LOT-1 IMAGING EQUIPMENT AFFECTING INFRASTRUCTURE WORKS

S/NO.	LOT NO.	EXPECTED EQUIPMENT	QTY	ESTIMATED UNITS PRICE	ESTIMATED TOTAL PRICE
1.	1-1	MRI (1.5T) complete with injector pump	1		
2.	1-2	CT-SCANNER (256 SLICE) complete with injector pump, with capacity to do coronary angiograms	1		
3.	1-3	Digital general system with fluoroscopy x-ray	1		
4.	1-4	Digital Mammography Unit	0		
5.	1-5	Digital C-Arm (minimum 12-Inches)	2		
6.	1-6	Bi-Plane Angiography System	1		

LOT-2 PENDANTS AND BEDHEAD UNITS

S/NO.		EXPECTED EQUIPMENT	QTY	ESTIMATED UNITS PRICE	ESTIMATED TOTAL PRICE
1.	2-1	Requirements for standard Bedhead Unit Units	176		
2.	2-2	Dialysis Unit Bedhead Unit Units	45		
3.	2-3	Ground Floor Critical Care BHU	4		
4.	2-4	ICU Double arm Pendants	20		
5.	2-5	PACU Bedhead Unit Units	5		
6.	2-6	Pre-op Ward Bedhead Unit Units	5		

S/NO.	LOT NO.	EXPECTED EQUIPMENT	QTY	ESTIMATED UNITS PRICE	ESTIMATED TOTAL PRICE
7.	2-7	Theatre Anaesthetic Pendant (Single mount, Single arm, Height adjustable)	6		
8.	2-8	Theatre Surgical Pendant (Single mount double Articulated stackable arm)	6		
9.	2-9	Treatment room Bedhead Unit Units	7		
10.	2-10	MRI Room Bedhead Unit (Anti-magnetic system)	1		
11.	2-11	CT- Scanner Room Bedhead Unit	1		
12.	2-12	Brachytherapy Room	1		

LOT-3 OPERATION THEATRE LIGHST AND THEATRE CONTROL PANELS

S/No		EXPECTED EQUIPMENT	QTY	Estimated Units Price	Estimated Total Price
		4 general surgery rooms			
1.		Operation theatre LED lights with inbuilt IP Camera, voice and Data capability	4		
2.		Theatre Wall control panels	8		
3.		Brachytherapy room Examination light	1		
4.		Angiography room Examination light	1		
5.		Lithotripsy room Examination light	1		

LOT 1: IMAGING EQUIPMENT

LOT 1-1 MRI (1.5T)

Item Code No.	Department	Section	Item Description
LOT 1-1	Imaging Equipment	MRI	1.5T MRI Complete with Injector Pump

1.5T Superconducting Magnetic Resonance Imaging System (MRI)

Operational requirements

Whole Body **1.5T Magnetic Resonance Imaging** system optimized for higher performance in Cardiac and Neuro-radiological examinations with shorter superconducting magnet, high performance gradients and digital Radio Frequency. All capabilities as detailed below should be integral part of the quotation and none of these essential requirements should be quoted as optional. If a supplier has any additional advanced applications or technique available with them, the same may be quoted as options.

Technical Specifications

Magnet System

1. 1.5 Tesla active shielded super conductive magnet.
2. Should state the magnet length preferred Ultrashort 1.4 m
3. It should have at least 70cm patient bore with flared opening; larger patient bore is preferable. The magnet should have facilities of better illumination, ventilation and designed to avoid patient claustrophobia
4. The magnet should be shielded from the external interferences.
5. The homogeneity of the magnet should be mentioned in relation to 10, 20, 30, 40 cm DSV. Give details of the number of the planes plots and number of measurements per plane to measure the homogeneity. (A minimum of 40 cm DSV)
6. Specify maximum FOV in all 3 axis (FOV to scan the largest possible human)40 cm minimum or more preferred)
7. Specify Homogeneity at 50 (z) X 50 (x,y) cm DSV
8. Specify the weight of the magnet including the gradient and covers etc.
9. The front panel display at the magnet should display coil table position and also remote selection of coil elements,

Gradient System

1. Actively shielded Gradient system with strength of at least 44 mT/m or more with the slew rate of 200 T/m/s or more. This slew rate of 200 T/m/s at 44 mT/m should be available in each axis independent, for overall better duty cycle performance of the gradient.
2. The duty cycle should be 100 percent. Please give details.
3. The Gradient system should have provision for eddy current compensation. (Bidder should demonstrate how they've compensated for the loss)
4. Largest Field of View should be at least *40* cm in all three axis. Higher viable FOV will be preferred.

Item Code No.	Department	Section	Item Description
LOT 1-1	Imaging Equipment	MRI	1.5T MRI Complete with Injector Pump
5. Minimum TE in Gradient Echo 2D / 3D should be specified for all sequences. Minimum of 0.9 msec			
6. Minimum Slice Thickness in 2D should be specified. Minimum of 0.3 mm			
7. Minimum Slice Thickness in 3D should be specified. Minimum of 0.1 mm			
8. Maximum Echo Tr' Length in both Spin Echo and Gradient Echo should be at least 256 or more.			
9. The measurement matrix should be from128x128 to 1024x1024 in both 2D and 3D imaging as well.			
RF System			
1. RF system should be fully digital with transmit power of at least 18 Kw			
2. RF system should have at least minimum of 60 true independent RF receiving channels with each having independent ADC with bandwidth of 250KHz or more.			
3. Should have necessary hardware to support Phased array coils.			
4. Specify frequency stability and amplifier resolution.			
5. RF system should be compatible with parallel imaging techniques. It should be able to support time reductions with compatible coils in 2D/3D imaging in Body/ Neuro imaging up to factor of 2 or more			
6. RF amplifier should be solid state for overall better performance			
RF Coils (How many coils are part of the equipment) **How many are to be purchased separately** **N/B: All coils are needed/ essential for advanced detail of the MRI studies**			
1. The main body coil integrated to the magnet must be Quadrature/ CP. In addition to this coil following coils should be quoted.			
2. Phased Array Head coil with mirror. It should be at least 16 Elements or more. Higher element coil will be preferred.			
3. Phased Array Neck Coil.			
4. In case above two coils do not suffice in combination for complete Neuro-vascular study from Aortic arch to Circle of Willis, please quote separate coil in addition to above two coils for this study. Please specify the max parallel imaging time reduction			
5. Phased Array Spine Coil for thoracic and Lumber spine imaging. Mention the number of coil elements available.			
6. It should be possible to do Head and Spine imaging together without changing the coil and the patient. It should be possible to do the same either with combination- of coils or a dedicated coil to achieve the same should be quoted			
7. Phased Array Body coil, capable of doing abdomen, pelvic, MRCP and peripheral imaging. It should have at least 12 elements and 45 cm FOV should be achievable.			
8. Flexible Coil -Large for imaging of large regions such as shoulder, hip and knee etc.			
9. Flexible Coil -small for imaging of small regions such as shoulders, wrist, elbow and ankle.			

Item Code No.	Department	Section	Item Description
LOT 1-1	Imaging Equipment	MRI	1.5T MRI Complete with Injector Pump
10. Quadrature Extremity Coil for Knee Imaging			
11. Dedicated Shoulder Phased Array coil.			
12. Coil for Cardiac Imaging with 8 channels or more. Please specify the time reduction factor with parallel acquisition techniques.			
13. Dedicated 8 channel Brain Coil for High resolution Brain Images. Please specify the time reduction factor with parallel acquisition techniques.			
14. Peripheral Angio. Coil: Specify, type and no. of elements used.			
15. Bilateral Breast Coil, specify type and channel			
16. A coil for Neurovascular Application.			
Patient Handling System: Dockable trolley/ stretcher system to limit lifting of patients into the examination couch. Also safe for patients			
1. Please specify the table type whether it's conventional trolley type or incorporates new (dockable trolley system) design principles. If fixed table, quote MRI compatible stretcher trolley.			
2. The table should be fully motorized, computer-controlled table movements in up and down) (vertical) and horizontal directions. The position accuracy should be at least +/ - 1mm or better for higher reproducibility' in advanced applications.			
3. The patient table should be able to withstand patient load of 250 kg			
4. The table should have facility for emergency manual traction in case of emergency. The table should have patient auto alarm system. .			
5. The CCTV/ Intercom system with LCD display to observe the patient.			
6. The table should deliver the protocols for automatic bolus chasing in peripheral angio with the automatic table movement.			
Host Computer /Main Console and Image Processor (Consideration for RIS and PACS to enable image transfer and archiving with enough storage capacity to archive images) consider cloud storage for unlimited space)			
1. Computer system should be latest in the industry, fast and efficient. It should have at least 16GB RAM.			
2. The main computer should have all the main processing software available in the Advanced work station for quick review			
3. The system should have image storage capacity of at least 1 TB for at least 500,000 images in 256 x 256 matrix.			
4. The reconstruction speed should be at least 800 images per sec or more for full FOV 256 matrix and the image processor should have high RAM capacity of at least 16 GB for faster processing for advanced applications.			
5. The main Host computer should have at least 18-inch TFT type Color monitor. The main console should have integrated music system for the patient			
6. The system should have DVD and CD archiving facility (can add USB/ External drive) on the main console for storage of 50,000 images or more in 256 x 256 matrix. Additionally, 500 high storage DVD's to be provided with external hard drives .			

Item Code No.	Department	Section	Item Description
LOT 1-1	Imaging Equipment	MRI	1.5T MRI Complete with Injector Pump

7. One additional workstation with Color monitor to be provided for the applications as listed and 4 Additional workstations for concurrent interpretation (radiologists and academic

Application Software / Hardware (The range of purchased software will determine the capability of the machine e.g Diffusion, Perfusion, Spectroscopy, Tractography, BOLD, Cardiac, CSF flow studies, DWIBS

1. The system should have basic sequences package with Spin Echo, Inversion Recovery, Turbo Spin Echo with high turbo factor of 256 or more, Gradient Echo with echo train length of 256 or more
2. The application software for image smoothing and edge sharpness etc. for improvement in image resolution should be quoted and it should apply for major imaging applications.
3. Single and Multi-shot EPI imaging techniques with ETl factor of 256 or more
4. Fat and water excitation, please specify the application package
5. Diffusion Weighted Imaging, with at least b value of 7000 (b-value used in diagnostics are 2000 or less. Higher b-values lead to loss in image resolution or more. The system (? Software) should have facility for ON Line automated calculation of ADC maps.
6. Please specify the motion correction algorithm/package for high-resolution motion free diffusion weighed imaging with multishot/ segmented EPI techniques.
7. It should be also possible to do 3D motion correction, please specify the application
8. Perfusion Imaging to enable large anatomy coverage of the brain and in line calculation of the resulting hemodynamic data. The perfusion analysis should have capability to calculate color display of relMTT, reI CBV, reICBF. (? Software purchase or inbuilt)If the perfusion analysis is not possible on the main console the same should be quoted on the workstation.
9. BOLD imaging: BOLD .technique with automated 3D motion correction, z- score, and correlation analysis with color overlay on anatomical images. It should be possible to have Real Time Processing of BOLD imaging data on the main console for the complete reconstruction. ? software purchase
10. The perfusion and the BOLD imaging should be possible for the whole brain with motion correction techniques. Please specify the application package and the motion correction technique.
11. Parallel Acquisition Techniques: Please specify the name of the package. It should have applications in abdomen, neuroimaging including diffusion and perfusion etc., free breathing abdomen imaging and Cardiac imaging. The scan reduction time should be mentioned.
12. Bolus chasing with automatic moving table should be offered and should be available with fluoro triggered MR angiography for manual and fast switchover in less than 1 sec for ceMRA results.
13. The system should facility for quantification of the CSF flow data. The same should be preferably on the main console. In case of this application not available on the main console please provide it on the additional workstation as detailed below.

Item Code No.	Department	Section	Item Description
LOT 1-1	Imaging Equipment	MRI	1.5T MRI Complete with Injector Pump
14. The system should have the Hydrogen, Single Voxel spectroscopy, Multivoxel, multislice 2D, 3D Spectroscopy and also the Chemical shift imaging in 2D/3D. The complete processing/ post-processing software including color metabolite maps should be available			
15. Advanced Cardiac Applications: Morphology/wall motion; perfusion imaging; Myocardial viability imaging; Cardiac function including EF, ED/ES volume, Cardiac output, wall thickening and wall thickness; Cardiac Tagging Techniques; Coronary artery techniques			
16. The system should have prospective ECG triggering and retrospective gating with navigator pulses, interactive or automatic definition of the ventricular and myocardial contours, cine imaging, grid tagging etc. Besides this comprehensive set of all post processing			
17. The system should be supplied with ECG Trigger; respiratory trigger, peripheral pulse trigger and external trigger Electrodes			
18. The system should have facility to do Head to Toe imaging without shifting the patient at one go for metastases study (DWIBS) and without any loss of SNR.			
19. It should be possible to have the prostate spectroscopy in conjunction with the endorectal coils to be quotes as item 3.4.13. Please include any other interface, or hardware and software required for this application.			
20. The system should be available to perform Multi Direction Diffusion weighted imaging /Diffusion Tensor Imaging and the same should be possible on the main console.			
21. The system quoted should have image pasting software on the main console for ease of use.			
22. The system should be quoted with motion correction software for uncooperative Head patients, It should be possible to have the same routine in T1, T2 and FLAIR imaging.			
23. The system quoted should have the software for Whole Body Diffusion weighted imaging (DWIBS)			
24. The system should have acoustic reduction techniques to reduce acoustic noise to the lowest level. Please specify noise reduction technology and reduction amount.			
25. The system quoted should be able to do multi contrasts in a single image to save time.			
Workstation and documentation			
1. The additional 5 workstations in number with parallel licences for concurrent use by more than one radiologist and also for academic use by students. The workstations should be vendor neutral to integrate with any modality with preferably the same user interface as of the main console with the availability of MPR, MIP etc. It should have 18-inch LCD monitor, with hard disk of at least 50 GB for at least 95000 image storage in 256 x 256 matrix, and 2 GB RAM.			
2. Image documentation should be possible from the main as well as the workstation(s).			
3. The workstation should have display of Cardiac cine images in movie mode with rapid avi creation.			

Item Code No.	Department	Section	Item Description
LOT 1-1	Imaging Equipment	MRI	1.5T MRI Complete with Injector Pump
4. The workstation should have availability of Cardiac post processing capabilities: calculation of ventricular area/volume, stroke volume, ejection fraction, relative ejection fraction, calculation of myocardial thickness, Time volume diagram generation.			
5. The perfusion analysis should have capability to calculate color display			
6. Processing of 2D/3D CSI data with color metabolite mapping, if not offered/available on the main console as mentioned in point 3.7.14 should be quoted here.			
7. Processing of Real Time BOLD imaging data sets for color overlay of functional and anatomic data, if not available on the main console should be quoted here. It should be possible to have Real Time BOLD image processing for the complete brain.			
8. The system should facility for quantification of the CSF flow data on the main console, if not offered/available on the main console as mentioned in point 3.7.13 should be quoted here.			
9. The post processing workstation should have software package for analysis of the vessel disease with the possibility of detection of vessel segments and to quantify the changes in vessel size.			
10. Volume Rendering Techniques software for visualization of complex anatomy.			
Multiformat Dry Laser Imager			
1. Dry imager - DICOM 3.0 (or newer version) compatible, Dry chemistry. 600 DPI or more, with at least two film drawers. 14 x 17 "(35 x 45 cm) and 14 x14" (35 x 35 cm) size. 2. System must provide complete batch filming with means to adjust image contrast and density. 3. Imager must be controlled for exposure from the operator's console and any workstation. An interlock/indicator system must be provided to prevent image production from one console, being intermixed with images from other consoles. 4. Automatic transport system. 5. Remote keypad, contrast inversion, 35mm adaptability. 6. Should be connectable to multiple modalities like CT, MRI, Angiographic systems, Ultrasonography, with online PACS necessary interface provided. Filming must be possible with all modalities mixed on a film. 7. Must be able to do serial processing imaging system wise when multiple systems are connected to the processor. 8. All needed software and hardware must be provided.			
Accessories			
1. MRI Compatible O2 patient monitor			
2. Patient Comfort Kit for different body parts(head, knee, shoulder etc) two for each to provide adequate support)			
3. Portable metal detector with battery loader ? entry metal detector vs hand held metal detector			

Item Code No.	Department	Section	Item Description
LOT 1-1	Imaging Equipment	MRI	1.5T MRI Complete with Injector Pump

4. MR compatible Injector (Dual head): Must have Independent dual Syringe power head and console must have full color touch screen with user-defined protocols with programmable interscan delay.

Environmental factors

1. The unit shall be capable of operating continuously in ambient temperature of 30^0 C and relative humidity of 80%
2. Chiller System
3. All the shielding requirements of the room will have to be done by the supplier.

UPS and Power supply

1. Power input to be 220-240VAC, 50Hz, /440 V 3 Phase
2. UPS of suitable rating shall be supplied for complete system with minimum 8 minutes backup
3. Voltage stabilizer with suitable rating will be supplied

Standards and safety

1. Should be FDA and/or CE approved product
2. Electrical safety conforms to standards for electrical safety IEC-60601 / ISO-13450

Warranty

1. 24 months from the date of satisfactory installation & handing over to the department.

Maintenance

Comprehensive maintenance contract (CMC) for the complete system will start after expiry of the warranty period. This will include replacement of spares including all consumables and sealed units, liquid Helium and labour. The contract will also include the recommissioning of the system in the event of magnet quench for whatsoever reasons. The maintenance contract will also cover comprehensive maintenance (Labour + spares) for UPS including batteries. Note that any Liquid Helium lost due to quenching or due to any other causes during the guarantee period shall be borne by the firm. System spare parts availability should be guaranteed for at least 10 years from the delivery of the system.

Documentation

1. Two sets of operational/service/application manuals (Hard and soft copy) are to be provided along with the equipment.
2. Detailed documentation on various sequences, spectroscopy, application software and evaluation software etc. are to be provided and the same must be updated regularly for next 10 years as and when these are released.(Timely software updates are key)
3. Supplier is required to ensure mailing of product/research newsletters (on MRI and MRS) released from their R&D sites to the Hospital on a regular basis. This is to keep this centre abreast of the latest developments taking place in system technology and research techniques.

Item Code No.	Department	Section	Item Description
LOT 1-1	Imaging Equipment	MRI	1.5T MRI Complete with Injector Pump

4. The vendor is to provide a tender compliance sheet by giving all the necessary specifications, which should be supported by printed documentation sheets and certification of each item. In the absence of such documentation, a letter from the principals of the company should be provided.

Software up gradation

Software upgrades for the core system and all related applications for next 10 years to be provided free by the firm as a matter of routine as and when these are released, inclusive of minor hardware changes.

LOT 1-2 FULLY LOADED 256 SLICES COMPUTED TOMOGRAPHY (CT) SCANNER SYSTEM COMPLETE WITH INJECTOR PUMP

Item Code No.	Department	Section	Item Description
LOT 1-2	Imaging Equipment	CT-Scanner Room	Fully Loaded 256 Slice CT Scanner complete with injector pump.

General Description

SPECIAL INSTRUCTIONS:

a) The Companies with higher/better configuration in their product will be considered for consideration.
b) Specifications quoted are essential requirements of this equipment.
c) When required, additional information should be provided as a separate document referring to the specific section being addressed.
d) The detailed specifications that follow shall be understood to be the minimum required.
e) The system quoted should be latest state of art top of the line. The system should have 256 or more physical rows of detectors capable of Dual Energy applications. The scanner should be capable of comprehensive whole-body imaging including cardiac, abdomen, neuro and vascular imaging applications, true isotropic volume acquisition. It should also be capable of 3-D reconstructions at fast speeds, quantitative calcium scoring in the vessels using all documented quantification algorithms, 3-D image display during acquisition on-line as well as real time, 3-D vessel imaging with feasibility for volume rendering.
f) The KeNRA compliance for the equipment and its installation would be responsibility of the supplier.

THE OFFER SHOULD MEET THE SPECIFICATIONS AS CAPTURED BELOW:

DETECTOR:

1. The Detector Offered should be Solid State. Specify the Material.
2. The 256-acquisition slice or more per Rotation should be possible. (Specific 256 MDCT)
3. Specify the Fan Angle of the X rays and the geometry. The detectors should not require frequent calibration.
4. Specify the number of rows and the total number of detector cells.

GENERATOR:

1. The X ray Generator should be compact and inbuilt in the Gantry.
2. The System X ray power should be 100 kW (actual power) and above.
3. The mA range available should be between 20 to 800 mA or more with increments in steps of not more than 10 mA.
4. Specify various mA-KVP combinations available.(Kv values to be confirmed(80-160)

X-RAY TUBE:

1. It should be suitable latest technology X-ray tube with high heat dissipation rate at least 1000HU/min. High heat storage capacity 7.0 MHU or more for uninterrupted operation.
2. The X ray Tube should be essentially Dual Focus. The heat storage capacity should be 7 MHU or equivalent. Specify the method and technique of cooling. Range of temp. .....
3. Specify the focal spots of the X-ray tube - smaller focal spots preferred. = 0.7 mm (fine) 1.2mm (broad)

Item Code No.	Department	Section	Item Description
LOT 1-2	Imaging Equipment	CT-Scanner Room	Fully Loaded 256 Slice CT Scanner complete with injector pump.

4. Any special feature of the X ray tube to be highlighted with literature.
5. Please provide the acquisition and construction parameters to achieve these specifications.

GANTRY:

1. The CT Scanner should have low voltage slip rings incorporated in the gantry.
2. The Minimum scan time for a 360 Degree rotation should be less than or equal to 0.35 seconds.
3. The gantry should be provided with User control panels on either side for easy positioning.
4. At least 40 mm detector with 256 or more acquisitions should be available. The system should be in position to perform 256 acquisition Slices/ Rotation for general, cardiac/vascular applications. (Specify the submillimeter slice thickness 0.3 mm) pending confirmation
5. Aperture should be at least 70 cm.
6. The Scan Field of View (FOV) in acquisition mode should be at least 20 to 50 cm ~~or more~~ with intermediate steps for scanning different anatomies.
7. ~~Should be provided with user control panels on both side of gantry.~~
8. The gantry should have 3D positioning laser lights.

SPECTRAL IMAGING

The 256 slice CT system should be capable of performing Spectral imaging for;

- Lesion Enhancing Characterization: The CT should provide HU Spectral curves that can provide information to help characterize enhancing vs. non-enhancing lesions
- Metal Artifact Reduction: Reduction of beam hardening artifacts allow for clearer visualization of anatomy in the presence of metal implants that may have been previously obscured.
- Kidney stone characterization: The system should provide information of the chemical composition of renal calculi by calculation and graphical display of the spectrum of effective atomic number. (? Dual CT capability)

The system should allow for the primary review of monochromatic energy images at user selectable energy levels, detailed analysis using material density images (such as iodine, water calcium, etc.

PATIENT COUCH:

1. Table should have a metal-free scannable range of at least 200cm.
2. It should be capable of carrying at least 250 Kg of load.
3. Carbon fiber tabletop with adjustable horizontal and vertical movement. Mention the length (200 cm and width of the table (60 cm).
4. The Minimum tabletop height should not be more than 65cms from the floor level for easy transport of trauma patients.
5. The Floating tabletop width should be at least 40 cms for better comfort.
6. The vertical range should be at least 55 cms (max height - min height).
7. Manual movement of the table should be possible in case of power failure.
8. Remote UP/DOWN, Forward/Backward should be standard.
9. Specify the reproducing accuracy of the table. Latest technology with highest accuracy nearing 100%
10. All standard table accessories (like patient restrain kit, coronal head rest support, table extension head holder, table pad, arm rest, IV pole, cushions etc.) should be available.

TOPOGRAM:

Item Code No.	Department	Section	Item Description
LOT 1-2	Imaging Equipment	CT-Scanner Room	Fully Loaded 256 Slice CT Scanner complete with injector pump.

1. Views: should be feasible in in AP, RLAT, PA, LLAT (preset); or any angle from 0° - 359° (manually selected).
2. Should be possible to interrupt acquisition manually if necessary.

SPIRAL/HELICAL SECTION:

1. The range of Spiral facility in Axial Direction should be not less than 200 cms.
2. The Reconstruction Time in Spiral scan should be not less than 800 images per second.
3. The system should have facility & ability to track Contrast medium to trigger scan should be included in the scope of Supply.
4. High Resolution scan package should be offered as standard and Specify the minimum slice thickness for which High Resolution scan package is possible. Slice thickness for HRCT = 0.625mm or less
5. Multi Slice CT Fluoroscopy to be provided as standard.

CONSOLE & PROJECTION:

1. The Console offered should be the Latest Multi-tasking Processors and a menu driven platform with a RAM size of at least 32GB.
2. CT console should be of dual monitor design. The monitor should be: Medical grade, Colour TFT/LCD, The Twin Monitor system should work on either shared or Common database.
3. The display matrix should be at least 1024 x 1024.
4. The reconstruction time for an Axial scan should not be less than 800 images/second.
5. The Hard disk Capacity for both Image and Raw data should be more than 1TB.
6. It should have facility to store at least 250,000 Images.
7. The system should be supported with archiving facility of DVD & CD + External hard drives Main Console
8. DICOM facility to send, store, print, receive, Query/Retrieve, MWM, MPPS etc. should be standard. Patient radiation dose should be displayed on the monitor as well as on the patient films (optional).
9. PC Based connectivity should be standard for easy transfer of Images & Report. The image transfer from main console to (reporting platform/ monitor) projection should be automatic and immediate.
10. Projections & Server: A multimodality client (vendor neutral server) server architecture based solution with minimum concurrent 24,000 slices rendering capacity, with 128GB RAM with storage of minimum 2TB and Additional storage of at least 10 TB on the server. Client hardware specification- 2No. Projecttation with license: Dual quad core processor, at least 16 GB RAM, 1TB hard drive, DVD Writing with medical grade monitor of minimum 2 MP resolution & 3 button mouse.
11. The following software should be provided as standard:
    a. MPR
    b. Minimum and maximum intensity projection. (MIP and MinIP)
    c. 3D volume rendering.
    d. 3D SSD (Shaded Surface Display).
    e. Advanced vessel analysis.
    f. Auto bone removal.
    g. Virtual endoscopy and bronchoscopy.

Item Code No.	Department	Section	Item Description
LOT 1-2	Imaging Equipment	CT-Scanner Room	Fully Loaded 256 Slice CT Scanner complete with injector pump.

h. Dedicated virtual colonoscopy.
i. Time point comparison.

12. Whole organ (brain & body) perfusion CT.
13. Coronary tree analysis: Automated 3D processing of coronary arteries with automated bone removal, calcium scoring and analysis table, stent analysis, LV/ LA analysis. Cardiac functional analysis including EF, LV and LA contour and functional studies
14. CT Cardiac function
15. Neuro DSA with automated bone removal.
16. Neuro-perfusion
17. CT TAVI planning
18. CT oncology + Bone + vascular
19. Fusion CT: fusion of morphological data of CT & MRI.
20. Automatic segmentation of all nodule types and calculates each nodule's volume and diameter measurements.
21. Solution for detecting liver lesions with flexibility and exceptional performance. Automatic detection of portal venous phase. The solution should provide Automatic liver segmentation, Intelligent user guided segmentation algorithms to size liver lesions, etc.
22. Oncology software to determine lesion volumes and contour

DUAL ENERGY APPLICATIONS:

1. Advanced Dual Energy Applications to be provided specifying the technology used
2. Advanced Dual energy application must be possible on all projecttation and all fields of view with minimum FOV 33cm.
3. Also Specify if the Advanced Dual Energy Applications like Metal Artifact Correction I Beam Hardening artifact Correction, Brain Hemorrhage are available in the system.

APPLICATIONS:

1. The system should have standard software like 3D Volume rendering, MIP, CT angio, color angio Display, CT Perfusion, should be available as standard on the system.
2. The following software should be offered as standard (MPR, ROI, VOLUME CALCULATION. CT NUMBER DISPLAY. WINDOW WIDTH. WINDOW LEVEL, TOPOGRAM DISPLAY. CINE DISPLAY, HRCT LUNG/ T-BONE, DYNAMIC SCAN)
3. Cardiac Scan Attachment with ECG Gated Segmented Recon, Calcium score, Vessel Flythrough of the Coronaries should be available with software package.
4. Intelligent motion correction to reduce blurring artifacts due to motion in coronary vessels that cannot be addressed by gantry speed alone should be available.
5. Automatic display of MPR Images after scan will be preferred.
6. Bolus triggered Brain Perfusion CT study (at least 3-level) with automatic CBF, CBV, MTT, TTP maps, ROI placing, comparing ROI, saving maps
7. Neuro DSA with automatic bone removal software
8. Fusion CT: fusion of morphological data obtained on CT, MR or DSA

DOSE REDUCTION TECHNIQUES:

1. Noise Suppression protocols to maintain LCR at low dose should be standard.

Item Code No.	Department	Section	Item Description
LOT 1-2	Imaging Equipment	CT-Scanner Room	Fully Loaded 256 Slice CT Scanner complete with injector pump.

2. Special Software (Like MA Modulation in Routine & Cardiac Mode) to ensure Dose efficiency should be standard.
3. Specify the CT Dose Index.(As per standard 70 kg man)
4. Should have iterative reconstruction technique for X Ray dose reduction.
5. Low dose Paediatric CT mode should be available
6. Radiation dose reduction technique i.e. mA modulation in X, Y & Z axis, etc.
7. It should have iterative image reconstruction capabilities.
8. Patient radiation dose should be displayed on the monitor.

ACCESSORIES: (Make and Model of all the quoted accessories should be specified)

1. Dry chemistry printer of DPI 500 or more of any reputed make with 500 Nos of films.
2. Lead Glass as per IAEA Standards: 120 x 80 or more
3. UPS with Maintenance free batteries capable of at least 10 minutes back up to run the entire CT, Computers, Dry chemistry camera, Projecttations etc.
4. Dual Head Pressure Injector of reputed make with 500 Syringe pack that is inclusive of spike and connector tubings as startup kits. Specify the make of Injector.
5. Multi Para patients monitor min. 12inch, ECG, SP02, NIBP for monitoring vitals.
6. LIGHT WEIGHT lead aprons (0.25mm Lead equivalent) with hangers· 4 Nos.
7. Lead apron stand - 1 No.
8. Thyroid Shields - 2 nos.
9. Gonadal Shields - 2 nos.

CERTIFICATIONS:

1. Offered model should be European CE or US FDA approved. Copy of certifications should be submitted with bid
2. The system should be KeNRA Approved, and the manufacturer licensed by NRA Kenya.
3. Regular QA according to KeNRA/IAEA norms will be responsibility of bidder during warranty and CMC period.

Implementation & Project Management (PM) Services

PM Services (Clinical & Technical)

The bidder should have Project Management experience for implementing the solution. Bidder should include PMP certification for Project Manager(s) proposed. The bidder should also propose a recognized Project Management Methodology and provide structures as per the proposed methodology (Project Plan, Gantt Chart, Org. Structure, Change Management etc.)

The Project Plan should also include a detailed Implementation Schedule, Risk Management Plan, Responsibility Plan, Escalation Plan etc. In addition, it should state the Bidder's assessment of what it expects the Purchaser and any other party involved in the implementation of the System to provide during implementation and how the Bidder proposes to coordinate the activities of all involved parties;

5.4Implementation Services

The bidder should provide implementation services for the solution proposed using a recognized methodology. The bidder should provide a detailed implementation blueprint with sufficient granularity to provide accurate estimates of time and resources.

5.5 Training

5.5.1 Clinical Application End User Training

A detailed Clinical Application End User Training proposal should be provided. The proposal should include the different categories of training, (radiologist, radiographers, biomed, physicists) the number of people (in each category) who will be trained, the mode of training, duration of the training, location and evaluation of the training provided.

5.5.2 Technical Training

Technical training for a minimum of three weeks for each piece of equipment supplied. Training shall cover operation, daily upkeep and maintenance including calibration and may be on-site or at a suitable central training location, with all expenses covered by the tenderer.

5.6 Clinical Adoption Services

As the Ministry of Health gears towards achieving the e-health goals, there should be continuous system utilization in line with the e-health strategy. The bidder should provide a detailed proposal on how they will achieve continued system utilization. The proposal should include all the steps that will be taken by the bidder to ensure that the system is efficiently and effectively adopted and its continued usage for the 7 years.

Bidder should also provide adequate dedicated resources per county to ensure that users are continuously and properly utilizing the systems in line with the hospital workflows. For all Level 6 hospitals, bidder should provide a minimum of 2 resources to ensure service continuity and optimized usage of the systems provided. This will also be in line with the uptime requirements for all equipment proposed.

5.7 Equipment Support and Services

Onsite and Remote Support Services

The bidder should provide a detailed proposal for Onsite and Remote Support Services. The details for onsite support should include – Number of onsite resources, service levels to be provided, their level of skill and exact support tasks that they are expected to provide.
To ensure uptime the bidder should have dedicated personnel who can easily access the hospitals and provide the necessary support required. This will be subject to regular audit.

The details for Remote support services should include scenarios on when remote support services can be invoked, channels of communications and expected SLAs.

5.8 Call Center

The bidder should include a dedicated call center with hospital queries

- Should be available 24/7
- Minimum six (6) personnel

5.8Technical Support

The bidder should provide two-year warranty and 3 years Comprehensive Maintenance Contract.

LOT 1-3 Digital General x-ray System with fluoroscopy

Item Code No.	Department	Section	Item Description
LOT 1-3	Imaging	General X-Ray Rooms	Digital General x-ray System with fluoroscopy

1. General Description

High Frequency X-Ray Unit for general radiography with digital flat panel technology ? where is the description for fluoroscopy?. The system should be capable of both erect and supine radiological examinations. The unit should be completely integrated with the following specifications. All software updates should be provided in warranty & CMC period.

2. Composition (Excludes fluoroscopic elements)

2.1.	Two No. Flat Panel Detectors (Built-in), one for Bucky Table and one for Vertical stand
2.2.	Generator
2.3.	X-Ray Tube and Collimator
2.4.	Ceiling suspended 3D Column Stand

3. Description of the medical supply unit design type

3.1. **Flat Panel Detector:**

a. Flat Panel Detector size of at least 40 x 40 cm or more
b. Detector Panel should be made of amorphous Silicon with CsI or equivalent
c. Image matrix size at least 2000 x 2000 or more
d. Minimum pixel should be 200 micron or less
e. Grey scale of 12 bit.
f. A/D of 14 bit or better.
g. Tube assembly movement to be automatically synchronized with the detector movement.
h. Preview time after exposure 7 sec or less
i. Image processing time should not be more than 9 sec.
j. DQE (Detective Quantum Efficiency) at 0lp/mm should be at least 65% or more.

3.2. **Generator**

a. X-ray generator should be of microprocessor controlled high frequency (mention the frequency) type with latest technology having constant output with low ripple frequency.
b. Output 80 KW or more.
c. KVP range 40 kV - 150 kV with 1 kV steps.
d. Output 1000mA or more at 80 KV or better.
e. KV/MA output specifications.
   1000 mA at 80 kv.
   800 mA at 100 kv.
f. Minimum exposure time should be 1 ms or less.
g. It should have automatic exposure control (AEC) device
h. It should have digital display of KVP and mAs.
i. Anatomical programming radiography should be possible
j. It should have over loading protection

Item Code No.	Department	Section	Item Description
LOT 1-3	Imaging	General X-Ray Rooms	Digital General x-ray System with fluoroscopy

3.3. **X-Ray Tube**

a. The X-Ray Tube should be rotating anode high speed (8000 rpm or more) compatible with the generator and must have dual focus.
b. Focal spots of the following sizes:
   Large Focus: 1.2mm or less
   Small Focus: 0.6mm or less
c. X-ray tube loading should be at least 30KW for small focus and at least 80KW for large focus.
d. X-ray Tube with Anode heat storage capacity of 300kHU or more
e. Tube protection against overload
f. Target angle should be at least 12 deg
g. A high-speed rotor accelerator (starter).
h. Please specify tube rotation at vertical axis and horizontal axis.

3.4. **Ceiling suspension**

a. Ceiling suspended 3D Column stand with facility of automatic positioning and Synchronization
b. Movement in all direction should be easily possible
c. It should have auto-tracking and auto-positions functions
d. Monitoring of all the position data on colour touch screen for system control (kV, mAs, SID, tube angle, column angle)
e. SID (Source to Image Distance) in vertical positions150 cm or more, in horizontal position 180 cm or more.

3.5. **X-Ray Table**

a. Free floating Carbon fibre or equivalent tabletop table with low attenuation.
b. Anti-collision control system.
c. Table should support patient weight of 200 kg. or more.
d. Auto-tracking capability without mechanical link.

3.6. **Vertical Bucky stand (wall Stand)**

a. Motorized, counter balanced adjustable height vertical Bucky for the digital flat panel detector
b. Detector movement should be synchronized (auto-tracking) with movement of X-Ray Tube
c. Bucky should have a grid ratio 10:1 or more.

3.7. **Filter & Collimator**

a. Inherent filtration of at least 1.00mm Al.
b. Square collimation: manual 85 motorized, should be controllable by organ programming.
c. Full field light localizer;
d. Rotation of +/- 45 deg or more;
e. Display of collimation, filter 86 SID;

3.8. **Operating (Acquisition) Station**

Item Code No.	Department	Section	Item Description
LOT 1-3	Imaging	General X-Ray Rooms	Digital General x-ray System with fluoroscopy

a. Should have a high resolution TFT / LCD Monitor of minimum 19 inch size or more fully flat with minimum 1024 x 1024 or more display matrix and anti-reflective front screen
b. Please specify Image matrix size.
c. Operating console should have a facility for patient identity entry, viewing and processing images, documentation etc.
d. Preview image should be ready in minimum time. 1 sec
e. System should have auto protocol select
f. System should have latest processor with at least 8GB or more RAM and 2TB or more storage capacity

3.9. **Image viewing, post processing, reporting and documentation station**

a. It should have latest operating system.
b. 19" or more LCD/LED high quality reputed international make medical grade monitor of minimum 2MP resolution must be provided. Consider 1080p HD
c. Image display should be of high resolution.
d. High luminance display for diagnostic image viewing.
e. Post-acquisition image processing, viewing, reprocessing, hard copy documentation and onwards transmission should be possible.
f. Image processing functions like rotate, mirroring, zoom, move, windowing filter should be possible.
g. Should be connected to Dry chemistry camera for documentation. Multi format printing should be possible with user selectable options.
h. It should have CD /DVD and USB writing facility.

3.10. **Image storage and Transmission**

a. Hard disk storage capacity should be of 10,000 or more images
b. The system should support storage of images on compact discs/DVD and USB
c. The system should be DICOM 3.0 (or higher version) ready (like send, receive, print, record on CD/ DVD, acknowledge etc.) for connectivity to any network computed/PG-etc in DICOM format.
d. Easy integration and networking should be possible with any other existing future networking including other modalities HIS, RIS & PACS at no extra cost.

3.11. **DAP: Automatic collimator must be mounted on X-ray tube and collimator must have an integrated dose area product (DAP) meter. Output of DAP meter should be visible in console.**

3.12. **Accessories**

a. Dry Chemistry Camera. Should have 500 DPI and should print at least 3 sizes of films:
   8x10, 14x17, 10x12 or 11x14 inches. At least 200 films of each size to be supplied as start up.
b. Online UPS along with batteries of appropriate rating to give 30min. back up to operate the complete system including X-Ray machine and Imager.
c. Lead aprons with hangers- 4 Nos.

Item Code No.	Department	Section	Item Description
LOT 1-3	Imaging	General X-Ray Rooms	Digital General x-ray System with fluoroscopy

d. Stand for lead aprons-1

3.13. **Approvals**

a. The equipment should have US FDA or European CE with four digit notified body number certificate and certificate to be submitted.
b. The system should be IAEA and KNRA type approved
c. Regular QA according to KNRA norms will be responsibility of bidder during warranty and CMC period.

3.14. **Power supply:**

a. Suitable Power input to be 220-240VAC, 50Hz OR 3 PHASE of appropriate rating Standards and safety and training
b. Electrical safety conforms to standards for electrical safety
c. Safety aspects of Radiation dosage leakage should be spelt out
d. Certificate for calibration should be provided.

3.15. **Documentation**

a. The supplier must provide User manual/Technical Manuals in English both in soft and hard copies
b. Attach original manufacturer's product catalogue and specification sheet.

LOT 1 -4 Digital Mammography Unit

Item Code No.	Department	Section	Item Description
LOT 1-4	Imaging	Mammography	Digital Mammography Unit

1. General Description

1.1. Should be an advanced high-end digital mammography machine which allows fast, low-dose, high-quality 3D imaging of the breast.
1.2. System should be upgradable with latest technology available in future. There should be proof of upgradability required.
1.3. Tomosynthesis capability

CAD (Computer aided diagnosis)

A. GANTRY ASSEMBLY:

- The system should consist of a tube head and detector assembly that has isocentric rotation for every positioning. The angle of C-arm movement shall be displayed.
- The isocentric movements should be motorized. The patient Compression device should have automatic multispeed variable compression system which senses the breast density and adjust the compression force.
- Magnification devices of ratio 1.5 and 1.8 x should be offered.
- At least a pair of two-foot switches should be provided for compression.
- Digital display of motorized and manual compression force and compression thickness should be available on either side of gantry.
- Grid ratio should be mentioned. (order of 5:1)
- Mention about grid/breast support assembly system.
- The compression should be extremely smooth and there should be automatic decompression at the end of each exposure.
- There should be a safety mechanism for compression with respect to power failure.
- Two compression paddles for small and large breasts with Regular sliding movement.
- Round spot and square spot compression paddle or equivalent.

B. X-RAY GENERATOR:

The X-ray generator should be high frequency with the following parameters:

- KV range: at least 20-35 kV in steps of 1 kV.
- mAs range: 2-500 mAs or more.
- Exposure time: 10ms – 4 sec. or better.
- Maximum mA: 200 mA or higher.
- Exposure parameters should be displayed.
- Should display the dose delivered after each exposure on the display and film.
- Automatic exposure control device should be provided.

C. X-RAY TUBE UNIT:

- Dual focus rotating anode tube with Focal spot size: 0.1 mm and 0.3 mm.
- Anode heat storage capacity should be at least 150 KHU or higher.
- Please mention the material of anode and advantages. Molybdenum. Mono material preferred.

Item Code No.	Department	Section	Item Description
LOT 1-4	Imaging	Mammography	Digital Mammography Unit

- Should have at least two filters. Please mention the material used in the filter and its thickness.
- Tube heat storage capacity of 2 MHU or more.

D. FLAT PANEL DETECTOR:

- Type of detector: should be amorphous selenium.
- Direct Capture Technology or needle capture technology (please specify)
- Detector size: 24cm x 29cm or more with two image format.

Please mention the expected lifetime of the detector.

Image matrix in pixels: large size 3000X3500 or more Small Size: 2000X2500 or more. No Ghosting or lag effect should be present; image depth should be at least more than 12 bits.

E. DIGITAL ACQUISITION SYSTEM:

- Storage capacity should be 10000 images or more.
- Should provide Dual 5 Megapixel Grayscale medical grade LCD image monitor minimum 19' with high luminance.
- State of the art associated software technology should be available with the data acquisition system. Kindly mention the features advantages and upgradability.
- It should be possible to receive the demographic patient data directly from Hospital Information System. The demographic patient data should also be able to be entered manually. Retrieval of images from CD, DVD or PACS should be possible.
- It should be DICOM 3.0 ready and should have the facilities for connectivity.
- Film prints and CD, DVD copying should be possible.
- Dry Laser camera with at least 3 online film trays compatible for film sizes of 10X12' and 14x17' inches, 500 dpi or more for printing the digital images should be supplied. System should allow user to take print out in user defined format.
- Latest technology: Highly effective computer aided detection (CAD) digital mammography solution for early detection of cancer. There should be advanced technology for identification of micro calcification and suspicious lesions.

F. REVIEW WORK STATION:

- High performance Dual Processor CPU with clock speed 3 GHz of higher. (Branded company product).
- Memory of 4 GB High Speed RAM or better.
- Local image storage of min 1TB or higher.
- Video board resolution of 1024 grey levels (10 bit).
- Monitor Resolution 5000 x 5000 pixel.
- Dual high contrast resolution 5MP LCD medical grade monitors minimum 19" should be provided (Branded company product).
- Multi-modality viewer capability for display of ultra sound, x-ray, digital mammography, , CT, etc.

The following imaging processing should be possible on the work station:

a. Measurements, distance angle, volume, density.
b. Zoom, roam, pan, magnification, Quadrant zooming or selected zooming.

Item Code No.	Department	Section	Item Description
LOT 1-4	Imaging	Mammography	Digital Mammography Unit

c. Brightness and contrast adjustment.
d. Image inversion.
e. Position correlation
f. Contrast enhancement processing.
g. Flip rotate inward, 360 rotation
h. Annotations, measurements.
i. Image evaluation like contrast enhancement histogram display, length measurements before and after comparison etc.

User selectable screen layout from the available combination. There should be a CD, DVD and USB ROM drive available.

G. DIAGNOSTIC REVIEW SOFTWARE TO BE AVAILABLE:

- Advanced mammography specific hanging protocols.
- Customizable user environment including hanging protocols.
- Advanced Session Scheduling function.
- Easy image export to communication graphic format for use in presentations.
- Intelligent Roaming.

ACCESSORIES:
Breast skin markers of different sizes and shapes (A, O, S, X and box shaped) starter pack (5 of each)

H. OTHERS:

a. Should be supplied with transparent lead radiation shield, face shield, remote service modem, quality control tool kit, user and technical manuals etc.
b. Dedicated online UPS (Branded company product) for the entire machine and accessories supplied including the work station shall be provided for a minimum backup of at least 30 minutes. UPS rating to be 1.25 X rating of the unit (minimum 30 KVA).
c. Should be supplied with ACR phantom, phantom for calibration of AEC, phantom for calibration of image detector, flat panel detector, quality control kit.
d. The digital mammography unit with all features as per specification shall be FDA and CE.
e. Operating environment must be conducive for optimum operation of the machine

I. TRAINING:

- Training for mammography equipment use should be arranged for radiographers and radiologists until they are familiarized with the machine operation.

LOT 1-5 Digital C-Arm (Minimum 12-Inches)

Item Code No.	Department	Section	Item Description
LOT 1-5	Imaging	C-Arm	Digital C-Arm (Minimum 12-Inches)

1. General Description

Mobile C-arm Digital Imaging System on anti-static castors; easy to maneuver and capable of undertaking orthopedic and angiographic procedures

1.1. The system must be of state-of-the-art design and enable mobile Fluoroscopy and radiography of the complete skeletal system Chest and abdominal organs.
1.2. The system must have sufficient capability to provide high quality imaging on large and small patients, with no, or minimal deterioration in image quality.
1.3. The system must have a minimum of 30" free space between the x-ray tube and the image receptor.
1.4. The C-arm depth must be a minimum 24" in depth to provide C-arm clearance around the patient and table.
1.5. The C-arm must provide a minimum of 115˚ C-arm orbital rotation, 90˚ under-scan and 25˚ over-scan capabilities.
1.6. The system must allow user to reverse the x-ray tube and Image Intensifier positions and maintain C-arm under-scan and over-scan capabilities.
1.7. The C-arm must be able to rotate 180˚ to facilitate angled projections.
1.8. The system shall have a minimum of 18" of vertical C-arm travel for height adjustment.
1.9. The C-arm must provide side-to-side movement and horizontal travel to allow for "panning" during imaging.
1.10. Shall be counter-balanced in all positions.
1.11. Shall include a laser positioning system.
1.12. Generator Requirements
1.13. The generator must be a 60 KHz or higher high frequency inverter type, microprocessor controlled.
1.14. The output power rating of the generator must be 15 kW or greater.
1.15. The system shall be capable of performing examinations on large patients.
1.16. The generator shall be capable of providing a high dose fluoroscopic exposure at a minimum of 15mA.
1.17. The generator must be capable of providing pulse fluoroscopy.
1.18. The generator must be capable of providing cine pulse mode for cardiac & vascular imaging to reduce imaging lag caused by patient motion or C-arm movement with DSA digital subtraction angiography.
1.19. The mAs range in radiography mode must be approximately 1 to 300 mAs
1.20. The generator must meet the following minimum power requirements:

- Radiographic kVp range: 40 – 120 kVp
- Radiographic mA range: 50 mA or higher
- Fluoroscopic mA range: 20mA or better
- Fluoroscopic kVp range: 40 – 120 kVp
- The Vendor must complete the following:
- Trade name of quoted generator ____
- kW ____
- KHz high frequency ____

Item Code No.	Department	Section	Item Description
LOT 1-5	Imaging	C-Arm	Digital C-Arm (Minimum 12-Inches)

- KVp range ____
- Fluoroscopy mA range ____
- Pulsed fluoroscopy in pulses per second ____
- Digital spot maximum mA ____
- Pulsed fluoroscopy maximum mA at what PPS ____

1.21. X-Ray Tube
1.22. The X-Ray tube must be a rotating anode X-Ray tube.
1.23. The focal spot size shall be 0.6 mm to 0.8 mm dual focal spots for fluoroscopy and 1.2mm to 1.5mm for radiography.

- The Vendor must complete the following:
- Anode heat capacity ____
- Anode cooling capacity ____
- Cooling rate ____
- Housing heat capacity ____

1.24. The system should have a warning for the user before and when the anode reaches its maximum heat storage capacity
1.25. The anode temperature should automatically be monitored for its protection?
1.26. State the system dose management capabilities.
1.27. Imaging System
1.28. The system shall have a 12" tri-mode image intensifier.
1.29. State type of video capture device.
1.30. Monitors must be at least 16" dual monitors with 1 ? 2K or K2 resolution. Flat panel LCD type antiglare
1.31. Extra large screen academic monitors(For lecture theatre and outside the C-ARM/ Fluoro room
1.32. The system must provide an ambient room light sensor to automatically adjust the monitor brightness for optimum image display (Automatic Brightness Control).
1.33. Digital Image Processing
1.34. Shall have automatic brightness control.
1.35. Shall have noise filter.
1.36. Shall have motion artifact and noise reduction.
1.37. Shall have edge enhancements.
1.38. Shall have minimum of 1 TB image storage.
1.39. Shall have last image hold.
1.40. Shall have patient & image information annotation.
1.41. Shall have dose summary.
1.42. System Functions and Image Management
1.43. The system must provide a simple method to input patient information.
1.44. The system shall be equipped with a backlit X-ray control panel that allows for operation of the system in dim light situations.
1.45. The system shall allow for the change of image orientation on the display screen during exposure or using the last image hold. Functions should include: image rotation, left to right and top to bottom image reversals.

Item Code No.	Department	Section	Item Description
LOT 1-5	Imaging	C-Arm	Digital C-Arm (Minimum 12-Inches)

1.46. The system shall provide integration to a laser camera and shall include any & all required software/hardware. Please provide additional options for hard copy printing.
1.47. The system must provide a DICOM 3.0 interface capability that can be connected to the hospital's network to facilitate the transfer of images for archiving and print purposes.
1.48. Networking
1.49. The system must be PACS / DICOM 3.0 & HL-7 compatible / compliant.
1.50. The system must support the following DICOM 3.0 interfaces:

- DICOM print/store
- DICOM Modality Work list Management for HIS/RIS
- DICOM send/receive
- DICOM query/retrieve

2.	Technical documentations				
2.1.	User manuals	2 Sets			
2.2.	Service Manual	1 Set			
2.3.	Drawings	Nil			
3.	Commissioning				
3.1.	Testing and commissioning of the machine including radiation and calibration testing to the satisfaction of the user.				
4.	Warranty				
4.1.	Equipment	Minimum of one year after commissioning on all parts.			
4.2.	Equipment System	Nil			
5.	Maintenance contract				
5.1.	Capacity to provide maintenance and repair service		Vendor/manufacturer shall have adequate facilities, spare parts, qualified and skilled technical staff to offer comprehensive maintenance contract for at least 10 years		
5.2.	Comprehensive preventive and repair service		Provision for a comprehensive preventive and repair maintenance service contract including parts and material for a period of 10 years from commissioning date (see attached annex for details)		

LOT 1 -6 BI-PLANE ANGIOGRAPHY SYSTEM

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
GENERAL DESCRIPTION			
1.	Proposed system should be a dedicated biplane system for non-vascular (biliary stenting, renal stenting, intrathoracic and intra-abdominal abscess draining etc) and vascular (Central and peripheral vascular, neuro angiography and neuro-intervention, cardiac interventional procedures, 3D rotational angio & CT imaging is required for peripheral and neuro diagnostic & interventional procedures		
2.	The system should be state of the art, high resolution flat detector technology		
3.	The Cath lab should be EP (electrophysiology study capable- (workstation, mapping Eg.carTo system, stimulator and Ablator		
4.	The cathlab should have the following auxiliary equipment;- • IFR /IVUS/OCT. (single machine providing all 3 will be preferred) • Rotor blater upgrade (ROTORPRo)		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	• IBP –intra-Aortic balloon pump upgrade • lithotripsy to be provided		
5.	The system should be capable of real time digital angiographic and non-angiographic acquisition.		
6.	**Model/ Version should be recently launched within a period of 2 yrs.**		
7.	**All support services** and spare parts **for the supplied model should be available for at least 10 yrs. from the time of installation**		
	GANTRY		
1.	The system should have two C-arm gantries: one floor mounted and one ceiling suspended providing full body coverage. Both gantry movements should be rapid, motorized and collision proof.		
2.	Manual override by the operator should be possible. Gantry angulations & rotations in both planes, frontal and lateral should be freely user selectable to satisfy clinical imaging needs.		
3.	All movements of the gantries should be controlled from the joystick on the table-		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	side as well as from the control desk.		
4.	The system should have at least user defined 25 programmed positions and angulations of C- arm.		
5.	Both gantries should have fast speed for angulations and positioning. The frontal system should have a speed of at least 15 deg/sec for all positions and lateral plane should have a speed of at least 8 deg/Sec.		
6.	Gantry angulations & rotations in both planes, frontal and lateral should be freely user selectable to satisfy clinical imaging needs.		
7.	System should have an automatic positioning capability as projected from relevant reference image including 3D images.		
8.	Head to toe coverage with any one plane gantry should be possible.		
9.	Full configuration, positioning range, speed, weight of the c-arms with and without the tube / detector assembly should be clearly mentioned in the offer.		
PATIENT TABLE			

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
1.	The table should be ergonomically designed, made of radiolucent carbon fibre, contoured for all neuro radiological examinations & interventional procedures. Suitable soft mattress, easy to clean & to last long should be provided. It should adequately support patients who are tall & heavy weight at least 200 kg		
2.	It should be possible to swivel the table in case of emergencies.		
3.	All patient positioning accessories to be supplied (Head holders-2, Chin support-2, Abdominal compression device-2, Arm support for brachial approach-2, body straps-2, shoulder harness-2, ankle restrainer-2, as well as sand bags for thickness compensation for the head - adult & Paediatric)		
4.	Fully ergonomic foot switch should be provided		
5.	Gantry Collimator & table operations must be possible from control room as well as exam room.		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
6.	Table side controls for 3D reconstruction and C-Arm positioning with respect to 3D image & selection of 3D image with respect to C-arm positioning should be provided.		
7.	The table should have motorized, longitudinal, vertical(up-down movement) travel and floating tabletop for longitudinal and transverse movements with electromagnetic locking facility.		
8.	**Accessories** for the table & table mattress: • Should include Sand bags for thickness compensation for the head. • adult & paediatric (n-1 each), • Arm supports-catheterization arm support (n-2), • Foot support (n-4), • Accessory clamps (n-2)		
9.	It should have the facility for automatic bolus chase for peripheral angiography.		
X -RAY GENERATOR AND TUBES			
1.	The generator should be high frequency (at least 100KW at 100 KV or more)		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	microprocessor controlled for constant output for radiography and fluoroscopy.		
2.	Radiography KVP range should be between 40-125 KV.		
3.	Generator should have automatic exposure control device for radiography, fluoroscopy, and angiography mode.		
4.	Generator should have tube overload protection.		
5.	It should have digital display for KVP & mAs.		
6.	Pulsed fluoroscopy at variable rates for reducing the X- ray dose to the patient during interventional procedures should be possible without image drag during pulsing intervals.		
7.	Anode heat storage capacity for the X- Ray tubes should be at least 2.4 MHU or more having liquid bearing technology or metal lubricant for optimal heat dissipation and noiseless operation. Maximum continuous heat dissipation rate should not less than 3 kW.		
8.	The system should have adequate cooling facility for the X-ray tubes for		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	uninterrupted performance and should have long shelf life. Please mention.		
9.	Cooling rate or Anode Heat Dissipation of X- ray tube should be at least 3000 W or more.		
10.	The system should have adequate cooling facility for the X-ray tubes for uninterrupted performance & should have long self life.		
11.	Adequate filtration for clinical setting should be provided & clearly mentioned in the offer.		
12.	Leakage radiation should conform to international standards. Filtration & leakage radiation dose should be indicated in the offer.		
13.	The lateral plane tube should be mounted on the far side (left of the patient) of the ceiling suspended C- arm to reduce scatter radiation to operator.		
14.	One collimator for each plane with motorized transverse, transverse & hexagonal leaves to be provided. The collimator leaf should have IRIS type arrangement.		
15.	The collimator should have facility for automatic copper		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	pre-filtration for reducing X-ray dose as per patient thickness. Additional filters with multiple leafs should be provided & it should be possible to position these filters & collimators leafs without live fluoroscopy & independent of each other.		
16.	The collimator should have integrated dose measurement chamber to display skin dose on the live monitors in the lab		
17.	Automatic rotation of the displayed live image at all positions of the C-arms relative to the table should be possible, keeping the head-end of the image uppermost in the monitor. It should also be possible to rotate the image from control consoles as per user preference.		
FLAT PANEL DETECTORS			
1.	**Detector in the Frontal Plane should have a minimum of at least 30 x 40cm or bigger.**		
2.	Detector in the Lateral Plane should have a minimum of at least 30 x 30cm or bigger		
3.	Please mention detector zoom fields		
4.	Detector quantum efficiency should be 70% minimum		
5.	Detector pixel size should be at least 200 microns, the lower		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	will be preferred for better resolution.		
	MONITORS		
1.	Six TFT/LCD monitors at least 19″ in size, for each plane for display of live, reference and subtracted image with high resolution flicker free display should be provided or a single high resolution monitor of at least 56″ and 8 megapixel resolution to display live and reference image from each plane, patient hemodynamic monitoring, 3D image and input from external ultrasound. One medical grade 19″ monitors should be provided as back up.		
2.	Monitors should be of flat TFT technology permitting high resolution image display & undistorted viewing from any angle in ambient lighting.		
3.	Similarly Two high resolution medical grade TFT/LCD monitor for live image of both planes and one color monitor for 3D workstation in control room.		
4.	Additional 19″ high resolution **color** TFT monitor should be provided in the examination room.		
5.	The TV stand should be ceiling suspended & easily manoeuvrable to suit the operators viewing.		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
6.	Display of parameters of the tube, radiation dose, C-arm positions & orientation should be provided on the monitors in the examination room.		
PRESSURE INJECTOR PUMP			
1.	Pressure injector pump of stand–alone type desirable. High pressure injector for contrast delivery.		
2.	Feasibility of reusable and disposable syringes.		
3.	100 disposable / reusable syringes to be provided (as starter pack).		
4.	Syringes of at least 150ml capacity with min 200 disposable syringes.		
5.	All accessories including rubber pushes -10 extra numbers		
6.	Make and model of the injector to be mentioned in the offer along with the brochure		
OPERATOR LAMP			
1.	Ceiling- mounted examination lamp, flexibly adjustable towards the user, for diagnostics and minor surgery.		
3.	Luminance: 50,000 Lux (4,650) for 100 cm distance		
4.	Working distance: 70 to 140 cm		
5.	Color rendering index Ra (gen): 96		
6.	Color temperature: 4,3000 Kelvin		
7.	Focusable spot size: 14 to 25 cm		
8.	Light body diameter: 22 cm		
9.	LED Technology light system, Power supply, 230/240 V		
DIGITAL IMAGING SYSTEM & SOFTWARE			

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
1.	Biplane digital pulse fluoroscopy at variable pulse frequencies from 10 to 30p/s should be available at 1024 x 1024 matrix preferably with real time and motion detection.		
2.	Availability of vascular analysis software both in examination room and console room.		
3.	System should be capable of virtual collimation of the shutters and wedges in the last image to reduce the X- ray dose.		
4.	Grab function to allow storage and archiving of both a fluoro image.		
5.	Lower & Upper Body Protection Shield to be provided.		
6.	Pivot or Swivel of the Table should be provided.		
7.	Facility to use the reference image as a roadmap by superimposition of fluoro image on the reference image should also be provided for both planes.		
8.	The Biplane Dual Fluoroscopy mode allows side-by-side display of digitally processed non-subtracted fluoroscopy and trace-subtract fluoroscopy for visualization and catheter guidance during complex procedures.		
9.	It should have an optimum image storage capacity of images in 1024 x 1024 matrix.		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
10.	System should be DICOM compatible and PACS connectivity should exist.		
11.	Archiving of all the patient images on a CD/DVD should be provided.		
12.	The digital system should high resolution subtracted fluoroscopy in both planes (simultaneous & random). It should be possible to display subtracted and native images for both planes simultaneously alongside the reference image in the examination room.		
13.	Automatic pixel shift during road-mapping should be available.		
14.	Access to all series / images should be fast & possible from the control room as well as the examination room.		
15.	Digital rotational angiography at a speed of up to at least 30deg/sec or more should be available.		
16.	System should have advanced image processing techniques for; real time edge enhancement, real time harmonization, real time noise reduction and dose correction algorithms.		
17.	The system should be capable of giving 3D image and CT image from the same acquisition.		
18.	Digital subtraction angiography software for automatic pixel shift, enhancement for iodine and CO2, contrast should be possible.		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
19.	Remote service should be provided for hardware and software remote diagnosis.		
20.	**Subtracted Bolus Chase:** For visualization of lower peripheral vessel structures wherein the contrast bolus is followed interactively by a motorized table scan movement.		
21.	**2D/DSA Roadmap** • Roadmap should have presets application wise (Abdomen, Peripheral & Neuro). • Should also be able to select the procedures like Navigation, Coil, Stent, Glue, and Particle in the Roadmap to visualize different materials.		
22.	**Intervention Tools** • System should have integrated 3D Rotational Angiography application wherein the rotational scan data can be automatically sent to integrated **interventional** tool for creating 3D view for lesion assessment.		
23.	System should have an integrated 3D workstation for reconstruction of images in 3D and display of 3D images and control in examination with following advanced features. • 3D reconstruction using SSD, VRT, MIP in true 512 matrix with colour display in the		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	control & Examination room. • Reconstructive zooming, spine view, calci view automates vessels analysis, computer assisted Aneurysm analysis, virtual stenting & automatic voxel shift should be possible. • Stereoscopic display of 3D reconstructed image on the workstation. If available should be quoted separately as an optional item. • Retrieve & review any image / any series from the system disc independent to the ongoing work on the main system • Retrieve & review any image / any series from the PACS independent of the ongoing work on the main system. • All Post-processing functions for images including fusion of CT, MR and angio images with 3D display & 3D volume measurement. Immediate background transfer of all images as soon as they are acquired, to the PACS. • Compose & hardcopy images independent of the ongoing work on the main system. Split screen function to be provided to facilitate comparison of different sets of images.		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	• It should be possible to view dual density objects in one view to differentiate blood vessels form coils, devices in neuro exams.		
24.	Post processing software facilities with real time edge enhancement, re-masking, peak opacification, image inversion, anatomical background display, windowing, electronic shuttering, roaming, zooming, panning and magnifying with text, arrow and annotation functions should be provided. All essential post processing functions should be possible from table side consoles and from the control room.		
25.	Access to all series/ images should be fast & possible from the control room as well as the examination room.		
26.	The digital system should have facility to acquire & store physiological signals (ECG trace etc) along with the images. All images should register & display the date time, acquisition rate & image number in the series as well as the frame photo file.and radiation dose		
27.	Selection of venous phase DSA image as roadmap should be possible. It should be possible to have independent windowing of live fluoroscopy image and roadmap image.		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
28.	**Soft Tissue Imaging:** CT option to visualize soft tissue by rotational scan of the cathlab gantry. The CT 3D volume can be viewed in control room and examination room also. • Contrast resolution for soft tissue imaging should be up to 5 HU. • Image reconstruction should be fast & automatic • It should be possible to post process CT images (set slice thickness, distance & angle measurement etc.) Both in the control room & the examination room. • It should be possible to fuse the 3D CT data with 3D angio to combine high resolution vessel information with soft tissue information. • It should be possible for different density structures such as bone, contrast filled vessels, stents, clips & coils to be identified separately in image in real time.(Density/contrast resolution)		
29.	**Beyond the clot visibility:** Protocol for viewing the vasculature beyond the clot thru Bolus injection using the retrograde filling. Should have the		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	feature to display Vessel Structures Before and After Occlusions in Ischemic Stroke Intra – venous injection protocol using High Resolution soft tissue CT imaging inside Cath lab.		
HEMODYNAMIC RECORDER.			
	1. 12 channel EKG waveform display. 2. 2 or preferably three invasive pressure display and necessary reusable transducers (10) cables connectors. Display should be adjustable scales with at least 8 different scales (0-20, 0-30 ,0-50, 0-100,0-200.0-300,0-400) 3. dp/Dt Waveform display 4. SPO2 monitoring and display of waveform and value; necessary equipment should address (reusable paediatric/adult clip spo2 sensor, spo2 adapter cable. 5. Should provide 4 transducers. -connector cables 6. Laser printer to be supplied. 7. Should have all calculations packages and		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	pressure wave form analysis, valve area format		
30.	**Subtracted Bolus Chase:** For visualization of lower peripheral vessel structures wherein the contrast bolus is followed interactively by a motorized table scan movement.(run-off)		
31.	**3D Dynamic Road mapping** to reduce contrast and time, should allow overlay of real- time 2D fluoro images, CT images (Acquired in Cath) on the 3D vessel image to see the advancement of the guide wire, catheter and coils on the 3D volume in real time. Roadmap should have presets application wise (Abdomen, Peripheral & Neuro). Should also be able to select the Procedures like Navigation, Coil, stent, Glue, Particle in the Roadmap to visualize different materials.		
32.	The 3D images should be able to superimpose on the acquired CT datasets.		
33.	**2D PERFUSION:** 2D Perfusion high-definition visualizations should be based on special DSA (Digital subtraction angiography) acquisition protocols dedicated per anatomical region or any other equivalent protocols, which should		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	show small blood vessels and parenchymal enhancement • Should support subtracted X-ray exposure runs acquired with a 2D perfusion protocol. • It should be possible to select the individual frames where the presence of contrast is detected to reduce motion artifacts. • 2D perfusion should provide different options for exploring the time-to density curve, which quantifies the presence of contrast at a certain point in time: • By drawing a region of interest (ROI) the curve in the analysis graph should be updated automatically. • In procedures that compare left and right hemispheres, it's possible to draw a mirror line, and compare the perfusion behaviours in the ROI on the hemisphere suspected to have a perfusion alteration, with the normal perfused hemisphere. • Parameters: Mean transit time, Arrival time, Time to peak, wash in rate, width and area under curve.		
34.	CD Recording and Archival		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	• DICOM 3.0 based CD recording for recording on CD/ DVD. CD review DICOM CD's • System should have ability to record DSA runs on the CD and the embedded viewer should support review of these DSA runs at referring physician's PC. • The workstation provided should have the ability to view CT and MR images also. • The complete digital system along with workstation should be networked and connected to a DICOM compatible laser camera and it should be possible to hardcopy from the main system as well as the 3D workstation. All image & photofile transfers from the main system & the workstation should be instantaneous permitting rapid review & hardcopy • The digital system should have software for vascular analysis and quantification including stenosis quantification, auto–calibration (to the catheter ID) automatic contour recognition, slicing, measurement tools for distance (length and		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	diameter), angle, surface area, circumference & volume assessment. All quantification functions should be possible from table side as well as from the control room. • One pressure injectors compatible with the system from branded company or better make, pedestal mounted, single barrel, along with 50 disposable syringes. • Online UPS for the complete system including the X- ray system for both planes with at least 15 min. back up.		
35.	**Radiation Protection:** • Any available special software required for reduction of X-ray dosage given to patient should be offered as part of the standard offer and not as an added option. This includes and encompasses all and any kind of software, image processing tools etc. for reducing dose. It is re-integrated that the basic standard offer should include all the software, hardware etc. for this and related functions. Any offer which includes additional components as options will be summarily rejected.		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	• The system should have integrated computer controlled X- ray beam filtering with copper filters of varying dimensions. • The system should have positioning of collimator blades without radiation exposure. • The system should have monitoring and display of X-ray dose during the patient examination. • Lead Glass 100 x 80 cms or bigger with lead equivalent as prescribed by IAEA or KeNRA recommendations (for control room window) to be fixed between console room and gantry room for radiation protection. • Ceiling suspended radiation protection system and tableside protection system for the operator • Lead glass upper shield mounted on a movable stand one on each side of the angiography table to protect the angiographer from the radiation source to be provided preferably form the branded well known radiation protection device supplying		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	company. • Lead protection Accessories (lead aprons and thyroid shields) 15 nos. each. • Note: Lead aprons should be of standard state of the art make, lightweight, should be double sided. 7 of which should be two-piece and remaining 8 should be single piece. Design should be wrap around. (Confirm the design before supply) It should have lead equivalent of 0.5 mm. • Thyroid shield should have lead equivalent of 0.5mm • Radiation protection Visors/ Light weight lead goggles (for operator use) x 6 numbers • Metal stands to hold the 15 lead aprons.Provide hangers too • 2No. Patient monitoring systems to monitor ECG, heat rate, invasive & non-invasive pressures in the exam room with slave monitor to display all the parameters in the control room. The slave monitor should be 19″ colour TFT/ LCD monitor.		
STANDARDS AND SAFETY			
1.	System should be FDA and CE approved		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
2.	System should conform to standards for electrical safety IEC -60601/ ISO -13450		
3.	Should comply with IAEA and KeNRA Guidelines.		
INSTALLATION AND COMMISSIONING			
	• The chosen supplier would be expected to to undertake a Turnkey project wherein necessary work at the present site will include all the Civil works as detailed in ***ANNEX 1.***		
WARRANTY AND COMPREHENSIVE AMC			
1.	**Warranty:** Warranty should be for a minimum period of Three years from the date of successful Installation, Commissioning, Training and acceptance of the system. System will be considered as successfully installed, commissioned and accepted only after satisfactory training of the users and technical team, as well as demonstration to the concerned Doctor (HOD, cardiology) and concerned Biomedical Engineer.		
2.	A certificate has to be collected from HOD, Cardiology & Hospital Biomedical Engineer, /medical director to prove that all the items supplied as per purchase Order are installed & commissioned satisfactorily.		
3.	Comprehensive AMC:		

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	a) company should enter into comprehensive AMC as per the terms & conditions of TNMSC for a period up to end of life support of each equipment. The supplier should specify the date of end of life support.		
GENERAL REQUIREMENTS			
1.	Basic support biomedical engineer should be available on site during the whole life period of equipment.		
2.	After each service, the service engineer should submit the detailed service report of each work carried out and get the same signed by Hospital Biomedical Engineer record the same in the log book along with the satisfactory service report from the user in the work permit issued.		
3.	The equipment should address EPP-electrophysiology		
MR/CT Roadmap: Should extend the capabilities of the integrated 3D product by providing a sustainable 3D roadmap based on previous acquired CT or MR scans to support interventional procedures. The MR/ CT Roadmap option should be able to match the real-time 2D fluoroscopy images with the 3D volume of CT or MR.			
1.	**Real- time needle guidance in the angio suite:** Virtual needle paths to be created on a soft Tissue CT dataset or on the previous acquired CT or MR dataset. This option should match the real-time 2D fluoroscopy images with the 3D volume of soft Tissue CT, CT		

Commented [KI1]: Please clarify what this stands for , for the bidders to understand and respond accordingly.

Item Code No.	Department	Section	Item Description
LOT 1-6	Imaging	Imaging	BI-PLANE ANGIOGRAPHY SYSTEM
S/No.	**MINIMUM SPECIFICATIONS**	MEET SPECS? YES/NO.	REMARKS
	or MR; to visualize the actual needle path versus the virtual path previously planned.		
2.	The real time needle guide should have laser tool for positioning aid.		
3.	Guide Ablation options should enable to visualize the isotherm of the ablation needles during the planning phase of the real time guide. This tool should facilitate the planning of tumour ablation procedures. It should allow the positioning of multiple needles and visualizing the combined action of the ablation zones.		

LOT 2 BED HEADS AND PENDANTS

LOT 2-1 Medical Gases outlets on BHU (O2, MA, VAC, N2O in different and respective rooms as listed.

Item Code No.	Department	Section	Item Description
LOT 2-1	Imaging Department	Procedure rooms	Medical Gases outlets on BHU (O2, MA, VAC, N2O in different and respective rooms as listed.

1. General Description

Medical Bedhead Units are factory made for use in medical wards and functional areas. Medical Bedhead Units for sale must meet the following standards:

- ISO 11197, EN ISO 11197 or DIN ISO 11197 “Medical Supply Units”;
- EN 60601-1, IEC 60601-1 “Medical electrical equipment; General requirements for safety”;
- EN 60601-1-2, IEC 60601-1-2 “Medical electrical equipment. General requirements for basic safety and essential performance. Collateral Standard. Electromagnetic disturbances;

And the Medical Devices Directive 93/42/EEC (MDD).
The units must be individually routine tested in accordance with the stipulated standards and must be of a Class IIb classification and determined in the Medical Devices Directive 93/42/EEC. The manufacturer must certify conformity with the relevant standards and specifications by CE identification marking with the CE symbol and the number of the stated location in accordance with the Medical Devices Directive.

2. Composition

2.1	Main unit				

3. Description of the medical supply unit design type

1. Main Unit

a) Horizontal BHU
The BHU shall be manufactured from extruded aluminum. The surface of the body shall be finished in a natural anodized to a minimum to a minimum of 25 microns. All built in components required for the bed area, e.g. for lighting, mains power supply, communications, biomedical measuring technology and medical gases etc. shall be integrated in a rectangular profile with sloped top and bottom faces. All access lids are to be secured with a Stainless-Steel hex countersunk screw. All components e.g. power socket outlets, switches, nurse call sockets must be installed flush mounted in terms of hygienically issues. Those components shall be ergonomically setup and easy reachable.
The BHU shall be securely mounted using a full-length mounting rail. Mounting applications shall allow for either brick or false wall mounting with suitable anchors.
The BHU shall be supplied as a complete assembled unit, with all wiring and medical gas pipeline installed.

b) Vertical BHU
The unit shall be manufactured from extruded aluminium. The surface of the body shall be finished in a natural anodised to a minimum to a minimum of 25 microns.

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LOT 2-1	Imaging Department	Procedure rooms	Medical Gases outlets on BHU (O2, MA, VAC, N2O in different and respective rooms as listed.

Centre panels shall be manufactured from aluminium. The surface of the centre panel shall be finished in a natural anodise, powder coated in a RAL colour or vinyl wrapped.

All built in components required for the bed area, e.g. for lighting, mains power supply, communications, biomedical measuring technology and medical gases etc. shall be integrated in either the side extrusion or mounted behind the centre panel. All access lids are to be secured with a Stainless Steel hex countersunk screw. All components e.g. power socket outlets, switches, nurse call sockets must be installed flush mounted in terms of hygienically issues. Those components shall be ergonomically setup and easy reachable.

The BHU shall be securely mounted. Mounting applications shall allow for either brick or false wall mounting with suitable anchors.

The BHU shall be supplied as a complete assembled unit, with all wiring and medical gas pipeline installed.

2. Mains power fittings

Built in components for:

- Safety sockets 240V, 13A, flush fitted;
- Rocker type switches or mini circuit breakers as required;
- Potential equalization pins according to DIN 42 801, recessed design.

Pulse relays are provided as low-noise electronic units built-in 24V supply or a technically equivalent solution.

Wiring shall be completed as per the applicable regulation/specification to the closest entry point into the BHU. Connections to the BHU shall be to a WDU terminal.

3. Communication components

It must be possible to integrate plugs, socket-outlets and couplers, and low-voltage combinations according to common standards for:

- nurse/emergency/diagnostic call
- TV/radio broadcast
- telephone
- data transmission

Wiring of the BHU shall be in accordance with applicable regulations/standards as far as the central connection area. In case of data communication components, cables are laid on site directly to the built-in component without cutting.

4. Medical gases

Pipes for medical gases for up to three pipe circuits, diameter up to 15 mm, as far as central connection, according. to profile design and segregated from electrical and communication services.

BHU supplied ready for operation, including installation of British Standard-marked outlets or other specified standards such as DIN, CE, SS and AFNOR.

Pipelines to be designed, manufactured and tested in accordance to relevant standards like EN ISO 7396-1 for “Medical gas pipeline systems -- Part 1: Pipeline systems for compressed medical gases and vacuum, EN ISO 7396-2 “Medical gas pipeline systems -- Part 2: Anaesthetic gas scavenging disposal systems and EN ISO 5359 “Anaesthetic

Item Code No.	Department	Section	Item Description
LOT 2-1	Imaging Department	Procedure rooms	Medical Gases outlets on BHU (O2, MA, VAC, N2O in different and respective rooms as listed.

and respiratory equipment -- Low-pressure hose assemblies for use with medical gases". All bedhead units with pre-installed medical gas pipe circuits to be accompanied by compliance certificates.

5. Lighting

Lighting equipment for room and reading/examination lighting to be fitted as follows:

- Integrated room light designed as a unit fitted with a 23W 6500 kelvin cool white energy efficient (LED) with a frosted diffuser;
- Integrated reading light designed as a unit fitted with a 11W 4000 kelvin warm white energy efficient (LED) with a frosted diffuser;
- Integrated night light deigned as a unit fitted with a 5W 4000 kelvin warm white energy efficient (LED) with a frosted diffuser.

All diffusers shall be securely mounted from the inside of the unit to avoid loss during routine maintenance.

The lighting components are wired ready for operation and are fitted with wires to allow direct connection to a WDU terminal in the central feed-in area of the BHU without further wiring.

Lighting equipment must enable to design an installation to comply with EN 12464 "Lighting of indoor workplaces".

6. Central connection

The connectors for electrical, communications and gas equipment must converge at the central feed-in point of the BHU between the BHU and the installations on site; they must be separated from each other and individually disconnect-able. All protective conductor connections should be combined on a PE bus bar and connected to the basic section of the medical supply unit by means of a combined line of minimum cross-section 16 mm2. The basic section of the medical bed head unit.

Should also be used as a bus bar for the individual protective conductor connections within the medical supply unit.

7. Installation (example)

The connection of supply lines and the testing of communications equipment and medical gas pipes and a gas-type check on the valves are usually part of the services performed by the firm that is installing the communications or medical gas equipment; they are not part of these Detailed Specifications.

8. Additional equipment

The term "additional equipment" is to be construed as materials that are usually listed in the Detailed Specifications for other services (e.g. plug-in communication devices or combinations and plug-in couplers for medical gases) and are provided by third parties to the manufacturer of the BHU.

The parts must be made available to the commissioned BHU manufacturer free of charge and on time for the purposes of installation and wiring/piping. In the items listed below, these parts are identified as "additional equipment ".

Item Code No.	Department	Section	Item Description
LOT 2-1	Imaging Department	Procedure rooms	Medical Gases outlets on BHU (O2, MA, VAC, N2O in different and respective rooms as listed.

If plug-in communication devices which must be encoded are used, these must be supplied to the BHU manufacturer in their pre-encoded state and marked accordingly. Caution: the relevant manufacturers make a distinction between a plug-in communication device to be fitted in a BHU and those for other types of installation!

9. Services per bed

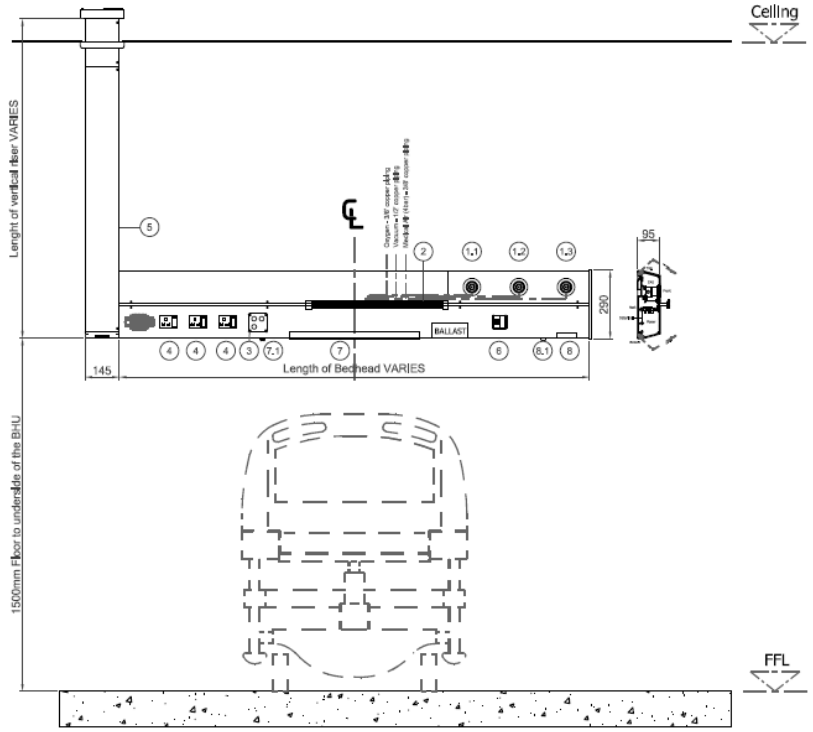
Quantity of services shall be ward and functional dependant. The latest version of the Health Technical Memorandum specification shall be consulted.

Area / Location	Electrical / Comms / Lighting							Medical Gas Terminals						
	Electrical Points	Up/light	Patient Reading Light	Night light	Data	Equipment rail	Nurse / Emergency call	O2 - Oxygen	Lpa – Medical Air	Vac - Suction	N2O – Nitrous Oxide	Hpa – Surgical Air	N2O / O2 - Entonox	AGSS - Scavenger
Acute Care														
Observation	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Accident & Emergency Department														
Trauma Bays	14	-	-	-	8	✓	✓	1	1	1	-	-	-	-
Resus	14	-	-	-	8	✓	✓	2	2	2	2	-	-	2
Maternity														
Delivery / Labour (mother)	4	✓	-	-	6	✓	✓	1	-	2	-	-	1	-
Delivery / Labour (baby)	2	-	-	-	2	✓	-	1	1	1	-	-	-	-
Post Natal / Pre Natal	4	✓	✓	✓	4	✓	✓	1	-	1	-	-	-	-
Nursery	2	-	-	-	2	✓	✓	1	-	1	-	-	-	-
Day Patients														
Day wards	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Renal Dialysis	14	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Chemotherapy	4	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Critical Care Unit														
Neo Natal - NNICU	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Adult/Paediatric ICU & CCU	14	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Burns Unit	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
High Dependency Unit	10	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Theatre Complex														
Post Op / Recovery	6	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Anesthetic Rooms	6				2	✓	✓	1	1	1	1	-	-	1
Theatres (Anesthetist)	6	-	-	-	6	-	-	2	2	2	1	-	-	1
Theatres (Surgeon)	6	-	-	-	6	-	-	-	-	2	-	4	-	-
Treatment														
Minor Treatment Rooms	8	-	-	-	4	✓	✓	1	1	1	-	-	-	-
Procedure Rooms	6				4	✓	✓	1	1	1	1			1

Item Code No.	Department	Section	Item Description
LOT 2-1	Imaging Department	Procedure rooms	Medical Gases outlets on BHU (O2, MA, VAC, N2O in different and respective rooms as listed.

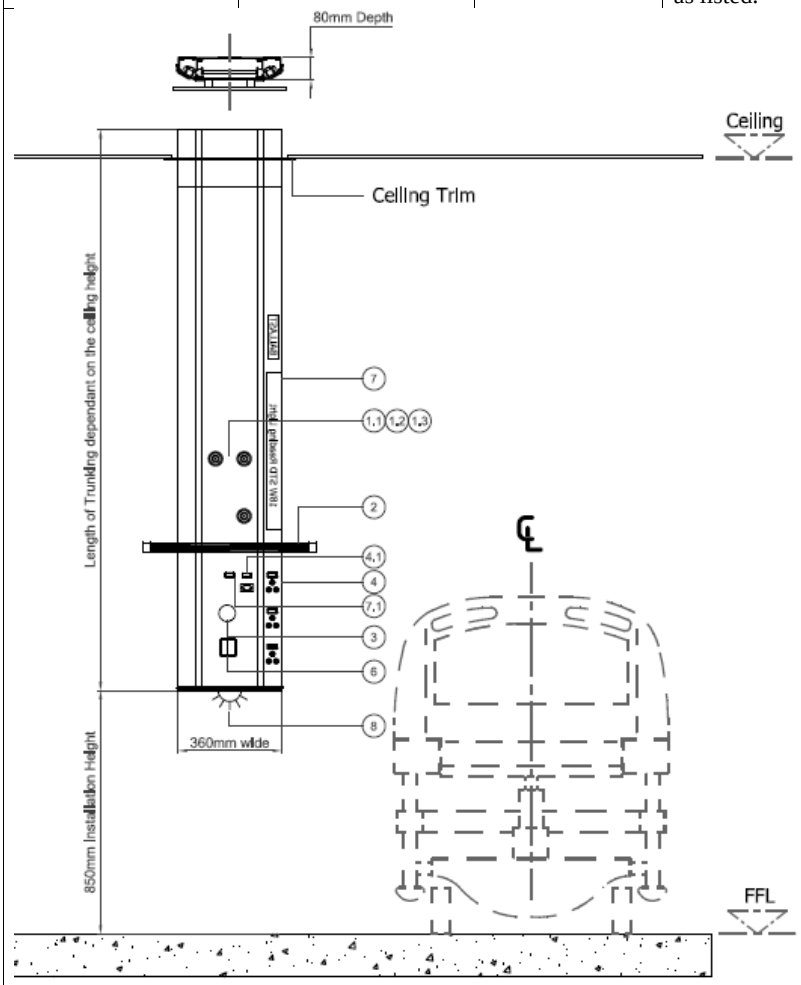
1. Typical design drawings – Horizontal and Vertical BHU

Horizontal single bed configuration



Vertical single bed configuration

Item Code No.	Department	Section	Item Description
LOT 2-1	Imaging Department	Procedure rooms	Medical Gases outlets on BHU (O2, MA, VAC, N2O in different and respective rooms as listed.



LOT 2-2 Bed head units (O2, VAC, 4 socket outlets, light, Voice & data outlets, Nurse call system)

Item Code No.	Department	Section	Item Description
LOT 2-2	Outpatient	Consulting Room	Bed head units (O2, VAC, 4 socket outlets, light, Voice & data outlets, Nurse call system)

1. General Description

Medical Bedhead Units are factory made for use in medical wards and functional areas.
Medical Bedhead Units for sale must meet the following standards:

- ISO 11197, EN ISO 11197 or DIN ISO 11197 "Medical Supply Units";
- EN 60601-1, IEC 60601-1 "Medical electrical equipment; General requirements for safety";
- EN 60601-1-2, IEC 60601-1-2 "Medical electrical equipment. General requirements for basic safety and essential performance. Collateral Standard. Electromagnetic disturbances.

And the Medical Devices Directive 93/42/EEC (MDD).
The units must be individually routine tested in accordance with the stipulated standards and must be of a Class IIb classification and determined in the Medical Devices Directive 93/42/EEC. The manufacturer must certify conformity with the relevant standards and specifications by CE identification marking with the CE symbol and the number of the stated location in accordance with the Medical Devices Directive.

2. Composition

2.1.	Main unit				

3. Description of the medical supply unit design type

3.1. Main Unit

a) Horizontal BHU

The BHU shall be manufactured from extruded aluminum. The surface of the body shall be finished in a natural anodised to a minimum to a minimum of 25 microns.
All built in components required for the bed area, e.g. for lighting, mains power supply, communications, biomedical measuring technology and medical gases etc. shall be integrated in a rectangular profile with sloped top and bottom faces.
All access lids are to be secured with a Stainless Steel hex countersunk screw.
All components e.g. power socket outlets, switches, nurse call sockets must be installed flush mounted in terms of hygienically issues. Those components shall be ergonomically setup and easy reachable.
The BHU shall be securely mounted using a full-length mounting rail.
Mounting applications shall allow for either brick or false wall mounting with suitable anchors.

The BHU shall be supplied as a complete assembled unit, with all wiring and medical gas pipeline installed.

b) Vertical BHU

Item Code No.	Department	Section	Item Description
LOT 2-2	Outpatient	Consulting Room	Bed head units (O2, VAC, 4 socket outlets, light, Voice & data outlets, Nurse call system)

The unit shall be manufactured from extruded aluminium. The surface of the body shall be finished in a natural anodised to a minimum to a minimum of 25 microns. Centre panels shall be manufactured from aluminium. The surface of the centre panel shall be finished in a natural anodise, powder coated in a RAL colour or vinyl wrapped.

All built in components required for the bed area, e.g. for lighting, mains power supply, communications, biomedical measuring technology and medical gases etc. shall be integrated in either the side extrusion or mounted behind the centre panel. All access lids are to be secured with a Stainless Steel hex countersunk screw. All components e.g. power socket outlets, switches, nurse call sockets must be installed flush mounted in terms of hygienically issues. Those components shall be ergonomically setup and easy reachable.

The BHU shall be securely mounted. Mounting applications shall allow for either brick or false wall mounting with suitable anchors.

The BHU shall be supplied as a complete assembled unit, with all wiring and medical gas pipeline installed.

3.2. Mains power fittings

Built in components for:

- Safety sockets 240V, 13A, flush fitted;
- Rocker type switches or mini circuit breakers as required;
- Potential equalization pins according to DIN 42 801, recessed design.

Pulse relays are provided as low-noise electronic units built-in 24V supply or a technically equivalent solution.

Wiring shall be completed as per the applicable regulation/specification to the closest entry point into the BHU. Connections to the BHU shall be to a WDU terminal.

3.3. Communication components

It must be possible to integrate plugs, socket-outlets and couplers, and low-voltage combinations according to common standards for:

- nurse/emergency/diagnostic call
- TV/radio broadcast
- telephone
- data transmission

Wiring of the BHU shall be in accordance with applicable regulations/standards as far as the central connection area. In case of data communication components, cables are laid on site directly to the built-in component without cutting.

3.4. Medical gases

Pipes for medical gases for up to three pipe circuits, diameter up to 15 mm, as far as central connection, according. to profile design and segregated from electrical and communication services.

Item Code No.	Department	Section	Item Description
LOT 2-2	Outpatient	Consulting Room	Bed head units (O2, VAC, 4 socket outlets, light, Voice & data outlets, Nurse call system)

BHU supplied ready for operation, including installation of British Standard-marked outlets or other specified standards such as DIN, CE, SS and AFNOR. Pipelines to be designed, manufactured and tested in accordance to relevant standards like EN ISO 7396-1 for "Medical gas pipeline systems -- Part 1: Pipeline systems for compressed medical gases and vacuum, EN ISO 7396-2 "Medical gas pipeline systems -- Part 2: Anaesthetic gas scavenging disposal systems and EN ISO 5359 "Anaesthetic and respiratory equipment -- Low-pressure hose assemblies for use with medical gases". All bedhead units with pre-installed medical gas pipe circuits to be accompanied by compliance certificates.

3.5. Lighting

Lighting equipment for room and reading/examination lighting to be fitted as follows:

- Integrated room light designed as a unit fitted with a 23W 6500 kelvin cool white energy efficient (LED) with a frosted diffuser;
- Integrated reading light designed as a unit fitted with a 11W 4000 kelvin warm white energy efficient (LED) with a frosted diffuser;
- Integrated night light deigned as a unit fitted with a 5W 4000 kelvin warm white energy efficient (LED) with a frosted diffuser.

All diffusers shall be securely mounted from the inside of the unit to avoid loss during routine maintenance.

The lighting components are wired ready for operation and are fitted with wires to allow direct connection to a WDU terminal in the central feed-in area of the BHU without further wiring.

Lighting equipment must enable to design an installation to comply with EN 12464 "Lighting of indoor workplaces"

3.6. Central connection

The connectors for electrical, communications and gas equipment must converge at the central feed-in point of the BHU between the BHU and the installations on site; they must be separated from each other and individually disconnect-able. All protective conductor connections should be combined on a PE bus bar and connected to the basic section of the medical supply unit by means of a combined line of minimum cross-section 16 mm2. The basic section of the medical bed head unit.

Should also be used as a bus bar for the individual protective conductor connections within the medical supply unit.

3.7. Installation (example)

The connection of supply lines and the testing of communications equipment and medical gas pipes and a gas-type check on the valves are usually part of the

Item Code No.	Department	Section	Item Description
LOT 2-2	Outpatient	Consulting Room	Bed head units (O2, VAC, 4 socket outlets, light, Voice & data outlets, Nurse call system)

services performed by the firm that is installing the communications or medical gas equipment; they are not part of these Detailed Specifications.

3.8. Additional equipment

The term "additional equipment" is to be construed as materials that are usually listed in the Detailed Specifications for other services (e.g. plug-in communication devices or combinations and plug-in couplers for medical gases) and are provided by third parties to the manufacturer of the BHU.
The parts must be made available to the commissioned BHU manufacturer free of charge and on time for the purposes of installation and wiring/piping. In the items listed below, these parts are identified as "additional equipment ".
If plug-in communication devices which must be encoded are used, these must be supplied to the BHU manufacturer in their pre-encoded state and marked accordingly.
Caution: the relevant manufacturers make a distinction between a plug-in communication device to be fitted in a BHU and those for other types of installation!

3.9. Services per bed

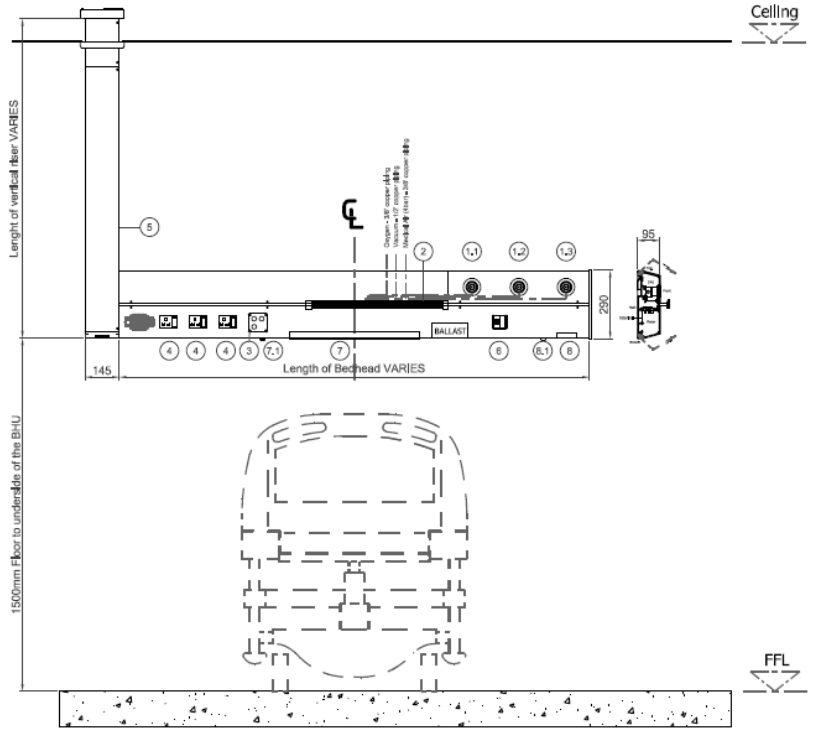
Quantity of services shall be ward and functional dependant. The latest version of the Health Technical Memorandum specification shall be consulted.

Item Code No.	Department	Section	Item Description
LOT 2-2	Outpatient	Consulting Room	Bed head units (O2, VAC, 4 socket outlets, light, Voice & data outlets, Nurse call system)

Area / Location	Electrical / Comms / Lighting							Medical Gas Terminals						
	Electrical Points	Up/light	Patient Reading Light	Night light	Data	Equipment rail	Nurse / Emergency call	O2 - Oxygen	Lpa – Medical Air	Vac - Suction	N2O – Nitrous Oxide	Hpa – Surgical Air	N2O / O2 - Entonox	AGSS - Scavenger
Acute Care														
Observation	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Accident & Emergency Department														
Trauma Bays	14	-	-	-	8	✓	✓	1	1	1	-	-	-	-
Resus	14	-	-	-	8	✓	✓	2	2	2	2	-	-	2
Maternity														
Delivery / Labour (mother)	4	✓	-	-	6	✓	✓	1	-	2	-	-	1	-
Delivery / Labour (baby)	2	-	-	-	2	✓	-	1	1	1	-	-	-	-
Post Natal / Pre Natal	4	✓	✓	✓	4	✓	✓	1	-	1	-	-	-	-
Nursery	2	-	-	-	2	✓	✓	1	-	1	-	-	-	-
Day Patients														
Day wards	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Renal Dialysis	14	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Chemotherapy	4	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Critical Care Unit														
Neo Natal - NNICU	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Adult/Paediatric ICU & CCU	14	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Burns Unit	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
High Dependency Unit	10	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Theatre Complex														
Post Op / Recovery	6	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Anesthetic Rooms	6				2	✓	✓	1	1	1	1	-	-	1
Theatres (Anesthetist)	6	-	-	-	6	-	-	2	2	2	1	-	-	1
Theatres (Surgeon)	6	-	-	-	6	-	-	-	-	2	-	4	-	-
Treatment														
Minor Treatment Rooms	8	-	-	-	4	✓	✓	1	1	1	-	-	-	-
Procedure Rooms	6				4	✓	✓	1	1	1	1			1

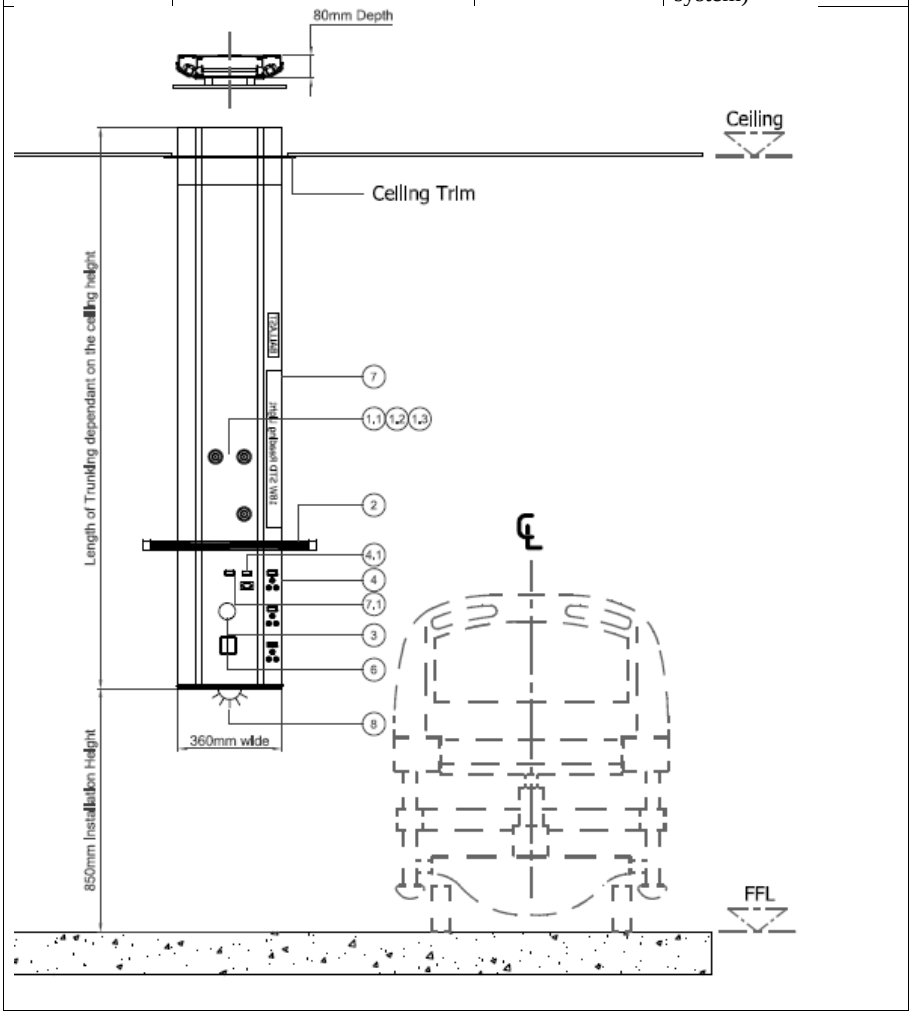
2. Typical design drawings – Horizontal and Vertical BHU
Horizontal single bed configuration

Item Code No.	Department	Section	Item Description
LOT 2-2	Outpatient	Consulting Room	Bed head units (O2, VAC, 4 socket outlets, light, Voice & data outlets, Nurse call system)



Vertical single bed configuration

Item Code No.	Department	Section	Item Description
LOT 2-2	Outpatient	Consulting Room	Bed head units (O2, VAC, 4 socket outlets, light, Voice & data outlets, Nurse call system)



LOT 2-3 **Single arm Anesthetic Theatre Pendants with complete sets of double Medical gases (Oxygen, Medical air, Nitrous Oxide, Surgical Air, Vacuum, Carbon dioxide, AGSS), at least 12No. 13A socket outlets, both mains and UPS supported, at least two sets of voice and data outlets with one shelf withdrawal and two infusion**

Item Code No.	Department	Section	Item Description
LOT 2-3	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**

1. General Description

2. Composition

2.1.	Main unit				

3. Description of the medical supply unit design type

3.1. General Description

Medical Supply Units are factory made for use in medical wards and functional areas. Medical Supply Units for sale must meet the following standards:

- ISO 11197, EN ISO 11197 or DIN ISO 11197 "Medical Supply Units";
- EN 60601-1, IEC 60601-1 "Medical electrical equipment; General requirements for safety";
- EN 60601-1-2, IEC 60601-1-2 "Medical electrical equipment. General requirements for basic safety and essential performance. Collateral Standard. Electromagnetic disturbances;

And the Medical Devices Directive 93/42/EEC (MDD).

The units must be individually routine tested in accordance with the stipulated standards and must be of a Class IIb classification and determined in the Medical Devices Directive 93/42/EEC. The manufacturer must certify conformity with the relevant standards and specifications by CE identification marking with the CE symbol and the number of the stated location in accordance with the Medical Devices Directive.

Description of the medical supply unit design type

3.2. Main Unit

The pendant MSU shall be manufactured from single or multiple extruded aluminum. The surface finish of the service fascia shall be powder coated in a RAL colour. The surface finish of the arms shall be powder coated in a RAL colour.

The service pillar sections shall be manufactured as a rectangular column which houses all electrical, communication components and gas terminal units.

The arm sections shall be manufactured from a hollow rectangular aluminium extruded profile which services shall be routed through the arm sections.

Item Code No.	Department	Section	Item Description
LOT 2-3	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**

The pendant MSU shall be designed with a pneumatic breaking system which allows for proper positing of the MSU. The bearing system shall be designed to limit rotation beyond 320 degrees. Operation of the pneumatic system shall be available on the service portion of the pendant MSU.

All built in components required for the functional area, e.g. mains power supply, communications, biomedical measuring technology and medical gases etc. shall be integrated in a square profile. Access to internal components housed within the pillar section shall require a special tool for opening. All components e.g. power socket outlets, switches must be installed flush mounted in terms of hygiene issues. Those components shall be ergonomically setup and easily reachable.

Equipment poles shall be provided. The pole shall be a diameter of 38mm and a stainless steel grade 304 with the finish of a polished nature. Load capacity shall be 10kg maximum.

The pendant MSU shall allow for either direct concrete slab mounting or roof truss mounting as per site requirements. For concrete installation, appropriate chemical anchors shall be used.

The MSU shall be supplied as a complete assembled unit, with all wiring and medical gas pipeline installed.

3.3. Mains power fittings

Built in components for:

- Safety sockets 240V, 13A, flush fitted;
- Rocker type switches or mini circuit breakers as required;
- Potential equalization pins according to DIN 42 801, recessed design.

Wiring shall be completed as per the applicable regulation/specification to the closest entry point into the pendant MSU. Connections to the pendant MSU shall be to a WDU terminal located closest to the ceiling void. A junction box shall be provided for such connections.

3.4. Communication components

It must be possible to integrate plugs, socket-outlets and couplers, and low-voltage combinations according to common standards for:

- emergency/diagnostic call
- data transmission

Wiring in accordance with applicable regulations/standards as far as the central connection area. In case of data communication components, cables are laid on site directly to the built-in component without cutting.

3.5. Medical gases

Medical grade flexible hose compliant to EN ISO 5359 shall be used. The pendant MSU shall be supplied ready for operation, including installation of British

Item Code No.	Department	Section	Item Description
LOT 2-3	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**

Standard-marked outlets or other specified standards such as DIN, CE, SS and AFNOR.

The ends of the medical flexible hose shall be fitted and supplied with NIST connectors.

Pipelines to be designed, manufactured and tested in accordance to relevant standards like EN ISO 5359 “Anaesthetic and respiratory equipment -- Low-pressure hose assemblies for use with medical gases”. All Pendant units with pre-installed medical gas pipe circuits to be accompanied by compliance certificates.

3.6. Central connection

The connectors for electrical and gas equipment must converge at the central feed-in point of the pendant MSU between the pendant MSU and the installations on site; they must be separated from each other and individually disconnect able. All protective conductor connections should be combined on a PE bus bar and connected to the basic section of the medical supply unit by means of a combined line of minimum cross-section 16 mm2.

3.7. Installation (example)

The connection of supply lines and the testing of communications equipment and medical gas pipes and a gas-type check on the valves are usually part of the services performed by the firm that is installing the communications or medical gas equipment; they are not part of these Detailed Specifications.

3.8. Additional equipment

The term “additional equipment“ is to be construed as materials that are usually listed in the Detailed Specifications for other services (e.g. plug-in communication devices or combinations and plug-in couplers for medical gases) and are provided by third parties to the manufacturer of the MSU.

The parts must be made available to the commissioned MSU manufacturer free of charge and on time for the purposes of installation and wiring/piping. In the items listed below, these parts are identified as “additional equipment “.

If plug-in communication devices which must be encoded are used, these must be supplied to the

MSU manufacturer in their pre-encoded state and marked accordingly.

3.8.1. **Services**

Quantity of services shall be area dependant. The latest version of the Health Technical Memorandum specification shall be consulted.

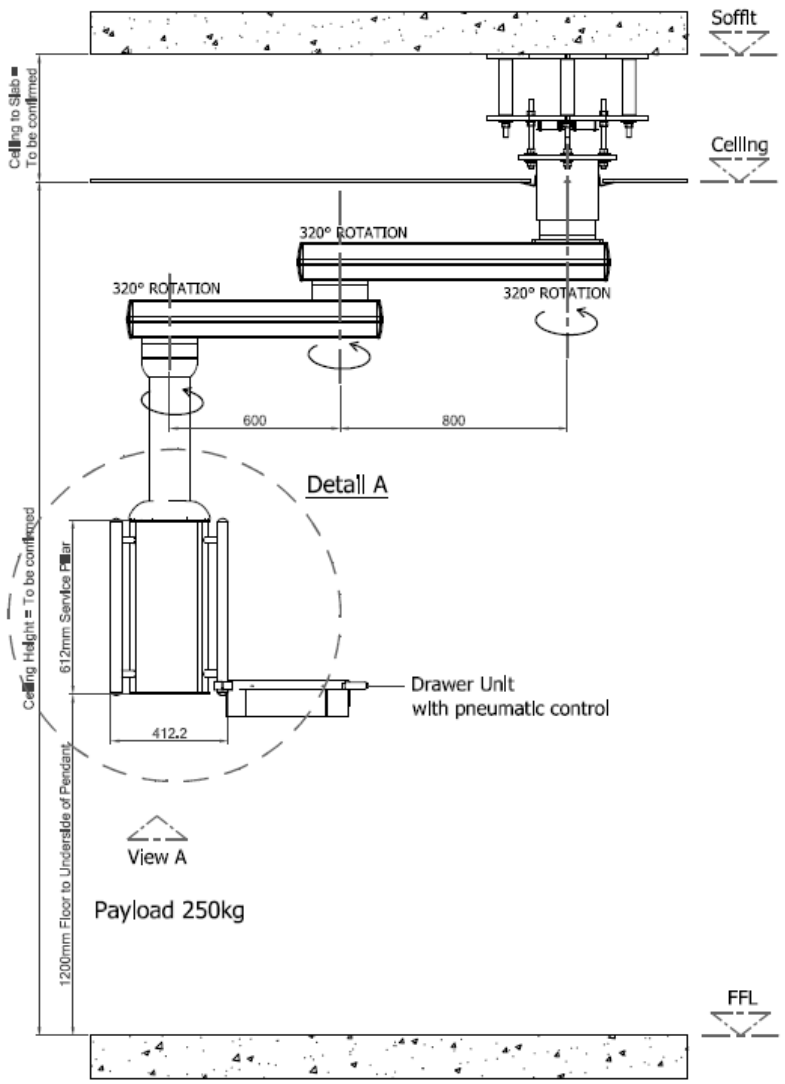
Item Code No.	Department	Section	Item Description
LOT 2-3	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**

Area / Location	Electrical / Comms / Lighting							Medical Gas Terminals						
	Electrical Points	Up/light	Patient Reading Light	Night light	Data	Equipment rail	Nurse / Emergency call	O2 - Oxygen	Lpa – Medical Air	Vac - Suction	N2O – Nitrous Oxide	Hpa – Surgical Air	N2O / O2 - Entonox	AGSS - Scavenger
Acute Care														
Observation	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Accident & Emergency Department														
Trauma Bays	14	-	-	-	8	✓	✓	1	1	1	-	-	-	-
Resus	14	-	-	-	8	✓	✓	2	2	2	2	-	-	2
Maternity														
Delivery / Labour (mother)	4	✓	-	-	6	✓	✓	1	-	2	-	-	1	-
Delivery / Labour (baby)	2	-	-	-	2	✓	-	1	1	1	-	-	-	-
Post Natal / Pre Natal	4	✓	✓	✓	4	✓	✓	1	-	1	-	-	-	-
Nursery	2	-	-	-	2	✓	✓	1	-	1	-	-	-	-
Day Patients														
Day wards	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Renal Dialysis	14	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Chemotherapy	4	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Critical Care Unit														
Neo Natal - NNICU	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Adult/Paediatric ICU & CCU	14	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Burns Unit	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
High Dependency Unit	10	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Theatre Complex														
Post Op / Recovery	6	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Anesthetic Rooms	6				2	✓	✓	1	1	1	1	-	-	1
Theatres (Anesthetist)	6	-	-	-	6	-	-	2	2	2	1	-	-	1
Theatres (Surgeon)	6	-	-	-	6	-	-	-	-	2	-	4	-	-
Treatment														
Minor Treatment Rooms	8	-	-	-	4	✓	✓	1	1	1	-	-	-	-
Procedure Rooms	6				4	✓	✓	1	1	1	1			1

3. Typical design drawings – single dual arm and tandem dual arm pendant MSU

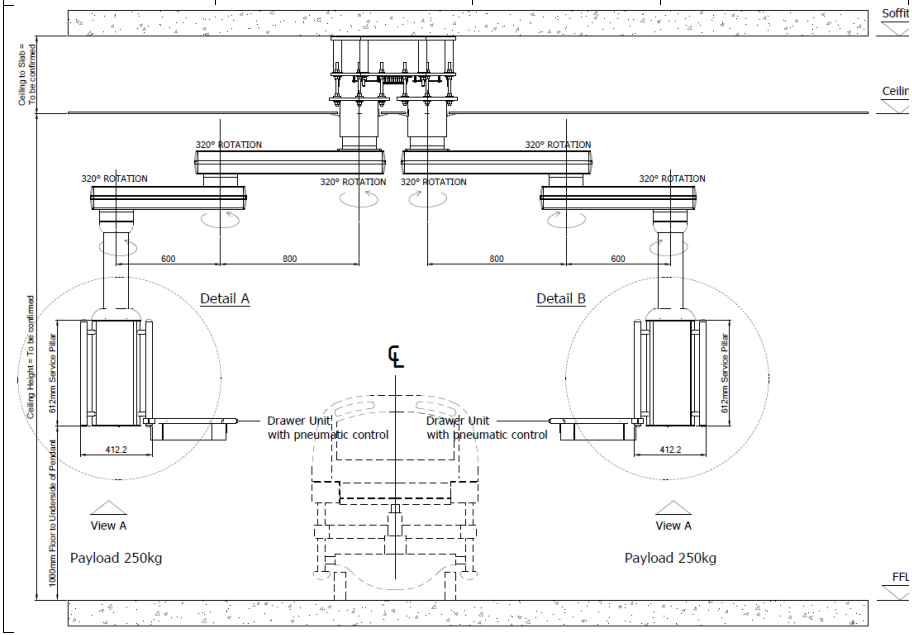
Single dual arm configuration

Item Code No.	Department	Section	Item Description
LOT 2-3	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**



Tandem dual arm configuration

Item Code No.	Department	Section	Item Description
LOT 2-3	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**



LOT 2-4 **Double arm Surgical Theatre Pendants with complete sets of double Medical gases (Oxygen, Medical air, Nitrous Oxide, Surgical Air, Vacuum, Carbon dioxide, AGSS), at least 12No. 13A socket outlets, both mains and UPS supported, at least two sets of voice and data outlets. Monitor arm and 4 shelves, one shelf withdrawal and side railings + infusion pole**

Item Code No.	Department	Section	Item Description
LOT 2-4	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**
4. General Description			
5. Composition			

Item Code No.	Department	Section	Item Description		
LOT 2-4	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**		
5.1.	Main unit				

6. Description of the medical supply unit design type

6.1. General Description

Medical Supply Units are factory made for use in medical wards and functional areas. Medical Supply Units for sale must meet the following standards:

- ISO 11197, EN ISO 11197 or DIN ISO 11197 "Medical Supply Units";
- EN 60601-1, IEC 60601-1 "Medical electrical equipment; General requirements for safety";
- EN 60601-1-2, IEC 60601-1-2 "Medical electrical equipment. General requirements for basic safety and essential performance. Collateral Standard. Electromagnetic disturbances;

And the Medical Devices Directive 93/42/EEC (MDD).

The units must be individually routine tested in accordance with the stipulated standards and must be of a Class IIb classification and determined in the Medical Devices Directive 93/42/EEC. The manufacturer must certify conformity with the relevant standards and specifications by CE identification marking with the CE symbol and the number of the stated location in accordance with the Medical Devices Directive.

Description of the medical supply unit design type

6.2. Main Unit

The pendant MSU shall be manufactured from single or multiple extruded aluminum. The surface finish of the service fascia shall be powder coated in a RAL colour. The surface finish of the arms shall be powder coated in a RAL colour.

The service pillar sections shall be manufactured as a rectangular column which houses all electrical, communication components and gas terminal units.

The arm sections shall be manufactured from a hollow rectangular aluminium extruded profile which services shall be routed through the arm sections.

The pendant MSU shall be designed with a pneumatic breaking system which allows for proper positing of the MSU. The bearing system shall be designed to limit rotation beyond 320 degrees. Operation of the pneumatic system shall be available on the service portion of the pendant MSU.

All built in components required for the functional area, e.g. mains power supply, communications, biomedical measuring technology and medical gases etc. shall be integrated in a square profile. Access to internal components housed within the pillar section shall require a special tool for opening. All components e.g. power socket outlets, switches must be installed flush mounted

Item Code No.	Department	Section	Item Description
LOT 2-4	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**

in terms of hygiene issues. Those components shall be ergonomically setup and easily reachable.

Equipment poles shall be provided. The pole shall be a diameter of 38mm and a stainless steel grade 304 with the finish of a polished nature. Load capacity shall be 10kg maximum.

The pendant MSU shall allow for either direct concrete slab mounting or roof truss mounting as per site requirements. For concrete installation, appropriate chemical anchors shall be used.

The MSU shall be supplied as a complete assembled unit, with all wiring and medical gas pipeline installed.

6.3. Mains power fittings

Built in components for:

- Safety sockets 240V, 13A, flush fitted;
- Rocker type switches or mini circuit breakers as required;
- Potential equalization pins according to DIN 42 801, recessed design.

Wiring shall be completed as per the applicable regulation/specification to the closest entry point into the pendant MSU. Connections to the pendant MSU shall be to a WDU terminal located closest to the ceiling void. A junction box shall be provided for such connections.

6.4. Communication components

It must be possible to integrate plugs, socket-outlets and couplers, and low-voltage combinations according to common standards for:

- emergency/diagnostic call
- data transmission

Wiring in accordance with applicable regulations/standards as far as the central connection area. In case of data communication components, cables are laid on site directly to the built-in component without cutting.

6.5. Medical gases

Medical grade flexible hose compliant to EN ISO 5359 shall be used. The pendant MSU shall be supplied ready for operation, including installation of British Standard-marked outlets or other specified standards such as DIN, CE, SS and AFNOR.

The ends of the medical flexible hose shall be fitted and supplied with NIST connectors.

Pipelines to be designed, manufactured and tested in accordance to relevant standards like EN ISO 5359 “Anaesthetic and respiratory equipment -- Low-pressure hose assemblies for use with medical gases”. All Pendant units with

Item Code No.	Department	Section	Item Description
LOT 2-4	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**

pre-installed medical gas pipe circuits to be accompanied by compliance certificates.

6.6. Central connection

The connectors for electrical and gas equipment must converge at the central feed-in point of the pendant MSU between the pendant MSU and the installations on site; they must be separated from each other and individually disconnect able. All protective conductor connections should be combined on a PE bus bar and connected to the basic section of the medical supply unit by means of a combined line of minimum cross-section 16 mm2.

6.7. Installation (example)

The connection of supply lines and the testing of communications equipment and medical gas pipes and a gas-type check on the valves are usually part of the services performed by the firm that is installing the communications or medical gas equipment; they are not part of these Detailed Specifications.

6.8. Additional equipment

The term “additional equipment“ is to be construed as materials that are usually listed in the Detailed Specifications for other services (e.g. plug-in communication devices or combinations and plug-in couplers for medical gases) and are provided by third parties to the manufacturer of the MSU.

The parts must be made available to the commissioned MSU manufacturer free of charge and on time for the purposes of installation and wiring/piping. In the items listed below, these parts are identified as “additional equipment “.

If plug-in communication devices which must be encoded are used, these must be supplied to the

MSU manufacturer in their pre-encoded state and marked accordingly.

6.8.1. **Services**

Quantity of services shall be area dependant. The latest version of the Health Technical Memorandum specification shall be consulted.

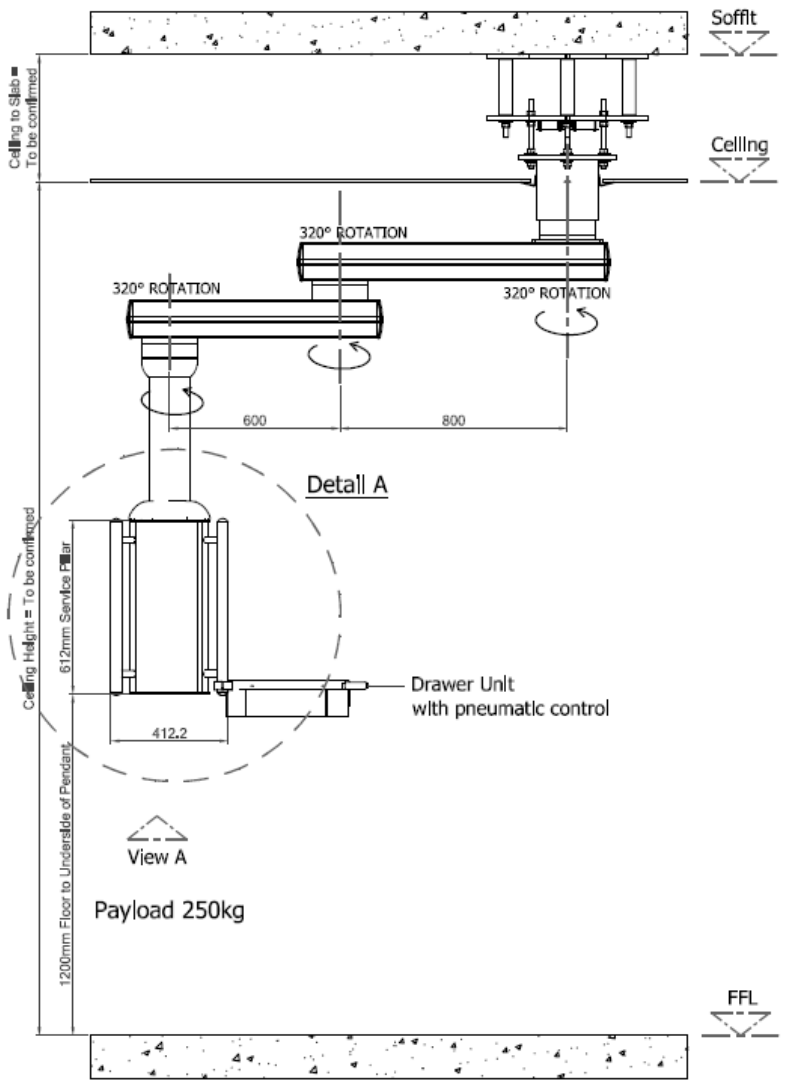
Item Code No.	Department	Section	Item Description
LOT 2-4	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**

Area / Location	Electrical / Comms / Lighting							Medical Gas Terminals						
	Electrical Points	Up/light	Patient Reading Light	Night light	Data	Equipment rail	Nurse / Emergency call	O2 - Oxygen	Lpa – Medical Air	Vac - Suction	N2O – Nitrous Oxide	Hpa – Surgical Air	N2O / O2 - Entonox	AGSS - Scavenger
Acute Care														
Observation	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Accident & Emergency Department														
Trauma Bays	14	-	-	-	8	✓	✓	1	1	1	-	-	-	-
Resus	14	-	-	-	8	✓	✓	2	2	2	2	-	-	2
Maternity														
Delivery / Labour (mother)	4	✓	-	-	6	✓	✓	1	-	2	-	-	1	-
Delivery / Labour (baby)	2	-	-	-	2	✓	-	1	1	1	-	-	-	-
Post Natal / Pre Natal	4	✓	✓	✓	4	✓	✓	1	-	1	-	-	-	-
Nursery	2	-	-	-	2	✓	✓	1	-	1	-	-	-	-
Day Patients														
Day wards	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Renal Dialysis	14	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Chemotherapy	4	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Critical Care Unit														
Neo Natal - NNICU	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Adult/Paediatric ICU & CCU	14	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Burns Unit	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
High Dependency Unit	10	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Theatre Complex														
Post Op / Recovery	6	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Anesthetic Rooms	6				2	✓	✓	1	1	1	1	-	-	1
Theatres (Anesthetist)	6	-	-	-	6	-	-	2	2	2	1	-	-	1
Theatres (Surgeon)	6	-	-	-	6	-	-	-	-	2	-	4	-	-
Treatment														
Minor Treatment Rooms	8	-	-	-	4	✓	✓	1	1	1	-	-	-	-
Procedure Rooms	6				4	✓	✓	1	1	1	1			1

4. Typical design drawings – single dual arm and tandem dual arm pendant MSU

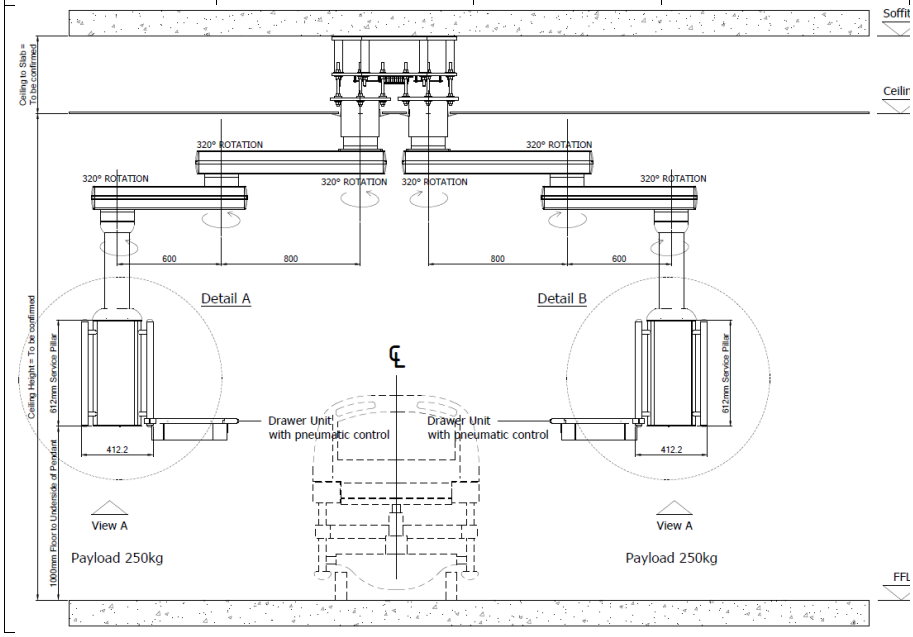
Single dual arm configuration

Item Code No.	Department	Section	Item Description
LOT 2-4	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**



Tandem dual arm configuration

Item Code No.	Department	Section	Item Description
LOT 2-4	Operation Theatre	Patient Area	**Pendants, with relevant supplies and utilities**



LOT 2-5 Bed head units (10 No. 13A socket outlets Medical Gases -Oxygen and Vacuum Examination lights, Voice and data)

Item Code No.	Department	Section	Item Description
LOT 2-5	Operation Theatre	Recovery Area	Bed Head Unit
4. General Description			
Medical Bedhead Units are factory made for use in medical wards and functional areas. Medical Bedhead Units for sale must meet the following standards: - ISO 11197, EN ISO 11197 or DIN ISO 11197 “Medical Supply Units”; - EN 60601-1, IEC 60601-1 “Medical electrical equipment; General requirements for safety”; - EN 60601-1-2, IEC 60601-1-2 “Medical electrical equipment. General requirements for basic safety and essential performance. Collateral Standard. Electromagnetic disturbances;			

Item Code No.	Department	Section	Item Description
LOT 2-5	Operation Theatre	Recovery Area	Bed Head Unit

And the Medical Devices Directive 93/42/EEC (MDD).
The units must be individually routine tested in accordance with the stipulated standards and must be of a Class IIb classification and determined in the Medical Devices Directive 93/42/EEC. The manufacturer must certify conformity with the relevant standards and specifications by CE identification marking with the CE symbol and the number of the stated location in accordance with the Medical Devices Directive.

5. Composition

5.1.	Main unit				

6. Description of the medical supply unit design type

6.1. Main Unit

c) Horizontal BHU

The BHU shall be manufactured from extruded aluminum. The surface of the body shall be finished in a natural anodised to a minimum to a minimum of 25 microns. All built in components required for the bed area, e.g. for lighting, mains power supply, communications, biomedical measuring technology and medical gases etc. shall be integrated in a rectangular profile with sloped top and bottom faces. All access lids are to be secured with a Stainless Steel hex countersunk screw. All components e.g. power socket outlets, switches, nurse call sockets must be installed flush mounted in terms of hygienically issues. Those components shall be ergonomically setup and easy reachable.
The BHU shall be securely mounted using a full-length mounting rail. Mounting applications shall allow for either brick or false wall mounting with suitable anchors.

The BHU shall be supplied as a complete assembled unit, with all wiring and medical gas pipeline installed.

d) Vertical BHU

The unit shall be manufactured from extruded aluminium. The surface of the body shall be finished in a natural anodised to a minimum to a minimum of 25 microns. Centre panels shall be manufactured from aluminium. The surface of the centre panel shall be finished in a natural anodise, powder coated in a RAL colour or vinyl wrapped. All built in components required for the bed area, e.g. for lighting, mains power supply, communications, biomedical measuring technology and medical gases etc. shall be integrated in either the side extrusion or mounted behind the centre panel. All access lids are to be secured with a Stainless Steel hex countersunk screw. All components e.g. power socket outlets, switches, nurse call sockets must be installed flush mounted in terms of hygienically issues. Those components shall be ergonomically setup and easy reachable.
The BHU shall be securely mounted. Mounting applications shall allow for either brick or false wall mounting with suitable anchors.
The BHU shall be supplied as a complete assembled unit, with all wiring and medical gas pipeline installed.

6.2. Mains power fittings

Item Code No.	Department	Section	Item Description
LOT 2-5	Operation Theatre	Recovery Area	Bed Head Unit

Built in components for:

- Safety sockets 240V, 13A, flush fitted;
- Rocker type switches or mini circuit breakers as required;
- Potential equalization pins according to DIN 42 801, recessed design.

Pulse relays are provided as low-noise electronic units built-in 24V supply or a technically equivalent solution.

Wiring shall be completed as per the applicable regulation/specification to the closest entry point into the BHU. Connections to the BHU shall be to a WDU terminal.

6.3. Communication components

It must be possible to integrate plugs, socket-outlets and couplers, and low-voltage combinations according to common standards for:

- nurse/emergency/diagnostic call
- TV/radio broadcast
- telephone
- data transmission

Wiring of the BHU shall be in accordance with applicable regulations/standards as far as the central connection area. In case of data communication components, cables are laid on site directly to the built-in component without cutting.

6.4. Medical gases

Pipes for medical gases for up to three pipe circuits, diameter up to 15 mm, as far as central connection, according. to profile design and segregated from electrical and communication services.

BHU supplied ready for operation, including installation of British Standard-marked outlets or other specified standards such as DIN, CE, SS and AFNOR. Pipelines to be designed, manufactured and tested in accordance to relevant standards like EN ISO 7396-1 for “Medical gas pipeline systems -- Part 1: Pipeline systems for compressed medical gases and vacuum, EN ISO 7396-2 “Medical gas pipeline systems -- Part 2: Anaesthetic gas scavenging disposal systems and EN ISO 5359 “Anaesthetic and respiratory equipment -- Low-pressure hose assemblies for use with medical gases”. All bedhead units with pre-installed medical gas pipe circuits to be accompanied by compliance certificates.

6.5. Lighting

Lighting equipment for room and reading/examination lighting to be fitted as follows:

- Integrated room light designed as a unit fitted with a 23W 6500 kelvin cool white energy efficient (LED) with a frosted diffuser;

Item Code No.	Department	Section	Item Description
LOT 2-5	Operation Theatre	Recovery Area	Bed Head Unit

- Integrated reading light designed as a unit fitted with a 11W 4000 kelvin warm white energy efficient (LED) with a frosted diffuser;
- Integrated night light deigned as a unit fitted with a 5W 4000 kelvin warm white energy efficient (LED) with a frosted diffuser.

All diffusers shall be securely mounted from the inside of the unit to avoid loss during routine maintenance.
The lighting components are wired ready for operation and are fitted with wires to allow direct connection to a WDU terminal in the central feed-in area of the BHU without further wiring.
Lighting equipment must enable to design an installation to comply with EN 12464 "Lighting of indoor workplaces"

6.6. Central connection

The connectors for electrical, communications and gas equipment must converge at the central feed-in point of the BHU between the BHU and the installations on site; they must be separated from each other and individually disconnect-able. All protective conductor connections should be combined on a PE bus bar and connected to the basic section of the medical supply unit by means of a combined line of minimum cross-section 16 mm2. The basic section of the medical bed head unit.
Should also be used as a bus bar for the individual protective conductor connections within the medical supply unit.

6.7. Installation (example)

The connection of supply lines and the testing of communications equipment and medical gas pipes and a gas-type check on the valves are usually part of the services performed by the firm that is installing the communications or medical gas equipment; they are not part of these Detailed Specifications.

6.8. Additional equipment

The term "additional equipment" is to be construed as materials that are usually listed in the Detailed Specifications for other services (e.g. plug-in communication devices or combinations and plug-in couplers for medical gases) and are provided by third parties to the manufacturer of the BHU.
The parts must be made available to the commissioned BHU manufacturer free of charge and on time for the purposes of installation and wiring/piping. In the items listed below, these parts are identified as "additional equipment ".
If plug-in communication devices which must be encoded are used, these must be supplied to the BHU manufacturer in their pre-encoded state and marked accordingly.
Caution: the relevant manufacturers make a distinction between a plug-in communication device to be fitted in a BHU and those for other types of installation!

Item Code No.	Department	Section	Item Description
LOT 2-5	Operation Theatre	Recovery Area	Bed Head Unit

6.9. Services per bed

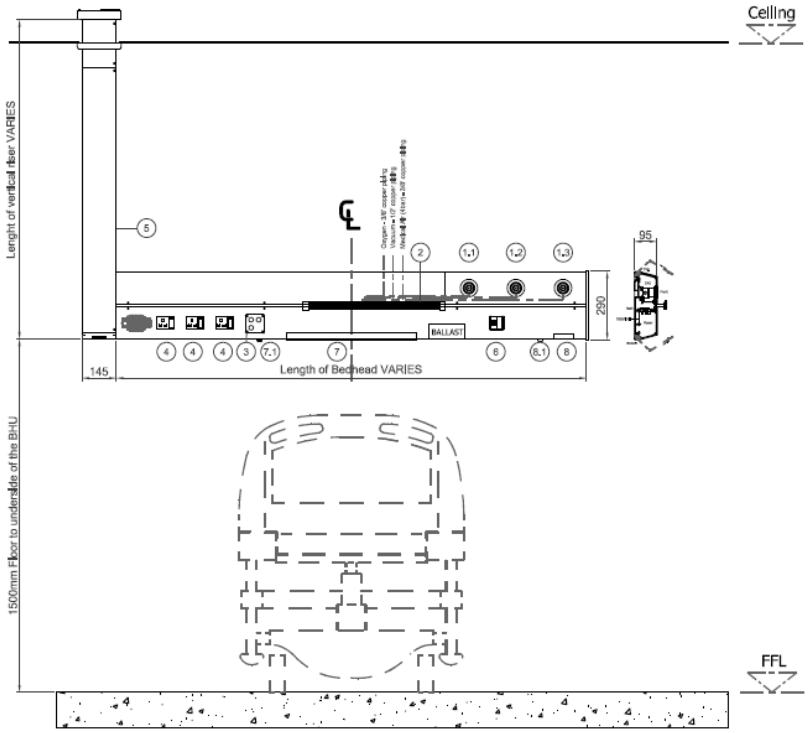
Quantity of services shall be ward and functional dependant. The latest version of the Health Technical Memorandum specification shall be consulted.

Area / Location	Electrical / Comms / Lighting							Medical Gas Terminals						
	Electrical Points	Up/light	Patient Reading Light	Night light	Data	Equipment rail	Nurse / Emergency call	O2 - Oxygen	Lpa – Medical Air	Vac - Suction	N2O – Nitrous Oxide	Hpa – Surgical Air	N2O / O2 - Entonox	AGSS - Scavenger
Acute Care														
Observation	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Accident & Emergency Department														
Trauma Bays	14	-	-	-	8	✓	✓	1	1	1	-	-	-	-
Resus	14	-	-	-	8	✓	✓	2	2	2	2	-	-	2
Maternity														
Delivery / Labour (mother)	4	✓	-	-	6	✓	✓	1	-	2	-	-	1	-
Delivery / Labour (baby)	2	-	-	-	2	✓	-	1	1	1	-	-	-	-
Post Natal / Pre Natal	4	✓	✓	✓	4	✓	✓	1	-	1	-	-	-	-
Nursery	2	-	-	-	2	✓	✓	1	-	1	-	-	-	-
Day Patients														
Day wards	4	✓	-	-	2	✓	✓	1	-	1	-	-	-	-
Renal Dialysis	14	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Chemotherapy	4	-	✓	-	4	✓	✓	1	1	1	-	-	-	-
Critical Care Unit														
Neo Natal - NNICU	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Adult/Paediatric ICU & CCU	14	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Burns Unit	10	-	-	-	4	✓	✓	2	2	2	-	-	-	-
High Dependency Unit	10	-	-	-	8	✓	✓	4	4	4	-	-	-	-
Theatre Complex														
Post Op / Recovery	6	-	-	-	4	✓	✓	2	2	2	-	-	-	-
Anesthetic Rooms	6				2	✓	✓	1	1	1	1	-	-	1
Theatres (Anesthetist)	6	-	-	-	6	-	-	2	2	2	1	-	-	1
Theatres (Surgeon)	6	-	-	-	6	-	-	-	-	2	-	4	-	-
Treatment														
Minor Treatment Rooms	8	-	-	-	4	✓	✓	1	1	1	-	-	-	-
Procedure Rooms	6				4	✓	✓	1	1	1	1			1

5. Typical design drawings – Horizontal and Vertical BHU

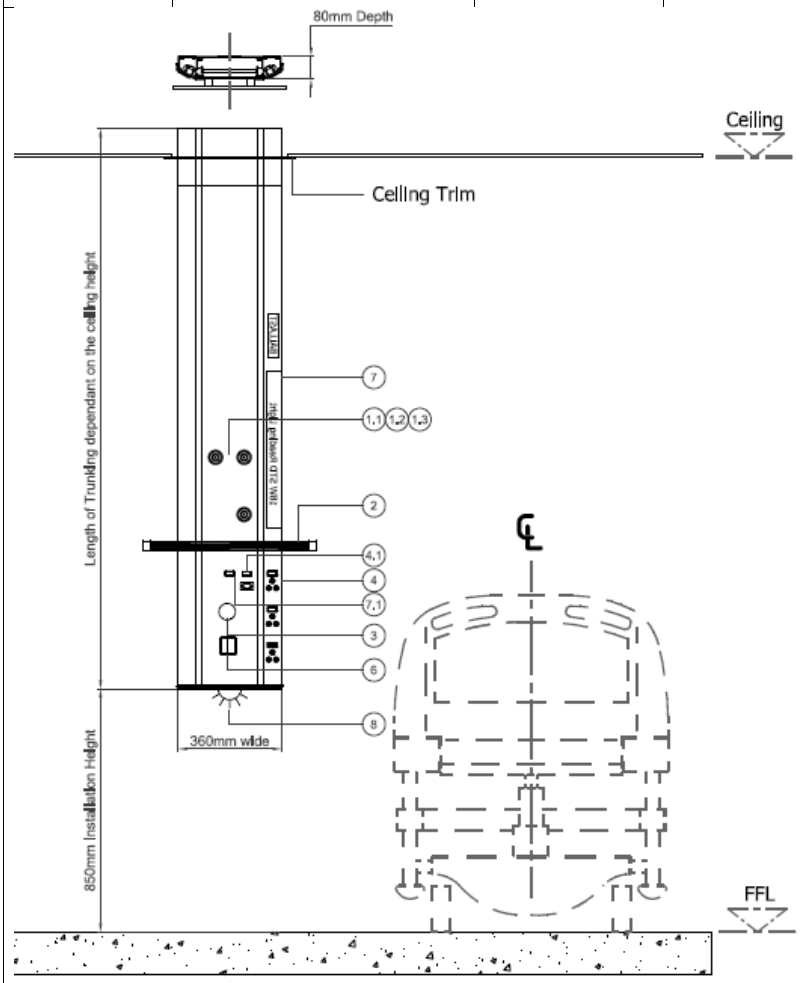
Horizontal single bed configuration

Item Code No.	Department	Section	Item Description
LOT 2-5	Operation Theatre	Recovery Area	Bed Head Unit



Vertical single bed configuration

Item Code No.	Department	Section	Item Description
LOT 2-5	Operation Theatre	Recovery Area	Bed Head Unit



LOT 3 OPERATION THEATRE LIGHTS AND THEATRE CONTROL PANELS

LOT 3-1 Operation theatre LED lights with inbuilt IP Camera & voice capability)

Item Code No.	**Department**	**Section**	**Item Description**
LOT 3-1	Operations Theatre	General Surgery	**Operating Theatre light**, Ceiling Type LED Technology
1. General Description			
Surgical light (Operating lamp) ceiling mounting type. The surgical light should consist of two lamp head, Equal diameter light head (dual type). It should be constructed from light weight material preferable aluminum, and easily to disinfect. It should have emergency backup power supply to last for at least 2 hours. One Light head should be fitted with a digital camera for ICT integration.			
2. Composition			
2.1.	Dual Unit equal lamp head system		
3. Performance Specifications			
3.1.	Comprise of 2 equal lamp heads		
3.1.1.	Operation	All light controls done on each light head control panel as well as a wall control panel independently.	
3.1.2.	Rotation	360^{o} along the central axis	
3.1.3.	Maximum light intensity	Above 150,000 lux at 1 meter each and central illuminance should be adjustable in steps from at least 40000 to 160000Lux.	
3.1.4.	Focus	Adjustable	
3.1.5.	Field	Constant to a depth of at least 500mm	
3.1.6.	Field	shadow less	
3.1.7.	Light colour Temperature	3500 to 5000 K Colour rendering index >95% Deeming range 30-100%	
3.1.8.	Lighting Control	Electronic system with touch button light intensity	
3.1.9.		Control mounted at a convenient place preferable on the head lamp.	
3.1.10.	Lighting Bulb	Low voltage LEDs service life >40,000 hours	
		Light field diameter of 300mm at 1 m	
3.1.11.	Mounting ceiling Height	Minimum 2.5m above floor	
3.1.12.		The system should be laminar flow compatible	
3.2.	Accessories		
3.2.1.	All mounting accessories	Ceiling anchor plates,	

Item Code No.	Department	Section	Item Description
LOT 3-1	Operations Theatre	General Surgery	**Operating Theatre light**, Ceiling Type LED Technology

3.2.2.		Bolts, nuts and other necessary			
3.2.3.		Sterilizable handles at least 2 pairs each			
4.	Operating environment				
4.1.	Power Requirements	240V, A/c 50 Hz, Single phase, with PE			
4.2.	Ambient temperature	10^{o} C to 40^{o} C			
4.3.	Relative humidity	20% to 90%			
5.	Emergency Backup power	To least for at least 2hour			
5.1.		With sealed batteries			
		Automatic change over and charger unit			
6.	Quality standards				
6.1.	Manufacturing standards	ISO 13485, ISO 9001			
6.2.	Product conformity standards	EU-93/42/EEC, IEC 60601-1 FDA and CE approved			
7.	Local back up service				
7.1.	Available	Should be available locally			
7.2.	Capacity to service equipment	Agent shall have adequate facilities, spare parts, and qualified and skilled technical staff			
8.	Installation and testing				
	Complete installation and set-up of the machine at per manufacturer's instructions				
9.	Training				
9.1.	User Training	On site user training on operation and daily up keep			
9.2.	Maintenance training	Onsite maintenance training on preventive maintenance			
10.	Technical documentations				
10.1.	User manuals	2 Sets (Hard and soft copy)			
10.2.	Service Manual	1 Set (Hard and soft copy)			
11.	Commissioning				
11.1.	Testing and commissioning of the machine to the satisfaction of the user.				
12.	**Warranty and After Sales Service:**				

Item Code No.	Department	Section	Item Description
LOT 3-1	Operations Theatre	General Surgery	**Operating Theatre light**, Ceiling Type LED Technology
12.1.	The Equipment including all accessories including bought out items should be under WARRANTY for a period of at least TWO YEARS after successful installation and commissioning.		
12.2.	Comprehensive maintenance contract rates for 5 YEARS after warranty must be quoted separately and these would be taken into consideration while comparing price bids.		
12.3.	All spare parts and consumables should be available with supplier or principals for a period of at least 10 years.		
12.4.	Should have local service facility. The service provider should have the necessary equipment recommended by the manufacturer to carry out preventive maintenance test as per guidelines provided in the service/maintenance manual.		
13.	**Other tender conditions**		
13.1.	Suppliers should have been in the market for at least 3 years and should have a satisfied userbase for this equipment.		
13.2.	All Essential Spare parts / Consumables rates to be given separately which may be frozen during the equipment life.		
13.3.	Suppliers should have made a large number of installations, within the last five years, in the country in reputed institutions and preferably in Government Hospitals with a proven track record of excellent after sales support for this system.		
13.4.	List of references to be enclosed.		

Drawn by:

Name:……. Signature ……Date: ……

Reviewed by:

Name……... Signature ……Date ……...

Confirmed by:

1. Name: ……... Signature……Date ……
2. Name: ……. Signature…… Date….....
3. Name……Signature…… Date……