GE Healthcare

Discovery ST, STE, & RX HP60

Pre-Installation Manual

OPERATING DOCUMENTATION

5141127-100
Revision 10

IMPORTANT PRECAUTIONS

LANGUAGE

ПРЕДУПРЕЖДЕНИЕ (BG)	Това упътване за работа е налично само на английски език. • Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод. • Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа. • Неспазването на това предупреждение може да доведе до нараняване на доставчика на услугата, оператора или пациента в резултат на токов удар, механична или друга опасност.
警告 (ZH-CN)	本维修手册仅提供英文版本。 • 如果客户的维修服务人员需要非英文版本，则客户需自行提供翻译服务。 • 未详细阅读和完全理解本维修手册之前，不得进行维修。 • 忽略本警告可能对维修服务人员、操作人员或患者造成电击、机械伤害或其他形式的伤害。
警告 (ZH-HK)	本服務手冊僅提供英文版本。 • 倘若客戶的服務供應商需要英文以外之服務手冊，客戶有責任提供翻譯服務。 • 除非已參閱本服務手冊及明白其內容，否則切勿嘗試維修設備。 • 不遵從本警告或會令服務供應商、網絡供應商或病人受到觸電、機械性或其他的危險。
警告 (ZH-TW)	本維修手冊僅有英文版。 • 若客戶的維修廠商需要英文版以外的語言，應由客戶自行提供翻譯服務。 • 請勿試圖維修本設備，除非 您已查閱並瞭解本維修手冊。 • 若未留意本警告，可能導致維修廠商、操作員或病患因觸電、機械或其他危險而受傷。
UPOZORENJE (HR)	Ovaj servisni priručnik dostupan je na engleskom jeziku. • Ako davatelj usluge klijenta treba neki drugi jezik, klijent je dužan osigurati prijevod. • Ne pokušavajte servisirati opremu ako niste u potpunosti pročitali i razumjeli ovaj servisni priručnik. • Zanemarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika.
VÝSTRAHA (CS)	Tento provozní návod existuje pouze v anglickém jazyce. • V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka. • Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah. • V případě nedodržování této výstrahy může dojít k poranění pracovníka prodejního servisu, obslužného personálu nebo pacientů vlivem elektrického proudu, respektive vlivem mechanických či jiných rizik.

ADVARSEL (DA)	Denne servicemanual findes kun på engelsk. • Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse. • Forsøg ikke at servicere udstyret uden at læse og forstå denne servicemanual. • Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk stød, mekanisk eller anden fare for teknikeren, operatøren eller patienten.
WAARSCHUWING (NL)	Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar. • Als het onderhoudspersoneel een andere taal vereist, dan is de klant verantwoordelijk voor de vertaling ervan. • Probeer de apparatuur niet te onderhouden alvorens deze onderhoudshandleiding werd geraadpleegd en begrepen is. • Indien deze waarschuwing niet wordt opgevolgd, zou het onderhoudspersoneel, de operator of een patiënt gewond kunnen raken als gevolg van een elektrische schok, mechanische of andere gevaren.
WARNING (EN)	This service manual is available in English only. • If a customer's service provider requires a language other than english, it is the customer's responsibility to provide translation services. • Do not attempt to service the equipment unless this service manual has been consulted and is understood. • Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.
HOIATUS (ET)	See teenindusjuhend on saadaval ainult inglise keeles • Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest. • Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist. • Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.
VAROITUS (FI)	Tämä huolto-ohje on saatavilla vain englanniksi. • Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla. • Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen. • Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.
ATTENTION (FR)	Ce manuel d’installation et de maintenance est disponible uniquement en anglais. • Si le technicien d'un client a besoin de ce manuel dans une langue autre que l'anglais, il incombe au client de le faire traduire. • Ne pas tenter d'intervenir sur les équipements tant que ce manuel d’installation et de maintenance n'a pas été consulté et compris. • Le non-respect de cet avertissement peut entraîner chez le technicien, l'opérateur ou le patient des blessures dues à des dangers électriques, mécaniques ou autres.

WARNUNG (DE)	Diese Serviceanleitung existiert nur in englischer Sprache. • Falls ein fremder Kundendienst eine andere Sprache benötigt, ist es Aufgabe des Kunden für eine entsprechende Übersetzung zu sorgen. • Versuchen Sie nicht diese Anlage zu warten, ohne diese Serviceanleitung gelesen und verstanden zu haben. • Wird diese Warnung nicht beachtet, so kann es zu Verletzungen des Kundendiensttechnikers, des Bedieners oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.
ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)	Το παρόν εγχειρίδιο σέρβις διατίθεται μόνο στα αγγλικά. • Εάν ο τεχνικός σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει τις υπηρεσίες μετάφρασης. • Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό αν δεν έχετε συμβουλευτεί και κατανοήσει το παρόν εγχειρίδιο σέρβις. • Αν δεν προσέξετε την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στον τεχνικό σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.
FIGYELMEZTETÉS (HU)	Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el. • Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészíttetése. • Ne próbálja elkezdeni használni a berendezést, amíg a karbantartási kézikönyvben leírtakat nem értelmezték. • Ezen figyelmeztetés figyelmen kívül hagyása a szolgáltató, működtető vagy a beteg áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.
AÐVÖRUN (IS)	Þessi þjónustuhandbók er aðeins fáanleg á ensku. • Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálaþjónustu. • Reynið ekki að afgreiða tækið nema að þessi þjónustuhandbók hefur verið skoðuð og skilin. • Brot á sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklings frá raflosti, vélrænu eða öðrum áhættum.
AVVERTENZA (IT)	Il presente manuale di manutenzione è disponibile soltanto in lingua inglese. • Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione. • Procedere alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto. • Il mancato rispetto della presente avvertenza potrebbe causare lesioni all'addetto alla manutenzione, all'operatore o ai pazienti provocate da scosse elettriche, urti meccanici o altri rischi.
警告 (JA)	このサービスマニュアルには英語版しかありません。 • サービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。 • このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないでください。 • この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

경고 (KO)	본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다 . • 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우 , 번역 서비스를 제공하는 것은 고객의 책임입니다 . • 본 서비스 매뉴얼을 참조하여 숙지하지 않은 이상 해당 장비를 수리하려고 시도하지 마십시오 . • 본 경고 사항에 유의하지 않으면 전기 쇼크, 기계적 위험, 또는 기타 위험으로 인해 서비스 제공자 , 사용자 또는 환자에게 부상을 입힐 수 있습니다 .
BRDINJUMS (LV)	Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā. • Ja klienta apkopes sniedzējam nepieciešama informācija citā valodā, klienta pienākums ir nodrošināt tulkojumu. • Neveiciet aprīkojuma apkopi bez apkopes rokasgrāmatas izlasīšanas un saprašanas. • Šī brīdinājuma neievērošanas rezultātā var rasties elektriskās strāvas trieciena, mehānisku vai citu faktoru izraisītu traumu risks apkopes sniedzējam, operatoram vai pacientam.
ĮSPĖJIMAS (LT)	Šis eksploatavimo vadovas yra tik anglų kalba. • Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba – ne anglų, suteikti vertimo paslaugas privalo klientas. • Nemėginkite atlikti įrangos techninės priežiūros, jei neperskaitėte ar nesupratote šio eksploatavimo vadovo. • Jei nepaisysite šio įspėjimo, galimi paslaugų tiekėjo, operatoriaus ar paciento sužalojimai dėl elektros šoko, mechaninių ar kitų pavojų.
ADVARSEL (NO)	Denne servicehåndboken finnes bare på engelsk. • Hvis kundens serviceleverandør har bruk for et annet språk, er det kundens ansvar å sørge for oversettelse. • Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått. • Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer.
OSTRZEŻENIE (PL)	Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim. • Jeśli serwisant klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta. • Nie próbować serwisować urządzenia bez zapoznania się z niniejszym podręcznikiem serwisowym i zrozumienia go. • Niezastosowanie się do tego ostrzeżenia może doprowadzić do obrażeń serwisanta, operatora lub pacjenta w wyniku porażenia prądem elektrycznym, zagrożenia mechanicznego bądź innego.
ATENÇÃO (PT-BR	Este manual de assistência técnica encontra-se disponível unicamente em inglês. • Se outro serviço de assistência técnica solicitar a tradução deste manual, caberá ao cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • A não observância deste aviso pode ocasionar ferimentos no técnico, operador ou paciente decorrentes de choques elétricos, mecânicos ou outros.

ATENÇÃO (PT-PT)	Este manual de assistência técnica só se encontra disponível em inglês. • Se qualquer outro serviço de assistência técnica solicitar este manual noutro idioma, é da responsabilidade do cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • O não cumprimento deste aviso pode colocar em perigo a segurança do técnico, do operador ou do paciente devido a choques eléctricos, mecânicos ou outros.
ATENȚIE (RO)	Acest manual de service este disponibil doar în limba engleză. • Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere. • Nu încercați să reparați echipamentul decât ulterior consultării şi înțelegerii acestui manual de service. • Ignorarea acestui avertisment ar putea duce la rănirea depanatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.
ОСТОРОЖНО! (RU)	Данное руководство по техническому обслуживанию представлено только на английском языке. • Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует самостоятельно обеспечить перевод. • Перед техническим обслуживанием оборудования обязательно обратитесь к данному руководству и поймите изложенные в нем сведения. • Несоблюдение требований данного предупреждения может привести к тому, что специалист по техобслуживанию, оператор или пациент получит удар электрическим током, механическую травму или другое повреждение.
UPOZORENJE (SR)	Ovo servisno uputstvo je dostupno samo na engleskom jeziku. • Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge. • Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo. • Zanemarivanje ovog upozorenja može dovesti do povređivanja servisera, rukovaoca ili pacijenta usled strujnog udara ili mehaničkih i drugih opasnosti.
UPOZORNENIE (SK)	Tento návod na obsluhu je k dispozícii len v angličtine. • Ak zákazníkov poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednos″ou zákazníka. • Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obluhu a neporozumiete mu. • Zanedbanie tohto upozornenia môže spôsobi″ zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie.

ATENCION (ES)	Este manual de servicio sólo existe en inglés. • Si el encargado de mantenimiento de un cliente necesita un idioma que no sea el inglés, el cliente deberá encargarse de la traducción del manual. • No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio. • La no observancia del presente aviso puede dar lugar a que el proveedor de servicios, el operador o el paciente sufran lesiones provocadas por causas eléctricas, mecánicas o de otra naturaleza.
VARNING (SV)	Den här servicehandboken finns bara tillgänglig på engelska. . • Om en kunds servicetekniker har behov av ett annat språk än engelska, ansvarar kunden för att tillhandahålla översättningstjänster. • Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken. • Om du inte tar hänsyn till den här varningen kan det resultera i skador på serviceteknikern, operatören eller patienten till följd av elektriska stötar, mekaniska faror eller andra faror.
DIKKAT (TR)	Bu servis kılavuzunun sadece ingilizcesi mevcuttur. • Eğer müşteri teknisyeni bu kılavuzu ingilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer. • Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz. • Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.

DAMAGE IN TRANSPORTATION

Check for damage to property that may have occurred at the site during delivery, such as damage to floors, door frames or walls.

All packages should be closely examined at time of delivery. If damage is apparent, have the notation *Damage in Shipment* written on **all** copies of the freight or express bill before delivery is accepted or signed for by a GE Healthcare representative or a hospital receiving agent. Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14-day period.

To file a report:

Call 1-800-548-3366, and use option 8.

Fill out a report on http://egems.med.ge.com/edq/home.jsp

Contact the local service coordinator for more information about this process.

Rev. September 17, 2006

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT

All electrical installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. In addition, electrical feeds into the Power Distribution Unit shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Healthcare personnel. The products involved (and the accompanying electrical installations) are highly sophisticated, and special engineering competence is required. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE's electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE's field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

IMPORTANT...X-RAY PROTECTION

X-ray equipment, if not properly used, may cause injury. Accordingly, the instructions herein contained should be thoroughly read and understood by everyone who will use the equipment before attempting to place this equipment in operation. The General Electric Company, GE Healthcare Group, will be glad to assist and cooperate in placing this equipment in use.

Although this apparatus incorporates a high degree of protection against x-radiation other than the useful beam, no practical design of equipment can provide complete protection. Nor can any practical design compel the operator to take adequate precautions to prevent the possibility of any persons carelessly exposing themselves or others to radiation.

It is important that anyone having anything to do with x-radiation be properly trained and fully acquainted with the recommendations of the National Council on Radiation Protection and Measurements as published in NCRP Reports available from NCRP Publications, 7910 Woodmont Avenue, Room 1016, Bethesda, Maryland 20814, and of the International Commission on Radiation Protection, and take adequate steps to protect against injury.

The equipment is sold with the understanding that the General Electric Company, GE Healthcare Group, its agents, and representatives have no responsibility for injury or damage which may result from improper use of the equipment.

Various protective materials and devices are available. It is urged that such materials or devices be used.

IMPORTANT...RADIOACTIVE MATERIAL HANDLING

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Only employees formally trained in radioactive materials handling and this equipment are authorized by the GE Healthcare Radiation Safety Officer to use radioactive materials to service this equipment.

GE Healthcare Services is required to notify the applicable U.S. state agency PRIOR to any source service event involving pin source handling. See NUC/PET Radioactive material guides for specific instruction or contact your EHS Specialist.

A radiation survey must be performed when a pin source has been removed and replaced. See Radiation Survey Form Instructions or contact your EHS Specialist.

Rev 2 (July 21, 2005)

LITHIUM BATTERY CAUTIONARY STATEMENTS

CAUTION Risk of Explosion

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

ATTENTION Danger d'Explosion

Il y a danger d'explosion s'il y a replacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rébut les batteries usagées conformément aux instructions du fabricant.

OMISSIONS & ERRORS

Customers: please contact the GE Healthcare Sales or Service representatives.

GE personnel: please use the GE Healthcare iTrak/PQR Process to report all omissions, errors, and defects in this publication.

Revision History

Revision	Date	Reason for change
1	08/01/05	Initial release
2	11/09/05	Chapter 1 Introduction: • Revised Purchaser's Responsibilities Chapter 3 Room Planning: • Revised minimum room dimensions and gantry and patient table clearances. • Updated Primary Component Dimensions and catalog numbers. Updated UPS dimensions and added Replacement Component Dimensions. Chapter 4 Environmental Conditions: • Updated Powerware UPS information. Chapter 5 Floor Loading and Weights: • Updated floor loading data for patient table and added UPS data. Chapter 6 Delivery Information: • Added van delivery sizes and weights of components. • Revised Operator Console Considerations. Chapter 7 Power Requirements: • Revised information for Main Disconnect Control. Chapter 8 Interconnection Information: • Deleted obsolete Component Designators. • Revised System Interconnect Diagram 5146583SCH and cable interconnect runs. Added note for cabling in the China market. • Revised Typical UPS Interconnect diagram. • Added schematic for A1 with UPS control panel.
3	4/14/06	Chapter 1 Introduction: • Updated entire chapter. • Added and updated Pre-Installation Checklists and Block Diagram. Chapter 2 Pre-Installation Overview: Added this chapter. Chapter 4 Room Planning: • Changed minimum and recommended room dimensions & diagrams. • Added regulatory requirements, clearances, and term definitions. • Revised service and common dimensions and clearances. • Removed Replacement Component Dimensions from this revision. • Updated Gantry and Patient Table Mounting Requirements. • Updated Radiation Protection. • Updated Cooling Requirements. • Added Electro-Magnetic Interference (EMI) section. Chapter 8 - Power Requirements: • Revised grounding system diagram. Chapter 9 - Interconnection Information: • Updated System Interconnect Diagram 5146583SCH. Chapters 4, 8, 9: Changed Powerware UPS model/information.

Revision	Date	Reason for change
4	3/13/07	Chapter 4 Room Planning: • Revised radiation scatter plots.
5	8/21/07	Added metric dimensions in all chapters where needed. Chapter 4 Room Planning: • Revised Regulation Clearances and Service Clearances. Chapter 5 Environmental Conditions: • Per SPR FCTge29223, combined cooling specs for all components of both CT and PET Gantries.
6	5/02/08	**ECR 205329**: Updated Chapter 8, Tables 8-2 and 8-3, to add Signal Cable (Gantry to RPM unit). **SPR FCTge36010:** Chapter 4, Section 4-7.1 Removed bullet allowing for remote mounting of console. Per George Farrington: Chapter 2: Added information to the Floor Levelness Specification section. Chapter 4: • Section 4-1: added a bullet about cable storage and a note about rear cable entry • Section 4-3.4: added information concerning clear access for service components. • Section 4-3.6 added information about egress requirements when siting the console • Section 4-10: added the acceptable broadband network speed specification. Chapter 5: Section 5-6.7: Added section about power lines under the floor and EMI testing. Chapter 8: Section 8-6.1: added information concerning LOTO and UPS.
7	9/13/08	**FCTge36009**: Updates to Chapters 1 - 4. • Finished floor and wall requirements • Construction site requirements • Relocatable building installations • System siting requirements • Update of system PMI tasks • Site-ready visit requirements **FCTge40534:** Updates to Chapter 4, Figure 5-2 (Service Clearances). **Important Precautions:** Updated to include new languages.
8	02/06/09	**FCTge44028** Updates to allow for differences in access depending on location of door in relation to scanner. Chapter 4 "Room Planning": • Sections 4-3-1.2 Egress, 4-3-2-4.3, 4-3.4, 4-6.1 • Updated Table 4-1, Table 4-5 • Replaced Figure 4-6, added Figure 4-7
9	10/09/09	**FCTge51303**: Removed Seismic Option Kit R4390JC
10	13-Nov-09	**CR 13255445**: Revised Table 9-4.

Table of Contents

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Chapter 1 Introduction

This direction contains physical and electrical data necessary for planning and preparing a site.

Pre-installation work is defined as site preparation for installation of the Discovery ST, STE, & RX HP60 scanner. It is the responsibility of the purchaser to arrange and pay for this work. Pre-installation work includes:

- Installation of electrical conduit, junction boxes, ducts, outlets, and line safety switches.
- Installation of interconnection wiring that is AWG stranded copper. The electrical contractor shall ring out and tag all wires at both ends. Color-coded wires are recommended for easier identification. Wires shall be continuous without splices. Ground wires must conform to local codes.
- Any site renovation.
- Alterations and modifications to products not specifically included in the sales contract.

All work must conform to local building and safety codes. Unless specifically mentioned, GE Healthcare does not provide or install wires, conduits, junction boxes, and ducts as illustrated in this publication.

All site plans, preliminary concepts and final working drawings must be reviewed by GE Healthcare Architectural Planning prior to construction or approval.

Contact your local General Electric sales representative for complete information regarding your site-specific room layout.

Section 1-1: Site Readiness

Site readiness is a requirement that must be achieved to install a Discovery ST, STE, & RX HP60 product. For your convenience, a site-ready visit inspection shall be performed at least three (3) days prior to the installation date. The site inspection must conclude with a minimum of a conditional pass status to be ready on the requested installation delivery date. *Site-ready inspections on the delivery date will not be acceptable unless prior arrangements have been made.*

Pre-Installation and Site-Ready Tools:

- Pre-Installation Quick Start Kit & Video
- System Floor Template
- Pre-Installation Checklist
- Pre-Installation Block Diagram
- Site Room Layouts
- Power and Grounding Inspection
- Pre-Installation Support

Section 1-2: Responsibility of Purchaser

2.1 Customer Room Prep Items

The Discovery ST, STE, & RX HP60 air intake is near the bottom of the gantry and draws air in through a filter in the gantry heater assembly. Fine dust as listed below will clog the filter and be deposited throughout the gantry, table, console and PDU electronics. This fine dust cannot be completely removed and can be damaging to electronic components.

For these reasons, the scanner should be the last item installed in the suite area.

“Pre-installation” is work necessary to plan and prepare a site for installation of equipment.

Pre-installation work helps the user (customer) avoid:

- Application delay and scheduling
- Surprise siting discoveries
- Installation confusion
- Waste of manpower

The following MUST be completed before installation work can begin for a Discovery ST, STE, & RX HP60 scanner:

- Completely finished:
  - Walls painted or have final wall covering
  - Ceiling tiles installed and no remaining ceiling work required
  - Final floors covering installed with no remaining dust causing floor work required
  - All room millwork installed as shown on the site print
  - All plumbing work in the suite is completed
  - No construction in or around the scan suite area that will produce:
    * Concrete dust
    * Drywall dust
    * Ceiling tile dust
    * Wood sawdust or shaving
    * Dust tracked into the suite area
- Active broadband connection
  - A completed network connection is required for ALL installations.
  - A GE Healthcare network specialist may be required to complete the VCN connection. This may take a week or longer to schedule.
- Power available to A1, with provision for Lockout/Tagout at the A1 disconnect

  If a UPS is required, a GE A1 breaker is needed to complete this installation. Refer to the electrical section for more details.

NOTICE **SERVICE NOTICE: An improperly-prepared site (i.e., one that is in a state of construction) can result in increased installation time.**

A scanner installed in a dirty environment is more prone to contamination, which can result in decreased reliability and increased scanner downtime.

2.2 Purchaser Site Preparation Work

This list below describes many of the items to consider when planning for a system replacement or designing a room for new equipment.

- Determine room dimensions and verify that doorways are large enough for the scanner system.
- Install appropriate conduits and duct work for system cables. If additional components are required in the Discovery ST, STE, & RX HP60 suite, their connection consideration must be determined and completed.
- Install junction boxes of correct size with covers at locations shown in installation plan.
- A1 main disconnect installation
- Install power supply of correct voltage output and adequate KVA rating.
- Install local disconnects, including proper over-current protection.
- Install “steelwork” or other suitable support work for mounting equipment on walls or from ceiling.
- Camera should be on-site at the time of installation.
- Complete all suite and room alterations and modifications.
- Verify that room shielding is adequate for the system being installed
- Review structural requirement - including floor vibration, levelness, and thickness
- Review HVAC requirements including system regulation and patient comfort.
- Review operational clearances to see if your daily used items fit, such as beds and carts.
- Emergency medical equipment should also be considered
- Storage cabinets and sink (if required) must be shown on the site print

These contractors and others may be required to help confirm that the site meets all installation requirements:

- Structural Engineer and /or Architect
- HVAC contractor
- Electrical contractor
- Qualified radiological health physicist

The Project Manager of Installation or sales will deliver a copy of the pre-installation quick start kit.

The above items can be found in the remaining chapters in this manual.

It is suggested that this work be completed at least three days prior to delivery.

2.3 Manufacturer’s System Level Siting Requirements

These siting requirements are the minimum that must be met in order to install a new or replacement system.

- Network communication in place and active
- Meets all scan room regulatory and service requirements
- Meets all minimum scan room structural requirements
- Meets minimum scan room HVAC requirements
- Meets minimum scan room electrical requirements
- Reviewed radiation protection section in the Pre-Installation manual
- All in room items shown on the final GE Healthcare site print and the final print is on site
- No construction in the scan room or neighboring suite areas

- Includes all finished doors, floors, windows, ceilings, and walls, with all plumbing and cabinets already installed. (Finished Floor Exception 1 on page 61 and Finished Floor Exception 2 on page 61 may apply. Finished Walls Requirements on page 62 may apply.)
- All required parties have received the Quick Start Kit and reviewed the requirements

It is suggested that this work be completed at least three days prior to delivery.

2.3.1 Meeting Site-Ready Requirements

The site-ready visit will take place at least three days prior to the delivery date. The site-ready visit is intended to verify that all of the siting requirements are met and the site is ready for installation.

The site-ready visit will result in a report to the Project Manager of Installation indicating one of the following:

Pass - All required items are present, completed and the site is ready for installation.

Conditional Pass - Issued when 80% of all the tasks are completed and all parties agree that the remaining 20% will be completed by the installation delivery date.

If a “Conditional Pass” is granted on the inspection date, the Project Manager of Installation must present conclusive evidence that unfinished tasks are completed and that the site is ready for delivery one business day prior to delivery.

Fail - Issued when less than 80% of the task are completed and all parties cannot agree that the remaining work will be completed by the requested installation delivery date. Failed sites will be rescheduled when all items are completed.

2.3.2 Quick Installs

Quick installations are described as sites with minimum room improvements required. These include, but are not limited to the following items:

- Existing electrical disconnect device, wire size and grounds meet all of the above requirements.
- Existing structural items including floor thickness meet all of the above requirements
- Existing HVAC capacity and regulation meet all of the above requirements
- Existing scanner suite meets all of the above regulatory and minimum size requirements
- Existing facility can accommodate the delivery and meet all of the above delivery requirements

Quick Installs are subject to the following restrictions:

- Quick installs must have a new room print that accurately reflects the rooms to be upgraded.
- Existing floor anchors from a non-VCT system CANNOT be reused.
- New floor anchors must be a minimum of 102 mm (4") from any existing floor penetrations.

Quick Installs typically involve a weekend de-install and room prep completion, with a next business day delivery and installation.

2.3.3 Construction Site Installations

A *construction installation* describes installations at sites without an occupancy permit, often with ongoing construction. In general, construction sites fail to meet the recommended specifications for delivery of the system. GE Healthcare does not recommend construction installations, as they can result in delays, increased costs, and possible damage to the system. When construction-site delivery proves unavoidable, the installation falls into one of two categories:

- Full construction site with completed radiology area
- Full construction site with limited delivery access

Review the following categories to determine which most closely matches the condition of the planned installation site.

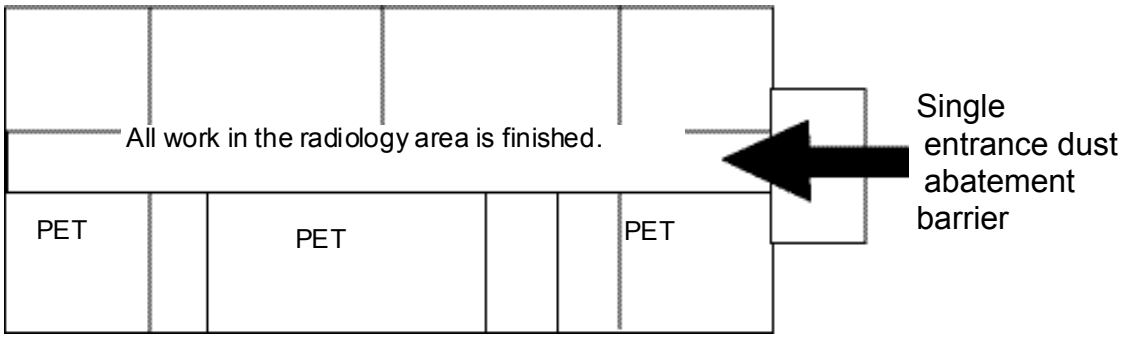


Figure 1-1 Full construction site with completed radiology area

2.3.3.1 Full Construction Site with Completed Radiology Area

This type of site consists of a finished, dust-free, occupancy-ready radiology suite. While there is no remaining construction in or around the scan suite area, there may be ongoing construction in other areas. At the time of delivery such sites feature:

- Dust control measures deployed in the radiology suite area.
- Scan suite access limited to a single entrance (see Figure 1-1).
- Radiology suite sealed off from the remaining construction area.
- Operational HVAC, with a positive air pressure within the radiology suite.

In addition, the radiology suite at such a site REMAINS in a dust-free, occupancy-ready state after delivery and throughout the remaining construction phase.

2.3.3.2 Full Construction Site with Limited Delivery Access

This type of site allows delivery during ongoing construction of the radiology suite area. At such sites, delivery occurs prior to site completion, but the product remains stored until a finished, dust-free, occupancy-ready radiology suite area is ready. This type of site requires the Discovery ST, STE, & RX HP60 to be delivered in a sealed package with dollies. Delivery to the storage area may require a lift truck or riggers. Installation work begins only when the site reaches the completed, dust-free, occupancy-ready radiology suite requirement.

Note: If delivery requires vertical or horizontal lifting, the PMI adds the necessary identifier to the order.

2.3.4 Relocatable Building Installations

A relocatable building is made in a factory and delivered to the site of its permanent location. Relocateable buildings qualify as fixed sites and must satisfy all of the requirements of a fixed site. The PETscanner and table must be mounted on a solid concrete floor. Any other floor type installations must be designed by the customer's structural engineer and meet all GE Healthcare's specifications listed in this manual.

Refer to Gantry and Patient Table Mounting Requirements on page 59 of this manual for further information.

Section 1-3: Site-Ready Inspection Visit

3.1 Overview

To ensure timely delivery and installation, GE recommends that the customer complete all necessary work and schedule a site-ready visit prior to the delivery date.

The visit verifies that the site meets all system siting requirements and results in a call or report to the Project Manager of Installation indicating a site-ready condition and confirming that the installation can proceed.

Use the Customer Installation Checklist to ensure that the site meets ALL requirements.

The customer and/or the customer's contractors must confirm that all work was completed, including floor levelness PRIOR to delivery.

1-3.2 Project Manager of Installation Tasks

The GE Healthcare Project Manager of Installation (PMI) assists the purchaser in meeting all system siting requirements.

1-3-2.1 Pre-Installation Delivery Tasks

The PMI also performs the following pre-installation delivery tasks:

- Determines the delivery type: ground, dock, or tilt-bed truck.
- Determines if delivery requires tilt dollies or riggers; orders dollies and lifting crates, as needed.
- Determines if the delivery requires the use of floor protection.

Determines if ground delivery requires the use of a tilt-bed truck, and informs GE Transportation of the need for a tilt-bed truck.

1-3-2.2 Site Review with Customer

A site-ready visit should occur prior to the delivery date. This visit verifies that the site meets all system siting requirements and confirms that installation can proceed. During the site-ready visit, a GE representative confirms that the site meets all of the required site-ready conditions including floor levelness, and delivery route readiness. Lifting options and construction site packaging must be ordered prior to delivery and cannot be added on-site.

1-3.3 Cusotmer Tasks for Site-Ready Visit

A day-of-installation site-ready visit will not be allowed. All site-ready visits must be at least 3 business days prior to delivery. If no site-ready visit is done, all pre-installation work must be completed to deliver and start the installation.

The site must meet all conditions in Purchaser Site Preparation Work on page 21 and Manufacturer's System Level Siting Requirements on page 21 plus these additions reviewed at the site-ready visit.

The GE Healthcare Project Manager of Installation will review the site delivery process with you to determine how to best transfer the equipment from the transportation truck to your room.

This site-ready inspection will review and check these items:

Delivery information:

Determine delivery route into the scan room
Determine if riggers are required
Determine if elevators, doorways and hallways are adequate for delivery
Determine if floor protection is required
Determine if a tilt bed truck is required for ground delivery and ordered

Regulatory Requirements:

Room size meets the minimum requirements
Site print is present and accurately reflects the room size and layout.
No grounded walls are present in the regulatory clearance areas
All regulatory clearances space is met
Room meets all local codes

Manufacturer Requirements: All requirements listed in Manufacturer's System Level Siting Requirements on page 21 must be met.

Purchaser's Site Preparation Work: All actions listed in Purchaser Site Preparation Work on page 21 must be completed.

1-3.4 Site Ready Review

The GE Healthcare project manager will review the site delivery process with you to determine how to best transfer the equipment from the transportation truck to your room.

This site-ready inspection will review and check these items:

- Delivery information:
  - Determine delivery route into the scan room
  - Determine if riggers are required
  - Determine if elevators, doorways and hallways are adequate for delivery
  - Determine if floor protection is required
  - Determine if a tilt bed truck is required for ground delivery and ordered
- Regulatory Requirements:
  - Room size meets the minimum requirements
  - Site print is present and accurately reflects the room size and layout.
  - No grounded walls are present in the regulatory clearance areas
  - All regulatory clearances space is met
  - Room meets all local codes
- Manufacturer Requirements: All requirements listed in Manufacturer's System Level Siting Requirements on page 21 must be met.

Purchaser's Site Preparation Work: All actions listed in Purchaser Site Preparation Work on page 21 must be completed.

Section 1-4: Customer Installation Checklists

Table 1-1 : Site-Required Information

Required Information for Site *Must be completed before the scheduled delivery date*
Hospital name as it appears on the system screens: _____
Network ID numbers / IP addresses Camera: _____ PACS: _____ AWW: _____ Other - Specify type & ID: _____ Other - Specify type & ID: _____
Camera setup information: _____ _____ _____
AW Direct Connect address: _____
Do you want HIPAA enabled? No___ Yes ___
Do you want automatic downloads enabled? No___ Yes ___

Table 1-2 : Schedule Date Commitments

GE Y N	Cust Y N	Dates
	❒ ❒	Has the project schedule been verified with facilities department, contractor, and GE?
	❒ ❒	Will the committed site-ready date be met?
❒ ❒	❒ ❒	Does the completion date for any/all construction meet or preceed the delivery date?
❒ ❒	❒ ❒	Is the Power & Ground survey complete? Date: _____ Hospital contact: _____
	❒ ❒	Site-Ready visit is scheduled. Date: _____
	❒ ❒	Delivery date is scheduled. Date: _____
	❒ ❒	Installation date is scheduled. Date: _____
❒ ❒	❒ ❒	Installation timing: A: Weekdays___ B: Weekend___ C: Quick Install___ If B or C, have all sub-contractors been notified? No___ Yes ___
❒ ❒	❒ ❒	Does the delivery and/or installation date need to be adjusted?
	❒ ❒	First-Use date is scheduled. Date: _____
❒ ❒	❒ ❒	Applications/Training dates: On-Site Training Date: _____ Healthcare Institute Training Date: _____

Table 1-3 : General Site Planning

GE Y N	CUST Y N	General / Site Requirements *Must be completed 5 weeks before scheduled delivery date*
❒ ❒	❒ ❒	Have final drawings been approved and distributed to the contractors?
❒ ❒	❒ ❒	Are final drawings “signed off” to approve equipment layout / orientation?
❒ ❒	❒ ❒	Do the actual room dimensions match those on the final drawings?
	❒ ❒	Has the radiologist health physician reviewed and approved the room layout and shielding requirements?
	❒ ❒	Have any additional requirements or questions about the installation been discussed with GE? List: _____ _____ _____ _____
	❒ ❒	Is there a person assigned to review and verify that all installation requirements are met? Name: _____
	❒ ❒	Have the specific site requirements been discussed with the contractor? Refer to the GE final drawings specifications. (See Table 1-4 below.)
	❒ ❒	Has the responsibility of cabling, installing, and interfacing accessories not on the order been discussed?
	❒ ❒	Are all third-party vendors identified, notified and scheduled? (Examples: Netcom, Medrad, etc.)
	❒ ❒	Have all regulatory requirements been met per Regulatory and Service Clearances on page 39?
	❒ ❒	Will existing network, broadband, and camera cable drops reach new locations and will they meet the requirements and function with Discovery ST, STE, & RX HP60? If not, what are the requirements? List: _____ _____ _____
❒ ❒	❒ ❒	Have all required radioactive material licenses and approvals been obtained for the equipment and facility?
	❒ ❒	Does the site have a radiation license allowing PET isotopes and GE68? A copy of customer's site radiation license must accompany order entry package. Otherwise, installation will be delayed.

Table 1-4 : References for Specific Site Requirements

Sections for Specific Requirements	
• Room Planning - Chapter 4 - page 37	• Floor Loads & Weights - Chapter 6 - page 83
• Environment - Chapter 5 - page 71	• Power - Chapter 7 - page 99
• Radiation Protection - page 64	• Delivery - Chapter 9 - page 119
All work by contractors must be completed before the scheduled delivery date.	

Table 1-5 : Equipment Compatibility

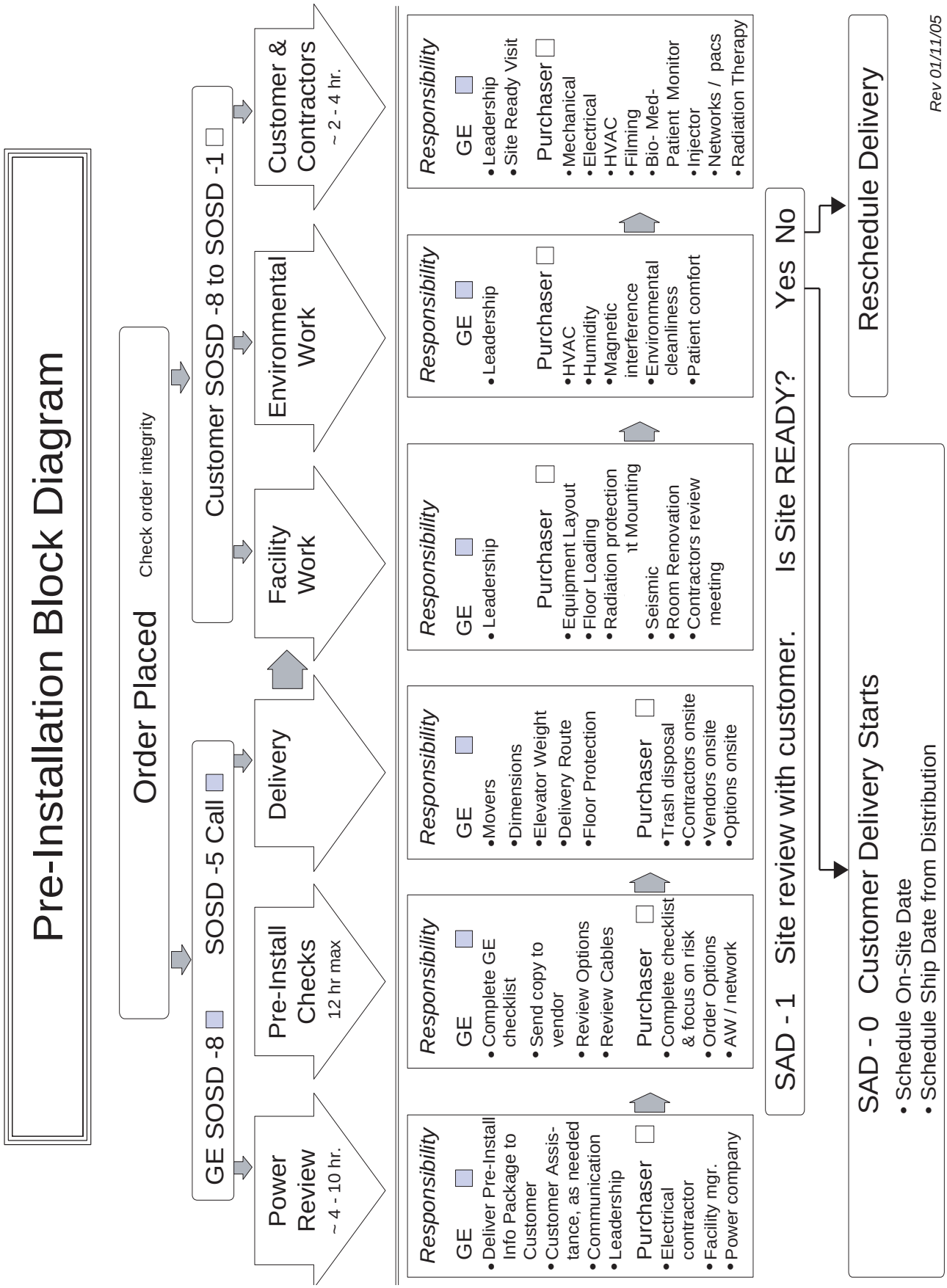
GE Y N	Cust Y N	Equipment *Must be completed 5 weeks before scheduled delivery date*
❒ ❒	❒ ❒	Has the order been reviewed for completeness and compatibility with existing equipment? Typical equipment: Remote monitors ____ AWW relocation ____ Cardiac option ____ Injectors ____
❒ ❒		Are interfaces to existing and/or new accessories ordered and planned for accordingly?
❒ ❒	❒ ❒	Have the following peripheral locations been included in the site drawings? EKG monitor___ Injector control___ Laser camera ___ UPS ___ 2nd Monitor___
❒ ❒	❒ ❒	Will GE Healthcare provide additional services per contract negotiations?
❒ ❒		Are correct length cables on order?

Table 1-6 : Network Connections

GE Y N	Cust Y N	Network Installation and Setup *Must be completed 5 weeks before scheduled delivery date*
❒ ❒	❒ ❒	Have IP addresses and Host Names been obtained? No___ Yes ___
❒ ❒	❒ ❒	Will a network camera be used? No___ Yes ___
❒ ❒	❒ ❒	**Mandatory:** Is the network installed, are network jacks installed, and is the entire network tested?
❒ ❒	❒ ❒	**Mandatory:** Broadband VPN installed/setup?
❒ ❒	❒ ❒	**Mandatory:** Are network software options ordered ____ HIS RIS option ___ DICOM print ___ AWW ____
	❒ ❒	**Optional:** Has modem option ordered? _____ (Requires a site escalation)
❒ ❒	❒ ❒	**Optional:** Is the Discovery ST, STE, & RX HP60 service telephone line identified and installed for InSite? *(Electrical, mechanical, etc.)*

Table 1-7 : Miscellaneous Tasks

GE Y N	Cust Y N	Other *Must be completed before the scheduled delivery date*
	❒ ❒	Arrangements made in the schedule to allow adequate time for remodeling, if required (such as wall, floor, or ceiling repair work, painting, other cosmetic finishes)
	❒ ❒	Have arrangements been made to clean the floor *after* equipment removal and *prior* to the installation of the new equipment?
❒ ❒	❒ ❒	Is de-installation of existing equipment required? No__ Yes ___ Removal date _____
❒ ❒	❒ ❒	Is there a trade-in of existing equipment? No __ Yes __ GoldSeal _____
❒ ❒	❒ ❒	Delivery route identified and verified with the proper hospital personnel? No__ Yes __ Elevators and doors checked for size and weight constraints? No__ Yes __
❒ ❒	❒ ❒	Have appropriate arrangements been made with traffic for delivery? No__ Yes __
❒ ❒	❒ ❒	Will acceptance/performance testing or bio-medical testing be required? No__ Yes __ Date: _____
❒ ❒	❒ ❒	Are trash and/or recycling bins available for the removal of papers, boxes, etc. during the installation? No__ Yes __
❒ ❒	❒ ❒	Has the GEHC Surface Penetration Permit been completed before equipment delivery? (A copy of this form must be sent to GEHC as defined in the permit.) No__ Yes __


Pre-Installation Block Diagram
Order Placed
Check order integrity
GE SOSD -8
SOSD -5 Call
Customer SOSD -8 to SOSD -1
Power Review
~ 4 - 10 hr.
Pre-Install Checks
12 hr max
Delivery
Facility Work
Environmental Work
Customer & Contractors
~ 2 - 4 hr.
Responsibility
GE
• Deliver Pre-Install Info Package to Customer
• Customer Assis-tance, as needed
• Communication
• Leadership
Purchaser
• Electrical contractor
• Facility mgr.
• Power company
Responsibility
GE
• Complete GE checklist
• Send copy to vendor
• Review Options
• Review Cables
Purchaser
• Complete checklist & focus on risk
• Order Options
• AW / network
Responsibility
GE
•Movers
•Dimensions
•Elevator Weight
•Delivery Route
•Floor Protection
Purchaser
•Trash disposal
•Contractors onsite
•Vendors onsite
•Options onsite
Responsibility
GE
• Leadership
Purchaser
• Equipment Layout
• Floor Loading
• Radiation protection
• Seismic
• Room Renovation
• Contractors review meeting
Responsibility
GE
• Leadership
Purchaser
•HVAC
•Humidity
•Magnetic interference
•Environmental cleanliness
•Patient comfort
Responsibility
GE
• Leadership
• Site Ready Visit
Purchaser
•Mechanical
•Electrical
•HVAC
•Filming
•Bio- Med- Patient Monitor
•Injector
•Networks / pacs
•Radiation Therapy
SAD - 1 Site review with customer. Is Site READY? Yes No
Reschedule Delivery
SAD - 0 Customer Delivery Starts
• Schedule On-Site Date
• Schedule Ship Date from Distribution
Rev 01/11/05

Chapter 2 Pre-Installation Overview

NOTICE **Prior to beginning the pre-installation process for a Discovery ST, STE, & RX HP60 system, it is highly recommended that the user review the Pre-Installation Video (DVD) provided in the Discovery ST, STE, & RX HP60 Quick Start Kit.**

Before a Discovery ST, STE, & RX HP60 system can be installed, all pre-installation requirements must be complete. These issues are particularly important:

- Chapter 4, Section 4-9 Structural Requirements
- Chapter 4, Section 4-11 Radiation Protection
- Broadband standard
- Site-Ready Visit
- Chapter 5, Sections 5-1 Temperature and Humidity Specifications & 5-2 Temperature and Humidity Monitoring (HVAC Requirements)
- Chapter 7 (Site Power Audit Required)
- Chapter 8

Site-specific items must be verified before the installation can begin.

Section 2-1: Dust/Dirt Contamination

The Discovery ST, STE, & RX HP60 (consisting of console, PDU, table and gantries) is highly susceptible to airborne contaminants, especially concrete and drywall dust. Due to the possibility of contamination, these systems should NEVER be installed in a construction site.

NOTICE **Any site with unfinished floors, walls or ceilings is considered a construction site, and is not suitable for system installation.**

Section 2-2: Chemical Contamination

Wet film processors must never be installed in the same room as the scanner, due to the possibility of chemical contamination of components. Such chemicals can contribute to increased equipment failures, increased system downtime, and decreased reliability. Film processor equipment installation must meet the manufacturer's requirements (such as ventilation specifications) and all applicable national and local codes. Also, consideration should be given to the location of this equipment and chemical fumes relative to human contact as it relates to locating this equipment and chemicals in the control room.

Section 2-3: Walls, Ceiling, and Floor

All walls, ceiling, and flooring must be completed before installation can begin.

Discovery ST, STE, & RX HP60 scanners can only be installed on a 127mm (5") concrete floor.

Section 2-4: Broadband

For information on broadband requirements, refer to Chapter 4, Section 4-10:, on page 62.

Section 2-5: Phone Lines (Modem Option)

One phone line must be installed at or near the console and be operational prior to installation:

- Analog line (optional for modem use)

Section 2-6: Review

The Discovery ST, STE, & RX HP60 series systems use adjustable leveling pads to support the gantry, PET image ring and table assembly. The gantry has four (4) primary leveling pads and 4 leveling pads on the table assembly.

Using the GE print to establish the room layout, make sure all the regulatory operating, and service clearances shown on the print are observed. Using the template shipped with the system, locate the anchor holes. Make sure they clear structural interferences in the floor.

Clean the area. Free the mounting surface of any material that may interfere with the positioning and leveling of the system.

1.) Lay out the 3 floor templates.
2.) Start with the Gantry template—align per the GE print.
3.) Place the table template over the top of the Gantry template. Align the scan and table center-lines and secure the templates to the floor. Make sure there are no potential clearance issues.
4.) Make sure the floor is level (per Figure 2-1) across the templates.

Note: Tiles (or other resilient flooring) around all holes will be cut during the installation process.

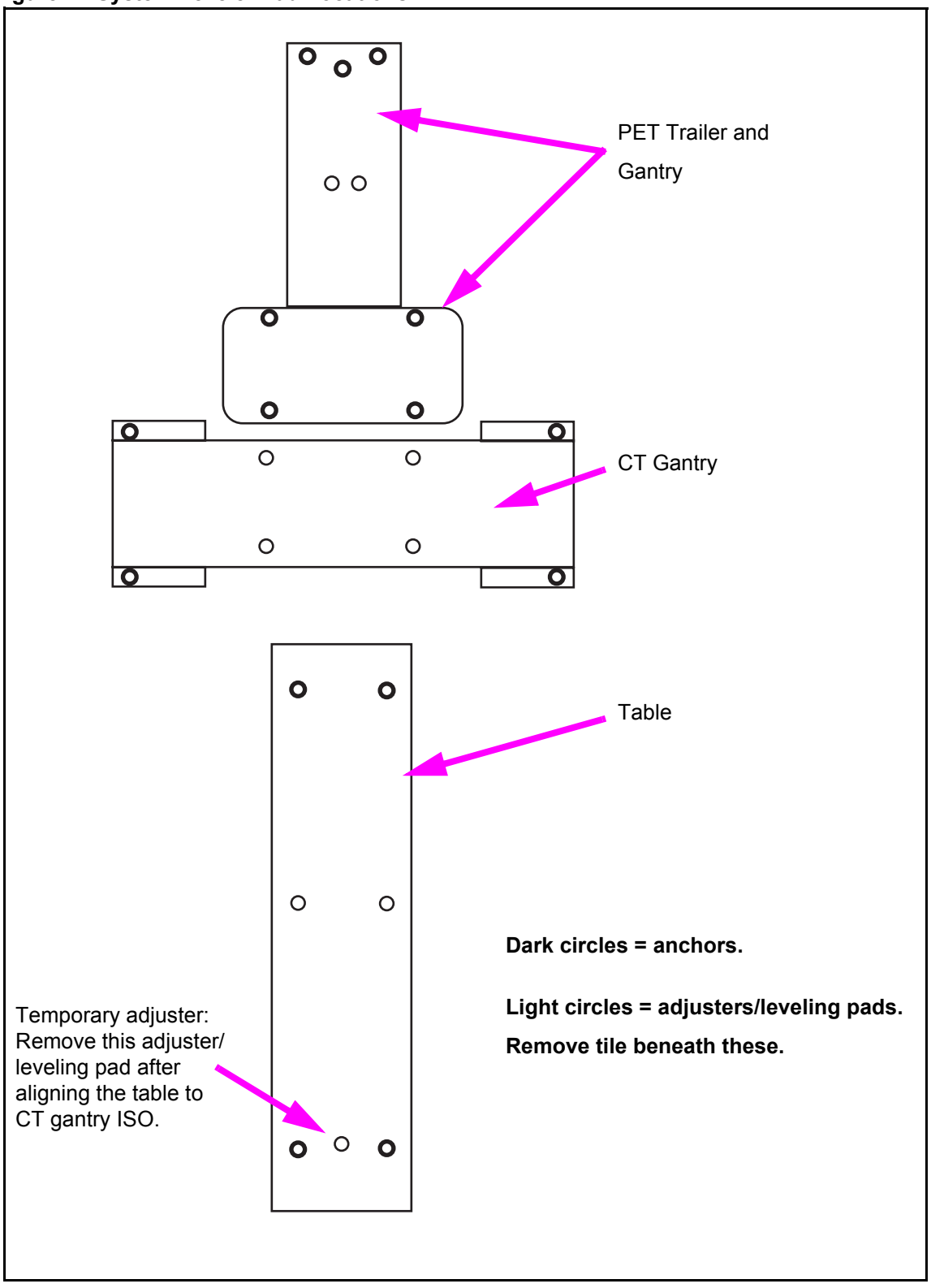
Subsystem	Number of Anchors	Number of Leveling Pads
Table	4	3
CT Gantry	4	4
PET Gantry & Base	7	2

FLOOR LEVELNESS SPECIFICATION

The floor levelness specification is 3 mm over 3048 mm (1/8 in (0.125 in) over 10 ft.). This should be measured on the template over the table/gantry area shown in Figure 2-1. These specifications apply to *any* area within the template area and within the areas illustrated in Figure 4-2 on page 39 and Figure 4-3 on page 44.

The floor must meet levelness specifications to properly align the table and gantry. Minimum gantry height at this specification is 1/2 in. (15 mm) to prevent cable crushing. The table level may not be achieveable if overall floor levelness is greater than the specification.

Figure 2-1System Leveler Pad Locations



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Chapter 3 System Catalog

Section 3-1: Option Catalog Numbers

The following is a list of system options requiring site planning work for the Discovery ST, STE, & RX HP60 system. *For a complete list of system options, contact the local GE Healthcare Sales representative or visit us at http://www.gemedical.com. Refer to the instruction manuals supplied with specific options for respective details.*

Table 3-1: System Installation Options and Kits

Catalog Number	Option Description
Uninterruptible Power Supply P5052PS	Discovery ST, STE, & RX HP60 UPS (Requires GE A1 breaker.)
International Dolly Set CT - B7850LD PET - P5050ZZ	For International customers, if dollies are required.
Remote Color Monitors P5050PZ	Ultra LCD monitor
SmartScore Option B7850KC	EKG Monitor and Recording Device
Performance Network Kits K9000L	6 Node, 10/100 Mbit Auto Sensing
Switched Network Kit B7500PM	ConnectPro Option provides a direct interface to HIS/RIS
Bar Code Reader B7540RB	Discovery ST, STE, & RX HP60 Bar Code Reader

Section 3-2: Base Scanner System

3-2.1 Application

The Discovery ST, STE, & RX HP60 scanner system includes hardware and software to support patient data acquisition and image analysis for whole-body positron emission tomography and computed tomography.

Available gantry options are as follows:

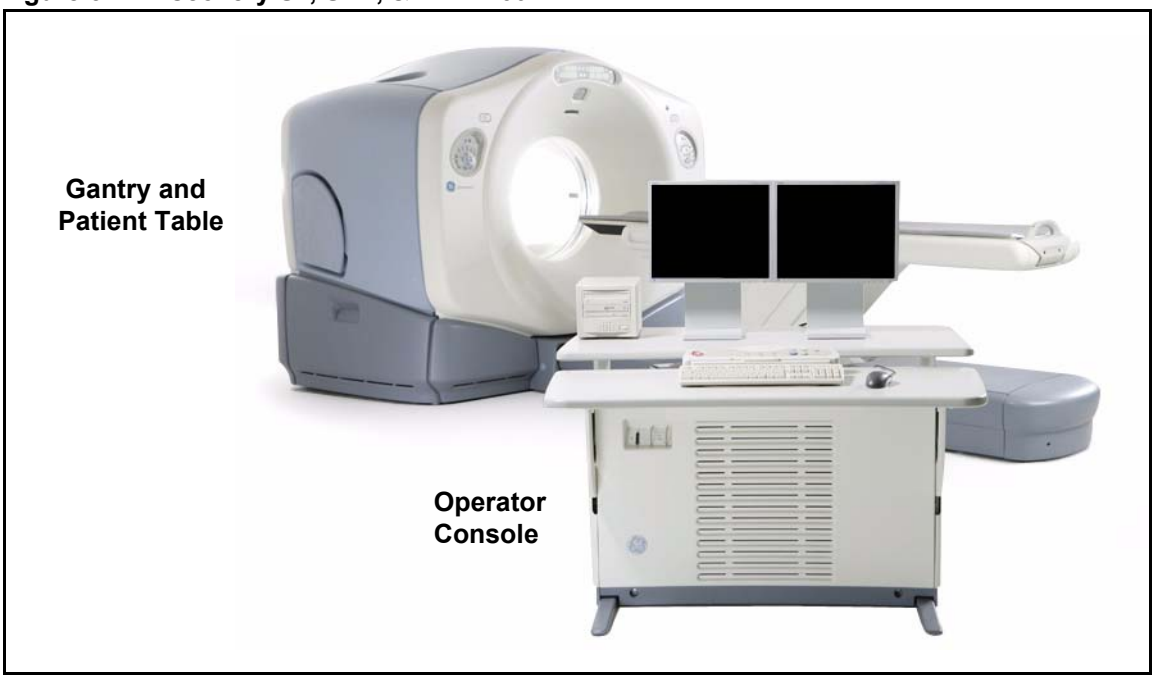
Table 3-2 : Gantry Options

System	Number of Slices
Discovery ST	4, 8, 16
Discovery STE	8, 16
Discovery RX	16

3-2.2 Configuration

Refer to Figure 3-1. The gantry and patient table reside in the scan room. During normal operation, the technologist controls all scan and analysis functions from the operator console located in an adjoining space with a full view of the patient.

Figure 3-1: Discovery ST, STE, & RX HP60



Chapter 4 Room Planning

Section 4-1: Required System Clearances

Consult your local GE Sales and Service Representative about your specific needs.

Some room size dimensions are shown in the table below.

Table 4-1 Room Dimensions

Room	Minimum *	Recommended **
Scan Room Size*** Door Opposite Tube Exchange Side	4140 mm x 7569 mm (13 ft, 7 in x 24 ft, 10 in)	4445 mm x 7569 mm (14 ft, 7 in x 24 ft, 10 in)
Scan Room Size*** Door on Tube Exchange Side	4445 mm x 7239 mm (14 ft, 7 in x 23 ft, 9 in)	44445 mm x 7239 mm (14 ft, 7 in x 23 ft, 9 in)
Control Room Size	2743 mm x 4267 mm (8 ft x 14 ft)	2743 mm x 4420 mm (9 ft x 14 ft 6 in)

* Minimum size of scan room may require a second door at rear of system (or side of system opposite to primary door) for alternate egress.

** Recommended room sizes accommodate potential system upgrades, such as for Discovery VCT.

***See the following Figures for scan room clearance requirements: Figure 4-2, Figure 4-3, Figure 4-6, and Figure 4-7.)

Additional component dimensions are available in Figure 4-9 through Figure 4-12 of this document. Consult your local GE Healthcare Project Manager of Installation for your appropriate room specifications.

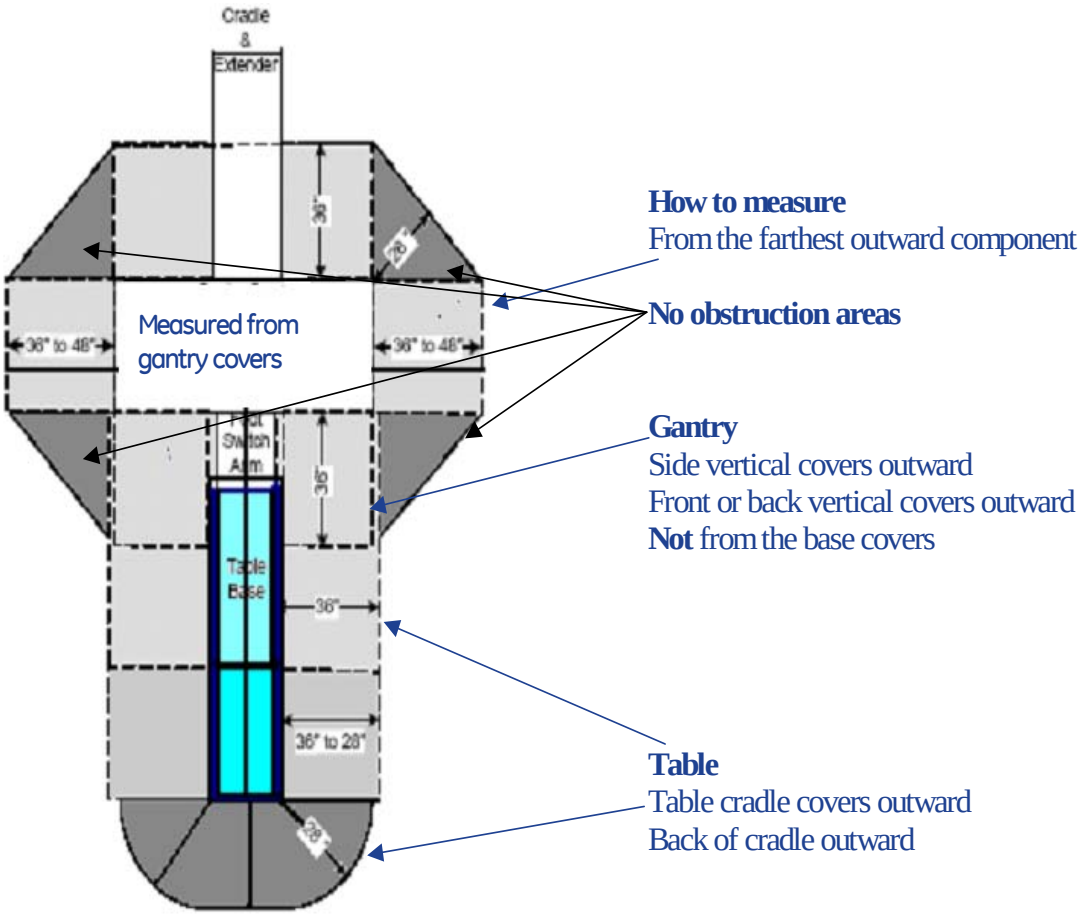
For equipment clearance requirements, refer to Section 4-3:

Note: Regulatory clearances cannot be compromised under any conditions!

- Sufficient regulatory and service clearances must be maintained around equipment for full operation, service and safety.
- Cable length is an important consideration in room layout. The Discovery ST, STE, & RX HP60 is shipped with standard long length cables, with a set of short cables (B7864JB) available as an option. See the electrical page of the GE print for your specific requirements.
- Excess cable may be stored in conduits, a cable storage box, or a floor duct, provided sufficient space is available. Observe the fill rate with each option. If you have questions regarding local electrical or building codes, consult the project electrical contractor or electrician.
- Excess cable length cannot be stored behind the console or PDU. Long cabling must not be cut or shortened. Excess cable may be stored in cable wall or floor duct, provided sufficient space is available. All NEC 70-E Electrical Regulations regarding conduit or duct fill must be observed.

Section 4-2: How to Measure

Figure 4-1: How to measure for clearances


Cradle & Extender
36"
28"
Measured from gantry covers
36" to 48"
36" to 48"
Table Switch Arm
36"
Table Base
36"
36" to 28"
28"
How to measure
From the farthest outward component
No obstruction areas
Gantry
Side vertical covers outward
Front or back vertical covers outward
Not from the base covers
Table
Table cradle covers outward
Back of cradle outward

Section 4-3: Regulatory and Service Clearances

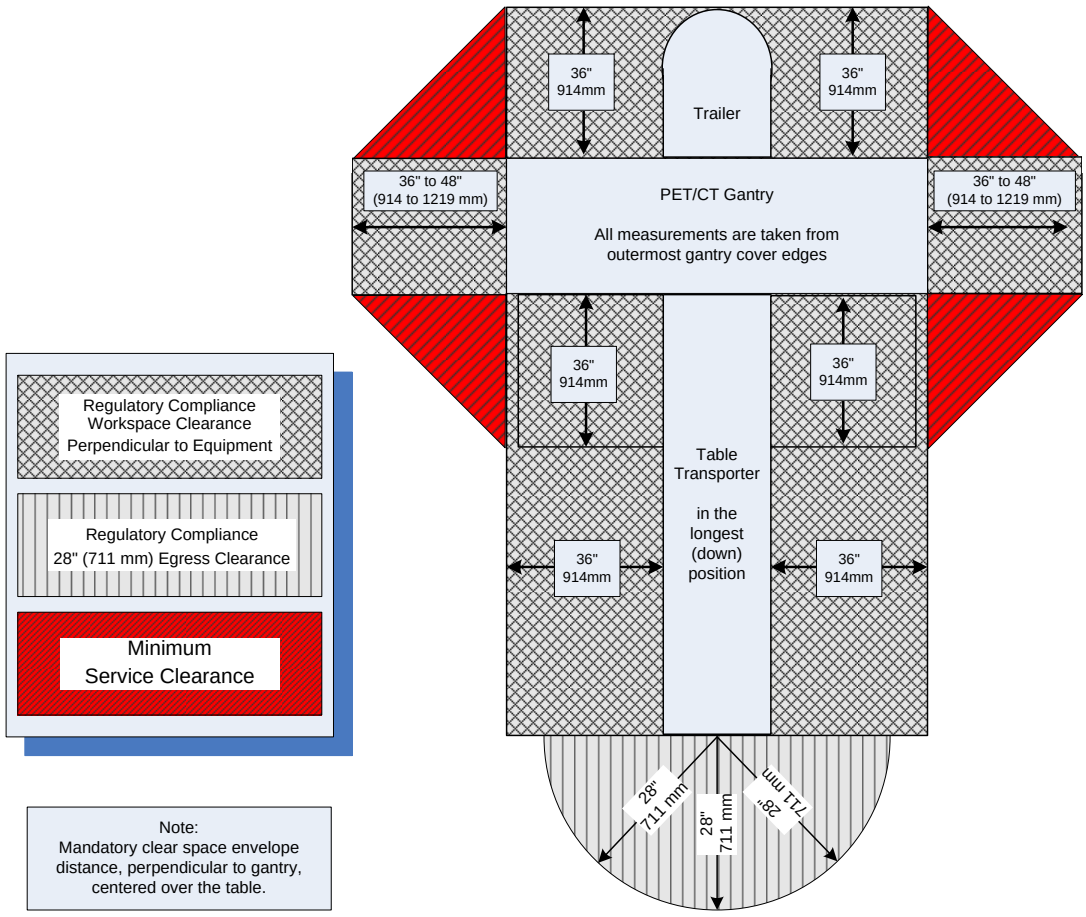
4-3.1 Regulatory Clearances

MINIMUM CLEARANCES UNDER U.S. FEDERAL REGULATIONS AND NATIONAL STANDARDS: 29 CFR 1910 (OSHA), NFPA 70E (STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE), AND NFPA 101 (LIFE SAFETY CODE):

Figure 4-2 is a diagram of clearance requirements for U.S. regulatory compliance. See clearance tables on the following pages for detailed dimensional clearances.

Please note that all systems installed in the United States must comply with all Federal and local regulations. For installations outside the United States, country-specific or other local regulatory clearance requirements must be met.

Figure 4-2 Regulatory Clearance Requirements



Note: See 4-3.3 for Service Clearances, where some minimum requirements are larger than for Regulatory Clearances.

4-3-1.1 Regulated Minimum Working Clearance by Major Subsystem

- Requirements apply to equipment operating at 600 V or less, where examination, adjustment, servicing, or maintenance is likely to be performed while live parts are exposed.
- Direction of Service Access is defined as perpendicular to the surface of the equipment being serviced.
- Required regulatory clearance distances must be maintained and may not be used for storage. This includes normal system operation as well as service inspection or maintenance.

Table 4-2 Console

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access	N/A No exposed live part hazards	

Table 4-3 NGPDU

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of PDU)	914 mm (36 in.) *	*1219 mm (48 in.), if exposed live parts of 151 - 600 volts are present on both sides of workspace with the operator between. *1067 mm (42 in.), if opposite wall is grounded and exposed live parts of 151 - 600 volts are present.
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	This is the width of the working space in front of the equipment. 762 mm (30 in.) or the width of the equipment, whichever is greater
Head Clearance	1981 mm (78 in.)	The height of the workspace measured from floor at the front edge of equipment to ceiling or overhead obstruction(s). 1981 mm (78 in.) or height of equipment, whichever is greater. This applies to all system components.

- For the Gantry and Table, distances are measured from the enclosure, not the finish covers.

Table 4-4 Gantry

Work Space Requirement	Minimum Clear Space in Inches	Additional Conditions
Direction of Service Access (All Sides)	914 mm (36 in.) *	* 1219 mm (48 in.), if exposed live parts of 151 - 600 volts are present on both sides of workspace with the operator between. * 1066.8 mm (42 in.), if opposite wall is grounded and exposed live parts of 151 - 600 volts are present.
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	This is the width of the working space in front of the equipment. 762 mm (30 in.) or the width of the equipment, whichever is greater.

Table 4-5 Table

Work Space Requirement	Minimum Clear Space in Inches	Additional Conditions
Direction of Service Access (Table Head)	N/A	
Direction of Service Access (Table Sides)	914 mm (36 in.) *	
Direction of Service Access (Table Foot)	711 mm (28 in.) *	* 457 mm (18 in.) minimum for Front Gantry Cover removal only if unobstructed egress space of 711 mm (28 in.) is maintained around the equipment for room exit behind the gantry.
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	This is the width of the working space in front of the equipment. 762 mm (30 in.) or the width of the equipment, whichever is greater.

4-3-1.2 Terms and Definitions

EGRESS

The path of exit from within any room. U.S. regulatory recommends a minimum of 28 in. (711 mm) of continuous and unobstructed space including trip hazards along the path of exit.It is the customer's responsibility to provide a means of egress.

WORK SPACE

This is the dimensional box required for safe inspection or service of energized equipment. It consists of depth, width, and height. The depth dimension is measured perpendicular to the direction of access. U.S regulation is minimum of 914 mm (36 in.). Additional conditions can increase the minimum requirement. FCT defines this as the envelope of the component superstructure. For the NGPDU, it is with the front panel removed. For the gantry and table, it is with the patient or external covers removed.

SERVICE ACCESS WIDTH

This is the width of the working space in front of the equipment, a minimum of 762 mm (30 in.) or the width of the equipment whichever is greater.

HEAD CLEARANCE

This is the height dimension of "Work Space." The height of the workspace measured from floor at the front edge of equipment to ceiling or overhead obstruction(s), 1981 mm (78 in.) or height of equipment, whichever is greater.

GROUNDED WALL

Any wall that can be electrically conductive to earth ground. Masonry, concrete, or tile, are considered conductive. Additional commonly-found aspects of a wall should also be considered as grounded. This is not an all-inclusive list:

- Medical gas ports
- Metal door and window frames
- Water sources and metallic sink structures
- Metallic wall-mounted cabinets
- A1 disconnect panel
- Equipment Emergency Off panels
- Industrial equipment such as air conditioners and vents
- Expansion joints

The following are not considered as grounded elements of a common wall:

- Standard wall outlet
- Light switches
- Telephones
- Communication wall jacks

MINIMUM

The lowest limit permitted by law or other authority.

DIMENSIONS AND CLEARANCES

Consisting of, or representing the lowest possible amount of degree for freedom permissible for equipment siting. This relationship must meet all safety, service, and regulatory requirements to be acceptable.

All measurements shall be taken from the cover at the furthest point that extends from the hazard or component. Table measurements shall be taken with the Table in the longest (CT Home) position. Measurement are not taken from the base covers unless that is the location of the hazard.

PRE-INSTALLATION ESCALATION

Process to consult with CT Engineering, the Design Center or EHS regarding pre-installation issues related to your siting concerns.

4-3.2 Additional Regulatory Clearance Information

4-3-2.1 Regulatory Caution

Site prints are required for all system installations including relocation and moves. Room layout, as shown on your site print, shall meet all regulatory requirements as described in the installation manual. Additional room components, such as cabinets, reduce room size. Equipment not shown on the site print may void the caution statement, making the room non-compliant. Actual site measurements before installation will be taken to determine room size and compliance.

4-3-2.2 Egress Clearance

Egress requires a clear, unobstructed route out of the room, either around the back of the gantry or around the back of the table. If your egress route is not around the back of the table, maintain 457 mm (18 in.) of clearance between the back of the table, with a continuous width of 3200 mm (126 in.), 1600 mm (63 in.) on each side of the table center line, on each side to any obstruction so that the front cover can be removed. It is the customer's responsibility to provide a means of egress.

4-3-2.3 Operational Caution

In a minimum room layout, 356 mm - 686 mm (14 in. - 27 in.), consider workflow, access for patient care, and critical-care operations space requirements. Additionally, there may be limited equipment access on the gantry left side when loading patients or when positioning patient equipment in the room between the gantry and the wall. Detailed customer installation tasks are detailed throughout chapters 1-4.

4-3-2.4 Information for Specific Room Configurations

4-3-2-4.1 Minimum Room Size

CT: The CT “minimum room size” configuration as installed does not allow for any future upgrades. It has limited workspace and no in-room millwork, but meets all regulatory requirements. This room is not compatible with two-step future installations.

PET: The PET “minimum room size” configuration as installed allows for some future upgrades. It has limited workspace and no in-room millwork, but meets all regulatory requirements. This room is not compatible with two-step future installations.

4-3-2-4.2 Recommended Room Size

The “recommended room size” configuration offers the most flexibility for future upgrades. It has sufficient workspace and space to add millwork, while meeting all regulatory requirements. This room is compatible with most two-step future installations. For CT upgrades to CT-PET, refer to section 4-3-2-4.3.

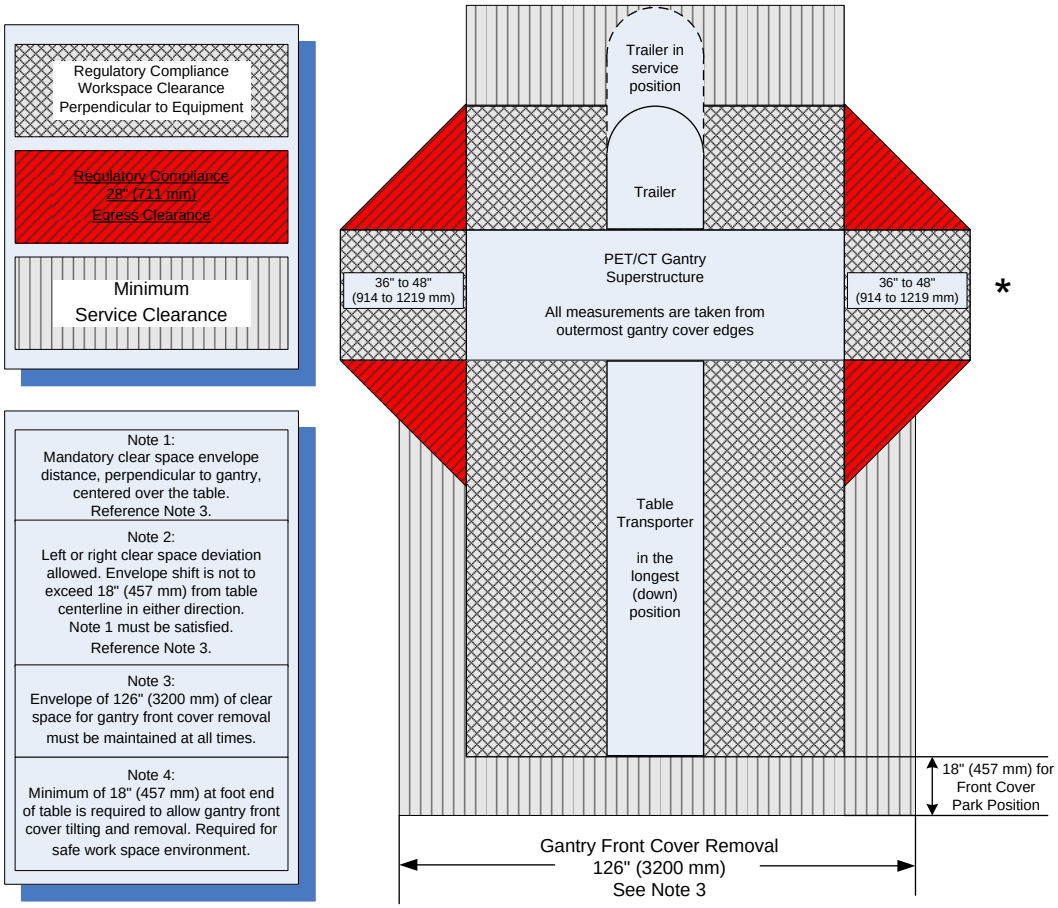
4-3-2-4.3 Room Size for PET Upgrades

To complete a future upgrade from CT to PET, you need to meet the requirements, including room size, to support the CT-PET configuration. To upgrade to Discovery ST, STE, & RX HP60 or Discovery VCT, you need a room size 8382 mm x 4420 mm (27 ft. 6 in. x 14 ft 6 in.), which, depending on the layout, allows space to add millwork while meeting all regulatory requirements. This room would be compatible with most PET two-step future installations. Detailed site prints are required for all upgrades.

4-3.3 Service Clearances

Servicing of the Discovery ST, STE, & RX HP60 system can be safely performed within the regulatory envelopes defined in Section 4-3.1, Regulatory Clearances, however sufficient space must be maintained to remove the covers from the system. To achieve this clearance for the gantry, clear space must be available to maneuver the gantry covers mounted on the service dollies. One service engineer can accomplish this.

Figure 4-3: Service Clearance



* To install the PET Gantry, 42 in.-48 in. (1067 mm-1219 mm) is preferred on the right side of the PET/CT Gantry.

* The PET Gantry is 48 in.(1219 mm) wide on dollies. If sufficient space is available behind the CT Gantry to store the PET Gantry during CT installation, the 36 in. (914 mm) dimension can be used. Otherwise, allow 48 in. (1219 mm) for the PET Gantry to be moved on dollies past the CT Gantry.

4-3.4 Service Clearances for Single Service Engineer

- Gantry front cover removal requires the use of the “Tilting Cover Dollies.” These dollies allow the Service Engineer to separate the cover from the gantry, tilt the cover 90 degrees, roll the cover to the foot end of the table, and then tilt the cover an additional 90 degrees such that the front cover is now upside-down relative to the normal system mounted condition. Figure 4-3 illustrates the minimum clear space required to achieve this operation. The gantry front cover must be removed to a position that satisfies the minimum regulatory clearances.
- The gantry rear cover, with service dollies installed, requires a width 2388 mm (94 in.) and a depth of 584 mm (23 in.) of clearance for removal as shown in Section 4-8:, Figure 4-4. Sufficient space must be calculated to move the cover either straight back or to a side of the table to satisfy the minimum regulatory clearance shown in Figure 4-3. This means the rear cover cannot violate the workspace on the rear or either side of the gantry.
- If gantry service requires both the front and rear covers be removed, then these covers must be positioned within the room in such a manner as to not violate the regulatory clearances on any side of the gantry. This may necessitate removing the covers from within the suite. This should be discussed with the customer and provisions made to accommodate this potential event.
- A single Service Engineer can safely perform servicing of the table. Sufficient clear space must be available to maintain regulatory clearances when the table covers or cradle are removed.\
- In your room layout design, service shall have a clear and unobstructed access to the gantry tube change area for all major component replacements. This clearance can be different depending on the location of the door to the scan room, in relation to the layout of the scanner. These components must be able to reach the service area by one service engineer, without lifting or rigging. Major components include:
  - CT X-ray tube in crate
  - High voltage tank(s) in crate
  - Slipring in crate
  - Detector assembly
- Be aware of cabinet placement and how surface floor ducts are used in room configurations.

4-3.5 Power Distribution Unit (NGPDU) Service Clearance

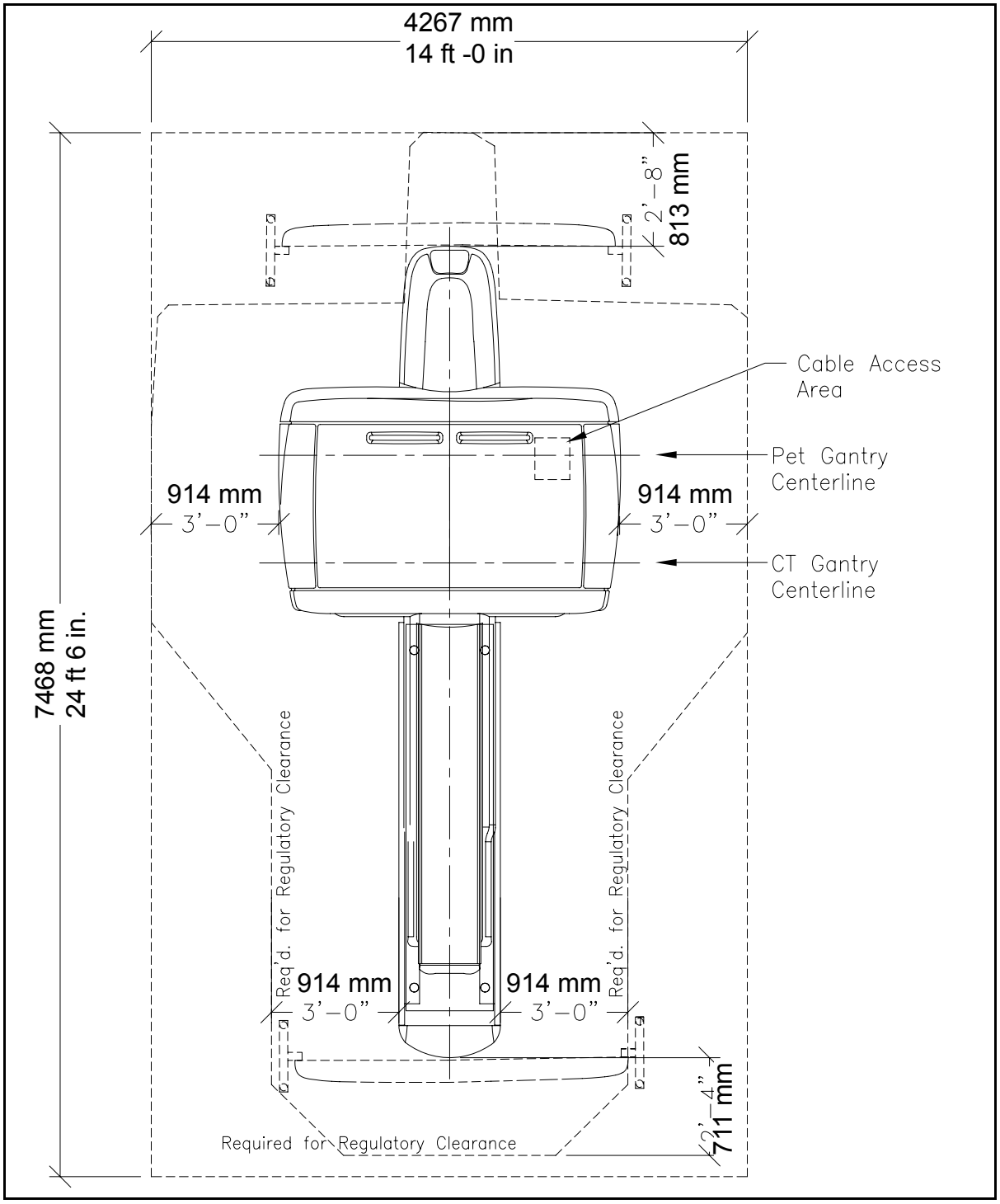
Positioning of this component must be considered for regulatory compliance as defined in Section 4-3.1, Regulatory Clearances.

4-3.6 Console Service Clearance

The console does not present an exposed live parts hazard. However, a minimum working space depth of 1219.2 mm (48 in.) and full width of the console must be maintained at all times for service activity. Additionally, sufficient space needs to be provided for repositioning of the console and side clearance for rear service access. Egress, as well as other service requirements, must be considered when siting the console. See Figure 4-8 for a typical control room layout.

Section 4-4: System Clearances

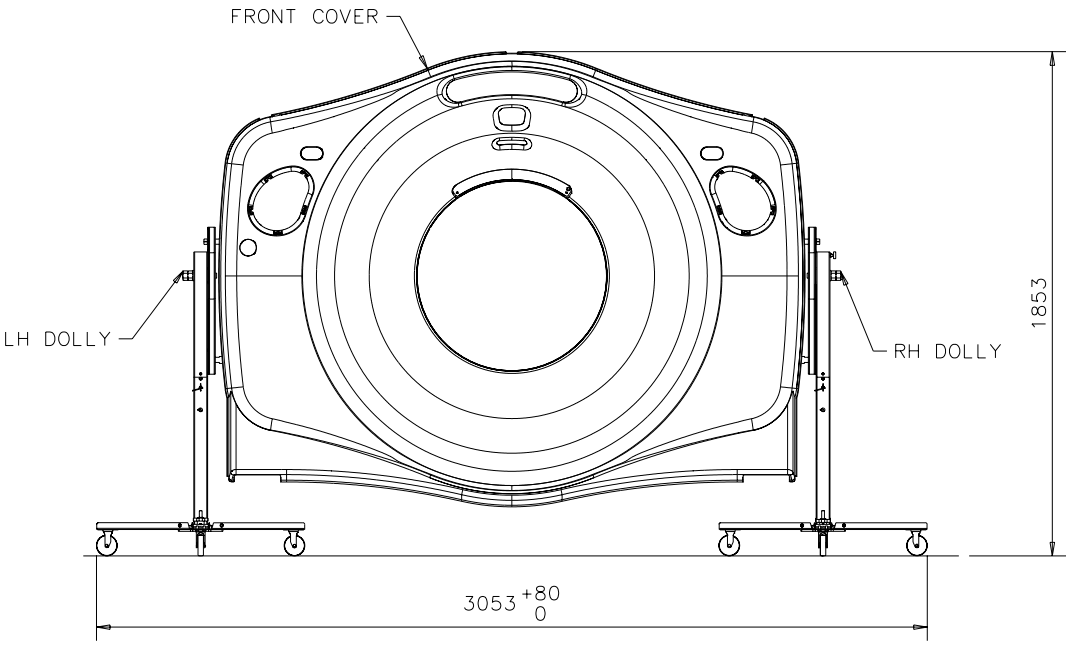
Figure 4-4: Minimum Discovery ST, STE, & RX HP60 Clearances



Note: All regulatory clearances shall be present and maintained at all times. Individual site escalations must be processed before final prints are issued.

Note: Figure 4-4 shows minimum sizes only, with no allowance for space to move the PET Gantry past the CT Gantry and no allowance for the following in Regulatory areas: surface raceway, grounded walls, electrical panels.

Figure 4-5: Gantry Front Cover with Service Dolly Dimensions



Note: Your system's covers may differ in shape.

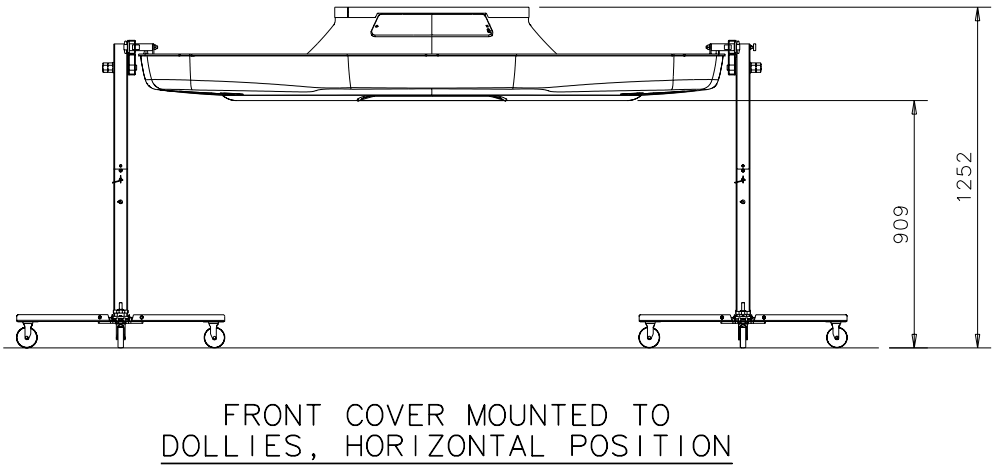


Table 4-6 Dimensions of Accessories

DESCRIPTION	WIDTH		DEPTH		HEIGHT	
	mm	inch	mm	inch	mm	inch
Remote Color Monitor (LCD)	413	16.25	203	8	406	16
Color printer	584	23	457	18	178	7

Section 4-5: Recommended Layouts

NOTICE **The illustrations in this section contain typical room layouts that maximize the use of space while accommodating minimum traffic and regulatory clearance requirements. Please contact the local GE Healthcare representative to discuss any unique facility conditions and requirements.**

Figure 4-6 shows minimum dimensions for a Discovery ST, STE, & RX HP60 scan suite floor plan, and Figure 4-2 shows the minimum regulatory clearances around the gantry and patient table. Section 4-8: contains dimensions for individual components.

Note: Regulatory clearances cannot be compromised under any conditions! The path of exit from within any room. U.S. regulatory recommends a minimum of 28 in. (711 mm) of continuous and unobstructed space including trip hazards along the path of exit.It is the customer's responsibility to provide a means of egress.

Note: **Other room arrangements are possible.** Cable length is an important consideration in room layout. The system ships with a long cable set (2346968 cable collector). A set of shorter cables is available, if needed, as PN 2346968-2. Refer to Section 8-3: Interconnect Runs, Wiring and Cables on page 107.

Figure 4-6: Minimum Dimensions for Room Layout with the door on the opposite side of the tube exchange side of the room.

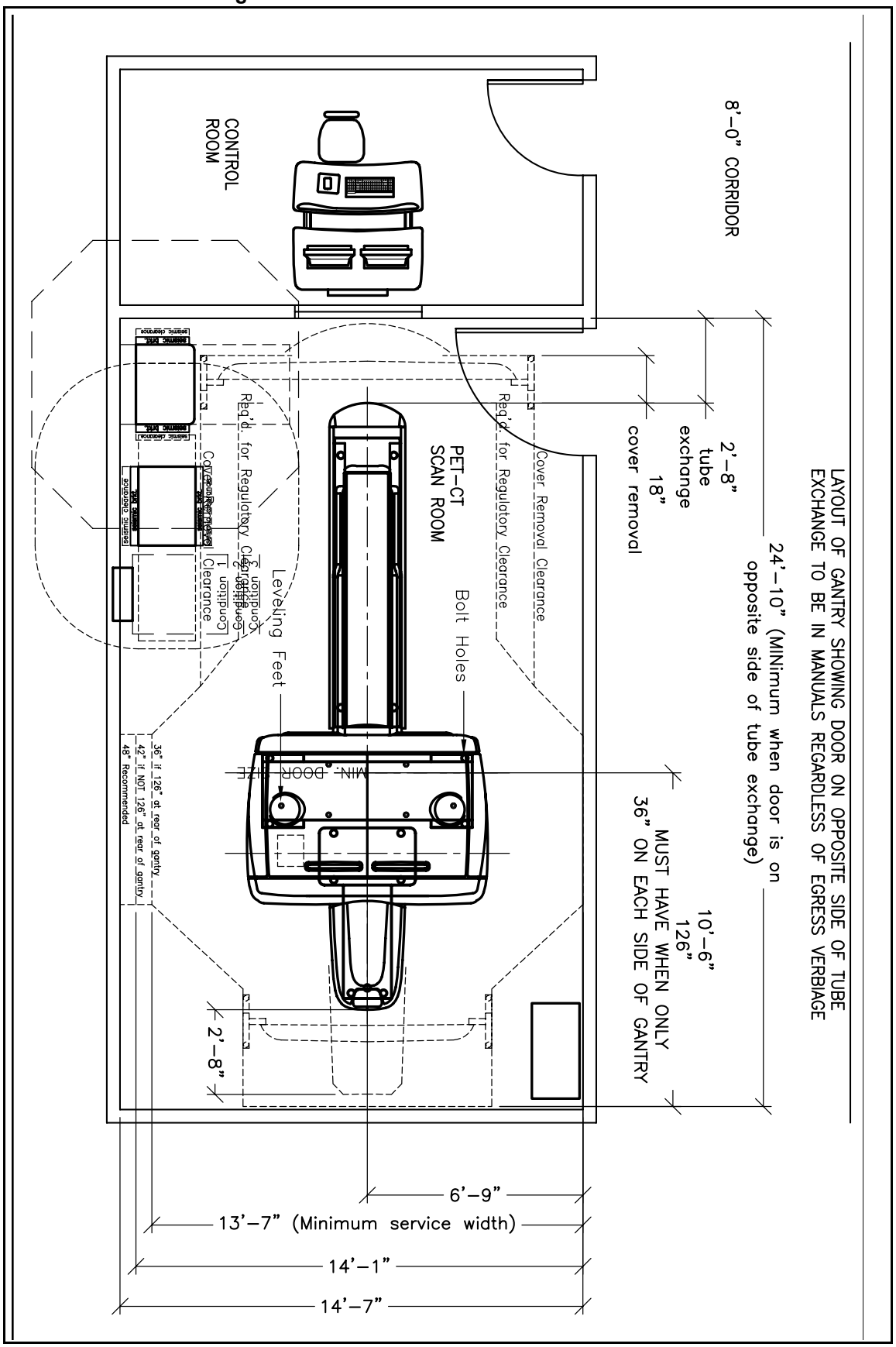
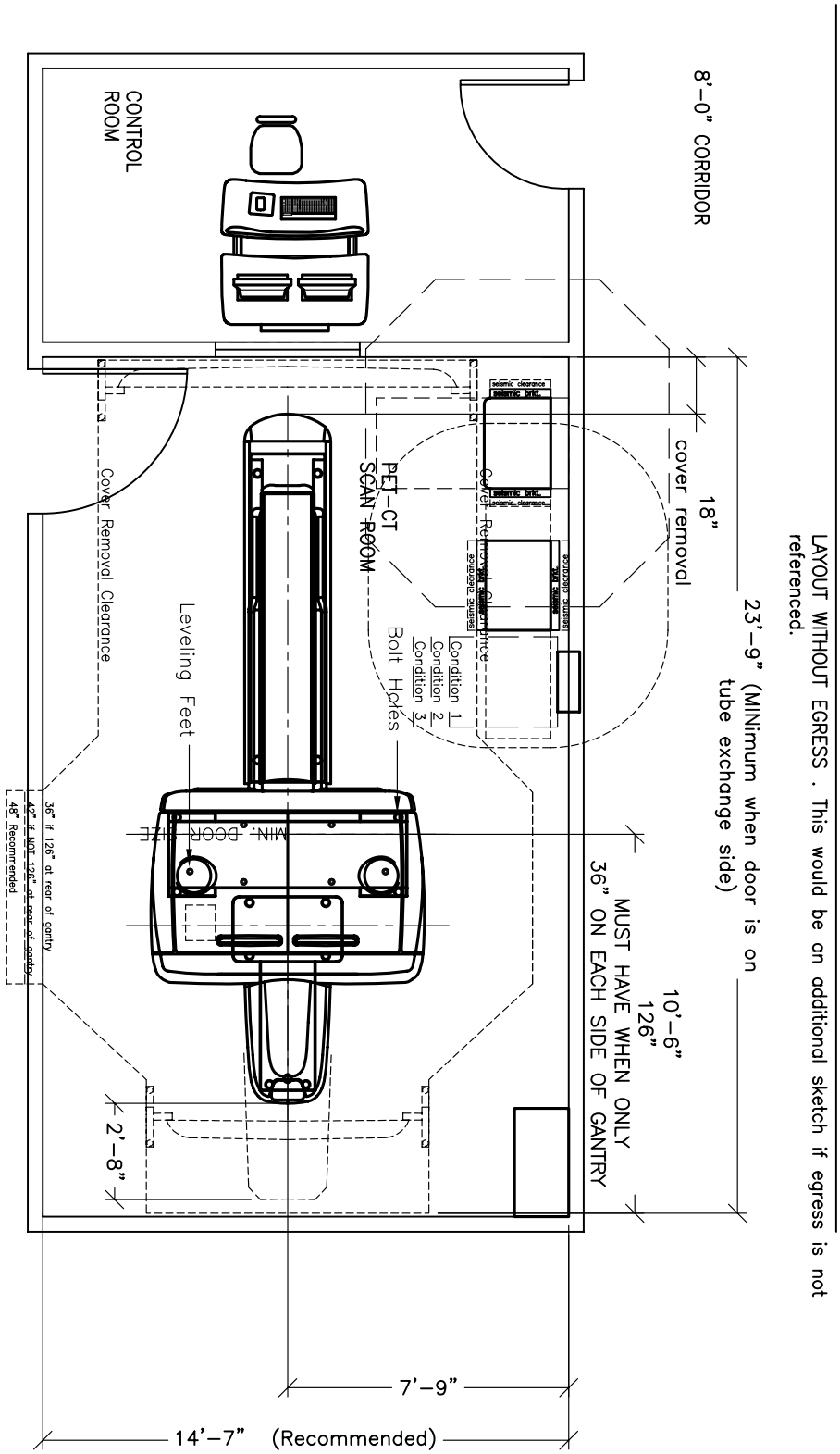


Figure 4-7: Minimum Dimensions for Room Layout with the door on the tube exchange side of the room



Note: Figure 4-6 and Figure 4-7 show one suggested suite layout. Consult regulatory requirements in your region for local requirements and layouts.

Section 4-6: Common Dimensions and Clearances

4-6.1 Minimum Room Dimensions

- Scan room
  - Door Opposite side of the tube exchange: 4140 mm x 7518 mm (13 ft, 7 in x 24 ft, 8 in)
  - Door on Same side of tube exchange: 4445 mm x 7239 mm (14 ft, 7 in x 23 ft, 9 in)
- Control room: 2743 mm X 4267 mm (8 ft X 14 ft)

Ask the local GE Healthcare Project Manager of Installation to provide a copy of the site-specific room layout with dimensions.

4-6.2 System Clearances During Normal Operation

- Finished ceiling to floor: 2743 mm (96 in.)
- Back of console to wall: 152 mm (6 in.)
- Back of console host cabinet to wall: 152 mm (6 in.)
- Back of PDU to wall: 152 mm (6 in.)

4-6.3 Ceiling Pedestal Mount

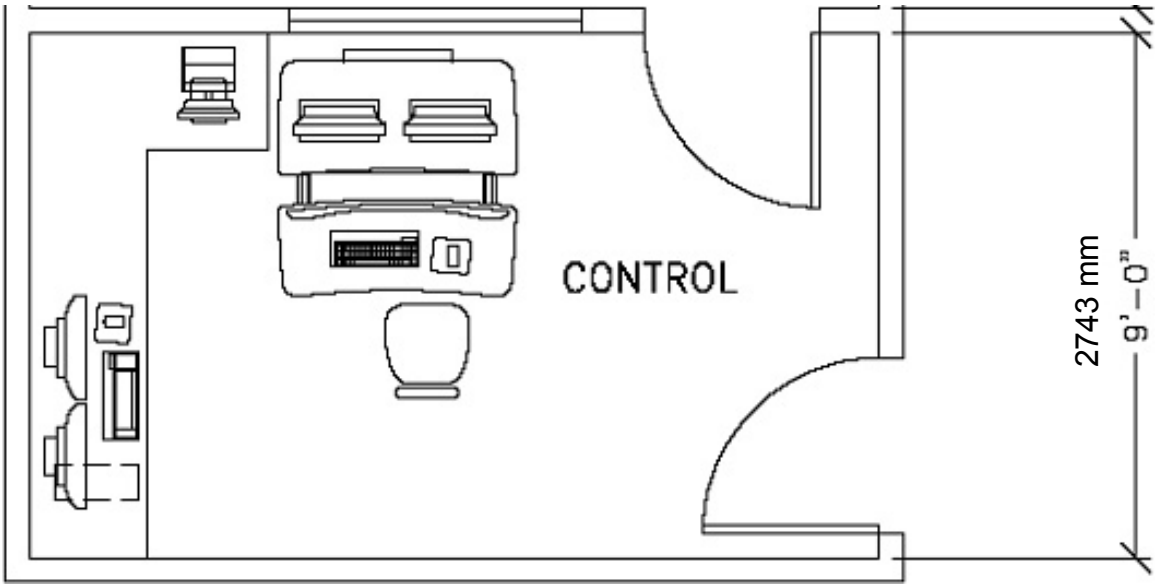
- Minimum acceptable distance for ceiling pedestal mount lowest point to floor injector or monitor: 2438 mm (96 in.)
- Recommended distance for ceiling pedestal mount lowest point to floor injector or monitor: 2743 mm (108 in.)

Note: Refer to Ceiling Heights on page 59.

Section 4-7: Recommended Layouts

4-7.1 Control Room Considerations

Figure 4-8: Typical Control Room Layout



- The control room must provide a suitable operating environment for the console electronic and operator working comfort.
- The console cannot be dismantled or have components removed or rearranged in configurations other than as shipped.
- A suitable work area, which is within reach of the operator's console, should be provided for placement of the injector control. The technologist should have full view of the patient while using the injector. Injector controls differ in dimensions depending on the brand selected.
- A PACS, workstation, image printer, or filming device are often placed in the console control room area, and sometimes may be directly linked to the console.
- Additional components, although linked via network or Ethernet cable, are not powered from the console.
- Additional room power and network connection should be considered when reviewing the console work space.

4-7.2 Storage Cabinet and Equipment

A storage cabinet is provided by GE Healthcare to store all supplied service equipment. (See Table 4-7 for equipment list.) This storage cabinet should be located in the scan room suite area for easy service access.

Table 4-7 Storage Cabinet and Equipment

Item	Size	Weight (total)
Storage Cabinet	46 cm x 91 cm x 107 cm (18 in D x 36 in W x 42 in H)	27.2 kg (60 lb) (approximately)
QA Phantom (water filled)	20 cm x 15 cm (7.9 in x 5.9 in)	5.4 kg (12 lb)
20CM Phantom	20 cm x 7 cm (7.9 in x 2.7 in)	5.9 kg (13 lb)
48CM Phantom	48 cm x 7 cm (19 in x 2.7 in)	11.3 kg (25 lb)
Phantom Holder	25 cm x 25 cm (9.8 in x 9.8 in)	3.6 kg (8 lb)
FE Box (Purple)	30 cm x 38 cm x 30 cm (11.8 in x 15 in x 11.8 in)	6.8 kg (15 lb)
Install Support Kit (box)	30 cm x 30 cm x 38 cm (11.8 in x 11.8 in x 15 in)	9 kg (20 lb)
Tube Hoist Kit	77 cm x 8 cm and 38 cm x 15 cm (30.3 in x 3.1 in and 15 in x 5.9 in)	9 kg (20 lb)
Balance Weight Kit	(box)	13.6 kg (30 lb)

Table 4-8 Gantry Cover Dollies

Item	Size	Weight (total)
Rear Cover Dollies (Hang behind cabinet)	158 cm x 82 cm (62.2 in x 32.3 in	11.3 kg (25 lb)
Front Cover Dollies (Store in power room, when available)	85 cm x 20 cm and 85 cm x 15 cm (33.5 in x 7.9 in and 33.5 in x 5.9 in)	15.9 kg (35 lb)

4-7.3 Advantage Workstation (AW)

Refer to Pre-Installation Manual 2111833 and Installation/Service Manual 2111831. For document access, please refer to GE Healthcare's Common Documentation Library web site.

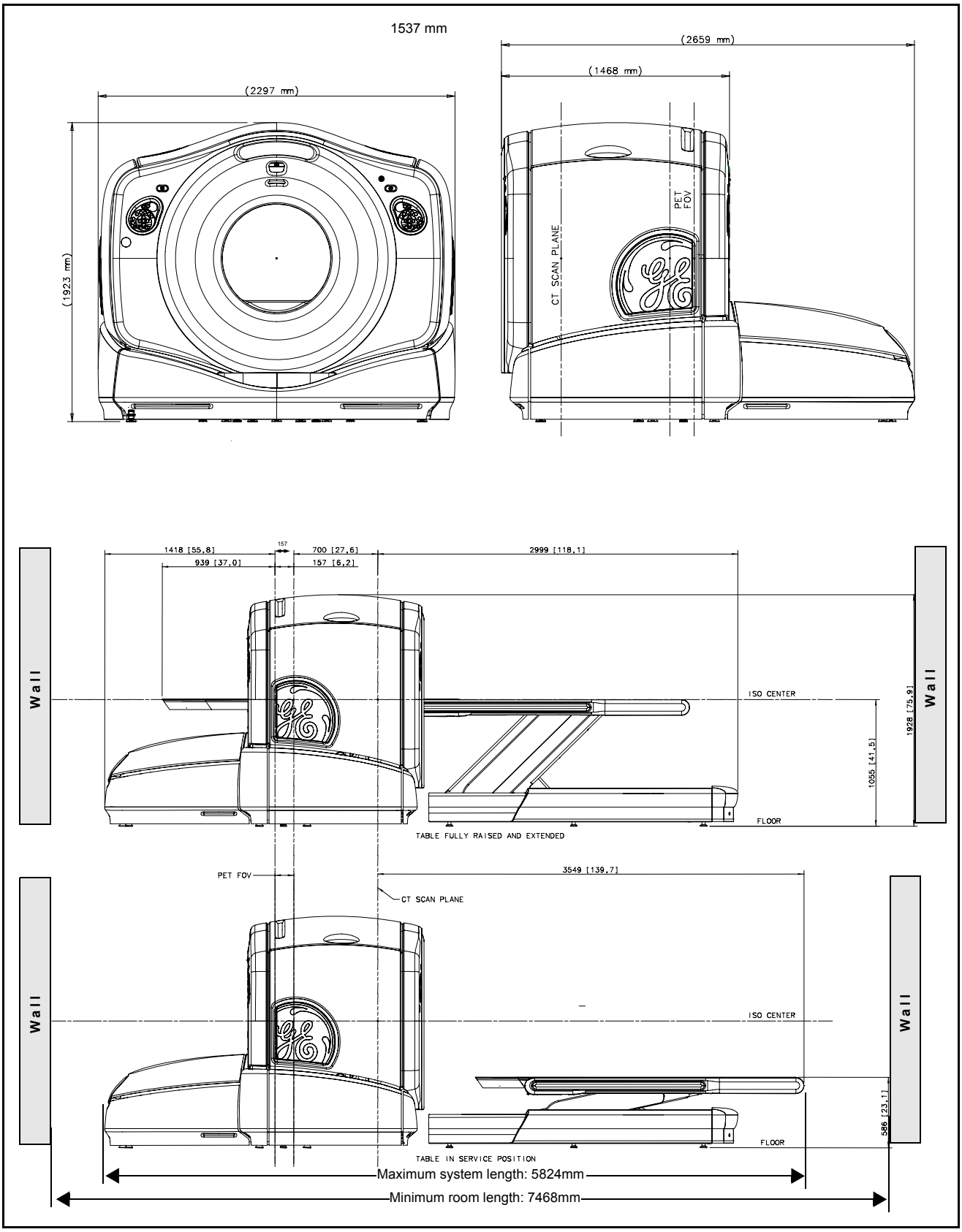
Section 4-8: Primary Component Dimensions

Table 4-9 : Discovery ST, STE, & RX HP60 Subsystem Dimensions

Description	Model/Catalog Number	Width		Depth		Height	
		mm	Inch	mm	Inch	mm	Inch
PET-CT Gantry (overall)	S9116LE S9118LE S9116LR S9114LF	2334	91.9	2703	106.4	1953	76.9
Table (at max elevation; 25mm below Discovery ST, STE, & RX HP60 Gantry ISO center)	P5051PT	686	27	2591	102	1080	42.5
Power Distribution Unit (PDU)	P5051RD	762	30	559	22	1270	50
Operator's Console	P5016JD	1219	48	991	39	851	33.5
LCD Color Monitors (2)	P5050PZ	413	16.25	203	8	406	16
UPS	P5052PS	559	22	864	34	940	37
A1 Disconnect	P5051RJ (90A) P5051RK (110A)	Not Applicable					

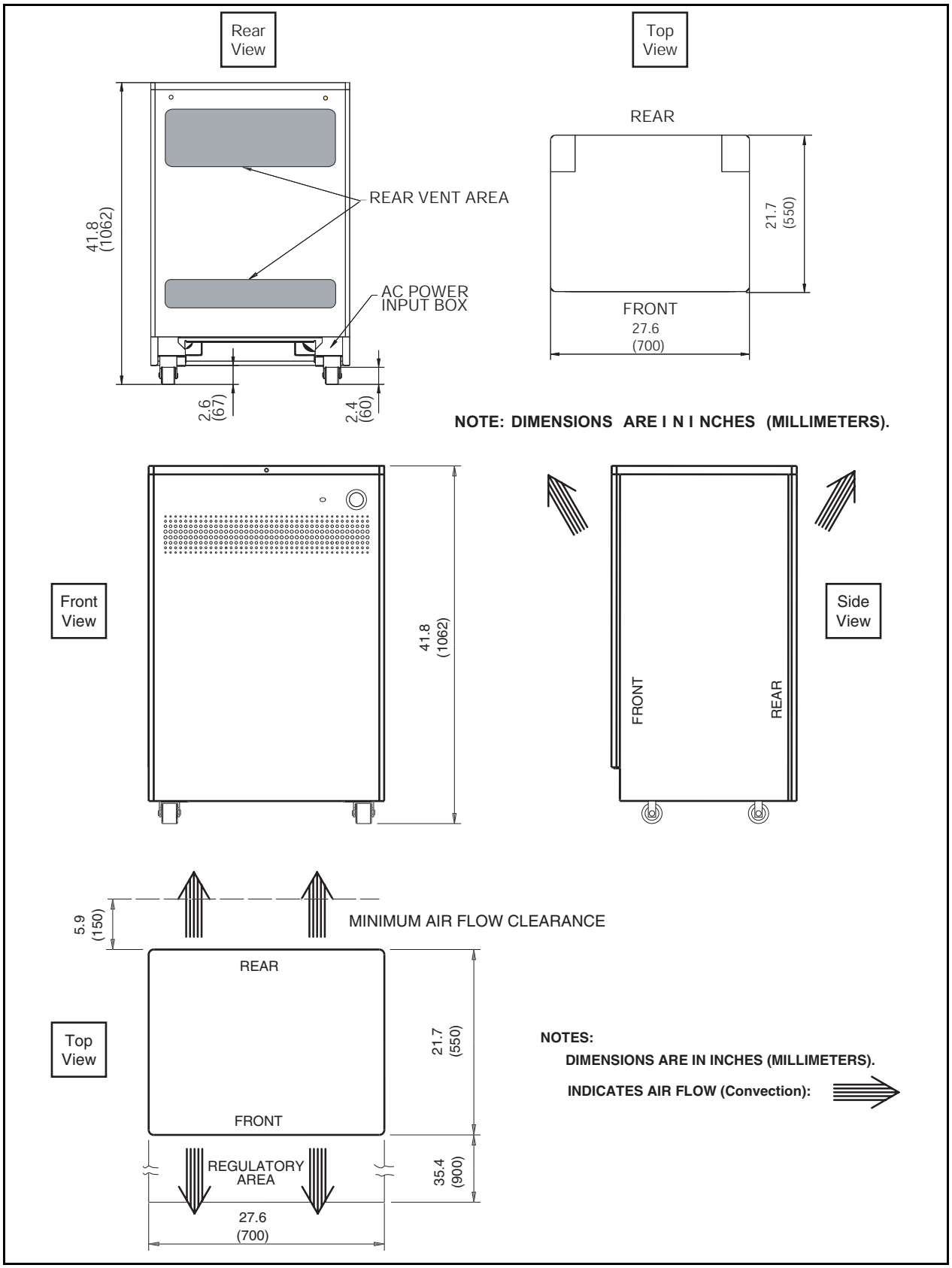
4-8.1 Gantry and Patient Table

Figure 4-9: Gantry and Patient Table Dimensions



4-8.2 Power Distribution Unit

Figure 4-10:Power Distribution Unit (PDU) Dimensions

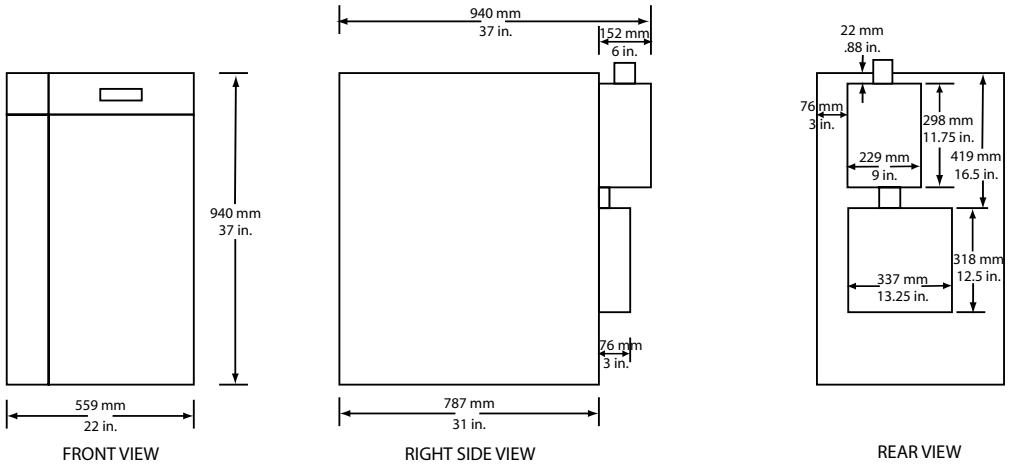


4-8.3 Uninterruptible Power Supply

The Powerware 9330 UPS has been selected for use with the Discovery ST, STE, & RX HP60 scanner. For more information on this product, see the manufacturer's web site at http://www.powerware.com.

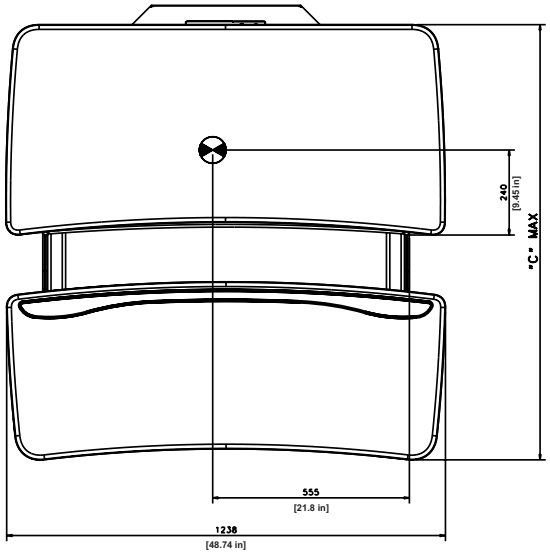
Figure 4-11:Powerware 9330G-14B UPS Dimensions

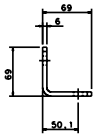
Powerware 9330G-14B

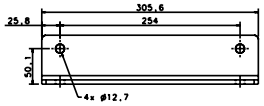


4-8.4 Operator's Console

Figure 4-12:GRE Operator Console Dimensions

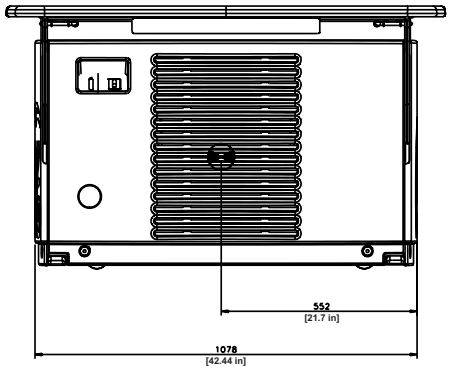


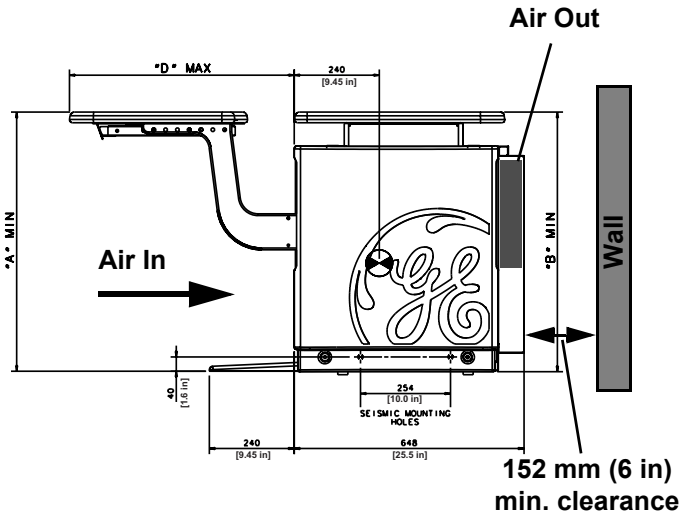




Dim	Min (mm, in.)	Max (mm, in.)
A	680, 26.8	883, 34.8
B	680, 26.8	807, 31.8
C	1020, 40	1228, 48.3
D	426, 16.8	634, 25

SEISMIC BRACKET
SUPPLIED WITH CONSOLE
ATTACH SEISMIC BRACKETS TO SIDES OF CONSOLE FRAME USING M10 BOLTS, SPLIT RING LOCKWASHERS AND FLAT WASHERS
ATTACH ASSEMBLED UNIT TO FLOOR USING HILTI HSL-TZ M12 x 200





NEC MultiSync LCD1860NX

Section 4-9: Structural Requirements

4-9.1 Ceiling Heights

- Minimum acceptable ceiling height: 2438.5 mm (96 in.)
- Recommended ceiling height: 2743 mm (108 in.)

Note: Refer to Ceiling Pedestal Mount on page 51.

4-9.2 Gantry and Patient Table Mounting Requirements

WARNING POTENTIAL FOR PATIENT INJURY! Improperly-secured table may tip, dislodging patient.

Proper anchoring is key to maintaining patient safety during system operation.

NOTICE **It is the purchaser's responsibility to provide an approved support structure and mounting/ method for all floor types other than those listed. GE Healthcare is not responsible for any failure of the support structure or method of anchoring, including seismic requirements. GE Healthcare is not responsible for methods other than those listed.**

Table and gantry mounting dimensions are shown in Figure 4-9, on page 55. Refer to Chapter 6 for additional details of floor loading, component weights, and gantry and table installation and anchoring.

Anchor gantry and table to floor by a means that will maintain their relative alignment and meet applicable building and other local codes, including seismic structural mounting requirements.

Floor structure must be capable of withstanding the occupied weight of table and gantry, and the individual contact area loading of these components. Refer to Table 4-10 for each of the three (3) major components of the Discovery ST, STE, & RX HP60 system.

Support areas of the patient table and gantry must rest on solid concrete, not resilient tile or carpeting as these will slowly yield over a period of time and disturb alignment of table to gantry. Factors that could cause misalignment between gantry and table due to floor sag should be considered. The cradle can carry a 204 kilogram (450 lb) patient. Center of gravity changes as cradle cantilevers. Take into consideration all other moving weights such as gurneys or personal equipment. Refer to Chapter 6 for gantry and table mounting details.

Table 4-10 : Floor Loading Specifications

Component	Floor Loading Kgf/sq meter (lbf/sq ft)	Effective floor Load Area * Sq meters (sq feet)	Maximum Foot Pad Pressure ** MPa (psi)
CT Gantry	1185 (243)	1.34 (14.4)	1.5 (212)
PET Gantry	6180 (1266)	0.34 (3.7) ***	1.9 (280)
Table (1.7 meter)	832 (170)	1.10 (11.8)	1.53 (222)

* Area bounded by outermost footpads (not stabilizers).

** Assumed floor pad area of 2660 sq mm (4.123 sq in.)

*** Area bounded by four (4) front foot pads while gantry is in operating position.

4-9.3 Flooring

4-9-3.1 Minimum Floor Thickness

For any installation on a floor with a rating less than the values listed in Table 4-10, consult a structural engineering specialist to determine any necessary enhancements.

Support areas of the patient table and gantry must rest on at least 127 mm (5 in.) of solid concrete, not resilient tile or carpeting which will slowly yield over a period of time and disturb alignment of table to gantry.

Factors that could cause misalignment between gantry and table due to floor sag should be considered. The cradle can carry a 204 kilogram (450 lb) patient. Center of gravity changes as the cradle cantilevers.

Take into consideration all other moving weights such as gurneys or personal equipment. Refer to Chapter 6 for gantry and table mounting details.

4-9-3.2 Floor Anchors

A qualified person must verify that the site and method of anchoring are adequate to support loads and maintain table-to-gantry alignment.

Location of supporting beams and columns may dictate position of table-to-gantry assembly. Use of flush floor duct or conduit in the floor may significantly affect floor strength. The method and placement of anchoring through bolts must not reduce the structural strength of floor.

The floor anchors provided in the installation kit are designed to be used *only* on concrete floors that meet the 127 mm (5 in.) concrete floor requirements. All other anchoring methods and/or use on floor types other than the 127 mm (5 in.) concrete minimum must be verified by the customer's engineering contractor, at the customer's expense, indicating that the anchors they chose meet the stated GE minimum load requirements. The customer's contractor is responsible for the installation of all anchors other than those shipped with the system or any anchors to be installed in non-approved flooring.

4-9-3.3 Non-Concrete Floors

If installing the Discovery ST, STE, & RX HP60 system on a type of floor that fails to meet the 127 mm (5 in.) concrete floor requirements, the customer, at their expense, shall provide acceptable anchoring and mounting methods that meet all the structural requirements listed in Structural Requirements on page 59 of this Site Planning Guide.

4-9-3.4 Floor Strength

Concrete floors must have a minimum strength of f'c = 2000 psi (1.4 X 10^7 MPa) at 28 days for mounting floor anchors. It is the responsibility of each customer to have appropriate tests performed to determine and measure concrete strength. The GE Healthcare Service representative can assist.

Consult GE Healthcare Installation Support Services for further details.

4-9-3.5 Floor Levelness

The Discovery ST, STE, & RX HP60 Scan Room floor levelness requirement is important for accurate patient positioning. Floor levelness specification in the Scan Room is 3 mm over 3028 mm (1/8 in. (0.125 in.) over 10 ft.) between depression and high spots over any 3048 mm (120 in.) distance within the area of the gantry and the area around the table. (Refer to Figure 4-4 or Figure 4-6.)

No part of floor surface within the table and gantry, nor the two interface areas between the table and gantry, should be higher than the support area for table and gantry.

4-9-3.6 Floor Vibration

The Discovery ST, STE, & RX HP60 equipment may be sensitive to vibration in the frequency range of 0.5 to 20 Hz depending on the amplitude of the vibration. It is the customer's responsibility to contract a vibration consultant or qualified engineer to implement design modifications to meet the specific limits, However, it is ultimately the customer/architect/engineer responsibility to design the site solution.

4-9-3-6.1 Steady State Vibration

The maximum steady state vibration transmitted through the floor should not exceed 10^{-3} m/s^2 rms maximum single frequency above ambient baseline from 0.5 to 80 Hz (measured in any 1 hour during a normal operating period).

4-9-3-6.2 Transient Vibration

The behavioral characteristics must be such that any measurable transient disturbance must also be minimized to less than 0.01 m/s^2 peak-to-peak.

4-9-3.7 Finished Floor Requirements

Installation requires a finished floor in the scan and control rooms. The scan room must be level by 6 mm (1/4 in) over the table and gantry area to be acceptable. You cannot use shims to level the floor. 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.

FINISHED FLOOR EXCEPTION 1

For sites replacing their scan room floor covering after the table and gantry are installed, the floor can be clean-finished with dust-free concrete. The finish floor in the scan room requires no dust-producing operations when applying final floor covering.

FINISHED FLOOR EXCEPTION 2

Facilities under new construction that have a finished radiology area with a single controlled-access and dust abatement barrier, can have a finished concrete floor in the scan room. The finished concrete floor in the scan room requires no dust-producing operations when applying final floor covering.

4-9-3-7.1 Equipment Location

To minimize the interference, the Discovery ST, STE, & RX HP60 equipment should be placed on a solid floor, located as far as possible from the following vibration sources:

- Parking lots
- Roadways
- Subways
- Trains
- Hallways
- Elevators
- Heliports
- Hospital power plants containing pumps, motors, air handling equipment and air conditioning units

4-9.4 Walls

4-9-4.1 Scan Window

⚠

NOTICE **The operator must be able to observe the patient from the Operator Console during normal system operation.**

Refer to Figure 4-6. The recommended patient viewing window dimensions are 1219 mm wide x 1067 mm high (48 in. wide by 42 in. high). The location of the window depends upon the location and orientation of the Operator Console and workspace.

4-9-4.2 Finished Walls Requirements

Finished walls inside the scan and control rooms must be painted at the time of installation. This requirement applies to all installation types.

A finished walls exception is made for the following condition:

In new construction and upgraded facilities, a primer coat of paint is acceptable for equipment installation. However, the final coat of paint must be applied using a brush of some type (e.g. roller or bristle). The final coat of paint cannot be applied using a spray method.

Section 4-10: Network Connections

The Discovery ST, STE, & RX HP60 system connects to the network through the operator console. A patch cable connects the console to a wall box. The system requires an IP address for the PET-CT operator console.

Broadband is considered the standard network connection for Discovery ST, STE, & RX HP60. (A dial-up modem is optional.) Broadband connections should use one of the following Category 5 patch cables:

The Discovery ST, STE, & RX HP60 system is connected to the network through the console. A high speed connection 1000 baseT with 100 baseT is acceptable.

CAT Number	GE Part Number	Length
K9000WB	2215028-10	20 m (65.6 ft)
K9000KP	2215028-5	10 m (32.8 ft)
K9000JR	2215028-4	5 m (16.4 ft)
K9000WA	2215028-9	3 m (9.8 ft)

Note: The hospital can use dial-up as an acceptable option for this product.

- The patch cable should be provided by the customer, and it is used to connect the console to a wall box.
- The run from the hospital switch to the Discovery ST, STE, & RX HP60 wall outlet must not exceed 88.4 m (290 ft.) Bandwidth performance is degraded when the length reaches 91.4 m (300 ft.) or greater.
- The console network and any integrated injector connect to the back of the console bulkhead.
- Some customer-site units may require cable ductwork or conduit to route connecting network cables to the workstation, camera and console.

4-10.1 U.S. Process Overview for Networking

The United States network connectivity requirement for this product is broadband. The U.S. process relies on the Project Manager of Installation to select a Customer Champion and identify an IT contact for the site. Together, these individuals complete a site assessment to gauge what tasks are needed to fulfill the connection.

For questions, contact the GE Connectivity team at 800.321.7937, option #3.

4-10.2 Customer Broadband Responsibilities

Provide the GE Healthcare Project Manager of Installation with an accurate site address, telephone number, contact name, and e-mail address for these:

- Customer Champion
  - Coordinates VPN activities between Radiology/Cardiology and the Information Technology (IT) departments
  - Acts as a focal point in assuring site broadband infrastructure meets GE Healthcare requirements for connection as determined by a mutual assessment with the GE Healthcare Connectivity team.
- IT Contact
  - Completes an equipment assessment with GE Healthcare Connectivity team to determine site readiness for broadband
  - Works with the Customer Champion to complete any identified infrastructure changes
  - Provides IP addresses for new Discovery ST, STE, & RX HP60 equipment
  - Provides a VPN-compatible appliance that will support the IPSec tunneling protocol and 3DES data encryption
  - To utilize an Internet Service Provider that supports static routing

Section 4-11: Radiation Protection

NOTICE **Scanner-room shielding requirements should be reviewed by a qualified radiological health physicist taking into consideration:**

- **Scatter radiation levels within the scanning room (See Figure 4-14.)**
- **At 40mm aperture, scan times of typical Discovery ST, STE, & RX HP60 patient exams are expected to be two or four times faster than that of LightSpeed Pro16 exams with a 20mm or 10mm aperture, respectively**
- **Equipment placement**
- **Weekly projected workloads (# patient/day technique (kvp*ma))**
- **Materials used for construction of walls, floors, ceiling, doors, and windows**
- **Access to surrounding scan room areas**
- **Equipment in surrounding scan room areas (e.g., film developer, film storage)**

Figure 4-13 and Figure 4-14 depict measured radiation levels within the scanning room at the indicated distances, while scanning a 16cm CTDI phantom for the Head Scan mode and 32cm CTDI phantom for the Body Scan Mode. The mAs, kV and aperture scaling factors are provided in Table 4-11 and they can be utilized to adjust the exposure levels to the typical usage at the site.

For example: The exposure level for a 120kV, 800 mA, 1sec scan at 50 in. away from the scan plane is: 10.4 µGy (from Figure 4-14) × 0.71 (from Table 4-11) × 800/100 (from Table 4-11) = 59.2 µGy.

Note: Actual measurements can vary. Expected deviation equals ±15%, except for the 5mA and 1.25mm techniques, where variation 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%.

Table 4-11 Shielding Requirements Scaling

Changed Parameter	Multiplication Factor
mAs	new mAs/100
80 kV	0.21
120 kV	0.71
140 kV	1.0
4 x 3.75 mm images	0.82
16 x 0.625 LD 8 x 1.25 LD Fluro 5 mm	0.59
4 x 1.25 LD 5 mm (1i) Fluro 2.5 mm	0.40
1 x 1.25 mm images	0.20
4 x 0.625 LD 1 x 1.25	0.10

Figure 4-13:Typical Scatter Survey (Large Filter)

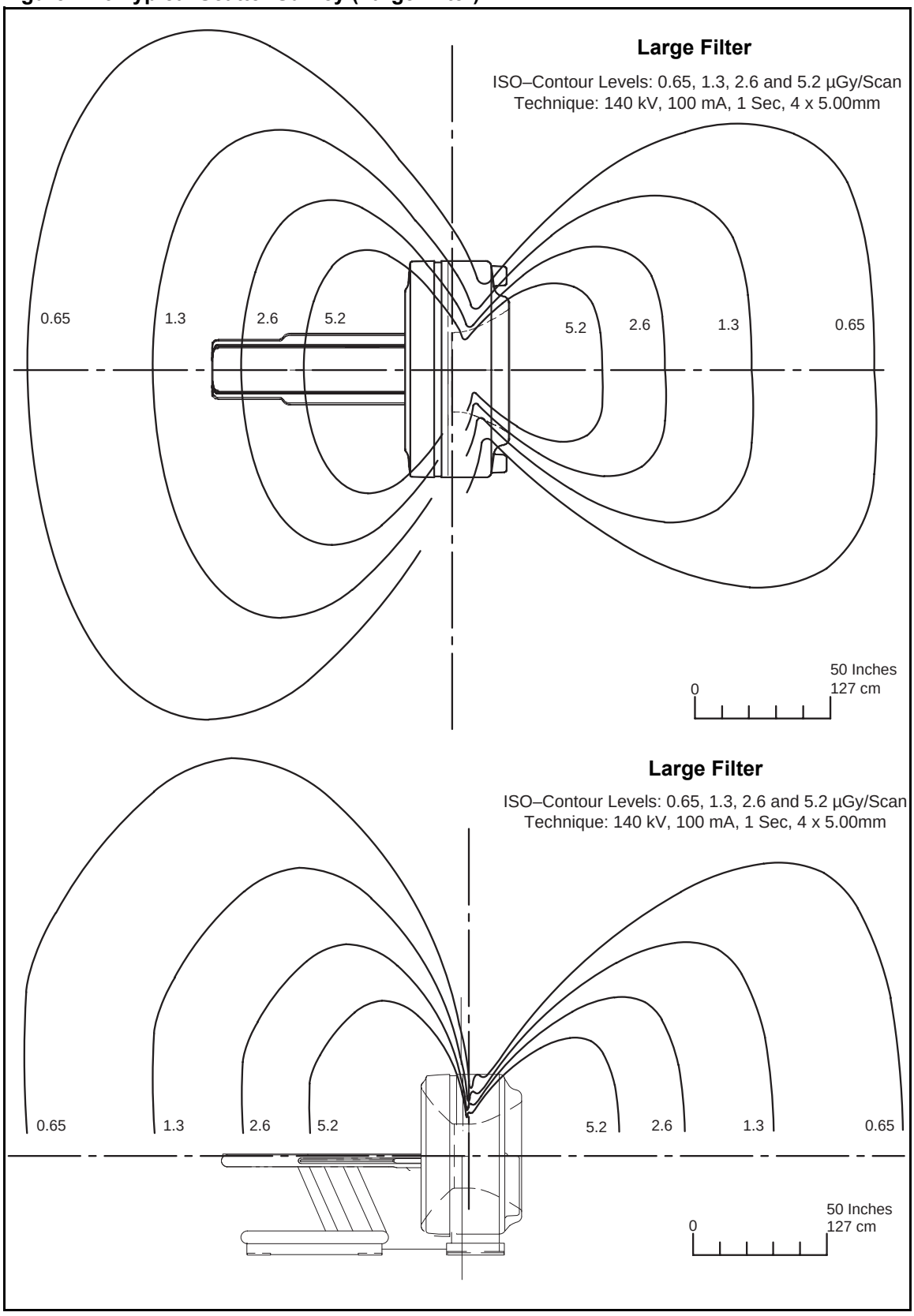
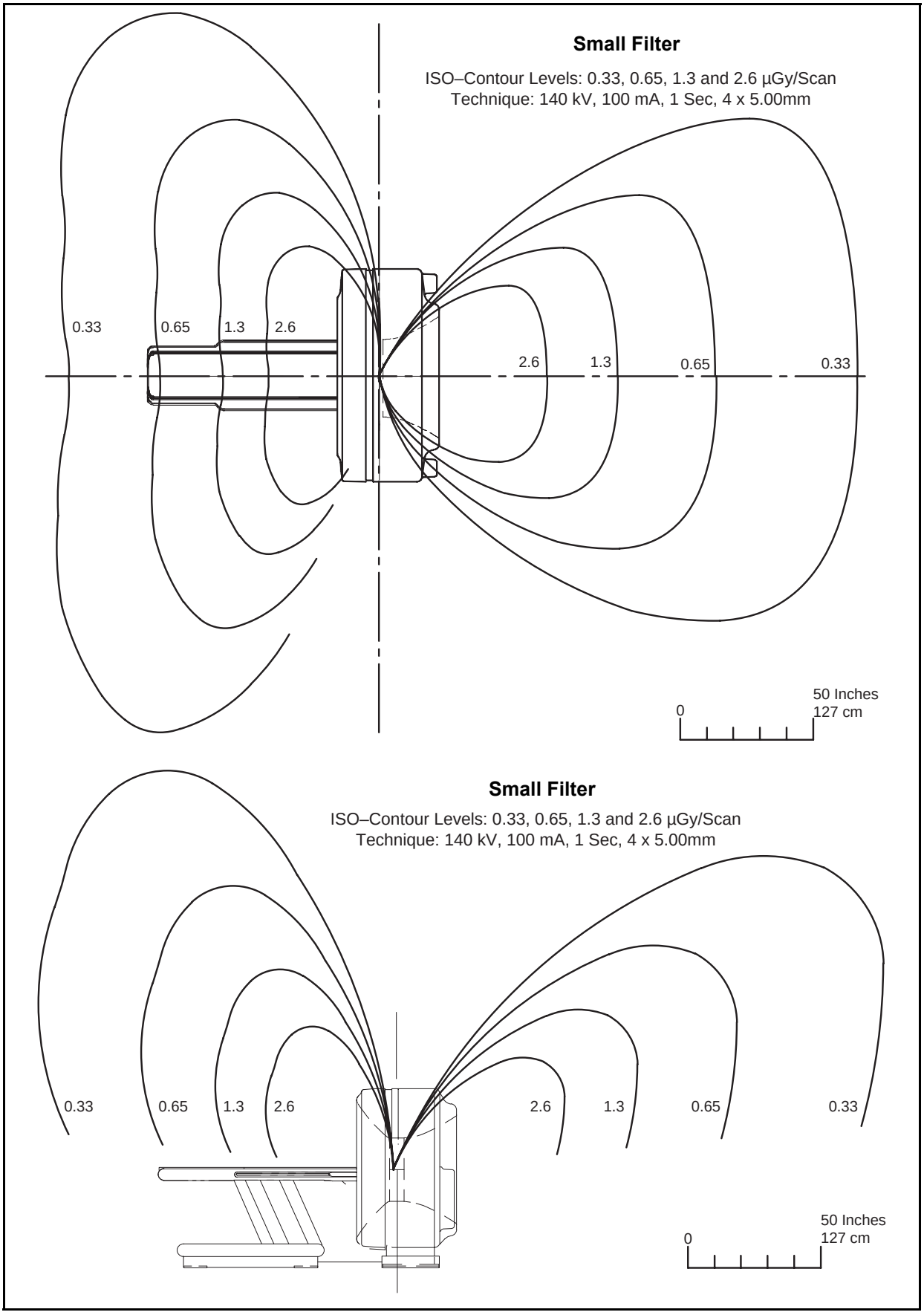


Figure 4-14:Typical Scatter Survey (Small Filter)



4-11.1 Dose Rate from Radioactive Rod Source

The Discovery ST, STE, & RX HP60 system uses one radioactive pin source during calibration and the Daily QA Check. During normal operation, the source pin remains in storage in a shielded container inside the PET trailer. The system automatically withdraws the source from its container before each use, and is automatically returned to the container after each use.

The dose rates described in this document are estimates, based on measurements taken under specific measurement conditions, described in detail for each measurement. Since the measurement conditions vary at every scanner installation (due to differing room geometries, the presence of other equipment or shielding material, etc.), use these measurements as guidelines *only*.

4-11-1.1 Radioactive Source Pin

PET images are generated by measuring radiation resulting from electron positron annihilation events within the patient. No external radiation source is required to generate this data. The pin radiation source is never used during a patient scan.

The system uses the source pin to:

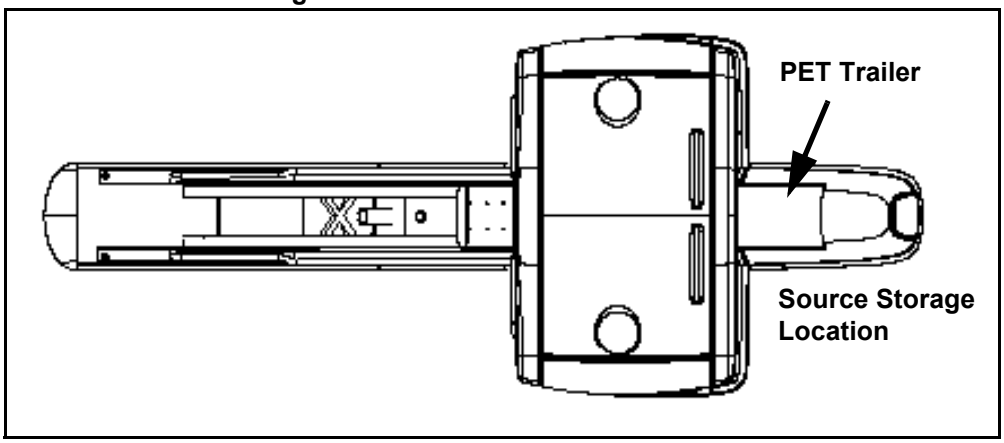
1.) Calibrate the scanner's detectors and electronics.

2.) Assess the relative performance of the scanner's detector channels, so differences in individual detector efficiency can be accommodated during reconstruction.

The PET scanner uses a radioactive source pin that contains Ge^{68}, an isotope with a half-life of 270.8 days. The radioactive source pin is referred to as "low activity pin." The pin has an initial activity level of 55MBg (1.5mCi) ± 2%.

Refer to Figure 4-15. During normal system operation, the radioactive source pin resides in a lead storage container, located inside the PET Trailer, at the rear of the Discovery ST, STE, & RX HP60 gantry.

Figure 4-15:Source Pin Storage Location



When the pin is in use, it is located inside the gantry near the wall of the patient port. Depending on the task the pin is performing, it may be held in a fixed location or rotated around the circumference of the patient port at a speed of up to 20 revolutions per minute (one revolution per three seconds). The pin is transferred from the storage container to its position near the patient port, and returned to the storage container after use, by a mechanical system under software control. Radiation indicators are displayed on both the gantry control panels and the operator's keypad when the pin source leaves the storage container.

4-11-1-1.1 Dose Rates with Pin Source Stored

When the radioactive source pin is stored in the lead container, and no other sources are present in the scanner room, the maximum dose rates on the Discovery ST, STE, & RX HP60 are directly over the source loader. The Discovery ST, STE, & RX HP60 uses one pin with an activity level of 55MBg (1.5mCi) ± 2% or less. The exposure rate at the cover is specified to equal 2mR/hr or less.

4-11-1-1.2 Dose Rates with Pin Source in Use

The dose rates were measured in the following conditions:

1.) Pin source rotating around the patient port

2.) Patient table lowered to its lower limit (55 cm [21.7 in.] above the floor)

3.) All measurements were taken at a height equal the center of the patient port.

The results of these experiments, measured along the central axis of the scanner, are summarized in Table 4-12 (distances are measured from the frontmost imaging slice; positive distance is in the direction towards the scanner table).

4-11.2 Gamma Ray Protection

A number of radioactive substances, of various levels of stability are used by the PET unit of the Discovery ST, STE, & RX HP60 system. This material is necessary in imaging procedures. Before the suite is operational, unstable material may be on the premises. It is very important to recognize that clear and significant hazards from ionizing radiation may exist at the site, as it is undergoing preparation. Other equipment may be in place and operational at this time. This may include such equipment as X-ray systems and CT scanners (other than the CT Gantry within the Discovery ST, STE, & RX HP60). Calibration source may be on the site at some time during the preparation process, as well as after the PET imager has been put into operation. A cyclotron may be operational at the site. Definite steps should be taken to insure the safety of workers, patients, and visitors, during all phases of the construction, installation and operation of the facility.

Note: By the time the site is ready to have radioactive material brought in, the licensing process must be complete. The site must be properly licensed before receiving radioactive material.

4-11.3 Protection of Equipment

It is important that background radiation be kept to a minimum. The coincidence detection used in a PET system allows a moderate amount of external singles events. The Discovery ST, STE, & RX HP60 system has been found to have less than 1% deadtime if the external field is below 1 mR/hr from a single source. Because area background can be more general than a single source, a lower limit is appropriate. If the area dose rate is maintained to less than 0.2 mR/hr (due to 511 or lower energy gamma rays) at the covers, detector deadtime should not exceed 1%.

Radioactive sources must be stored in approved shielded containers. It is recommended that any radioactive source not specifically designed to be housed in the gantry's lead storage container be stored in a separate room (hot lab) adjacent to, and accessible from, the Scan Room. This hot lab should be near the cyclotron (if used). Doses should be prepared in the same area.

Consideration should be given to the placement of the gantry in relation to existing X-ray, Magnetic Resonance, or Nuclear diagnostic equipment. Magnetic interference above 1.0 gauss, at the surface of PET components, can adversely affect the image quality. Good shielding techniques must be implemented in order to avoid this type of interference.

Some procedures involve the use of radioactive water. This will result in the patient exhaling radioactive carbon dioxide. This carbon dioxide must be contained in order to avoid adversely affecting the image quality. Some PET procedures require the use of radioactive gases. This too can result in compromising image quality if not properly controlled.

4-11.4 Protection of Personnel

The escape of radioactive gases, if not properly confined, can cause unnecessary exposure to clinical staff. All sources must be properly stored in appropriate enclosures to provide adequate protection to all in the suite.

4-11.5 Barriers, Partitions and Shielding

Appropriate barriers such as walls, lead-shielded glass, lead shields etc. must be installed to protect staff from unnecessary exposure to radiation. A qualified radiological health physicist must be consulted in the design of walls and safety barriers to assure proper attenuation.

Keep in mind that patients become significant sources of radioactivity. Consideration should be given to maximize the distance between the patient and operator during the uptake and acquisition phases of scan procedures.

4-11.6 Sources of Radiation

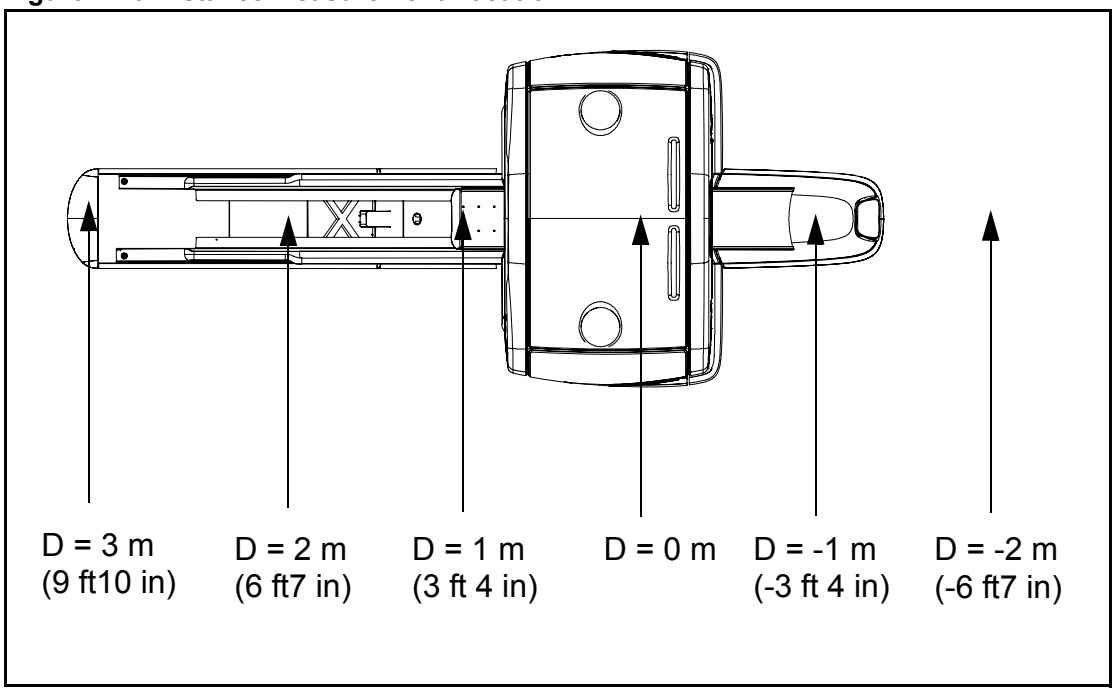
A number of common radio nuclides are used in the Discovery ST, STE, & RX HP60 system. These radio nuclides are either produced at the site or brought to the site from an outside source. In either case, these nuclides have relatively short half-life (2 min. to 110 min. maximum) and as such decay to benign levels fairly quickly. Typical positron emitting isotopes include: Carbon-11, Nitrogen-13, Oxygen-15, and Fluorine-18.

Table 4-12 shows the dose rate at various distances. The measurements have been taken at various locations around the equipment. These were measured without the CT gantry. Use the illustration in Figure 4-16 to understand the data in table Table 4-12.

Table 4-12 : Dose Rate at Specified Distances

Distances	-2m	-1m	Front Slice	+1m	+2m	+3m
Dose rate per mCi mR/hr/mCi	0.13	0.77	3.20	0.40	0.11	0.04

Figure 4-16:Distance Measurement Location



Chapter 5 Environmental Conditions

Ratings and duty cycles of Discovery ST, STE, & RX HP60 subsystems apply if site environment meets the standards of this section. Maintain the environmental conditions listed below at all times, including, for example, overnight, weekends and holidays. If air conditioning is not working, shut down the Discovery ST, STE, & RX HP60 system. When the system is shut down for major repair, air conditioning may be shut down also.

Section 5-1: Temperature and Humidity Specifications

NOTICE **System operation and image quality may be affected if environmental specifications are exceeded.**

5-1.1 Temperature (Scan and Control Rooms)

Maximum allowable ambient room temperature:	26º C (79º F)
Minimum allowable ambient room temperature:	18º C (64º F)
Maximum allowable ambient room temperature rate of change:	3º C per hour (5º F per hour)
Recommended ambient *scan* room temperature range for patient comfort:	20° – 22° C (68° – 72° F)
Allowable ambient *scan* room temperature range when room is unoccupied:	15° – 24° C (60° – 75° F)

NOTICE **Potential Equipment Failure**

Do not operate (that is, “Power ON”) gantry or console subsystems with ambient room temperatures exceeding 26º C (79° F). Scan room or control room temperatures in excess of 26º C (79° F) can result in the failure of gantry or console components.

Note: Any cooling equipment cycle control range must be taken into account, such that the maximum and minimum ambient room temperatures shown above are not exceeded, during room thermal cycling. For example, if the HVAC is capable of ± 2º C control, then the limits would be 20° – 24° C (68° F - 75° F) to maintain absolute limits.

5-1.2 Humidity (All Areas)

Maximum allowable non-condensing relative humidity:	60%
Minimum allowable non-condensing relative humidity:	30%
Maximum allowable relative humidity rate of change:	5% RH/hour

Section 5-2: Temperature and Humidity Monitoring

Position the computer subsystems in an area that meets the environmental specifications listed in Section 5-1:Temperature and Humidity Specifications.

First, assess the environment's heat and humidity. If necessary, temporarily install a temperature and humidity recorder close to the designated gantry installation area. Record the readings before installation, and again after installation, to verify the true temperature and humidity conditions for the environment.

Consider the HVAC needs and redundancy. It may be advisable to consider an air conditioner with two compressor units rather than one. A backup (redundant) air conditioner permits Discovery ST, STE, & RX HP60 system operation during an extended repair of the primary air conditioner.

Section 5-3: Cooling Requirements

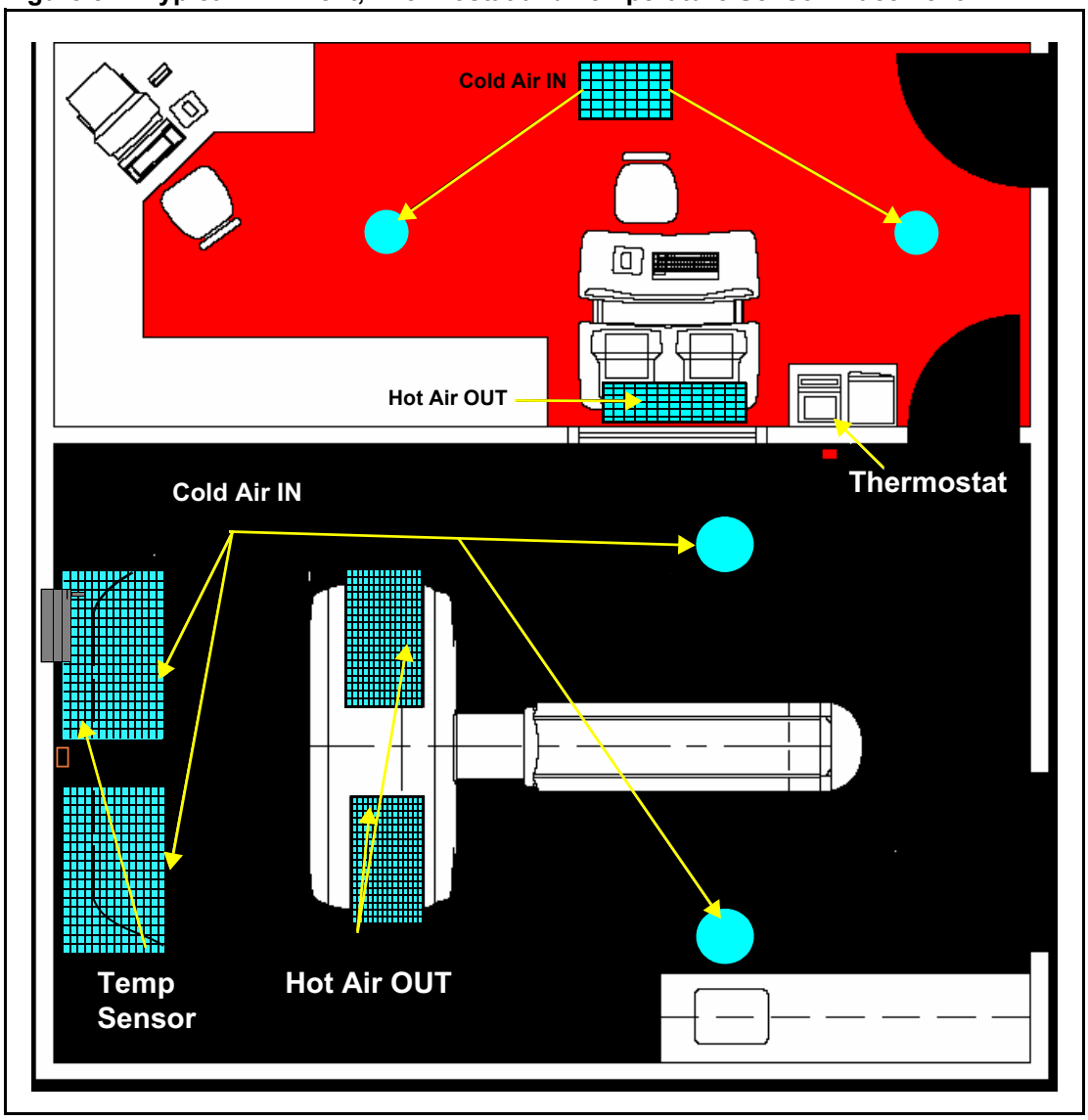
Use Table 5-1 to assist in planning the site's cooling requirements. The gantry generates more than half the total system heat output. For best results, locate a wall air conditioning vent *at floor level* beside and behind the gantry to meet the gantry's cooling needs while maintaining patient comfort levels.

Table 5-1: Cooling Requirement Worksheet

System Component (See NOTE 3.)	**BTU/hr**	**Watt**
Scanner System		
1. CT/PET Gantry and Table, minimum (See NOTE 1.)	39,300	11,500
2. Power Distribution Unit	3,400	1,000
3. Operator's GRE Console/computer, with 1 IG	6,900	2,000
SYSTEM TOTAL (Minimum) **SYSTEM TOTAL (To upgrade to Discovery VCT)** **(See NOTE 2.)**	**49,600** **66,600**	**14,500** **19,500**
Selected Options		
Powerware UPS	2900	850
Remote Color LCD Monitor	170	50
TV camera	34	10
TV monitor	300	88
Room Totals (Calculate as appropriate for your system.) **Total of Scanner System** **Total plus any/all selected options (See NOTE 2.)**		
NOTE 1 With 75 scan rotations per patient, the recommended gantry cooling accommodates up to six patients per hour. It is also needed during calibration of the system.		
NOTE 2 Cooling requirements do not include cooling for room lighting, personnel or non-scanner equipment.		
NOTE 3 CT gantry cooling requirements vary based on usage time of the CT gantry. Cooling requirements for all other components are continuous.		

Section 5-4: HVC Vent, Thermostat and Temperature Sensor Placement

Figure 5-1: Typical HVC Vent, Thermostat and Temperature Sensor Placement



Section 5-5: Altitude

System operating altitude is from mean sea level to 3050 meters (10,000 ft.)

Section 5-6: Electro-Magnetic Interference (EMI)

5-6.1 Gantry

Locate gantry in ambient static magnetic fields of less than 10^{-4} tesla (1,000 milligauss) to guarantee specified imaging performance. Ambient AC magnetic fields must be below 10^{-6} tesla (10 milligauss) peak.

5-6.2 Console / Computer Equipment

Locate computer equipment in ambient static magnetic fields of less than 10^{-3} tesla (10,000 milligauss) to guarantee data integrity.

5-6.3 Magnetic Media

Locate magnetic media in ambient static magnetic fields of less than 10^{-3} tesla (10,000 milligauss).

5-6.4 PDU

The PDU produces an electromagnetic field that radiates outward from its cabinet in all directions. Do not place sensitive electronics (e.g., console or computer equipment - the UPS is not classified as sensitive electronics) within one meter (1.0 m, 3.3 ft.) of the Power Distribution Unit., in any direction (including above or below).

5-6.5 EMI Reduction

If fields of excessive EMI are known or suspected to be present, consult GE Healthcare Sales & Service for recommendations. Consider the following if you attempt to reduce EMI:

- External field strength decreases rapidly with distance from source of magnetic field.
- External leakage magnetic field of a three-phase transformer is much less than that of a bank of three single phase transformers of equivalent power rating.
- Large electric motors are a source of substantial EMI.
- High-powered radio signals are a source of EMI.

Maintain good screening of cables and cabinets.

5-6.6 UPS

The Uninterruptable Power Supply (UPS) provides a consistent power supply to various electrical components of the system. Also, it continues to provide electrical power to components during a site-wide power outage so components can be safely shut down. The UPS should be kept at least one meter (1.0 m, 3.3 ft.) away from sensitive electronics (the PDU does not include sensitive electronics).

For UPS interconnect information, please refer to Section 8-5:UPS Interconnect on page 115.

5-6.7 Power Lines

If power substations exist under or above the scan room, or near the control room, consider EMI testing to determine if your proposed room meets the published acceptable EMI room limits. This also includes high voltage lines under the scan or control room floor.

Section 5-7: Electro-Magnetic Compatibility (EMC)

5-7.1 General Scope

This equipment complies with IEC60601-1-2 Edition 2 (2001) EMC standard for medical devices.

The Discovery ST, STE, & RX HP60 is suitable to be used in the electromagnetic environment, as per the limits and recommendations described in the tables hereafter:

- Emission Compliance level and limits (Table 5-2)
- Immunity Compliance level and recommendations to maintain equipment clinical utility (Table 5-3 and Table 5-4)

Note: This system complies with above-mentioned EMC standard when used with supplied cables. If different cable lengths are required, contact a qualified GE service representative for advice.

5-7.2 Electromagnetic Emission

The Discovery ST, STE, & RX HP60 is intended for use in the electromagnetic environment specified below. The customer or the user of the Discovery ST, STE, & RX HP60 should assure that it is used in such an environment.

Table 5-2: Electromagnetic Emissions

EMC Emissions Guidance and Declaration for Discovery ST, STE, & RX HP60		
Emissions Test	**Compliance**	**Electromagnetic Environment Guidance**
RF emissions CISPR 11	Group 1	The Discovery ST, STE, & RX HP60 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A + 12	*Warning:* This equipment is allowed to be installed only in X-ray protected rooms, which provide an attenuation of at least 12 dB for radio disturbances from 30 MHz to 1 GHz.
Harmonic emissions IEC 61000-3-2	Not applicable	When installed in such a shielded location, the Discovery ST, STE, & RX HP60 is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable	

5-7.3 Electromagnetic Immunity

The Discovery ST, STE, & RX HP60 is intended for use in the electromagnetic environment specified below. The customer or the user of the Discovery ST, STE, & RX HP60 should assure that it is used in such an environment.

Table 5-3: Electromagnetic Immunity

EMC Emissions Guidance and Declaration for Discovery ST, STE, & RX HP60			
Immunity Test	**IEC 60601-1-2 Test Level**	**Compliance Level**	**Electromagnetic Environment Guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5 % U_T (> 95 % dip in U_T) for 5 sec	< 5 % U_T (> 95 % dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Discovery ST, STE, & RX HP60 requires continued operation during power mains interruptions, it is recommended that the Discovery ST, STE, & RX HP60 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Table 5-3: Electromagnetic Immunity

Conducted RF IEC 61000-4-6	3 V_{RMS} 150 kHz to 80 MHz	3 V 150 kHz to 80 MHz	Portable and mobile RF communications equipment should be used no closer to any part of the Discovery ST, STE, & RX HP60, including cables, than the recommended separation distance calculated from the equation appropriate for the frequency of the transmitter. **Recommended Separation Distance:** $d = [\frac{3,5}{3}]\sqrt{P}$ (See Table 5-4.) $d = [\frac{3,5}{3}]\sqrt{P}$ 80 MHz to 800 MHz (See Table 5-4.) $d = [\frac{7}{3}]\sqrt{P}$ 800 MHz to 2,5 GHz (See Table 5-4.) where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 
Radiated RF IEC 61000-4-3 (Alternative method: Full range IEC 61000-4-21 test in lieu of Large, Permanently-Installed Equipment exemption)	3 V/m 150 kHz to 80 MHz	3 V/m 150 kHz to 80 MHz	

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Discovery ST, STE, & RX HP60 is used exceeds the applicable RF compliance level above, the Discovery ST, STE, & RX HP60 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Discovery ST, STE, & RX HP60.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

NOTE: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

NOTE: U_T is the AC mains voltage prior to application of the test level.

The Discovery ST, STE, & RX HP60 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Discovery ST, STE, & RX HP60 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Discovery ST, STE, & RX HP60 as recommended below, according to the maximum output power of the communications equipment.

Table 5-4: Recommended Separation Distances

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the Discovery ST, STE, & RX HP60			
Rated Maximum Output Power (P) of Transmitter Watts (W)	**Separation Distance (Meters) by Frequency of Transmitter**		
	150 kHz to 80 MHz $d = [\frac{3,5}{3}]\sqrt{P}$	**80 MHz to 800 MHz** $d = [\frac{3,5}{3}]\sqrt{P}$	**800 MHz to 2.5 GHz** $d = [\frac{7}{3}]\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74
1	1.17	1.17	2.33
10	3.69	3.69	7.38
100	11.7	11.7	23.3
For transmitters rated at a maximum output power not listed above, the separation distance can be estimated using the equation in the corresponding column, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.			

As an example, a 1W mobile phone (800MHz to 2.5GHz carrier frequency) shall be separated by at least 2.3 meters (7.5 ft.) from the Discovery ST, STE, & RX HP60 (in order to avoid image interference risks.)

LIMITATIONS MANAGEMENT: Adhering to the distance separation recommended in Table 5-4, between 150KHz and 2.5GHz, will reduce disturbances recorded at the image level but may not eliminate all disturbances. However, when installed and operated as specified herein, the system will maintain its essential performance by continuing to acquire, display, and store diagnostic quality images safely.

5-7.4 External Component Use Limitations

The use of accessories, transducers, and cables other than those specified below or supplied with the system may result in degraded ELECTROMAGNETIC COMPATIBILITY of the Discovery ST, STE, & RX HP60 system. For additional compatible accessories, consult the GE Healthcare Sales and Service representative.

- UPS (P5052PS)
- Enhanced PET Recon Option (P5091RC)
- PET/CT Gating Interface Kit (P5851JB)
- Advantage 4D for Discovery LS/ST (S9111RG)
- SmartStep (P5050SM, P5050SN)
- Laser Camera Interface (B7700L)
- Gammex RMI Laser Tracking System (E8505LF, E8505LK)

5-7.5 Installation Requirements and Environment Control

In order to minimize interference risks, the following requirements shall apply.

5-7-5.1 Cable Shielding and Grounding

All interconnect cables to peripheral devices must be shielded and properly grounded. Use of cables not properly shielded and grounded may result in the equipment causing radio frequency interference.

The manufacturer is not responsible for any interference caused by using other than recommended interconnect cables or panels, or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the users' authority to operate the equipment.

All interconnect cables to peripheral devices must be shielded and properly grounded, except when technologically prohibited. Use of cables not properly shielded and grounded may result in the equipment causing radio frequency interference.

5-7-5.2 Environment Control

This product complies with the radiated emission as per CISPR11 Group1 Class A + 12 limits. The Discovery ST, STE, & RX HP60 system is predominantly intended for use in non-domestic environments and not directly connected to the Public Mains Network. The system is predominantly intended for use (e.g., in hospitals) with a dedicated supply system, and with an X-ray shielded room. In case of using in a domestic environment (e.g., doctors’ offices), in order to avoid interferences, it is recommended to use a separate AC power distribution panel and line, with an X-ray shielded room.

This equipment generates, uses, and can radiate radio frequency energy. The equipment may cause radio frequency interference to other medical and non-medical devices and radio communications. To provide reasonable protection against such interference, this product complies with the radiated emission as per CISPR11 Group1 Class A + 12 limits. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment is found to cause interference (which may be determined by turning the equipment on and off), the user (or qualified service personnel) should attempt to correct the problem by one or more of the following measure(s):

- Reorient or relocate the affected device(s).
- Increase the separation between the equipment and the affected device.
- Power the equipment from a source different from that of the affected device.
- Consult GE Healthcare Sales and Service for further suggestions.

5-7-5.3 Power Supply Distribution for Accessories and Subsystems

All components, accessories, subsystems and systems which are electrically connected to the Discovery ST, STE, & RX HP60 must have all AC power supplied by the same power distribution panel and line.

5-7-5.4 Stacked Components and Equipment

The components/sub-systems of the Discovery ST, STE, & RX HP60 should not be used adjacent to or stacked with other equipment; if adjacent or stacked use is necessary, the Discovery ST, STE, & RX HP60 system should be observed in order to verify normal operation in the configuration in which it will be used.

5-7-5.5 Low Frequency Magnetic Field

To minimize the risk of interference from low-frequency magnetic field sources, any such sources (such as CRT monitors) must be installed at least 1 meter (3.3 ft.) from the Discovery ST, STE, & RX HP60 gantry.

5-7-5.6 Static Magnetic Field Limits

In order to avoid interference on the Discovery ST, STE, & RX HP60 system, static field limits from the surrounding environment are specified:

- Less than 1 gauss in examination room, and in the control room.
- Less than 3 gauss in the equipment/technical room.

5-7-5.7 Electrostatic Discharge Environment and Recommendations

In order to reduce electrostatic discharge interference, install a charge dissipative floor material to avoid electrostatic charge buildup. The dissipative material shall be connected to the system ground reference, if applicable. The relative humidity shall be at least 30 percent.

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Chapter 6 Floor Loading and Weights

Section 6-1: Floor Loads

The Discovery ST, STE, & RX HP60 system has a total floor load of approximately 5,543 kg (12,221 lbs). About 4603 kg (10,148 lbs), including patient (204 kg [450 lbs]), is concentrated in the Gantry and Patient Table.

Table 6-1 shows Discovery ST, STE, & RX HP60 components with size and weight, floor loading and normal mounting requirements.

Table 6-1: Discovery ST, STE, & RX HP60 System Floor Loads

Item	Net Weight lb (kg)	Overall W X D inch (mm)	Weight/Area lb/sq. ft. (kg/m^2)	Load Pattern in. (mm)	Normal Method Of Mounting in. (mm) (GE-Supplied)[1]
CT Gantry	3507 (1591)	88 x 43 (2235 x 1095)	243 (1185)	CT effective load area is 27 x 77 (694 x 1937) with four round pads, each 2.5 (63.5) in contact with the floor.	1/2 in. (12.7 mm) diameter x 10 in. (254 mm) long per P/N 2106573-2 at four leveling pads into concrete floor.
PET Gantry	4631 (2101)	41.5 x 64.5 (1050 x 1635)	1266 (6180)	While in the imaging position, the effect PET load area is 19.2 x 24 (480 x 708) with 7 pads each 2.5 (63.5) as well as 2 pads that do not get anchored (support only)	Hilti Kwik-Bolt II 1/2in (12.7mm) diameter by 8in (203mm) long per P/N 2106573 at seven leveling pads into concrete floor.
Patient Table	2010 (912) Includes 450 (204) Patient	27 x 102 (685 x 2591)	170 (832)	Rectangular base 89 x 25 (2270 x 627) with six round pads, each 2.5 (63.5) in contact with the floor.	Hilti Kwik-Bolt II 1/2in (12.7mm) diameter by 8in (203mm) long per P/N 2106573 at four leveling pads into concrete floor.
Power Distribution Unit (PDU)	800 (363)	30 x 22 (762 x 559)	180 (82)	Four Casters support area of 30 x 22 (762 x 559).	Casters are for positioning and service. Set on floor. May be anchored to floor with angle brackets in seismic zones.

Notes:

1.) Use the GE-supplied mounting hardware ONLY IF anchoring the system to 5” (127 mm) concrete floors.
2.) Seismic angle brackets are included and shipped with the PDU.

Item	Net Weight lb (kg)	Overall W X D inch (mm)	Weight/Area lb/sq. ft. (kg/m^2)	Load Pattern in. (mm)	Normal Method Of Mounting in. (mm) (GE-Supplied)[1]
Operator Console with HP and without monitors Monitor - LCD (ea.)	450 (204) 22 (10)	48 x 39 (1219 x 991)	140 (681)	Four Casters or Leveling Feet support area of 46 x 19 (1168 x 483).	Casters are for positioning. Set on floor. Console may be anchored to floor using angle brackets[3].
Universal Power Supply (UPS)	801 (363)	22 x 34 (559 x 864)		Rectangular base 22 x 34 (559 x 864) with six castors, each in contact with the floor.	Casters are for positioning and service. Set on floor. Adjust the six leveling pads on the floor.

Notes:

1.) Use the GE-supplied mounting hardware ONLY IF anchoring the system to 5” (127 mm) concrete floors.

2.) Seismic angle brackets are included and shipped with the PDU.

Section 6-2: Mounting and Seismic Information

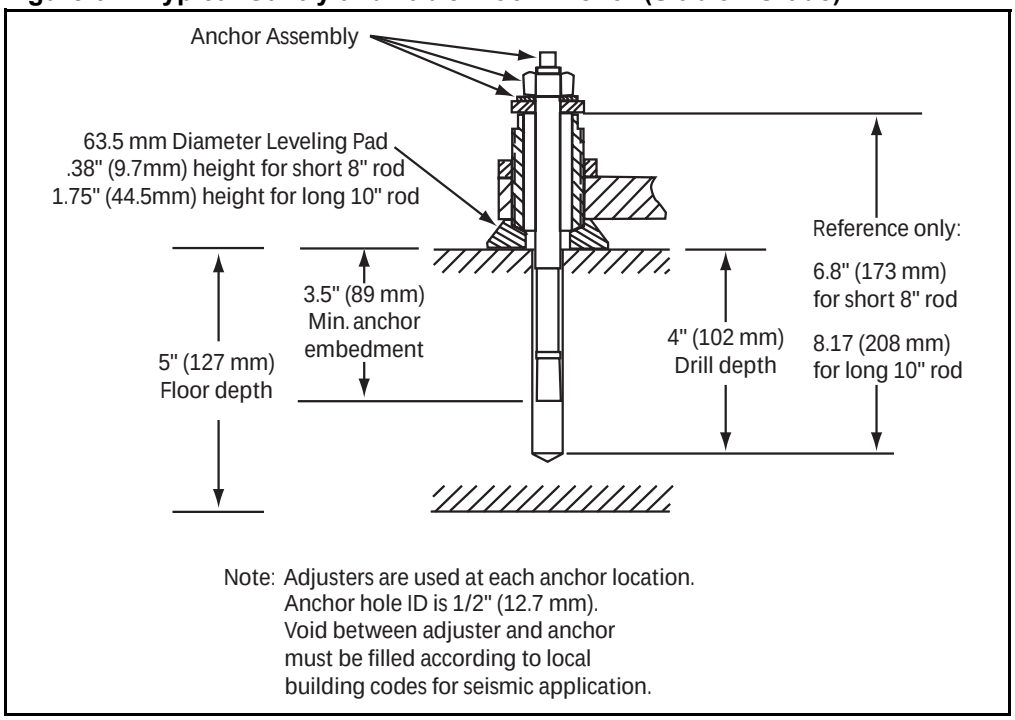
Standard mounting meets seismic requirements. See Table 6-2 below and Figure 6-1. However, customer is responsible for seismic mounting. Refer to all applicable codes for the specific area.

6-2.1 Mounting Requirements - Major Components

Table 6-2: Mounting Requirements - Major Components

Mounting Requirements	CT Gantry mm (in.)	PET Table mm (in.)	PET Gantry mm (in.)
Minimum Floor Thickness	127 (5)	127 (5)	127 (5)
Recommended Drilling Depth	102 (4)	102 (4)	102 (4)
Average Anchor Embedment	95 (3.75)	95 (3.75)	95 (3.75)
Minimum Anchor Embedment	89 (3.5)	89 (3.5)	89 (3.5)
Available Alternate Anchor Locations	Yes	Yes	Yes
Anchor Size Shipped	254 x 13 (10 x ½)	203 x 13 (8 x ½)	203 x 13 (8 x ½)
Alternate Anchoring Methods	Yes See Floor Anchors on page 60.	Yes See Floor Anchors on page 60.	Yes See Floor Anchors on page 60.
Floor Levelness Requirement	8 mm (0.3125”) over 3048 mm (10 ft.)	8 mm (0.3125”) over 3048 mm (10 ft)	8 mm (0.3125”) over 3048 mm (10 ft)

Figure 6-1: Typical Gantry and Table Floor Anchor (Slab on Grade)



The following pages show center-of-gravity information for system components:

- Gantry: Figure 6-7 and Figure 6-8
- Table: Figure 6-11
- Power Distribution Unit: Figure 6-13
- Operator's Console/Computer: Figure 6-14

Floor mounting hole locations for components that do not have templates are also in this section.

6-2.2 Seismic Information

Figure 6-2: Seismic Anchorage - Slab on Grade

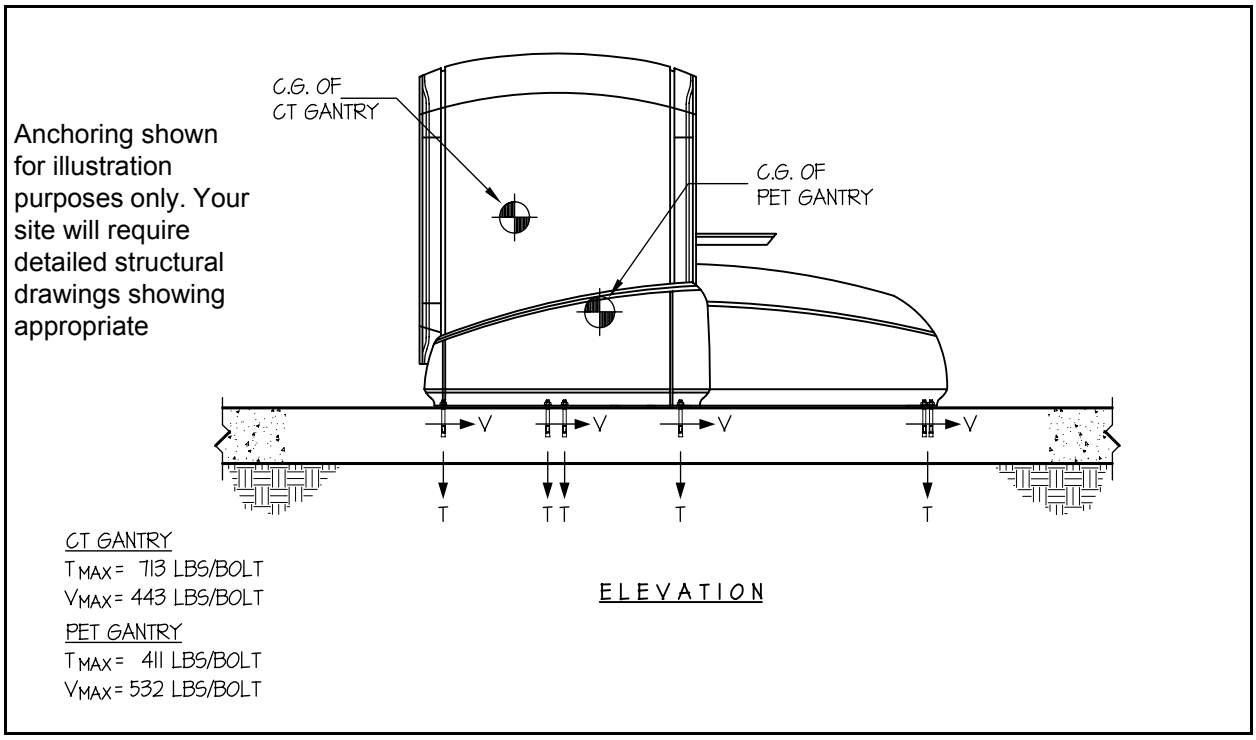


Figure 6-3: Seismic Anchorage - Upper Floor

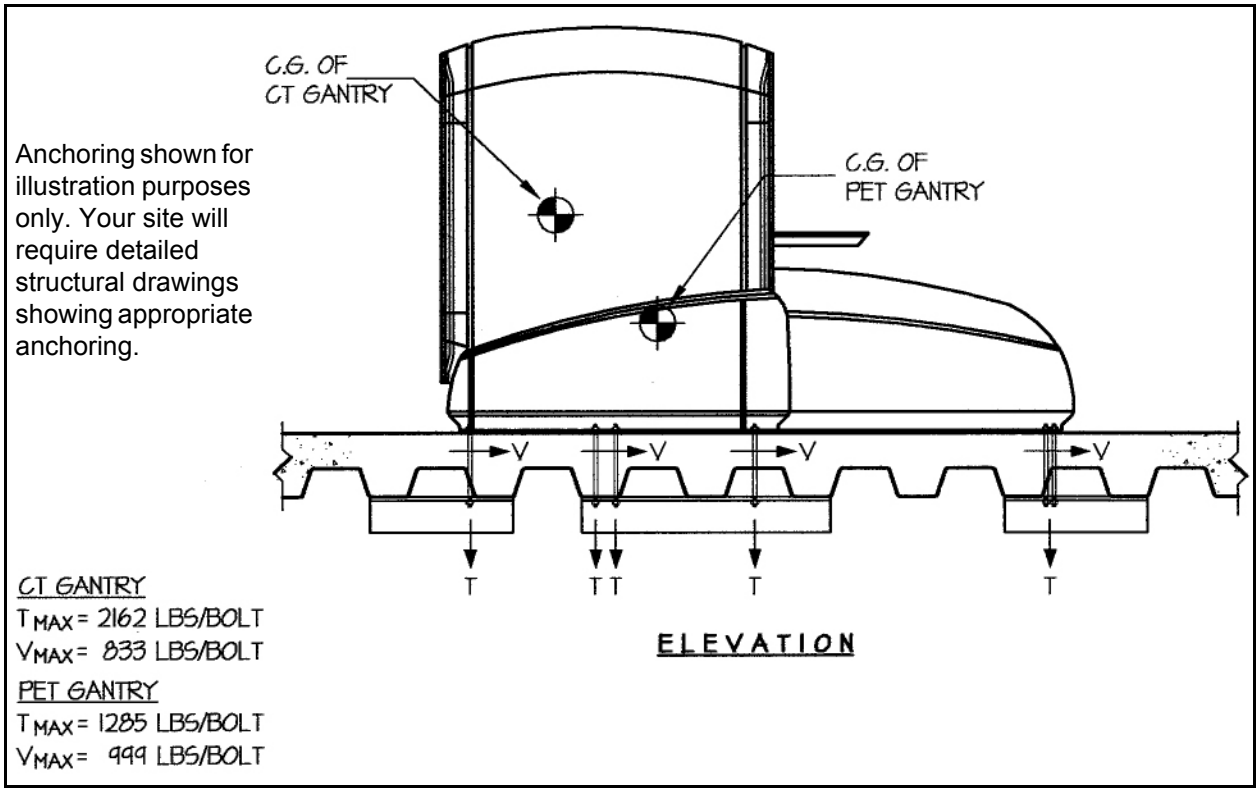


Figure 6-4: Seismic Anchorage - CT Gantry

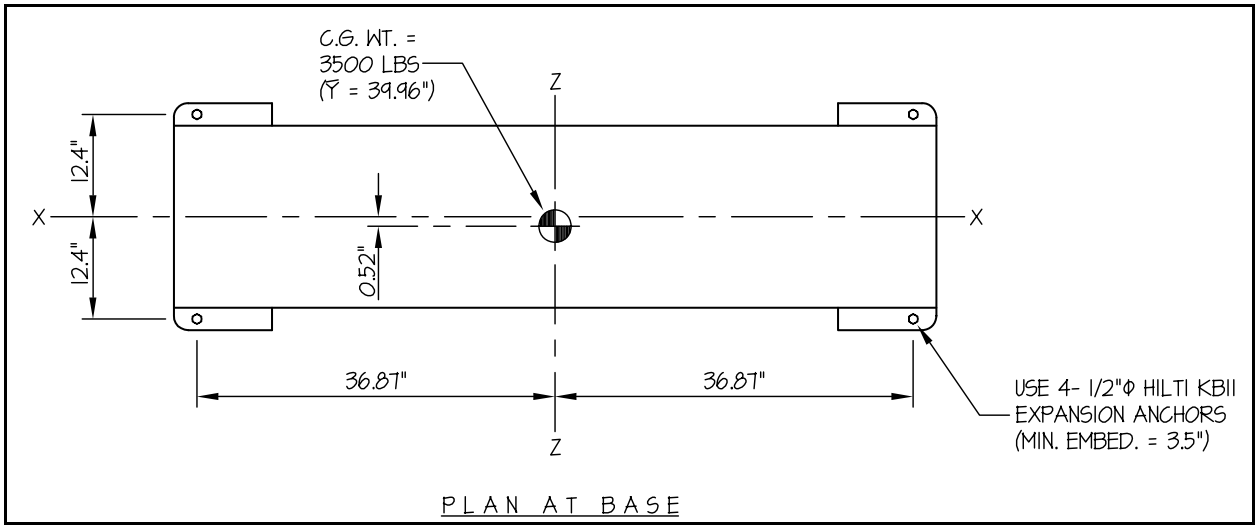


Figure 6-5: Seismic Anchorage - PET Gantry

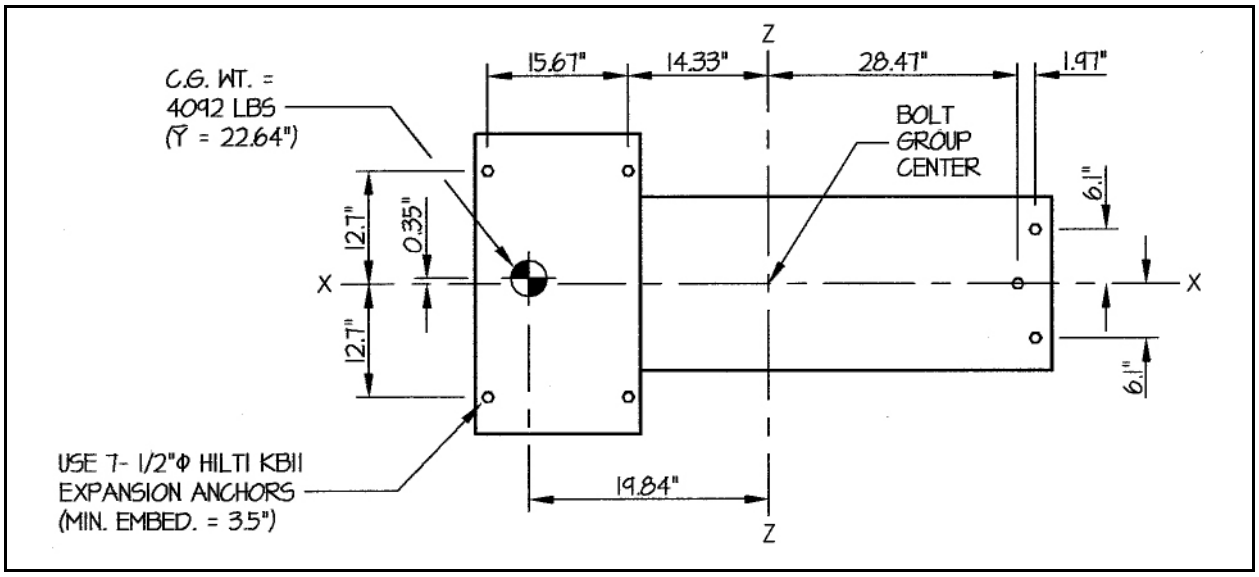


Figure 6-6: Seismic Anchorage - Number 3 of 3

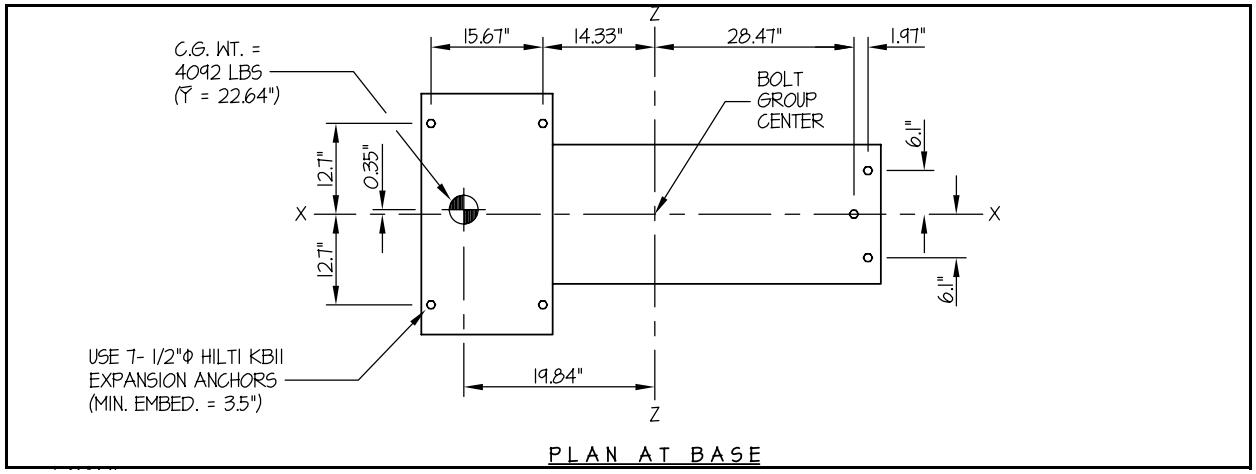


Figure 6-7: Gantry - PET/CT Center of Gravity Locations at Operating Position (SK4092003, Sheet 1, Rev 1)

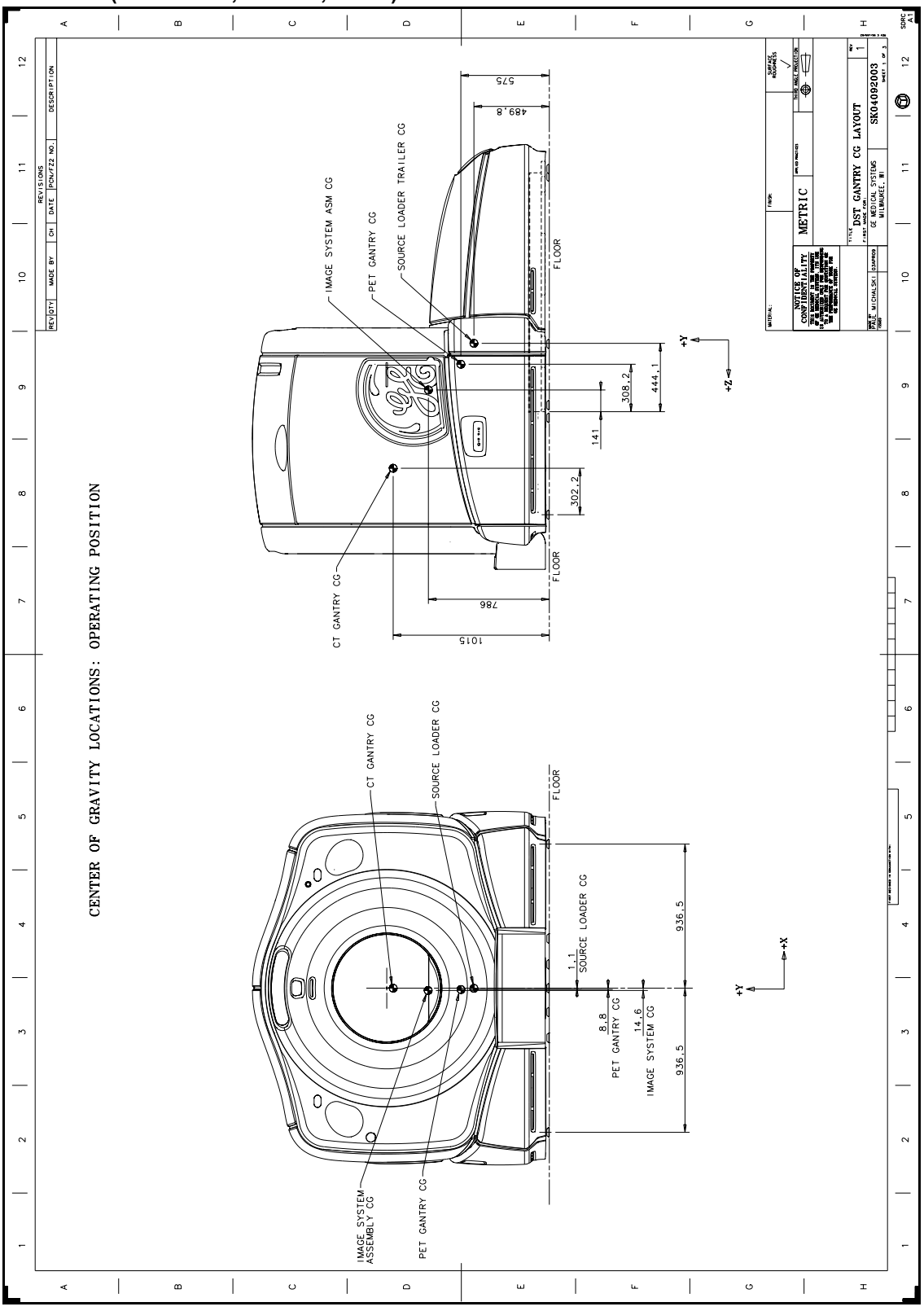


Figure 6-8: Gantry - PET/CT Center of Gravity Locations Entire Gantry (SK4092003, Sheet 3, Rev 1)

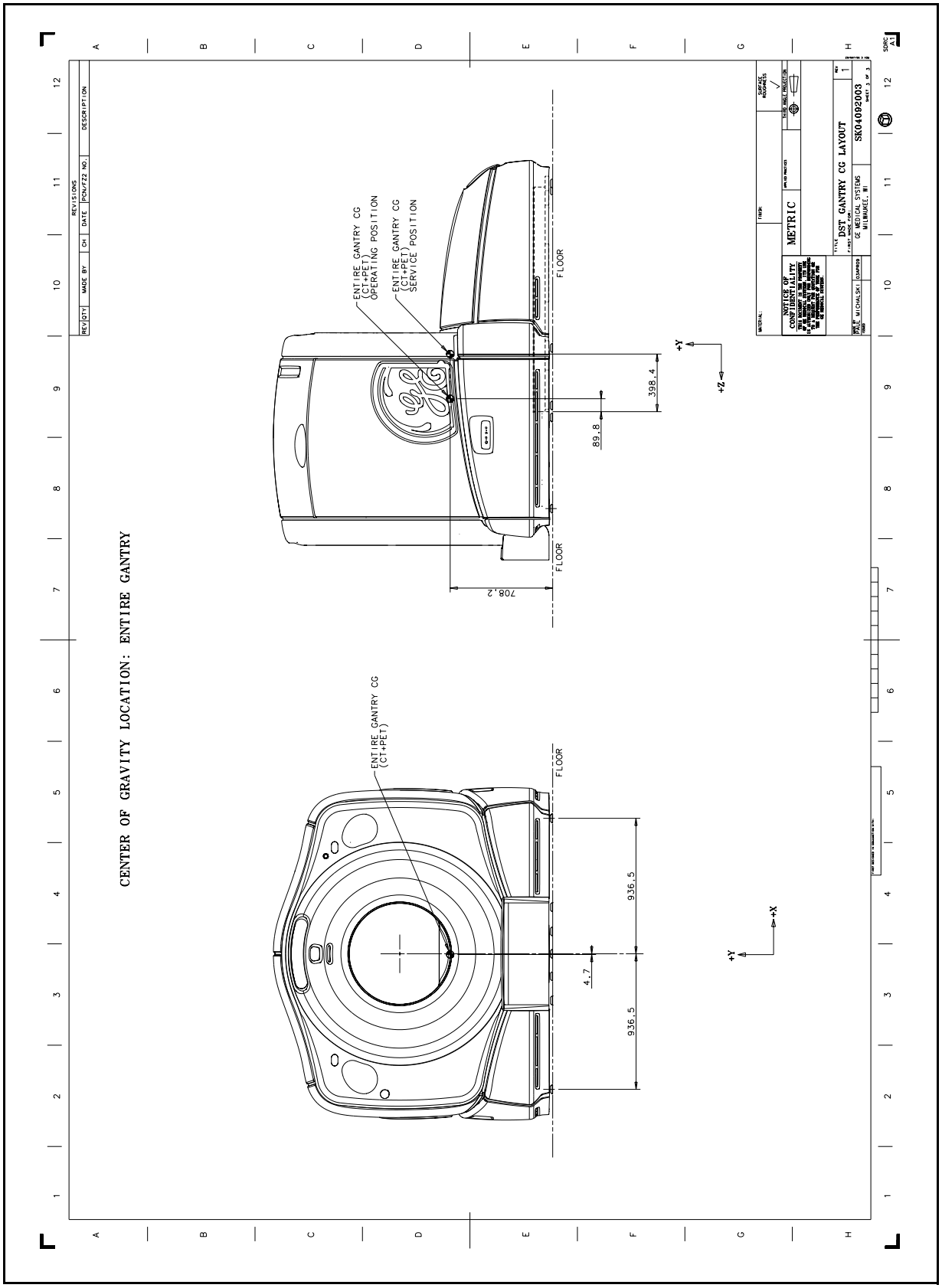
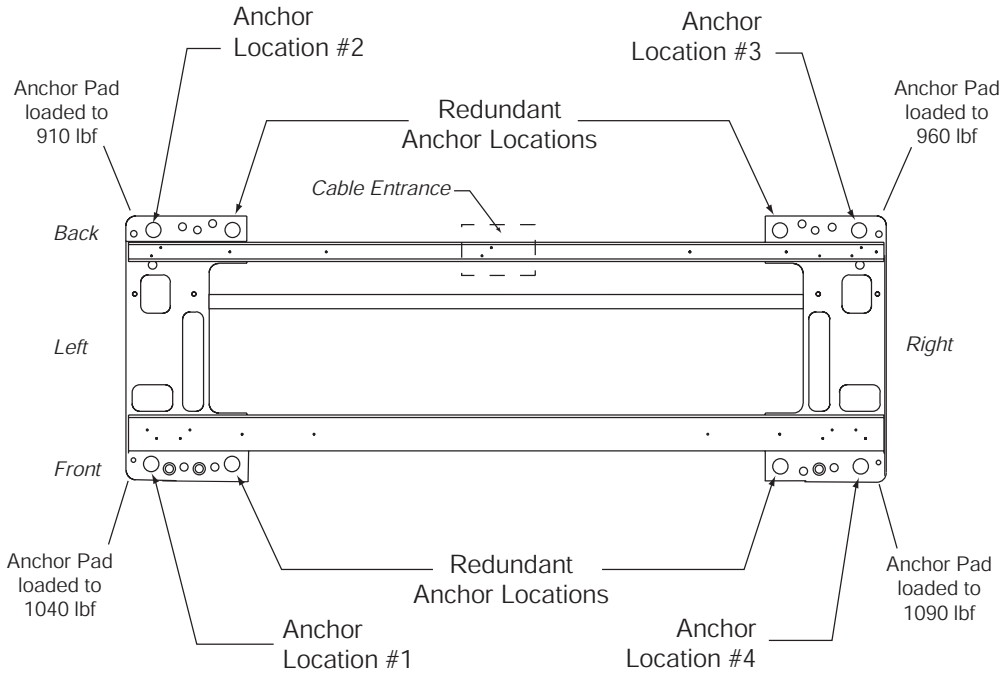


Figure 6-9: CT Gantry Leveler and Adjuster Location



Note: Adjusters are used at each anchor location. Anchor hole ID is 1/2" (12.7 mm). Void between adjuster and anchor must be filled according to local building codes for siesmic application.

Figure 6-10:PET Gantry Leveler and Adjuster Location

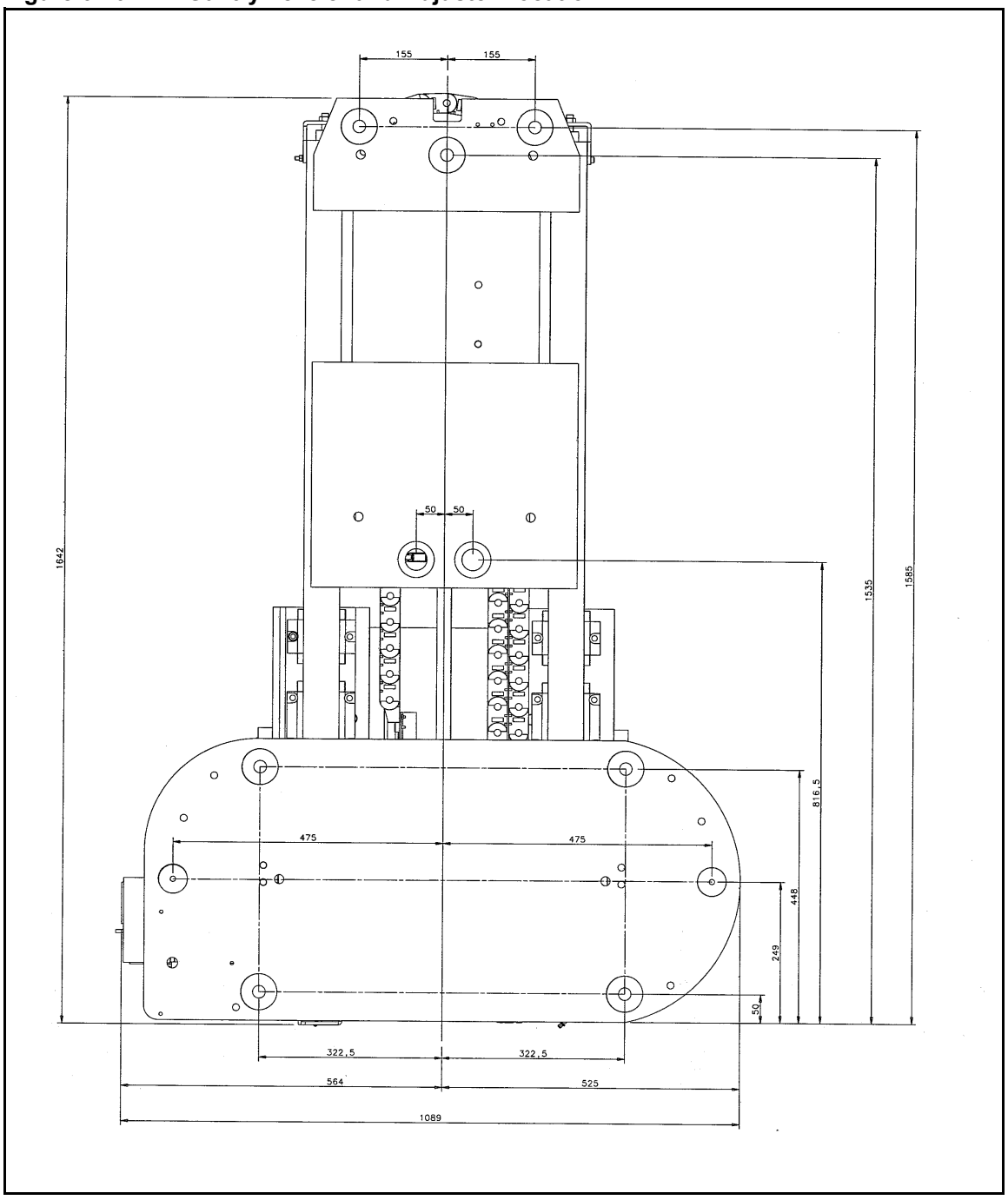


Figure 6-11:Patient Table (Slab on Grade)

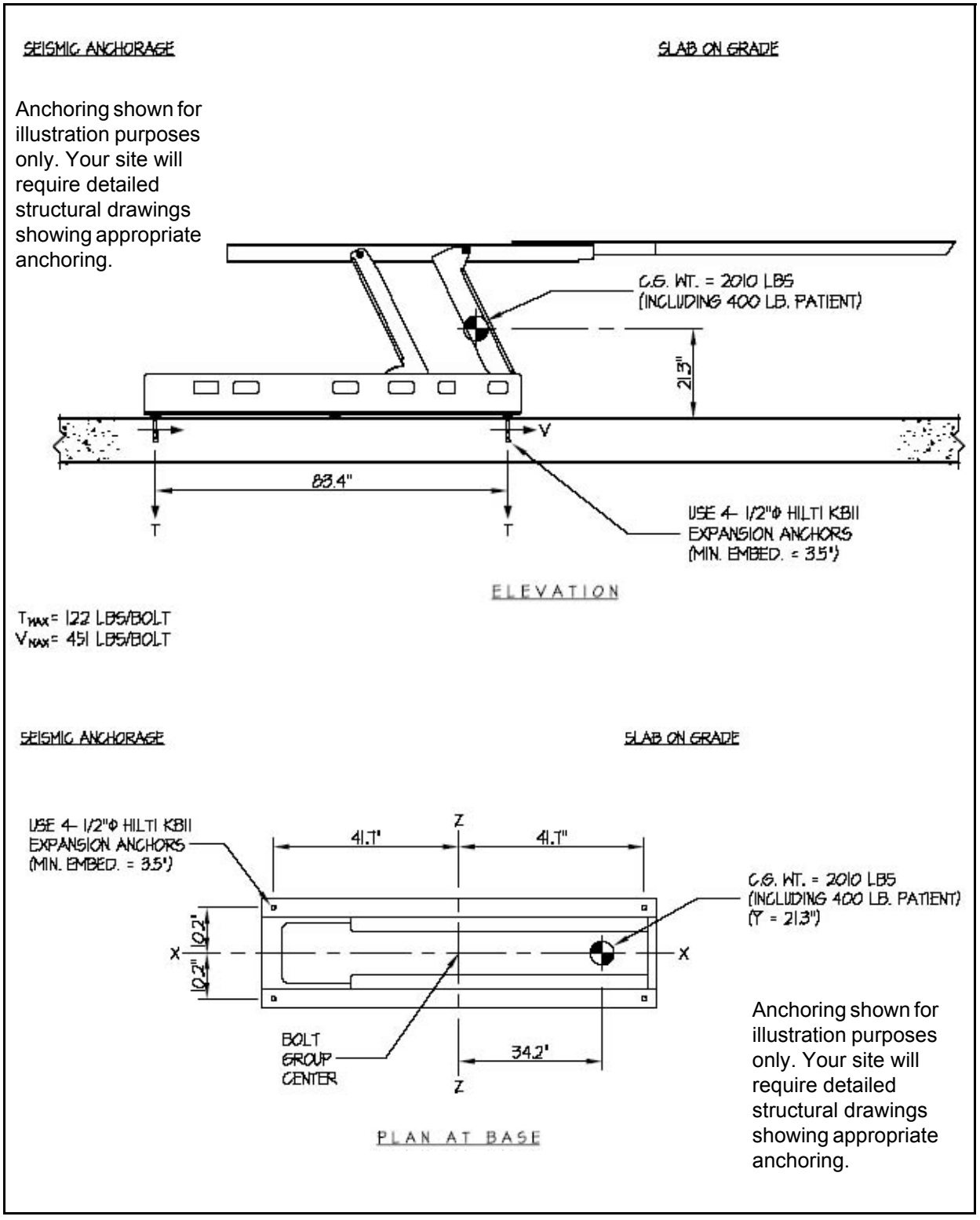


Figure 6-12:Patient Table (Upper Floor)

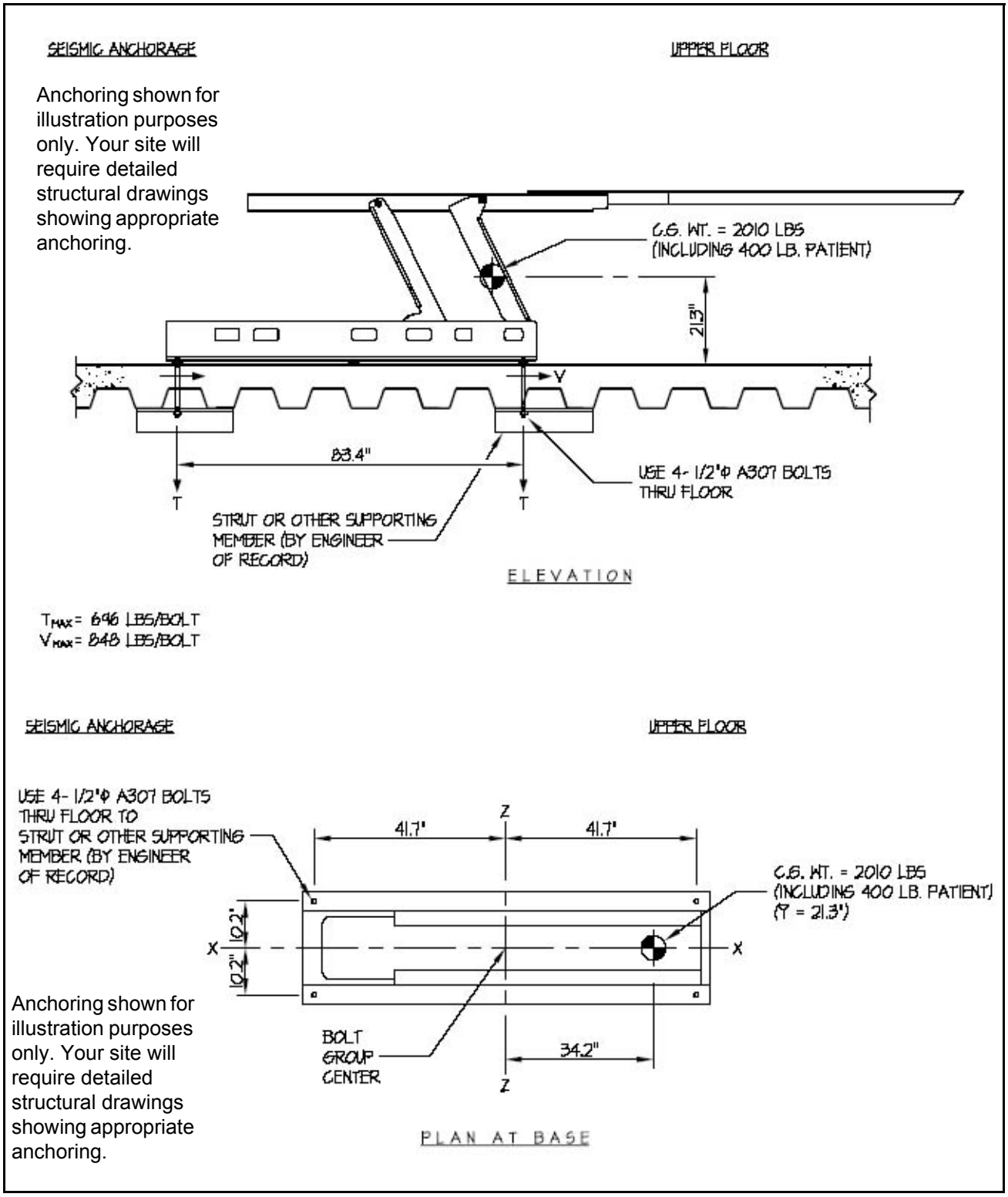


Figure 6-13:Power Distribution Unit (PDU)

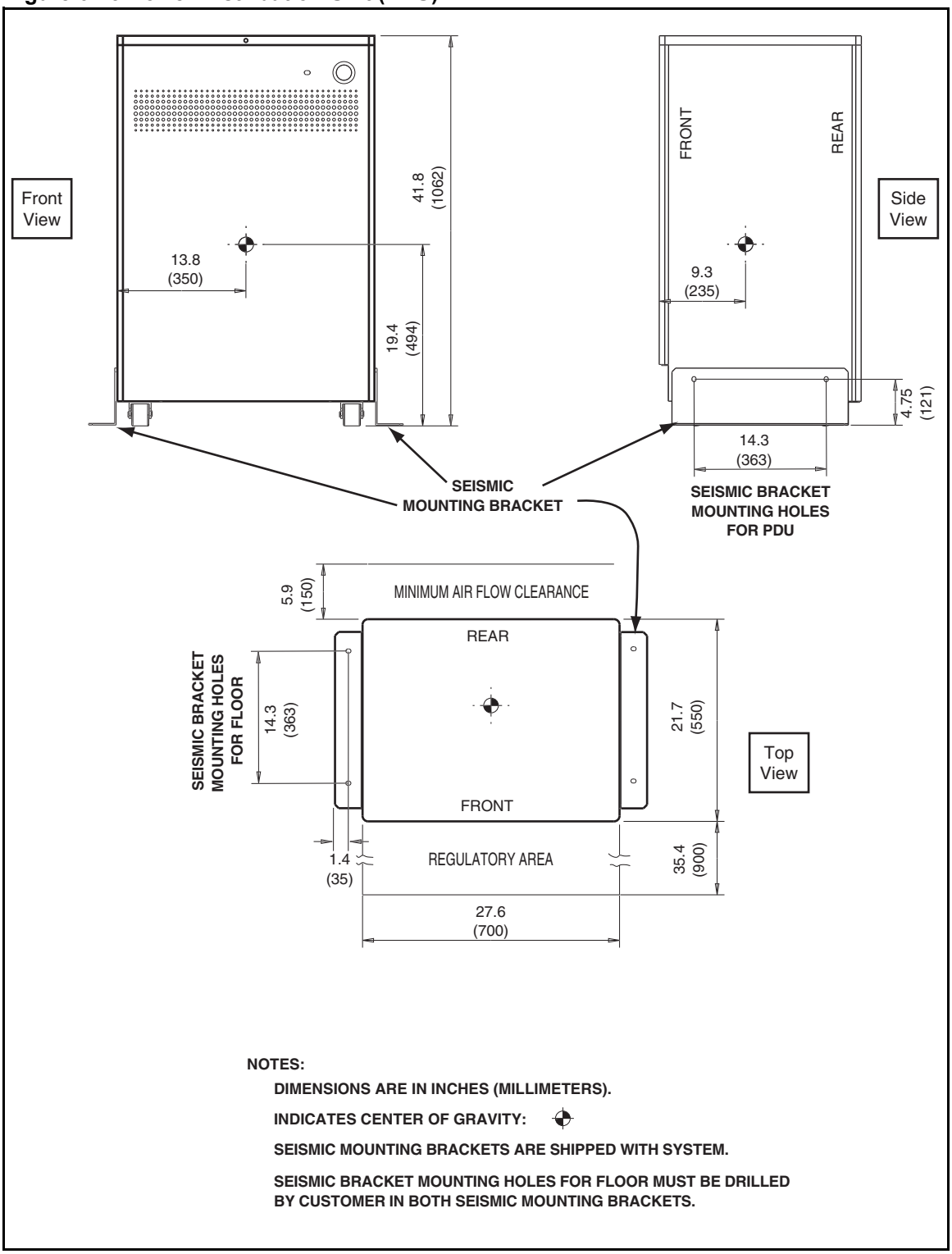
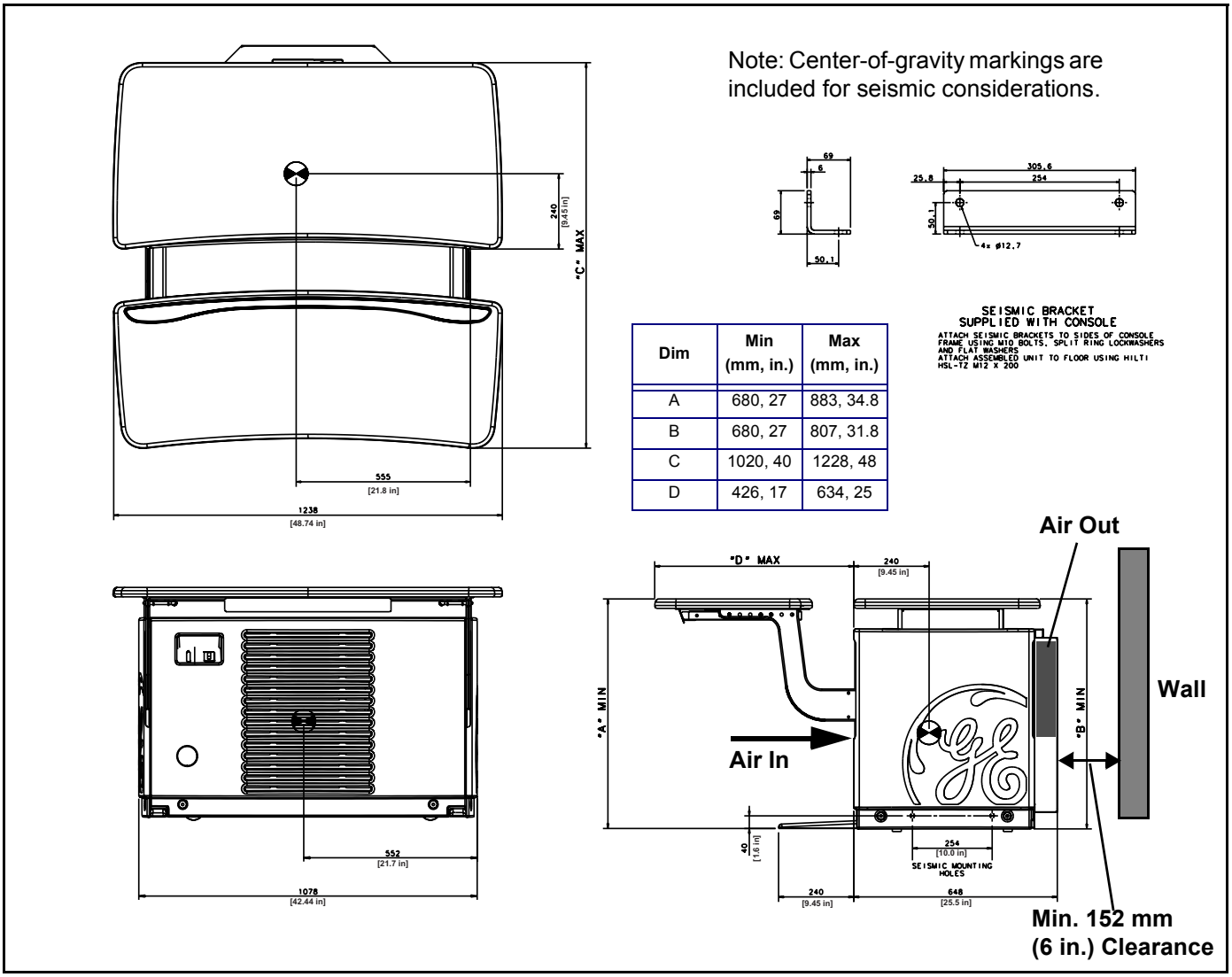
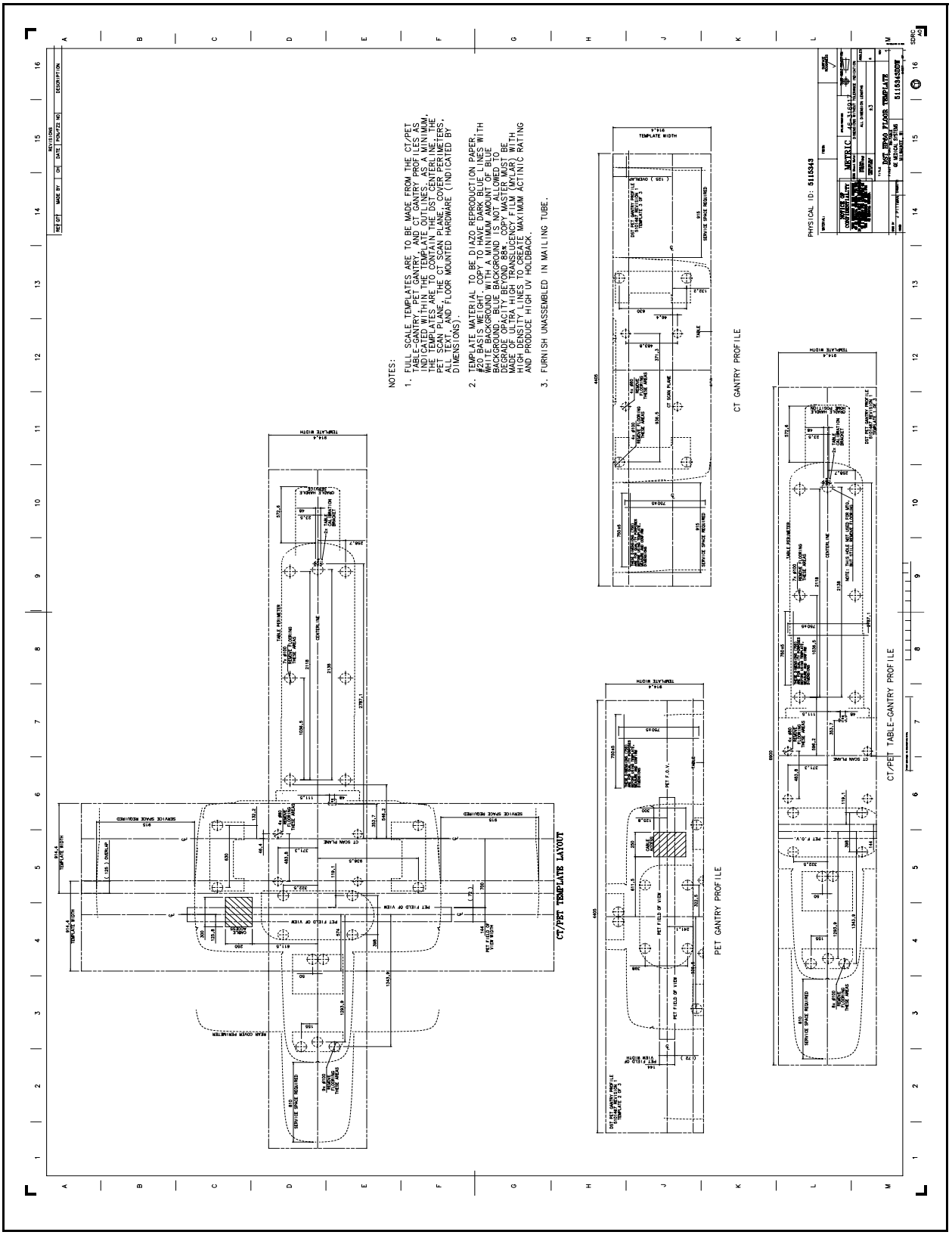


Figure 6-14:GRE Operator Console Dimensions



Dim	Min (mm, in.)	Max (mm, in.)
A	680, 27	883, 34.8
B	680, 27	807, 31.8
C	1020, 40	1228, 48
D	426, 17	634, 25

Figure 6-15:Gantry/Table Mounting Dimensions



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Chapter 7 Power Requirements

Section 7-1: Introduction

The Power Distribution Unit (PDU) supplied with the Discovery ST, STE, & RX HP60 systems transforms and distributes power to all system components. The PDU is the only power entry point required to operate the system.

Power wiring between the facility main distribution panel and the PDU should be kept as short as possible. This minimizes voltage regulation effects.

Carefully consider advantages and disadvantages of conduits, floor ducts and surface raceways for running cables. Make cable passageways large enough to install any cable with all other cables already installed.

When routing power cables, all three phase wires and ground must be run in the same conduit or raceway duct-work. Power cables should be routed separately from system control cables (for example, use a separate trough in duct).

Section 7-2: System Input Power

7-2.1 Facility Source

Power to the system should be supplied by a dedicated feeder from the nearest Main Distribution Panel (MDP). A protective disconnect device must be provided in the power line supplying the PDU in accordance with National Electric Code and applicable local codes.

Note: Lockout/tagout provision required

The disconnect device must be located within 10,668 mm (35 feet) of the PDU, visible to PDU service personnel, and must have provision for tagout / lockout. It is identified as “A1” in the interconnection schematic diagrams.

GE part numbers for A1 Disconnect panels are:

- P5051RJ (Discovery A1 panel - 90 amp)
- P5051RK (Discovery A1 panel - 110 amp)

Since the disconnect is not included with the system catalog, it is possible to arrange to have this item delivered during the site construction phase.

The rating of the disconnect device depends on the nominal line voltage. It must provide over-current protection and have a low voltage release, with multi-point remote control capability. Refer to Power Distribution System on page 101, for minimum rated capacity requirements and suggested device.

7-2.2 Main Disconnect Control

Customer-supplied emergency off buttons must be connected to the main disconnect controller (A1) in order to disable the power to all Discovery ST, STE, & RX HP60 system equipment in emergency situations. They should be mounted in the control room near the operator console. Emergency off buttons are to be clearly labeled “Emergency Off” and visible to personnel in the PET-CT Room. It is important that the button be labeled “off” and not “stop” since there exists an

"Emergency Stop" button in the Discovery ST, STE, & RX HP60 system that disables output power to the system equipment in the patient area of the PET-CT system.

The main disconnect control must be lockable for power Lockout/Tagout requirements to meet GE Healthcare Service and/or OSHA requirements.

If installed in the United States, the main disconnect control must be approved by UL (or another nationally-recognized testing organization listed and labeled in accordance with 1999 National Electrical Code (NEC) Article 110-2).

If installed in a country other than the United States, the main disconnect control must be approved by the local regulatory organization.

Table 7-1 defines specific values for power levels, both for recommended (minimum) installation and for future growth purposes.

Table 7-1 Typical Power Requirements

Region	Minimum/ Recommended	Growth
North America	90A P5051RJ	125A E4502AE
Europe/Asia	110A P5051RK	150A E5502AF

7-2.3 Configuration

The Discovery ST, STE, & RX HP60 systems are designed to operate on three-phase, **four-wire** wye power. A ground referenced wye source produces the lowest leakage currents and is preferred. However, the neutral wire does not need to be run to the system, i.e., four-wire connection. (A dummy terminal is provided for "parking" the neutral wire in the event a five-wire service is already installed at the site.)

7-2.4 PDU Rating

Table 7-2 Rating Table for PDU (NGPDU - P5051RD)

Specification	Acceptable Range
Voltage	380 to 480 VAC (see note, below)
Capacity	90 KVA momentary 20 KVA average
Frequency	50 or 60 Hz (47 to 53 or 57 to 63 Hz)

Note: The absolute range of line voltage at the input to the PDU must remain within one of the ranges shown in Table 7-3 at all times.

WARNING **TO PREVENT POWER LOSS TO OTHER LOADS IN CASE OF AN UNEXPECTED CT OR PET SYSTEM FAULT, THE POWER FEEDER MUST HAVE OVERCURRENT PROTECTION SUCH THAT THE DOWNSTREAM OVERCURRENT PROTECTION DEVICES (e.g. GE A1 PANEL) CLEAR THE FAULT BEFORE ANY UP-STREAM OVERCURRENT PROTECTION DEVICE OPENS.**

7-2.5 Regulation

The size of the facility transformer and feeder wires determine load regulation presented to the system. Total load regulation as measured at the PDU input terminals must not exceed 6%.

7-2.6 Phase Imbalance

The difference between the highest line-to-line voltage and lowest line-to-line voltage must not exceed 2% of the lowest line-to-line voltage.

7-2.7 Sags, Surges & Transients

Sags and surges of the power line must not exceed the absolute range limits shown in Table 7-3.

Limit maximum transient voltage to 1500V peak.

7-2.8 Microcuts

The Discovery ST, STE, & RX HP60 systems are generally unaffected by microcuts.

7-2.9 Grounding

The ground to the PET-CT system shall originate at the system power source, (i.e., transformer or first access point of power into a facility) and be continuous to the PET-CT system power disconnect in the room. **A dedicated 55mm^2 (1/0) or larger insulated copper ground wire must be run with the phase wires from the main distribution panel to the PDU**. These grounds can be spliced with “High Compression Fittings” and should be terminated at each distribution panel it passes through. When the ground is broken for a connection to a panel, it shall be connected into an approved non-insulated grounding block with the incoming and outgoing ground in this same grounding block, which is then connected to the steel panel, never using the steel or other material of the panel as the block.

The resistance between the PDU ground and the facility earth ground must not exceed 0.5 ohm. In addition, the total resistance between the PDU ground and **earth must not exceed 2 ohms**. Resistance between any two grounded devices must not exceed 0.1 ohm to ensure equal potential ground system within the PET-CT Room.

Section 7-3: Power Distribution System

A single-unit installation where the distribution transformer and feeder are dedicated to the Discovery ST, STE, & RX HP60 system is recommended. In this case, the minimum recommended transformer size is 112.5 KVA, rated 3.2% regulation at unity power factor. Resultant maximum allowable feeder regulation: 2.4 %. The minimum recommended feeder size and over-current protection device ampacity based on line voltage is shown in Table 7-3.

- Maximum power demand = 90 kVa @ 0.85 PF at a technic of 140 kV, 380 mA.
- Average (continuous) power demand at maximum duty cycle = 20 kVa.
- Maximum allowable total source regulation = 6%

The nominal line voltage must fall within one of the ranges listed below.

Table 7-3 Facility Power Requirements

Nominal Line Voltage (VAC)	380	400	420	440	460	480
Voltage Range (VAC) +/- 10 %	342-418	360-440	378-462	396-484	414-506	432-528
Continuous Line Current (A)	30	29	27	26	25	24
Momentary Line Current (A)	137	130	124	118	113	108
Maximum Line Current (A)	152	144	138	131	126	120
Minimum Recommended Circuit Protection Rating	110	110	110	90	90	90
Feeder Length (MDP to A1)						
0 - 46 m (0 - 150 ft)	35 (2)	35 (2)	35 (2)	30 (3)	30 (3)	30 (3)
46 - 61 m (150 - 200 ft)	45 (1)	45 (1)	35 (2)	35 (2)	30 (3)	30 (3)
61 - 76 m (200 - 250 ft)	55 (1/0)	55 (1/0)	45 (1)	45 (1)	35 (2)	35 (2)
76 - 91 m (250 - 300 ft)	70 (2/0)	70 (2/0)	55 (1/0)	55 (1/0)	45 (1)	45 (1)
91 - 107 m (300 - 350 ft)	85 (3/0)	70 (2/0)	70 (2/0)	55 (1/0)	55 (1/0)	45 (1)
107 - 122 m (350 - 400 ft)	100 (4/0)	85 (3/0)	85 (3/0)	70 (2/0)	70 (2/0)	55 (1/0)
Sub-Feeder Length (A1 to PDU)	Minimum sub-feeder wire size, sq. mm (AWG or MCM)					
10.668 m (35 ft)	35 (2)	35 (2)	35 (2)	30 (3)	30 (3)	30 (3)

Notes:

1.) The feeder table above is based on the use of copper wire, rated 75C and run in steel conduit. Ampacity is determined in accordance with the National Electric Code (NFPA 70), Table 310-16 (2002).

2.) The minimum feeder size is determined by the ampacity of the circuit protection device listed above, except where a larger size is necessary to meet total source regulation limits.

3.) A 1/0 (55 sq. mm) ground wire is recommended in all cases.

WARNING **IF THE POWER FEED FOR THE A1/PDB PANEL IS NOT ON A DEDICATED POWER TRANSFORMER, ANY DEVICE THAT SHARES POWER FROM THAT TRANSFORMER MAY BE IMPACTED BY INADVERTENT POWER INTERUPTION CAUSED BY AN A1/PDB POWER PANEL FAULT. CONVERSLY, THE OPERATION OF OTHER DEVICES SHARING THE POWER TRANSFORMER MAY ALSO IMPACT THE OPERATION OF THE CT/PET SCANNER.**

- If the Discovery ST, STE, & RX HP60 system must be powered from an existing distribution transformer and secondary feeder, such as the equipment distribution panel of an X-ray department, installation with other X-Ray equipment which use rapid film changers should be avoided. These changers use a large number of high-powered, closely-spaced exposures which may coincide with a PET-CT scan and produce image artifacts.

In all cases, qualified personnel must verify that the transformer and feeder, at point of take-off, plus the run to Discovery ST, STE, & RX HP60 meets all the requirements.

Section 7-4: Uninterruptable Power Supplies (UPS)

An Uninterruptable Power Supply (UPS) is recommended for any area or site with known power issues. Consult the local power provider for power quality data in the area. UPS is standard equipment on all mobile units. Filter and surge protectors are not needed with Discovery ST, STE, & RX HP60 systems. For use with Discovery ST, STE, & RX HP60 systems, the PowerWare 9330 UPS (catalog number P5052PS) and A1 disconnect panel (P5051RJ, 90 amp, or P5051RK, 110 amp) are recommended.

Section 7-5: Power Audit

A site power audit is required for the Discovery ST, STE, & RX HP60 family of products. This site power audit can be arranged with the GE Power Quality team, or through a sales representative.

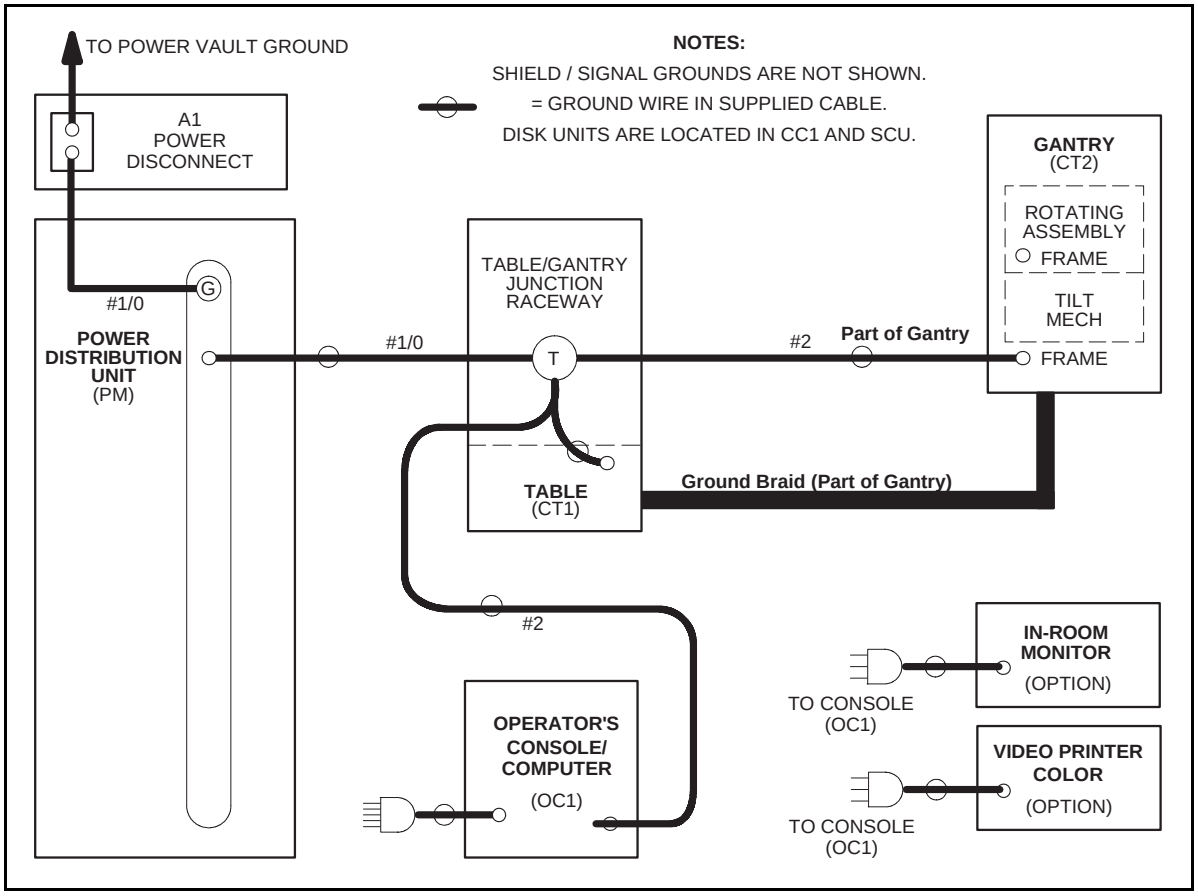
A power and grounding audit is an installation requirement. A GE representative will coordinate this visit to the site.

Section 7-6: Ground System

The Discovery ST, STE, & RX HP60 uses an equal potential grounding system. The required ground system is shown in Figure 7-1. There are three primary grounding points:

- A system power ground point located in the PDU PM (Power Module).
- A reference ground point located between gantry and table base. All exposed metal surfaces in patient vicinity are grounded to the reference ground point
- A patient ground point located at the front of the table base.

Figure 7-1: System Ground Map



Chapter 8 Interconnection Information

Section 8-1: Introduction

Table 8-1 shows component designators for supplied equipment, options and wall power outlets.

Table 8-2 and Table 8-3 list details for connection to Discovery ST, STE, & RX HP60 equipment, using long-length (standard) and short-length (optional) cables respectively. Details are valid for the following types of runs as appropriate:

- Flush-floor duct
- Computer floor
- Through-wall bushing
- Junction box
- Through-floor duct
- Wall duct
- Conduit

The need for additional junction boxes is minimized by use of either a cable raceway system or a raised computer floor. The Discovery ST, STE, & RX HP60 uses prefabricated cables with large plugs. Therefore, conduit or pipe is not recommended for cable runs.

Table 8-4 lists contractor- or customer-installed wiring and supplied cables. The actual length of each run is less than the length of supplied cables to allow for routing inside equipment. Cable diameters and sizes of connectors are provided to aid in sizing conduit and access plates.

Table 8-5 details components other than cabling which are to be supplied by the contractor or customer.

Figure 8-1 shows an interconnection diagram for the Discovery ST, STE, & RX HP60 system. Figure 8-2 shows interconnection runs for a 50/60 Hz system.

Section 8-2: Component Designators

Table 8-1: Component Designators

Designator	Applies To	Source
A1	Primary power disconnect	**Contractor-supplied**
CT1	Patient table	System
CTPT CT2 PT1	Gantry - CT - PET	System
LP	Line printer	Option
OC1	Operator's console/computer	System
PM	Power distribution unit	System
SEO	System emergency off	**Contractor-supplied**
WL	“X-Ray on” warning light	**Contractor-supplied**

Section 8-3: Interconnect Runs, Wiring and Cables

8-3.1 GE Healthcare-Supplied Cables

8-3-1.1 Long-Length Run Cables - PN 2346968 (Standard)

Table 8-2: Connections to Runs 1, 2, 3 and 4 (Standard, supplied by GE Healthcare)

Run #	Length, Actual (Usable)		Part #	Description	UL Cable Information								Pull Size mm (inch)
	ft	m			UL Style	Flammability Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia. mm (inch)	# of Cond	Size AWG	
1	63 (55)	19.3 (16.76)	2371450	Ground - PDU to CT1	1284	VW-1 (FT-1)	600	0	105	15.5 (0.608)	1	1/0	15.8 (0.62) Dia
	63 (55)	19.3 (16.76)	2343529	HVDC - PDU to CT2	2587	FT-4	600	± 350 VDC	90	19.0 (0.751)	2	(2)4 (1)8	22 (0.87) Dia
	60 (55)	18.5 (16.76)	2343528	Power - PDU to CT2	2587	FT-4	600	208Y/120	90	13.8 (0.542)	5	8	56.4 (2.22) Dia
	62.5 (55)	19.0 (16.76)	2343530	HVAC - PDU to CT2	Flexible Motor Supply Cable	FT-4	600	440Y/254	90	15.3 (0604)	4	12	11.2 (.44) Dia
	60 (55)	18.5 (16.76)	2344446	Power - PDU to PT-1	2587	FT-4	600	208Y/120	90	13.8 (0.542)	5	8	56.4 (2.22) Dia
2	80 (75)	24.5 (22.86)	2343531	Power - PDU to OC1	2587	FT-4	600	208Y/120	90	12.3 (0.483)	4	10	56.4 (2.22) Dia
	83 (75)	25.5 (22.86)	2371450-3	Ground - Raceway to OC1	1283	VW-1 (FT-1)	600	0	105	11.9 (0.467)	1	2	12.2 (.48) Dia
3	63 (55)	19.3 (16.76)	2333152	Signal - PDU to Gantry MSUB	UL	FT-4	300	<30VDC	80	13.3 (0.525)	37	22	20 x 75 (.78 x 2.95) 20 x 51 (.79 x 2.01)

Run #	Length, Actual (Usable)		Part #	Description	UL Cable Information								Pull Size mm (inch)
	ft	m			UL Style	Flammability Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia. mm (inch)	# of Cond	Size AWG	
4	83 (75)	25.5 (22.86)	2333150	Signal - Console to Gantry MSUB (CT2)	UL	FT-4	300	<30VDC	80	11.2 (0.440)	25	22	17 x 58 (0.68 x 2.30) 19 x 51 (.75 x 2.01)
	80 (75)	24.3 (22.86)	2373436-1	Signal - LAN Console to CT2	UL (RG-223/U)	FT-4	1900	<30VDC		5.9 (0.234)	1	19	15 (0.59) Dia
	80 (75)	24.3 (22.86)	2117848-2	Fiber Optic - Console to CT2			NA	NA			1	NA	10 (0.39) Dia
	80 (75)	24.3 (22.86)	2215028-10	Signal - LAN Console to PT-1	CAT 5	FT-4	1900	<30VDC		5.9 (0.234)	1	19	15 (0.59) Dia
	100 (25)	30.8 (7.62)	5199717	Signal - Cable-Gantry to RPM unit	UL	FT-4	300	<15VDC		5.9 (0.234)	4	22	15 (0.59) Dia

8-3-1.2 Short-Length Run Cables - PN 2346968-2 (Optional)

Table 8-3: Connections to Runs 1, 2, 3 and 4 (Optional. Can be ordered from GE Healthcare.)

Run #	Length, Actual (Usable)		Part #	Description	UL Cable Information								Pull Size mm (Inches)
	ft	m			UL Style	Flammability Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia. mm (inch)	# of Cond	Size AWG	
1	43 (35)	13.2 (10.67)	2371450-2	Ground - PDU to CT1	1284	VW-1 (FT-1)	600	0	105	15.5 (0.608)	1	1/0	15.8 (0.62) Dia
	28 (20)	8.5 (6.1)	2343529-2	HVDC - PDU to CT2	2587	FT-4	600	± 350 VDC	90	19.0 (0.751)	3	(2)4 1(8)	22 (0.87) Dia
	28 (20)	8.5 (6.1)	2343528-2	Power - PDU to CT2	2587	FT-4	600	208Y/120	90	13.8 (0.542)	5	8	56.4 (2.22) Dia
	28 (20)	8.5 (6.1)	2343530-2	HVAC - PDU to CT2	Flexible Motor Supply Cable	FT-4	600	440Y/254	90	15.3 (0.604)	4	14	11.2 (0.44) Dia
	28 (20)	8.5 (6.1)	2344446-3	Power - PDU to PT-1	2587	FT-4	600	208Y/120	90	13.8 (0.542)	5	8	56.4 (2.22) Dia
2	65 (60)	19.8 (18.3)	2343531-2	Power - PDU to OC1	2587	FT-4	600	208Y/120	90	12.3 (0.483)	4	10	56.4 (2.22) Dia
	71 (60)	21.7 (18.3)	2371450-4	Ground - Raceway to OC1	1283	VW-1 (FT-1)	600	0	105	11.9 (0.467)	1	2	12.2 (0.48) Dia
3	32.5 (20)	9.9 (6.1)	2333152-2	Signal - PDU to Gantry MSUB	UL	FT-4	300	<30VDC	80	13.3 (0.525)	37	22	20 x 75 (0.78 x 2.95) 20 x 51 (0.79 x 2.01)

Run #	Length, Actual (Usable)		Part #	Description	UL Cable Information								Pull Size mm (Inches)
	ft	m			UL Style	Flammability Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia. mm (inch)	# of Cond	Size AWG	
4	71 (60)	21.7 (18.3)	2333150-2	Signal - Console to Gantry MSUB (CT2)	UL	FT-4	300	<30VDC	80	11.2 (0.440)	25	22	17 x 58 (0.68 x 2.30) 19 x 51 (0.75 x 2.01)
	68 (60)	20.7 (18.3)	2352714-3	Signal - LAN Console to CT2	UL (RG-223/U)	FT-4	1900	<30VDC		5.9 (0.234)	1	19	15 (0.59) Dia
	68 (60)	20.3 (18.3)	2117848-7	Fiber Optic - Console to CT2			NA	NA			1	NA	10 (0.39) Dia
	55 (50)	16.9 (15.24)	2215028-10	Signal - LAN Console to PT-1	CAT 5	FT-4	1900	<30VDC		5.9 (0.234)	1	19	15 (0.59) Dia
	100 (25)	30.8 (7.62)	5199717	Signal - Cable-Gantry to RPM unit	UL	FT-4	300	<15VDC		5.9 (0.234)	4	22	15 (0.59) Dia

8-3.2 Contractor/Customer-Supplied Cables

Table 8-4: Connections to Runs 5, 6, 7, 8 and 9 (Supplied by Contractor or Customer)

Run #	Customer Installed Wiring		Description	Wire & Cable Pigtails m (ft.)	
	Qty	Size mm^2 (AWG)		From	To
RUN NO. 5 FROM PRIMARY POWER SOURCE TO FACILITY DISCONNECT (POWER SOURCE - A1) Maximum Run Length *					
5	3	*	POWER	1 (3)	1 (3)
	1	50 (1/0)	GROUND	3 (1)	1 (3)
	1	*	NEUTRAL	1 (3)	1 (3)
RUN NO. 6 FROM FACILITY DISCONNECT TO POWER MODULE (A1 - PM) / POWER DISTRIBUTION UNIT (PDU) Maximum Run Length *					
6	3	*	POWER	1 (3)	1 (3)
	1	50 (1/0)	GROUND	1 (3)	1 (3)
	1	*	NEUTRAL	1 (3)	1 (3)
RUN NO. 7 FROM FACILITY DISCONNECT TO SYSTEM EMERGENCY OFF (A1 - SEO)					
7	2	**	POWER	2 (6)	2 (6)
	1	**	GROUND	2 (6)	2 (6)
RUN NO. 8 POWER MODULE TO WARNING LIGHT CONTROL (PM - WL)					
8	2	**	WARNING LIGHT 24 VOLT CONTROL A3J2-1,2,3,4	1 (3)	1 (3)
RUN NO. 9 POWER MODULE TO SCAN ROOM DOOR INTERLOCK (PM - DOOR SWITCH)					
9	2	**	SCAN ROOM DOOR INTER LOCK A3J6-1,2	1 (3)	1 (3)
	*	Refer to Table 7-3, “Facility Power Requirements” on page 102 for AWG (mm^2) wire sizes			
	**	Wire sizes determined by local code and contractor			

Figure 8-1: System Interconnect Diagram 5146583SCH Rev. 4

Note: For details, refer to Discovery ST, STE, & RX HP60 Block Diagrams and Schematics, PN 5141132-100.

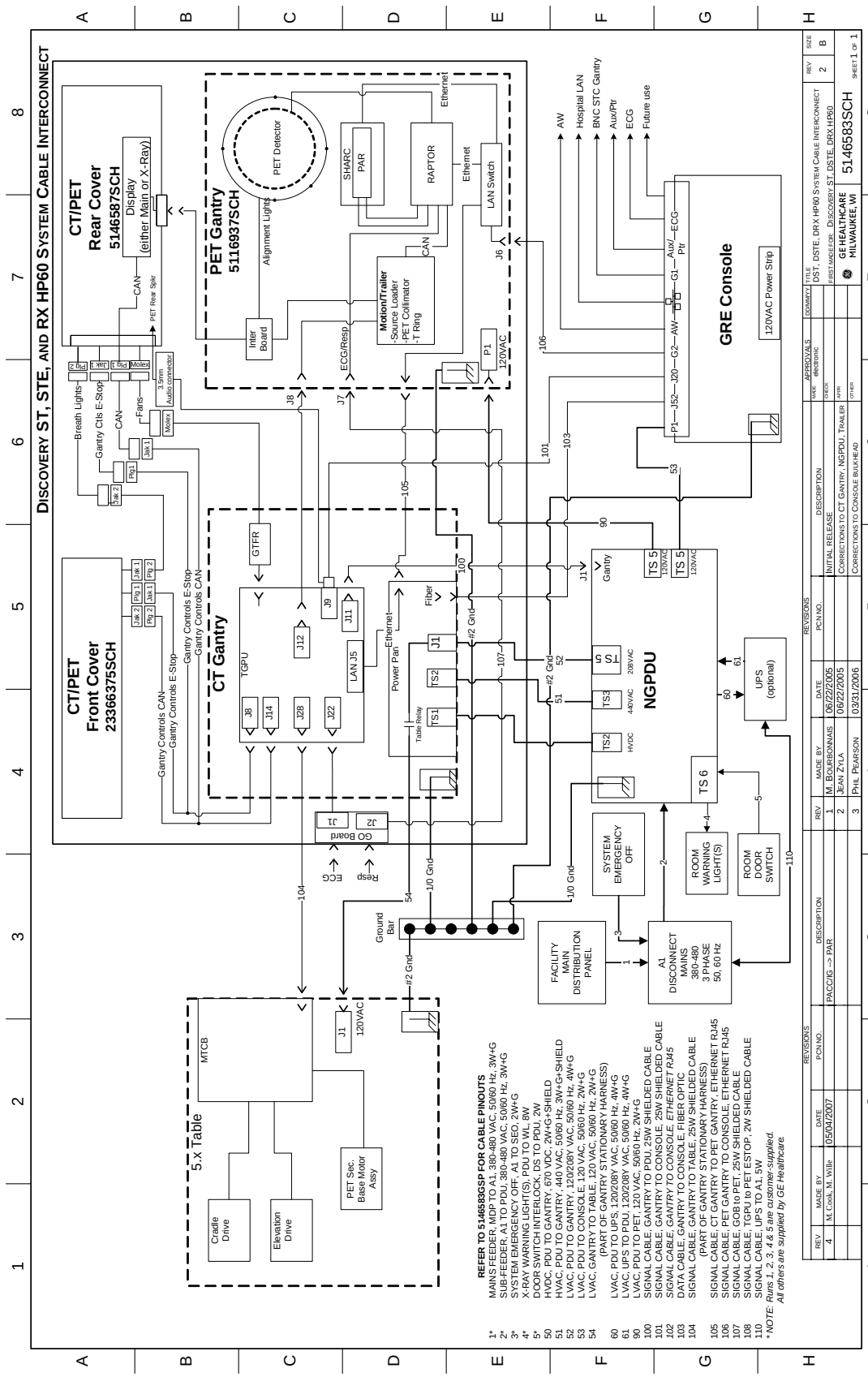
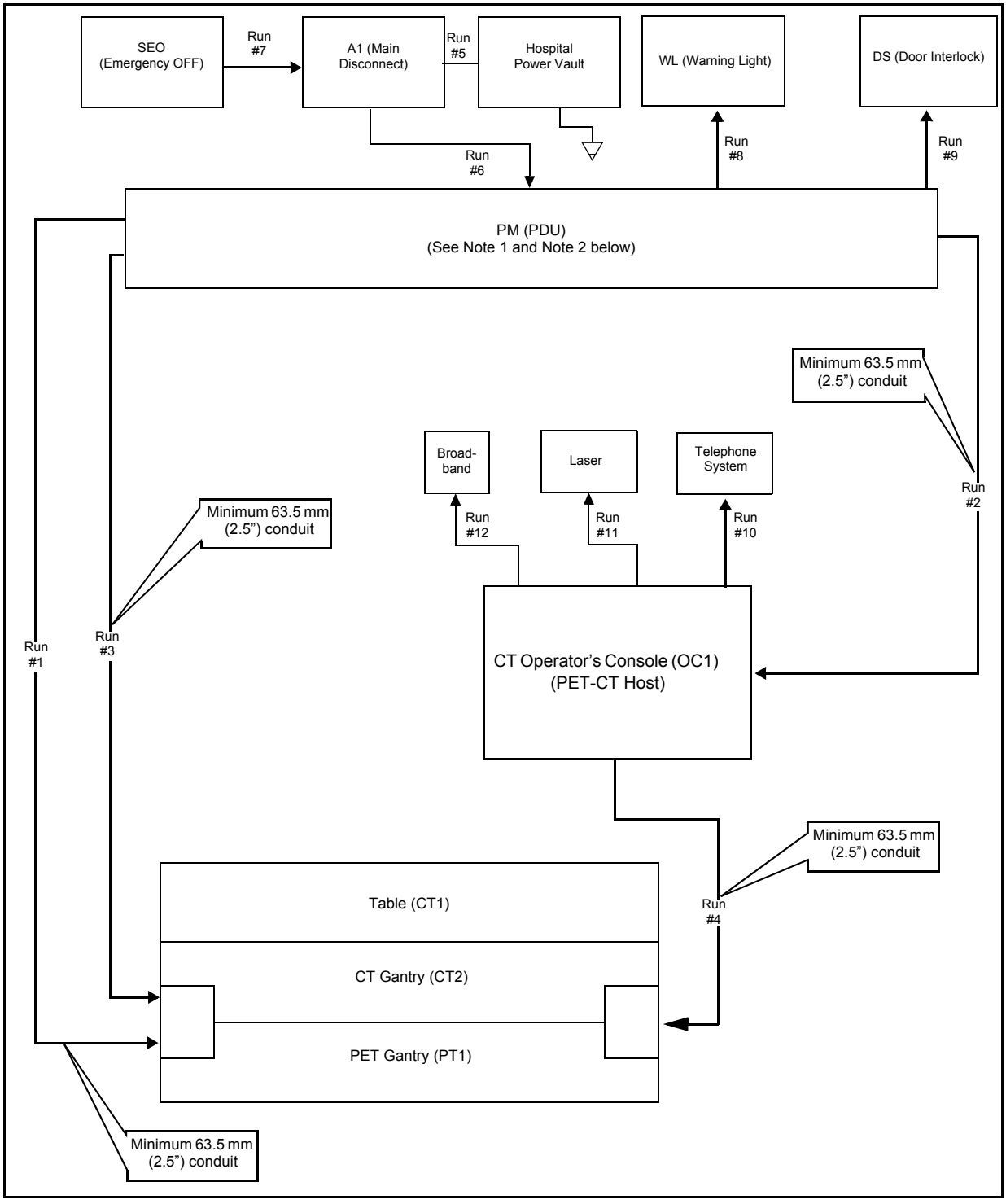


Figure 8-2: Cable Interconnect Runs



Note 1 In order to avoid any violation of each National Regulation (NEC in USA, CCC in China, etc.), use of the compliant cable/wire is recommended. For the China market, the China end-user shall purchase the power supply cable that has the CCC mark.

Note 2 Refer to Table 8-2, Table 8-3, Table 8-4 and Table 8-5 for details about the various runs and components depicted in this diagram. Run/component numbers shown here are listed in the left column of each table.

Section 8-4: Contractor-Supplied Components

Table 8-5: Contractor-Supplied Components Other than Cables

Run #	Ref.	Associated Equipment	Material/labor Supplied By Customer Contractor	USA Vendor / Cat No. GE Catalog
	A1 (90 or 110 amp)	Main Disconnect Control (MDC)	480VAC, Surface or Flush Mount, On/ Off Control, LOTO-capable	Main Disconnect Control, 480VAC, Surface Mount with Flush Mount Kit included, two remote Push Button Switches. • Catalog No. P5051RJ: 90 amp • Catalog No. P5051RK: 110 amp
10 11	ITL	In-suite Broadband/ Telephone Lines (Recommended) Voice Grade Analog Telephone Lines (Alternative)	**Broadband:** To take maximum advantage of the GE Service remote diagnostic and services capabilities, a network connection (CAT 5) with internet access is preferred. This allows GE Healthcare to better provide service and even perform proactive maintenance on the GE system. For additional remote diagnostic and services information, please contact the GE Healthcare Service or Sales representative. **Telephone:** If an on-site LAN connection is not available, a voice-grade analog telephone line will allow GE to connect to the system through a dedicated modem, with some limited capabilities due to bandwidth restrictions. Supply two voice-grade telephone lines, one for the scan room and one for the dedicated modem. The dedicated modem line must be a direct number from outside the facility; do not route this line through a telephone switchboard. Telephone line operating charges are paid by the customer.	
12		Laser Camera	Communication Cable (Supplied): For direct connect via DASM – or – RG45 network camera connection	
		System Components	Reference the system installation drawings supplied by the local area GE Healthcare Installation Support team.	

Section 8-5: UPS Interconnect

Figure 8-3: Typical PowerWare UPS

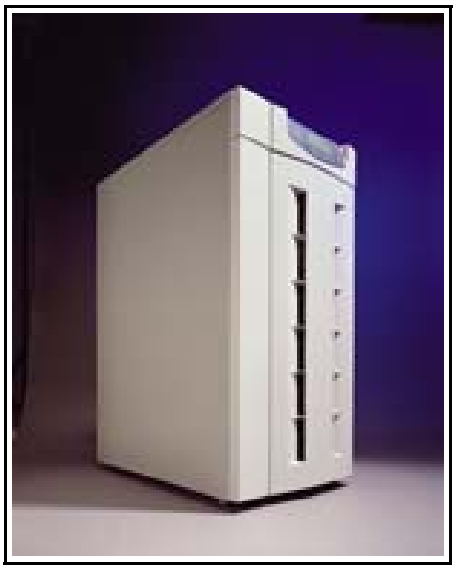


Figure 8-4: Typical UPS Interconnect

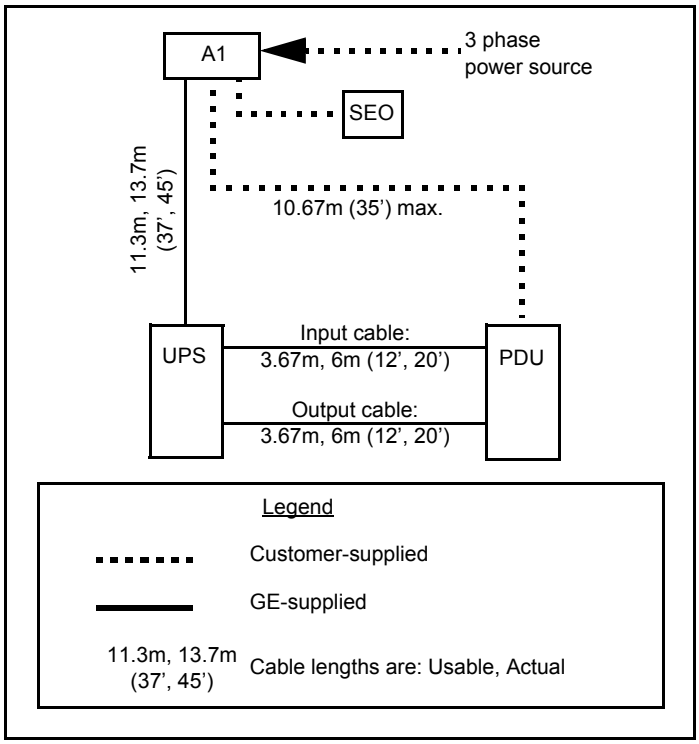


Table 8-6: PowerWare UPS Part Number

Part Num	Description
2366558-2	Powerware 9330 Uninterruptible Power Supply for Discovery ST, STE, & RX HP60 system. (Requires GE A1 disconnect.)

Section 8-6: Typical Customer-Supplied Wiring

8-6.1 Primary Power Disconnect

Note: The Primary Power Disconnect requires a LOTO-compatible disconnect to install this system. If a UPS is required, a GE Disconnect is strongly recommended for safe operation. The GE Disconnect and UPS are designed to work together.

Figure 8-5: Primary Power Disconnect (A1) – <u>Without</u> UPS Control Panel – Fusible Disconnect and Magnetic Contactor

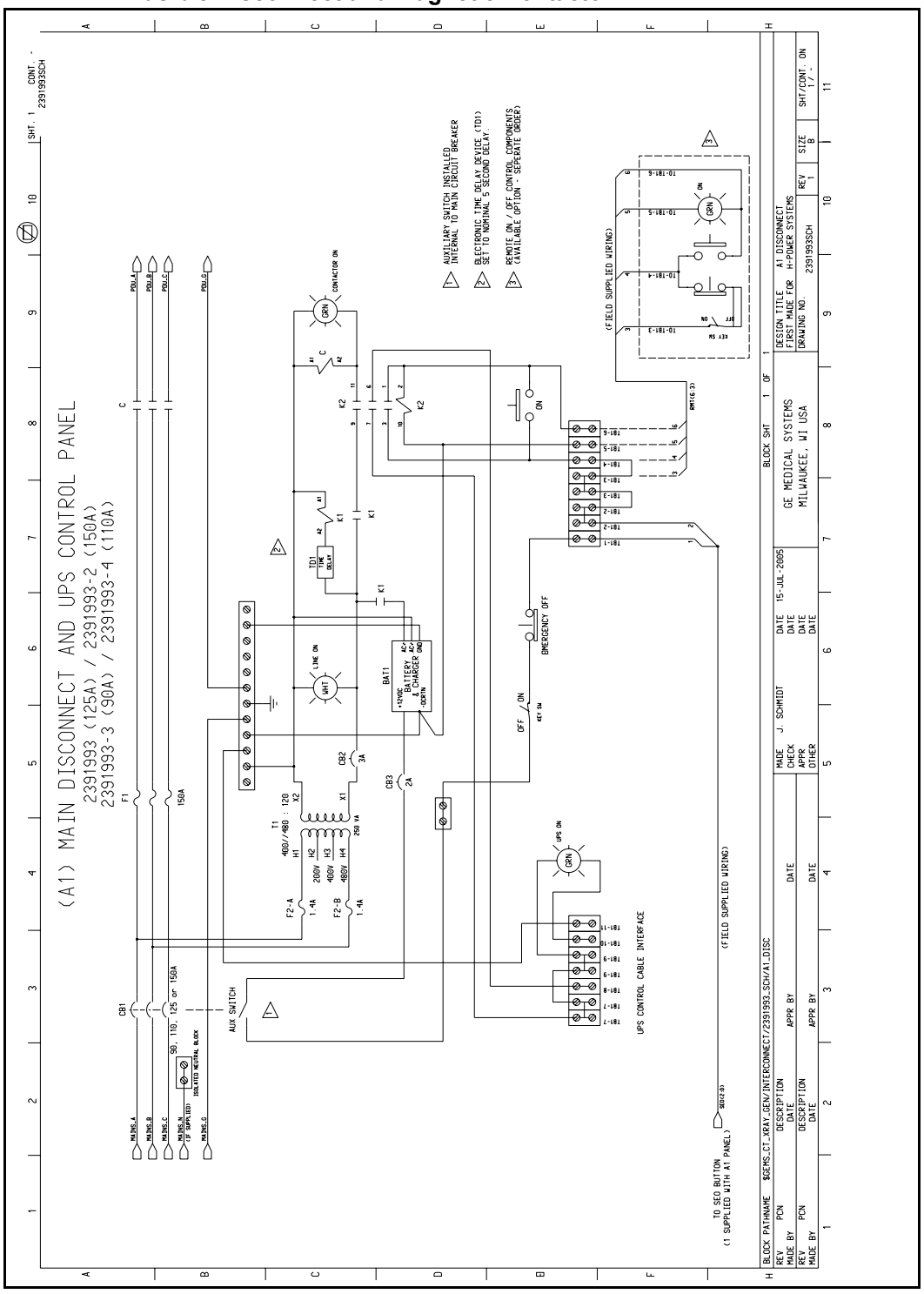
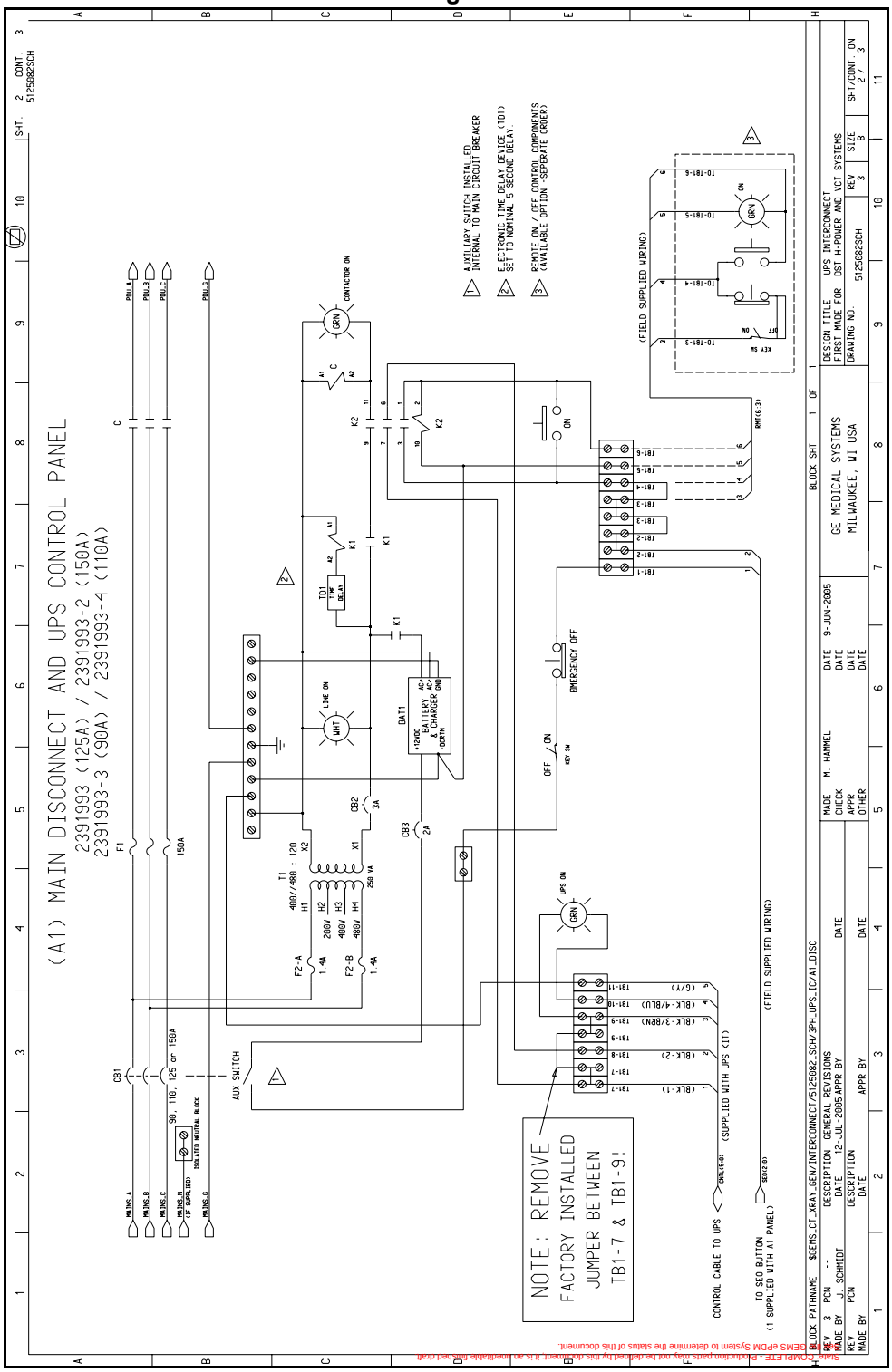
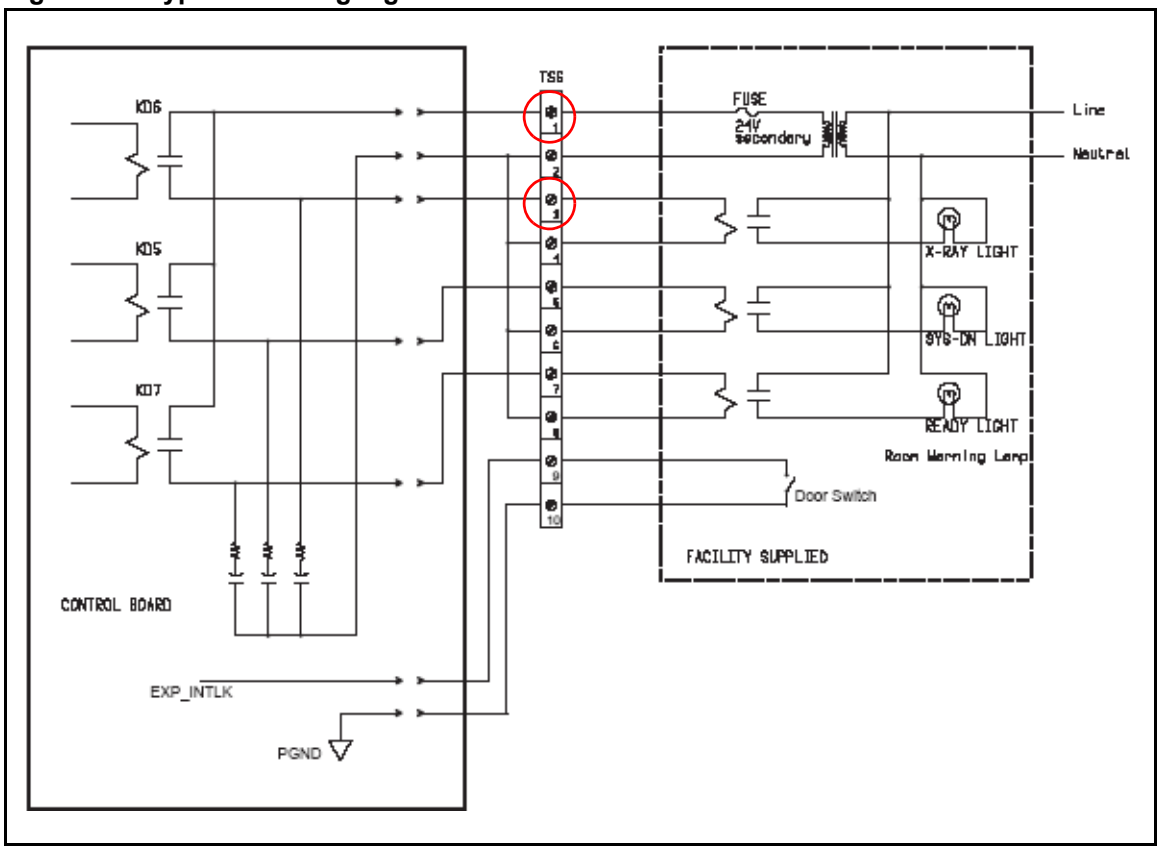


Figure 8-6: Primary Power Disconnect (A1) – <u>With</u> UPS Control Panel – Fusible Disconnect and Magnetic Contactor



8-6.2 Scan Room Warning Light & Door Interlock

Figure 8-7: Typical Warning Light & Door Interlock Connections



Chapter 9 Delivery Information

WARNING **SOME ASSEMBLIES ARE TOP-HEAVY. BE CAREFUL NOT TO TIP.**

THE CT GANTRY CAN NOT BE LIFTED WITHOUT WRITTEN PERMISSION.

DO NOT LIFT THE GANTRY EITHER USING A LIFT TRUCK UNDER THE GANTRY FRAME, OR WITH STRAPS ON THE GANTRY DOLLIES.

THE DELIVERY TRUCK SHOULD HAVE EITHER AN AIR RIDE OR SHOCK-SMOOTHING SUSPENSION.

Section 9-1: Van Delivery (U.S. Domestic)

The Discovery ST, STE, & RX HP60 system is packed for van shipment with minimum tear-down of components. It consists of approximately 20 shipping containers which include dollies, skids and boxes without skids.

Note: The information in Table 9-2 is *approximate*, due to the potential for slight variation.

Table 9-1: Estimated Van Delivery Sizes and Weights

Item	Height CM (IN)	Width CM (IN)	Depth CM (IN)	Weight KG (LB)
Source Ring	167.6 (66)	96.6 (38)	243.8 (96)	608 (1340)
Image Ring	190.5 (75)	99.1 (39)	266.7 (105)	1429 (3150)
Table (with accessories)	139.7 (55)	76.2 (30)	330.2 (130)	837 (1845)
Power Distribution Unit	109.2 (43)	76.2 (30)	58.4 (23)	367 (810)
Console	111.8 (44)	116.8 (46)	137.2 (54)	231 (510)
Trailer/Retractor	114.3 (45)	104.1 (41)	243.8 (96)	678 (1495)
Gantry	200.7 (79)	289.6 (114)	129.5 (51)	2218 (4890)

Section 9-2: Crated Deliveries (International)

The Discovery ST, STE, & RX HP60 system components, including the operator console chair, are packed for air shipment in 6 packages. Total weight of the basic system is 5384 kg (11,869 lbs). It is shipped in wooden crates.

Note: The information in Table 9-2 is *estimated*, due to lack of experiential shipping information as of the release date of this document.

Table 9-2: Estimated Crated Delivery Sizes and Weights

Crate #	Height CM (IN)	Width CM (IN)	Depth CM (IN)	Weight KG (LB)
1	221.5 (87)	145.5 (57.5)	248 (97.75)	2056 (4533)
2	203 (80)	97.5 (38.5)	262 (103)	672 (1481)
3	158 (60)	94 (37)	103 (40.5)	432 (953)
4	130 (51)	146 (57.5)	159.5 (63)	450 (992)
5	157.5 (62)	134 (52.75)	134.5 (53)	298 (656)
6	174 (68.5)	134.5 (53)	134.5 (53)	1476 (3254)

Section 9-3: Delivery/Shipping Considerations

The Discovery ST, STE, & RX HP60 system is not designed to tolerate excessive mishandling, including dropping, shock, vibration, tipping or hoisting.

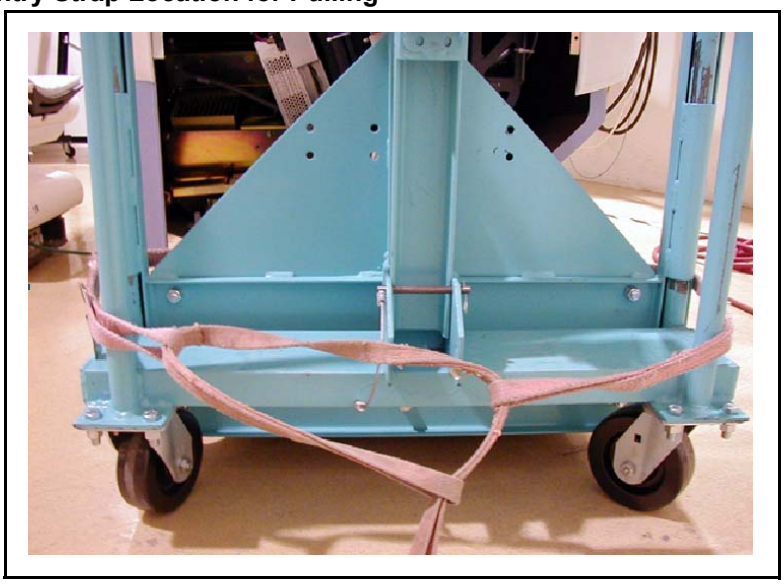
The Gantry, Console, Table and PDU must NEVER be dropped. A drop from a height greater than 13 mm (½ in.) may induce structural damage to the frame or other major components. Damage resulting from a drop, such as a bent frame, or misalignment, may not be obvious until late in the system installation.

Note: Never use a fork lift or a fork truck for moving the system!

Arrange for Dock-to-Dock shipment to minimize the chances of damage during delivery. Other delivery methods are acceptable, provided the system is not dropped or mishandled. For example, the system may be transferred from the delivery van to the hospital by a flat-bed roll back truck, or by rolling the subsystems on their dollies across SMOOTH sidewalks or other paved surfaces.

Refer to Figure 9-1. When moving the Gantry off a flat-bed truck, attach the straps to the lowest possible point on the dolly. Use the crank to lower the Gantry at the slowest reasonable rate.

Figure 9-1: Gantry Strap Location for Pulling



The Discovery ST, STE, & RX HP60 System—including the Gantry components, Operator Console, Patient Table and PDU—is not designed to tolerate any excessive shock or vibration that may occur during unloading. For example, rolling the console across a “washboard” style ramp may vibrate components, causing loosened or broken connections, etc. Damage resulting from shock or vibration to the monitors, DVD-ROM, hard-drives or system computers, may not be evident until late in the installation, during the system tests.

All system components must remain upright at all times, and must not be tipped. Do not tip or hoist the Gantry components. Move the Gantry component by rolling them on their shipping dollies. During transit through hallways, doorways, elevators, etc., do not tip or lift the Gantry components.

Section 9-4: Site Environmental Considerations

9-4.1 Dust/Dirt Contamination

The Discovery ST, STE, & RX HP60 systems (consisting of: Console, PDU, Table and Gantry) are highly susceptible to airborne contaminants, especially concrete and drywall dust. Due to the possibility of contamination, these systems should NEVER be installed in a construction site. Any site with unfinished floors, walls or ceilings is considered a construction site, and is not suitable for system installation.

9-4.2 Chemical Contamination

Wet film processors must never be installed in the same room as the scanner, due to the possibility of chemical contamination of Discovery ST, STE, & RX HP60 components. Such chemicals can contribute to increased equipment failures, increased system downtime, and decreased reliability. Film processor equipment installation must meet the manufacturer’s requirements (e.g., ventilation specifications) and all applicable national and local codes. Also, consideration should be given to the location of this equipment and chemical fumes relative to human contact as it relates to locating this equipment and chemicals in the control room.

Section 9-5: Storage Requirements

9-5.1 Short-Term Storage (Less Than 6 Months)

If the Discovery ST, STE, & RX HP60 system is to be stored before installation, store in a temperature and humidity controlled warehouse. Protect from weather, dirt and dust.

Meeting these requirements prevents rust and corrosion from forming on bearing surfaces due to condensation.

- Storage temperature should not exceed 4º to +27º C (40º to +80º F).
- Maintain relative humidity (non-condensing) between 20% and 60%.
- Maximum relative humidity rate of change is 5%/hr.
- The maximum temperature rate of change is 3º C/hr. (5º F/hr.)

⚠ **NOTICE** **Between delivery is considered short-term storage.**
Van storage must meet the same specifications as above.

9-5.2 Long-Term Storage (6 Months to One Year)

If the Discovery ST, STE, & RX HP60 system is to be stored before installation, store in a temperature- and humidity-controlled warehouse. Protect from weather, dirt and dust.

Meeting these requirements helps prevent rust and corrosion from forming on bearing surfaces due to condensation.

- **Storage temperature should not exceed 10º to +32º C (50º to +90º F).**
- **Maintain relative humidity (non-condensing) between 20% and 70%.**

Figure 9-2: Package Symbols (Storage)

Section 9-6: Extreme Temperature Transportation and Deliveries

Extreme temperatures should be avoided during system transportation and delivery.

Extreme temperatures are defined as below -18º C (0º F) or above 49º C (120º F) without humidity control.

Section 9-7: System Transportation

When transporting the Discovery ST, STE, & RX HP60 system, ensure that the system is not exposed for an extended period of time to temperatures or humidity outside the following specifications:

- Temperature: -18º to +49º C (0º to +120º F)
- Humidity: 0% to 80%

⚠ **NOTICE** **Component freezing will occur if the system is exposed to temperatures below -18º C (0º F) for a period longer than two days.**

In particular, do not allow the detector ring to freeze.

Allow a minimum of 12 hours for the system to adjust to ambient room temperature, prior to installation.

Section 9-8: Gantry/Table Considerations

The following Discovery ST, STE, & RX HP60 Gantry components ship on individual sets of dollies:

- The 4-, 8- or 16-slice CT Gantry: Figure 9-3
- The PET Base: Figure 9-4
- The PET Image Ring: Figure 9-5
- The PET Trailer: Figure 9-6

Figure 9-3: CT Gantry with Shipping Dollies and Side Rails

The CT Gantry ships with the Front and Rear covers attached to its front and rear cover brackets. During installation, the rear cover is transferred to the PET Gantry, and the rear cover brackets are removed from the CT Gantry. The assembly is mounted between two dollies. Refer to Figure 9-3. Two side rails are bolted to the dollies to stabilize the dollies and protect the gantry. The dolly elevating casters lift the gantry off its base and roll it into position.

Refer to Table 9-3. The minimum hallway and door size for the CT Gantry with covers and dollies attached, but side rails removed, is 107 cm (42 in.)

Table 9-3: CT Gantry and Dollies Dimensions, with and without Side Rails

Configuration	Length CM (IN)	Width CM (IN)	Height CM (IN)
Dollies On, Side Rails On	290 (114)	129 (51)	200 (79)
Dollies On, Side Rails Removed	290 (114)	107 (42)	200 (79)

The PET Gantry consists of:

- PET Base (Figure 9-4)
- PET Image Ring (Figure 9-5)
- PET Trailer/Retractor (Figure 9-6)

Refer to Figure 9-4. The PET Base dollies have a center stabilizing frame to protect the exposed base components.

Table 9-4: PET Gantry Dimensions, with and without Dollies

Configuration	Length IN (MM)	Width IN (MM)	Height IN (MM)	Weight lb (kg)
PET Base with Dollies	88.5 (2248)	41.5 (1054)	43.5 (1105)	1430 (649)
PET Base without dollies	64.5 (1639)	41.5 (1054)	10.5 (267)	1070 (485)
PET Image Ring with Dollies	110 (2794)	44 (1118)	73.5 (1867)	2935 (1331)
PET Image Ring without Dollies	81.5 (2070)	36 (914)	73.5 (1867)	2210 (1002)
PET Trailer without Dollies	71.5 (1816)	32.75 (832)	55.5 (1410)	730 (331)
PET Source Ring and Trailer with Dollies	96 (2438)	44 (1118)	55.5 (1410)	1415 (642)

Figure 9-4: PET Gantry Base and Trailer, with Shipping Dollies

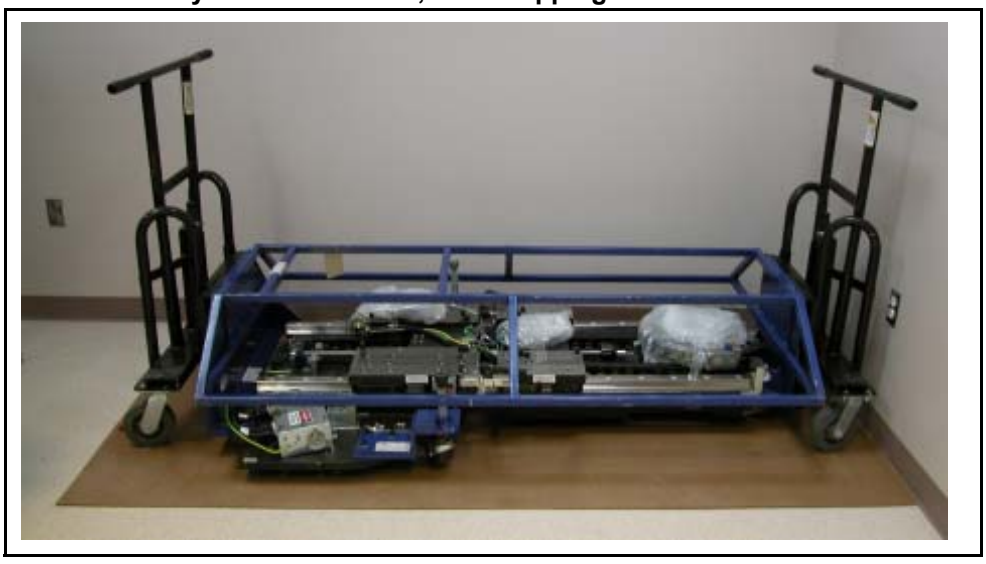


Figure 9-5: PET Gantry Image Ring, with Shipping Dollies and Side Rails

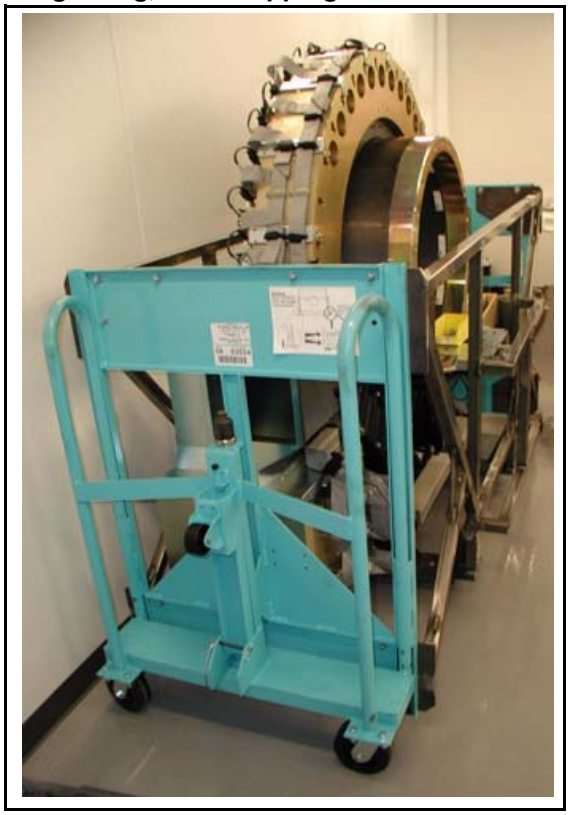
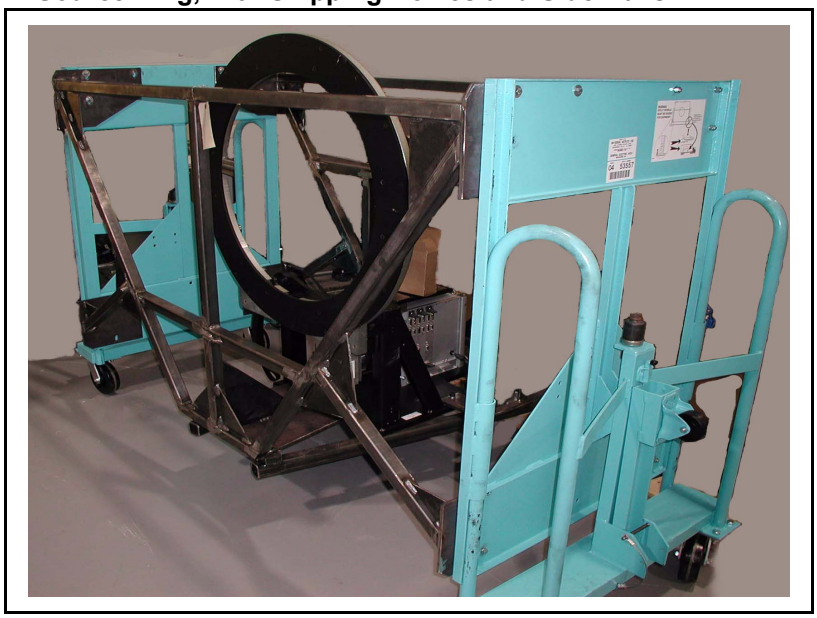


Figure 9-6: PET Source Ring, with Shipping Dollies and Side Rails

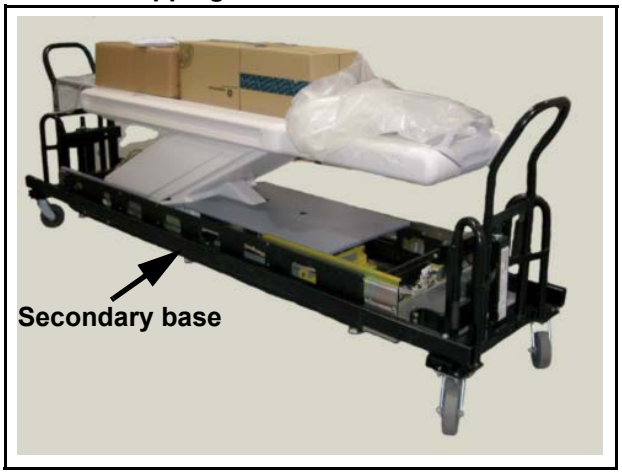


The Patient table consists of a CT Patient Table mounted to a secondary base. The Patient Table travels along this secondary base to reach the CT and PET gantry scan locations. Once the entire Patient Table moves into the CT or PET position, the cradle positions the patient within the corresponding scan field of view.

Refer to Figure 9-7. The secondary base covers ship separately. The dimensions in Table 9-5 do not include shipping crates or packaging materials.

Refer to Figure 9-7. The Discovery ST, STE, & RX HP60 Patient Table ships to domestic (North American) installations on a set of dollies with stabilizing side rails.

Figure 9-7: Patient Table with Shipping Dollies



Refer to Figure 9-8. The Patient Table ships to international sites in a crate. The installation team uncrates the table and attaches the dollies at the site.

Figure 9-8: Patient Table on Shipping Pallet

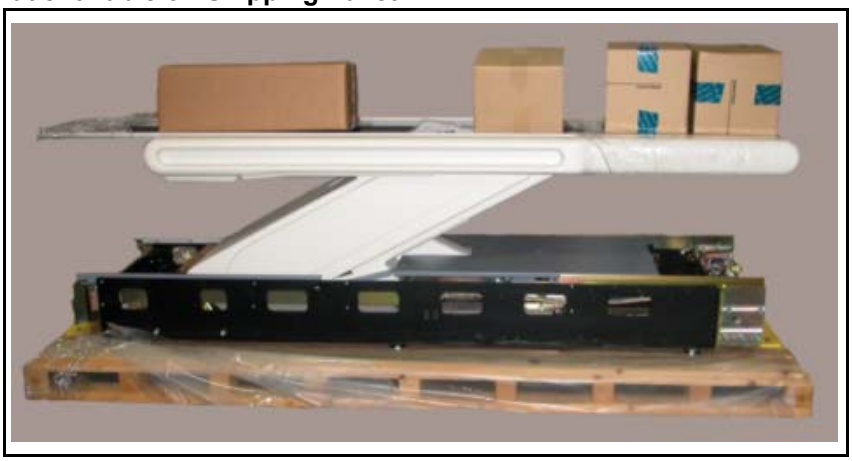


Table 9-5: Size of Table & Dollies

Configuration	Length mm (in.)	Width mm (in.)	Shipping Height mm (in.)	Weight kg (lb)
Dollies On	3251 (128)	762 (30)	1067 (42) nominal	869 (1916)
Dollies Off	2534 (110)	627 (24.7)	1041 (41) nominal	730 (1610)

9-8.1 Door Openings

Clear door openings for moving equipment into building must be 44 X 82 in. (1118 X 2083 mm) minimum, if there is an 8 ft. (2439 mm) corridor width.

9-8.2 Elevator Requirements

Remember to take the size and capacity of any elevators into consideration when plotting the delivery route through the facility to the installation site. It may be necessary to partially disassemble a dolly in order to fit one of the components into an elevator. For best results, arrange for the use of a surgical elevator, if available.

Contact a representative of the elevator manufacturer if a component weight exceeds the elevator's capacity.

NOTICE **For alternative lifting arrangements and instructions, contact GE Healthcare Installation Support Services.**

9-8.3 Dollies

Typically, the Table, and Gantry components ship on dollies to domestic installations. The GRE Console ships on a pallet. The installation team has the responsibility to arrange for removal of the dollies from the installation site.

9-8-3.1 United States Only Installations

When finished with the dollies, use the shipping document, located in Box #1, to return the dollies to GE Healthcare in Milwaukee, Wisconsin, USA.

9-8-3.2 International Installations

The following Dollies sets can be purchased for international shipments, for use at the customer site. After the system has been removed from the crates, dollies shipped with international shipments remain in the destination country, for local use. Do NOT return any dollies used during installations that take place outside the Americas.

The International PET-CT Shipping Dolly set, catalog number, P5050ZZ, consists of the following subsystem dolly kits:

- PET Base dolly: P/N 2312734
- PET Trailer dolly: P/N 2372735
- PET Image Ring dolly: P/N2372736
- CT Gantry dollies: P/N 2282714
- Table dollies: P/N 5101469

NOTICE **If this is a CT to** Discovery ST, STE, & RX HP60 **upgrade and will take place outside the Americas, order the International CT to DST Upgrade dolly kit, catalog number P5050ZY.**

Section 9-9: Operator Console Considerations

- The console is shipped on a skid equipped with ramps for unloading.
- Do not remove the console from the shipping skid until it is in the CT equipment room.
- The keyboard table is shipped with the console, but not installed.

Table 9-6 : Discovery ST, STE, & RX HP60 Console Shipping Dimensions

Description	Width		Depth		Height	
	mm	inch	mm	inch	mm	inch
Operator's Console (on shipping skid)	1168	46	1372	54	1118	44

Figure 9-9: Operator Console on Shipping Skid

Packed for Shipment

Ready to be Unloaded from Shipping Skid

GE Medical Systems, a General Electric Company, going to market as GE Healthcare.
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