

Product Data Remote Controlled R&F Table ± 90° 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 Digital 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 Digital features +90 – 90 tilting, elevating tabletop and a very easy access to the patient, even from a stretcher or a wheel chair. SID (source Image Distance) is variable from 105 cm up to 180 cm thus allowing thorax exams without the use of an additional bucky stand. It allows diagnostic X-ray and fluoroscopic examinations, using both traditional and digital techniques, other than the possibility of using special applications as angiography and vascular interventional procedures. This system offers a complete control of the system, of the exam parameters and of the lowest patient dose, fast execution time and excellent 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

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

Loaded voltage fall

< 2%





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REMOTE CONTROLLED TILTING TABLE

MECHANICAL CARACTERISTICS

Table height in vertical position

2580 mm

Vertical mount height

1960 mm

Width

2545 mm

Maximum height with | I.I. 9": 2537 mm table in horizontal position and focus to film at 180 cm

I.I. 12": 2687 mm I.I. 16": 2687 mm

Minimum and ground with table in horizontal position

I.I. 9": 650 mm - 1450 mm maximum height from | I.I. 12": 750 mm – 1450 mm I.I. 16": 800 mm - 1450 mm

Access from forth side 300 mm (back)

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 quaranteed by the field of movement of the column and the flat panel.

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

± 40°

Tabletop tilting range

- 90° to +90° continuously

X-ray tube assembly rotation range

-180° to +180° 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°

25 sec

Tabletop combined rotation from 0° to -90°

26 sec

Tabletop combined rotation from -90° to

37 sec

+90°

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

Tabletop lateral displacement

12 sec

Lined translation (tube + receptor) along the horizontal

Rotation only from 0° to +90°

16 sec

Focus to film extension from 105 to 180

18 sec

cm





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TOMOGRAPHY

range

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.

DirectionBi-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 opera-

tor or to the reaching of preset limit; stratum, area, etc.

Receptor movement 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 80 mm

compressor cone from tabletop

Max. distance compressor cone from

tabletop Compressor

displacement

Protections Compressor limit control

Automatically deductible compressor

Movements and parking

Motorized

420 mm

340 mm

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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STEP ANGIO (OPTIONAL)

Type

Linked to a digital Wi Fi Flat Panel detector, cassette sized and related workstation.

Step Length

Manual

Direction

· Automatic according to receptor size

Selectable

Interface

Integrated with HF Generator, collimator and digital images acquisition system

STITCHING EXAMS OF THE COLUMN AND LOWER ARTS (OPTIONAL)

Type

Linked to a digital Wi Fi Flat Panel detector, cassette sized and related workstation.

Image size

43 x 60 (2 images)

43 x 90 (3 images)

43 x 120 (4 images)

Direction

Head to foot

Interface

Integrated with HF Generator, collimator and digital images acquisition system



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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

All standard formats

sizes

- 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 CONTROLLED CONSOLE



Description 19" Control console Medical Grade Panel PC Touch Screen with all commands.

Nr. 4 joysticks duplicating the most frequent commands: tube angulations movements; FFD; tabletop tilting and elevation movements; longitudinal and transversal displace-

ment.

Touch screen Dimension: 19"

characteristics 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 accu-

racy

< 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 of 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

Anode speed

Input Phase / Voltage

Line voltage Range

Manual Power De-Rating

Compatible X-Ray

tubes

Tube operation

Anatomical programs

(membrane /Touch screen console)

Image receptors

Techniques Selection

Communication ports

Auxiliary Room & collimator Power

GenWare® Service

Software

RADIOGRAPHY

kV_p range/Steps

kV_p accuracy

High Voltage Ripple

mA range

mA accuracy

Exposure Time Range

Exposure Time Accuracy (measured at

75% points of kV waveform)

mAs Range (non-AEC)

mAs Accuracy

50 kW

65 kW

80 kW

100 kW

High Frequency Output (maximum 400 KHz)

Low Speed Starters / optional Dual Speed Starter

3 Φ 400-480 VAC

±10%

<10% line

>300 tube models

1 tube standards (2 tubes optional)

1024 / 20.000 + techniques

Up to 6

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

RS232, RS422

Standard feature

PC based and technical support software

40-150 kV in 1 kV increments

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

65 kW

<1 kV @ 110 kV

50 kW

10-630 mA 10-800 mA

10-1000 mA

100 kW

80 kW

 \pm (5% + 1 mA) measured at + 5 ms for exposure > 5 ms

 \pm (20% for exposure \leq 5 ms (\leq 0.5 mAs)

1 ms – 6300 ms in 1 ms increments

 \pm (2% + 0.5 ms) from 5 ms to 6300 ms, $\pm (10\% + 1 \text{ ms}) \le 5 \text{ ms} (\le 0.5 \text{ mAs})$

0.1 - 1000 mAs

 \pm (10% + 0.2 mAs) for exposure > 5 ms (> 0.5 mAs)



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CONTINUOUS 65 kW 80 kW 100 kW **FLUOROSCOPY**

kV_p range/Steps 40-125 kV in 1 kV steps

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

High Voltage Ripple <1 kV @ 110 kV

mA Range / Steps 0.1 - 10 mA in 0.1 mA steps

mA Accuracy \pm (5% + 1 mA) measured at > 50 ms;

 \pm (20%) for exposure \leq 6.7 mA

OPTIONS 50 kW 80 kW 100 kW

(not included)

AEC Interface Available - Ionization, PTM, or Solid State

Available – Up to 20 mA

Hand Switch Standard

Dose Area Product Available

(DAP) Interface

Dual Speed Starter Available

Falling Load Available

High Level Continuous

Fluoroscopy

Available

High level Pulsed

Fluoroscopy

Control

Available Remote Fluoroscopy

Additional Tube

Capability

Available

Standard Console

Pedestal

Available

Standard Console

Wall Mount

Available

Touchscreen Console

Available

Touchscreen Wall

Mount

Available





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MIRROR DII: DIGITAL IMAGE ACQUISITION SYSTEM



Mirror DII's workflow enhancements make it faster and easier to consistently acquire high-quality images. The new low-dose technology surpasses industry standards and puts patient safety first. With Mirror DII's integrated, on-screen generator controls, workflow is significantly improved.

Key Features

- 1Kx1Kx12 bits image processing
- 25 fps @ 1kx1k pixels continuous fluoroscopy
- Up to 25 fps @ 1Kx1K High contrast Pulsed fluoroscopy
- Up to 12 fps @ 1Kx1K Digital Radiography
- · Auto / Manual Cine-loop
- Anatomical programs
- Real Time Digital Subtraction Angiography (optional)
- Max opacification and Road Mapping procedures (optional)
- · Shifting Pixels and Land-Marking operations
- Complete RAD & Fluoro Dose Area Product reporting
- Large reporting capability: DICOM print, DICOM CD/DVD, USB2 Pen Drive in BPM format, USB2 Windows printer
- · Windows XP Professional Operating System
- High speed processing: 2GB RAM memory, CPU Intel >2GHz





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TECHNICAL DATA

General Data

- Multiprocessor digital system: 32 bit microcontroller and one Intel PC
- 2GHZ, 2GB RAM memory, 160 GB HD and Windows XP Profession OS
- High Sensitivity Low Noise dedicated 1 MPixels CCD TV Camera
- Up to 3 Medical Display with DICOM LUT, 19" LCD monochrome and/or 19" LCD color

Acquisition mode

- Continuous fluoroscopy 25 fps @ 1Kx1K pixels resolution
- High Contrast Fluoroscopy: 1, 3, 6, 12, 25 fps @ 1Kx1K pixels
- Digital Radiography: 0.5, 1, 2, 3, 4, 6, 12 fps @ 1Kx1K pixels

Operator Interface

- · Window XP Graphic interface and dedicated icons for intuitive selections
- Anatomical programs for dedicated studies with automatic pre-setting of acquisition, processing and reporting operations
- · High brightness monochrome Medical Display for a comfortable image view
- Up to eight selectable reference images on second display

Real time display

- Automatic image brightness and exposure control
- Dynamic noise reduction filters in fluoroscopy (recursive & motion detect)
- · Anatomical harmonization spatial filters in radiography
- Hard disk image storing @ rate of 25 fps, up to 50 minutes registration time (standard HD size)
- · H/V image reverse
- 90° image rotation
- Grey scale image reverse
- Auto / man windowing (Contrast / brightness)
- · Registration of the Max Opacification in fluoroscopy
- Digital Subtraction Angiography with automatic / manual mask selection
- Automatic Fluoroscopy Registration capability





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TECHNICAL DATA

Post Processing

- H / V image reverse
- Grey scale image reverse
- Auto / man windowing (Contrast / brightness)
- 90° image rotation
- Spatial filters (Edge enhancement, Harmonization)
- Auto / Man cine-loop with selectable sequence period and frame rate
- Electronic smart collimators
- Electronic zoom
- Overview of 4-9-16 images (mosaic)
- Road Mapping
- Digital Subraction angiography with remasking, Land Marking , Shifting Pixel
- · Text overlay with pre-programmed words and symbols
- Distances, angles, measurements, stenosis (option)

Reporting

- DICOM print
- Window printer via USB2
- BMP format via USB2 Pen Drive

Networking

- DICOM 3 VERIFIY SCU/SCP
- DICOM 3 STORAGE SCU
- DICOM 3 PRINT SCU
- DICOM 3 WORKLIST SCU
- DICOM 3 MEDIA: CDROM/DVD
- DICOM 3 MMPS SCU
- DICOM 3 STORAGE COMMITMENT SCU





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thickness

DQE at 59.5 keV

65%

	IMAGE INTENSIFER DATA		
CHARACTERISTICS			
9" (23 cm)	Triple field with 25 mm output window, it is intended for high-end digital radiography applications. I lower noise in digital mode; improved blemish characteristics; pulse operating mode; wide dynamic operating mode		
12" (32 cm)		aracteristics; e;	des ultra-high contrast
16" (40 cm)	 Quadruple field with 35 mm output window, this image intensifier provides ultra-high contrast needed for high-end digital radiography applications. Advanced input screen, for high DQE, high resolution and lower x-ray exposure; Ultra compact output phosphor screen, for unrivalled resolution, low structural noise and a high conversion factor; Thick output window, for high contrast and compatibility with digital image processing; 		
ADDITION CHARACTERISTICS			
	9" (23 cm)	12" (32 cm)	16" (40 cm)
Zoom	3	3	4
Nominal entrance field size	23 cm	32 cm	40 cm
Output image diameter	25 mm	25 mm	35 mm
Output window	14 mm	14 mm	19 mm



65%

65%



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(90%radius)

OPERATING MODE

9" (23 cm)	Normal	Zoom 1	Zoom 2
Useful entrance field	215 mm	160 mm	120 mm
Conversion factor	260 cd.m ² /mR.s ⁻¹	130 cd.m ² /mR.s ⁻¹	65 cd.m ² /mR.s ⁻¹
	30 cd.m-²/μGy.s ⁻¹	15 cd.m-²/μGy.s ⁻¹	8 cd.m- ² /μGy.s ⁻¹
Limiting reduction			
• Center	56 lp/cm	62 lp/cm	70 lp/cm
• 93% radius	50 lp/cm	56 lp/cm	64 lp/cm
Contrast ratio	·	·	•
• Large area (10%)	36:1	>36:1	>36:1
• Small detail (10mm)	23:1	25:1	30:1
Brightness non	25%	12%	6%
uniformity			
Distortion			
• Integral	4%	3%	2%
 Differential 	18%	8%	4%
(90%radius)			
12" (32 cm)	Normal	Zoom 1	Zoom 2
Useful entrance field	290 mm	215 mm	160 mm
Conversion factor	320 cd.m ² /mR.s ⁻¹	160 cd.m²/mR.s ⁻¹	80 cd.m ² /mR.s ⁻¹
	36 cd.m-²/μGy.s ⁻¹	18 cd.m-²/μGy.s ⁻¹	9 cd.m-²/μGy.s ⁻¹
Limiting reduction			
• Center	48 lp/cm	54 lp/cm	62 lp/cm
• 93% radius	40 lp/cm	50 lp/cm	58 lp/cm
Contrast ratio			
• Large area (10%)	36:1	>36:1	>36:1
• Small detail (10mm)	22:1	24:1	30:1
Brightness non	20%	15%	10%
uniformity			
Distortion			
 Integral 	8%	5%	3%
 Differential 	30%	12%	6%





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OPERATING MODE

16" (40 cm) Useful entrance field Conversion factor	Normal	Zoom 1	Zoom 2	Zoom 3
	360 mm	290 mm	215 mm	160 mm
	350 cd.m²/mR.s ⁻¹	205 cd.m ² /mR.s ⁻¹	110 cd.m²/mR.s ⁻¹	65 cd.m ² /mR.s ⁻¹
	40 cd.m-²/μGy.s ⁻¹	124 cd.m- ² /μGy.s ⁻¹	13 cd.m-²/μGy.s ⁻¹	8 cd.m- ² /μGy.s ⁻¹
Limiting reductionCenter70% Radiusu93% radiusContrast ratio	46 lp/cm	50 lp/cm	56 lp/cm	64 lp/cm
	42 lp/cm	46 lp/cm	53 lp/cm	61 lp/cm
	40 lp/cm	44 lp/cm	51 lp/cm	59 lp/cm
 Large area (10%) Small detail (10mm) Brightness non	30:1	32:1	>34:1	>36:1
	20:1	23:1	25:1	>30:1
	20%	15%	10%	10%
uniformity Distortion • Integral • Differential (90%radius)	9%	7%	6%	5%
	29%	18%	14%	10%





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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/m²

View angle 178° H – 178° V

Total response time 18 ms (TIP)

Grey scale compensa-

tion

Resolution presets 640x480 @ 60/75 Hz

10 bits

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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Screen type 19" LCD TFT Monochrome

Resolutions 1280x 1024 pixels

View area 376x301 mm

Contrast ration 900:1 (TIP)

Brightness 1000 Cd/m²

View angle 170° H – 170° V

Total response time 18 ms (TIP)

Grey scale compensa-

tion

Resolution presets 640x480 @ 60/75 Hz

10 bits

800x600 @ 60/75 Hz 1024x768 @ 60/75 Hz 1280x1024 @ 60/75 Hz

Dimensions 430x380x80 mm

Weight 8,6 Kg

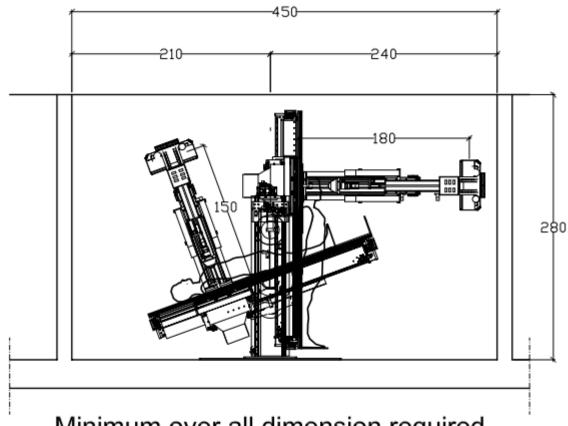




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ROOM DIMENSIONS



Minimum over all dimension required during operation

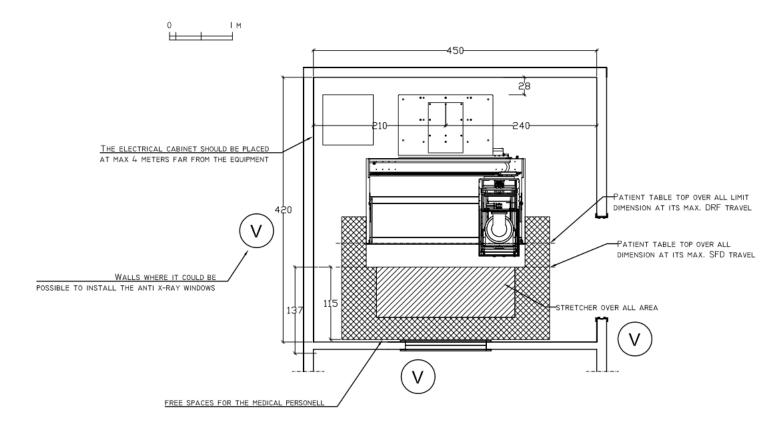




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ROOM DIMENSIONS



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

Data subject to modification without prior notice







