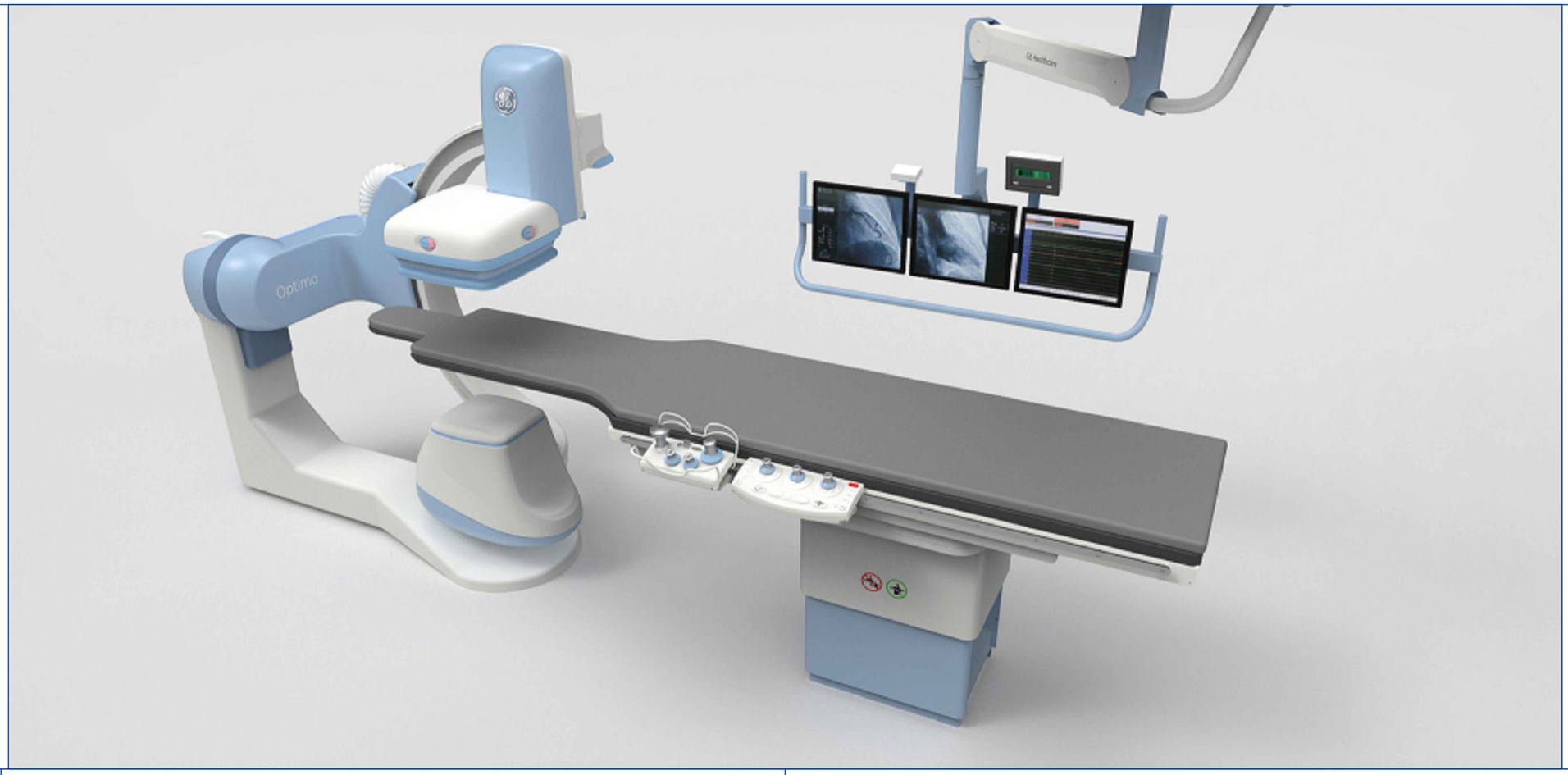


REV	DATE	MODIFICATIONS
A	31/Oct/2019	Initial release based on PIM revision 3

01 - C1 - Cover Sheet
02 - C2 - Disclaimer - Site Readiness
03 - A1 - General Notes
04 - A2 - Equipment Layout
05 - A3 - Section Views
06 - A4 - Equipment Details (1)
07 - A5 - Equipment Details (2)
08 - A6 - Delivery
09 - S1 - Structural Notes
10 - S2 - Structural Layout
11 - S3 - Structural Details (1)
12 - S4 - Structural Details (2)
13 - S5 - Structural Details (3)
14 - M1 - HVAC
15 - E1 - Electrical Notes
16 - E2 - Electrical Layout (2)
17 - E3 - Electrical Elevations
18 - E4 - Power Distribution
19 - E5 - Power Requirements
20 - E6 - Interconnections

A mandatory component of this drawing set is the GE Healthcare Pre Installation manual. Failure to reference the Pre Installation manual will result in incomplete documentation required for site design and preparation.
Pre Installation documents for GE Healthcare products can be accessed on the web at: www.gehealthcare.com/siteplanning

GE does not take responsibility for any damages resulting from changes on drawings made by others. Errors may occur by not referring to the complete set of final issue drawing. GE cannot accept responsibility for any damage due to the partial use of GE final issue drawings, however caused. All dimensions are in millimeters unless otherwise specified. Do not scale from printed pdf files. GE accepts no responsibility or liability for defective work due to scaling from these drawings.

TYPICAL

GE Healthcare

OPTIMA IGS 320-330
FINAL STUDY

Drawn by	Verified by	Concession	S.O. (GON)	PIM Manual	Rev
RET	TST	-	-	5537562-1-1EN	3

Format	Scale	File Name	Date	Sheet
A3	1/4"=1'-0"	EN-VAS-TYP-OPTIMA_IGS_3X0-WEB.DWG	02/Jul/2020	01/20

DISCLAIMER

GENERAL SPECIFICATIONS

- GE is not responsible for the installation of developers and associated equipment, lighting, cassette trays and protective screens or derivatives not mentioned in the order.
- The final study contains recommendations for the location of GE equipment and associated devices, electrical wiring and room arrangements. When preparing the study, every effort has been made to consider every aspect of the actual equipment expected to be installed.
- The layout of the equipment offered by GE, the dimensions given for the premises, the details provided for the pre-installation work and electrical power supply are given according to the information noted during on-site study and the wishes expressed by the customer.
- The room dimensions used to create the equipment layout may originate from a previous layout and may not be accurate as they may not have been verified on site. GE cannot take any responsibility for errors due to lack of information.
- Dimensions apply to finished surfaces of the room.
- Actual configuration may differ from options presented in some typical views or tables.
- If this set of final drawings has been approved by the customer, any subsequent modification of the site must be subject to further investigation by GE about the feasibility of installing the equipment. Any reservations must be noted.
- The equipment layout indicates the placement and interconnection of the indicated equipment components. There may be local requirements that could impact the placement of these components. It remains the customer's responsibility to ensure that the site and final equipment placement complies with all applicable local requirements.
- All work required to install GE equipment must be carried out in compliance with the building regulations and the safety standards of legal force in the country concerned.
- These drawings are not to be used for actual construction purposes. The company cannot take responsibility for any damage resulting therefrom.

CUSTOMER RESPONSIBILITIES

- It is the responsibility of the customer to prepare the site in accordance with the specifications stated in the final study. A detailed site readiness checklist is provided by GE. It is the responsibility of the customer to ensure all requirements are fulfilled and that the site conforms to all specifications defined in the checklist and final study. The GE Project Manager of Installation (PMI) will work in cooperation with the customer to follow up and ensure that actions in the checklist are complete, and if necessary, will aid in the rescheduling of the delivery and installation date.
- Prior to installation, a structrual engineer of record must ensure that the floor and ceiling is designed in such a way that the loads of the installed system can be securely borne and transferred. The layout of additional structural elements, dimensioning and the selection of appropriate installation methods are the sole responsibility of the structural engineer. Execution of load bearing structures supporting equipment on the ceiling, floor or walls are the customer's responsibility.

RADIO-PROTECTION

- Suitable radiological protection must be determined by a qualified radiological physicist in conformation with local regulations. GE does not take responsibility for the specification or provision of radio-protection.

THE UNDERSIGNED, HEREBY CERTIFIES THAT I HAVE READ AND APPROVED THE PLANS IN THIS DOCUMENT.		
DATE	**NAME**	**SIGNATURE**

GLOBAL SITE READINESS CHECKLIST (DI)

DOC1809666 Rev. 7

Site Ready Checks at Installation
EHS Site Requirements
Overall access route to the scan room free from obstruction / high hazards.
Enough space to store tools, equipment, parts, install waste and the general area free from obstruction and trip hazards.
Enough necessary facilities for the GE employees available.
No 3rd parties working in the area that may affect the safety of the installation activity.
Area free from any chemical, gas, dust, welding fume exposure and has painting been completed and dry.
All emergency routes identified, signed and clear from obstruction.
Accessible single source lockable panel that LOTO can be applied to for GE equipment installation (MDP and/or PDU).
There are no other conditions or hazards that you have observed or have been made aware of by the customer or contractors on site.
Required for Mechanical Install start
Room dimensions, including ceiling height, for all Exam, Equipment/Technical & Control rooms meets GE specifications.
Ceiling support structure, if indicated on the GE drawing, is in the correct location and at the correct height according to the Original Equipment Manufacturer specifications.
Levelness and spacing has been measured, and is ready for the installation of any GE supplied components.
Overhead support Structure (unistrut) has been confirmed with customer/contractor to meet required GE provided criteria.
Finished ceiling is installed. If applicable ceiling tiles installed per PMI discretion.
Floor levelness/flatness is measured and within tolerance, and there are no visible defects per GEHC specifications.
Entry door threshold meets PIM requirement
Floor Strength and thickness have been discussed with customer/contractor and they have confirmed GE requirements are met.
Rooms that will contain equipment, including staging areas if applicable, are construction debris free. Precautions must be taken to prevent debris from entering rooms containing equipment.
Cable ways (floor/wall/ceiling/Access Flooring) are available for installation of GE cables are of correct length and diameter.
Cable ways routes per GE Final drawings and cable access openings areas installed at a time determined by GEHC PM. Surface floor duct can be installed at time of system installation.
Adequate room illumination installed and working.
Customer supplied countertops where GE equipment will be installed are in place.
Vascular baseplates preparation complete per GE requirements.
For IGS 730/740: Floor finish is according to the GE Specifications and protection is installed . Specifications for concrete substrate & Monopur 7 mm flooring have been met. Table baseplate installed and flush to the finished floor.
For IGS 730/740: Room Interventional Reference Point (RIRP) value has been defined with the customer. Either 1120mm, 1278 mm or 1508 mm.
Ensure that all third party suppliers are identified and have been informed about the project dates and how they need to proceed in accordance with their needs for interfacing to our equipment.
Required for Calibration start
HVAC systems Installed, and the site meets minimum environmental operational system requirements.
System power & grounding (PDB/MDP) is available as per GE specifications.
System power & grounding (PDB/MDP) is installed at point of final connection and ready to use. Lock Out Tag Out is available.
PMI to confirm all feeder wires and breaker are size appropriately. EPO installed if needed.
PMI to confirm with electrician all power and signal cables are well terminated ensuring there are no loose connections.
Network outlets installed.
Computer network available and working.
Lead doors and windows complete or scheduled to be installed. If applicable, radiation protection (shielding) finished & radioprotection regulatory approval for installation obtained.

Note: The details shown here are only an extract from DOC1809666. For the complete document please contact your PMI.

MAGNETIC INTERFERENCE SPECIFICATIONS

- Image intensifiers must be located in ambient static magnetic fields of less than 1 gauss to guarantee specified imaging performance.
- X-ray tubes must be located in ambient static magnetic fields of less than 10 gauss to guarantee specified performance.
- System electronics must be located in ambient static magnetic fields of less than 10 gauss to guarantee data integrity.
- Operators console equipment must be located in ambient static magnetic fields of less than 10 gauss to obtain specified geometric linearity.

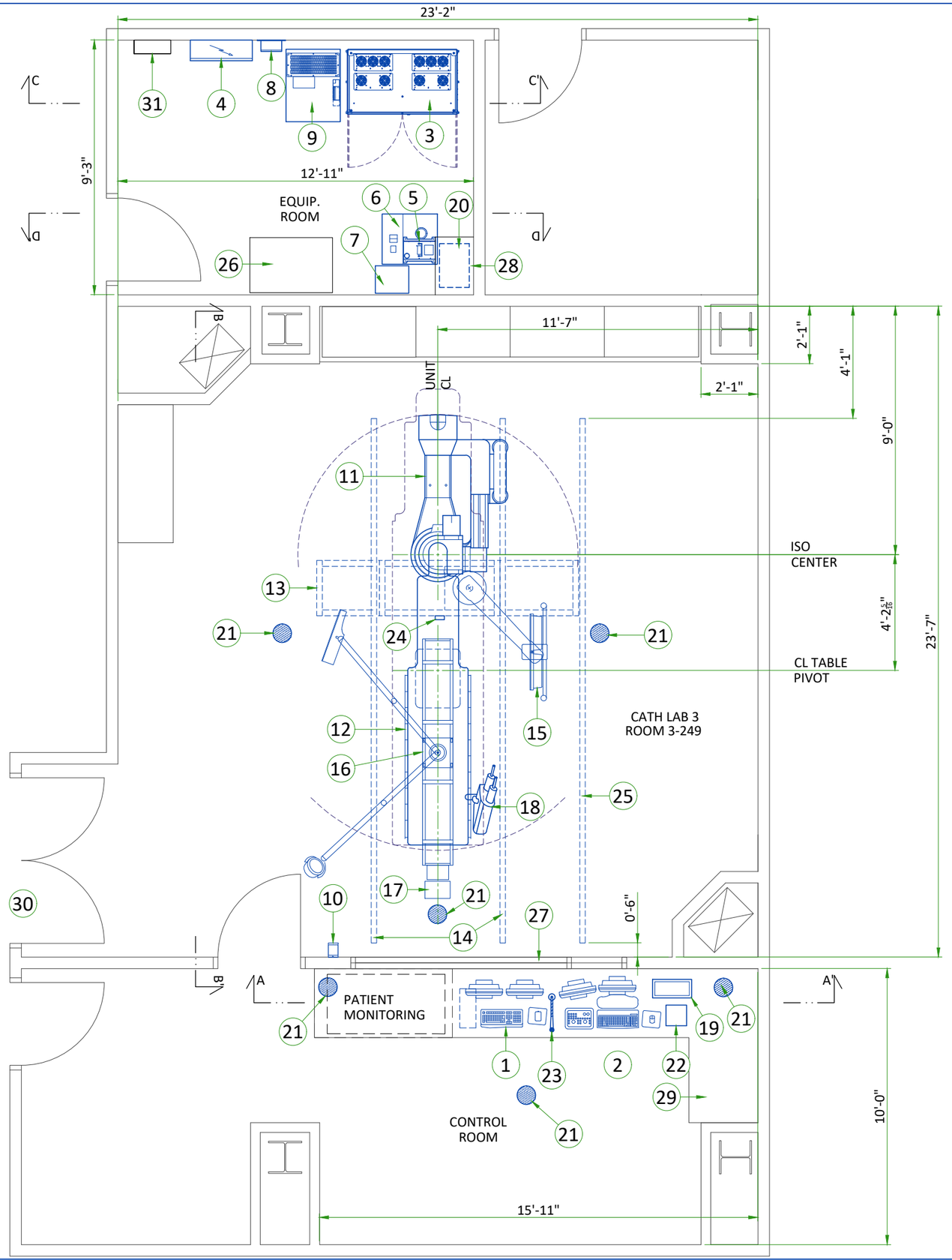
ELECTROMAGNETIC INTERFERENCE

The system is suitable for use in the specified electromagnetic environment. The purchaser or user of the system should assure that it is used in an electromagnetic environment as described below:

EMISSIONS	TEST COMPLIANCE	ELECTROMAGNETIC ENVIRONMENT
Radio–Frequency Emissions CISPR11	Group1 Class A limits	The system is suitable for use in all establishments other than domestic and those directly connected to the low voltage power supply network that supplies buildings used for domestic purposes.
	Group1 Class A limits	The system uses RF energy only for its internal function. Therefore, the RF emission is very low and not likely to cause any interference in nearby electronic equipment.
Harmonic emissions IEC 61000–3–2	Not applicable	The system is suitable for use only in establishments not directly connected to a public low voltage power supply network.
Voltage fluctuations/ flicker emissions IEC 61000–3–3	Not applicable	The system is suitable for use only in establishments not directly connected to a public low voltage power supply network.

CUSTOMER SITE READINESS REQUIREMENTS

- Any deviation from these drawings must be communicated in writing to and reviewed by your local GE Healthcare Installation project manager prior to making changes.
- Make arrangements for any rigging, special handling, or facility modifications that must be made to deliver the equipment to the installation site. If desired, your local GE Healthcare Installation project manager can supply a reference list of rigging contractors.
- New construction requires the following;
  1. Secure area for equipment,
  2. Power for drills and other test equipment,
  3. Capability for image analysis,
  4. Restrooms.
- Provide for refuse removal and disposal (e.g. crates, cartons, packing)
- It is the customer's responsibility to contract a vibration consultant/engineer to implement site design modifications to meet the GE vibration specification. Refer to the system preinstallation manual for the vibration specification.



LEGEND

A	GE Supplied	C	Customer/contractor supplied and installed
B	GE Supplied/contractor installed	D	Available from GE
E	Existing/Reinstall		

BY	ITEM	DESCRIPTION	MAX HEAT OUTPUT (btu)	WEIGHT (lbs)	MAX HEAT OUTPUT (W)	WEIGHT (kg)
D	1	Advantage workstation	2019	22	590	10
A	2	Operator console	341	19.6	100	9
A	3	System Control Cabinet	7378	1323	2160	600
A	4	Power Distribution Box	1534	326	450	148
A	5	Detector conditioner	717	32	210	14.5
A	6	COOLIX 4100 water chiller	23646	265	6930	120
A	7	Chiller Autotransformer	222	66	65	30
D	8	UPS Interface Box	-	9	-	4
D	9	20kVA Fluoro UPS UL	6751	1169	1980	530
A	10	Xray buzzer	-	1	-	0.5
A	11	LC gantry	2416	1655	708	750
A	12	OMEGA V long patient table	614	1300	180	590
A	13	Monitor suspension long bridge	-	-	-	-
A	14	Longitudinal stationary rail for XT suspension	-	139	-	63
D	15	Suspension with 4 LCD monitors	1157	225	339	102
D	16	Mavig rad shield and LED lamp with 2.5m ceiling track	-	143	-	65
D	17	External Transformer for LED Surgical lamp	-	17	-	8
D	18	Injector head on table rail	-	15	-	7
D	19	Injector control	-	4	-	2
D	20	Injector electronics	320	37	94	17
D	21	Vitalinq speaker	-	-	-	-
D	22	Vitalinq console	-	-	-	-
D	23	Vitalinq microphone	-	-	-	-
D	24	Vitalinq microphone (one on monitor bridge in exam room)	-	-	-	-
C	25	Cable drape rail.				
C	26	Storage cabinet				
C	27	Control wall to ceiling with lead glass viewing window.				
C	28	Shelf - customer to provide adequate wall support				
C	29	Counter top for equipment- provide grommeted openings as required to route cables				
C	30	Minimum door opening for equipment delivery is 44 in. w x 83 in. h [1118mm x 2108mm], contingent on a 96 in. [2438mm] corridor width				
C	31	150-AMP Local service disconnect for lock-out/ tag-out capability. (may be a fused disconnect, circuit breaker or safety switch.)				

EXAM ROOM HEIGHT

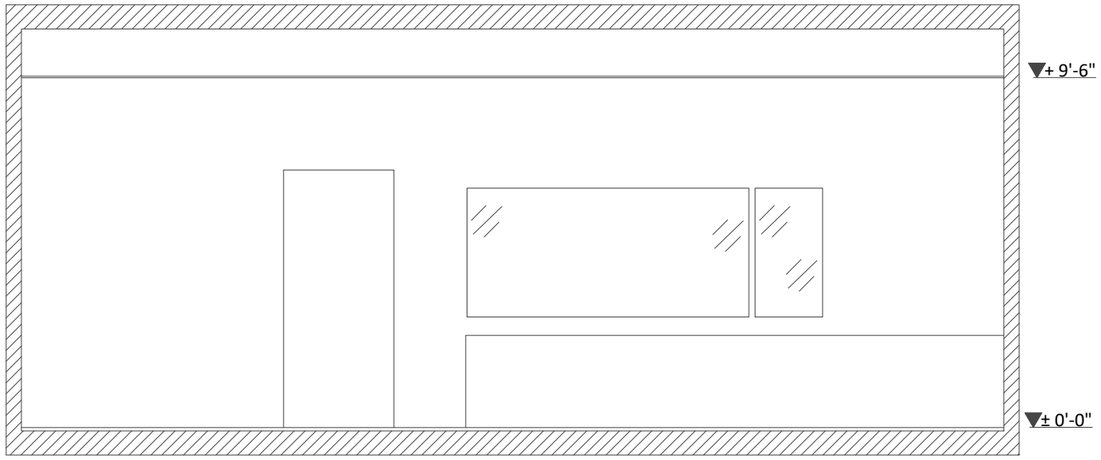
	Minimum		Recommended	
FINISHED FLOOR TO FALSE CEILING	9'-0"	2.74m	10'-0"	3.05m

Door openings: Exam room min 1160 [50 in], Technical room min 800 [36 in], rec 1000 [40 in]

For Accessory Sales: (866) 281-7545 Options 1, 2, 1, 2 or mail to: gehcaccessorysales@ge.com

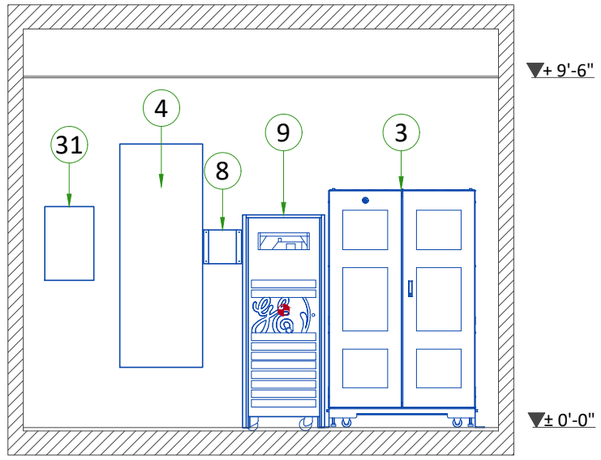
CONTROL ROOM VIEW

SECTION A-A'



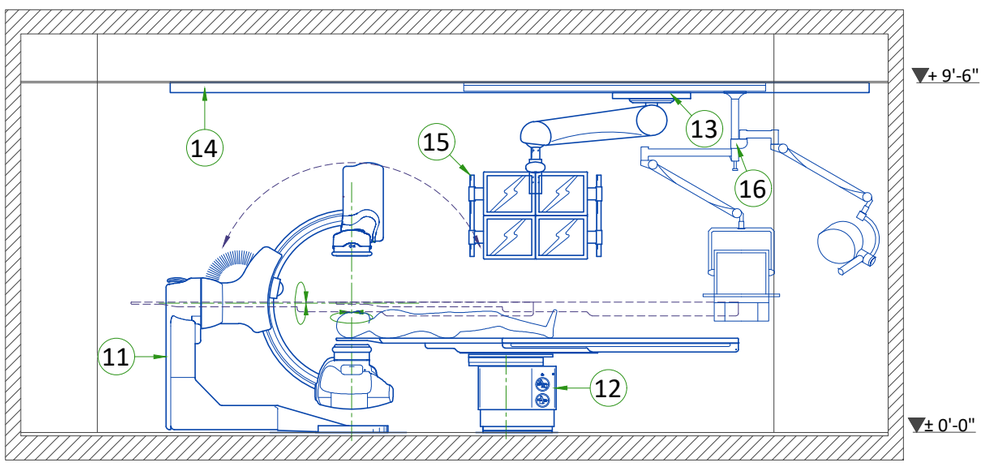
TECHNICAL ROOM VIEW

SECTION C-C'



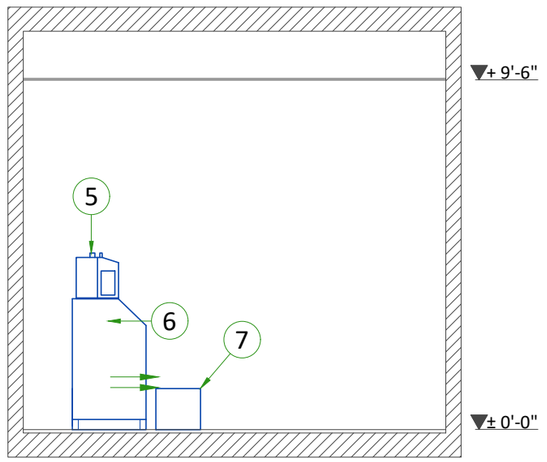
EXAM ROOM VIEW

SECTION B-B'

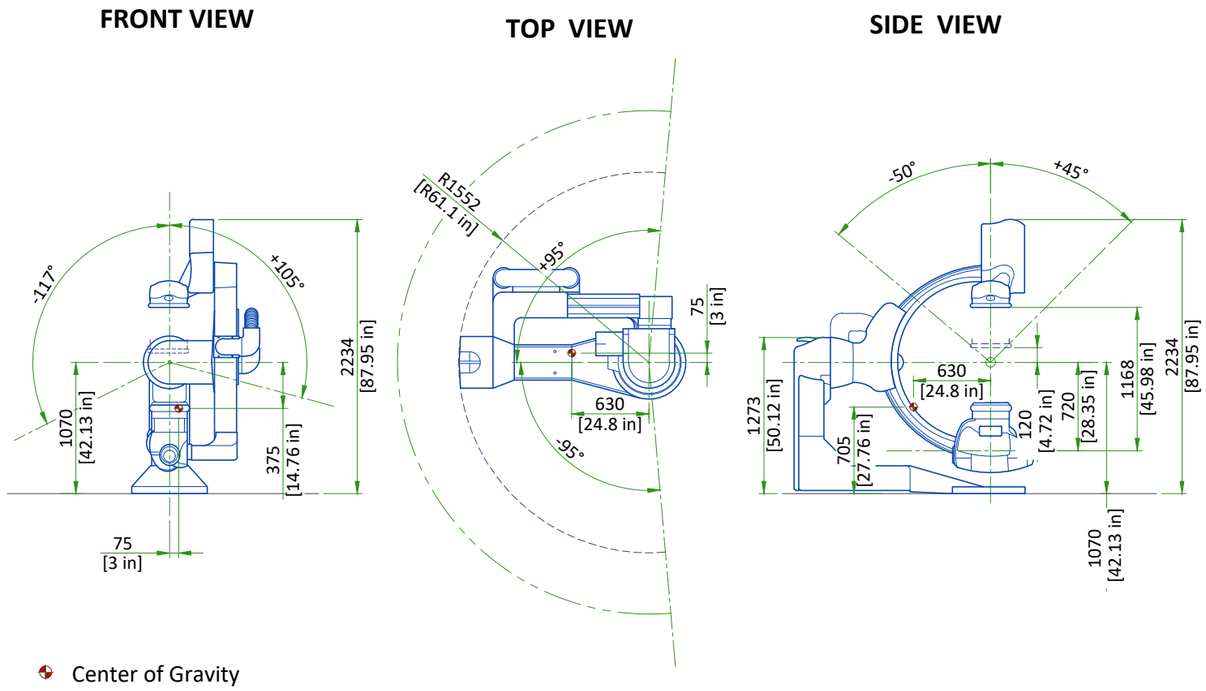


TECHNICAL ROOM VIEW

SECTION D-D'



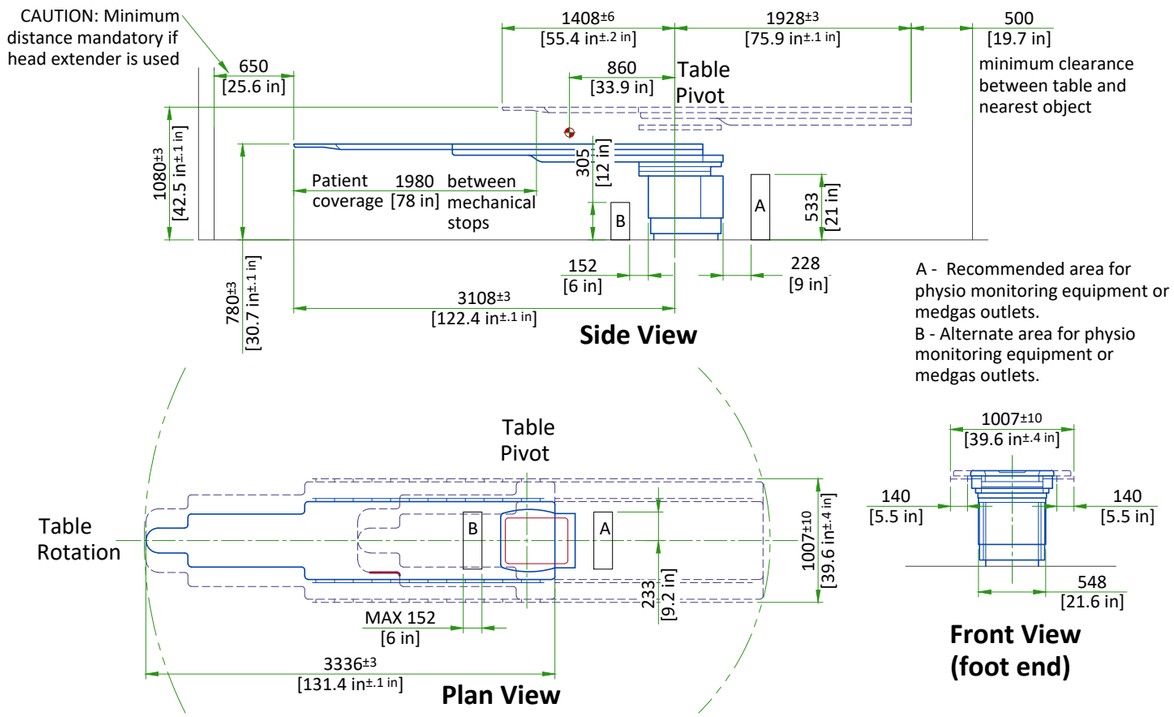
GANTRY



Center of Gravity

SCALE 1:50

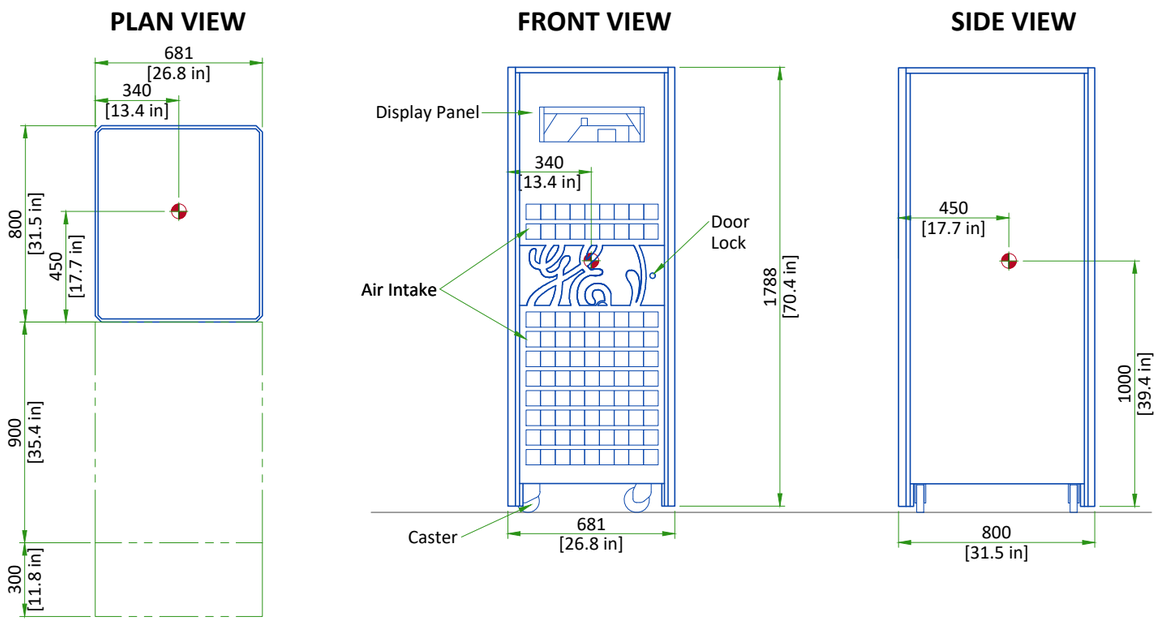
PATIENT TABLE



Scale 1:50

Center of Gravity

DIGITAL ENERGY SG SERIES 10-20kVA UPS

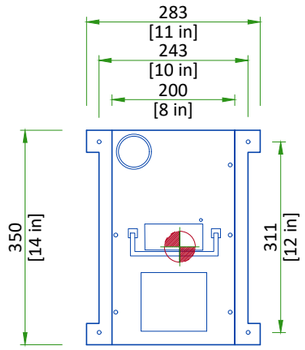


SCALE 1:25

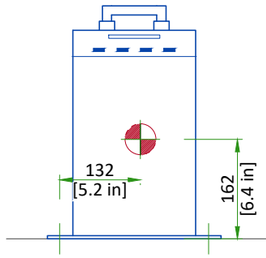
Center of Gravity

DETECTOR CONDITIONER

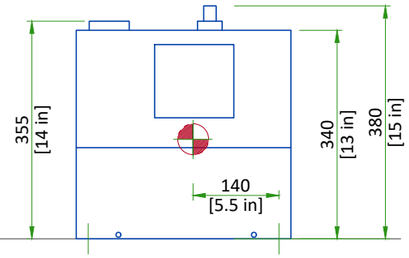
TOP VIEW



FRONT VIEW



SIDE VIEW

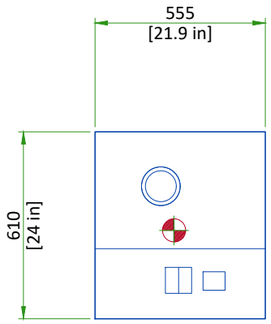


Center of Gravity

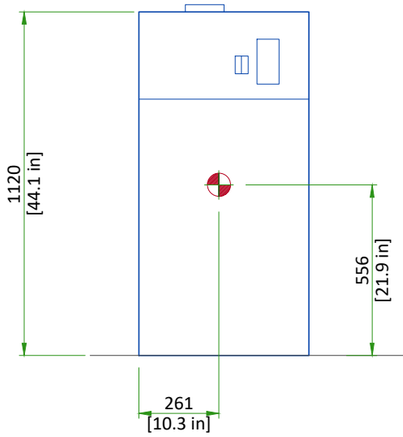
Scale 1:10

X-RAY TUBE CHILLER

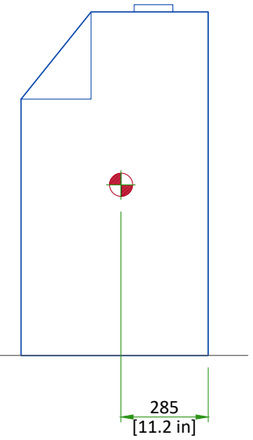
TOP VIEW



FRONT VIEW



SIDE VIEW

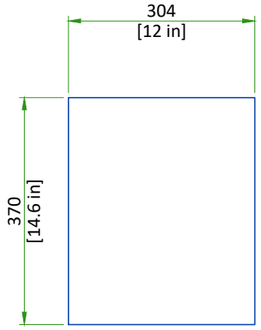


Center of Gravity

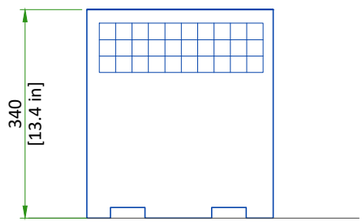
Scale 1:20

COOLIX AUTOTRANSFORMER

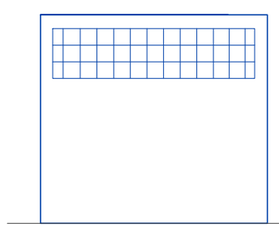
Plan View

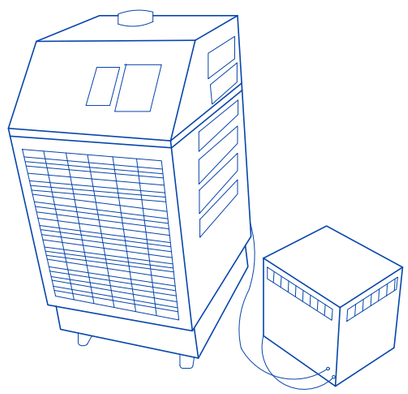


Front View



Side View





Scale 1:10

DELIVERY

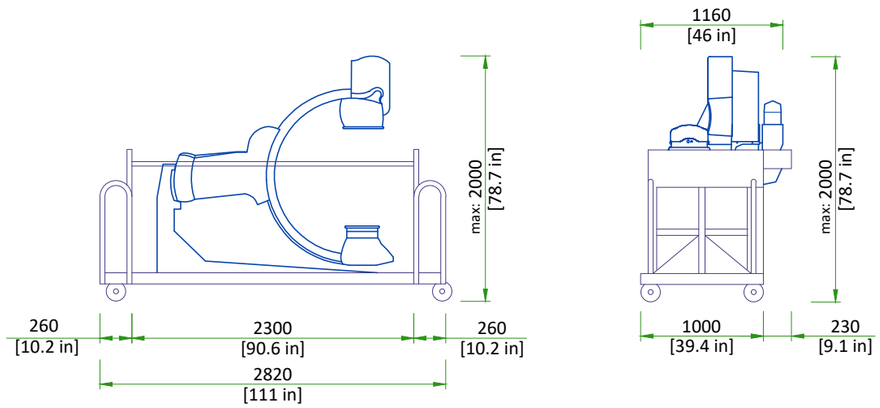
THE CUSTOMER/CONTRACTOR SHOULD:

- Provide an area adjacent to the installation site for delivery and unloading of the GE equipment.
- Ensure that the dimensions of all doors, corridors, ceiling heights are sufficient to accommodate the movement of GE equipment from the delivery area into the definitive installation room.
- Ensure that access routes for equipment will accommodate the weights of the equipment and any transportation, lifting and rigging equipment.
- Ensure that all necessary arrangements for stopping and unloading on public or private property not belonging to the customer have been made.

DIMENSIONS OF DELIVERY WITH DOLLY TRANSPORT EQUIPMENT

EQUIPMENT	DIMENSIONS		WEIGHT
GANTRY	LENGTH	2820 mm [111 in]	1060 kg [2340 lb]
	WIDTH	1230 mm [48.4 in]	
	HEIGHT	2000 mm [79 in]	

SHIPPING DOLLY FOR LC GANTRY



SHIPPING WEIGHT: 1060 kg [2337 lb].

Both ends of the dolly can be removed which will shorten the LC gantry dolly to 2300 mm [90 in], also the right and left top handles can be removed which will make the width 1160 mm [46 in].

SCALE 1:50

STRUCTURAL NOTES

- All steel work and parts necessary to support ceiling mounted tube hanger or other equipment are to be supplied by the customer or his contractors. The unistrut or equivalent structure should run continuous with no fittings extending below face of unistrut channel, run wall to wall, be parallel, square and in the same horizontal plane flush with finished ceiling. The system is to be cross braced vertically, horizontally and diagonally to allow no movement and a maximum of 1,58mm(1/16") deflection. (10) 12,7mm (1/2") dia. X 38,1mm (1 1/2") long bolts with unistrut 12,7mm (1/2") nuts with springs are to be provided by customer or his contractors for each stationary and auxillary support rail. Closure strips shall be provided for areas of unistrut exposed and without mounting units.

- Methods of support for the steelwork that will permit attachment to structural steel or through bolts in concrete construction should be favored. Do not use concrete or masonry anchors in direct tension.

- All units that are wall mounted or wall supported are to be provided with supports where necessary. Wall supports are to be supplied and installed by the customer or his contractors. See plan and detail sheets for suggested locations and mounting hole locations.

- All ceiling mounted fixtures, air vents, sprinklers, etc. To be flush mounted, or shall not extend more than 6,35mm (1/4") below the finished ceiling.

- Control walls with tube hanger passage above shall be constructed to 2130mm (7'-0") high.

- Floor slabs on which equipment is to be installed must be level to 3,17mm (1/8") in 3050mm (10'-0")

- Minimum floor thickness of 203mm (8").

- Dimensions are to finished surfaces of room.

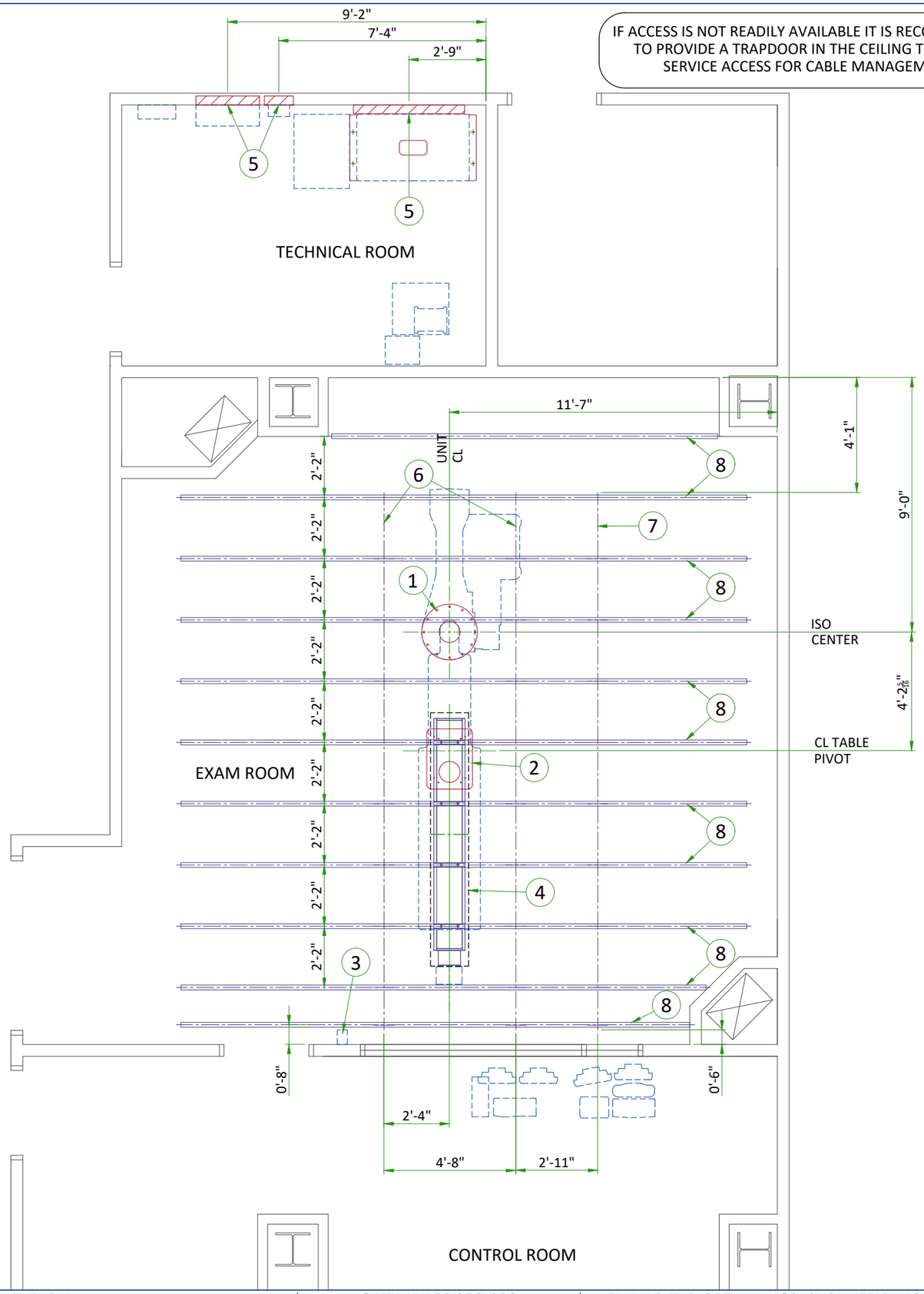
- Customers contractor must provide all penetrations in post tension floors.

- Customers contractor must provide and install any non-standard anchoring. Documents for standard anchoring methods are included with GE equipment drawings for geographic areas that require such documentation.

- Customers contractor must provide and install hardware for "through the floor" anchoring and/or any bracing under access floors. This contractor must also provide floor drilling that cannot be completed because of an obstruction encountered while drilling by the GE installer such as rebar etc.

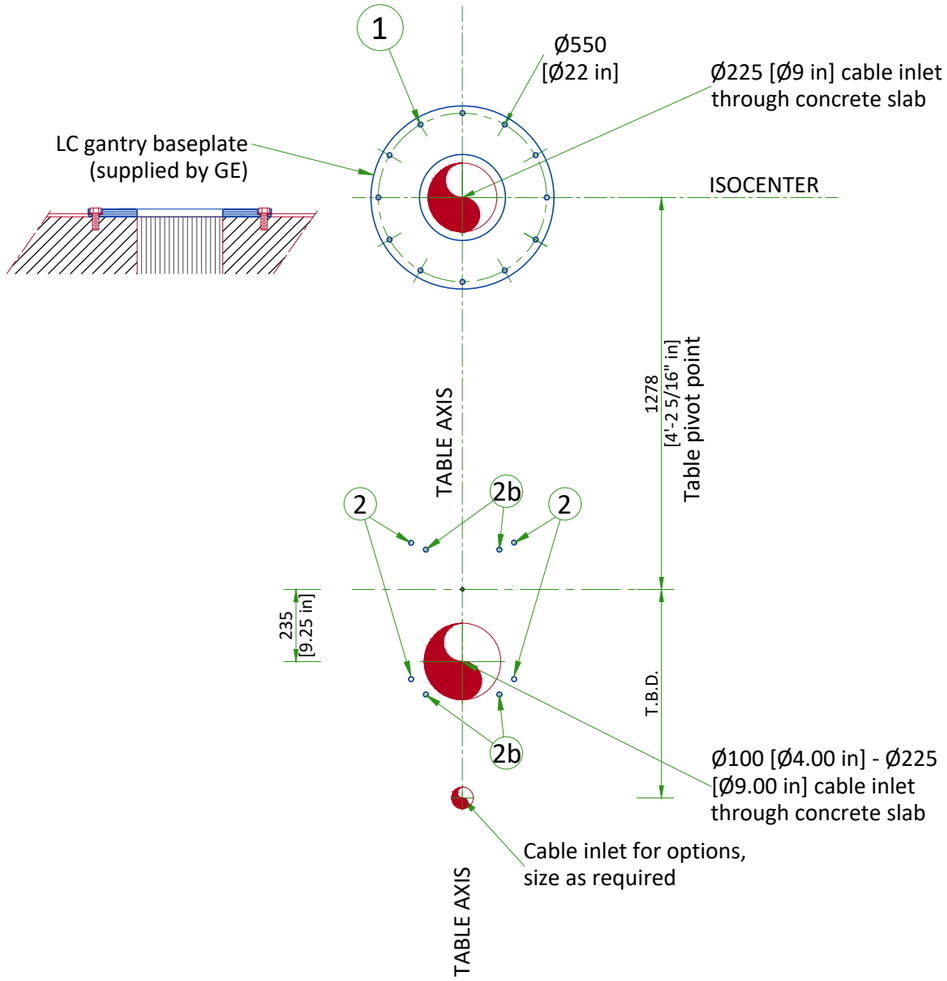
- It is the customer's responsibility to perform any floor or wall penetrations that may be required. The customer is also responsible for ensuring that no subsurface utilities (e.g., electrical or any other form of wiring, conduits, piping, duct work or structural supports (i.e. post tension cables or rebar)) will interfere or come in contact with subsurface penetration operations (e.g. drilling and installation of anchors/screws) performed during the installation process. To ensure worker safety, GE installers will perform surface penetration operations only after the customer's validation and completion of the "GE surface penetration permit"

IF ACCESS IS NOT READILY AVAILABLE IT IS RECOMMENDED TO PROVIDE A TRAPDOOR IN THE CEILING TO ALLOW SERVICE ACCESS FOR CABLE MANAGEMENT.



STRUCTURAL LAYOUT ITEM LIST	
(GE SUPPLIED / CONTRACTOR INSTALLED)	
1	Area occupied by GE supplied positioner baseplate
2	Area occupied by GE supplied table baseplate
3	Mount X-Ray buzzer bracket on wall above ceiling
(CUSTOMER SUPPLIED / CONTRACTOR INSTALLED)	
4	Area of radiation shield mounted to unistrut grid in ceiling
5	Support backing, locate as shown.
6	Stationary rails attached to gridded support in ceiling.
7	Cable drape rail attached to gridded support in ceiling.
8	Structural support in ceiling for fastening ceiling supported equipment. Supports to run continuous with no fittings extending below face of channel, run wall to wall, be parallel, square, and in the same horizontal plane, flush with the finished ceiling. Rails are mounted to these supports every 2'-2" and require 350 lbs. (597 lbs. In seismic regions) per bolt load. Methods of support that permit attachment to structural steel or through bolts in concrete should be favored. Do not use screw anchors in direct tension.

LC GANTRY AND TABLE ANCHORING WITH NO BASEPLATE



(1) LC baseplate mounting location : 12 bolts
Pullout strength on each bolt 736 daN
- M20 Through-Bolts recommended (supplied by GE)
Alternates:
- M16 Mechanical anchors (supplied by GE)
- Chemical anchors (not supplied by GE):
HILTIHVU adhesive capsule + HAS Anchor rod

(2) Table mounting location : 4 bolts required
Pullout strength on each bolt 4432 daN
- M20 Through-Bolts recommended (supplied by GE)
Alternates:
- M16 Mechanical anchors (supplied by GE)
- Chemical anchors (not supplied by GE):
HILTIHVU adhesive capsule + HAS Anchor rod

(2b) Alternate bolt holes for seismic zones 1 and 2

FLOOR REQUIREMENTS AND CABLE MANAGEMENT

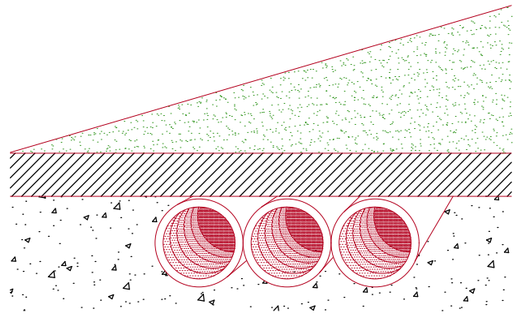
FLOOR REQUIREMENTS

- The maximum pullout force per GE supplied anchor was calculated assuming :

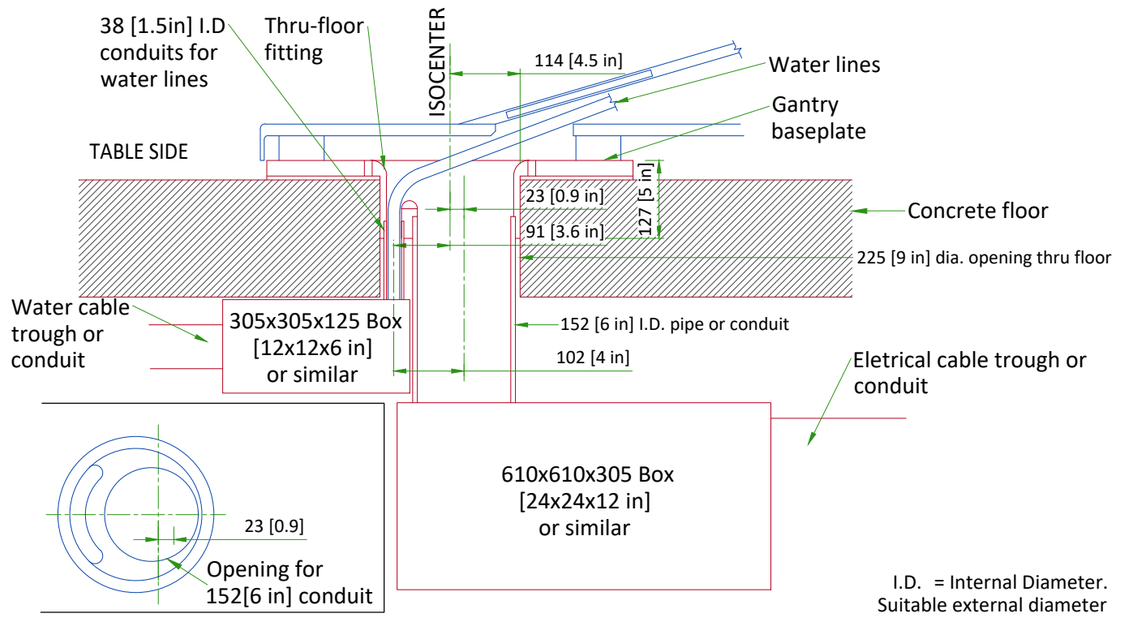
  - A concrete compression strength of **17.24 MPa** at 28 days (which is the minimum required compression stength).
  - Anchors installed to the required hole depth of **165.1 mm [6.5 in] minimum**.
  - Center of anchor hole to concrete edge distance **79.4 mm [3.1 in]**.
  - Make sure to obtain data on compression strength of the concrete before using floor anchors.

- The floor slab on which the equipment is to be installed must be flat and level (1 mm [0.04 in]/1 m [40 in] where equipment is installed and 5 mm [0.2 in]/2 m [79 in] general levelness).
- Anchoring to the floor is intended to the structural elements and not to common screed.
- Do not glue the floor covering in the gantry zone.

CONDUIT IN THE FLOOR



GANTRY UNDER FLOOR CABLING DETAILS

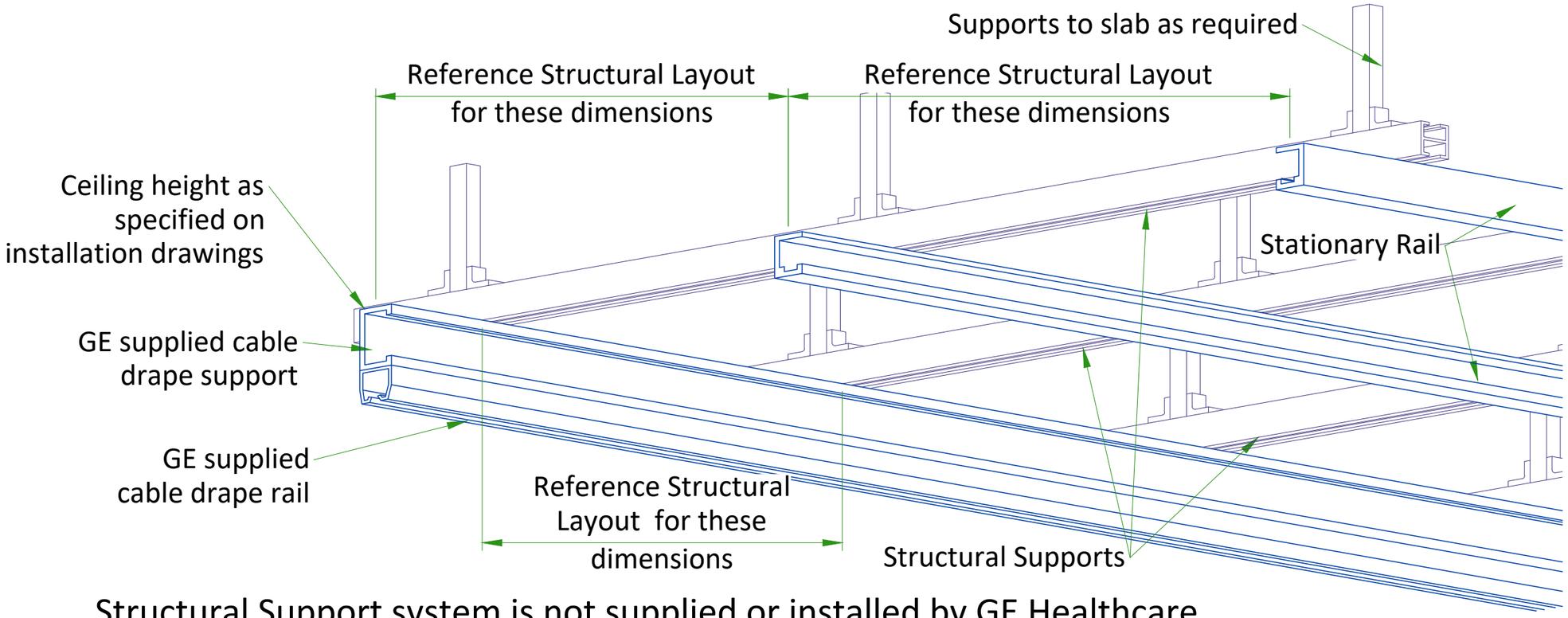


I.D. = Internal Diameter.
Suitable external diameter

NOTE: PIPE, JUNCTION BOX AND DUCT OR CONDUIT ARE TO BE SUPPLIED AND IS TO BE INSTALLED BY CUSTOMER OR CUSTOMER'S CONTRACTOR

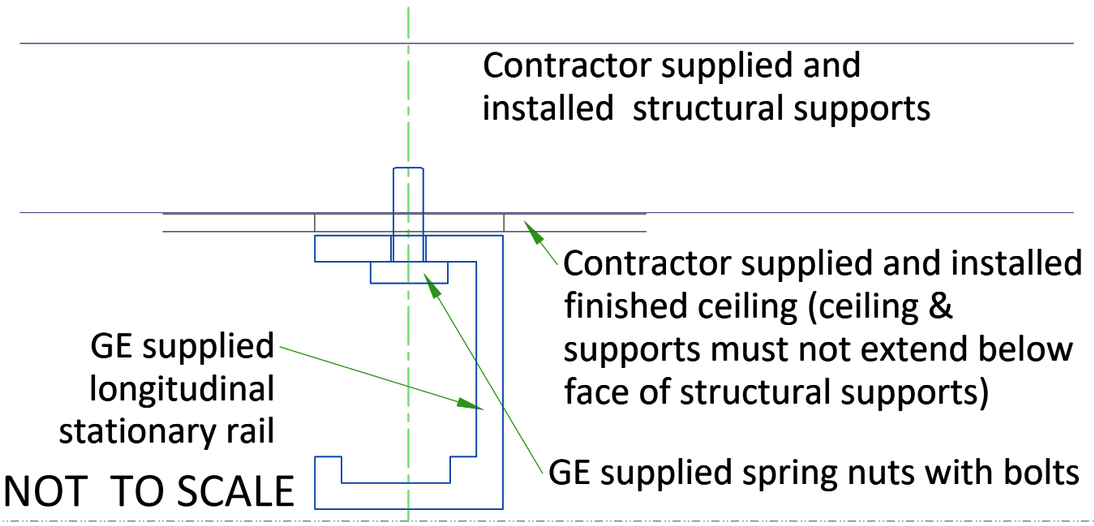
NOT IN SCALE

XT RADIOGRAPHIC SUSPENSION, INBOARD MOUNTING



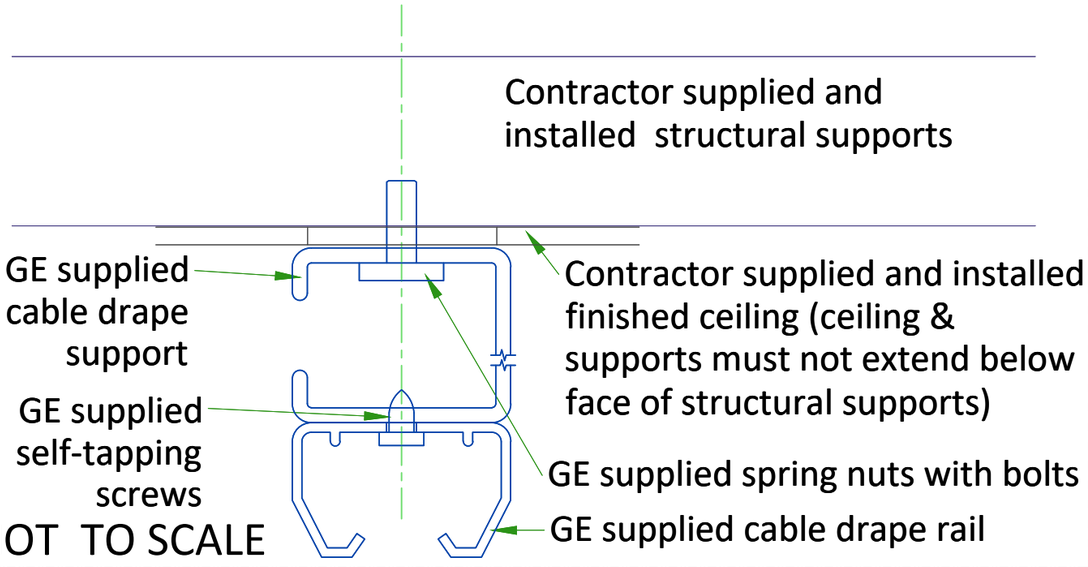
Structural Support system is not supplied or installed by GE Healthcare

DETAIL 1



NOT TO SCALE

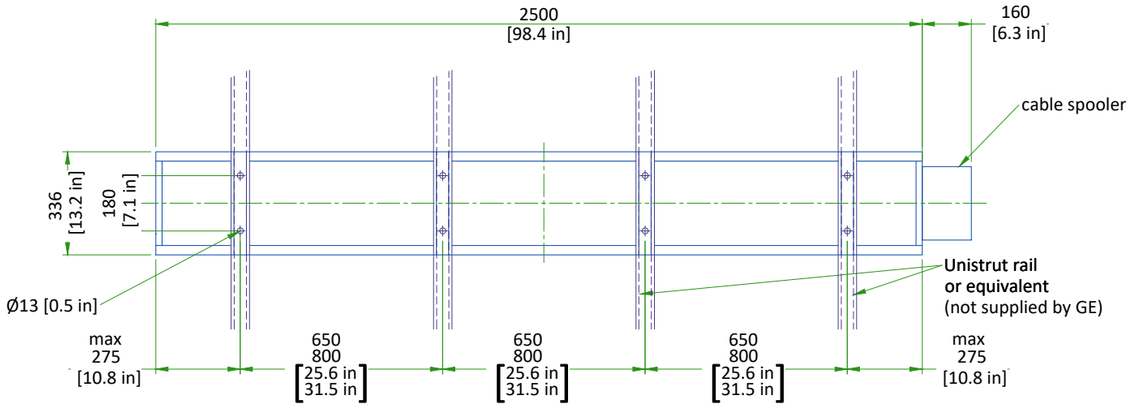
DETAIL 2



NOT TO SCALE

MAVIG SUSPENSION MOUNTING METHOD

2.5m CEILING TRACK

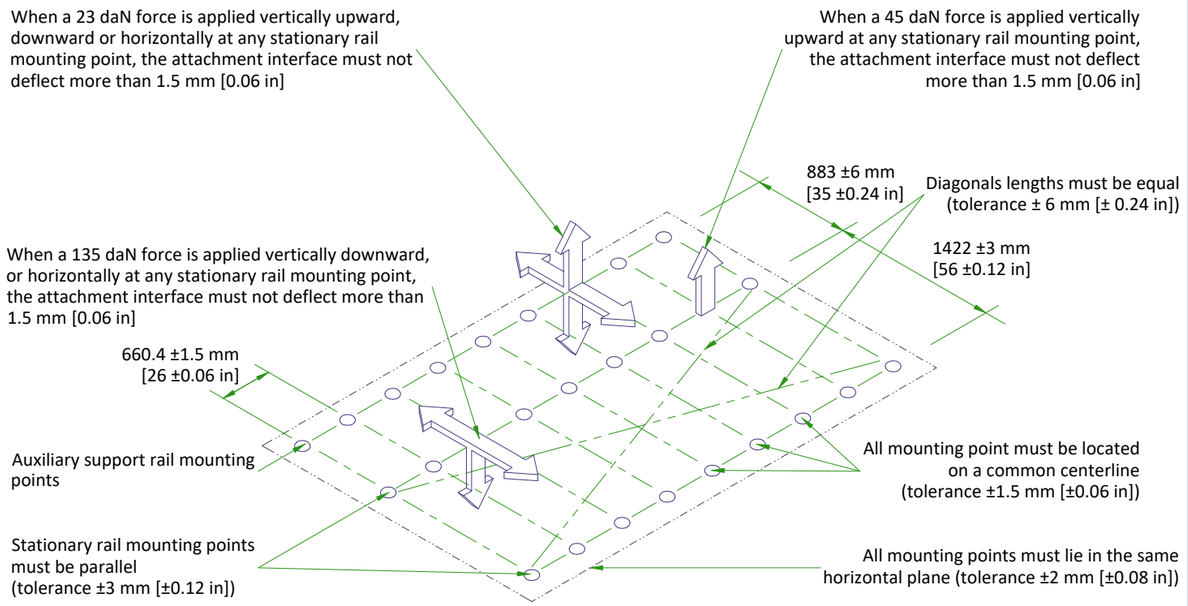


- Weight up to: 94 kg [207 lb] (75 kg [165 lb] system + 19 kg [42 lb] track)
- The required factor of safety is "4" for attaching to Unistrut or equivalent rails and "6" for attaching to the concrete ceiling.

CONSULT MAVIG INSTALLATION MANUAL REV: POR03001 TO DESIGN AND MOUNT THE CEILING SUPPORT.

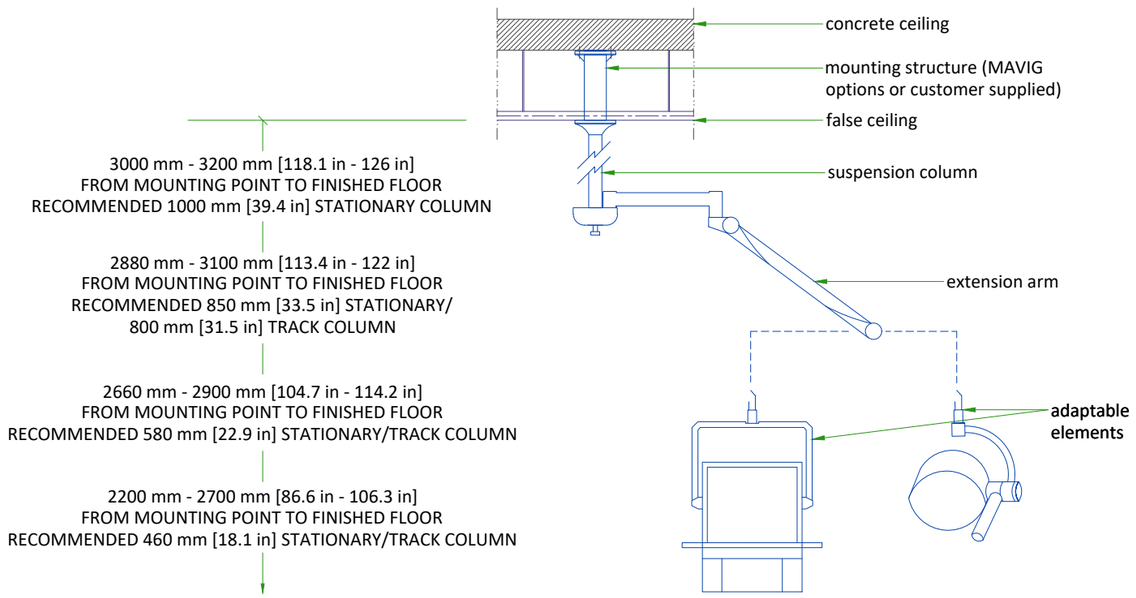
SCALE 1:20

MONITOR SUSPENSION RAIL MOUNTING SPECIFICATIONS



Each stationary rail must be mounted by bolts supplied or by 12 mm [0.47 in] as metric bolts. Maximum load per bolt is 160 daN, however each mounting bolt must not "PULL OUT" or otherwise fail under a vertically downward dead load of 635daN.

SUSPENSION COLUMN LENGTHS AND INSTALLATION DETAILS



For rooms with higher mounting point than 3200 mm [126 in], a ceiling construction between structural ceiling and vertical column is suggested which needs to be designed by a structural engineer.
All design and pre-installation activity must be done in accordance of the MAVIG Installation manual.
Contact your GE Project Manager for OEM documentation. Installation of mounting plate performed by GE or a GE sub-contractor.

NOT TO SCALE

CEILING SUSPENSION DISCLAIMER

Safety and precautionary comments:

Only qualified, licensed technicians can perform electrical connections, installation, removal and repair. It is strongly recommended that at least two persons perform the installation.

Installing the system: Prior to installation, a structural engineer must confirm that the mounting structure is strong enough to provide proper support for the entire system and any attached end devices. Installation must be completed according to local building codes.

Determination of required installation hardware and torque values for installation of the ceiling column and ceiling track is the sole responsibility of the structural engineer.

Ceiling mounted systems must be installed properly. Failure to follow the instructions provided may lead to a potentially dangerous and unstable condition of the system.

GE and/or MAVIG is not responsible for unauthorized modifications made to the system or use of the system for unintended purposes. GE and/or MAVIG cannot be held liable for improper operation and modifications. Since improper modifications may impair proper operation, safety or reliability of the system, product modifications require written authorization from MAVIG.

Under GE responsibility or under Customer responsibility, for all pre-installations, whatever is the supporting structure (bridge, chair, Unistrut channel, other channels, direct anchorage in concrete, transversal beam, etc. …) a certificate must be obtained from a structural engineer.

This certificate shall include the definition of fasteners and of their tightening torque, especially for the non-standard cases described in MAVIG PIM and for which the standard anchoring/screws delivered with product shall not be used but shall be defined (and implemented in most cases) by the structural company.

WARNING:

It is prohibited to alter the length of the ceiling column or remove any securing screws.

TEMPERATURE AND HUMIDITY SPECIFICATIONS

IN-USE CONDITIONS

	EXAM ROOM			CONTROL ROOM			TECHNICAL ROOM		
Temperature	Min	Recommended	Max	Min	Recommended	Max	Min	Recommended	Max
	15 °C [59 °F]	22 °C [72 °F]	32 °C [90 °F]	15 °C [59 °F]	22 °C [72 °F]	35 °C [95 °F]	10 °C [50 °F]	18 °C [64 °F]	30 °C [86 °F]
Temperature gradient	**≤ 10 °C/h [50 °F/h]**			**≤ 10°C/h [50 °F/h]**			**≤ 10 °C/h [50 °F/h]**		
RH (1) non condensing	30% to 70%			30% to 75%			30% to 75%		
Humidity gradient	**≤ 10%/h**			**≤ 10%/h**			**≤ 10%/h**		

STORAGE CONDITIONS

Temperature	+10 °C [50 °F] to +40 °C [104 °F]
RH (1) non condensing	10% to 70%
Material should not be stored for more than 90 days.	

(1) Relative humidity

AIR RENEWAL

According to local standards.

NOTE
In case of using air conditioning systems that have a risk of water leakage it is recommended not to install it above electric equipment or to take measures to protect the equipment from dropping water.

HEAT DISSIPATION

ROOM	DESCRIPTION	HEAT DISSIPATION					
		STAND BY		AVERAGE*		MAX	
		kW	BTU/hr	kW	BTU/hr	kW	BTU/hr
Examination room	LC Gantry Patient table	0.41	1394	0.89	1858	1.62	5517
	3 monitor	0.25	843	0.25	843	0.25	843
	4 monitor	0.34	1146	0.34	1146	0.34	1146
	6 monitor	0.50	1719	0.50	1719	0.50	1719
	Typical injector	0.09	320	0.09	320	0.09	320
	Vivid E9 Ultrasound	-	-	1.11	3816	1.11	3816
	TOTAL	**0'-1 1/2"**	**5422**	**0'-3 1/4"**	**9702**	**0'-4"**	**13361**
Control room	Operator Console	0.25	853	0.25	853	0.25	853
	AW Workstation	0.59	2013	0.59	2013	0.59	2013
	CA1000 Workstation	0.59	2013	0.59	2013	0.59	2013
	Reference monitor	0.12	409	0.12	409	0.12	409
	IVUS	-	-	0.52	1774	0.52	1774
	MACLAB	-	-	1.20	4094	1.20	4094
	CARDIOLAB	-	-	1.20	4094	1.20	4094
	COMBOLAB	-	-	1.20	4094	1.20	4094
	TOTAL	**0'-1 1/2"**	**440'-8"**	**0'-5 3/4"**	**1612'-0"**	**0'-5 3/4"**	**1612'-0"**
Technical room	System Cabinet	0.70	2387	1.53	5217	2.16	7378
	Tube chiller	2.53	8619	5.50	18725	6.93	23625
	Detector conditioner	0.21	709	0.21	709	0.21	709
	Power Distribution Box	0.40	1364	0.45	1534	0.45	1534
	Fluoro UPS CE	2.14	7302	2.14	7302	2.14	7302
	Fluoro UPS UL	1.98	6751	1.98	6751	1.98	6751
	Full UPS	11.44	39034	11.44	39034	11.44	39034
	TOTAL	**1'-7 1/2"**	**5513'-1 0"**	**1'-11 1/4"**	**6606'-0"**	**2'-1 1/4"**	**7194'-5"**

WARNING
The list contains only the principal components of the system and doesn't contain any non-GE supplied equipment.

* This average corrisponds to 11 cases in 10 hours.

ELECTRICAL NOTES

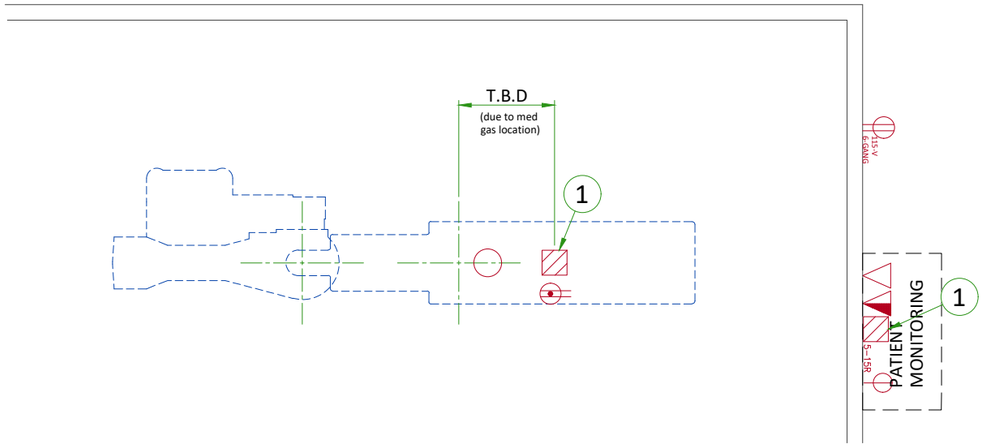
1. All wires specified shall be copper stranded, flexible, thermo-plastic, color coded, cut 10 foot long at outlet boxes, duct termination points or stubbed conduit ends. All conductors, power, signal and ground, must be run in a conduit or duct system. Electrical contractor shall ring out and tag all wires at both ends. Wire runs must be continuous copper stranded and free from splices.
   1.1. Aluminum or solid wires are not allowed.
2. Wire sizes given are for use of equipment. Larger sizes may be required by local codes.
3. It is recommended that all wires be color coded, as required in accordance with national and local electrical codes.
4. Conduit sizes shall be verified by the architect, electrical engineer or contractor, in accordance with local or national codes.
5. Convenience outlets are not illustrated. Their number and location are to be specified by others. Locate at least one convenience outlet close to the system control, the power distritbution unit and one on each wall of the procedure room. Use hospital approved outlet or equivalent.
6. General room illumination is not illustrated. Caution should be taken to avoid excessive heat from overhead spotlights. Damage can occur to ceiling mounting components and wiring if high wattage bulbs are used. Recommend low wattage bulbs no higher than 75 watts and use dimmer controls (except MR). Do not mount lights directly above areas where ceiling mounted accessories will be parked.
7. Routing of cable ductwork, conduits, etc., must run direct as possible otherwise may result in the need for greater than standard cable lengths (refer to the interconnection diagram for maximum usable lengths point to point).
8. Conduit turns to have large, sweeping bends with minimum radius in accordance with national and local electrical codes.
9. A special grounding system is required in all procedure rooms by some national and local codes. It is recommended in areas where patients might be examined or treated under present, future, or emergency conditions. Consult the governing electrical code and confer with appropriate customer administrative personnel to determine the areas requiring this type of grounding system.
10. The maximum point to point distances illustrated on this drawing must not be exceeded.
11. Physical connection of primary power to GE equipment is to be made by customers electrical contractor with the supervision of a GE representative. The GE representative would be required to identify the physical connection location, and insure proper handling of GE equipment.
12. GEHC conducts power audits to verify quality of power being delivered to the system. The customer's electrical contractor is required to be available to support this activity.

- All junction boxes, conduit, duct, duct dividers, switches, circuit breakers, cable tray, etc., are to be supplied and installed by customers electrical contractor.
- Conduit and duct runs shall have sweep radius bends
- Conduits and duct above ceiling or below finished floor must be installed as near to ceiling or floor as possible to reduce run length.
- Ceiling mounted junction boxes illustrated on this plan must be installed flush with finished ceiling.
- All ductwork must meet the following requirements:
  1.Ductwork shall be metal with dividers and have removable, accessible covers.
  2.Ductwork shall be certified/rated for electrical power purposes.
  3.Ductwork shall be electrically and mechanically bonded together in an approved manner.
  4.PVC as a substitute must be used in accordance with all local and national codes.
- All openings in raceway and access flooring are to be cut out and finished off with grommet material by the customers contractor.
- General contractor to insert pull cords for all cable run conduits between the equipment room and the operators control room.
- 10 foot pigtails at all junction points.
- Grounding is critical to equipment function and patient safety. Site must conform to wiring specifications shown on this plan.

PHYSIO MONITORING

ITEM	Outlet Legend for Physio Equipment
	Duplex hospital grade, dedicated outlet 120-v emergency, single phase power, 15a
6-GANG	6-Gang hospital grade, dedicated wall outlet 115-V, single phase power
5-15R	5-15R NEMA Receptacle, dedicated outlet 120-v, single phase power
	Dedicated telephone line(s)
	Network outlet

	ELECTRCAL LAYOUT ITEM LIST
1	J-Box or area of conduit stubs for patient monitoring - Size per local code

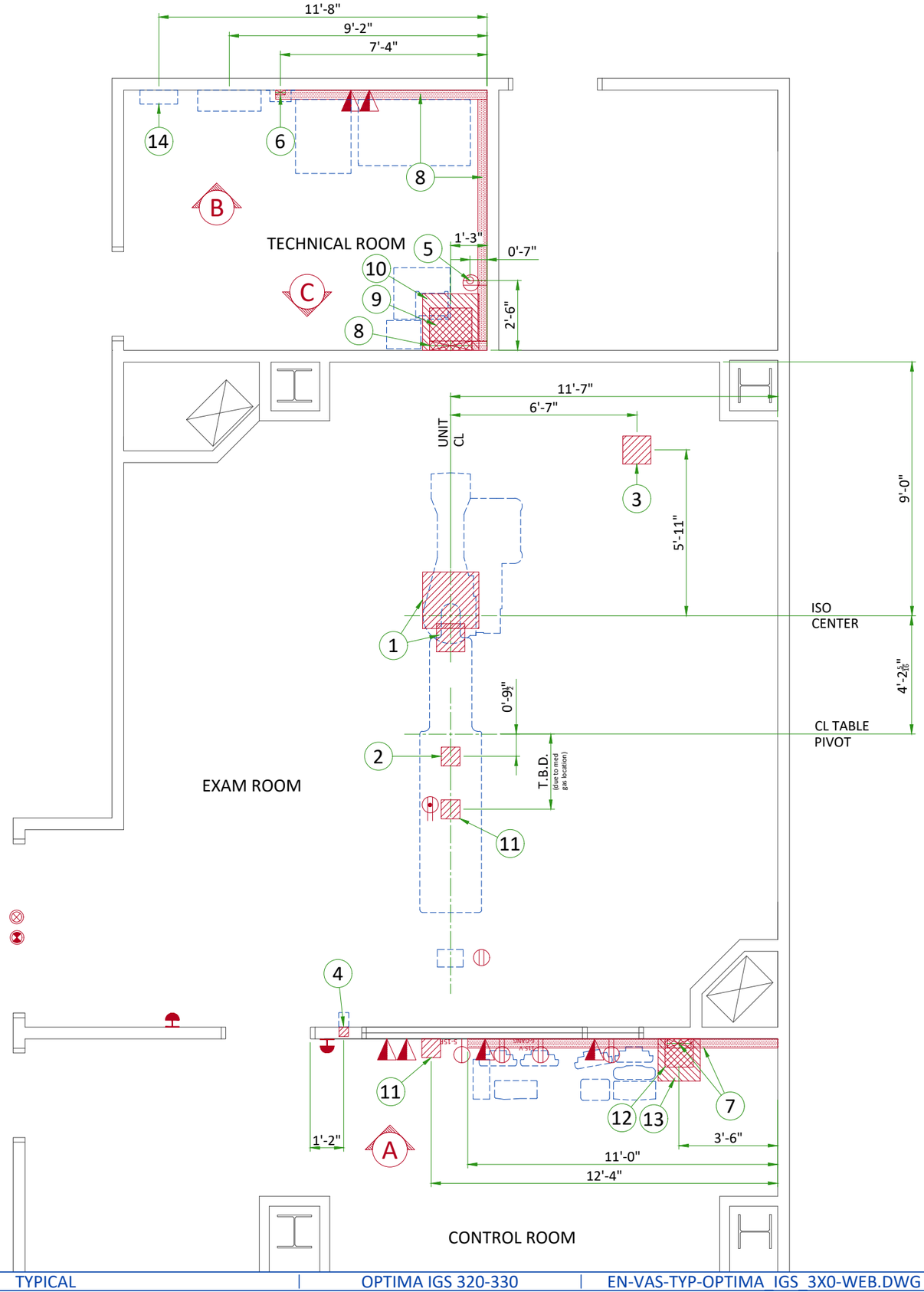


CONNECTIVITY REQUIREMENTS

Broadband Connections are necessary during the installation process and going forward to ensure full support from the Engineering Teams for the customers system. Maximum performance and availability for the customers system is maintained and closely monitored during the lifetime of the system. Proactive and reactive maintenance is available utilising the wide range of digital tools using the connectivity solutions listed below:

- Site-to-Site VPN/GE Solution
- Site-to-Site VPN/Customer Solution
- Connection through Dedicated Service Network
- Internet Access - connectivity for InSite 2.0

The requirements for these connectivity solutions are explained in the broadband solutions catalogue (separate document).

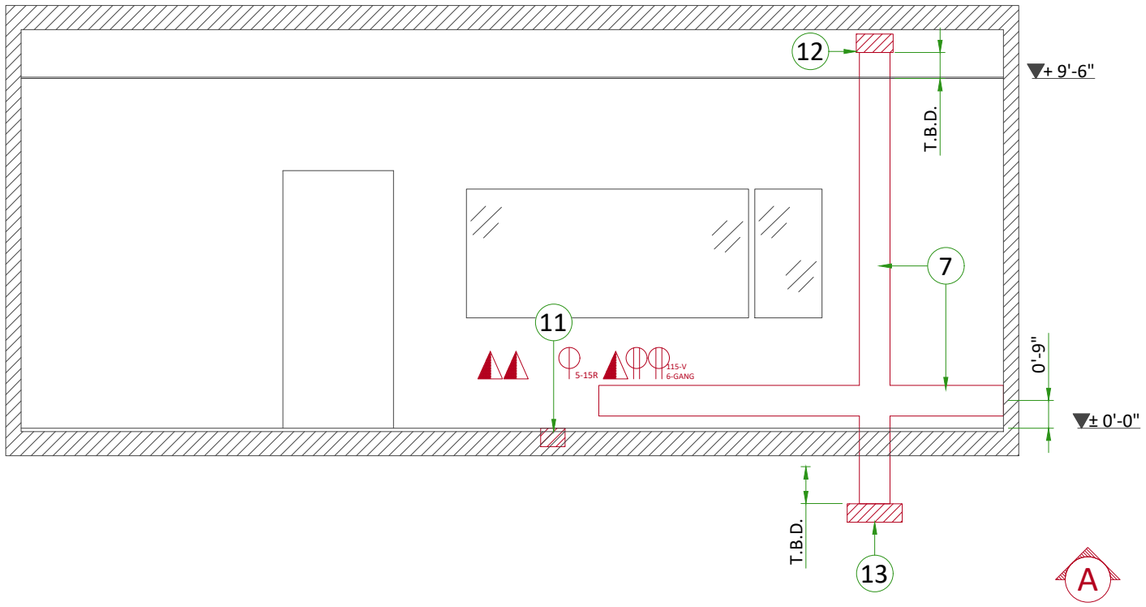


	ELECTRCAL LAYOUT ITEM LIST
1	600x600x300 [24"x24"x12"] Box below floor at gantry
	300x300x150 [12"x12"x6"] box below floor for water lines at gantry
2	200x200x150 [8"x8"x6"] box below floor at table
3	300x300x150 [12"x12"x6"] pull box above ceiling for monitors
4	100x100x100 [4"x4"x4"] flush junction box 300 [12"] below finished ceiling (x-ray buzzer)
5	Empty 3" [75mm] conduit below floor for waterlines
6	4" x 2" [100mm x 50mm] surface wall duct with minimum 1 divider
7	10" x 3 1/2" [250mm x 100mm] surface wall duct with minimum 2 dividers
8	18" x 3 1/2" [450mm x 100mm] surface wall duct with minimum 2 dividers
9	450x450x150 [18"x18"x6"] pull box above ceiling in technical/equipment room
10	600x600x300 [24"x24"x12"] Box below floor in technical/equipment room
11	200x200x150 [8"x8"x6"] for patient monitoring equipment
12	300x300x150 [12"x12"x6"] pull box above ceiling in control room
13	450x450x150 [18"x18"x6"] Box below floor in control room
14	Local service disconnect (LOTO)

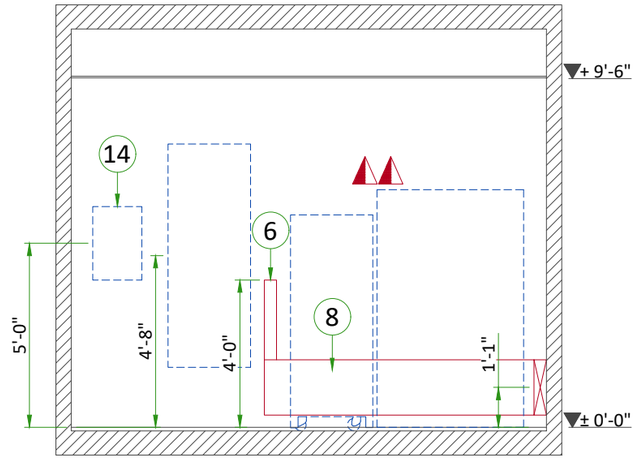
ITEM	QTY	Outlet Legend for GE Equipment
		System emergency off (SEO), (recommended height 1.2m [48"] above floor)
		X-Ray ON lamp (L1) - 24 V
		X-Ray room warning light control panel
		Duplex hospital grade, dedicated wall outlet 120-v, single phase power
		Duplex hospital grade, dedicated ceiling outlet 120-v, single phase power
		Network outlet
		Duplex hospital grade, dedicated outlet 120-v emergency, single phase power, 15a
115-V 6-GANG		6-Gang hospital grade, dedicated wall outlet 115-V, single phase power
5-15R		5-15R NEMA Receptacle, dedicated outlet 120-v, single phase power

Additional Conduit Runs
(Contractor Supplied and Installed)

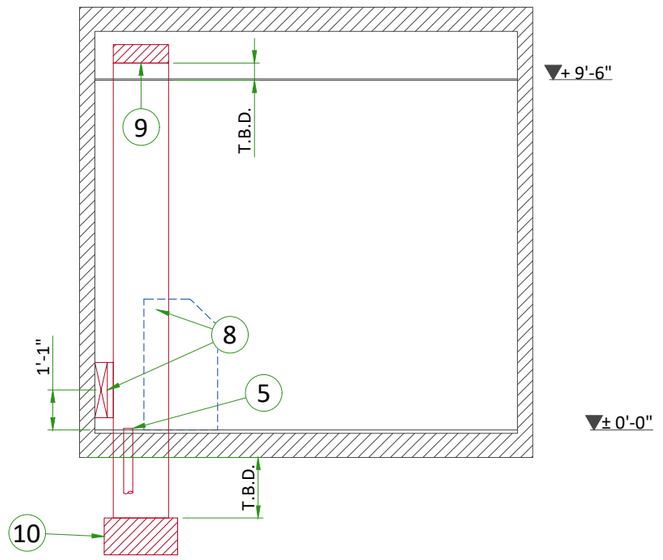
From	To	Qty	Size	
			In.	mm
LC Gantry	System Control Cabinet	4	4	100
LC Gantry	Table	1	4 and 2	100 and 50
Water line	LC Gantry	1	3	75
Warning light controller	Warning light	1	½	50
Warning light controller	System Control Cabinet	1	½	50
Warning light controller	120-V 1 phase power	1	As Required	As Required
LED Transformer	Spooler	1	As Required	As Required
LED Trans.(LT) or lamp	120-V 1 phase power	1	As Required	As Required
LED Lamp	Spooler	1	Cables come with spooler	Cables come with spooler
Xray Buzzer	System Control Cabinet	1	¾	19
Xray Buzzer	Control Room	1	¾	19
3-4 Monitor suspension	System Control Cabinet	2	2 ½	64
Monitor	Control Room	1	2 ½	64
Power Distribution Box	Emergency off	1	½	50
Power Distribution Box	Emergency off	1	½	50
Power Distribution Box	System Control Cabinet	1	1	25
LOTO Disconnect	480-V 3 phase power	1	As Required	As Required
LOTO Disconnect	Power Distribution Box	1	As Required	As Required
Injector Electronics	Injector Head	1	3	75
Injector Electronics	Injector Control	1	3	75
Patient Monitoring	Monitor	1	3	75
Patient Monitoring	TRAM/PDM/AMP	2	3	75


12
+ 9'-6"
T.B.D.
7
11
5-15R
15-V
6-GANG
0'-9"
± 0'-0"
T.B.D.
13

A

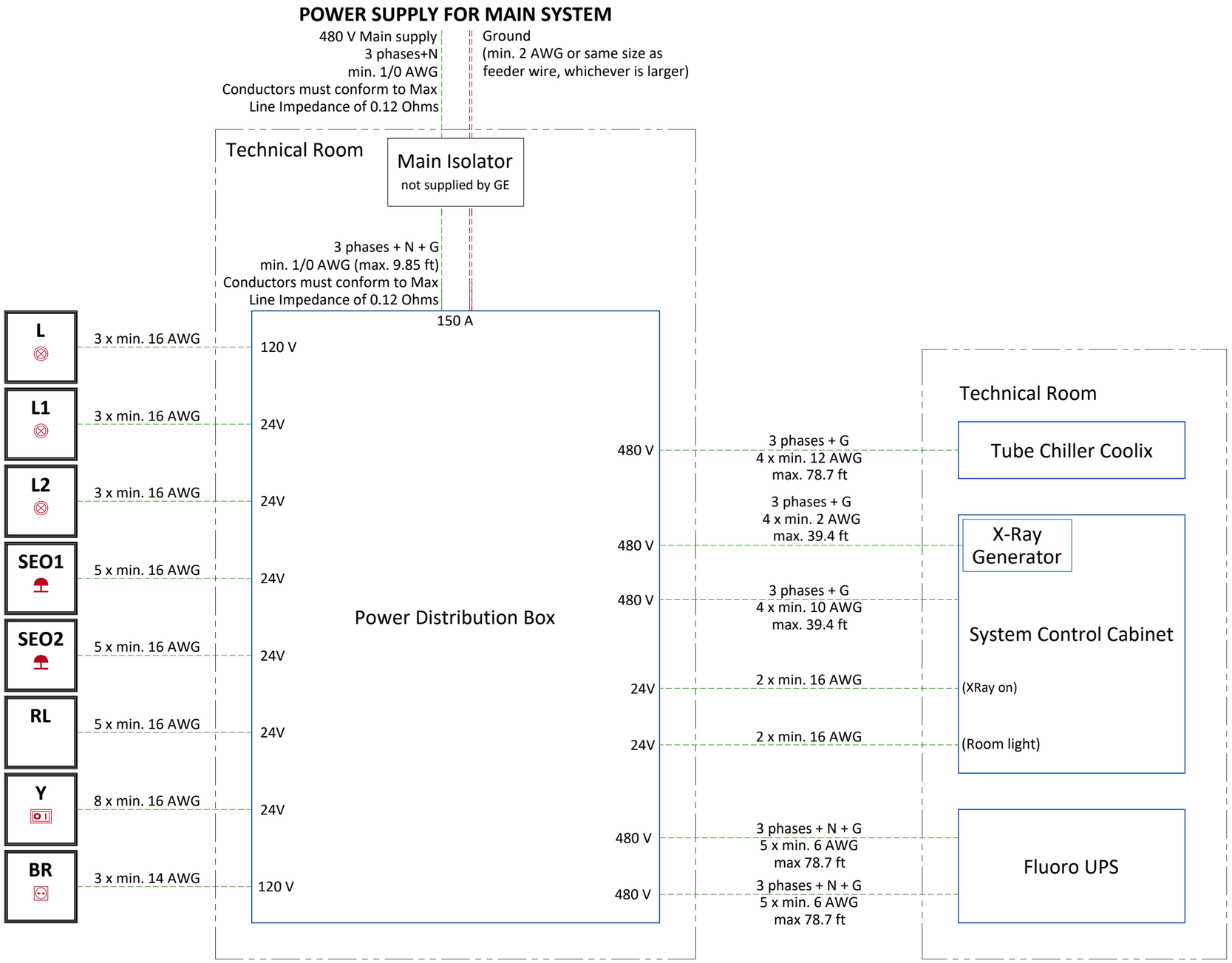

+ 9'-6"
14
6
8
5'-0"
4'-8"
4'-0"
1'-1"
± 0'-0"

B


+ 9'-6"
9
T.B.D.
8
1'-1"
5
± 0'-0"
T.B.D.
10

C

POWER DISTRIBUTION



Cable SUPPLIED BY CUSTOMER

Equipment SUPPLIED BY CUSTOMER

Equipment SUPPLIED BY GE

L	System ON light - 230V Located near access doors (1) (2)
L1	XRay ON light - 24V Located near access doors (1) (2)
L2	XRay ON light - 24V Located inside exam room, visible from anywhere in the room (2)
SEO1-2	Emergency OFF, located near access doors with double contacts for two independent circuits. Second circuit sized for 5A. (2)
RL	Room light circuit: room lights off during X-Ray generation
Y	System remote-control locked when power OFF "ON" and "OFF" impulse buttons with indicator lamps red=on / green=off
BR	Injector wall outlet 10/16A+G

(1) Refer to local standards

(2) Location and/or quantity: refer to layout

Following cables shall be furnished locally :

- Power cable between PDB and X-Ray generator (max. 39.4 ft): 4 x min. 2 AWG, Conductors must conform to Max Line Impedance of 0.12 Ohms
- Power cable between PDB and C1 cabinet (max. 39.4 ft): 4 x min. 10 AWG
- Power cable between PDB and X-Ray tube Chiller Coolix (max. 78.7 ft): 4 x min. 12 AWG

Additional cables with Fluoro UPS option:

- Power cable between EMI filter and PDB (max. 9.85 ft)
- Power cables between PDB and Fluoro UPS:5 x min. 6 AWG(x2)
- Ground cable between EMI filter and PDB

NOTES :

- A wall circuit breaker or equivalent device with LOTO (Log-Out/Tag-Out) capability must be installed on the main power.
- All the cables entrances to the PDB are at the bottom of the cabinet.
- Max size of terminal block for PDB input cables: 4 x 3/0

POWER REQUIREMENTS

POWER SUPPLY	**3 PHASES+N+G 380/400/420/440/460/480 V ±10%**
FREQUENCIES	**50/60 Hz ± 3 Hz**
MAXIMUM INPUT POWER (0.1 sec max)	**150 kVA**
CONTINUOUS (AVERAGE) POWER	**60 kVA**
MAXIMUM LINE RESISTANCE PER 2 PHASES WIRES	**380 V : 0.09 Ω / 400 V : 0.096 Ω / 420 V : 0.102 Ω**
	440 V : 0.108 Ω / 460 V : 0.114 Ω / 480 V : 0.12 Ω

- An EMI filter, provided by GE, is required in front of the PDB.
- Neutral is mandatory for UPS control.
- TNC neutral point connection must not be used.
- In case of IT or delta configuration without neutral, an isolation transformer is needed (supplied by customer)
- Three-phase, 5 conductors (3 phase conductors, 1 neutral and 1 protective earth conductor)
- Power supply should come into a power distribution box (PDB) containing the protective units and controls.
- The section of the supply cable should be calculated in accordance with its length and the maximum line resistance per 2 phases.

SUPPLY CHARACTERISTICS

- Power input must be separated from any others which may generate transients (elevators, air conditioning, radiology rooms equipped with high speed film changers ...)
- All equipment installed with IGS system components must be powered separately (e.g. lighting, power outlets)
- Transients must be less than 2,000 V peak in common mode and 1,000 V in differential mode, with a duration limited to a few microseconds.

GROUND SYSTEM

- At least 35mm² copper from main ground point to the PDB.
- The equipotential link will be by means of an equipotential bar. This equipotential bar should be connected to the protective earth conductors in the ducts of the non IGS cableways and to additional equipotential connections linking up all the conducting units in the rooms where IGS units are located.

CABLES

- Power and cable installation must comply with the distribution diagram.
- All cables must be isolated and flexible, cable color codes must comply with standards for electrical installation.
- The cables from signalling and remote control (Y, SEO, L...) will go to PDB with a pigtail lenght of 1.5 m, and will be connected during installation.
- Each conductor will be identified and isolated (screw connector).

CABLEWAYS

The general rules for laying cableways should meet the conditions laid down in current standards and regulations, with regard to :

- Protecting cables against water (Cableways should be waterproof),
- Protecting cables against abnormal temperatures (Proximity to heating pipes or ducts),
- Protecting cables against temperature shocks,
- Replacing cables (Cableways should be large enough for cables to be replaced) ,
- Only GE cables are running inside cableways,
- Metal cableways should be grounded.

LOTO DEVICES

- Core system: Means to isolate the system electrically from the SUPPLY MAINS (main isolator) with locking ability (LOTO capability) must be installed on the mains line to the PDB. This device must be compatible with the power input specifications of the system. The customer is responsible for the procurement, delivery and installation of this device.

FEEDER TABLE

MIN. FEEDER WIRE SIZE, AWG OR MCM (sq. mm)/VAC	MINIMUM FEEDER WIRE LENGTH - ft (m)							
	50 (15)	100 (30)	150 (46)	200 (61)	250 (76)	300 (91)	350 (107)	400 (122)
480 VAC	*1/0 (55)	*1/0 (55)	*1/0 (55)	1/0 (55)	3/0 (85)	4/0 (107)	4/0 (107)	300M (150)

GENERAL NOTES

IN ALL CASES QUALIFIED PERSONNEL MUST VERIFY THAT THE FEEDER (AT THE POINT OF TAKE-OFF) AND THE RUN TO THE GE SYSTEM MEET ALL THE REQUIREMENTS STATED IN THE PIM

FOR A SINGLE UNIT INSTALLATION, THE MINIMUM TRANSFORMER SIZE IS 225KVA, WITH 2.4% RATED REGULATION AT UNITY POWER FACTOR. RESULTANT MAXIMUM ALLOWABLE FEEDER REGULATION IS 3.6%

THE GROUND WIRE TO EARTH SHALL BE A MINIMUM OF AWG 2/0 (UL) OR 35 MM² (CE) OR THE SAME SIZE (100%) AS FEEDER WIRES, WHICH EVER IS LARGER.

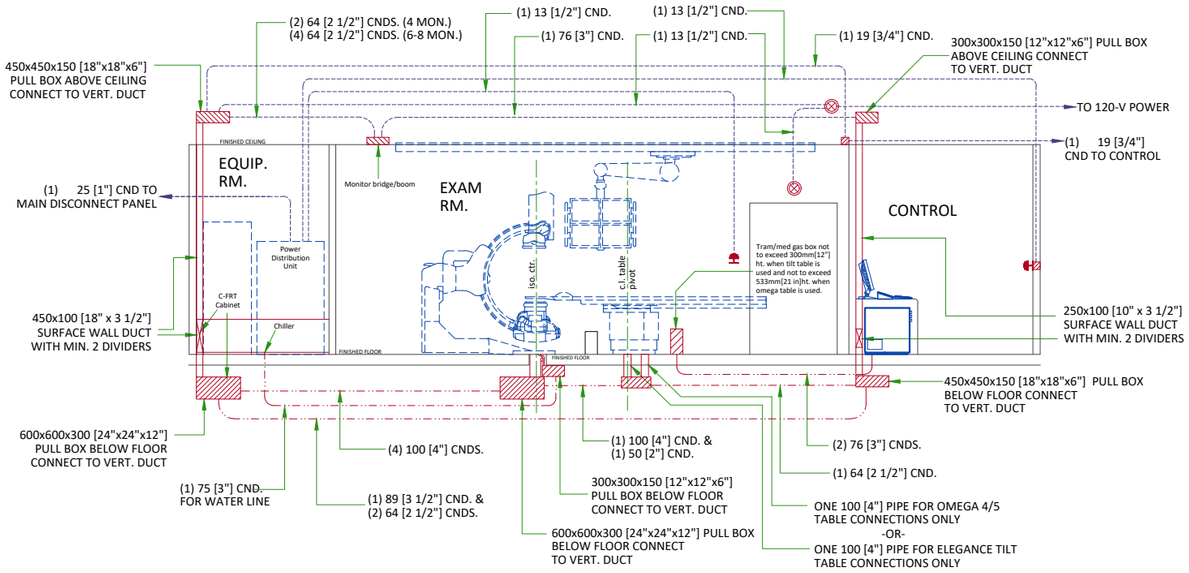
WHEN A FLUORO UPS IS OR WILL BE INSTALLED, A NEUTRAL LINE IS MANDATORY. IF IT SCHEME AS EARTHING SYSTEM IS USED, AN ISOLATION TRANSFORMER IS REQUIRED WITH DELTA-WYE OR DELTA-STAR CONNECTION.

* MINIMUM WIRE SIZE FOR CIRCUIT BREAKER, BASED ON RECOMMENDED OVERCURRENT PROTECTION.

ELECTRICAL SECTION VIEW

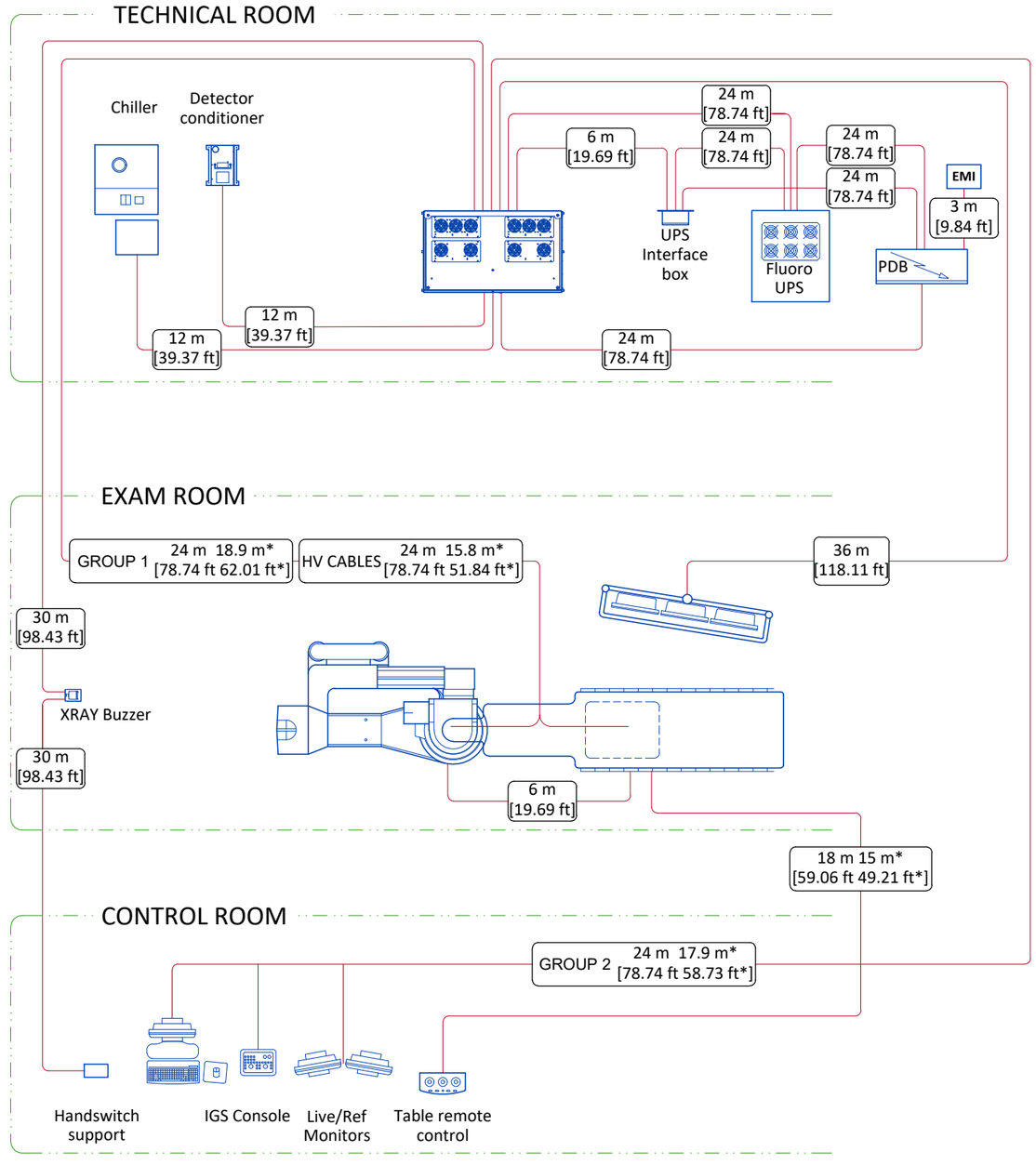
ITEM	Outlet Legend for Physio Equipment
	System emergency off (SEO), (recommended height 1.2m [48"] above floor)
	X-Ray room warning light control panel
	X-Ray ON lamp (L1) - 24V

Conduit legend	
	Above ceiling
	Below floor



DETAIL NOT TO SCALE

INTERCONNECTIONS



		Cable supplied by GE
		Room wall
.....m	.....ft	Total length
.....m*	.....ft*	Usable length