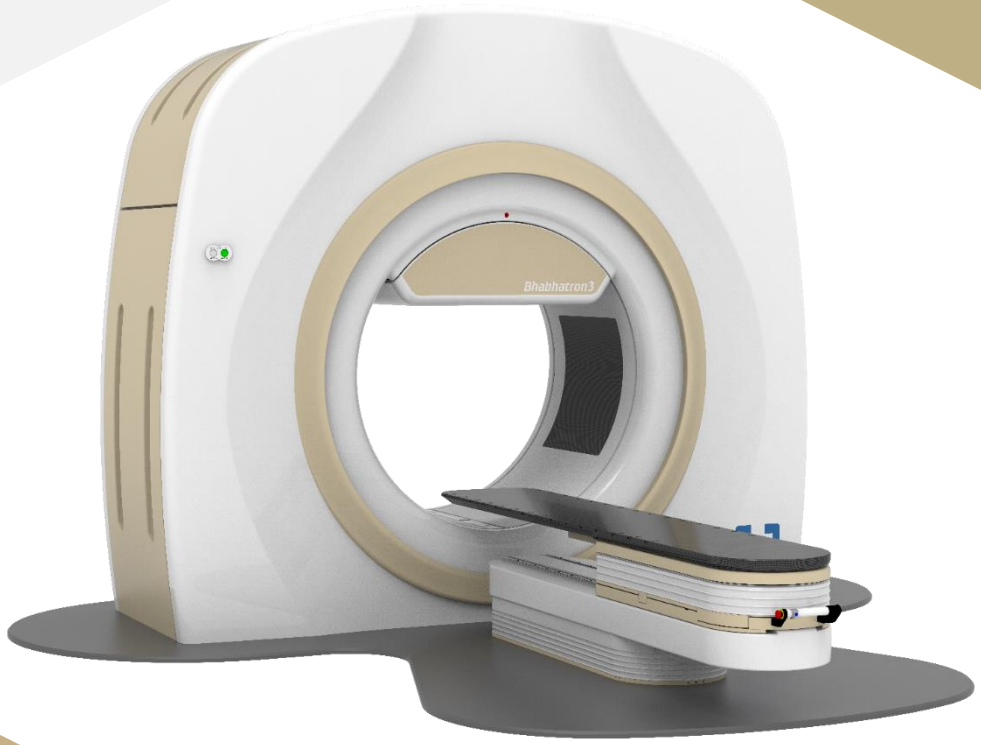
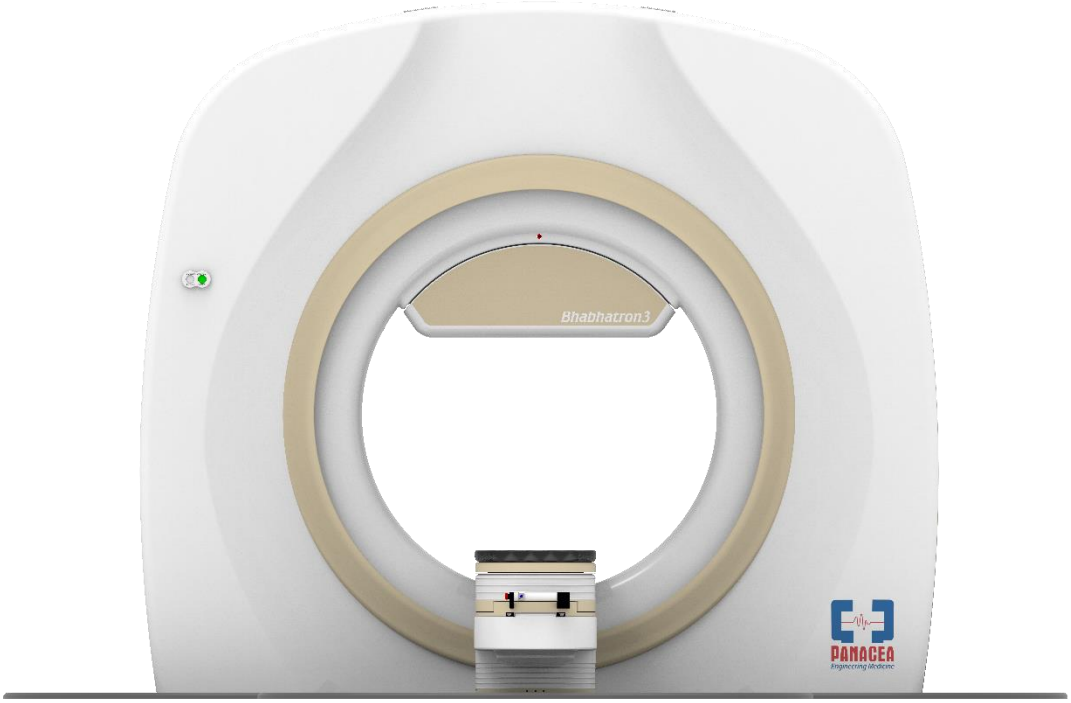
PANACEA
Engineering Medicine

Bhabhatron3i

IGRT based Gamma Therapy Unit



Technical Specifications



Panacea Medical Technologies brings to you a revolutionary new product Bhabhatron 3i. The tried, tested and proven cobalt radiation therapy gets a completely new overhaul with the revolutionary Bhabhatron 3i, the ring gantry-based gamma therapy unit.

The robustness and simplicity of a cobalt unit combined with image guidance and 6D robotic couch makes Bhabhatron 3i a unique solution for every radiotherapy center. Bhabhatron 3i provides the user with the ease of operation and reliability of a cobalt unit along with several additional features like onboard imaging and 6D robotic couch. Built on a ring gantry platform, Bhabhatron 3i gamma beam therapy unit empowers the user with a spectrum of radiation therapy modalities to treat the patients expeditiously including treatment modalities like Intensity Modulated Radiotherapy (IMRT), and Image-Guided Radiotherapy (IGRT). With In-gantry technological advances, Bhabhatron 3i expands the treatment capabilities of cobalt radiation therapy beyond expectations.

1 Salient Features

Bhabhatron-3i, a cobalt -60 Teletherapy machine with latest technology designed to house source activity of upto 250 RMM (15000 Ci). The unit is a ring gantry based Teletherapy Cobalt-60 machine. The salient features of the System is as below:

Cobalt 60 of ≤ ϕ2cm
Source Head Capacity: 250 RMM, with Tungsten shielding.
Maximum Dose rate @80 cm: ~ 350 cGy/min
Mulitleaf Collimator on Cobalt Platform
6D Couch with radiolucent carbon fibre couch top
ISO Wedge
Auto Patient Setup
In-Gantry kV Imaging
Krystal R&V Interface
In-built Beam Stopper
Treatment modalities- 3D CRT, IGRT, IMRT

2 Gantry

The Gantry has variable speed for arc and rotational treatment.	
The Gantry angle is digitally displayed on the control console	
Isocentre Height	120 cm from floor
Isocentre Position Accuracy	≤1mm radius
Rotation Angle	±185°
Rotation Speed	0.1 – 1rpm
Position Accuracy	≤0.3°
Readout Resolution	0.1°
Scales	IEC 61217

3 Source to Axis Distance

Source-Axis Distance	80 cm
Position Accuracy	0.2 cm

4	Multi Leaf Collimator	
Motorized Motion	± 100 °
Speed	0.2 - 1 rpm
Position Accuracy	0.5 mm
Readout Resolution	0.1°
No. of leafs	50 No's
Leaf projection at Isocentre	1 cm
Max. field size at Isocentre	25 x 25 cm
Position Accuracy at Isocentre	≤ 0.5 mm
Leaf Speed	Max. 3cm/sec at Iso centre

5	Source Drawer
The pneumatically driven source drawer is used for moving the source between the shielded position and treatment position.
The pneumatic cylinder will return the source automatically to radiation-off position in case of any emergency.

6	X-Ray Tube and Housing	
Nominal Voltage	150 kV
Anode heat capacity	600 kHU
Maximum anode heat dissipation	162 kHU/min
Target Angle	14°
Focal spot	0.4 X 0.4 mm (small) / 0.8 mm X 0.8 mm (large)
Housing Heat Storage capacity	1500 kHU
Maximum Housing Temperature	78 °C

7	Image Detector	
Detector type	Amorphous Silicon
Detector Type	42.7 X 42.7 cm
Scintillator	Cesium Iodide (CsI)
Resolution	3.6 lp/mm

Pixel Matrix	3072 (h) x 3072 (v)
Active Pixel	42.7 cm (h) x 42.7 cm (v) (16.8 x 16.8 in)
ADC	16 bit
Frame Rate	Up to 9Fps

8 Cone Beam CT

Full fan field size	23 X 23 (cm)
Half fan field size	46 X 23 (cm)

9 Patient Table

A Radiolucent Carbon fiber couch which facilitates ARC and non-coplanar beam treatments.

Indexed couch for easy and repeatable patient positioning.

Couch top	Carbon Fibre
Deflection	IEC standard
Length	284 cm
Width	51 cm
Maximum Load	225 kg
Vertical Range	60 cm
Longitudinal Range	157.5 cm
Transverse Range	± 15 cm
Iso-centric Rotation	± 30°
Motions	Longitudinal, lateral, vertical, theta, pitch and roll
Linear Accuracy for all motions	0.2 cm
Rotational Accuracy for all motions	0.5°
Readout Resolution	0.01 cm

10 Treatment modes

TSD (Target to skin distance)
TAD (Target to axis distance)
Step & Shoot IMRT
IGRT

IMRT (Field in field)
Arc treatment

11	**Keypad Control**

Hand-pendant for controlling all the movements of Gantry, Collimator, Field Defining Jaws, couch and all other necessary functions of the unit.

12	**Krystal - Record & Verification**

One step solution for streamlined workflow, making the department completely digital eliminating paper management.
Patient Data Administration
Auto population of patient demographics from HIS to minimize manual errors
Treatment protocols can be defined by the user to reduce treatment plan time
OAR constraints, Beam Accessories, Patient immobilization, positioning can be defined.
Electronic authorization at each step
Drag and drop appointment scheduling for all patients. Colour coded based status for treatment for pending and treatment completed, Fractions completed, remaining appointments for the patient.
Customisable calendar is provided specific to user based on Daily/Weekly/Monthly visits.
Graphical Representation of Vitals of the patient such as Height, weight, BP.
Quick analysis of vital signs result

13	**Krystal- Hardware**

Higher configuration workstations

14	**Control Console- User Interface**

Onscreen display of Gantry Angle, Collimator angle, Wedge code, Couch Motions (lateral, Longitudinal, vertical).
Dedicated menu for Patient information, treatment, machine configuration and maintenance.
Treatment mode screen displays treatment parameter and treatment time
Onscreen Display of Emergency, Door, Wedge, Air Pressure.
Password Protected access menu related to unit configuration and calibration menu to facilitate the unit configuration, servicing, and maintenance.

15	**Control Console- User Interface**

Higher configuration workstation

16	**Connectivity**

DICOM compatible

17	**Safety Features**

Automatic collimator closure

Emergency Stop Switches

Treatment Door Interlock

Air Pressure Interlock

Position Interlock

Last Man Out Switch

Collision Interlock

Mechanical Source Indicator rod

18	**Treatment Planning System**

ISOgray® a comprehensive Treatment Planning System with provision for Advanced Multimodality Imaging and Contouring along with modules for Beam Set-up and Virtual Simulation

Image Processing and Rendering	3D volume reconstruction
	Fast multi-planar reconstruction
Registration and Fusion	Visualization of CT, 4DCT, CBCT, MRI, PET et SPECT data sets
	Rigid multimodal registration based on CPU parallelized or GPU accelerated algorithms
Contouring	Intensity-based contour delineation such as automatic external body contour extraction
	Manual, semi-automatic and automated segmentation tools for various anatomies
	Easy margin definition for different volumes: CTV, GTV, ITV, PTV, OAR and PRV
Dose Computation	Minimal Computation time
Assessment & Plan Evaluation	Immediate assessment of plan clinical values
	Dose distribution with anatomical structures
	Real-time 3D display

Auto Planning	Smart tools to increase efficiency through Automatic Planning
Connectivity	• DICOM CT, 4DCT, CBCT, MRI PET and SPECT data sets • DICOM Import/Export (SCP / SCU) • DICOM Import/Export of dynamic structures phase by phase or several phases at the same time • DICOM RT including image, structure set and plan & dose • Network, PACS and device (CD, DVD) supported

19 Accessories

Mandatory
Laser patient alignment system
UPS with power backup
Web Camera
Closed-circuits TV
Emergency source home positioning tool (T-Rod)
QA Accessories
Build Up Sheet
Water Phantom (40 cm x 40 cm x 40 cm)
Optional Accessories
Therapy Dosimetry System
Gamma Zone Monitor
Survey meter

19 Installation Requirement

Electrical	
Power Supply	3N Ph, 50 KVA
Frequency	50HZ
Voltage	400 VAC
Environment	
Temperature	10° C to 40° C
Humidity	<80% RH non-Condensing

Installation Requirements	
Room Layout	Drawing available on request.
Pit Dimension	Length: 8.56 ft Width: 10.23 ft Depth: Step1: 0.72 ft, Step 2: 1.77 ft
Floor Loading	1800 kg/Sq. meters

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