

BRT-90 PLUS SFD

Product Data Remote Controlled R&F Table $\pm 90^\circ$ Tilting



EQUIPMENT DESCRIPTION

BMI Biomedical International distributes high technology remote control diagnostic systems, able to satisfy every need of X-ray operators.

***BRT-90 Plus SFD** is equipped with Hi-Tech control electronics, modular and expandable, interfaced through LAN and CAN to the generator, collimator, images acquisition devices and remote tele-diagnosis server.*

BRT-90 Plus SFD features $\pm 90^\circ$ tilting, elevating tabletop and a very easy access to the patient, even from a stretcher or a wheel chair. SID (Source-Imager Distance) is variable from 105cm up to 180 cm thus allowing thorax exams without the use of an additional bucky stand.

It offers a complete control of the system, of the exam parameters and of the lowest patient dose so that fast execution time and impressive image quality are ensured for any examination.



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STANDARD CHARACTERISTICS

GENERAL

Kind of equipment and class According to IEC60601-1

Class II with applied parts of B type

Protection degree according to IEC 60529

Continuous working

Covers

ABS
PUR
Metallic

Colors

Standard:
- White RAL9001
- Green NCS S 0575G40Y

ELECTRICAL

Standard power supply

3N ~ 380-400 Vac

Frequency

50-60 Hz

Net isolation

Transformer 2 kVA

Protection

8A with thermo magnetic switch

Line impedance

$< 1.0 \Omega$ 380-400 Vac $\pm 10\%$

Loaded voltage fall

$< 2\%$



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REMOTE CONTROLLED TILTING TABLE

MECHANICAL CHARACTERISTICS

Table height in vertical position	2580 mm
Vertical mount height	1960 mm
Width	2545 mm
Maximum height with table in horizontal position and focus to film at 180 cm	I.I. 9": 2537 mm I.I. 12": 2687 mm I.I. 16": 2687 mm
Minimum and maximum height from ground with table in horizontal position	I.I. 9": 650 mm – 1450 mm I.I. 12": 750 mm – 1450 mm I.I. 16": 800 mm – 1450 mm
Access from forth side (back)	300 mm
Column displacement	2240 mm
SFD holder displacement	2140 mm
Rx covering area	430 x 2020 mm
Weight distribution plate (to be anchored on the floor)	1520x1520x20 mm – 360 Kg, alternatively 1520x1520x15 mm – 262 Kg



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PATIENT TABLE TOP

Tabletop dimensions

250 x 70 cm.
Width 27 mm
Useful are: 232x50,5 cm

Tabletop

Standard tabletop (white): carbon fiber covered with laminated
Filtration 0,7 mm Al @ 100 kV
Max patient weight 225 Kg (without limitation)

Optional tabletop (black): carbon fiber
Filtration 0,4 mm Al @ 100 kV
Max patient weight 225 Kg (without limitation)

Tabletop side profiles of 6 mm, ready to attach some accessories.

Tabletop lateral excursion movement

± 15 cm

Longitudinal excursion

Tube column longitudinal excursion: 188 cm
Spot film device (center) excursion: 168,5 cm
The movement of both column and flat panel allows for patient total scanning: **202 cm** at adjustable speed up to **15 cm/sec**, controlled through joystick.

Important:

The movement of the longitudinal tabletop is not necessary as the complete exposure of the patient is guaranteed by the field of movement of the column and the detector.

Tube angulations range for oblique projections with I.I. parallax correction

$\pm 40^\circ$

Tabletop tilting range

- 90° to $+90^\circ$ continuously

X-ray tube assembly rotation range

- 180° to $+180^\circ$ motorized, control from console

SID

From 105 to 180 cm continuously or with presets



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ACCESSORIES

Standard

Removable footrest with surface 400x600 mm;
Shoulder rest
Pair of ergonomic handlers

Optional

Paper roll bearer
LDC glass bearer
Compression band
OB-GYN legs bearer
Lateral cassette holder for oblique projection
Hand safety stripes
Additional pedal (in examination room) for RAD/Fluoro

DYNAMIC CHARACTERISTICS

Tabletop rise time from lower to max height (horizontal position)

15 sec

Tabletop combined rotation from 0° to $+90^\circ$

25 sec

Tabletop combined rotation from 0° to -90°

26 sec

Tabletop combined rotation from -90° to $+90^\circ$

37 sec

Tabletop lateral displacement

From 1cm/sec to 2,5 cm/sec

Lined translation (tube + receptor) along the horizontal axis

12 sec

Rotation only from 0° to $+90^\circ$

16 sec

Focus to film extension from 105 to 180 cm

18 sec



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TOMOGRAPHY

Type

Planigraph with homothetic linear movement and electronic fulcrum calculation

Stratum max height

400 mm (physical limit 450 mm)

Increase / decrease

Manual, 1 mm step
Automatic (auto step function) with step mm program and selectable according to starting tomo angle

Speed

10° - 21° / sec. Adjustable

Tilting angles

Preset 8° - 15° - 20° - 30° - 40°
According to customer preference within max 80° with respect to the chosen anatomical area and FFD

Tomo timings

Up to 5 speeds can be chosen that represent a percentage of the max speed: 3525 cm/sec (21°/sec)
For each tilting angles the speed can be decreased in 5 steps of approx. 10% per step.
A tomography at 40° and FFD 105cm at the maximum speed will take approx. 2,2 sec.

Direction

Bi-directional in each position of table and FPD/column group

Sequence tomography

Sequence program with outward and inward emission up to the limits set by the operator or to the reaching of preset limit; stratum, area, etc.

Receptor movement range

Tomography can be executed in different receptor position according to the angle, to the FFD and the selected stratum.



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ABDOMINAL COMPRESSOR (OPTIONAL)

Positions

Park
On field
Compression

Commands

On the touch screen, through the joystick and on table control boards

Compression power

Can be set from 2 kg to 20 kg with 0,5 kg step

Min. distance compressor cone from tabletop

80 mm

Max. distance compressor cone from tabletop

420 mm

Compressor displacement

340 mm

Protections

Compressor limit control
Automatically deductible compressor

Movements and parking

Motorized

Other characteristics

Remote controlled with automatic parking. It can be separately installed.
Display of the dynamic pressure and of the set pressure
Possibility to go out of the x-ray field at end-of-the-run with longitudinal retraction, for better safety.



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SPOT FILM DEVICE

Longitudinal displacement	168,5 cm
Speed	Possibility to set the speed up to 100 mm/sec
Type	Dragging belts without trolley
Accepted cassette sizes	All standard formats Film or CR from 18x24 to 35x43, both directions Film or CR from 5x7" to 14x17" both directions Wi fi DR panels (optional)
Line divisions	Band division 1, 2, 3, 4 and 5 Cassette can be divided in two directions, vertical and horizontal Special function to optimize the use of the film dividing it in different size areas
Operating functions	Standard Quick sequence Wi fi DR program (optional)
Fluoroscopy to radiography switch time	Lower than 1 sec
Fast sequence average timing	2 imm. / sec
Lead limit control	Integrated
Anti-diffusion grid	Inserted in the SFD with its frame. Different types and models can be used. Functioning: Fixed on field Vibrating on field Retractable for examination without grid. Recommended specifications: FFD=120 cm and/or FFD=180 cm
I.I. mounting	Side flange ready to host any I.I. from 9" to 16".
Parallax correction	Extremely accurate. It is electronically controlled by stepper motor
Ione chamber fixing	Ready to host the most common models



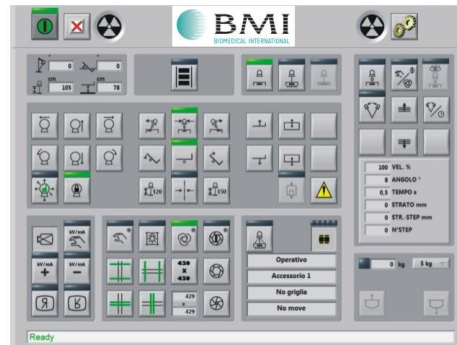
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REMOTE CONTROL CONSOLE



Description

19" Control console Medical Grade Panel PC Touch Screen with all commands
N. 4 joysticks duplicating the most frequent commands: tube angulations movements;
FFD; tabletop tilting and elevation movements; longitudinal and transversal displacement.

Touch screen characteristics

Dimension: 19"
Resolution: 1600x1200 pixel
Brightness: 350 cd/m²
Number of colors: 32 bit
View angle: 170°H - 170°V
Aspect ratio: 4:3

Available connections

Dedicated LAN connected to control CPU
Standard LAN for networking
N. 4 RS232 ports

Additional controls

N. 2 additional membrane keyboards are located on the image receptor front and x-ray tube front duplicating all table controls.



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COLLIMATOR

CHARACTERISTICS

Model	R225 ACS inclusive of retractable tape meter
Functioning	Manual with push buttons and knob Automatic, microprocessor controlled and CAN-BUS interface
Field	Square & rectangular + iris
Inherent filtration	2 mm Al eq.
Square field covering at 1 mt FFD	430x430 mm
Field light indicator	> 160 lux
Light indicator accuracy	< 1% FFD
Laser pointer	Single line projection
Options	
Laser pointer	Double (cross) line projection
Additional filtering	Disk support with automatic filter exchange device; it can be manual or automatically controlled by CAN-BUS 1mm Al + 0.1mm Cu 1mm Al + 0.2mm Cu 2mm Al
RO314	Integrated camera for patient view
RO320	Collimator motorized rotation



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GENERAL SPECIFICATIONS

Generator type 50 kW 65 kW 80 kW 100 kW
High Frequency Output (maximum 400 KHz)

Anode speed Low Speed Starters / optional Dual Speed Starter

Input Phase / Voltage 3 Φ 400-480 VAC

Line voltage Range $\pm 10\%$

Manual Power De-Rating <10% line

Compatible X-Ray tubes >300 tube models

Tube operation 1 tube standards (2 tubes optional)

Anatomical programs (membrane /Touch screen console) 1024 / 20.000 + techniques

Image receptors Up to 6

Techniques Selection kV / AEC, kV / mAs or kV / mA / ms

Communication ports RS232, RS422

Auxiliary Room & collimator Power Standard feature

GenWare[®] Service Software PC based and technical support software

RADIOGRAPHY

kV_p range/Steps 50 kW 65 kW 80 kW 100 kW
40-150 kV in 1 kV increments

kV_p accuracy $\pm (2\% + 1 \text{ kV})$ for 70-85 kV, $\pm (5\% + 1 \text{ kV})$ for 40 – 150 kV

High Voltage Ripple <1 kV @ 110 kV

mA range 10-630 mA 10-800 mA 10-1000 mA

mA accuracy $\pm (5\% + 1 \text{ mA})$ measured at + 5 ms for exposure > 5 ms
 $\pm (20\%$ for exposure $\leq 5 \text{ ms}$ ($\leq 0.5 \text{ mAs}$)

Exposure Time Range 1 ms – 6300 ms in 1 ms increments

Exposure Time Accuracy (measured at 75% points of kV waveform) $\pm (2\% + 0.5 \text{ ms})$ from 5 ms to 6300 ms,
 $\pm (10\% + 1 \text{ ms}) \leq 5 \text{ ms}$ ($\leq 0.5 \text{ mAs}$)

mAs Range (non-AEC) 0.1 – 1000 mAs

mAs Accuracy $\pm (10\% + 0.2 \text{ mAs})$ for exposure > 5 ms (> 0.5 mAs)



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CONTINUOUS FLUOROSCOPY

kV_p range/Steps

40-125 kV in 1 kV steps

kV_p Accuracy

± (2% + 1 kV) for 70-85 kV, ± (5% + 1 kV) for 40 – 150 kV

High Voltage Ripple

<1 kV @ 110 kV

mA Range / Steps

0.1 - 10 mA in 0.1 mA steps

mA Accuracy

± (5% + 1 mA) measured at > 50 ms;
± (20%) for exposure ≤ 6.7 mA

OPTIONS (not included)

	50 kW	65 kW	80 kW	100 kW
AEC Interface	Available – Ionization, PTM, or Solid State			
Hand Switch	Standard			
Dose Area Product (DAP) Interface	Available			
Dual Speed Starter	Available			
Falling Load	Available			
High Level Continuous Fluoroscopy	Available – Up to 20 mA			
High level Pulsed Fluoroscopy	Available			
Remote Fluoroscopy Control	Available			
Additional Tube Capability	Available			
Standard Console Pedestal	Available			
Standard Console Wall Mount	Available			
Touchscreen Console	Available			
Touchscreen Wall Mount	Available			

AEC Interface

Available – Ionization, PTM, or Solid State

Hand Switch

Standard

Dose Area Product (DAP) Interface

Available

Dual Speed Starter

Available

Falling Load

Available

High Level Continuous Fluoroscopy

Available – Up to 20 mA

High level Pulsed Fluoroscopy

Available

Remote Fluoroscopy Control

Available

Additional Tube Capability

Available

Standard Console Pedestal

Available

Standard Console Wall Mount

Available

Touchscreen Console

Available

Touchscreen Wall Mount

Available



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ANALOGUE IMAGE ACQUISITION SYSTEM

For the simplest use at very affordable price BMI Biomedical International supplies **BRT-90 Plus SFD** with TV chain which offers high definition fluoroscopic performance.

4 possible solutions are available:

- 9" image intensifier and 625 lines CCD camera
- 9" image intensifier and 1K CCD camera
- 12" image intensifier and 625 lines CCD camera
- 12" image intensifier and 1K CCD camera

The analogue TV chain has been designed for all routine examinations which can be carried out with diagnostic X-ray systems with Helios. It has both analogue and digital treatment of the video signal and allows acquisition of images in DIGITAL FLUOROSCOPY according to the functions listed below:

- Acquisition during continuous fluoroscopy with automatic storage of the last image;
- Reduction in the quantum noise by means of a RECURSIVE FILTER
- Automatic gain control (AGC)
- Digital inversion of the image both vertically and horizontally
- Generation of the signal for automatic X-ray dose control

One, two or more LCD monitors of different sizes are available according to customer needs.



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Image Intensifier 9"

Zoom fields: 3.
Fields Diameter: 23 – 17 – 14 cm.
Conversion factor: 300 $\text{cd.m}^{-2} / \text{mR.s}^{-1}$.
Contrast: 40:1 (23 cm);
Spatial resolution: 40/48/57 lp/cm
DQE: 61% at 59.5 keV (IEC standard)

TV Chain

ALR

Camera: CCD 576 x 576 x 8 bit
Number of lines: 625 on 56 Hz
Standard video: CCIR: 752 x 582 interlaced 50Hz
Scanning: 4:3
256 levels of grey
Transmission band: 14 MHz +/- 3 db
S/N ratio: > 40 db on 0.12 Lux
Automatic control of dose and brightness
Last Image Hold (LIH)

AHR

Camera: CCD 1024 x 1024 x 10 bit

Image Intensifier 12"

Zoom fields: 3.
Fields Diameter: 12" – 9" – 7"
Conversion factor: 240/120/655 $\text{cd.m}^{-2} / \text{mR.s}^{-1}$.
Contrast: 22:1 (32 cm);
Spatial resolution: 44/50/56 lp/cm
DQE: 65% at 59.5 keV (IEC standard)

TV Chain

ALR

Camera: CCD 576 x 576 x 8 bit
Number of lines: 625 on 56 Hz
Standard video: CCIR: 752 x 582 interlaced 50Hz
Scanning: 4:3
256 levels of grey
Transmission band: 14 MHz +/- 3 db
S/N ratio: > 40 db on 0.12 Lux
Automatic control of dose and brightness
Last Image Hold (LIH)

AHR

Camera: CCD 1024 x 1024 x 10 bit



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STANDARD MONITOR LCD TFT 19" Colour



Screen type	19" LCD TFT colour panel with anti-glare surface
Resolutions	1280x 1024 pixels
View area	376x301 mm
Contrast ration	800:1 (TIP)
Brightness	270 Cd/m ²
View angle	178° H – 178° V
Total response time	18 ms (TIP)
Grey scale compensation	10 bits
Resolution presets	640x480 @ 60/75 Hz 800x600 @ 60/75 Hz 1024x768 @ 60/75 Hz 1280x1024 @ 60/75 Hz
Grey scale	256 levels X3 (8bit) / 16.7 million colours
Dimensions	430x380x80 mm
Weight	8,6 Kg



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OPTIONAL MONITOR LCD TFT 19" Monochrome



Screen type	19" LCD TFT Monochrome
Resolutions	1280x 1024 pixels
View area	376x301 mm
Contrast ration	900:1 (TIP)
Brightness	1000 Cd/m ²
View angle	170° H – 170° V
Total response time	18 ms (TIP)
Grey scale compensation	10 bits
Resolution presets	640x480 @ 60/75 Hz 800x600 @ 60/75 Hz 1024x768 @ 60/75 Hz 1280x1024 @ 60/75 Hz
Dimensions	430x380x80 mm
Weight	8,6 Kg



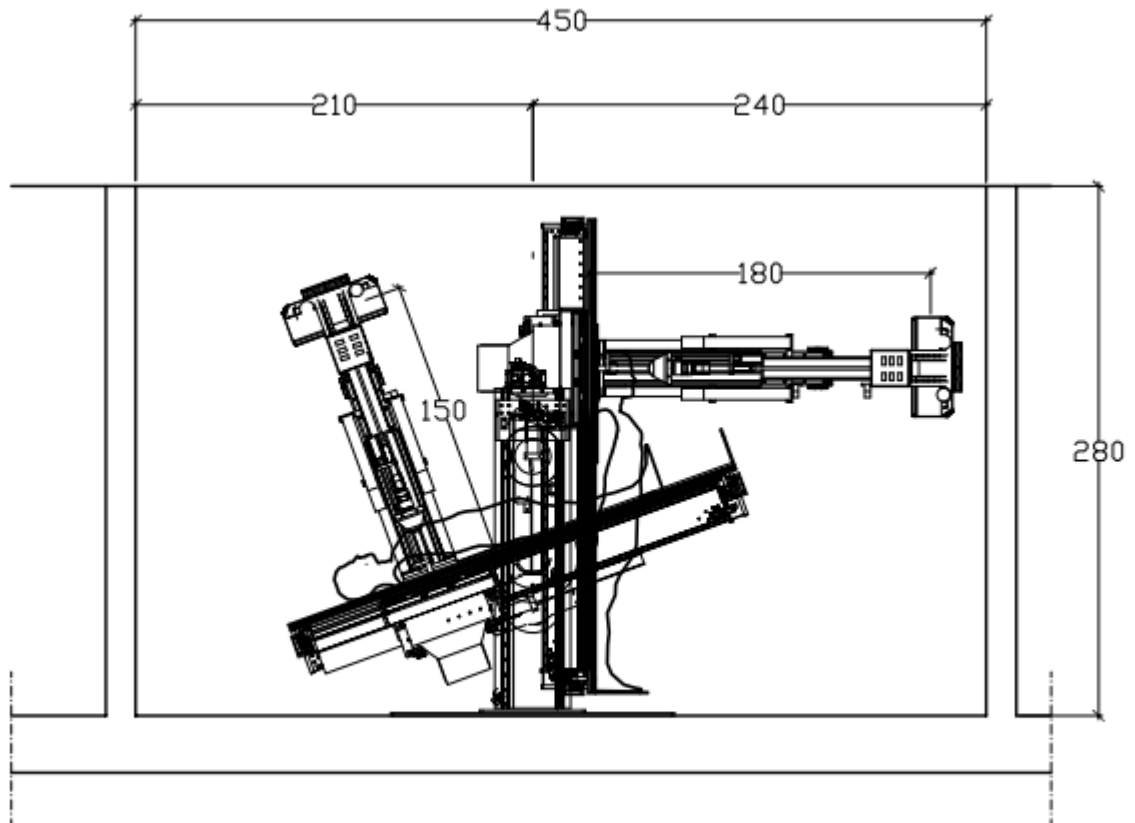
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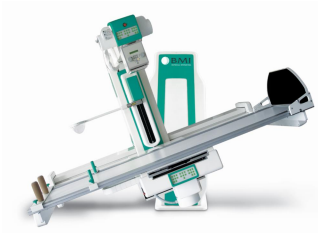
ROOM DIMENSIONS



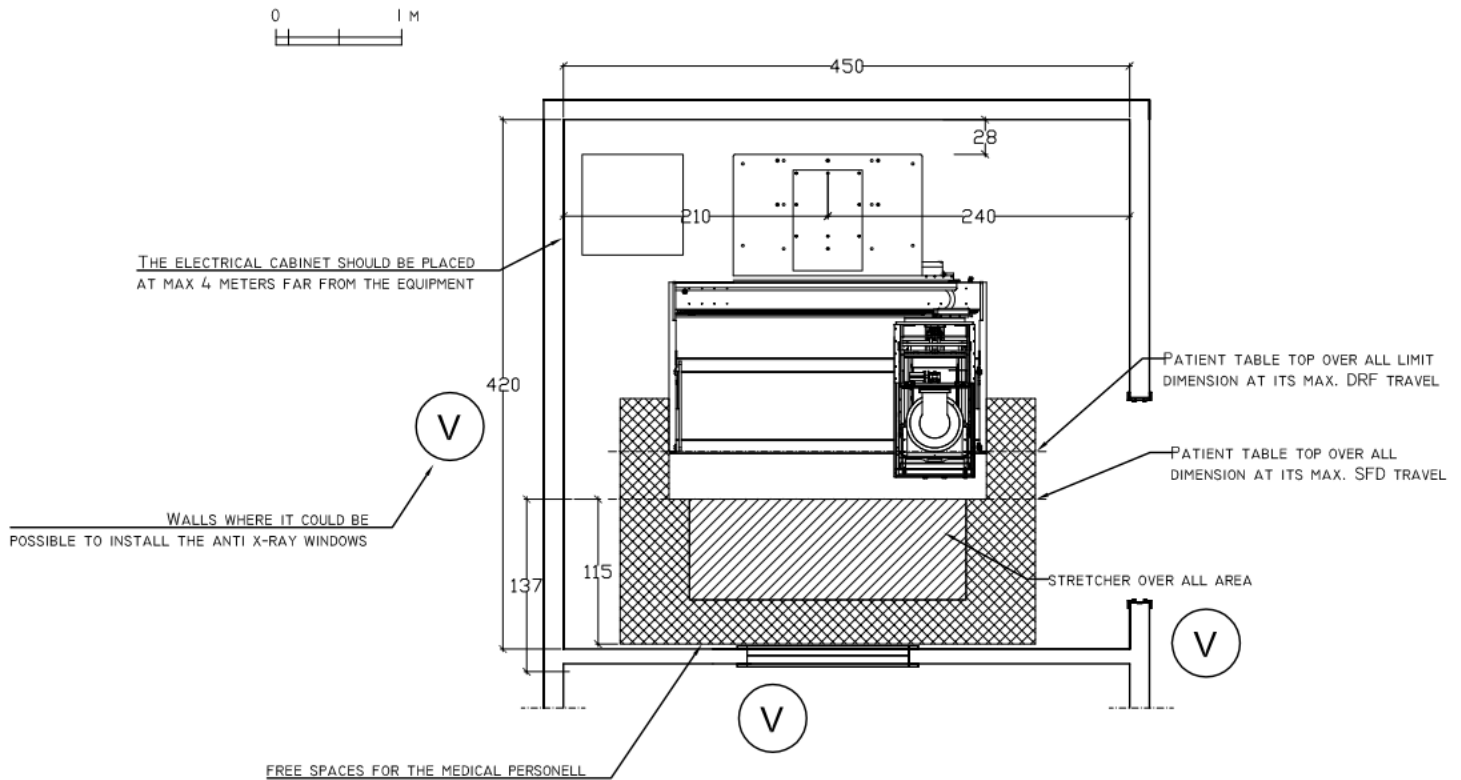
Minimum over all dimension required during operation

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ROOM DIMENSIONS



In case of DRF the depth could be reduced from 420 cm to 380 cm

Data subject to modification without prior notice

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