Fondation Eagle

Report Form

Fondation Eagle reference:

Development through the implementation and long-term operation of 3D medical imaging (CT) equipment supported by new tele-radiology services

Name of charity:

CEA Foundation (Surgery for African Children)

The African Children's Surgery Foundation (FCEA), was created in 2014 as part of a partnership between the Terre des hommes Foundation, the Pediatric Surgery Department of the CHUV (Lausanne) and the Zou department hospital. in Benin. This surgical collaboration has existed for more than 35 years and allows children from less privileged countries to benefit from care to which they do not otherwise have access.

More than 60 children are operated on and 250 consulted each year, by a team from the FCEA which goes there twice a year.

Introduction:

Doctors and surgeons need access to the same equipment they use in Europe and very specifically 3D imaging (CT) techniques.

The FCEA, which has an operating theater for pediatric interventions at the Zou et Collines hospital in Abomey, Benin, would like to build new medical diagnostic facilities equipped with new diagnostic technologies and specifically computed tomography (CT). An installation of this type would allow the FCEA to expand access to diagnostic services within the pediatric department but would be likely to enable the hospital to offer access to this type of new diagnostic technology for its different services which is crucial in the Zou population area, a region which has a population of 600,000 inhabitants but does not currently have any computed tomography (CT) scanners.

Details of the project:

We have developed the idea of medical services by "tele-radiology" in order to compensate for a lack of resources on site in terms of expertise in radiology or for certain radiological subspecialties. The FCEA identified in Switzerland/Germany the company RAD-X in 2023, which is a European operator in medical imaging acquired by Swiss Life and Vesper Next Generation in March 2024. Based on its discussions with them, the idea of trying to set up a service for hospitals in Africa, the first hospital of which could be the hospital with which Professor De Buys Roessingh has worked for a long time and whose management and staff he knows well. In fact, there is no CT radiology offer for the population basin of the Zou and Colline region nor certain neighboring regions, i.e. Togo.

The FCEA (Monsieur Serge Rovenne) plans to identify an industrial partner, who could also develop the service and extend it to other sites. He told us in October about a

network of radiology centers in Switzerland and Germany (RAD-X), which was acquired by Swiss Life in the meantime in March 2024, which could probably strengthen the potential of the development idea. (Swiss Life acquisition RAD-x, leading medical imaging and social infrastructure platform in Germany & Switzerland). An assessment of current resources in Abomey was made in 2017 by the team of Kisano and Mr. Serge Rovenne (see report) who evaluated the local equipment and produced a report to radiologically equip the hospital adequately and efficiently with different technical solutions depending on the desired cost-benefit ratio. A report was also made for the provision of a second-hand MOT for preliminary information. A secure collaborative platform (KISANO Health Portal) has been made available and installed; a server was installed in the hospital, as was a diagnostic quality DICOM digitizer to digitize radiological images on silver film with a view to creating virtual digital files including the clinical context.

He continues his contacts with doctors and radiologists in coordination with Prof. de Buys Roessingh to develop this avenue in parallel with progress with hospital management.

Project beneficiaries:

Population of adults and children over 1 million inhabitants (ZOU department, Benin)

Expenditure summary:

Cf Budget 120.000 Euro

Conclusion:

Our goal for the coming years is to equip the Zou departmental center hospital with functional radiology with (1) basic radiology, (2) fluoroscopy, (3) ultrasound and (4) CT-Scan. In recent years, we have expanded our activity with maxillofacial surgery (Prof. Martin Broome) and neurosurgery. For these last two activities, we need to be able to perform more advanced radiological diagnoses with CT-Scan. It should be noted that all this equipment will be shared between the pediatric and adult surgery departments of the hospital. The budget is attached.

Professeur Anthony de Buys Roessingh

Président de FCEA

Date : 9. 12. 24

Groupe de Projet :

- **Coordination opérationnelle du projet** par Monsieur Serge Rovenne, FCEA (Fondation Chirurgie pour l'Enfance Africaine)
- **Conseiller médical et directoire FCEA** : FCEA - Le Pr. Anthony de Buys Roessingh, Président FCEA (CHUV / RC Nyon Projet FCEA en 2023)
- **Contact RC Nyon:** Johannes Schmid

Objectif :

Définir un rôle potentiel du RC Nyon et éventuellement de Rotary International pour soutenir ces idées de développement par la mise en œuvre et l'exploitation pérenne d'équipements d'imagerie médicale 3D (CT) appuyés par des nouveaux services de télé-radiologie en Afrique et dans des pays sous-développés pour faciliter dans un premier temps au Bénin les traitements médicaux locaux qui sont depuis des années pratiqués par FCEA. (Fondation Chirurgie pour l´Enfance Africaine https://fondationcea.ch/en/accueil-en/).

Introduction / Background :

Nous avons contacté Monsieur Rovenne en octobre 2023 par l´intermédiaire du Dr. De Buys Roessingh avec qui nous avions réalisé un projet pour FCEA en 2023 en finançant un appareil médical pour des opérations des médecins Suisses au Benin.

L´idée de développer des appareils médicaux spécifiques pour l´Afrique discuté dans le passé n´est pas réalisable, car les médecins et chirurgiens ont besoin d'accéder aux même équipements qu´ils utilisent en Europe et très spécifiquement des techniques d'imagerie 3D (CT).

La FCEA qui dispose d'un bloc opératoire pour des interventions pédiatriques au sein de l'hôpital du Zou et Collines à Abomey au Bénin souhaiterait construire de nouvelles installations de diagnostic médical dotées des nouvelles technologies de diagnostic et spécifiquement la tomodensitométrie (CT). Une installation de ce type permettrait à la FCEA d'élargir l'accès aux services de diagnostic dans le cadre du service de pédiatrie mais serait de nature à permettre à l'hôpital de proposer un accès à ce type de nouvelles technologies de diagnostic pour ses différents services ce qui est crucial dans le bassin de population du Zou, une région qui a une population de 600'000 habitants mais ne compte aucun tomodensitomètre (CT) en ce moment.

De ce fait dans nos discussions nous avons développé **l´idée de services médicaux par « télé-radiologie » de façon à permettre de pallier un manque de ressources sur place au niveau de l'expertise en radiologie ou pour certaines sous-spécialités radiologiques.** M. Rovenne a identifié en Suisse/ Allemagne la société RAD-X en 2023, qui est un opérateur européen en imagerie médicale racheté par Swiss Life et Vesper Next Generation en mars 2024. Sur la base de ses discussions avec eux s´est développé l´idée d´essayer de mettre en place un service pour les hôpitaux en Afrique, dont un premier hôpital pourrait être l´hôpital avec lequel le Pr. De Buys Roessingh travaille depuis longtemps et dont il connait bien la direction et le personnel. En effet il n'y a aucune offre de radiologie en CT pour le bassin de population de la région Zou et Colline ni certaines régions limitrophes

i.e. Togo.

Approche et situation actuelle :

M. Rovenne est en train de coordonner le développement d'un projet initial pour une approche pour l'Afrique ou d'autres pays sous-développés en Asie comme « Proof of Concept » pour des « Services d'imagerie 3D médicaux » avec **les participants suivants :**

- Les médecins Suisse de la FCEA et du Service de chirurgie pédiatrique du CHUV / Professeur Anthony de Buys Roessingh, MD, PhD,
- L'hôpital du département de Zou et Colline au Bénin et le ministère de la santé au Benin
- Le fournisseur des appareils et de la technologie (partenaire industriel GE et son distributeur commercial local-régional Maroc et Afrique Ouest – T2S)
- Les fournisseurs des services télé-radiologies prestations radiologues. Mr Rovenne possède une expertise dans ce domaine comme sa société dispose de plateformes de télé-radiologie opérationnelles en Afrique (e.g., RDC) pour de l'interprétation en routine journalière d'IRM réalisées en RDC avec téléexpertise en Belgique par un groupe de 25 radiologues spécialisés.
- Développement des marchés / exploitation opérationnelle (RAD-X opérateur européen en imagerie médicale)
- D'autres instruments de co-financement/soutient en cours d'identification selon critères d'éligibilités du projet (e.g., Stavros Niarchos Fondation, Expertise France …). Les sociétés de leasing / financement (e.g., Groupe Banque Mondiale (IFC – Société Financière Internationale)

et **le développement en 4 étapes** :

- Une approche valable et la décision de l'installation à l'hôpital (direction et ressources) et
- en accord et avec la validation du projet à long terme (8-10 ans) du ministère de la santé du Bénin
- développement du « business model » avec le catalogue des prestations, les ressources humains et techniques pour les services de radiologie et la gérance des appareils localement, les prix et les coûts opérationnelles (maintenance long terme) en considérant une bonne qualité comparable à l'Europe.
- Faisabilité du business model « Proof of Concept » avec les opérateurs pour ce cas comme fournisseur des services télé-radiologie, General Electric (ou autres) pour les appareils, Swiss Life (finance), l'hôpital / le ministère de la santé (personnel, opérations) et le Rotary (soutien pour le financement du cas «pilote ») pour définir les rôles et les moyens à investir. D'autres instruments de co-financement/soutient en cours d'identification selon critères d'éligibilités du projet (e.g., Stavros Niarchos Fondation, Expertise France …)

Situation actuelle :

Actuellement le groupe du projet autour de M. Rovenne et le Dr. De Buys Roessingh est dans l'étape 1 : Pour revenir au projet de mise en œuvre d'un CT Scan au Bénin, ils sont toujours en attente d'une séance avec le **Directeur de l'hôpital Zou & Collines pour**

valider la cohérence de son modèle d'exploitation local et les bonnes conditions de son installation technique et de son exploitation future avec un modèle de revenu selon les actes de radiologie permettant d'amortir et de garantir la maintenance, le support, les coûts d'exploitation et les besoins en personnel spécialisés.

Ci-après les points ouverts qu'il faut valider avec le directeur pour préparer le montage du dossier e.g., :

- **Existe-t-il un projet similaire CT Scan avec le Ministère au Bénin ?** quelles sont les **contraintes règlementaires** applicables ? et si existantes
- quelle est **la capacité de recrutement** (volumétrie) ? le **catalogue des procédures ?** et les **tarifications** pratiquées ?
- quelles sont les **ressources médicales et technico-médicales** (radiologue et technicien) ? Doit-on **prévoir de la formation** (technicien) selon les procédures ? Nécessité de télé-radiologie (radiologue) ?
- **revoir les locaux dans l'hôpital** : voir le plan-type d'implantation avec les dimensions minimum requises pour l'installation du CT (attachement **PROPOSITION IMPL SCANNER-Model ici un modèle General Electric REVO ACT)**
- **développer un checklist des travaux et vérification à prévoir sur le site final** (attachement **ETUDE TYPE REVO ACT**) - il s'agit d' une étude-type avec l'ensemble des paramètres à considérer dans la préparation du site. **On pourra valider si les tâches peuvent être réalisées par le service biomédical de l'hôpital ou s'il faut prévoir des ressources externes, etc.**

Développement de l'exploitation : M. Rovenne envisageait d'identifier un partenaire industriel, qui pourrait également développer le service et l'étendre à d'autres sites. Il nous avait parlé en octobre **d'un réseau de centres de radiologie en Suisse et en Allemagne (RAD-X),** qui **a été racheté par Swiss Life** entretemps en mars 2024 ce qui pourrait renforcer probablement le potentiel de l'idée de développement. (Swiss Life acquisition RAD-x, plateforme d'imagerie médicale et d'infrastructures sociales leader en Allemagne & Suisse).

Il poursuit ses contacts avec les médecins et radiologues en coordination avec le Dr de Buys Roessingh pour développer cette piste en parallèle à l'avancement avec la direction de l'hôpital.

Prochaine étape :

Les réunions que la FCEA va tenir prochainement permettront de préciser certaines contraintes avec les parties sur place (hôpital, ministère, investissement, mise en opération, exploitation) pour valider les options définitives pour la mise en œuvre avec un scénario final spécifique. Ce scénario avec ses besoins en termes d'investissement matériel (CT) ou de service à financer seront décrits et quantifiés afin de permettre à la partie RC Nyon de prendre position quant au soutient qu'elle pourrait apporter en tout ou en partie comme la FCEA pourrait aussi solliciter d'autres sponsors si les parties RC Nyon ou Rotary International le souhaitent.

Compréhension commune de ce document :

Ce document constitue une première note de cadrage afin de partager l'objectif générique du projet ensemble entre nos parties. Il est sans engagement entre les parties à ce stade. Cet objectif générique est celui qui sera communiqué si nous contactons différents intervenants pour assurer une cohérence dans la communication.

Le 29 août 2024

J. Schmid avec S. Rovenne (FCEA)

Salle RAD Trophy type Salle os poumons avec bucky mural . Générateur N500 HSF de 50kW haute fréquence.

La colonne porte tube est fixée au sol et au plafond.









Figure 1 - Radiology

KISANO

FONDATION CHIRURGIE POUR L'ENFANCE AFRICAINE

Fondation Chirurgie pour l'Enfance africaine

http://fondationcea.ch/

Document rédigé à l'attention de Monsieur le Docteur A.S. de Buys Roessingh, MD, PhD – Chirurgien pédiatrique

Président de Fondation

Rue du Grand-Chêne 8 Case Postale 5463 CH – 1002 Lausanne

Mémoire technique, fonctionnel, organisationnel et financier

Décembre 2017

PROJET DE NUMERISATION DES SALLES DE RADIOLOGIE AU BENIN ET AU TOGO

AFIN DE METTRE EN SERVICE UNE PROJET DE TELE-EXPERTISE RADIOLOGIQUE EN ROUTINE ET ASSURER UN FONCTIONNEMENT IDEAL EN ROUTINE LOCALE

- suivant inventaires et descriptifs reçus -

KISANO Suisse SA
EPFL Innovation Park, PSE-C
CH-1015 Lausanne

Figure 2. Mémoire complet en annexe

Fourniture CT Scan seconde main

KISANO

Date 21-10-18

Référence KM / Dv / 1/10218-2 19-10-18

Designation	Detail	Qt	PU EURO	TOTAL MONTANT HT	EURO
CT SCANNER TOSHIBA LE GARETTES AQUILION LB	Modèle TSX -201A/3C- Année 2008 SN-3C0062208B - 200V - 50/60Hz 80kVA Logiciel Software Aquilion V3.30GR305 - 2 stations TUBE RX année 2015 MARQUE/modèle : VARIAN TYPE MC3787HD - Gaine / Housing D-8201K - Foyers Focus 0.9X0.8 / 1.4X1.4 - 347000 coupes Gantry CO2T-020A - 200V - 50/60Hz 25kVa X-RAY High voltage generator CXA3-050A - 200V - 50/60Hz 65kVa - 125kV 500mA / 135kV 440mA Patient Couch CBTD-020A 200V 50/60Hz 2kVA Licenses List: -ALATO_3DVIEWER -ALATO_MULTIDIRECT -ALATO_STANDARD -DICOM_CDR -D_PRT_BW -D_PRT_COLOR -MULTIVIEW -POSTSCRIPT -PRINT_SCU -TIFF -TSB_DVD -WINPRT -QUICKAN- -STRG_SCU Kit FANTOMS DE CALIBRATION ET ACCESSOIRES - Fantom calibration kit and accessories	1	90.000 EUR		90.000 EUR
Injecteur d'occasion		1	5.000 EUR		5.000 EUR
Onduleur Prix 120 KVA 200V ----> 400 380V / 120KVA		1	25.000 EUR		25.000 EUR
Neuf		1	2.150 EUR		2.150 EUR
Porte plombée double revue		1	1.350 EUR		1.350 EUR
Porte plombée simple		1	2.200 EUR		2.200 EUR
Vitre plombée 120 x 80		1	8.700 EUR		8.700 EUR
Tableau de plomb		1	15.000 EUR		15.000 EUR
Installation : incluant les coûts de transport et 7 jours sur place des techniciens.	Le client reste responsable de : - Sécuriser le sol de la salle avec des rivaux correspondants aux recommandations constructeur - Plomber la salle à l'équivalent de 2mm - Assurer toute modification de construction du bâtiment pour accueillir le CT scanner dans la salle La logistique sur place sera assurée par la partenaire Scanner de KISANO	1	2.200 EUR		2.200 EUR
Logistique sur place					
Transport container 20 pieds	A définir selon pays				
TOTAL					120.600 EUR

Figure 3. Mémoire économique complète en annexe



REV	DATE	MODIFICATIONS

Typical

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01 - C1 - Cover Sheet
02 - C2 - Disclaimer - Site Readiness Checklist
03 - A1 - General Notes
04 - A2 - Equipment Layout
05 - A3 - Radiation Protection
06 - A4 - Radiation Protection Details
07 - A5 - Equipment Dimensions
08 - A6 - Delivery
09 - S1 - Structural Notes
10 - S2 - Structural Layout
11 - S3 - Structural Details (1)
12 - M1 - HVAC
13 - E1 - Electrical Notes
14 - E2 - Electrical Layout
15 - E3 - Electrical Elevations
16 - E4 - Power Requirements
17 - E5 - Electrical Details - Interconnect

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.

GE Healthcare

REVOLUTION ACT
FINAL STUDY

Drawn by	Verified by	Concession	S.O. (GON)	PIM Manual	Rev
PMM	BAP	-	----	5487127-1EN	9

Format	Scale	File Name	Date	Sheet
A3	1/4"=1'-0"	EN-CT-TYP-REVOLUTION_ACT-NF.DWG	27/JUN/2023	01/17

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 structural 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

CUSTOMER SITE READINESS REQUIREMENTS

REQUIRED MANUALS FOR SYSTEM PRE-INSTALLATION	
Description	Document Number*
Product specific Pre-installation Manual	Refer to cover page
*documents can be accessed in multiple languages at https://customer-doc.cloud.gehealthcare.com/#/cdp/dashboard	

- 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.
- The items on the GE Healthcare Site Readiness Checklist **DOC1809666** are REQUIRED to facilitate equipment delivery to the site. Equipment will not be delivered if these requirements are not satisfied.
  - 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. Restrooms.
  - Provide for refuse removal and disposal (e.g. crates, cartons, packing)
  - For CT systems it is required to minimize vibrations within the scan room. 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 Pre-installation manual for vibration specifications.

ENVIRONMENT

ALTITUDE

- The system shall meet all functional and performance specifications when placed in a room that is at an elevation of -150 m to 3000 m [-492 ft to 9,843 ft] above sea level.

MAGNETIC FIELD SPECIFICATIONS

- Limit the magnetic interference to guarantee specified imaging performance.

GANTRY:
- Ambient static magnetic fields less than 1 Gauss.
- Ambient AC magnetic fields less than 0.01 Gauss peak.

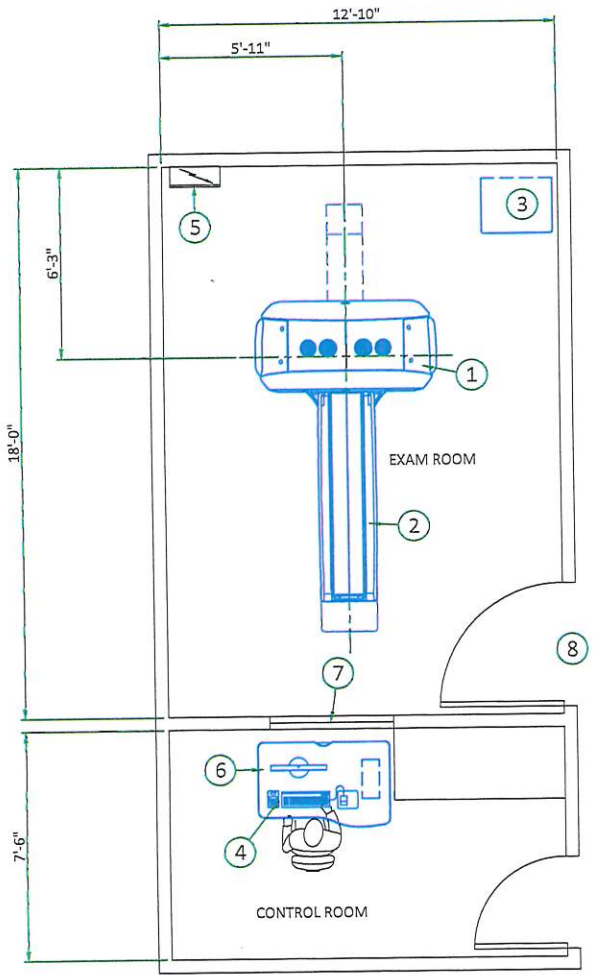
OPERATOR CONSOLE:
- Ambient static magnetic fields less than 10 Gauss.

MAXIMUM GANTRY AUDIBLE NOISE LEVEL

- The maximum ambient noise level is produced by the gantry during a CT scan acquisition. It is less than 70dBA when measured at a distance of one meter from the nearest gantry surface, in any direction.

MAXIMUM CONSOLE AUDIBLE NOISE LEVEL

- Maximum Console Audible Noise Level The maximum ambient noise levels is less than or equal to 56dBA when measured 1m up and 1m away from the console at an ambient temperature of 26°C.

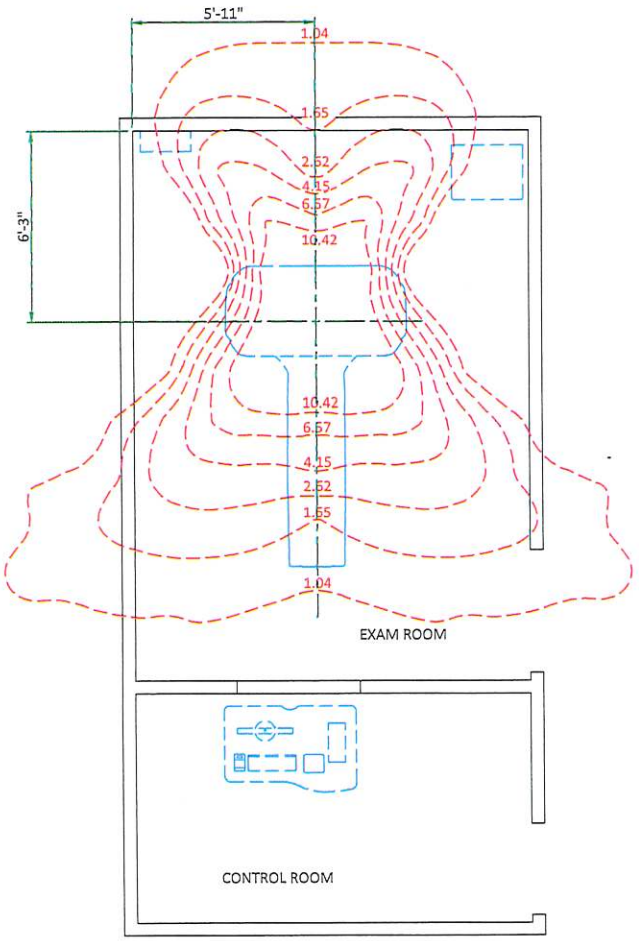


LEGEND			
A	GE SUPPLIED	D	AVAILABLE FROM GE
B	GE SUPPLIED/CONTRACTOR INSTALLED	E	EQUIPMENT EXISTING IN ROOM
C	CUSTOMER/CONTRACTOR SUPPLIED AND INSTALLED	*	ITEM TO BE REINSTALLED FROM ANOTHER SITE

BY	ITEM	DESCRIPTION	MAX HEAT OUTPUT (BTU/h)	WEIGHT (lbs)	MAX HEAT OUTPUT (W)	WEIGHT (kg)
A	1	GANTRY	11935	1830	3500	830
A	2	UP/DOWN TABLE	682	750	200	340
A	3	POWER DISTRIBUTION UNIT (PDU)	2387	662	700	300
A	4	OPERATOR CONSOLE	2847	22	835	10.2
D	5	MAIN DISCONNECT PANEL (MDP) (NOT SUPPLIED BY GE)	-	-	-	-
A	6	AURORA SWS TABLE	-	88	-	40
C	7	LEAD GLASS WINDOW				
C	8	MINIMUM OPENING FOR EQUIPMENT DELIVERY IS 850 mm x 1900 mm [33.5 in x 74.8 in], CONTINGENT ON A 2438 mm [96 in] CORRIDOR WIDTH				

EXAM ROOM HEIGHT	
FINISHED FLOOR TO SLAB HEIGHT	TBD
FALSE CEILING HEIGHT	rec. 8'-9"

RADIATION PROTECTION LAYOUT



SHIELDING REQUIREMENTS SCALING	
CHANGED PARAMETER	**MULTIPLICATION FACTOR**
mAs	new mAs/100
80 kV	0.24
100 kV	0.45
120 kV	0.71
140 kV	1.00
1.25 mm aperture	0.09
5 mm aperture	0.34
10 mm aperture	0.56
15 mm aperture	0.81
20 mm aperture	1.00

SHIELDING REQUIREMENTS:

Engage a qualified radiological health physicist to review your scan room shielding requirements, taking into consideration:

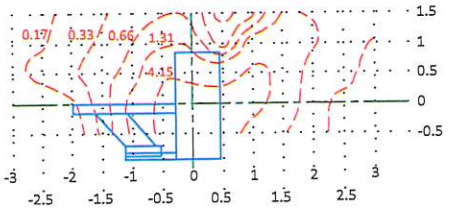
- Scatter radiation levels within the scanning room
- Equipment placement.
- Weekly projected work-loads (number of patients/day technique (kvp*ma))
- Materials used for construction of walls, floors, ceiling, doors, and windows.
- Activities in surrounding scan room areas.
- Equipment in surrounding scan room areas (e.g., film developer, film storage)
- Room size and equipment placement within the room relative to room size.

The Illustrations on this page depict measured radiation levels within the scanning room, while scanning a 32 cm CTDI phantom and using a large filter, with the technique shown. Use the mAs, kV and aperture scaling factors in the table shown here to adjust exposure levels to the scan technique used at the site.

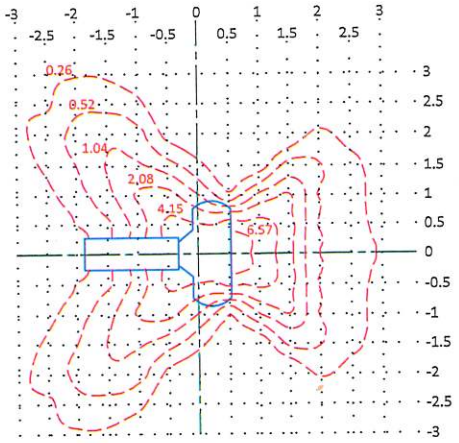
NOTE: Actual measurements can vary. Expected deviations equals ±15%, expect for the 5 mA and 1 mm techniques, where variations may be greater (up to a factor of 2), due to the inherent deviation in small values. The maximum deviation anticipated for tube output equals ±40%.

RADIATION SCATTER - HEAD PHANTOM

NOTE: 140 kV
100 mAs/scan
1 sec
16 x 1.25mm



Elevation

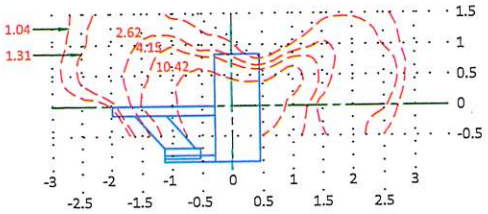


Plan View

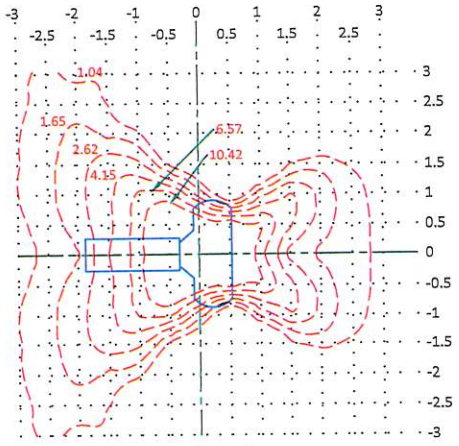
DETAIL NOT TO SCALE

RADIATION SCATTER - BODY PHANTOM

NOTE: 140 kV
100 mAs/scan
1 sec
16 x 1.25mm



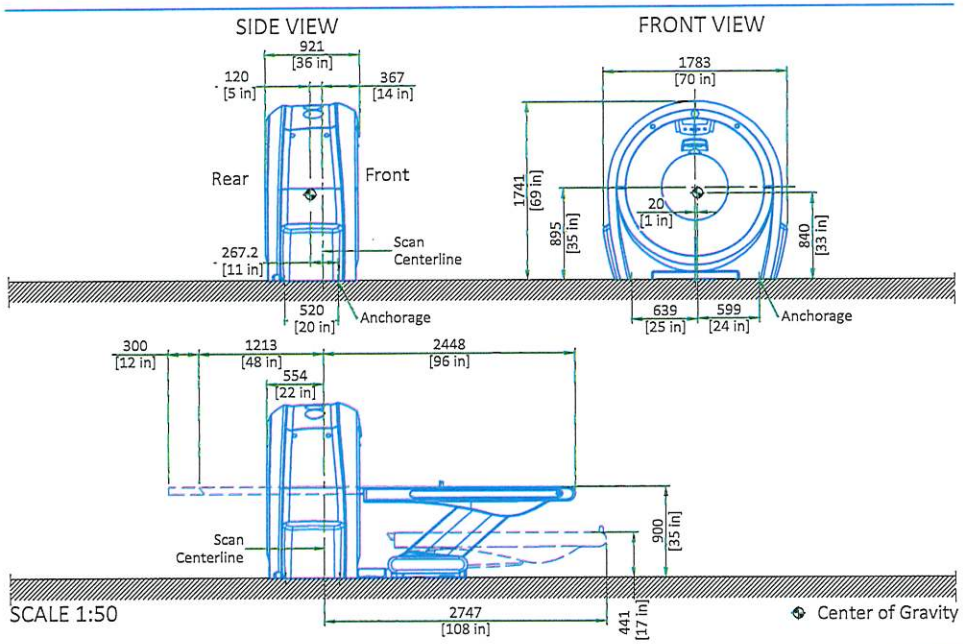
Elevation



Plan View

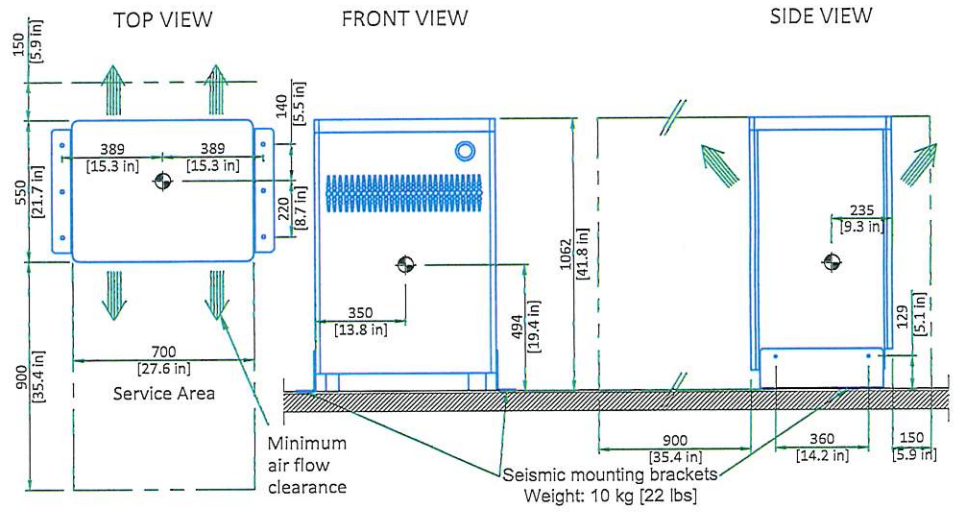
DETAIL NOT TO SCALE

GANTRY WITH TABLE



SCALE 1:50

POWER DISTRIBUTION UNIT (PDU)



SCALE 1:20

AURORA SWS TABLE AND CONSOLE

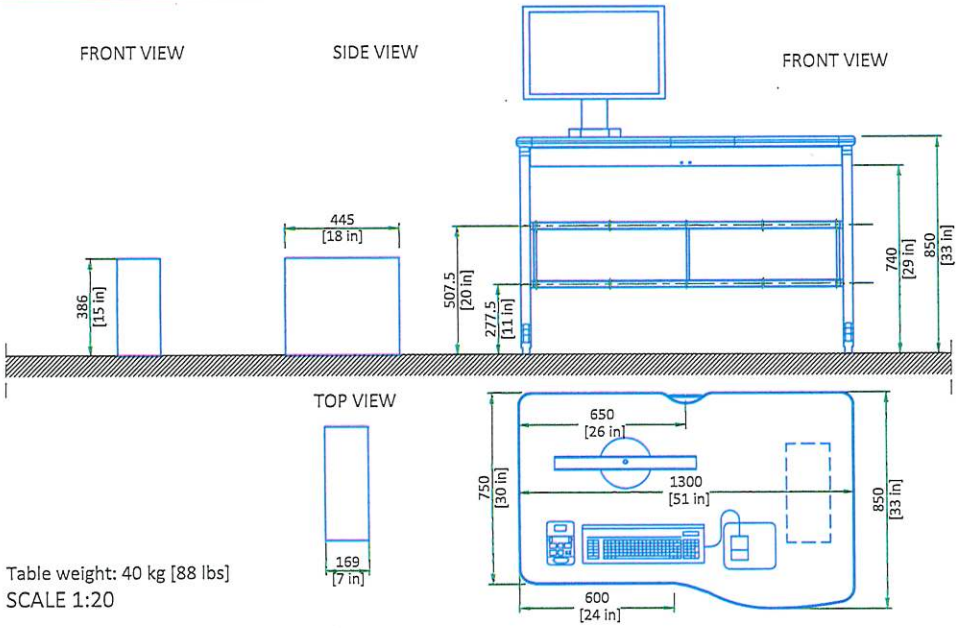


Table weight: 40 kg [88 lbs]

SCALE 1:20

DELIVERY

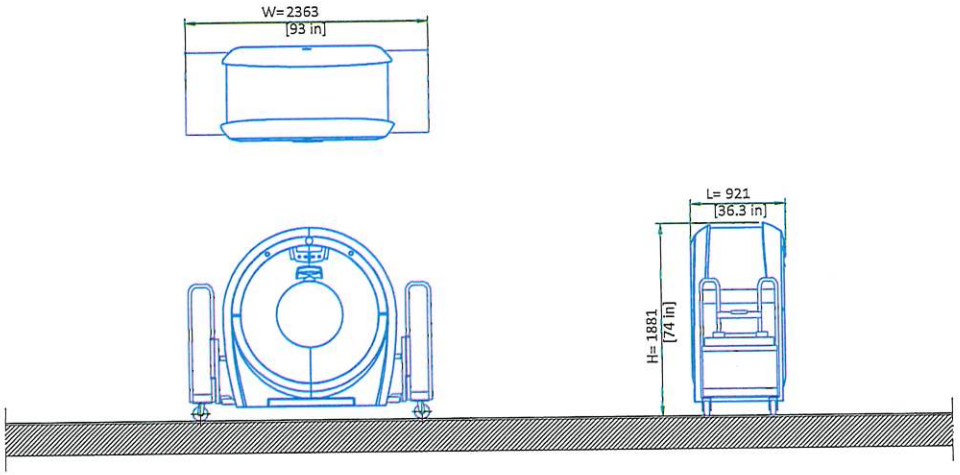
THE CUSTOMER/CONTRACTOR SHOULD:

- 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	2363 mm	93.1 in	1125 kg	2480 lbs
	WIDTH	921 mm	36.3 in		
	HEIGHT	1881 mm	74 in		
UP/DOWN TABLE	LENGTH	2137.5 mm	84.2 in	372 kg	821 lbs
	WIDTH	820 mm	32.3 in		
	HEIGHT	1038 mm	40.8 in		

GANTRY DELIVERY

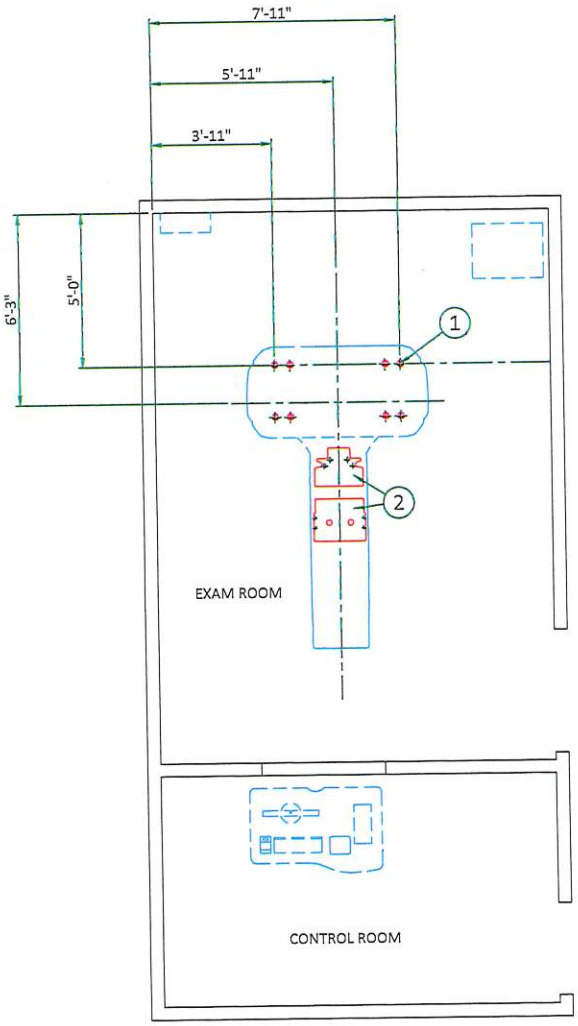


- The gantry is shipped on a dolly equipped with elevating casters (normal shipping configuration).

NOT TO SCALE

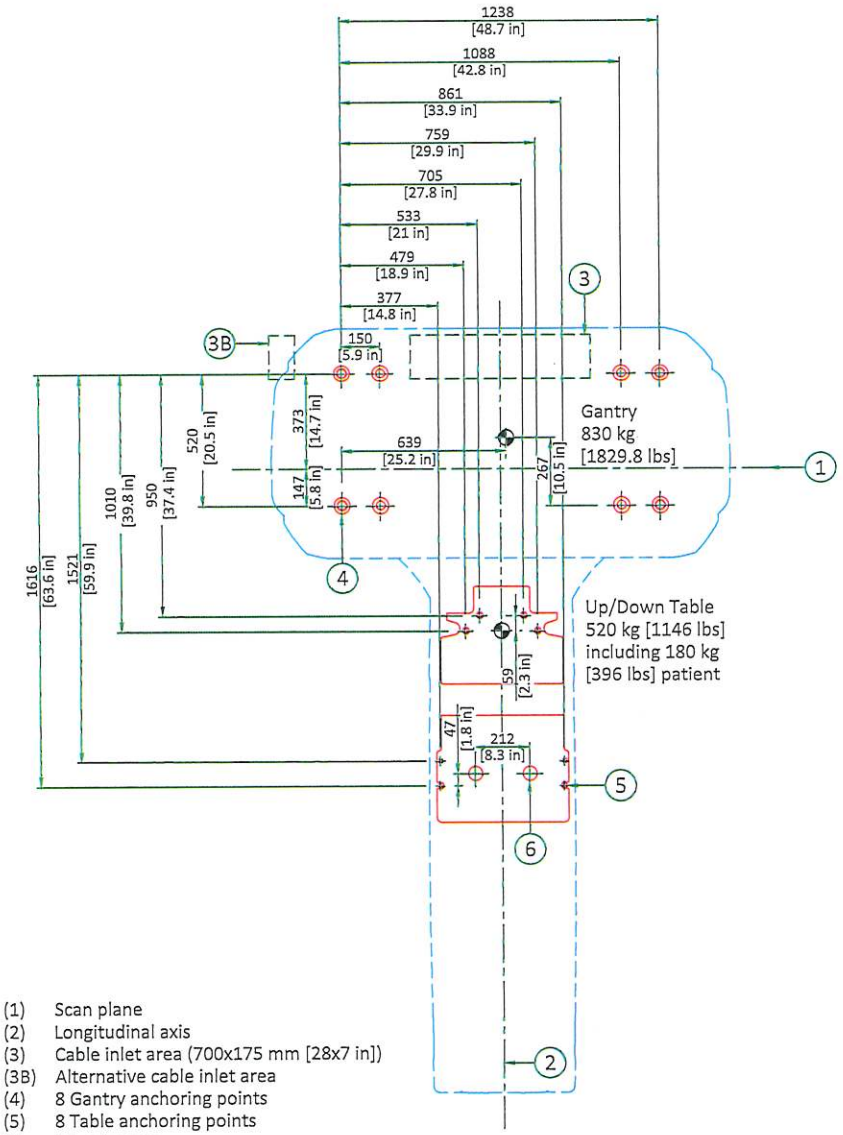
STRUCTURAL NOTES

- all steel work and parts necessary to support ceiling mounted equipment is to be supplied by the customer or his contractors.
- 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 1/4" below the finished ceiling.
- floor slabs on which equipment is to be installed must be level to 1/4" in 10'-0"
- 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"



ITEM	DESCRIPTION
1	Gantry leveling pads. See Structural Detail
2	Table leveling pads. See Structural Detail
3	Support Backing, locate as shown

ANCHORING/LOADING DISTRIBUTION TO THE FLOOR

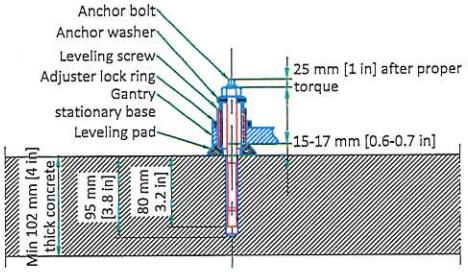


(1) Scan plane
(2) Longitudinal axis
(3) Cable inlet area (700x175 mm [28x7 in])
(3B) Alternative cable inlet area
(4) 8 Gantry anchoring points
(5) 8 Table anchoring points
(6) 2 level areas
Center of gravity
Main anchoring point
Backup anchoring point
Remove flooring

SCALE 1:20

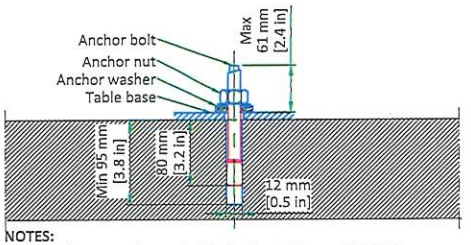
FLOOR REQUIREMENTS

GE SUPPLIED GANTRY ANCHORS (5479997)



NOTES:
- Anchors must be embedded at least 155 mm [6.1 in] from concrete floor edge or expansion joint
- Torque anchor to 50 Nm

GE SUPPLIED TABLE ANCHORS (5479996)



NOTES:
- Anchors must be embedded at least 155 mm [6.1 in] from concrete floor edge or expansion joint
- Torque anchor to 50 Nm

FINISHED FLOOR REQUIREMENTS

- Installation requires a finish floor in the scan and control rooms
- The floor surface in the scan room directly under the gantry and table must be level.
- The floor levelness tolerance of the floor surface that the gantry and table will rest on is 6 mm [0.2 in] over a 3000 mm [118.1 in] distance.
- Shims should not be used to compensate for a floor that does not meet this requirement.
- Eight or more floor covering openings that are 101.6 mm [4 in] in diameter are made to ensure the table and gantry rest on a solid surface. These floor penetrations can be sealed if required.
- These requirements apply to all installation types.

NOT TO SCALE

TEMPERATURE AND HUMIDITY SPECIFICATIONS

IN-USE CONDITIONS

	EXAM ROOM			CONTROL ROOM		
	Min	Recommended	Max	Min	Recommended	Max
Temperature	18°C	22°C	26°C	18°C	22°C	26°C
	64°F	72°F	79°F	64°F	72°F	79°F
Temperature gradient	≤ 3°C/h			≤ 3°C/h		
	≤ 5°F/h			≤ 5°F/h		
Relative humidity (1)	30% to 60%			30% to 60%		
Humidity gradient	≤ 5%/h			≤ 5%/h		

STORAGE CONDITIONS

Temperature	0°C to +30°C	32°F to 86°F
Temperature gradient	≤ 3°C/h	≤ 5°F/h
Relative humidity (1)	< 70%	< 70%
Humidity gradient	≤ 5%/h	≤ 5%/h

Storage longer than 6 months is not recommended.
(1) Non-condensing

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	MAX HEAT DISSIPATION	
		kW	BTU
Exam Room	Gantry	3.5	11945
	Up/down Table	0.2	700
	TOTAL	3.7	12645
Exam/Technical Room*	Power Distribution Unit (PDU)	0.7	2389
	TOTAL	0.7	2389
Control Room	Operator Console (Z4G4)	0.81	2746
	LCD Monitor	0.03	102
	TOTAL	0.84	2848
*Technical Room is not mandatory, the placements of these elements are recommended in the Exam Room.			

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.

CONNECTIVITY REQUIREMENTS

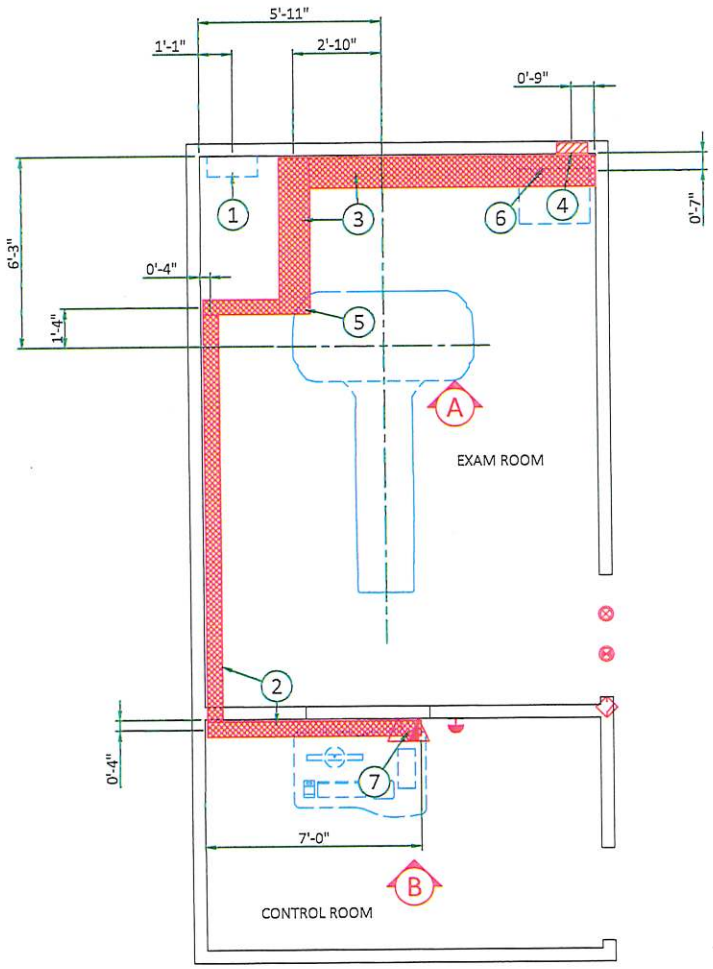
Your new GE Healthcare imaging modality will require local and remote connectivity to enable our full range of digital support:

- Local connectivity - This allows your system to connect to local devices such as PACS and modality worklist. We will require network information to configure the system(s), and a live ethernet port(s) prior to the delivery of the system(s).
- Remote connectivity - Your GE Healthcare service warranty includes InSite™ (applicable to InSite capable products), a powerful broadband-based service which enables digital tools that can help guard your hospital against equipment downtime and revenue loss by quickly connecting you to a GE Healthcare expert.

Depending on product family and software version, imaging systems can be connected in one of the following methods:

1. TLS over TCP Port 443 (Preferred method for new products) via:
    a. DNS resolution
    b. Customer-provided Proxy or
    c. GE Proxy (Available in some regions)
2. Site-to-Site IPsec VPN tunnel

Please provide the GE project manager with the contact information for the resource that can provide information required to set up these connections. GEHC will send out communication to these contacts, which will include the project's Connectivity requirements, and a Connectivity form. This form will need to be completed and returned to GEHC prior to delivery of the system to ensure the system is tested and connectivity is enabled prior to the completion of the installation.

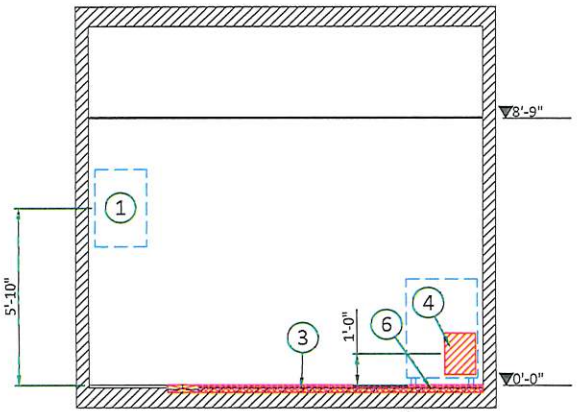


Item	Electrical Layout Item List
1	Main disconnect panel (MDP)
2	6" x 3" [150mm x 100mm] trench duct with minimum 1 divider
3	12" x 3" [300 x 100] trench duct with minimum 2 dividers
4	12" x 16" x 4" [300 x 400 x 100] box (Power Distribution Unit)
5	Suitable chase nipples, refer to Anchoring/Loading Distribution to the Floor detail on sheet S3 (Gantry)
6	Suitable chase nipples (Power Distribution Unit)
7	Suitable chase nipples (Operator's console)

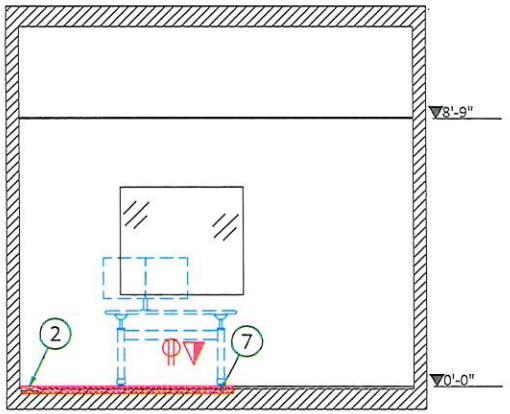
ITEM	QTY	Electrical Outlet Legend Customer/contractor supplied and installed items unless otherwise specified. Height above floor determined by local codes unless otherwise specified.
△		Dedicated telephone line(s)
◭		Network outlet
⏚		System emergency off (SEO), (recommended height 1.2m [48"] above floor)
⊗		X-Ray room warning light control panel
⊗		X-Ray ON lamp (L1) - 24V
◇		Door interlock switch (needed only if required by state/local codes)

Additional Conduit Runs
(Contractor Supplied and Installed)

From (Bubble # / Item)	To (Bubble # / Item)	Qty	Size	
			In.	mm
3 Phase Power	1 Main Disconnect Panel	1	As req'd	As req'd
1 Main Disconnect Panel	Emergency Off	1	1/2	13
	4 Power Distribution Unit	1	As req'd	As req'd
4 Power Distribution Unit	Door Switch	1	1/2	13
	Warning Light Control	1	1/2	13
Warning Light		1	1/2	13
1 Phase Power		1	1/2	13



A



B

POWER REQUIREMENTS

POWER SUPPLY	**3 PHASES+G 200/220/240/380/400/420/440/460/480 V ± 10%**
FREQUENCIES	**50/60Hz ± 1Hz**
MAXIMUM POWER DEMAND	**40 kVA**
AVERAGE (CONTINUOUS) POWER DEMAND	**6.3 kVA**
POWER FACTOR	**0.85**

- 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 permissible voltage drops.
- There must be discrimination between supply cable protective device at the beginning of the installation (main low-voltage transformer side) and the protective devices in the PDB.

SUPPLY CHARACTERISTICS

- Power input must be separate from any others which may generate transients (elevators, air conditioning, radiology rooms equipped with high speed film changers...).
- All equipment (lighting, power outlets, etc...) installed with GE system components must be powered separately.
- Phase imbalance 2% maximum.
- Transients must be less than 1500V peak. (on a 400V line)

GROUND SYSTEM

- System of equipotential grounding.
- Equipotential: 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 GE cableways and to additional equipotential connections linking up all the conducting units in the rooms where GE system 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 signaling and remote control (Y, SEO, L...) will go to PDB with a pigtail length of 1.5m, 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).
- Metal cableways should be grounded.

POWER DISTRIBUTION

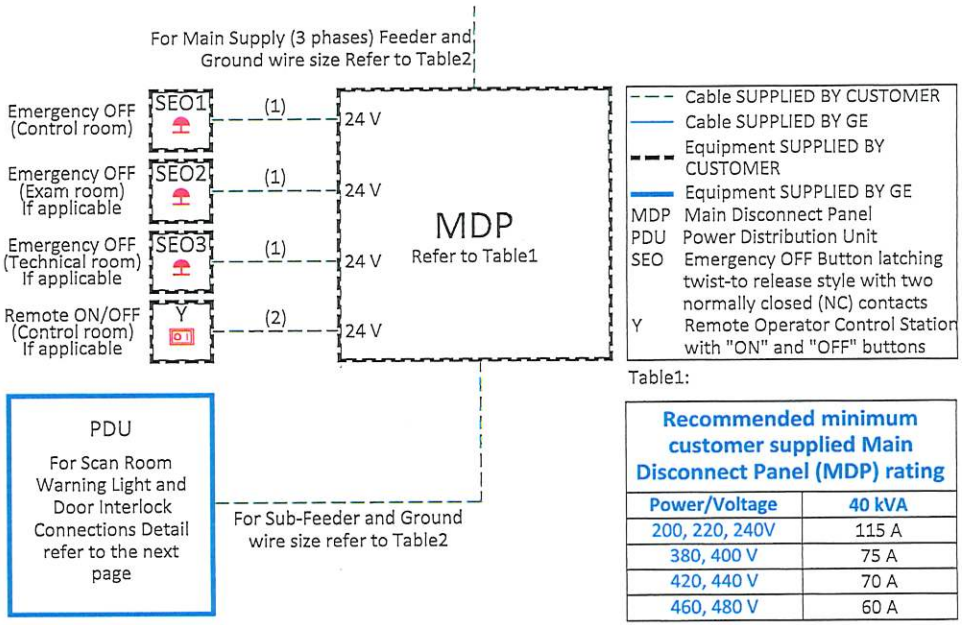


Table1:

Recommended minimum customer supplied Main Disconnect Panel (MDP) rating	
Power/Voltage	**40 kVA**
200, 220, 240V	115 A
380, 400 V	75 A
420, 440 V	70 A
460, 480 V	60 A

Table2:

Feeder Table - 40 kVA

The information below assumes the use of copper wire, rated 75 C and run in steel conduit. All ampacity is determined in accordance with the National Electrical Code (NFPA 70), Table 310-16 (2002). The ampacity of the circuit protection device listed above determines the minimum feeder size, except where total source regulation limits require a larger size. If the wire size does not match the above lists, please select the nearest wire size as per to local standards.

Feeder length from Power Substation to MDP - ft (m)	Minimum Wire Size, AWG or MCM (mm²)/VAC								
	200 VAC	220 VAC	240 VAC	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
50 (15)	2 (35)	3 (30)	3 (30)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
100 (30)	2/0 (70)	1/0 (55)	1/0 (55)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
150 (46)	5/0 (125)	3/0 (85)	3/0 (85)	3 (30)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
200 (61)	6/0 (170)	5/0 (125)	4/0 (100)	3 (30)	3 (30)	3 (30)	3 (30)	4 (22)	4 (22)
250 (76)	6/0 (170)	6/0 (170)	5/0 (125)	1 (45)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)
300 (91)	7/0 (215)	6/0 (170)	6/0 (170)	1 (45)	1 (45)	1 (45)	2 (35)	2 (35)	3 (30)
350 (107)	8/0 (275)	7/0 (215)	6/0 (170)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)	2 (35)
400 (122)	8/0 (275)	8/0 (275)	8/0 (275)	2/0 (70)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)
Sub-Feeder length from MDP to PDU - ft (m)									
32 (9.7536)	2 (35)	3 (30)	3 (30)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)

Grounding

Run a dedicated 1/0 [50 mm²] or larger insulated copper ground wire from the power source to the MDP and from MDP to the PDU. Run the ground wire in the same raceway with the three-phase wires.

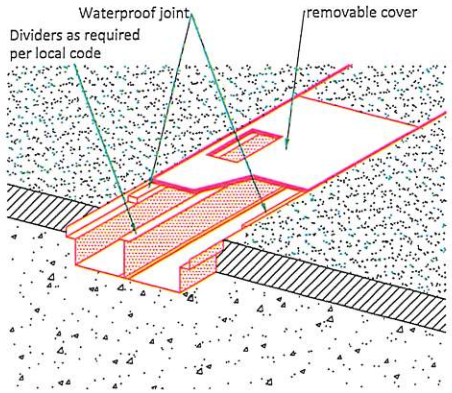
Notes :

(1) Wire size: 4x2mm² [14AWG] and 1x2mm² [14AWG] GND

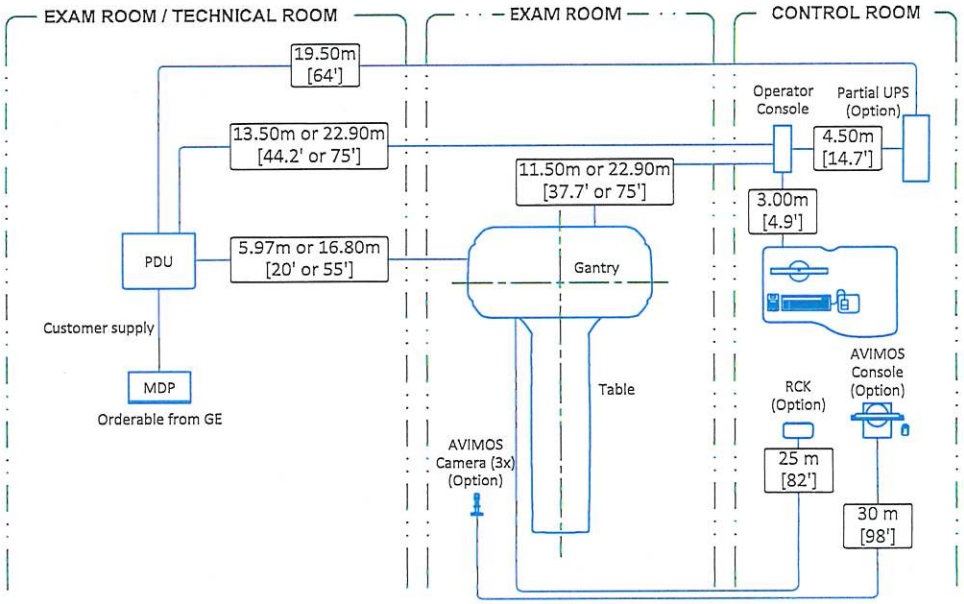
(2) Wire size: 6x2mm² [14AWG] and 1x2mm² [14AWG] GND

TYPICAL CABLE MANAGEMENT

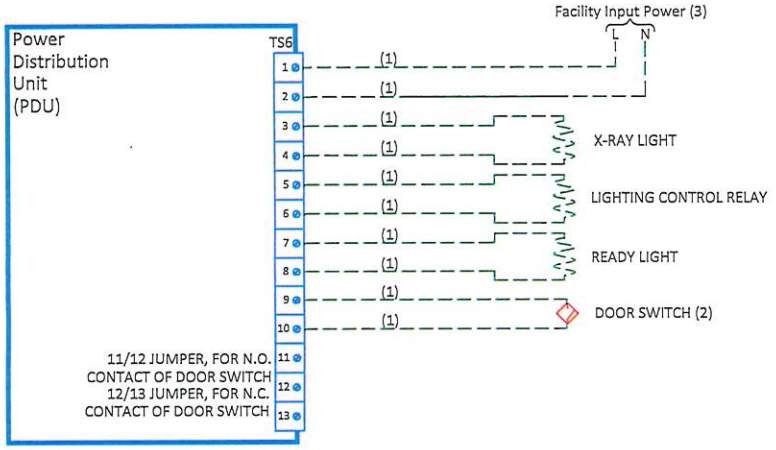
FLUSH FLOOR DUCT



INTERCONNECTIONS



SCAN ROOM WARNING LIGHT AND DOOR INTERLOCK



Notes :

(1) Wire size: 2mm² [14 AWG] at 24V

(2) Door Interlock circuit is jumpered out if a door switch is not provided.

(3) Grounding not shown on the detail, but must comply with local codes.

- Cable SUPPLIED BY CUSTOMER
- Cable SUPPLIED BY GE
- Equipment SUPPLIED BY CUSTOMER
- Equipment SUPPLIED BY GE

TS6 Terminal Block 6