remains natural, and a comparable image impression between RF and DR images.

Specifications

- Computer
  - Processor: based on 3.9 GHz, Intel Core I7
  - Memory: 16 GB RAM
  - Local storage: 1 TB Solid State Disk (SSD), 800 GB free for clinical images
- Monitors
  - Two high quality color LCD monitors, one with touchscreen
  - Size: 21.3"
  - Matrix: 1,600" x 1,200" (2 Megapixel)
  - Pixel pitch: 0.270 mm
  - Calibrated luminance: > 700 cd/m^2
  - Luminance ratio: >800:1
  - Dimensions: 492 x 394 mm
  - DICOM calibrated for room environmental illuminance from 0 to 1,000 LUX
  - DICOM illuminance compensation automatically adjusted for room illuminance

DICOM
DICOM interoperability
DICOM Print for Rad images (SCU)
DICOM store (SCU)
DICOM storage commit (SCU)
DICOM worklist management (SCU)
DICOM MPPS (SCU)
DICOM structured dose report (optional)

Optional

Monitor to be placed in examination room.

Main benefits at a glance

- Live image feedback for nearby procedures or for the staff in the room
- Wide size, high brightness LCD technology for high quality and flicker-free images
- Flat design for low footprint in the examination room
- Lightweight for easy maneuverability

Specifications

- Type: LCD color monitor IPS
- Size: 21.3"
- Matrix: 1,600" x 1,200" (2 Megapixel)
- Pixel pitch: 0.270 mm
- Calibrated luminance: > 700 cd/m^2
- Luminance ratio: > 800:1
- Dimensions: approx. 495 x 425 mm (19.5" x 16.7")
- Weight: approx. 7.1 kg (15.6 lbs)
- DICOM calibrated for room environmental illuminance from 0 to 1,000 LUX
- DICOM illuminance compensation automatically adjusted for room illuminance

Eleva

Automatic exam settings
Pre-defined parameters
Exposure technique
Patient size
Focal spot
Exposure factors
Look up tables for gray scale optimization
Region of interest based parameter optimization
Image processing algorithm
Zoom factor
Automatic or manual windowing
Anatomical based tissue harmonization

Image review	
Review modes	
Single image review	Playback of sequences at acquisition speed Manual image browsing Cine loop
Multi image review	Mosaic view of 4, 9 or 16 single images
Zoom	1 : 1 2 : 1 3 : 1

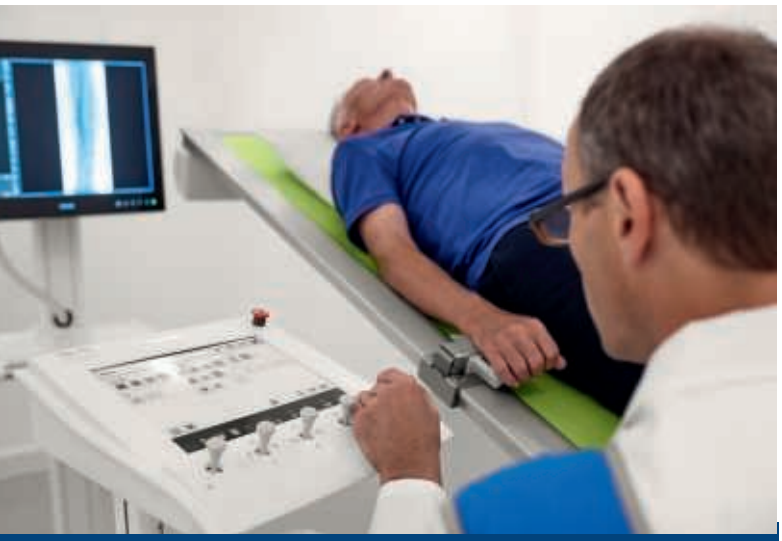
Applications

Philips CombiDiagnost R90 premium cross-functional system is a true all-rounder. Applications include chest, spine, upper and lower extremities, skull, as well as gastro-intestinal exams, arthrography, venography, lymphography and myelography for fluoroscopy. You can further enhance your variety with optional orthopedic image stitching.

Automatic image stitching

The automatic image stitching software is a dedicated orthopedic feature to automatically acquire long-length images. Image acquisition is possible vertically in front of a vertical stand. A set of smart accessories provides excellent patient comfort and superb image quality.

Orthopedic exams are facilitated by the use of the orthopedic patient support for patient positioning. After the automatic acquisition of the image set (two to three images depending on the exam), a composite image is instantly created on the CombiDiagnost Eleva workspot. The algorithm is fully automatic, manual interaction becomes unnecessary although manual adjustments can be made. Furthermore, this package also provides Cobb's angle and femoral head difference measurements.



Venogram examinations are easily performed with the optional in-room monitor

Main benefits at a glance

- Ability to do stitching procedures with vertical stand
- Easy for the technologist to use by simply defining the collimation on the patient
- System automatically acquires the number of images needed based on the defined collimation
- Automatic tube and detector movements during acquisition
- Acquisition of two or three images depending on collimation
- Software automatically stitches acquired images into one composite image
- Optional patient stand for streamlined patient positioning
- Single-focus tube rotation to reduce image distortions
- Dedicated orthopedic measurements included

Optional accessories

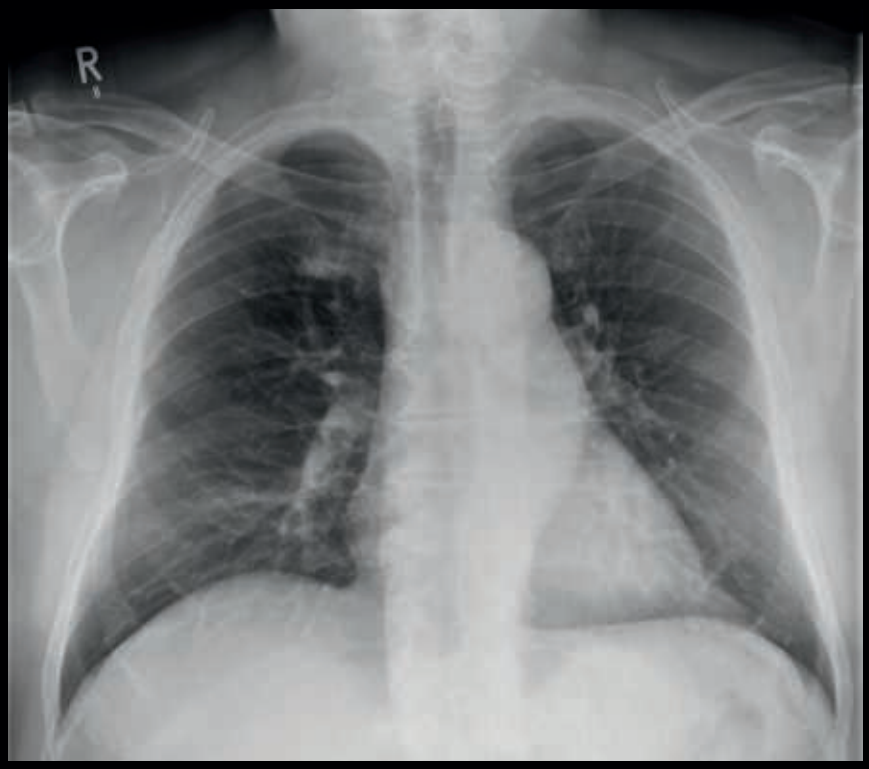
- Patient support
- Pair of adjustable positioners
- Additional lead ruler for patient support
- Parking frame for accessories

Specifications with large SkyPlate	
Number of acquired images	up to 3
Patient coverage at vertical stand	
Portrait orientation	117.3 cm (46.2")
Landscape orientation	94.5 cm (37.2")
Overlap area between images	4.5 cm (1.8")

A picture is worth a thousand words

The premium Eleva user interface, dynamic UNIQUE image processing and cutting-edge digital detectors combine to offer you exceptional CombiDiagnost R90 images.

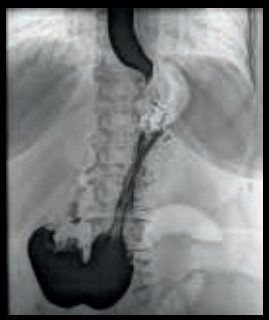
Full spine via automatic stitching



Bariatric chest

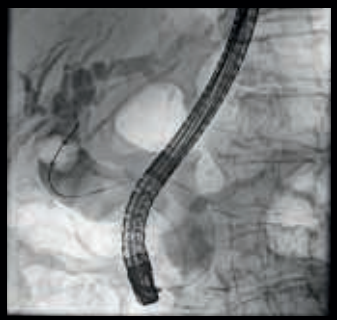
Lauenstein hip

Pediatric hand



Stomach - Iodine

Enema - Iodine



ERCP

SkyFlow

Naturally, the decision is always yours whether or not to use a grid. When working without a grid, SkyFlow – Philips first scatter correction technology for portable X-rays – provides you with grid-like image contrast. Applied in combination with the large SkyPlate, you can work quickly and conveniently by avoiding the time and effort of attaching and detaching a grid.

Exceptional procedures

Gridless exams mean you don't have to carry, position and align an anti-scatter grid. Nevertheless, with SkyFlow you can achieve grid-like contrast. You and your patients can benefit from enhanced workflow compared to working with a grid. Potential retakes due to grid cut-off or misalignment are avoided – simply because there is no grid.

Exceptional image quality

If you are used to working without a grid you will appreciate the enhanced SkyFlow image contrast which does not influence your workflow and dose level. More specifically, SkyFlow requires no technologist input since it automatically adjusts contrast enhancement based on the amount of scatter. You do not have to change your chest exam routine and no extra training is necessary.

All patient types

SkyFlow automatically adjusts contrast enhancement based on the amount of scatter for each individual patient type. Therefore, it is suitable for a wide range of patient types, and particularly beneficial for bariatric patients. Short exam times also contribute to high patient comfort.

Main benefits at a glance

- Save time with gridless workflow and benefit from automatic image contrast enhancement
- Achieve excellent image quality with grid-like contrast for all patient types, including bariatric
- Focus fully on the patient with automatic operation, short exam times, and comfortable positioning

Digital Workflow

Naturally, the decision is always yours whether or not to use a grid. When working without a grid, SkyFlow – Philips first scatter correction technology provides you with grid-like image contrast for exams such as chest, knee, abdomen, pelvis, hip, and more. Applied in combination with the large SkyPlate, you can work quickly and conveniently by avoiding the time and effort of attaching and detaching a grid.

SkyFlow for all anatomies

Abdomen
Image taken without grid

Abdomen
Image taken w'out grid and with SkyFlow scatter correction

Knee
Image taken without grid

Chest
Image taken without grid

Chest
Image taken without grid and with SkyFlow scatter correction

Knee
Image taken without grid and with SkyFlow scatter correction

Hip
Image taken without grid

Hip
Image taken without grid and with SkyFlow scatter correction

Accessories

Customize your CombiDiagnost R90 room according to your facility's special requirements with a number of optional accessories. For example, make your patients even more comfortable with arm and leg supports and a head and shoulder rest. Consider enhancing your technologists' workflow with a stitching stand for streamlined patient positioning. Or a two-step exposure hand switch and a combined fluoroscopy/exposure foot pedal.

Standard
Handgrips
Footrest

Optional

Head and shoulder rest
Shoulder support
Lateral cassette support
Compression band
Additional fluoro/exposure footpedal
2 step exposure handswitch
Side bar
Mattress
Pair of leg supports
Infusion bottle holder
Arm support
Pediatric cradle
Stitching Ruler

Low floor to footrest step for patient convenience

Patient support for stitching

SkyPlate mobile holder

SkyPlate bed holder

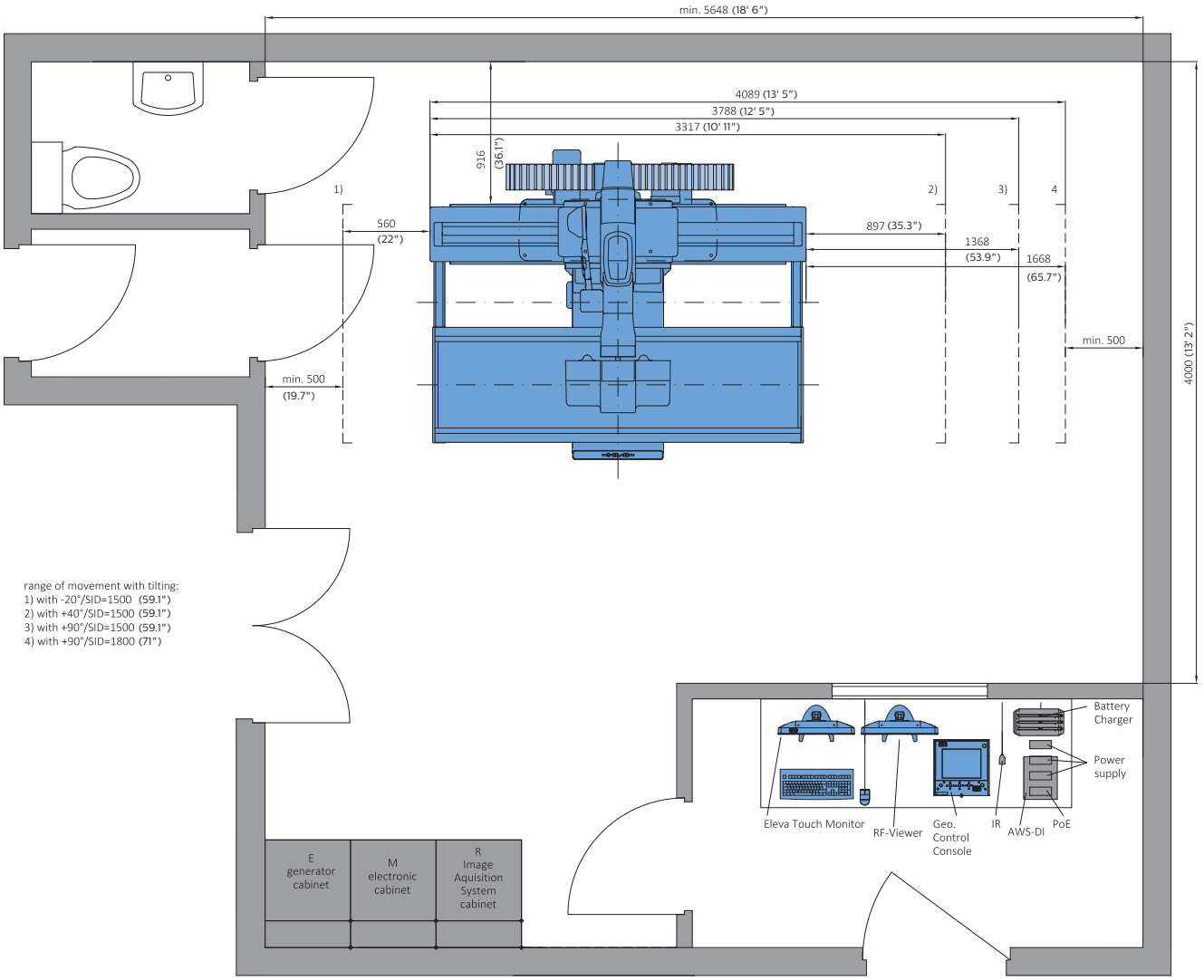
Nearby trolley including touchscreen console, waterproof keyboard and touchpad

Arm support

Room layouts

Minimal room layout:

- CombiDiagnost R90 table

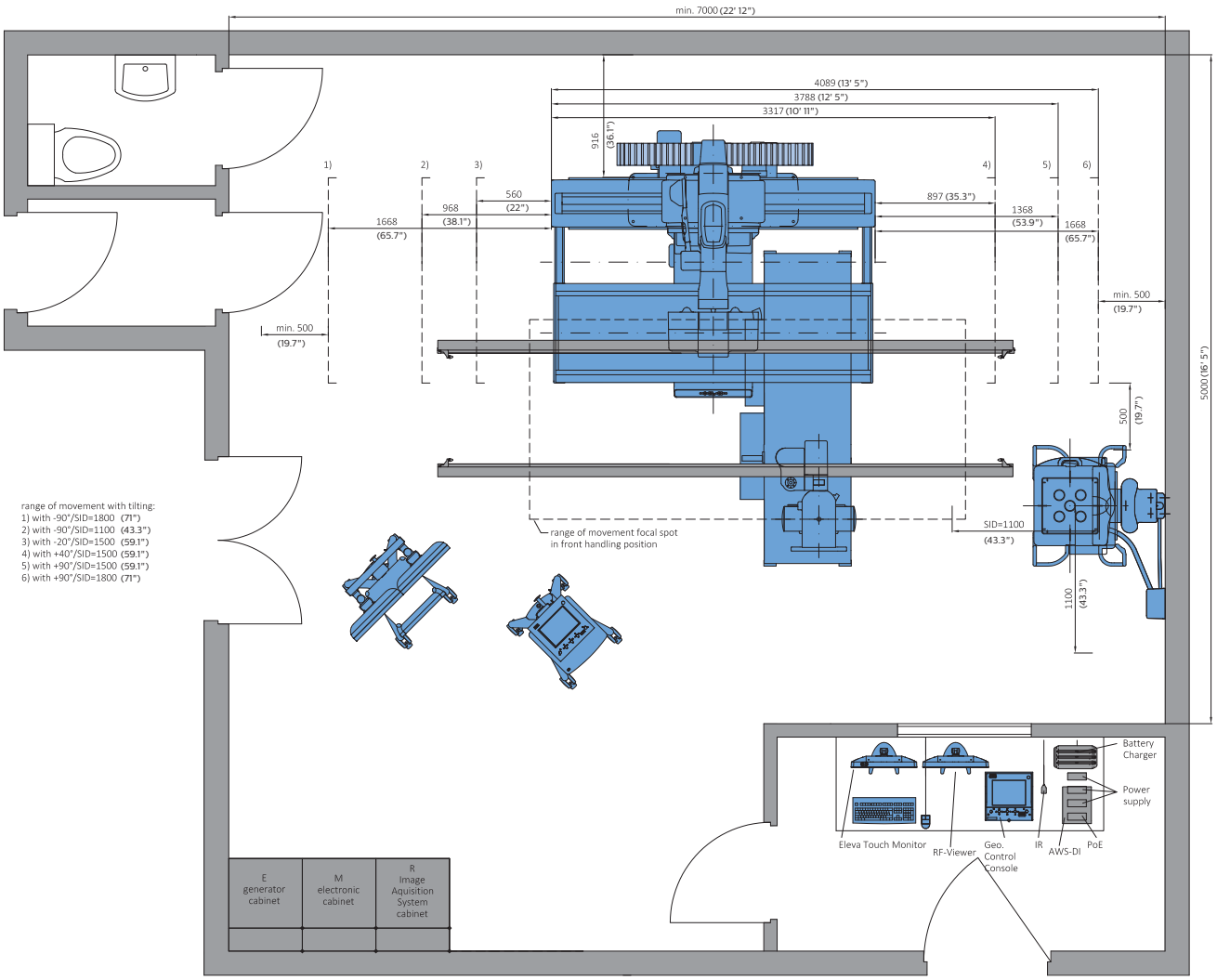


Dimensions

All dimensions in mm (feet/inches)

Maximal room layout:

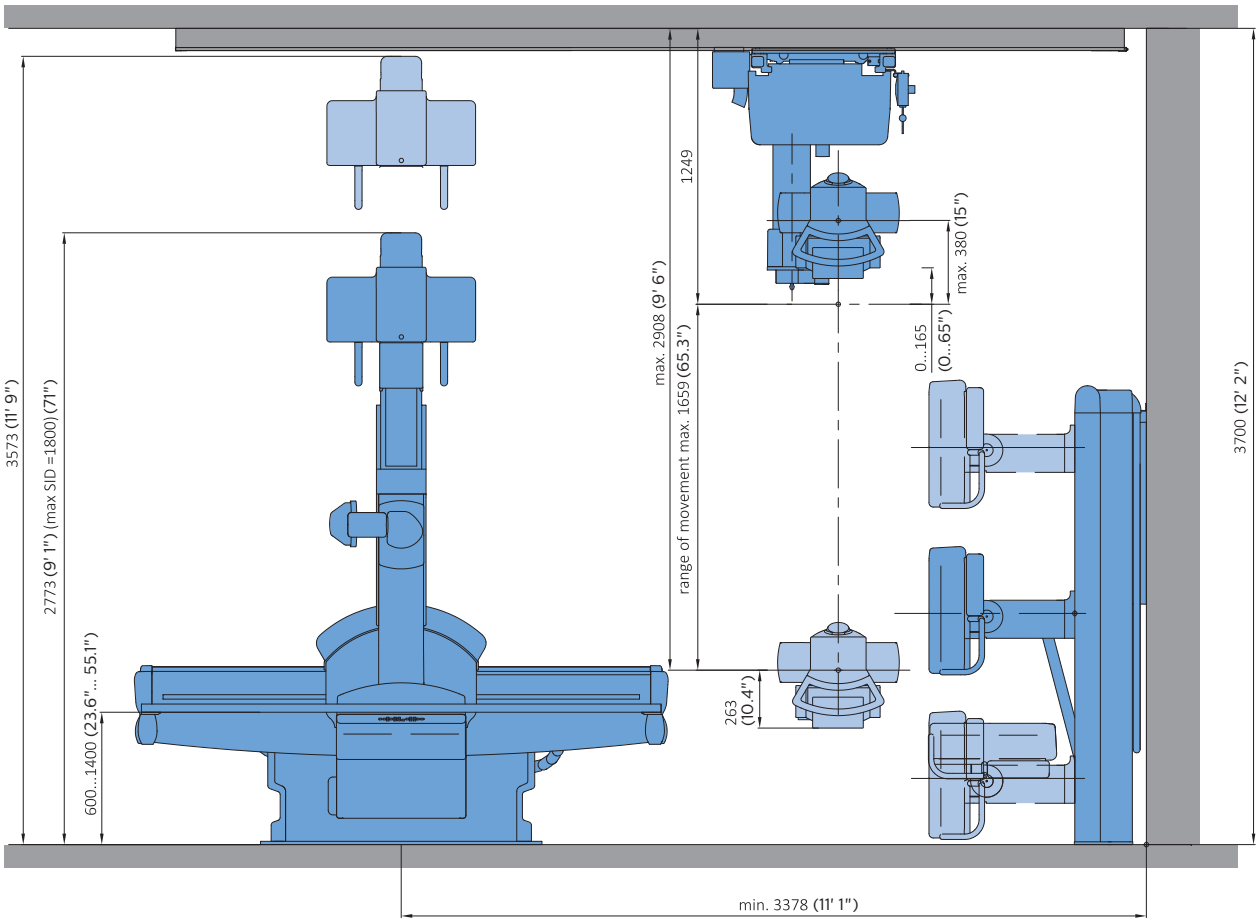
- CombiDiagnost R90 table with Ceiling Suspension
- Vertical Stand
- Monitor Trolley
- Nearby Trolley



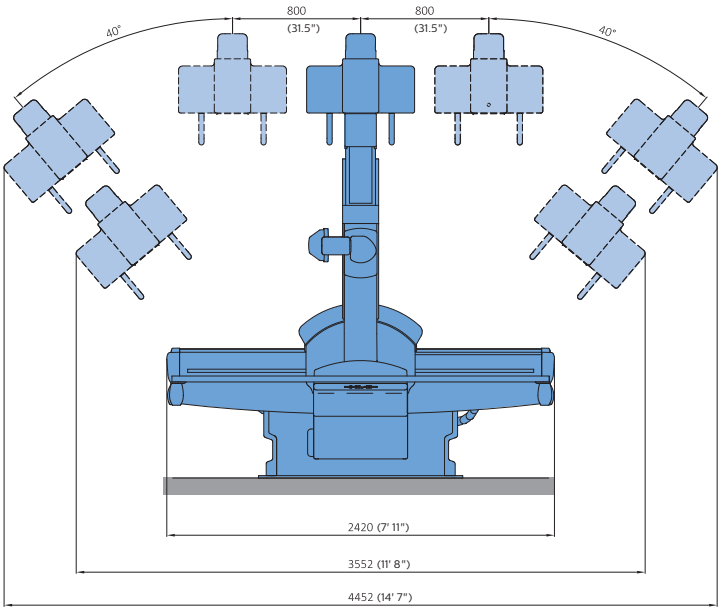
Dimensions

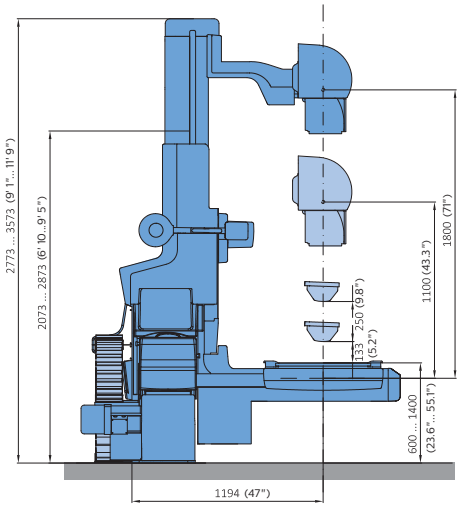
All dimensions in mm (feet/inches)

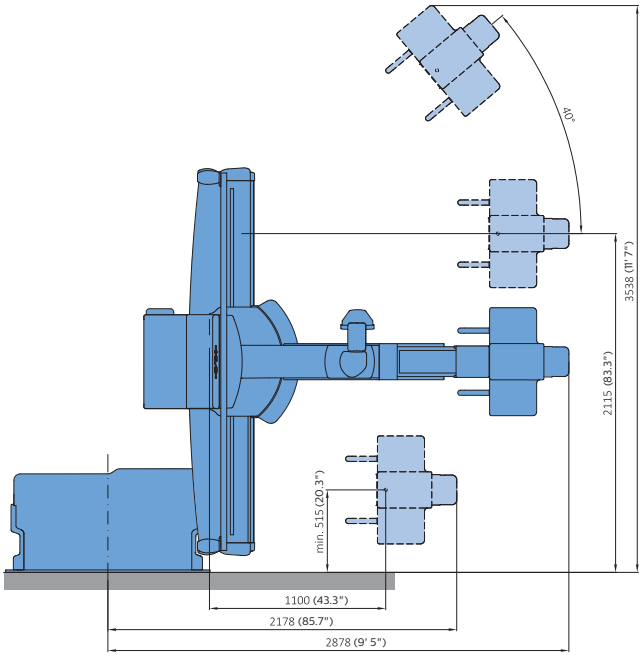
Dimensions

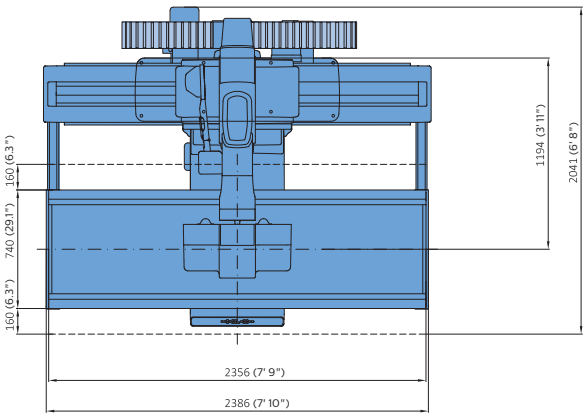


Dimensions
All dimensions in mm (feet/inches)









Dimensions

All dimensions in mm (feet/inches)

Standard scope of delivery

The difference is in the details. The standard CombiDiagnost R90 scope of delivery contains a huge number of tools and features, which enhance your workflow in different phases of your digital radiography and fluoroscopy exams. Experience intuitive and seamless procedures with the system geometry, with the premium Eleva user interface and while using dynamic UNIQUE image processing.

Premium Eleva benefits

Eleva touch screen
Designed for DR working environments for high ergonomics and fast DRF workflow

Eleva user interface
Easy to learn, efficient user interface across X-ray modalities, designed with end-users for use in DRF working environments

Individual operator login and user profiles
To meet high IT security demands with improved efficiency by automatically filling in dedicated input fields

Built in help feature based on function
Provides improved user convenience and faster workflow

Eleva Review Plus
Provides dedicated review environment and tools for image review at the Eleva workstation

Eleva Workflow Plus
Provides smart tools for an improved and fast workflow such as automatic image markers or the intuitive RIS code learning feature for on-the-fly configuration of new or changed RIS codes

User-configurable and operator-depending user interface
For individualized workflow

Move tool
Allows for fast & easy corrections in case of operator error

Auto ranger function
Automatic selection of the optimal anatomically relevant image area for image processing guarantees stable image brightness

ROI pointer function
Manual selection of a dedicated, anatomically relevant image area for image processing

Window width/ Window level (WW/WL) function
For fast image gray level adjustments

One-button dose adaption
Sets the desired dose level for the next exposure for improved dose management

Full screen viewing mode
For improved clinical review and quality management of images

High quality display including DICOM display standard
Dual-monitor provides high image quality at the Eleva user interface display

User accessible DICOM verify function
For easy access to the availability status of all connected, external DICOM nodes (e.g. PACS, RIS)

Image rotation tool
Manual image rotation (by 0.5°) and semi-automatic rotation for fast image correction and review

7 patient types function (automatically and manually)
Adaptation of critical examination parameters for enhanced dose management and image quality ranging from babies (newborn patients) to extra large adult patients

Advanced Eleva Dose reporting
Individual patient dose and cumulative daily dose reports can be printed for easy dose management

Dynamic UNIQUE image processing benefits

Always fully processed, in real time
Radiography, fluoroscopy and spot images are always displayed at full resolution, fully processed and in real time.

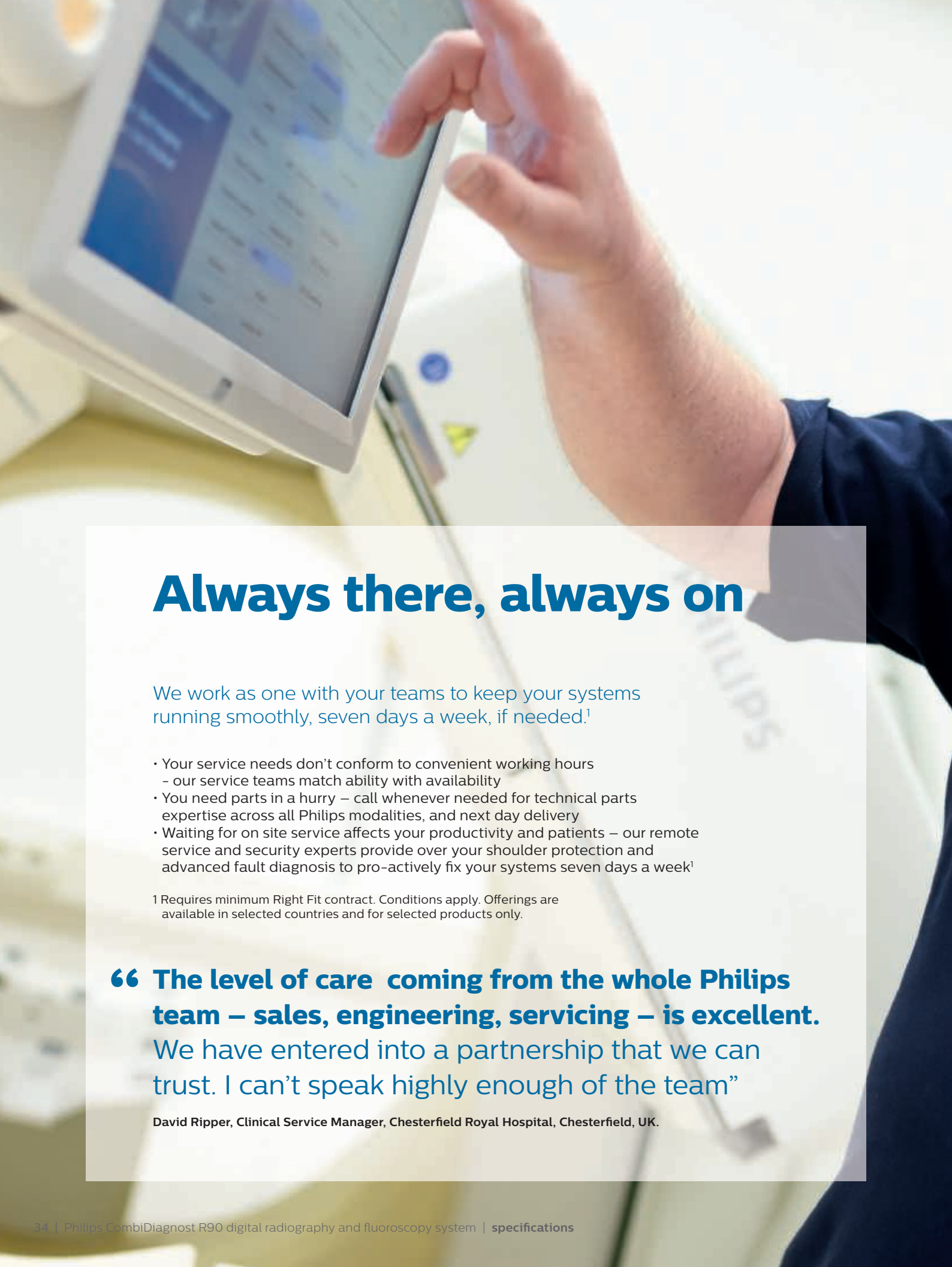
It's just the way you expected it
Bones, soft tissues and contrast agent are harmonized, without losing details.

Advanced de-noising
Real time frame by frame de-noising combined with movement adaptative temporal de-noising, for noise-free images from the first frame onwards and no lag effect on high contrasted structures.

Virtually unlimited number of processing presets
To cover even the most specialized views and application procedures

Interactive & real time image processing
Provides immediate visual feedback on manual processing parameter changes for fast and intuitive re-processing.

Intuitive, simplified UNIQUE user interface
Medical-oriented processing features and feature names to allow for fast and intuitive use



Always there, always on

We work as one with your teams to keep your systems running smoothly, seven days a week, if needed.[1]

- Your service needs don't conform to convenient working hours – our service teams match ability with availability
- You need parts in a hurry – call whenever needed for technical parts expertise across all Philips modalities, and next day delivery
- Waiting for on site service affects your productivity and patients – our remote service and security experts provide over your shoulder protection and advanced fault diagnosis to pro-actively fix your systems seven days a week[1]

1 Requires minimum Right Fit contract. Conditions apply. Offerings are available in selected countries and for selected products only.

> **"The level of care coming from the whole Philips team – sales, engineering, servicing – is excellent.** We have entered into a partnership that we can trust. I can't speak highly enough of the team"
>
> **David Ripper, Clinical Service Manager, Chesterfield Royal Hospital, Chesterfield, UK.**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How to reach us
Please visit www.philips.com/healthcare
healthcare@philips.com