

GE Healthcare

LightSpeed RT¹⁶ and Xtra Pre-Installation Manual

OPERATING DOCUMENTATION



5177460-100
Rev 11
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Effectivity

The information in this manual applies to the following LightSpeed RT CT Systems:

- LightSpeed RT¹⁶
- LightSpeed Xtra

IMPORTANT PRECAUTIONS

LANGUAGE

ПРЕДУПРЕЖДЕНИЕ (BG)	<p>Това упътване за работа е налично само на английски език.</p> <ul style="list-style-type: none"> • 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)	<p>本维修手册仅提供英文版本。</p> <ul style="list-style-type: none"> • 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)	<p>本服務手冊僅提供英文版本。</p> <ul style="list-style-type: none"> • 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、機械性或其他危險。
警告 (ZH-TW)	<p>本維修手冊僅有英文版。</p> <ul style="list-style-type: none"> • 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)	<p>Ovaj servisni priručnik dostupan je na engleskom jeziku.</p> <ul style="list-style-type: none"> • 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. • Zanimarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika.
VÝSTRAHA (CS)	<p>Tento provozní návod existuje pouze v anglickém jazyce.</p> <ul style="list-style-type: none"> • 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.

<p>ADVARSEL (DA)</p>	<p>Denne servicemanual findes kun på engelsk.</p> <ul style="list-style-type: none"> • 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.
<p>WAARSCHUWING (NL)</p>	<p>Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar.</p> <ul style="list-style-type: none"> • 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.
<p>WARNING (EN)</p>	<p>This service manual is available in English only.</p> <ul style="list-style-type: none"> • 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.
<p>HOIATUS (ET)</p>	<p>See teenindusjuhend on saadaval ainult inglise keeles</p> <ul style="list-style-type: none"> • 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.
<p>VAROITUS (FI)</p>	<p>Tämä huolto-ohje on saatavilla vain englanniksi.</p> <ul style="list-style-type: none"> • 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.
<p>ATTENTION (FR)</p>	<p>Ce manuel d'installation et de maintenance est disponible uniquement en anglais.</p> <ul style="list-style-type: none"> • 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.

<p>WARNUNG (DE)</p>	<p>Diese Serviceanleitung existiert nur in englischer Sprache.</p> <ul style="list-style-type: none"> 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.
<p>ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)</p>	<p>Το παρόν εγχειρίδιο σέρβις διατίθεται μόνο στα αγγλικά.</p> <ul style="list-style-type: none"> 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.
<p>FIGYELMEZTETÉS (HU)</p>	<p>Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el.</p> <ul style="list-style-type: none"> Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészítése. Ne próbálja elkezdni 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.
<p>AÐVÖRUN (IS)</p>	<p>Þessi þjónustuhandbók er aðeins fáanleg á ensku.</p> <ul style="list-style-type: none"> Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálþjónustu. 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.
<p>AVVERTENZA (IT)</p>	<p>Il presente manuale di manutenzione è disponibile soltanto in lingua inglese.</p> <ul style="list-style-type: none"> 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.
<p>警告 (JA)</p>	<p>このサービスマニュアルには英語版しかありません。</p> <ul style="list-style-type: none"> 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。

<p>경고 (KO)</p>	<p>본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다 .</p> <ul style="list-style-type: none"> • 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 .
<p>BRDINJUMS (LV)</p>	<p>Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā.</p> <ul style="list-style-type: none"> • 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.
<p>ĮSPĖJIMAS (LT)</p>	<p>Šis eksploatavimo vadovas yra tik anglų kalba.</p> <ul style="list-style-type: none"> • 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.
<p>ADVARSEL (NO)</p>	<p>Denne servicehåndboken finnes bare på engelsk.</p> <ul style="list-style-type: none"> • 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.
<p>OSTRZEŻENIE (PL)</p>	<p>Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.</p> <ul style="list-style-type: none"> • 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.
<p>ATENÇÃO (PT-BR)</p>	<p>Este manual de assistência técnica encontra-se disponível unicamente em inglês.</p> <ul style="list-style-type: none"> • 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.

<p>ATENÇÃO (PT-PT)</p>	<p>Este manual de assistência técnica só se encontra disponível em inglês.</p> <ul style="list-style-type: none"> • Se qualquer outro serviço de assistência técnica solicitar este manual noutra língua, 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.
<p>ATENȚIE (RO)</p>	<p>Acest manual de service este disponibil doar în limba engleză.</p> <ul style="list-style-type: none"> • 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 și înțelegerii acestui manual de service. • Ignorarea acestui avertisment ar putea duce la rănirea deparatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.
<p>ОСТОРОЖНО! (RU)</p>	<p>Данное руководство по техническому обслуживанию представлено только на английском языке.</p> <ul style="list-style-type: none"> • 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.
<p>UPOZORENJE (SR)</p>	<p>Ovo servisno uputstvo je dostupno samo na engleskom jeziku.</p> <ul style="list-style-type: none"> • 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.
<p>UPOZORNENIE (SK)</p>	<p>Tento návod na obsluhu je k dispozícii len v angličtine.</p> <ul style="list-style-type: none"> • Ak zákazníkovi poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka. • Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obsluhu a neporozumiete mu. • Zanedbanie tohto upozornenia môže spôsobiť zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie.

<p>ATENCION (ES)</p>	<p>Este manual de servicio sólo existe en inglés.</p> <ul style="list-style-type: none"> • 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.
<p>VARNING (SV)</p>	<p>Den här servicehandboken finns bara tillgänglig på engelska. .</p> <ul style="list-style-type: none"> • 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.
<p>OPOZORILO (SL)</p>	<p>Ta servisni priročnik je na voljo samo v angleškem jeziku.</p> <ul style="list-style-type: none"> • Če ponudnik storitve stranke potrebuje priročnik v drugem jeziku, mora stranka zagotoviti prevod. • Ne poskušajte servisirati opreme, če tega priročnika niste v celoti prebrali in razumeli. • Če tega opozorila ne upoštevate, se lahko zaradi električnega udara, mehanskih ali drugih nevarnosti poškoduje ponudnik storitev, operater ali bolnik.
<p>DIKKAT (TR)</p>	<p>Bu servis kılavuzunun sadece ingilizcesi mevcuttur.</p> <ul style="list-style-type: none"> • 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

All packages should be closely examined at time of delivery. If damage is apparent, have notation "damage in shipment" written on all copies of the freight or express bill before delivery is accepted or "signed for" by a General Electric 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 your local service coordinator for more information on this process.

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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 you attempt to place this equipment in operation. The General Electric Company, Healthcare, 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, Healthcare, 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.

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 remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

OMISSIONS & ERRORS

Customers, please contact your GE Sales or Service representatives.

GE personnel, please use the GEMS CQA Process to report all omissions, errors, and defects in this publication.

Revision History

Revision	Date	Reason for change
11	08/26/10	<p>Chapter 4: Section 6.0: Updated Figure 4-7 for Dimensions without cover</p> <p>Chapter 5: Section 4.8: Updated Figure 5-1 Sample room Layout</p>
10	06/24/10	<p>Chapter 4: Section 2.1: Updated Figure 4-1 for table dimension</p> <p>Chapter 5: Section 2.0: Updated Total system heat consumption on Table 5-1</p>
9	08/13/09	<p>Chapter 4: Section 8.2 and Section 8.3: Added the notice for GT650lbs concrete floor thickness is 127 mm (5 in.)</p> <p>Chapter 6: Section 2.0: Added GT650lbs concrete floor thickness is 127 mm (5 in.) Updated Figure 6-2 for GT650lbs</p> <p>Chapter 8: Section 2.2 and Section 3.0: Added WARNING Messages</p>
8	11/20/08	<p>Chapter 2: Section 6.0: Added GT650lbs or High Capacity Table information on Table 2-1.</p> <p>Chapter 3: Section 1.0: Updated Option list</p> <p>Chapter 4:</p> <ul style="list-style-type: none"> • Section 1.0: Added GT 650lbs, High Capacity Table on Table 4-1 • Section 2.0: Added GT 650lbs dimension on the Figure 4-1 • Section 3.0: Added GT 650lbs information on 3.1.2 and 3.1.4 • Section 4.0: Added GT 650lbs dimension on the Figure 4-4 • Section 6.0: Added GT 650lbs dimension on the Figure 4-7 and 4-9 • Section 7.0: Delete Table max extension on Table 4-11 <p>Chapter 5: Added the Notice for environmental requirement at beginning of Section 1.0</p> <p>Chapter 6:</p> <ul style="list-style-type: none"> • Section 1.0: Updated GT 1700/2000 and added GT650lbs on Table 6-1 • Section 2.0: Added GT 650lbs information • Section 2.0: Added Figure 6-2 Floor Anchor of GT650lbs drawing • Section 2.0: Updated Figure 6-5 Floor Template • Section 2.0: Added Figure 6-7 GT650lbs gravity center drawing <p>Chapter 7: Section 8.0: Added GT 650lbs information on the Table 7-2, 7-3, 7-4</p> <p>Chapter 9: Section 3.0: Updated Figure 9-1 system interconnection diagram</p>
7	06/06/08	<p>Chapter 5: Section 3.0: Updated Altitude Specification.</p>

Revision	Date	Reason for change
6	12/04/07	<p>Chapter 4:</p> <ul style="list-style-type: none"> Section 1.0: Added bullet point concerning cable storage. Section 2.1.1: Corrected Regulatory Minimum Working Clearance by Major Subsystem tables to match what is in the LS 5.X Installation Manual. Added tables with information for the UPS and A1 Disconnect. Section 4.1: Added bullet point concerning clear access for service components. Section 8.4 Floor levelness: added Note about specifications for the floor/gantry to prevent cable crushing. Section 9.0: Added the network specifications. <p>Chapter 5: Section 4.0: Added note concerning EMI testing near power sub-stations.</p> <p>Chapter 9: Section 7.1: Added information concerning LOTO and UPS.</p>
5	08/13/07	<p>Added Bulgarian Warning in Important Precautions</p> <p>Chapter 4 and Chapter 6</p> <p>Updated Gantry Dimension</p> <p>Chapter 4:</p> <p>Added Limited Access contents</p>
4	05/08/07	<ul style="list-style-type: none"> PQR 13106373: Updated the Chapter 8--> section 2.1 for Power Source Configuration information
3	3/27/07	<ul style="list-style-type: none"> Updated measurements to metric to meet European standards and compliance. Updated warning contents according to new language policy. <p>Chapter 1:</p> <p>Added Section 4 - Medical Electrical Equipment for EMC.</p> <p>Chapter 3:</p> <p>Updated Option List</p> <p>Chapter 4:</p> <p>Updated room size dimension according to Regulatory and Service Clearances</p> <p>Chapter 5:</p> <p>Delete Section 4.9 EMC Edition 2 Cpmpliance - duplicate with newly added Chapter 1, Section 4.</p> <p>Chapter 7:</p> <p>Added weights to Table 7-1.</p> <p>Chapter 8:</p> <p>Updated Section 2.1 - Power Source Configuration</p> <p>Chapter 9:</p> <p>Updated Figure 9-1 System Interconnect Diagram for include options.</p> <p>Added Section 3.3 cable list of options</p> <p>Added Section 5 Fuse information</p> <p>Added Notes in Section 1.0: Use dry cleaning for electro components.</p> <p>Deleted the Appendix: CT Installation Site Ready Form</p>

Revision	Date	Reason for change
2	11/02/06	Corrected cooling data in system Component at Chapter 5, section 2.0. Corrected foot print value in Chapter 6, section 2.0, Figure 6-5 Corrected UPS information in Chapter 9, section 5.0 Remarked Typical GE A1 shown in Chapter 9, section 6.0
1	7/25/06	Initial Release.

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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 GE CT 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 CT site plans, preliminary concepts and final working drawings must be reviewed by General Electric Headquarters Architectural Planning prior to construction or approval.

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

Section 1.0

Site Readiness

Site ready is a requirement that must be achieved to install a CT 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:

- LightSpeed RT¹⁶ and Xtra Floor template
- Pre-Installation check List
- Pre-Installation Block Diagram
- Site Room Layouts
- Power and Grounding Inspection
- Pre-Installation Support

Section 2.0

Responsibility of Purchaser

2.1 Customer Room Prep Items

The CT 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 your CT 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 GE CT scanner:

- Completely finished:
 - Wall painted or have final wall covering
 - Ceiling tiles installed and no remaining ceiling work is 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 CT 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 CT suite area
- Active Broad Band connection
 - A completed network connection is required for ALL CT installations.
 - A GE Healthcare network specialist may be required to complete the VPN 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* will be 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 CT 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 will describe 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 CT 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 meet all installation requirements:
 - Structural Engineer and /or Architect
 - HVAC contractor
 - Electrical contractor
 - Qualified radiological health physicist

The above items can be found in chapter 2 through 9 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

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 indicating one of the following:

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

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

If a "Conditional Pass" is granted on the inspection date, the project manager must present conclusive evidence that unfinished tasks are completed and that the site is ready for delivery one business day prior to delivery.

Fail - is issued when less than 80% of the tasks 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 CT 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.
- New floor anchors must be a minimum of 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 install.

2.3.3 "Two-Step" and Upgrade Installs

A "Two-Step" installation is the practice of temporarily installing one CT system in a site with the intention of upgrading the site to a different CT system at a later date.

- For a "two-step" installation to be considered, the room must meet the minimum room requirements for the project being upgraded.
- As with any upgrade installation, "two-steps" are subject to ALL of the siting requirements imposed by the upgrade/final system. This includes the recommended room size as well as electrical, structural and HVAC requirements.
- Two-steps and other upgrades may be done as "Quick" Installs. In this case, all requirements described in Section 2.3.2 (above) also apply.
- It is the customer's responsibility to check that all requirements are met.
- Rooms that do not meet the minimum requirements for the final product must either upgrade (or enlarge) their room, or consider the "Left-Side Limited Access" option.

2.3.4 Site Ready Inspection Visit

Must meet all in section 1 and 2 plus these additions reviewed at the site ready visit.

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 tilt dollies or 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 Requirement

- 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: As listed in section 2 - all requirements are met

Purchaser's Site Preparation Work: As listed in section 1 - all actions are completed

Section 3.0 Pre-Installation Checklist

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

PACS: _____

Other - Specify type & ID: _____

Other - Specify type & ID: _____

Camera: _____

AW: _____

Camera setup information: _____

AW Direct Connect address: _____

Do you want HIPAA enabled? No ___ Yes ___

Do you want automatic downloads enabled? No ___ Yes ___

Table 1-1 Schedule Date Commitments

GE		Cust		Dates
Y	N	Y	N	
		<input type="checkbox"/>	<input type="checkbox"/>	Has the project schedule been verified with facilities department, contractor, and GE?
		<input type="checkbox"/>	<input type="checkbox"/>	Will the committed site-ready date be met?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does the completion date for any/all construction meet or precede the delivery date?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the Power & Ground survey complete? Date: _____ Hospital contact: _____
		<input type="checkbox"/>	<input type="checkbox"/>	Site-Ready visit is scheduled. Date: _____
		<input type="checkbox"/>	<input type="checkbox"/>	Delivery date is scheduled. Date: _____
		<input type="checkbox"/>	<input type="checkbox"/>	Installation date is scheduled. Date: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installation timing: A: Weekdays___ B: Weekend___ C: Quick Install___ If B or C, have all sub-contractors been notified? No ___ Yes ___
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does the delivery and/or installation date need to be adjusted?
		<input type="checkbox"/>	<input type="checkbox"/>	First-Use date is scheduled. Date: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Applications/Training dates: On-Site Training Date: _____ Healthcare Institute Training Date: _____

Table 1-2 General Site Planning

GE		CUST		General / Site Requirements <i>Must be completed 5 weeks before scheduled delivery date</i>
Y	N	Y	N	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have final drawings been approved and distributed to the contractors?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are final drawings “signed off” to approve equipment layout / orientation?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do the actual room dimensions match those on the final drawings?
		<input type="checkbox"/>	<input type="checkbox"/>	Has the radiologist health physician reviewed and approved the room layout and shielding requirements?
		<input type="checkbox"/>	<input type="checkbox"/>	Have any additional requirements or questions about the installation been discussed with GE? List: _____ _____ _____ _____
		<input type="checkbox"/>	<input type="checkbox"/>	Is there a person assigned to review and verify that all installation requirements are met? Name: _____
		<input type="checkbox"/>	<input type="checkbox"/>	Have the specific site requirements been discussed with the contractor? Refer to the GE final drawings specifications. (See Table 1-3 below.)
		<input type="checkbox"/>	<input type="checkbox"/>	Has the responsibility of cabling, installing, and interfacing accessories not on the order been discussed?
		<input type="checkbox"/>	<input type="checkbox"/>	Are all third-party vendors identified, notified and scheduled? (Examples: Netcom, Medrad, etc.)
		<input type="checkbox"/>	<input type="checkbox"/>	Have all regulatory requirements been met per <i>Regulatory and Service Clearances</i> , on page 47?
		<input type="checkbox"/>	<input type="checkbox"/>	Will existing network, broadband, and camera cable drops reach new locations and will they meet the requirements and function with LightSpeed RT ¹⁶ and Xtra? If not, what are the requirements? List: _____ _____ _____

Table 1-3 References for Specific Site Requirements

Sections for Specific Requirements	
Room Planning - Chapter 4 (page 45)	Floor Loads & Weights - Chapter 6 (page 87)
Radiation Protection - page 77	Delivery - Chapter 7 (page 99)
Environment - Chapter 5 (page 81)	Power - Chapter 8 (page 107)
All work by contractors must be completed before the scheduled delivery date.	

Table 1-4 Equipment Compatibility

GE		Cust		Equipment
Y	N	Y	N	<i>Must be completed 5 weeks before scheduled delivery date</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has the order been reviewed for completeness and compatibility with existing equipment? Typical equipment: Remote monitors ____ AW relocation ____ Cardiac option ____ Injectors ____
<input type="checkbox"/>	<input type="checkbox"/>			Are interfaces to existing and/or new accessories ordered and planned for accordingly?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have the following peripheral locations been included in the site drawings? EKG monitor ____ Injector control ____ Laser camera ____ UPS ____ 2 nd Monitor ____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Will GE Healthcare provide additional services per contract negotiations?
<input type="checkbox"/>	<input type="checkbox"/>			Are correct length cables on order?

Table 1-5 Network Connections

GE		Cust		Network Installation and Setup
Y	N	Y	N	<i>Must be completed 5 weeks before scheduled delivery date</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have IP addresses and Host Names been obtained? No ____ Yes ____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Will a network camera be used? No ____ Yes ____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mandatory: Is the network installed, are network jacks installed, and is the entire network tested?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mandatory: Broadband VPN installed/setup?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mandatory: Are network software options ordered ____ HIS RIS option ____ DICOM print ____ AW ____
		<input type="checkbox"/>	<input type="checkbox"/>	Optional: Has modem option ordered? ____ (Requires a site escalation)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Optional: Is the LightSpeed RT ¹⁶ and Xtra service telephone line identified and installed for InSite? (<i>Electrical, mechanical, etc.</i>)

Table 1-6 Miscellaneous Tasks

GE		Cust		Other
Y	N	Y	N	<i>Must be completed before the scheduled delivery date</i>
		<input type="checkbox"/>	<input type="checkbox"/>	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)
		<input type="checkbox"/>	<input type="checkbox"/>	Have arrangements been made to clean the floor <i>after</i> equipment removal and <i>prior</i> to the installation of the new equipment?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is de-installation of existing equipment required? No ____ Yes ____ Removal date _____

Table 1-6 Miscellaneous Tasks (Continued)

GE		Cust	Other
Y	N	Y	N
<i>Must be completed before the scheduled delivery date</i>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			Is there a trade-in of existing equipment? No __ Yes __ GoldSeal _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			Delivery route identified and verified with the proper hospital personnel? No__ Yes __ Elevators and doors checked for size and weight constraints? No__ Yes __
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			Have appropriate arrangements been made with traffic for delivery?No__ Yes __
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			Will acceptance/performance testing or bio-medical testing be required?No__ Yes __ Date: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			Are trash and/or recycling bins available for the removal of papers, boxes, etc. during the installation? No__ Yes __

Section 4.0 Medical Electrical Equipment for EMC

4.1 General Scope

This System complies with IEC60601-1-2 Edition 2 EMC standard for medical electrical equipment. The System is suitable to be used in the electromagnetic environment, as per the limits & recommendations described in the tables hereafter:

- Emission Compliance level & limits (see [Table 1-7](#))
- Immunity Compliance level & recommendations to maintain equipment clinical utility (see [Table 1-8](#), [Table 1-9](#), and [Table 1-10](#)).

Note: This system complies with above mentioned EMC standard when used with supplied cables up to maximum lengths referenced in the MIS MAPS or system cable interconnect diagrams.

4.2 Electromagnetic Emission

Table 1-7 Emission Declaration

EMC Emissions Guidance & Declaration for LightSpeed RT ¹⁶ and Xtra System		
The LightSpeed RT ¹⁶ and Xtra system is intended for use in the electromagnetic environment specified below. The customer or the user of the LightSpeed RT ¹⁶ and Xtra system should assure that it is used in such an environment.		
Emissions Test	Compliance	Electromagnetic Environment Guidance
RF emissions CISPR 11	Group 1	The LightSpeed RT ¹⁶ and Xtra system 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	
Harmonic emissions IEC 61000-3-2	Not applicable	The LightSpeed RT ¹⁶ and Xtra system 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 61000-3-2	Not applicable	

4.3 Electromagnetic Immunity

Table 1-8 Immunity Declaration

EMC Immunity Guidance & Declaration for LightSpeed RT¹⁶ and Xtra System			
The LightSpeed RT ¹⁶ and Xtra system is intended for use in the electromagnetic environment specified below. The customer or the user of the LightSpeed RT ¹⁶ and Xtra system should assure that it is used in such an environment.			
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 typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV line-line ± 2 kV line-earth	± 1 kV line-line ± 2 kV line-earth	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 LightSpeed RT ¹⁶ and Xtra system requires continued operation during power mains interruptions, it is recommended that the LightSpeed RT ¹⁶ and Xtra system be powered from an uninterruptible power supply or a battery.
Powerfrequency (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.
Note : U _T is the a.c. mains voltage prior to application of the test level.			

Table 1-9 Immunity Declaration con't

EMC Immunity Guidance & Declaration for LightSpeed RT ¹⁶ and Xtra System			
The LightSpeed RT ¹⁶ and Xtra system is intended for use in the electromagnetic environment specified below. The customer or the user of the LightSpeed RT ¹⁶ and Xtra system should assure that it is used in such an environment.			
Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment Guidance
Radiated RF IEC 61000-4-3 (alternative method: IEC 61000-4-21)	3 V/m 80 MHz to 2.5 GHz	3 V/m 80 MHz to 2.5 GHz	$d = \left[\frac{3.5}{3} \right] \sqrt{P}$ 80 MHz to 800 MHz (see Table 1-10) $d = \left[\frac{7}{3} \right] \sqrt{P}$ 800 MHz to 2.5GHz (see Table 1-10) 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 metres (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: 
<p>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, and electromagnetic site survey should be considered. If the measured field strength in the location in which the LightSpeed RT¹⁶ and Xtra System is used exceeds the applicable RF compliance level above, the LightSpeed RT¹⁶ and Xtra System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocation the LightSpeed RT¹⁶ and Xtra System.</p> <p>b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</p> <p>Note : These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.</p>			

Table 1-9 Immunity Declaration con't

EMC Immunity Guidance & Declaration for LightSpeed RT ¹⁶ and Xtra System			
<p>The LightSpeed RT¹⁶ and Xtra system is intended for use in the electromagnetic environment specified below. The customer or the user of the LightSpeed RT¹⁶ and Xtra system should assure that it is used in such an environment.</p>			
<p>Conducted RF IEC 61000-4-6</p>	<p>3 V_{RMS} 150kHz to 80 MHz</p>	<p>3 V 150kHz to 80 MHz</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the LightSpeed RT¹⁶ and Xtra System, including cables, than the recommended separation distance calculated from the equation appropriate for the frequency of the transmitter.</p> <p>Recommended Separation Distance</p> $d = \left[\frac{3.5}{3} \right] \sqrt{P}$ <p>(see Table 1-10)</p>
<p>Radiated RF IEC 61000-4-3 (alternative method: IEC 61000-4-21)</p>	<p>3 V/m 80 MHz to 2.5 GHz</p>	<p>3 V/m 80 MHz to 2.5 GHz</p>	<p>$d = \left[\frac{3.5}{3} \right] \sqrt{P}$ 80 MHz to 800 MHz (see Table 1-10)</p> <p>$d = \left[\frac{7}{3} \right] \sqrt{P}$ 800 MHz to 2.5GHz (see Table 1-10)</p> <p>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 metres (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.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>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, and electromagnetic site survey should be considered. If the measured field strength in the location in which the LightSpeed RT¹⁶ and Xtra System is used exceeds the applicable RF compliance level above, the LightSpeed RT¹⁶ and Xtra System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocation the LightSpeed RT¹⁶ and Xtra System.</p> <p>b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</p> <p>Note : These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.</p>			

Table 1-10 Separation Distances

Recommended separation distances between portable and mobile RF communications equipment and the LightSpeed RT¹⁶ and Xtra System.			
The LightSpeed RT ¹⁶ and Xtra System is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the LightSpeed RT ¹⁶ and Xtra System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the LightSpeed RT ¹⁶ and Xtra System as recommended below, according to the maximum output power of the communications equipment.			
Rated Maximum Output Power (P) of Transmitter Watts (W)	Separation distance according to frequency of transmitter		
	150 kHz to 80 MHz	80 MHz to 800MHz	800 MHz to 2.5 GHz
	$d = \left[\frac{3.5}{3} \right] \sqrt{P}$	$d = \left[\frac{3.5}{3} \right] \sqrt{P}$	$d = \left[\frac{7}{3} \right] \sqrt{P}$
	Separation Distance meters	Separation Distance meters	Separation Distance meters
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.			

4.3.1 Limitations Management :

Adhering to the distance separation recommended in [Table 1-10](#), between 150kHz & 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.

(*) For example, a 1W mobile phone (800MHz to 2.5GHz carrier frequency) shall be put 2.3 meters apart from the System (in order to avoid image interference risks).

4.4 Use Limitation :

4.4.1 External components

The use of accessories, transducers, and cables other than those specified may result in degraded ELECTROMATHNETIC COMPATIBILITY of the System.

4.5 Installation Requirements & Environment Control :

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

4.5.1 Cable Shielding & 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.

4.5.2 This product complies the radiated emission as per CISPR11 Group 1 Class A standard limits

The LightSpeed RT¹⁶ and Xtra 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 a X-ray shielded room. In case of using in a domestic environment (e.g. doctor's offices), in order to avoid interferences, it is recommended to use a separated AC power distribution panel & line with a X-ray shielded room.

4.5.3 Subsystem & Accessories Power Supply Distribution

All components, accessories subsystems, systems which are electrically connected to the System, must have all AC power supplied by the same power distribution panel & line.

4.5.4 Stacked Components & Equipment

The LightSpeed RT¹⁶ and Xtra System should not be used adjacent to or stacked with other equipment; if adjacent or stacked use is necessary, the System should be observed in order to verify normal operation in the configuration in which it will be used.

4.5.5 Low Frequency Magnetic Field

In case of a digital LightSpeed RT¹⁶ and Xtra System, the Gantry (digital detector) shall be apart 1 meter from the generator cabinet, and 1 meter apart from the analog (CRT) monitors. These distance specifications will minimize the low frequency magnetic field interference risk.

4.5.6 Static Magnetic Field Limits

In order to avoid interference on system, static field limits from the surrounding environment are specified.

Static field is specified less than <1 Gauss in Examination room, and in the Control Area.

4.5.7 Electrostatic Discharge Environment & Recommendations

In order to reduce electrostatic discharge interference, install a charge dissipative floor material to avoid electrostatic charge buildup.

The relative humidity shall be at least 30 percent.

The dissipative material shall be connected to the system ground reference, if applicable.

Chapter 2

Pre-Installation Overview

Before a system can be installed, all pre-installation requirements must be complete.

- Chapter 4, Section 6.0 and 7.0 Structural Requirements
- Chapter 4, Section 8.0 Radiation Protection
- Broad-band standard
- Site Ready Visit
- [Chapter 5, Environmental Conditions](#) Section 1.0& 2.0 HVAC Requirements
- [Chapter 8, Power Requirements](#) (Site Power Audit Required)
- [Chapter 9, Interconnection Data](#)

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

Section 1.0 Dust/Dirt Contamination

The 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.



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

Section 2.0 Chemical Contamination

Wet film processors must never be installed in the same room as the scanner, due to the possibility of chemical contamination of the 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's 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 3.0 Walls, Ceiling, and Floor

All walls, ceiling, and flooring must be completed before installation can begin.
System scanners can only be installed on a 101.6mm (4") concrete floor.

Note: Minimum concrete floor thickness for GT650lbs is 127 mm (5")

Section 4.0 Broad-band

For information on Broad-band requirements, refer to [Chapter 4, Room Planning, Section 9.0 - Network Connections](#)

Section 5.0 Phone Line (for optional modem)

Two phone lines must be installed at or near the console and be operational prior to installation.

- 1-Analog line (for modem use)
- 1-Voice line

Section 6.0 Review

The systems use adjustable leveling pads to support the gantry and table. The gantry has four (4) primary leveling pads. Refer to [Table 2-1](#), below, to determine the number of leveling pads, by table style.

TABLE	# OF PADS	TEMPLATE
GT 1700	4	5164728
GT 2000 / GT 650lbs	4	5164728

Note: This Room Layout Template (5164728) is shipped with the system. It may also be ordered via the Web, from Coakley-Tech.

Table 2-1 Number of Leveling Pads and Floor Template P/N, by Table Type

Note: GT 650lbs = High Capacity Table (part number on Rating Plate: 5272966)

Using the GE print to establish the room layout, make sure all the operating and service clearances shown on the print are observed. Using the template (see [Table 2-1](#)) 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 2 floor templates.
- 2.) Start with the Table template—align per the GE print.
- 3.) Place the Gantry template over the top of the Table template. Align the scan and table center-lines and secure the templates to the floor. Make sure there are no potential clearance issues.
- 4.) Check the level of the floor (See [Figure 2-1](#)) across the templates.

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

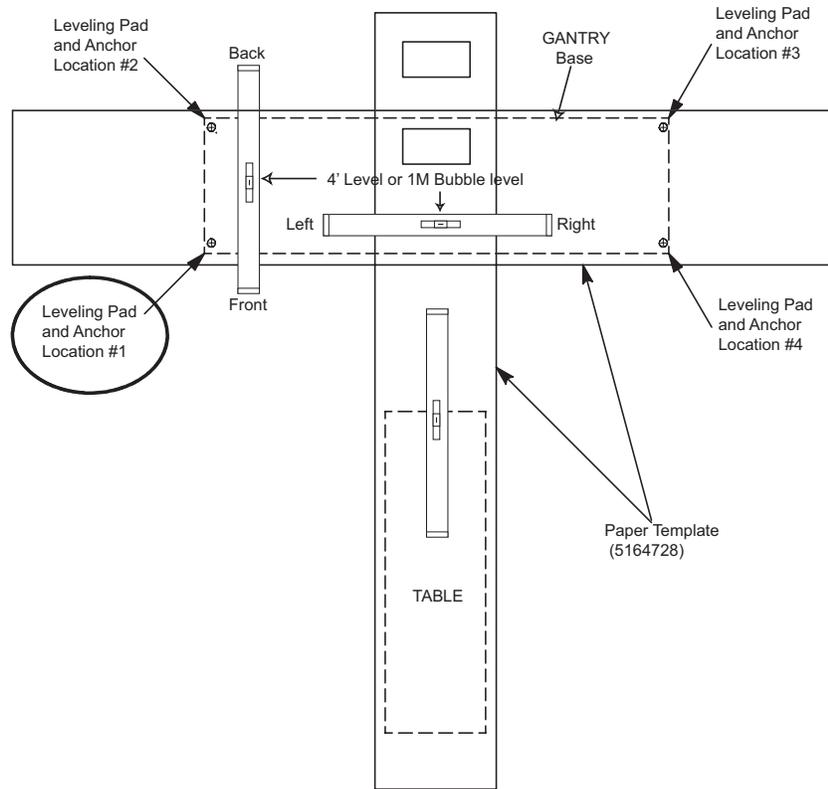


Figure 2-1 Hole Locations

FLOOR LEVELNESS SPECIFICATION

- 6 mm (1/4 in.) over 3 m (10 ft.)

This should be measured on the template over the table/gantry area, as shown in [Figure 2-1](#), above.

Chapter 3

System Catalog

Section 1.0

Option Catalog Numbers

The following is a list of system options requiring site planning work for the LightSpeed RT¹⁶ and Xtra system. *Contact your local GE Healthcare Sales representative for a complete list of all system options or visit us at <http://www.gehealthcare.com>. Refer to the instruction manuals supplied with specific options for respective details.*

CATALOG NUMBER	OPTION DESCRIPTION
B7850LD	International Dolly Set For International customers, if dollies are required.
B7850TC	Rear Cable Cover Optional rear cable cover for LightSpeed RT ¹⁶ /Xtra upgrades
B7710LN	Boom in Room Monitor
E8505LF	Gammex Lasers (CT Simulation Laser Systems)
E8505P	LAP Lasers CT Simulation Laser Systems
E6315JD	Exact Couch. Radiation Therapy Planning (RTP) Exact Couch. Flat panel table top provides a flat surface for accurate and reproducible patient positioning.
B7868ME	Boom Upgrade Cable Kit for IB(B7710WM&B7530RC)
K9000L	Switched Network Kit 6 Node, 10/100 Mbit Auto Sensing
B7500PL	ConnectPro Option provides a direct interface to HIS/RIS With BarCode Reader
B7540RB	Bar Code Reader
B71182CA/B7816PH	Long Cable Set
B71172CA/B7816PS	Short Cable Set
B7700MG	Global Modem Kit
B75792CA/B75022BS	Gantry Accessory I/F HW
B75802CA	AC Outlet Box for OC
B70222RT	Prospective Gating
B75822CA	Integrated Injector Class 1
B75832CA	Enhanced Integrated Injector Class 4

Table 3-1 LightSpeed RT¹⁶ and Xtra Installed Options and Kits

Section 2.0

Base Scanner System

2.1 Application

The CT scanner system includes hardware and software to support patient data acquisition and image analysis for whole-body computed tomography.

2.2 Configuration

The base scanner system is configured as shown. All scan and analysis functions are controlled from the operator's console (not shown).



Figure 3-1 Base Scanner System

Chapter 4

Room Planning

Section 1.0 Required Systems Clearances



NOTICE If your system was installed before December 2006, Limited Access is not available for your system. You must use the Recommended Room Size to reinstall it.

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

Some possible room size dimensions are shown in the table below. These room size dimensions are table dependent.

System Configuration	Recommended Scan Room Size	Typical Scan Room Size	Recommended Ctrl Room Size	Clearance Requirements
GT 1700mm Table	4420 x 6706 mm (14 ft. 6 in. x 22 ft.)	4267 x 6096 mm (14 ft. x 20 ft.)	2743 x 4420 mm (9 ft. x 14 ft. 6 in.)	see Figure 4-1
GT 2000mm Table	4420 x 7315 mm (14 ft. 6 in. x 24 ft.)	4267 x 6706 mm (14 ft. x 22 ft.)	2743 x 4420 mm (9 ft. x 14 ft. 6 in.)	see Figure 4-1
GT 650lbs	4420 x 6915 mm (14 ft. 6in. x 22ft. 8 in.)	4267 x 6706 mm (14 ft. x 22 ft.)	2743 x 4420 mm (9 ft. x 14 ft. 6 in.)	see Figure 4-1

Note: GT 650lbs = High Capacity Table

Table 4-1 List of Sample Room Layouts, by System Configuration

Limited Access Rooms (width only):

- Minimum Width: 3708 mm (12 ft. 2 in.); 356 mm (14 in.) cover to wall
- Average Width: 4064 mm (13 ft. 4 in.); 711 mm (28 in.) cover to wall

Additional component dimensions are available in [Figure 4-9](#) through [Figure 4-13](#) of this document. Consult your local General Electric Project Manager of Installation (GE PMI) for your appropriate room specifications.

For equipment clearance requirements, refer to [Section 2.0](#). Remember, 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 LightSpeed RT¹⁶ and Xtra system is shipped with standard short length cables, with a set of longer cables (B71182CA) available as an option. See the electrical page of the GE print for your specific requirements.

Note also, that where possible, the cables should enter the gantry from the rear, utilizing the rear cable cover assembly. Alternate cable entry is possible at the center of the gantry (refer to the Installation template).

- Excess cable length cannot be stored behind the operator console or PDU.
- A long cable must not be cut or shortened.
- Excess cable may be stored in conduits, a cable storage box if present, or the floor duct, provided sufficient space is available. Observe the fill rate for each option. If there are questions regarding local electrical or building codes, consult the project electrical contractor or electrician.
- All NEC 70-E Electrical Regulations regarding conduit or duct fill must be observed.

Section 2.0 Regulatory and Service Clearances

2.1 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)

NFPA 101 (LIFE SAFETY CODE):

Figure 4-1 is a map of clearance requirements for U.S. regulatory compliance. See clearance tables on the following pages for detailed dimensional clearances. Please note 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.

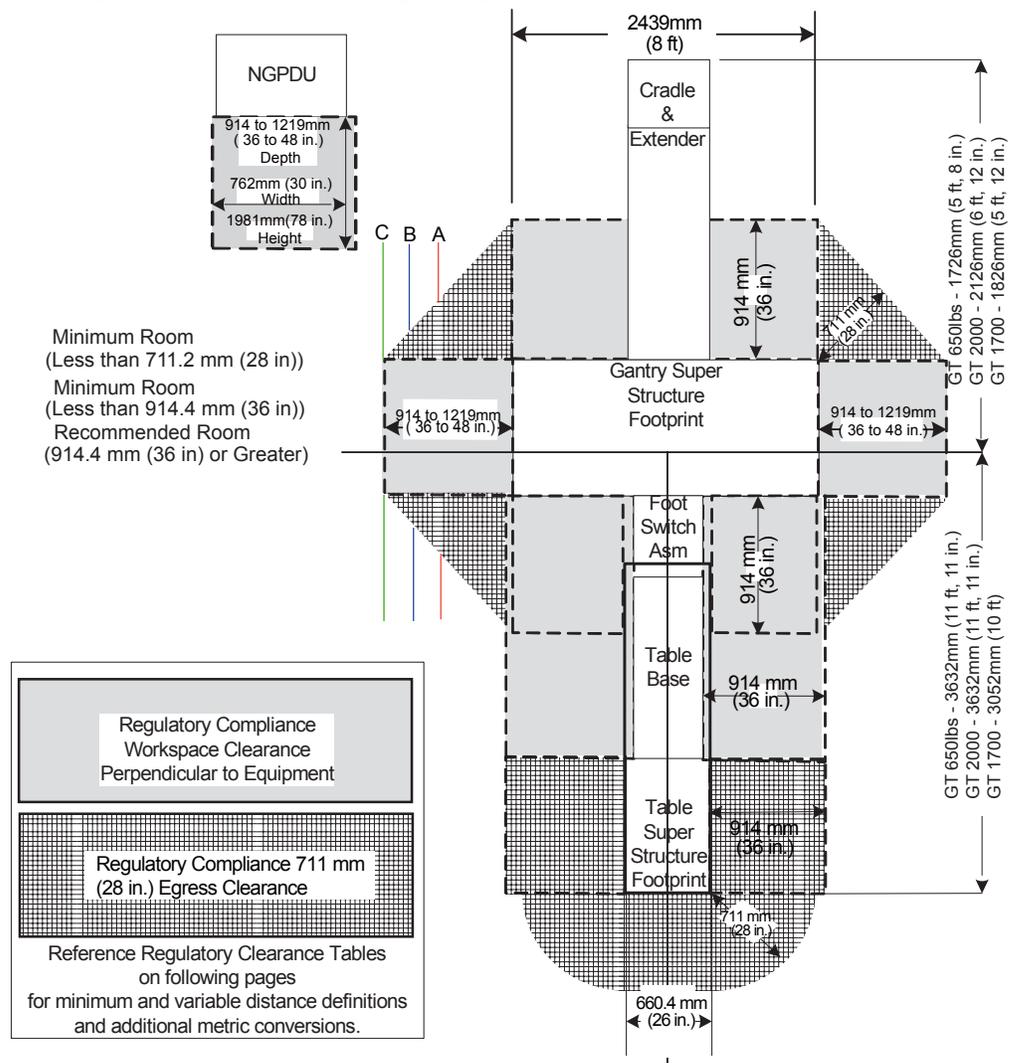


Figure 4-1 Regulatory Clearance Requirements for LightSpeed RT¹⁶ System Configuration

Note: See Section 4.0 for Service Clearances

2.1.1 Regulated Minimum Working Clearance by Major Subsystem

- Requirements apply to equipment operating at 600V 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..

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access: front of console	914 mm (36 in.)	There are no exposed live part hazards with the cover in place. If the console is placed under a counter, the front edge of the console must be even with the vertical edge of the console workspace. Note: This component is typically serviced from the front with access to the rear.
Service access width: Front of console	762 mm (30 in.)	This is the width of the workspace in front of the equipment. A minimum of 762 mm (30 in.) or the width of the equipment, whichever is greater, is required.
Head clearance	1981.2 mm (78 in.)	This is the height of the workspace measured from the floor at the front edge of the equipment to the ceiling or overhead obstruction(s). A minimum of 1981.2 mm (78 in.) or the height of the equipment, whichever is greater, is required.

Table 4-2 Console Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of NGPDU)	914.4 mm (36 in.)*	There are no exposed live part hazards with the cover in place. This component is typically serviced from the front with access to the rear. *If exposed live parts of 151 - 600 volts are present, 1219 mm (48 in.) is required on both sides of the workspace with the operator between. *If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	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, is required.

Table 4-3 NGPDU Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Head Clearance	1981 mm (78 in.)	This is the height of the workspace measured from the floor at the front edge of the equipment to the ceiling or overhead obstruction(s). A minimum of 1981 mm (78 in.) or the height of the equipment, whichever is greater, is required.

Table 4-3 NGPDU Subsystem

- For the gantry and table, distances are measured from the enclosure, not the finish covers.

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (All Sides)	914 mm (36 in.)	If exposed live parts of 151 - 600 volts are present, 1219 mm (48 in.) on both sides of workspace with the operator between is required. If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	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, is required.

Table 4-4 Gantry Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Table Head or Foot)	914 mm (36 in.)	There are no exposed live parts hazards with the cover in place. This component is typically serviced from all four sides. this is the width of the workspace on each side of the equipment. A minimum of 914.4 mm (36 in.), or the width of the equipment, whichever is greater, is required.
Direction of Service Access (Table Sides)	914 mm (36 in.)*	*This distance can be reduced to 711 mm (28 in.) provided a written and signed approval is obtained by the local team from the local AHJ (Authority Having Jurisdiction). The signed document must be on file with GE.

Table 4-5 Table Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Table Foot)	711 mm (28 in.)	For the front gantry cover removal, a minimum of 457 mm (18 in.) is allowed only if an unobstructed egress space of 711 mm (28 in.) is maintained around the equipment for room exit. This also means no trip hazards exist along the path of egress.
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	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, is required.

Table 4-5 Table Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of UPS)	914.4 mm (36 in.)*	There are no exposed live part hazards with the cover in place. This component is typically serviced from the front with access to the rear. *If exposed live parts of 151 - 600 volts are present, 1219 mm (48 in.) is required on both sides of the workspace with the operator between. *If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.
Service Access Width (Right side and length of UPS)	762 mm (30 in.)	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, is required.
Head Clearance	1981 mm (78 in.)	This is the height of the workspace measured from the floor at the front edge of the equipment to the ceiling or overhead obstruction(s). A minimum of 1981 mm (78 in.) or the height of the equipment, whichever is greater, is required.

Table 4-6 UPS Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of A1 Disconnect)	914.4 mm (36 in.)*	There are no exposed live part hazards with the cover in place. This component is typically serviced from the front with access to the rear. *If exposed live parts of 151 - 600 volts are present, 1219 mm (48 in.) is required on both sides of the workspace with the operator between. *If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.
Service Access Width (Right side and length of A1 Disconnect)	762 mm (30 in.)	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, is required.
Head Clearance	1981 mm (78 in.)	This is the height of the workspace measured from the floor at the front edge of the equipment to the ceiling or overhead obstruction(s). A minimum of 1981 mm (78 in.) or the height of the equipment, whichever is greater, is required.

Table 4-7 A1 Disconnect Subsystem

2.1.2 Term and Definitions

EGRESS

The path of exit from within any room. U.S. regulatory requires a minimum of 711.2 mm (28 in.) of continuous and unobstructed space including trip hazards along the path of exit.

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, which ever 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.

PRE-INSTALLATION ESCALATION

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

Section 3.0 Additional Regulatory Clearance Information

3.1 Minimum Room Size (Limited Access)

The CT Gantry Left Side Limited Access Initiative provides the capability to reduce the minimum room size for CT Systems while still meeting all installation requirements and specifications. This adds left side flexibility, allowing the CT system to be sited in rooms with widths 558.8 mm (22 in.) smaller than the current minimum room width. Left-side access and egress may be restricted. Refer to your site's installation print for your room's detail.

If you are using the square meters (square feet) to determine compliance, remember that the front cover clearance is wider than the regulatory clearance along the table length, and that the cover park position is behind the table in the home position. The cover is removed on tilting dollies and can be moved side-to-side to reach the park position of 457 mm (18 in.), if this is not an egress route.

Wall duct and conduit on walls within the regulatory clearance areas shall be 1067mm (42 in.), measured from the covers to the obstruction. Servicing of the CT System can be safely performed within the regulatory envelopes, however sufficient space must be maintained to remove system covers, and replace large system components. To achieve this clearance for the gantry, clear space must be available to maneuver the gantry covers mounted on the service dollies. Surface floor raceway cannot be used in the egress route areas. OSHA ramps are available. The FE lifting the rear or front cover to avoid floor obstructions is not an EHS-approved service procedure.

One Service Engineer shall be able to accomplish all service component replace tasks listed without the need for special tools or equipment, such as a tube change, detector change, and HV tank.

3.1.1 Regulatory Caution

Site prints are required for all system installations including relocation and moves. CT 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.

3.1.2 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. Refer to the Pre-Installation manual for more details on service clearances.

Exceptions

Rooms smaller than GT 1700: 3708 mm x 6096 mm (12 ft. 2 in. x 20 ft.); GT 2000/GT650lbs: 3708 mm x 6706 mm (12 ft. 2 in. x 22 ft.), require construction to meet the minimum requirements. The design center or your GE PMI may have additional recommendations for your room size.

3.1.3 Operational Caution

In a minimum room layout 355.6 mm - 685.8 mm (14 in. - 27 in.), the customer should consider workflow, customer 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 in the product Pre-Installation manual, Chapters 1-4.

3.1.4 System Specifications (LightSpeed RT¹⁶ and Xtra)

System Configuration	Recommended Room Size	Typical Room Size	Minimum Room Size
GT 1700mm Table	4420 mm x 6706 mm (14 ft. 6 in. x 22 ft.)	4267 mm x 6096 mm ¹ (14 ft. x 20 ft.)	3708 mm x 6096 mm ² (12 ft. 2 in. x 20 ft.)
GT 2000mm Table	4420 mm x 7315 mm (14 ft. 6 in. x 24 ft.)	4267 mm x 6706mm (14 ft. x 22 ft.)	3708 mm x 6706 mm (12 ft. 2 in. x 22 ft.)
GT 650lbs	4420 mm x 6915 mm (14 ft. 6 in. x 22 ft. 8 in.)	4267 mm x 6706mm (14 ft. x 22 ft.)	3708 mm x 6189 mm (12 ft. 2 in. x 20 ft. 4 in.)

Table 4-8 System Specifications (LightSpeed RT¹⁶ and Xtra)

¹Same Regulatory requirements apply

²Same Regulatory requirements apply, with the addition of no energized left side service.

3.1.4.1 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.

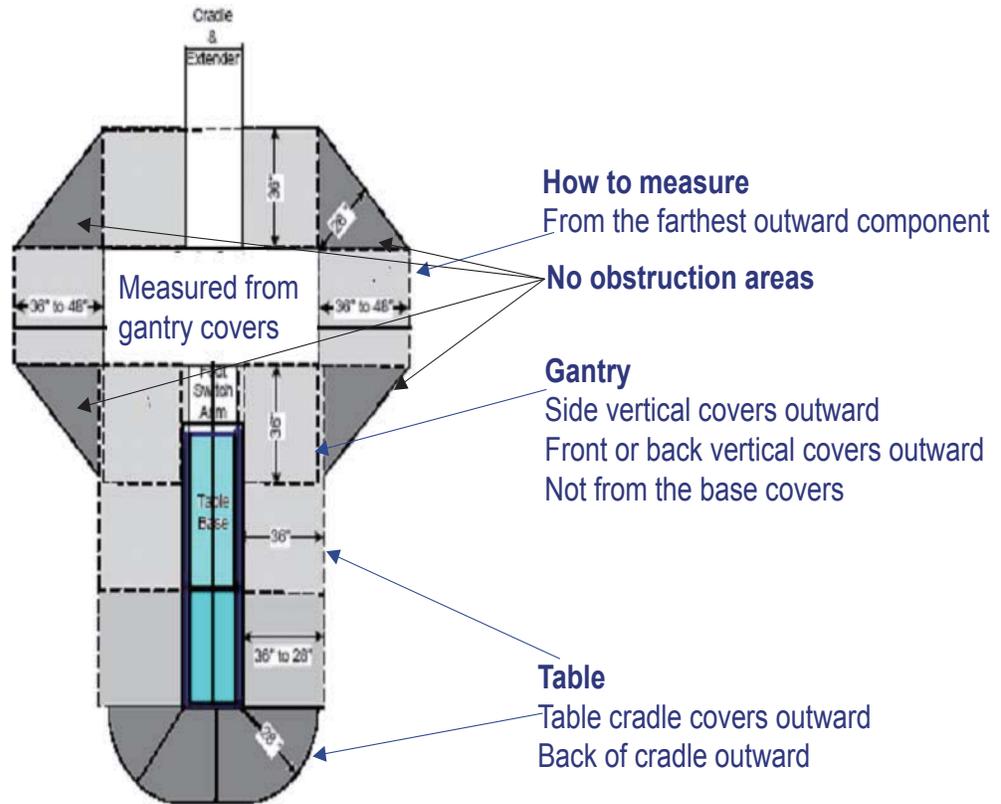
3.1.4.2 Typical Room Size

The "Typical room size" configuration allows for some future upgrades. It has sufficient workspace, but limited space to add millwork and meet all regulatory requirements. This room may be compatible with some two-step future installations.

3.1.4.3 Minimum Room Size

The "minimum room size" configuration allows for no 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.

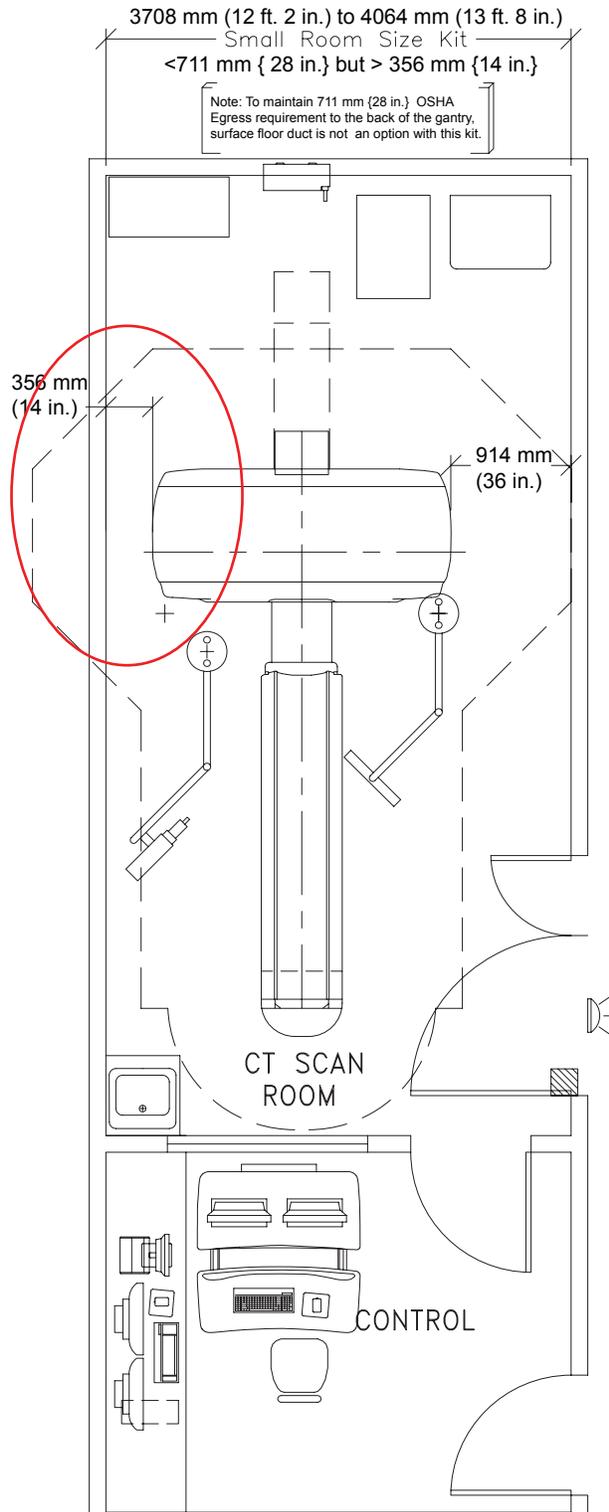
3.2 How to Measure



3.3 Minimum Room Size & Requirement Layouts

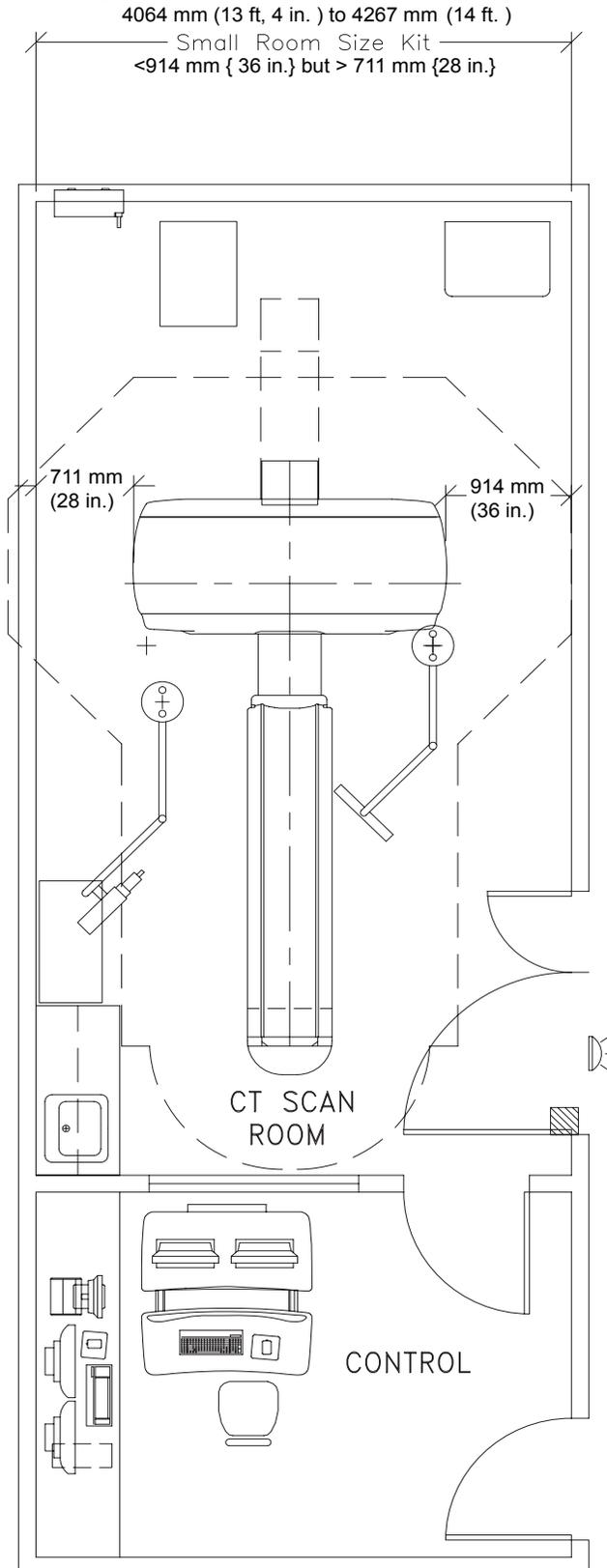
Room A - Less than 711 mm (28 in.), but greater than 256 mm (14 in.), measured from the covers to the left sidewall.

In this configuration service, egress and workspace are compromised around the gantry's left side.



Room B - Less than 914 mm (36 in.) but greater than 711 mm (28 in.) measured from the covers to the left sidewall.

In this configuration service, egress, and workspace are acceptable around the gantry.



3.4 Recommended and Typical Room Size & Requirement Layouts

Figure 4-2 and Figure 4-3 show Recommended and typical room layouts, with and without in-room cabinets. You need to be aware of locations for med gas, surface ductwork, or other items that make a grounded wall.

Note: Your room layout may meet the Recommended or typical room requirements but look different than Figure 4-2 or Figure 4-3. Contact your sales person to have a detail room layout completed for your site.

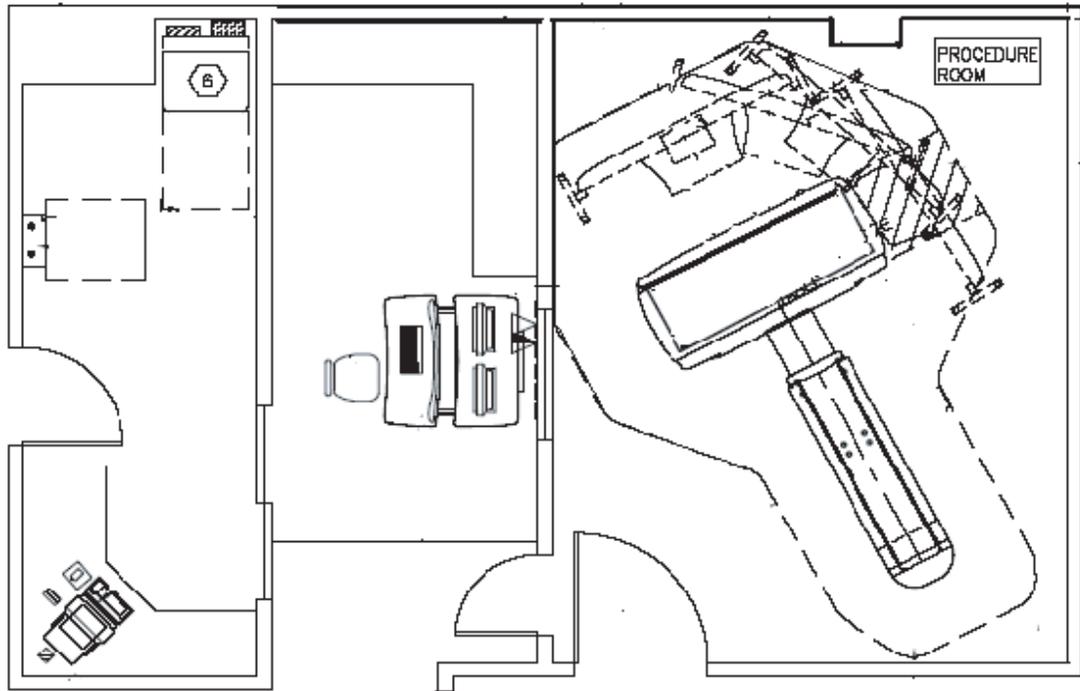


Figure 4-2 Room Layout with cabinets

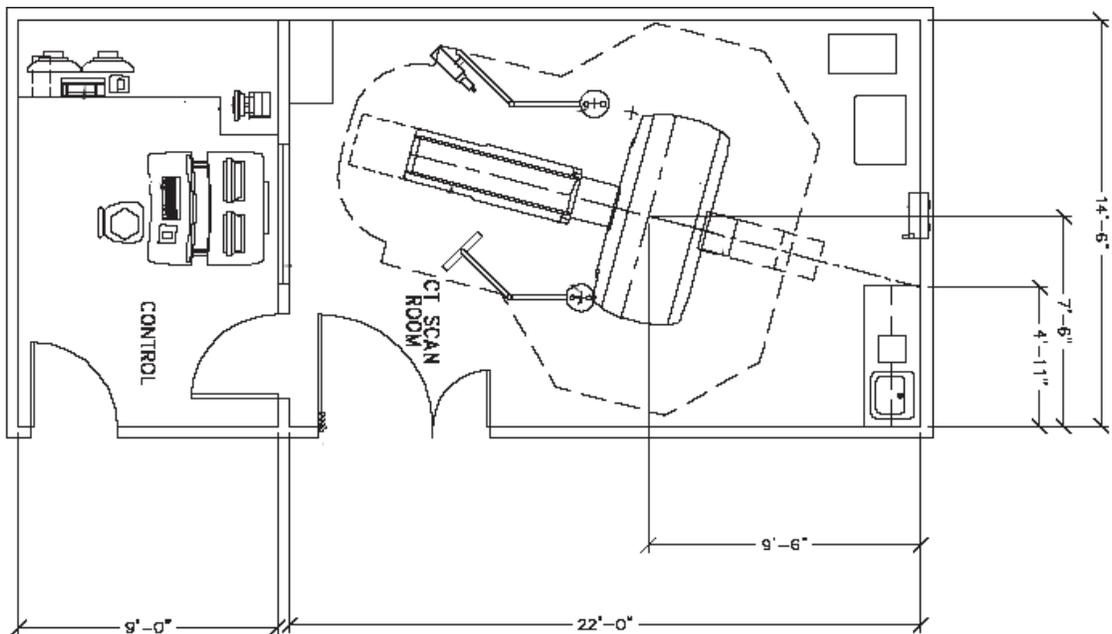


Figure 4-3 Room Layout without cabinets

Section 4.0 Service Clearance

Servicing of the CT System can be safely performed within the regulatory envelopes defined in [Section 2.1](#), 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.

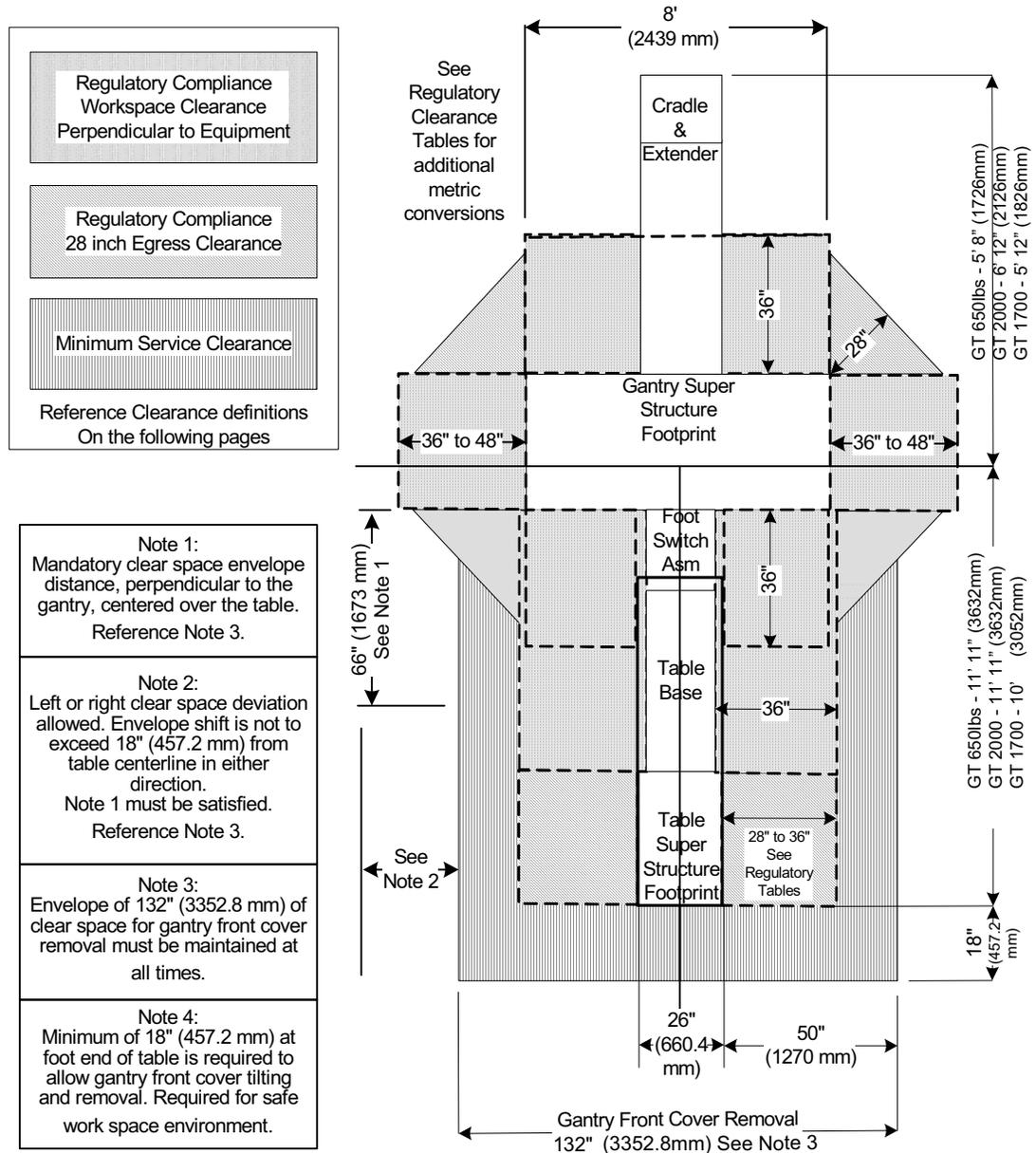


Figure 4-4 Minimum Service Clearance

4.1 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 4-4](#) illustrates the minimum clear space required to achieve this operation of 3,200.4 mm (126 in.). 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 of 2660 mm (104 ft, 7 in.) and a depth of 596 mm (23 ft, 5 in.) of clearance for removal as shown in [Section 6.0, Figure 4-6](#). Sufficient space must be calculated to move the cover either straight back or to one side of the table to satisfy the minimum service clearance shown in [Figure 4-4](#). This means the rear cover cannot violate the workspace on the rear, or on 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 clear and unobstructed access to the gantry tube change area for all major component replacements. These components must be able to reach the service area without lifting or rigging by one service engineer. 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.

4.2 Power Distribution Unit (NGPDU) Service Clearance

Positioning of this component must be considered for regulatory compliance as defined in [Section 2.1](#), Regulated Minimum Working Clearance by Major Subsystem.

See Regulatory Tables.

4.3 Console Service Clearance

The console does not present an exposed live parts hazard. However, it is recommended that a minimum working space depth of 1219.2 mm (48 in.) and full width of the console 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 requirement shall be considered when siting the console. See [Figure 4-5](#) for a typical control room layout.

Section 5.0 Recommended Layouts

5.1 Storage Cabinet

A storage cabinet is provided by GE Healthcare to store all supplied service equipment (see [Table 4-9](#) for equipment list). This storage cabinet (457mm D x 914mm W x 1067mm H) (18" D x 36" W x 42" H; ~90 lbs) should be located in the scan room suite area for easy service access..

ITEM	SIZE	WEIGHT (TOTAL)	
QA Phantom (water filled)	20 cm x 15 cm (7.9 in. x 5.9 in.)	5.5 kg	12 lb
35CM Phantom	35 cm x 7 cm (13.8 in. x 2.8 in.)	8.2 kg	18 lb
48CM Phantom	48 x 7 cm (18.9" x 2.8)	11.4 kg	25lb
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
Rear Cover Dollies	158 cm x 82 cm (62.2 in. x 32.3 in.)	11.4 kg	25 lb
Front Cover Dollies	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
Install Support Kit (box)	30 cm x 30 cm x 38 cm (11.8 in. x 11.8 in. x 15 in.)	9.1 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.)	9.1 kg	20 lb
Balance Weight Kit		33 kg	73 lb

Table 4-9 Equipment to be stored in storage cabinet

5.2 Advantage Workstation (AW)

Refer to Advantage Workstation Pre-Installation Manual and Installation/Service Manual.

5.3 Control Room Considerations

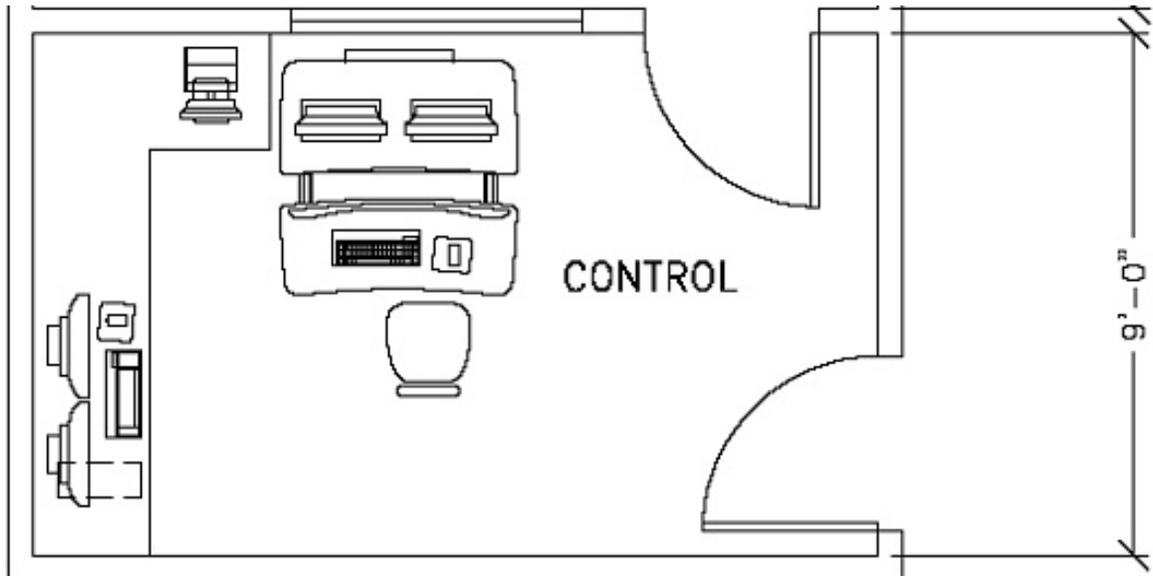


Figure 4-5 Typical Control Room Layout

- 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.
- If operationally possible, the monitor desktop and user desktop components may be removed and placed on a counter-top, providing the cable lengths shipped are not altered or changed. The console cabinet then can be remote mounted, provided the cooling and venting requirements are met.
- A suitable work area, which is within reach of the operator's console, should be provided for placement of the injector control. 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 CT console.
- Additional room power and network connection should be considered when reviewing the console work space.

5.4 CT Simulation Laser Alignment Systems

CT simulation laser alignment systems are used to reproduce the patient position for simulation and subsequent treatment on a linear accelerator. These lasers can be wall mounted or can be free standing. Work with your installation planner to determine the correct installation solution for your site.

Laser Options: www.gammex.com and www.lap-laser.com

Custom freestanding mounting structures are available for rooms that have no suitable wall or ceiling mounting space. Stanchion systems can provide flexibility in room design for placing alignment devices in rooms that may not be suitable for wall-mounted lasers.

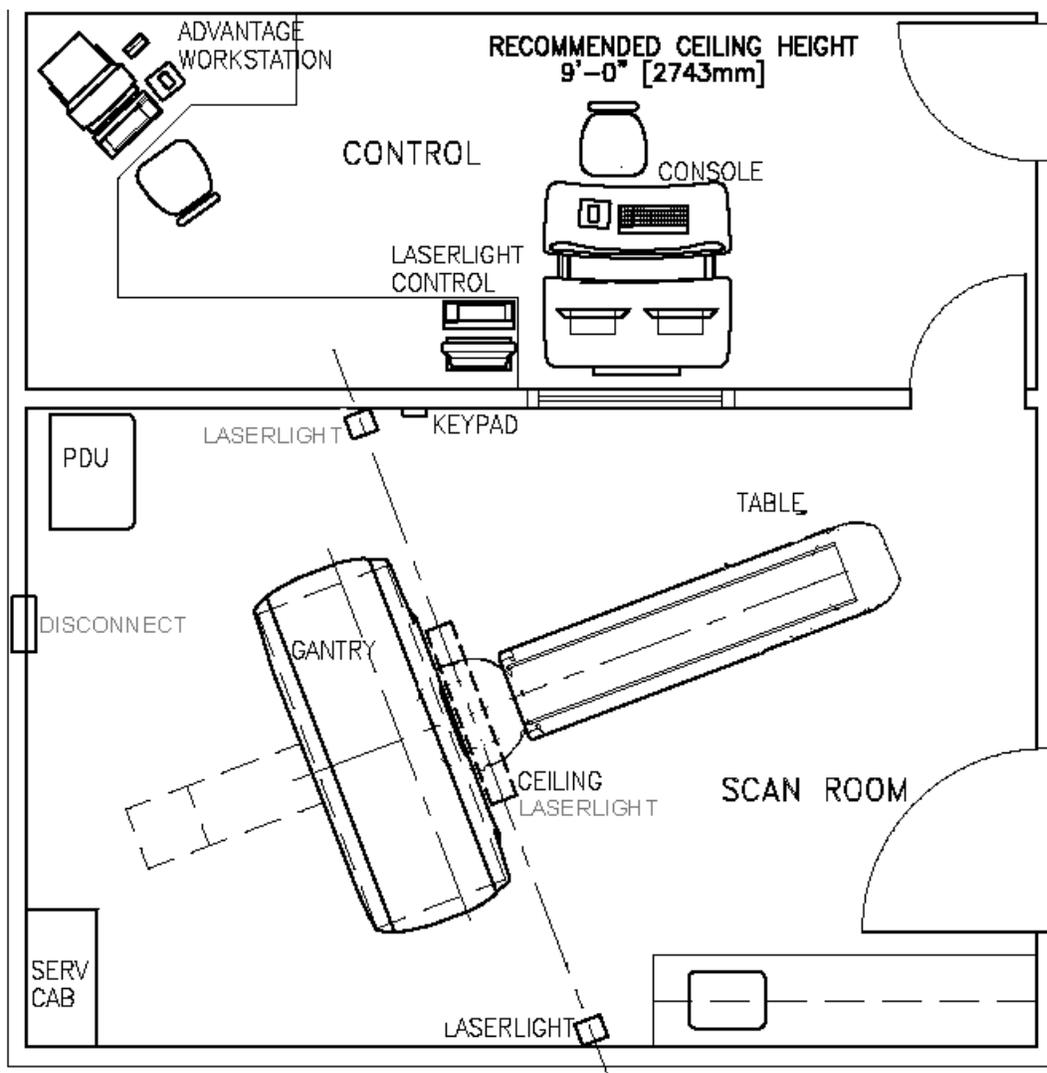


Figure 4-6 Typical Room Layout with CT Simulation Laser Alignment System

Section 6.0 Component Dimensions

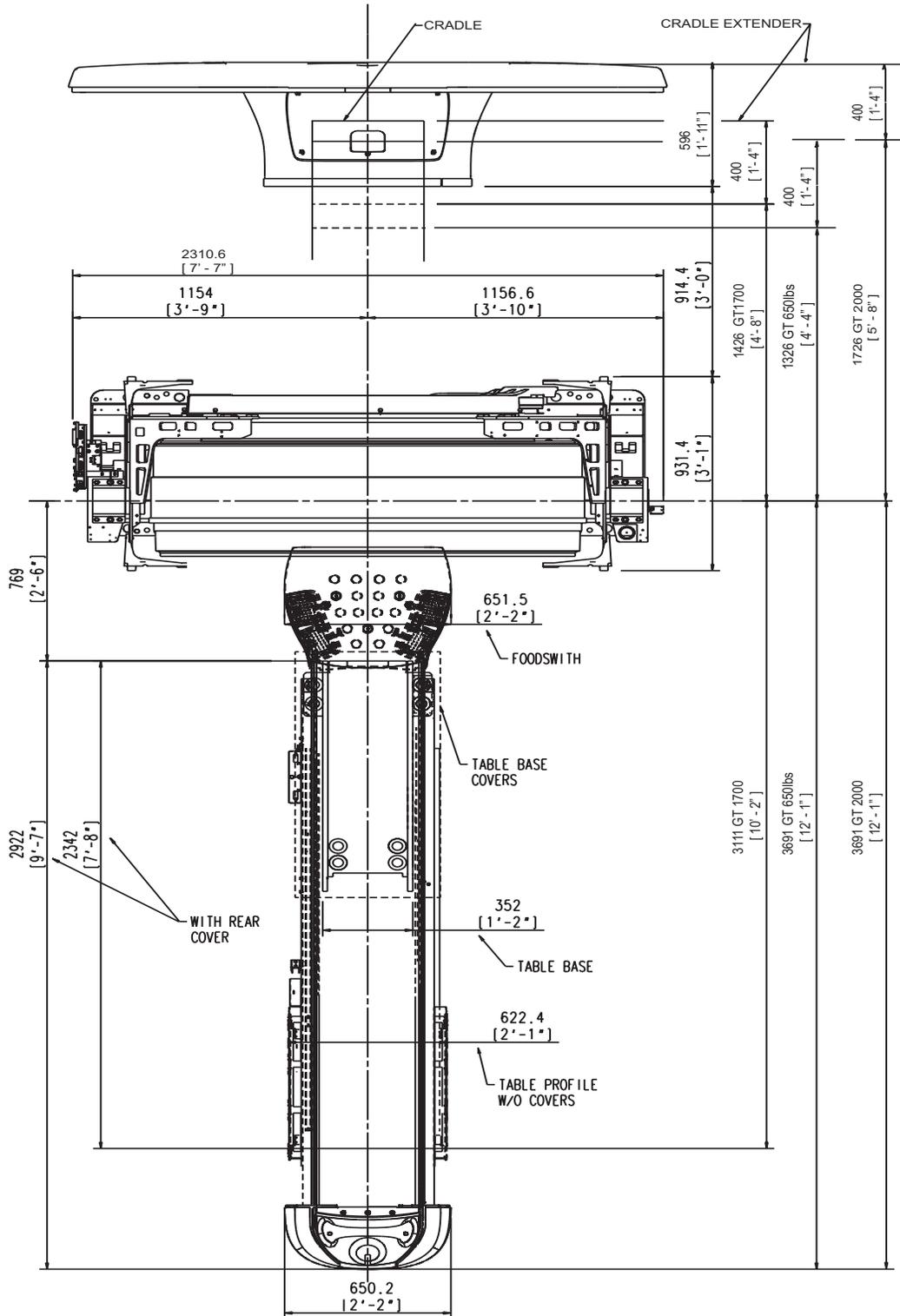
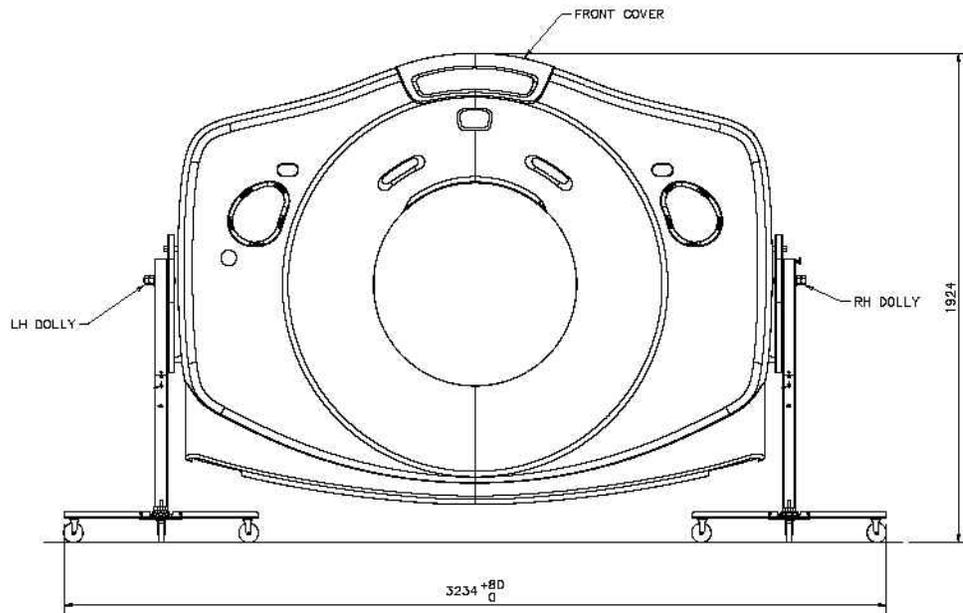
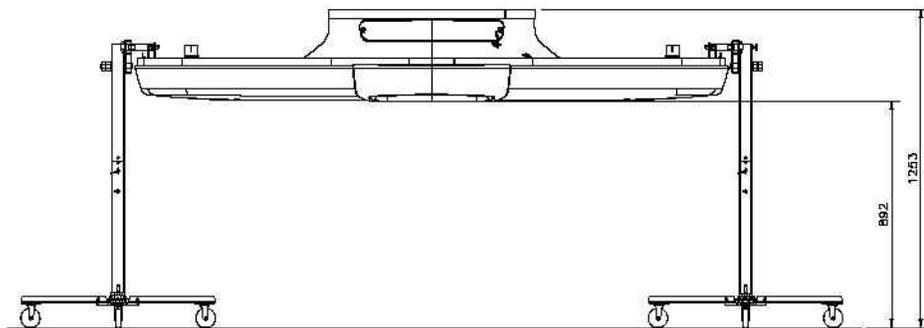


Figure 4-7 LightSpeed RT¹⁶ and Xtra Dimensions without Covers



FRONT COVER MOUNTED TO DOLLIES, VERTICAL POSITION



FRONT COVER MOUNTED TO DOLLIES, HORIZONTAL POSITION

Figure 4-8 Gantry Front Cover with Service Dolly Dimensions

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

Table 4-10 Dimensions of Accessories

6.1 Table and Gantry

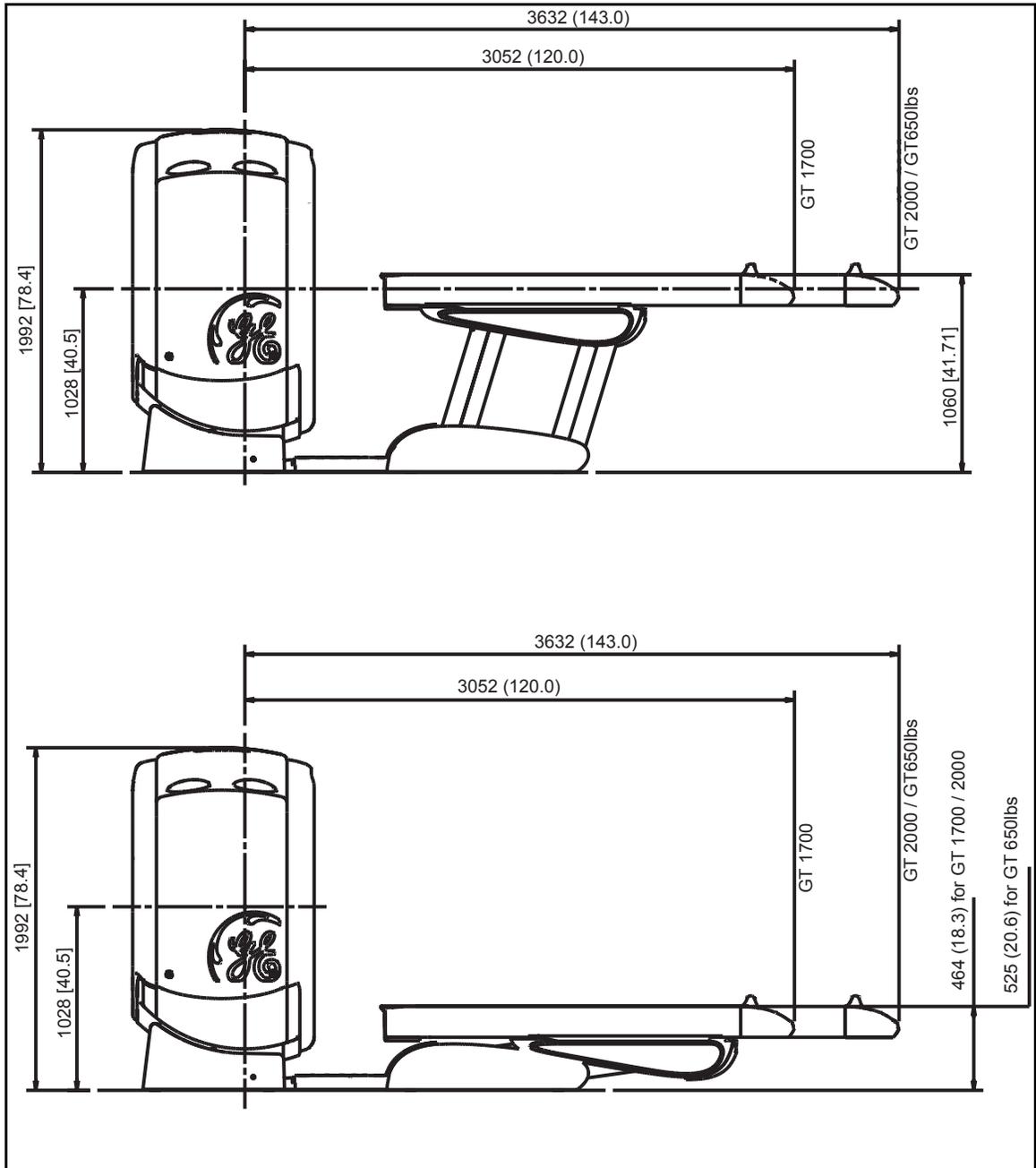


Figure 4-9 Table and Gantry (Side View)

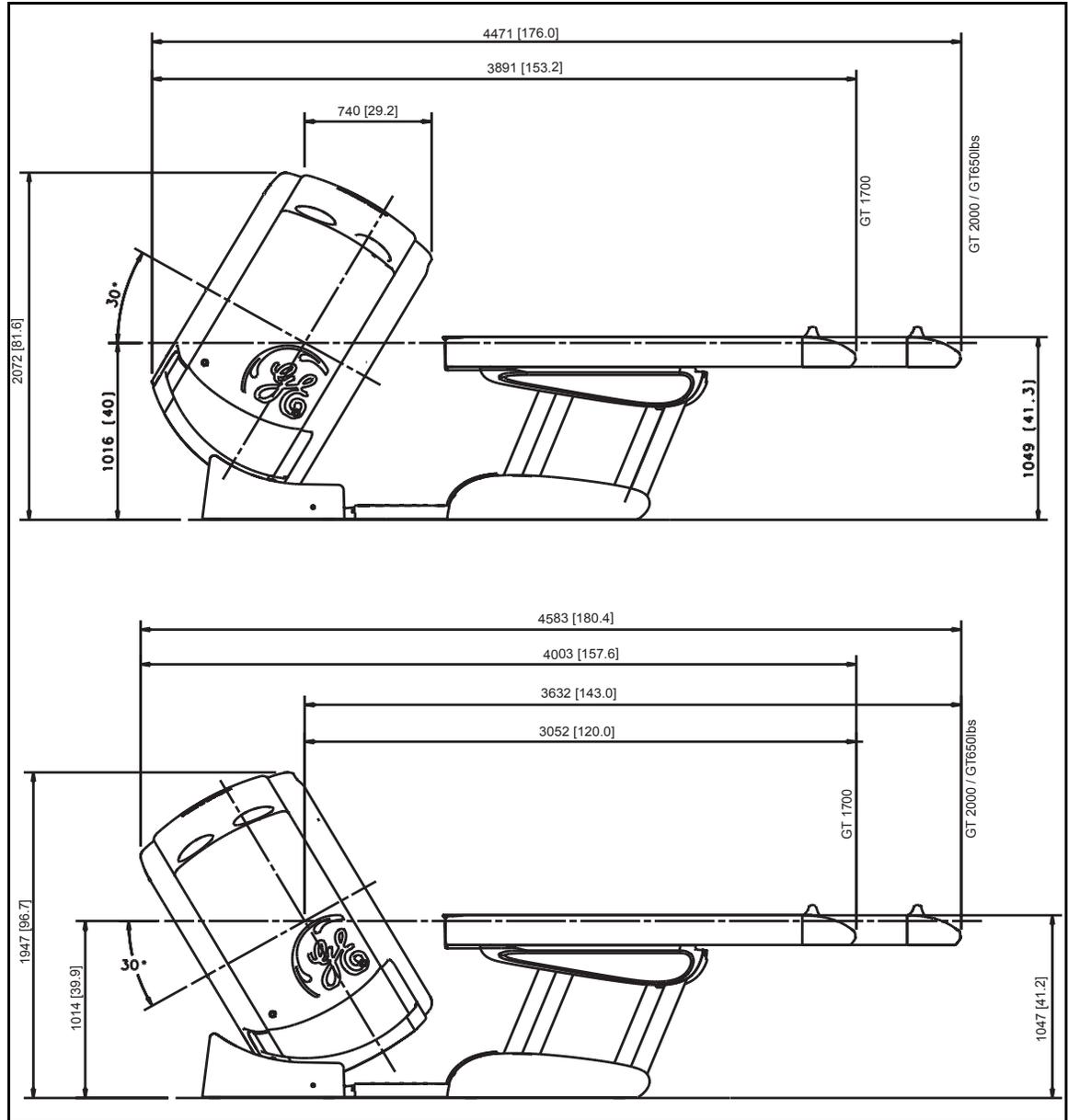


Figure 4-10 Gantry shown tilted +30° (top) and -30° (bottom)

6.2 Power Distribution Unit

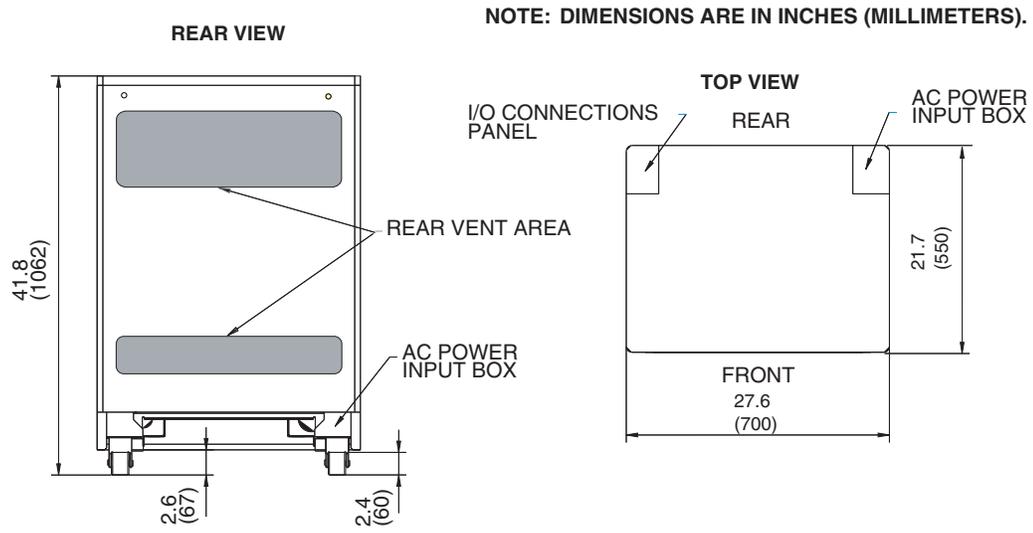
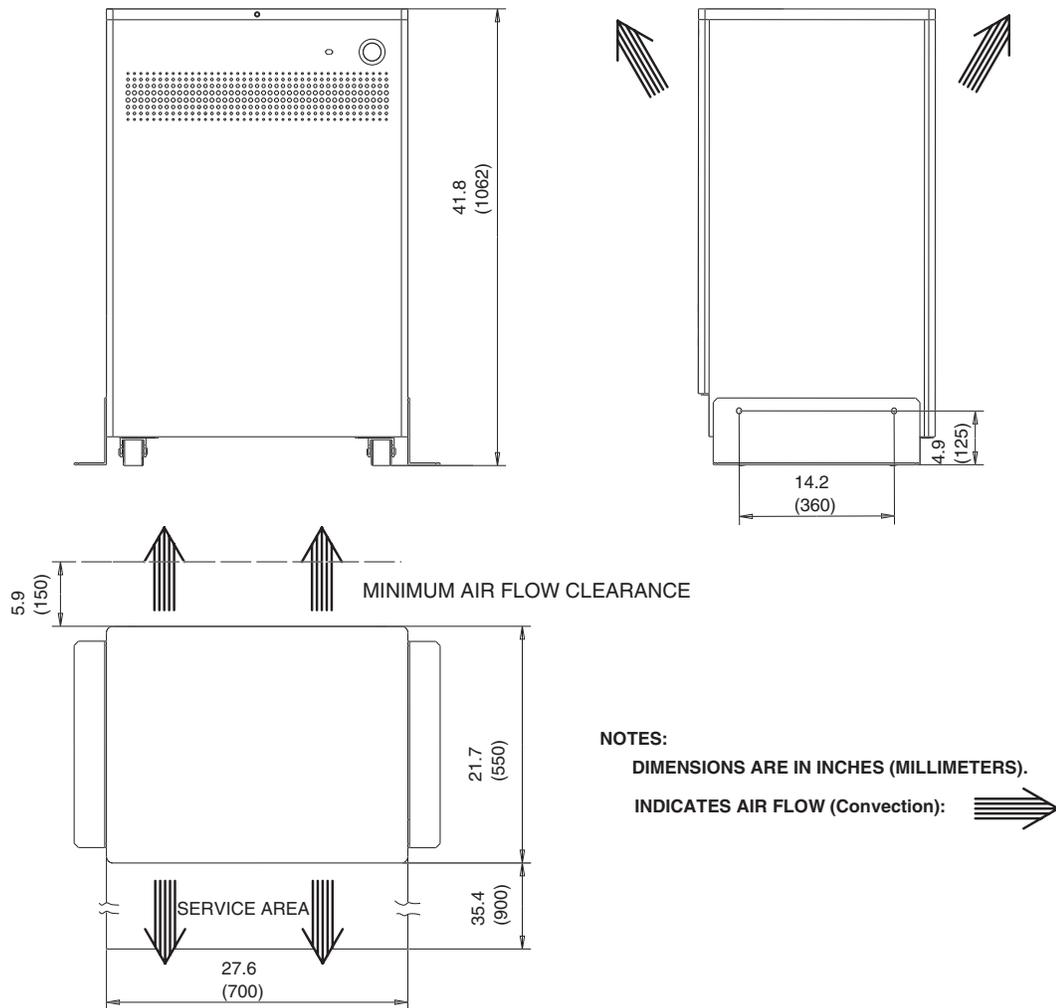


Figure 4-11 Power Distribution Unit (NGPDU)



NOTES:
 DIMENSIONS ARE IN INCHES (MILLIMETERS).
 INDICATES AIR FLOW (Convection):

Figure 4-12 Power Distribution Unit (NGPDU)

6.3 Operator's Console

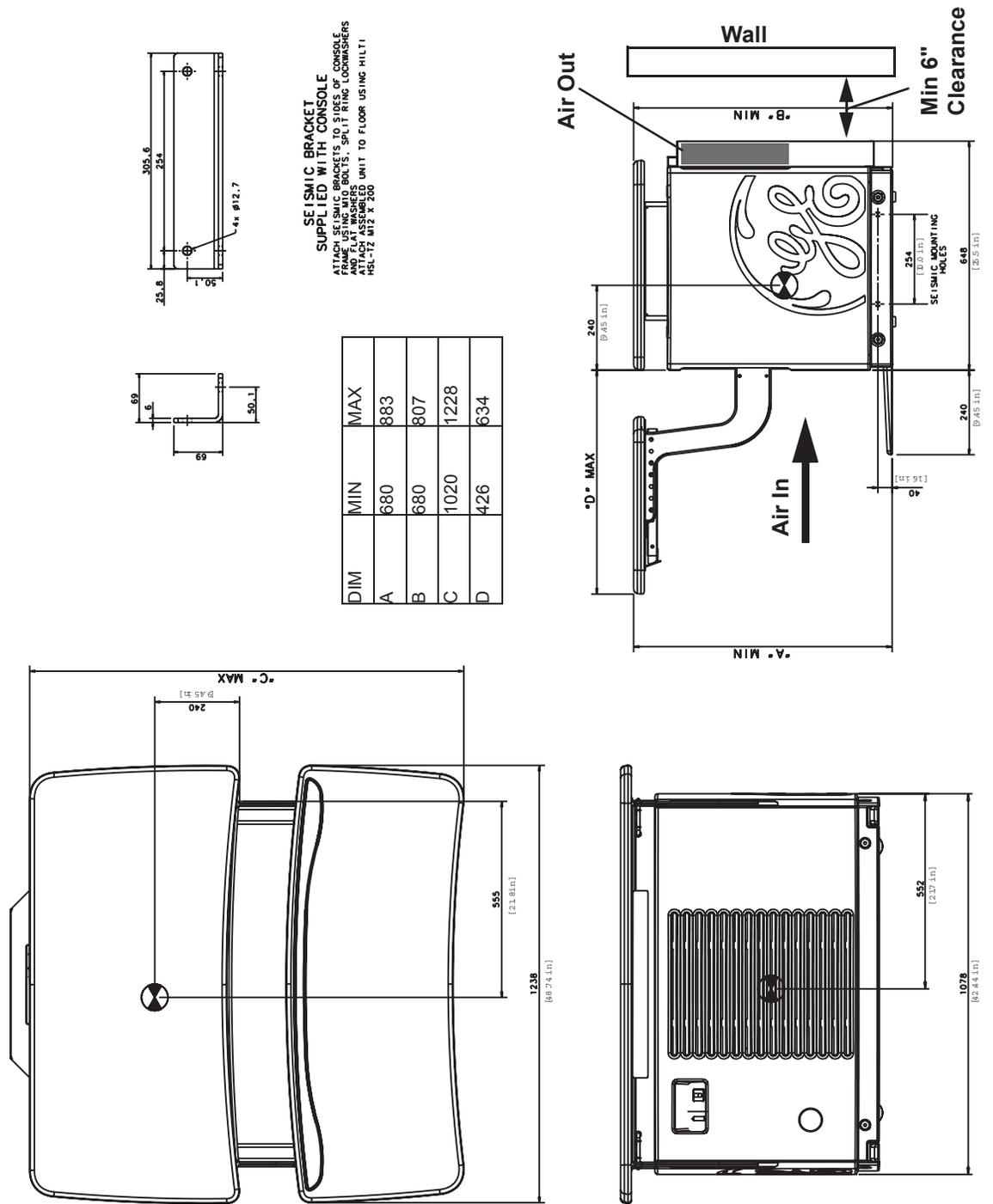


Figure 4-13 Operator's Console

Section 7.0

Minimum Dimensions and Clearances

SYSTEM OPERATION	MM	INCHES
Ceiling Pedestal mount (optional) (lowest point to floor injector or monitor)	2438.5 mm	96 in.
Finished ceiling to floor (recommended)	2743 mm	108 in.
Finished ceiling to floor (minimum)	2438.5 mm	96 in.
Table extension head end w/extender to obstruction	152 mm	6 in.
Table in lowest pos. w/cradle @home pos. to Center Line	3209 mm	126.5 in.
Back of Console to wall	152 mm	6 in.
Back of PDU to wall	152 mm	6 in.

Table 4-11 Minimum Dimensions and Clearances

7.1 Injector Control

A suitable work area, which is within reach of the operator's console, should be provided for placement of the injector control. Refer to [Figure 4-14](#).

Wall mounted, ceiling mounted and pedestal units need cables to be routed from the gantry area to the console area. The supplied cable is 15.24 m (50 ft.) in length. Injectors require AC power that is not supplied by the CT system.

Note: Injector cables should not be routed with the system cables.

Mounts are available in different configurations and lengths. Refer to Injector documentation for detailed installation instructions.

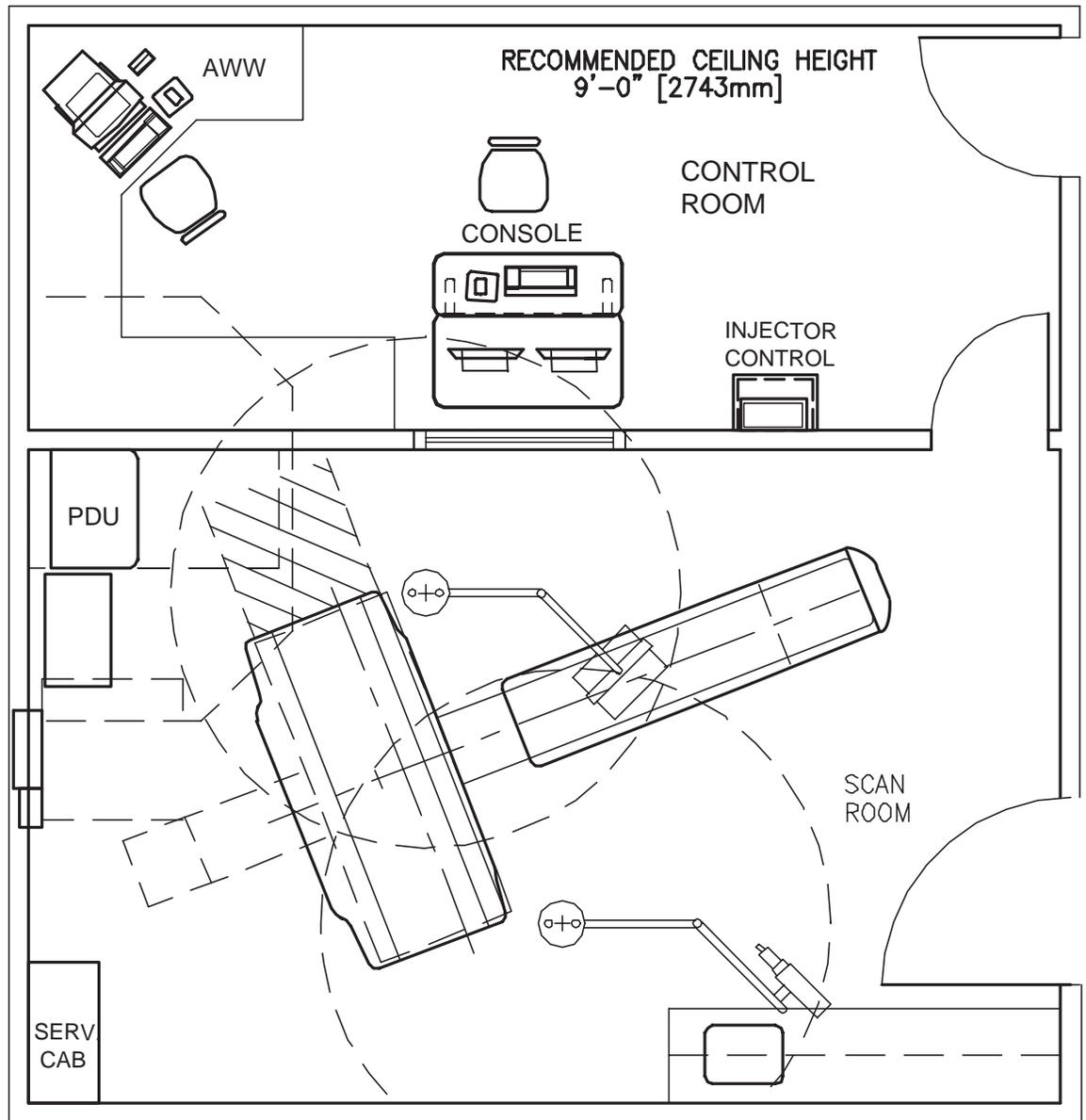


Figure 4-14 Typical Room Layout, with Injector Option

Section 8.0 Structural Requirements

8.1 Table and Gantry 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. General Electric is not responsible for any failure of the support structure or method of anchoring, including seismic requirements. GE is not responsible for methods other than those listed.**

Table and gantry mounting dimensions are shown in [Figure 6-3](#), [Figure 6-4](#), [Figure 6-5](#). Refer to [Chapter 6](#) for additional details of floor loadings, 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 [Section 6.0](#) for each of the three (3) major components of the LightSpeed RT¹⁶ and Xtra system.

Support areas of the patient table and gantry must rest on 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 potentially carry a 227 kg (500 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.

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

8.2 Floor Anchors

Provided floor anchors are designed for use ONLY on concrete floors that meet the 101.6 mm (4in.) concrete floor requirements. At the customer's expense, all other anchoring methods (on floor types other than the 101.6 mm (4 in.) concrete minimum) must be determined by their structural contractor to 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.

 **NOTICE** **Minimum concrete floor thickness for GT650lbs is 127 mm (5 in.)**

8.3 Floor Strength

Concrete floors must have a minimum strength of $f'c = 2000$ psi (1.4×10^7 Pa) at 28 days (curing time) for mounting floor anchors. It is the responsibility of each customer to have appropriate tests performed to determine and measure concrete strength.

Note: If installing the GE LS scanner on a floor type thinner than a 101.6 mm (4 in.) concrete floor, the purchaser, at their expense, shall provide acceptable anchoring and mounting methods that meet all structural specifications provided in sections 8.1 through 8.5 of this Pre-Installation Manual.

Minimum concrete floor thickness for GT650lbs is 127 mm (5 in.)

8.4 Floor Levelness

The CT Room floor levelness requirement is important for accurate patient positioning. Floor levelness in the Scan Room must not be greater than 6 mm (1/4 in.) between depression and high spots over any 3048 mm (120 in.) distance within the area of the gantry/table template (see the envelope shown in [Figure 4-4](#), on page 31).

Note: The floor must meet levelness specification to properly align the table/gantry. Minimum gantry height at this specification is 15 mm (1/2 in.) to prevent cable crushing.

Table level may not be achievable if the overall floor levelness is greater than the specification. The overall floor level must be 0 in. to use under gantry cable entrance. The minimum gantry height is 20 mm (3/4 in.) with this option to prevent cable crushing.

The use of floor shims is not suitable to achieve floor levelness. It is recommended that the concrete be leveled to meet this requirement.

8.5 Floor Vibration

The CT 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 customers 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.

8.5.1 Steady State Vibration

The maximum steady state vibration transmitted through the floor should not exceed 10^{-3} m/s² rms maximum single frequency above ambient baseline from 0.5 to 80 Hz (measured in any 1 hour during a normal operating period).

8.5.2 Transient Vibration

The behavioral characteristics must be such that any measurable transient disturbance must also be minimized to less than 0.01 m/s² peak-to-peak.

8.5.3 Equipment Location

To minimize the interference, the CT 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

8.6 Walls: Scan Window

The recommended patient viewing window dimensions are 1219 mm wide x 1067 mm high (48 in. x 42 in.). The location of the window is dependent on the position of Operator Workspace position. Consult [Section 10.0](#) of this chapter and a **qualified radiological health physicist** for radiation protection requirement of glass (lead content and thickness).

Note: The operator at the Operator Workspace must be able to view the patient during a scan.

Section 9.0 Network Connections

Broad-band is considered the standard network connection for the systems. (A dial-up modem is optional.) A 1000 baseT high-speed network is desired, with 100 baseT network service acceptable. Broad-band connections should use one of the following Category 5 patch cables:

CAT Num	GE Part Num	Length
K9000WB	2215028-10	20 m
K9000KP	2215028-5	10 m
K9000JR	2215028-4	5 m
K9000WA	2215028-9	3 m

The CT system is connected to the network through the Console.

- A patch cable (not to exceed 3.05 m (10 ft.)) should be provided by the customer, and it is used to connect the console to a wall box. (See Notes on [Figure 9-2](#))
- Some customer-site units may require cable duct-work or conduit to route connecting network cables to the workstation, camera and console.
- The run from the hospital switch to the CT wall outlet must not exceed 88 m (290 ft.). Bandwidth performance is degraded when the length reaches 91 m (300 ft.) or greater.
- For the optional modem: **Two phone lines should be provided by the facility.** One line is for use with a modem and must be an analog line. The second line is a voice only line.



Figure 4-15 Console Rear Bulkhead

9.1 US Broad Band Process Overview

The United States network connectivity requirement for this product is broad-band. The US process relies on the GE PMI to select a Customer Champion and identify an IT contact for the site. Together, those individuals then complete a site assessment to gauge what tasks are needed to fulfill the connection.

Anyone can contact the GE Connectivity team at 800.321.7937, Option #3, with questions.

9.2 Customer Broad-Band Responsibilities

Provide GE Healthcare Installation Project Manager with an accurate site address, telephone number, contact name, and email address for the:

- Customer Champion
 - Coordinate VPN activities between Radiology/Cardiology and the Information Technology (IT) departments
 - Act as a focal point in assuring site broad-band infrastructure meets GE Healthcare requirements for connection as determined by a mutual assessment with the GE Healthcare Connectivity team.
- IT Contact
 - Complete an equipment assessment with GE Healthcare Connectivity team to determine site readiness for broad-band
- Contact your GE PMI, for the name of the zone broad-band specialist to:
 - Work with the Customer Champion to complete any identified infrastructure changes
 - Provide IP addresses for new CT equipment
 - Provide a VPN compatible appliance that will support the IPSec tunneling protocol and 3DES data encryption
 - Utilize an Internet Service Provider that supports static routing

Section 10.0 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 4-16](#))
- Equipment placement
- Weekly projected work-loads (# 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 4-16](#) depicts measurable radiation levels within the scanning room while scanning a 32 cm CTDI phantom (body) and a 20 cm water phantom (head) with the technique shown.

Note:
 Actual
 measurements
 can vary.

All measurements have an accuracy of ± 20% because of measurement equipment, technique, and system-to-system variation.

Use the correction factors shown in [Table 4-12](#) to adjust exposure levels to the usual scan technique at your site.

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

Table 4-12 Shielding Requirements Scaling



NOTICE The units of measure used for radiation levels have been changed in this publication, from mR (millirads) to μGy (micrograys). The conversion factor is:

$$1 \text{ mR} = 8.69 \text{ } \mu\text{Gy}$$

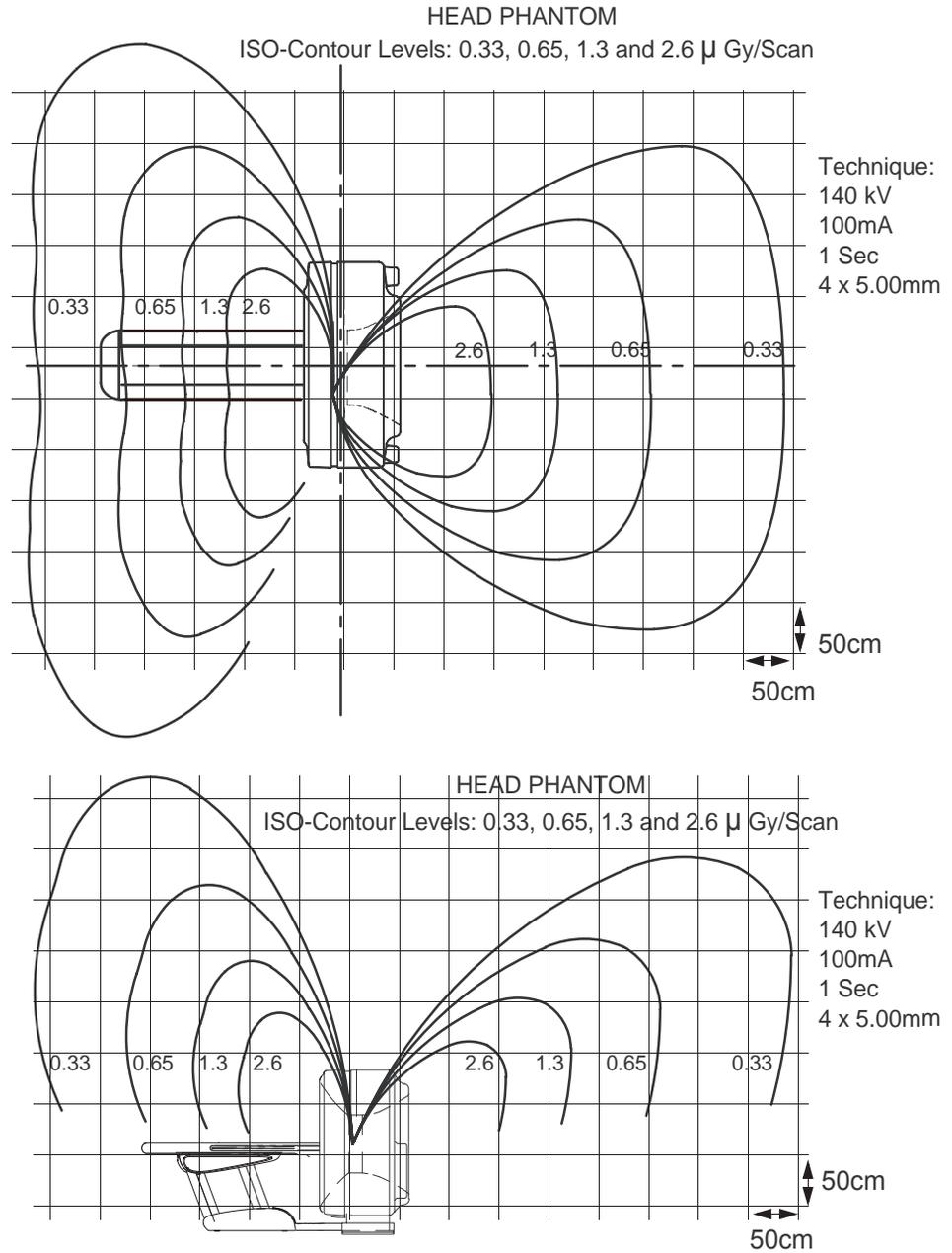


Figure 4-16 Typical Scatter Survey (Head Filter)

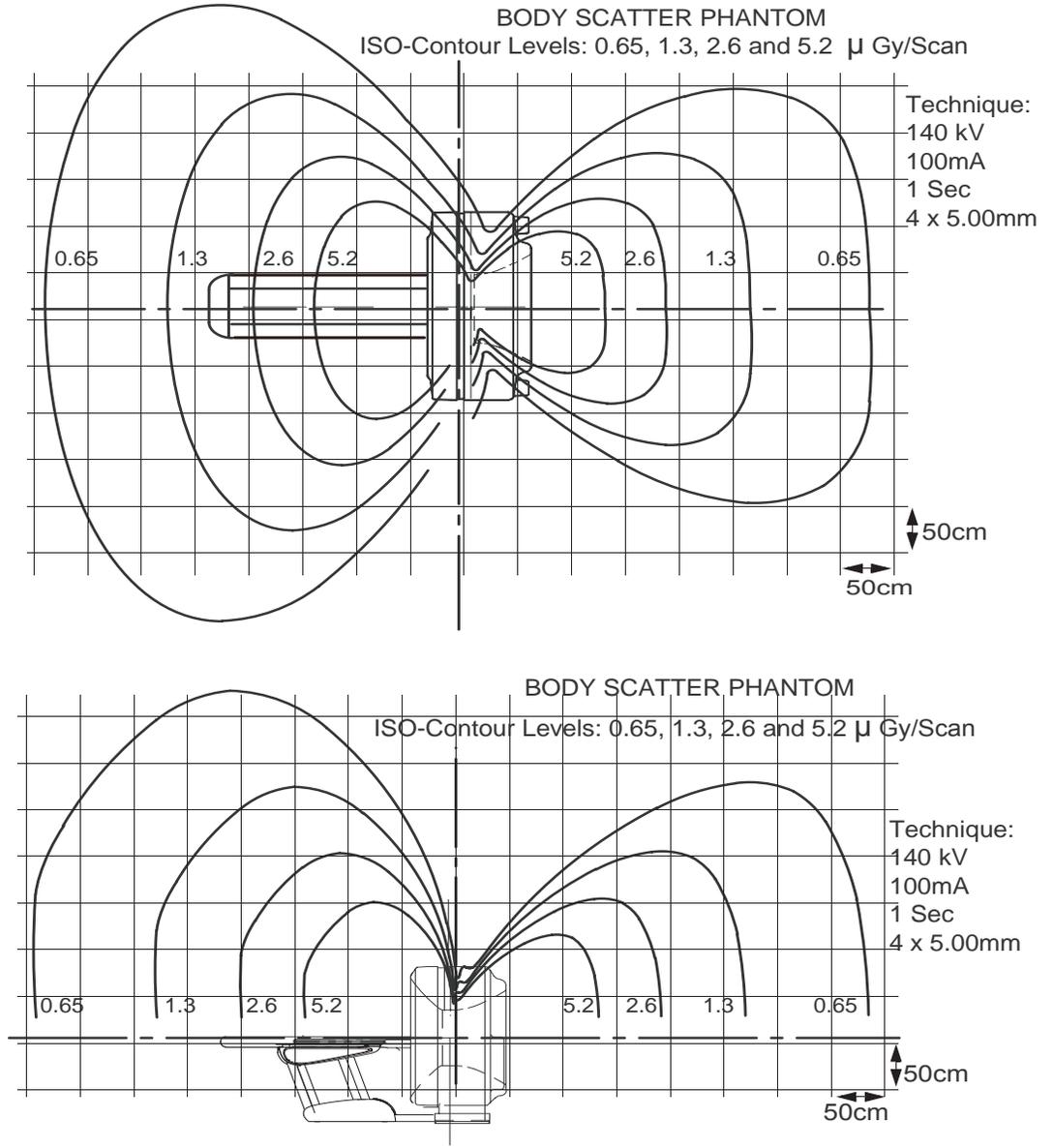


Figure 4-17 Typical Scatter Survey (Body Filter)

Chapter 5

Environmental Conditions

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



NOTICE Silver, copper, gold films used in the CT system are especially sensitive to the presence of sulfide, chloride and nitrate contaminates. Sulfur is the most damaging. If high levels of contaminates exist site may want to consider appropriate air filtration systems.

Section 1.0

Temperature and Humidity Specifications

Environmental specifications apply to the table, gantry, power distribution unit, and operating console.



NOTICE System Operation and Image Quality may be affected, if environmental specifications are exceeded.

1.1 Temperature (Scan Room & Control Room)

Maximum allowable ambient room temperature:	26° C (79° F)
Recommended ambient room temperature:	22° C (72° F)
Minimum allowable ambient room temperature:	18° C (64° F)
Maximum allowable ambient room temperature rate of change:	3° C per hour (5° F per hour)

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 ±2° C control, then the limits would 20° C - 24° C, to maintain absolute limits.

1.2 Humidity (Scan Room & Control Room)

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

1.3 Other Guidelines

- To help determine the hospital room environmental conditions, a temperature and humidity recorder may be temporarily installed close to where the system will be installed. Note readings before and after installation, to verify the true temperature and humidity in your environment.
- Consider heating, ventilating, air conditioning (HVAC) needs and redundancy. An air conditioner with two compressor units, rather than one, may prevent system downtime. A back-up (redundant) air conditioner permits CT system operation during an extended repair of the primary air conditioner.

Section 2.0 Cooling Requirement

Use [Table 5-1](#) to assist in cooling requirements planning. Over half the cooling used by your scanner is required for gantry operation. Locate a wall air-conditioning vent at floor level beside and behind gantry to meet both gantry cooling needs and provide patient comfort. Do not locate any cooling vents directly above the gantry. Air returns above the gantry are recommended.

SYSTEM COMPONENT	BTU/HR	WATT
Scan Room Subtotal	35,000	10,264
Includes: Gantry, Table, PDU & Peripherals		
Recommended Control Room Subtotal (includes OC w/1 IG, 2 monitors & SCSI Tower):	8126	2390
Operator's console/computer with one IG	7361	2165
Additional IG, each	1360	400
LCD Monitor, each (x2)	170 (340)	50 (100)
SCSI Tower	425	125
Injector	425	125
DASM	425	125
System Total (Recommended) (See NOTE 1)	43,126	12,654
Option: Remote Color Monitor	170	50
Option: UPS	2900	850
ROOM TOTAL (SEE NOTE 2)	46,196	13,554
NOTE 1: With 75 scan rotations per patient: Recommended BTU/hr. provides for 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-CT equipment.		

Table 5-1 Cooling Requirements (Worksheet)

Section 3.0 Altitude

System operating altitude is from mean sea level from - 492 ft. to 7875 ft. (-150m to 2400m).

Section 4.0 Electro-Magnetic Interference (EMI)

Note: If power sub-stations 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.

4.1 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.

4.2 Color Monitor

Locate color monitors in ambient static magnetic fields of less than 5×10^{-5} tesla (100 milligauss) to guarantee color purity and display geometry. See [Figure 5-1](#).

4.3 Console / Computer Equipment

Locate computer equipment in ambient static magnetic fields of less than 10^{-3} tesla (10,000 milligauss) to guarantee data integrity. See [Figure 5-1](#).

4.4 Magnetic Media

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

4.5 PDU

The PDU produces an electromagnetic field that radiates outward from its cabinet in all directions. Do not place the gantry or patient table within 0.3 meters (12 in.) of the edge of the Power Distribution Unit. Do NOT place other sensitive electronics (e.g. the computer equipment) within 1 m (39 in.) of the edge of the Power Distribution Unit in any direction, including above or below it. See [Figure 5-1](#).

Note: The UPS is not classified as sensitive electronics.

4.6 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:

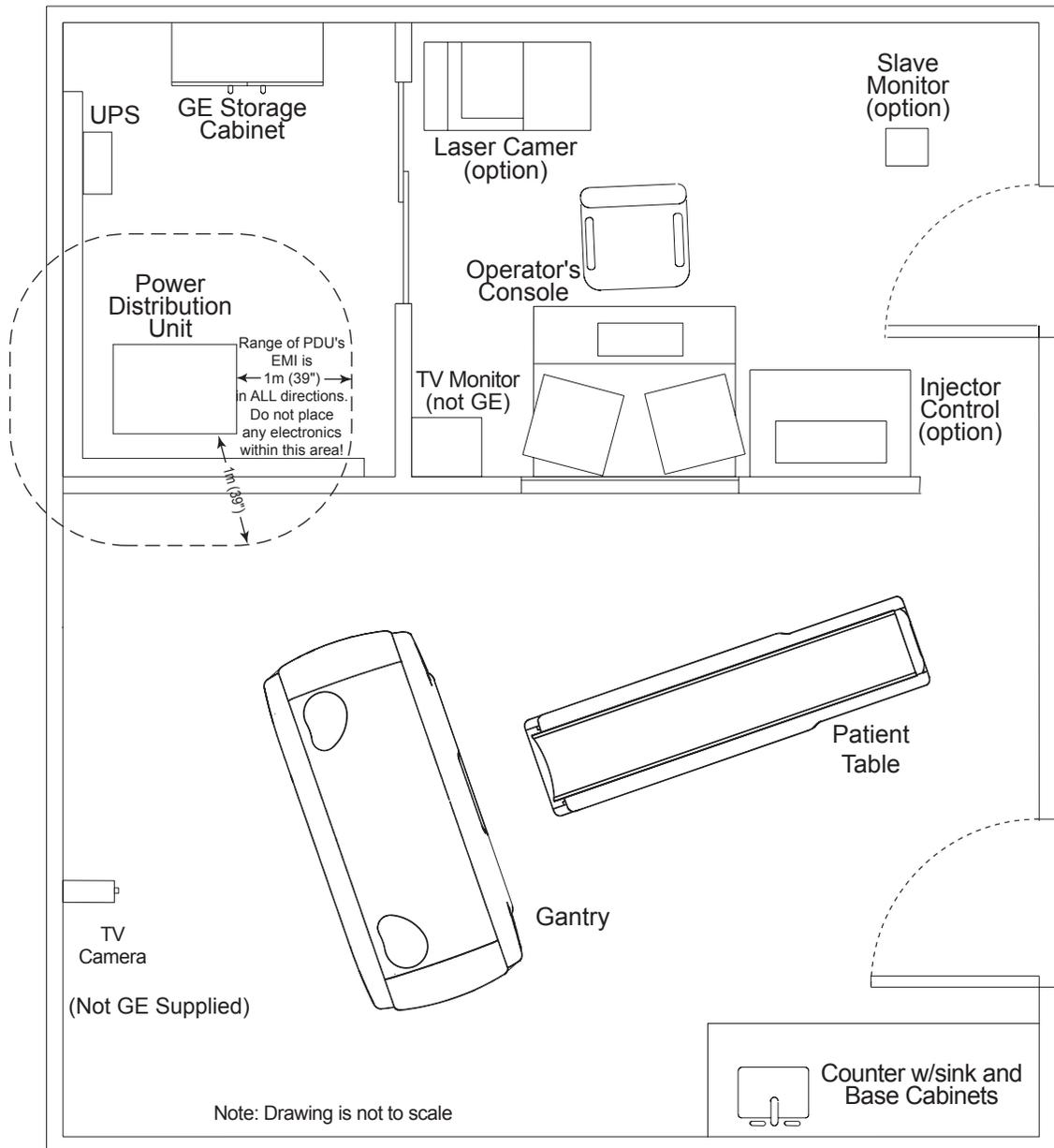
- External field strength decreases rapidly with distance from source of magnetic field.
- External leakage magnetic field of a three-phase transformer is much less than that of a bank of three single phase transformers of equivalent power rating.
- Large electric motors are a source of substantial EMI.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

Maintain good screening of cables and cabinets.

4.7 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 (1m) away from sensitive electronics (the PDU does not include sensitive electronics). For UPS interconnect information, please refer to [Chapter 9 - Interconnection Data, Section 6.0 on page 121](#)

4.8 Equipment EMI “Envelopes”



5 – Environmental Conditions

Figure 5-1 Sample Room Layout, showing approximate EMI requirements

Chapter 6

Floor Loading and Weights

Section 1.0 Floor Loading

The systems have a total floor load of approximately 3119kg (6869lbs). About 2561kg (5642lbs), including patient, is concentrated in the table-gantry assembly.

Table 6-1 lists CT components with weight, size, floor loading and normal mounting requirements.

ITEM	NET WEIGHT KG(LB)	OVERALL W X D MM (INCH)	WEIGHT/AREA LB/SQ. FT. (KG/M ²)	LOAD PATTERN MM (IN.)	NORMAL METHOD OF MOUNTING MM (IN.) (GE SUPPLIED) ¹	
Gantry (w/ covers)	~1765 (~3891)	2439 X 1006 (96.0 X 39.6)	238 (1164)	Rectangular base plate 700 X 2165.7 (27.6 X 85.26) with four round pads, each 63.5 (2.5) in contact with floor. Individual pad loadings are: 499 KG (1100 lb), 518 KG (1140 lb), 558 KG (1230 lb), and 593 KG (1306 lb) (see Figure 6-4)	Hilti Kwik-Bolt II 12.7mm (1/2 in) diameter by 203mm (8 in) long per P/N 2106573 at four leveling pads into concrete floor.	
Dollies (each)	114 (250)					
Top Cover (each)	11.2 (24.6)					
Side Cover (each)	11.3 (25)					
Front Cover	43 (95)					
Rear Cover	45 (100)					
Patient Table: GT 1700 w/ 227kg patient	400 (880) 627 (1377)	650 x 2436 (25.6 x 95.9)	238 (1161)	Four round 63.5 mm (2.5 in.) pads: 19.7 x 40.3	Hilti Kwik-Bolt II 12.7mm (1/2 in) diameter by 203mm (8 in) long per P/N 2106573 at leveling pads into concrete floor.	
GT 2000 w/ 227kg patient	467 (1029) 694 (1529)	650 x 2910 (25.6 x 114.5)	- 238 (1167)	Four round 63.5 mm pads: 19.7 x 40.3		
GT650lbs w/ 295kg patient	500 (1101) 795 (1751)	650 x 2910 (25.6 x 114.5)	273 (1337)	Four round 63.5 mm (2.5 in.) pads: 19.7 x 40.3	Hilti Kwik-Bolt 5/8 in. diameter by 8 1/2 in. long per P/N 5314211 at the leveling pads into concrete floor.	
Footswitch (GT)	15 (33)	-	-	-	-	
Power Distribution Unit	~370 (~815)	711 X 559 (28 X 22)	161 (788)	Four Casters support area of 711 X 559 (28 X 22) .	Casters are for positioning and service. Set on floor. May be anchored to floor using angle brackets ² in seismic zones.	
Console w/HP & w/o monitors	204 (450)	1219x 991 (48 X 39)	140 (681)	Four Casters or Leveling Feet support area of 1168 X 483 (46 X 19).	Casters are for positioning. Set on floor. Console may be anchored to floor using angle brackets ²	
Monitor - LCD (ea)	10 (22)	415 x 453 (16.3 x 17.8)				

Table 6-1 LightSpeed RT¹⁶, Xtra System Floor Loading

ITEM	NET WEIGHT KG(LB)	OVERALL W X D MM (INCH)	WEIGHT/AREA LB/SQ. FT. (KG/M ²)	LOAD PATTERN MM (IN.)	NORMAL METHOD OF MOUNTING MM (IN.) (GE SUPPLIED) ¹
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Notes:

- 1.) Use the GE Supplied mounting hardware ONLY IF APPROVED by qualified personnel.
[See statements in 8.1 - Table and Gantry Mounting Requirements.]
- 2.) Seismic angle brackets are included and shipped with the PDU
- 3.) Seismic angle brackets are included on the shipping skid.

Table 6-1 LightSpeed RT¹⁶, Xtra System Floor Loading

Section 2.0 Mounting Data, Including Seismic



WARNING

**POTENTIAL FOR PATIENT INJURY.
 IMPROPERLY SECURED TABLE MAY TIP, DISLODGING PATIENT.
 PROPER ANCHORING IS KEY TO MAINTAINING PATIENT SAFETY DURING
 SYSTEM OPERATION.**

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

- Gantry: [Figure 6-3](#)
- Table: [Figure 6-6](#)
- Power Distribution Unit: [Figure 6-8](#)
- Operator's Console/Computer: [Figure 6-10](#)

Floor mounting hole locations for components that don't have templates are also in this section. Customer is responsible for seismic mounting. Refer to all applicable codes in your area.

GE provided floor anchors ([Figure 6-1](#)) are designed to be used ONLY on concrete floors that meet the concrete floor requirement. Supplied floor anchors must be installed by a trained contractor, and shall be set to a minimum depth of 3 inches at each anchor point. Any anchors having more than 1 inch of thread showing above the nut, when torqued to 55 ft.-lbs, (60 ft.-lbs for GT650lbs) shall have a second anchor installed in the closest adjacent hole. the second anchor shall be installed to the standard depth and torque specifications.

MOUNTING REQUIREMENTS	GANTRY	TABLE
Minimum Floor Thickness:	101.6 mm (4 in.)	101.6 mm (4 in.) for GT1700/2000 127 mm (5 in.) for GT 650lbs
Recommended Drilling Depth:	95.25 mm (3.75 in.)	95.25 mm (3.75 in.)
Average Anchor Embedment:	88.9 mm (3.5 in.)	88.9 mm (3.5 in.)
Minimum Anchor Embedment:	76.2 mm (3 in.)	76.2 mm (3 in.)
Available Alternate Anchor Locations:	Yes	Yes
Shipped Anchor Size:	203.2 mm (8 in.)	203.2 mm (8 in.) for GT 1700 / 2000 215.9 mm (8 1/2 in.) for GT 650lbs
Alternate Anchoring Methods:	Yes (see notes, below)	Yes (see notes, below)
Floor Levelness Requirement:	6 mm (1/4 in.) over 3 m (10 ft.)	6 mm (1/4 in.) over 3 m (10 ft.)

If the Installers cannot set at four anchors for the GT1700 or GT2000 tables, the installer must inform the customer that the minimum anchoring cannot be met, and a structural engineering contractor is required to determine the anchoring method and certify that their anchoring meets the stated GE minimum load requirement and torque specifications.

Note: All other anchoring methods on floor types other than the concrete minimum must be determined at the customer's expense by a structural engineering contractor, and anchoring method must be certified to meet the stated GE minimum load requirement and torque specification.

Note: If installing the GE LS scanner on a floor type other than 101.6 mm (4 in.) concrete floor, all structural specifications in this document must be reviewed and met.

Minimum concrete floor thickness for GT650lbs is 127 mm (5 in.)

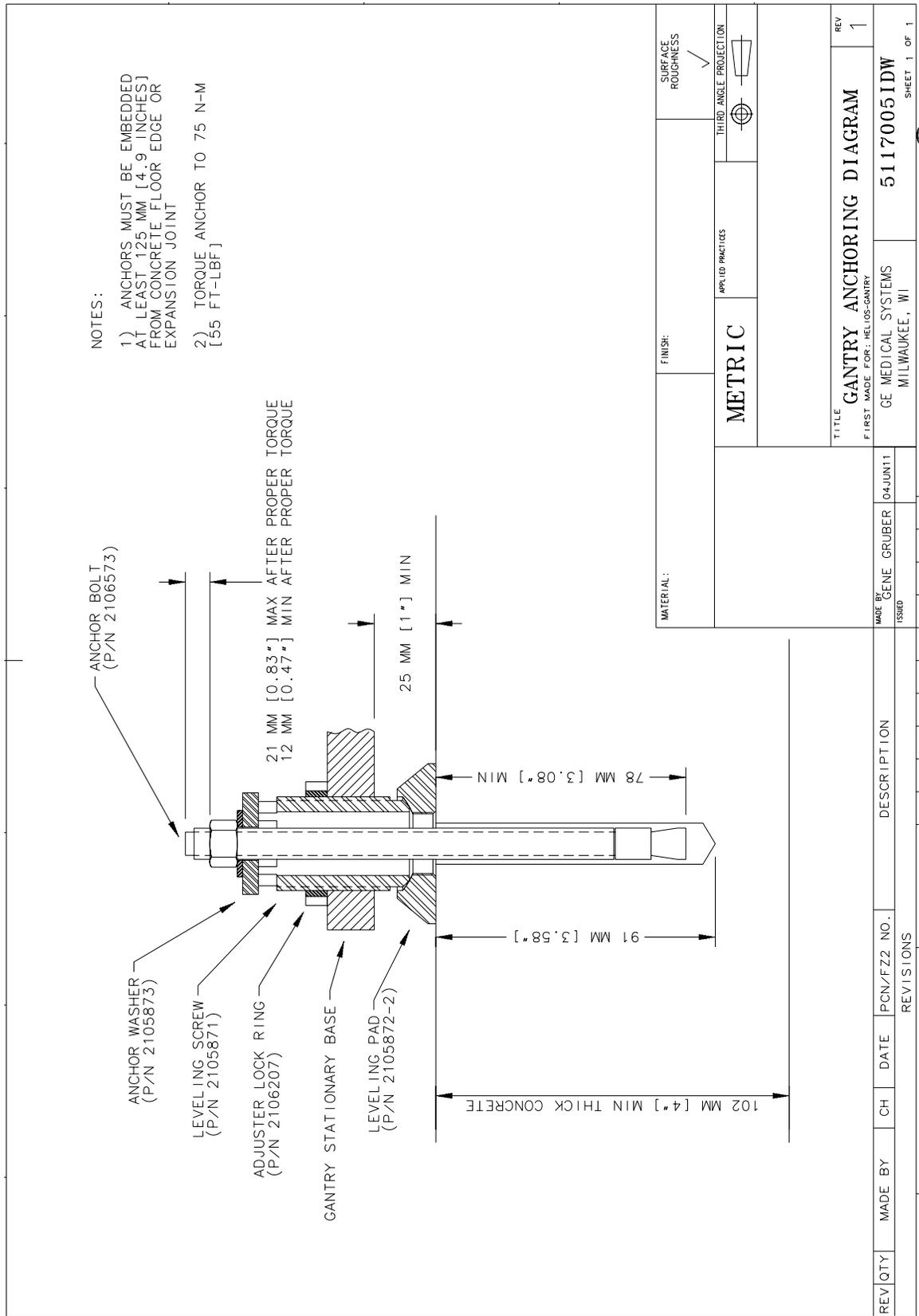


Figure 6-1 Typical Floor Anchor, Gantry and Table (GT 1700/GT2000)

- NOTES:
- 1) AT LEAST 86 MM [3.39 INCHES] EMBEDDED REQUIRED
 - 2) TORQUE ANCHOR TO 81 N-M [60 FT-LBF]

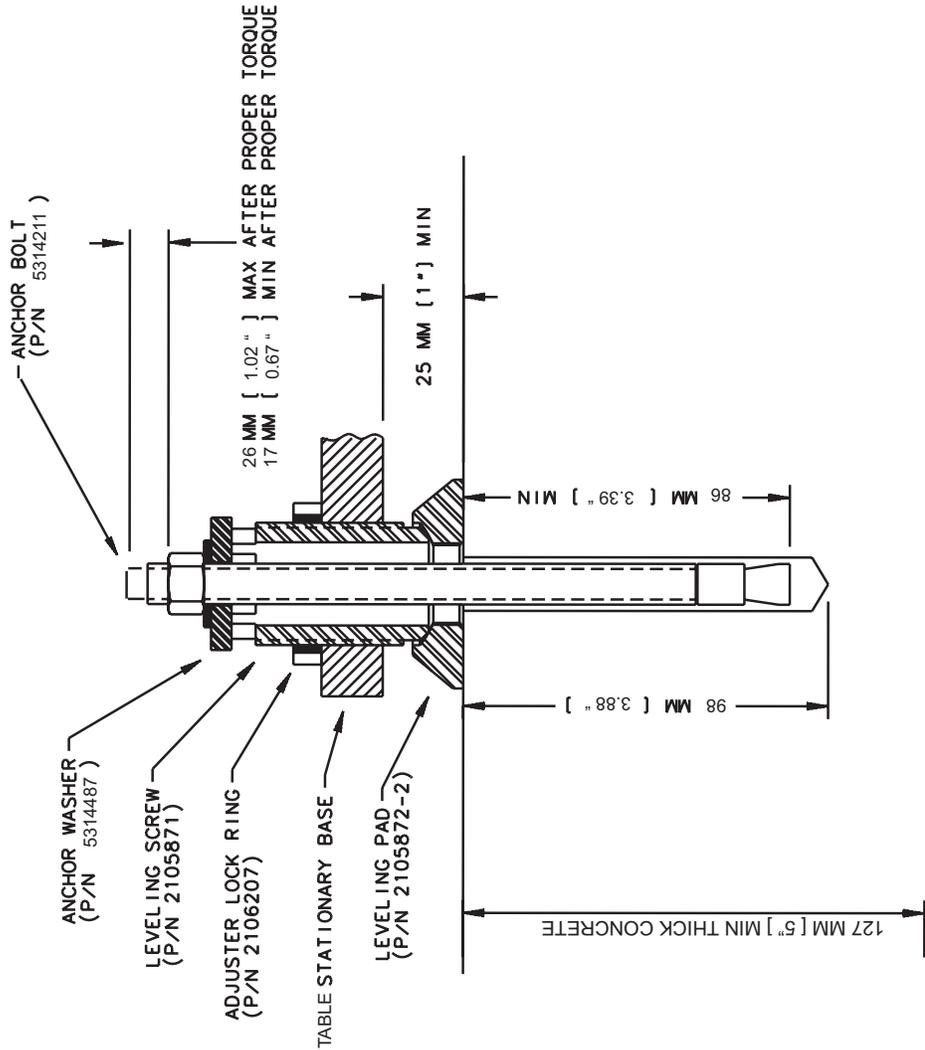


Figure 6-2 Typical Floor Anchor, Table (GT650lbs)

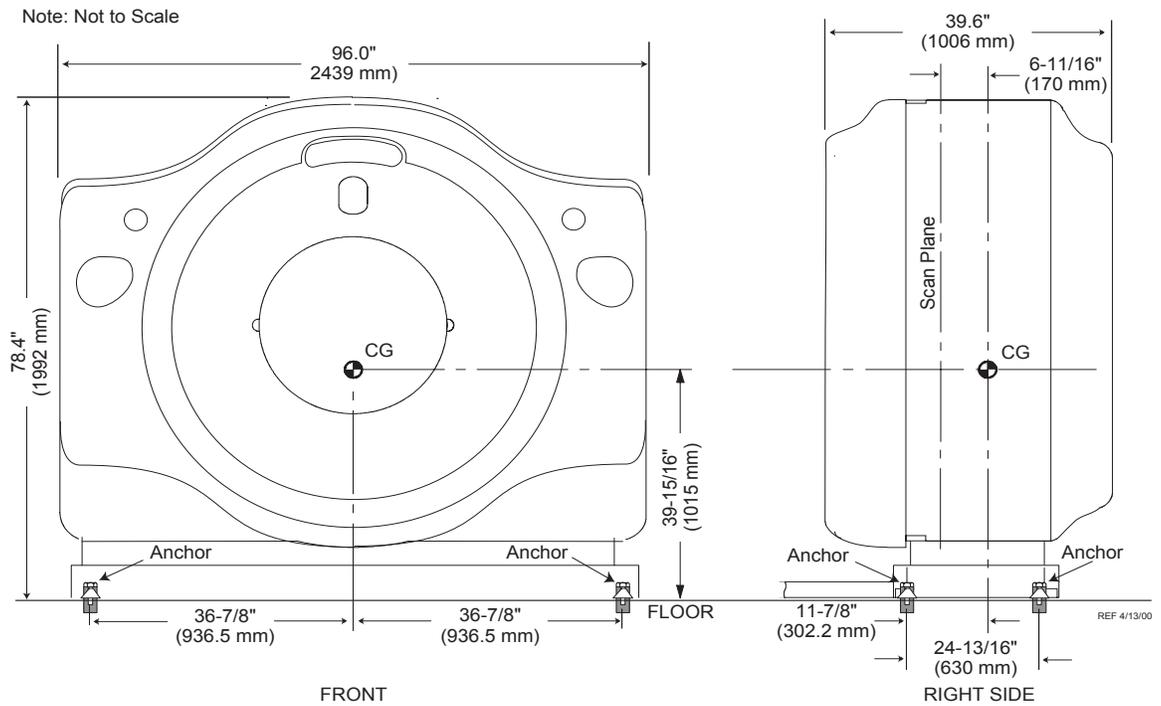


Figure 6-3 Gantry Center of Gravity

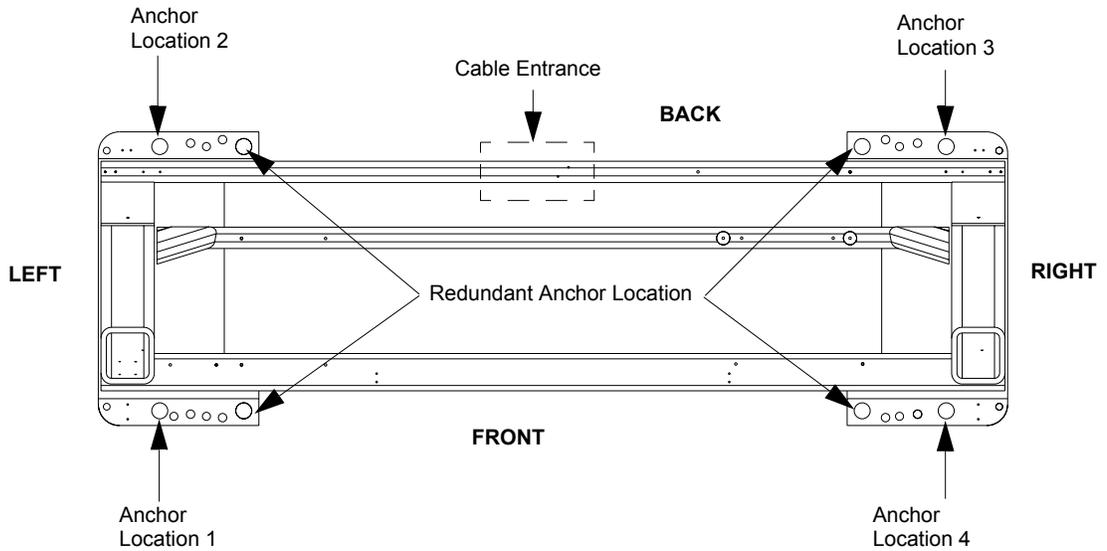


Figure 6-4 Gantry Anchor Locations

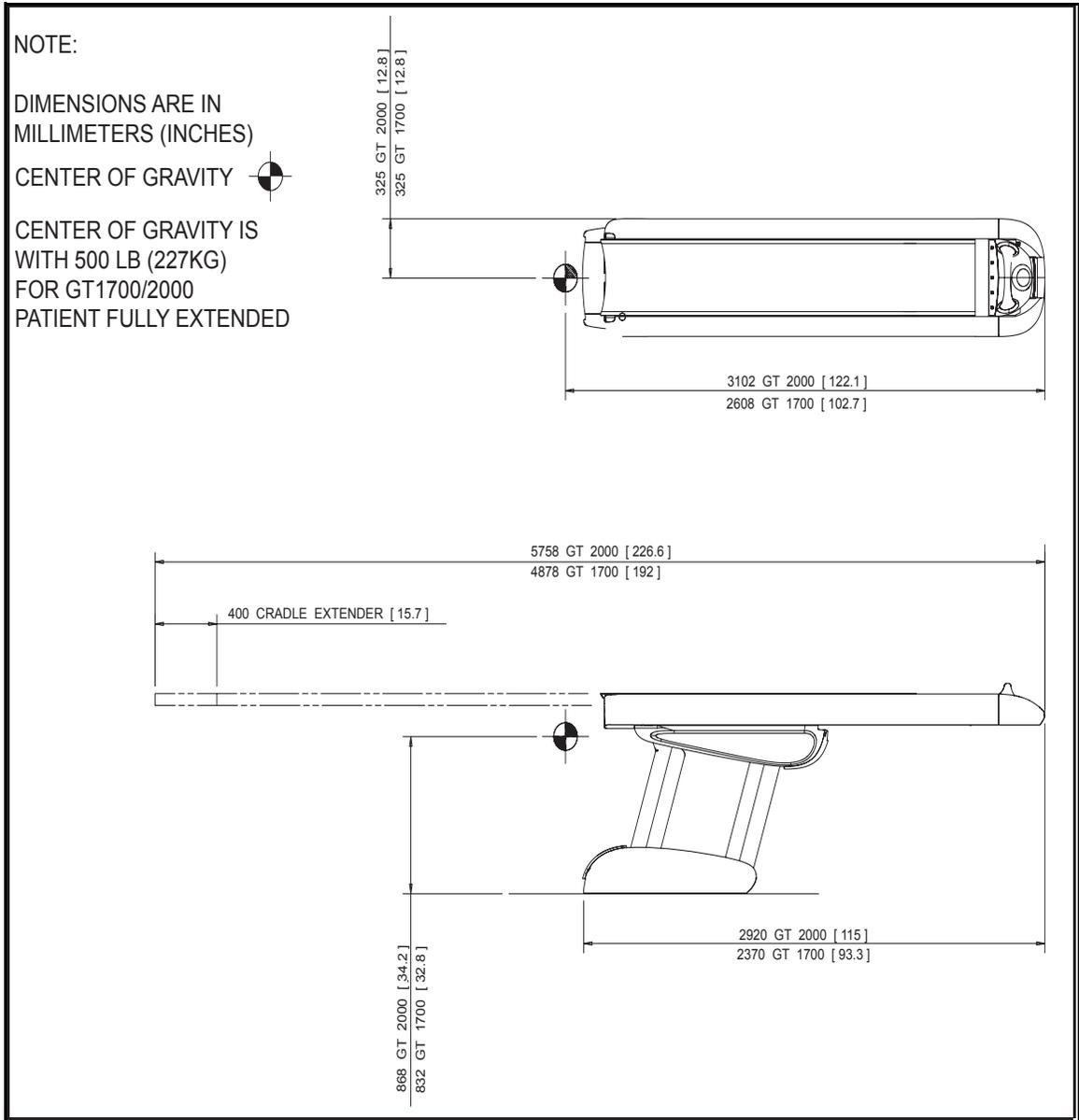
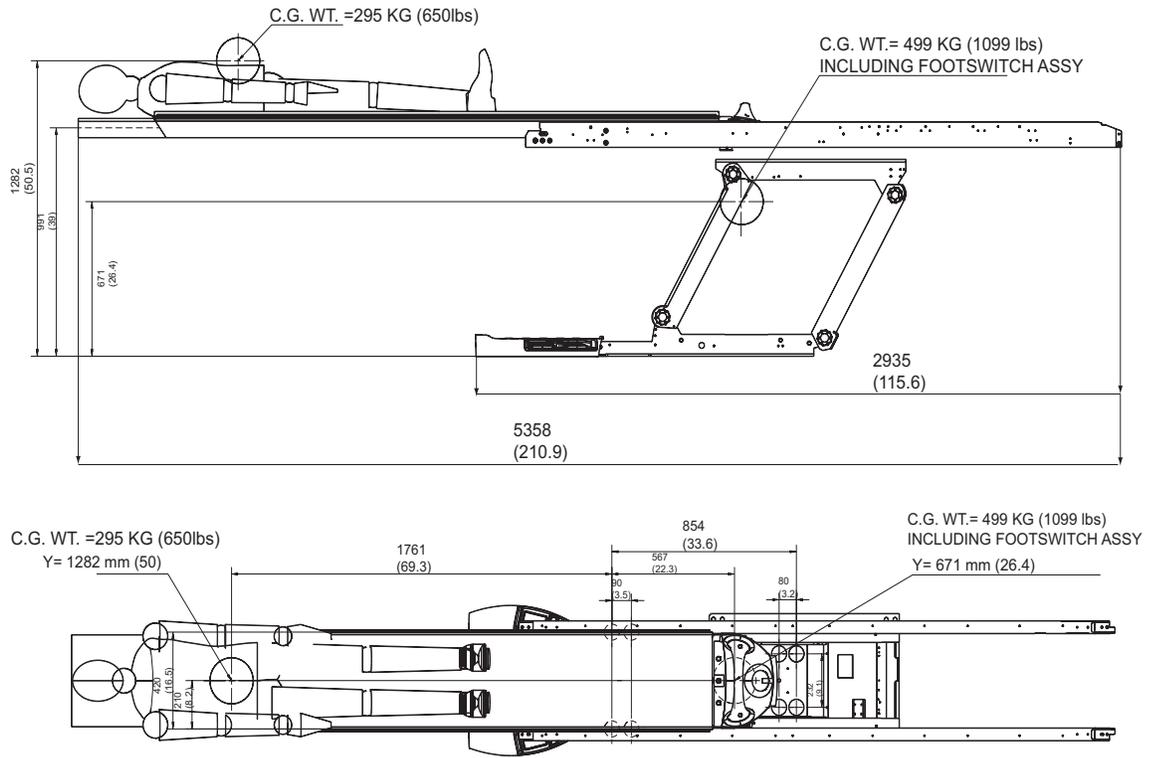


Figure 6-6 Patient Table (CT1) - GT 1700 & GT 2000 (Cradle *Mechanical* Limits shown)



CRADLE : INMAX POSITION
 IMS : INMAX POSITION
 TABLE HEIGHT : 991 mm (39)

NOTES:
 DIMENSIONS ARE IN MILLIMETERS (INCHES)

Figure 6-7 Patient Table (CT1) - GT 650lbs

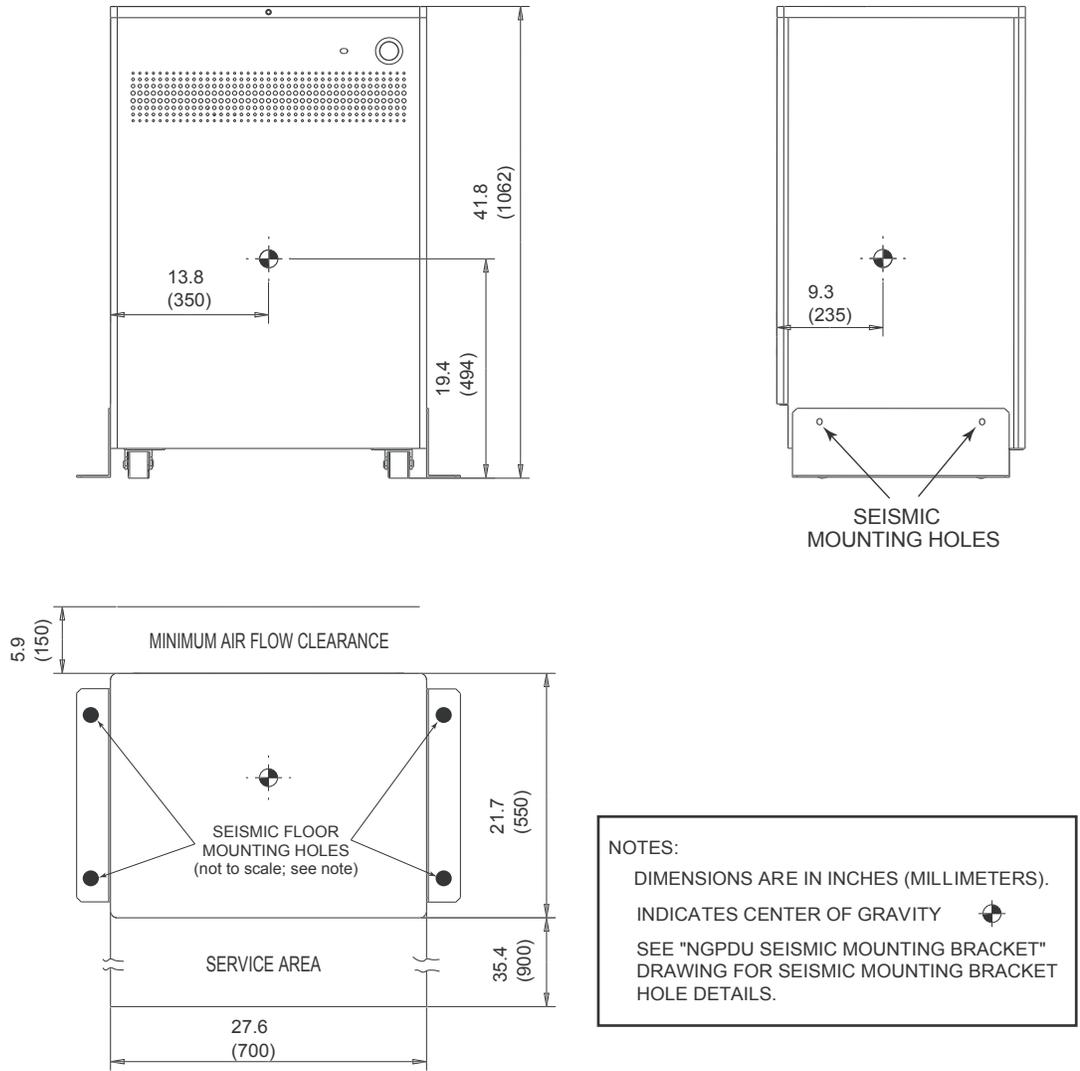


Figure 6-8 Power Distribution Unit (NGPDU)

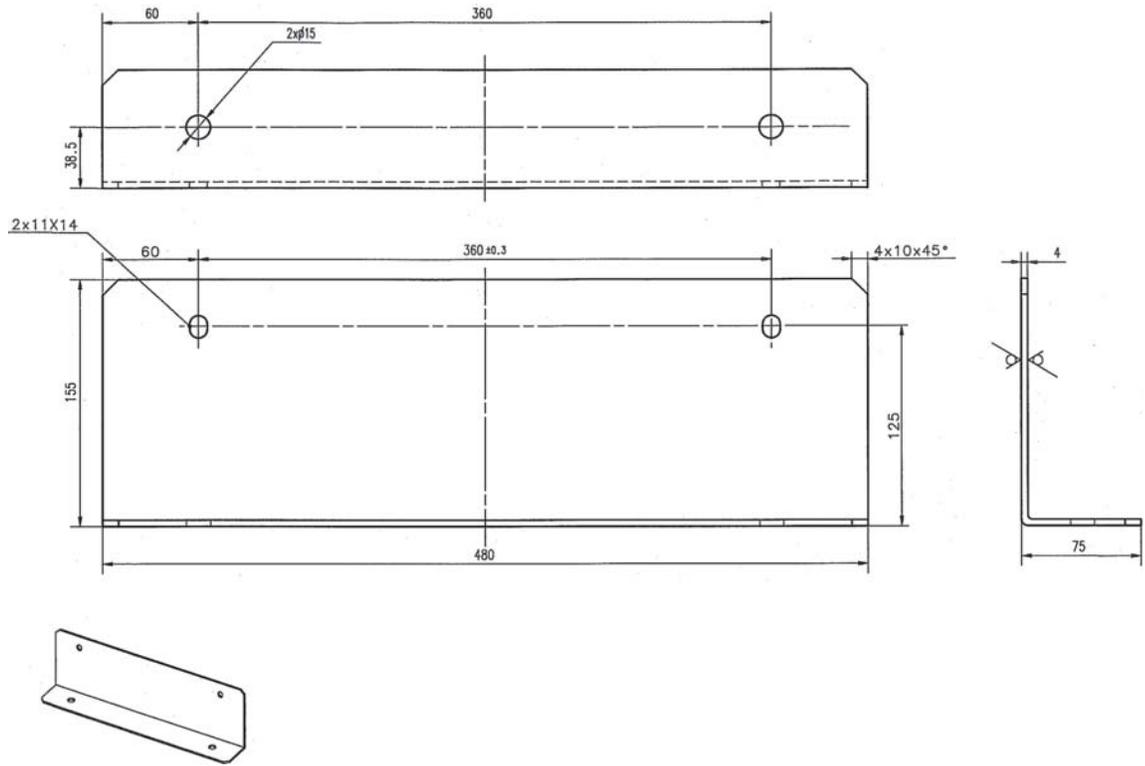


Figure 6-9 NGPDU Seismic Mounting Bracket (dimensions are in mm)

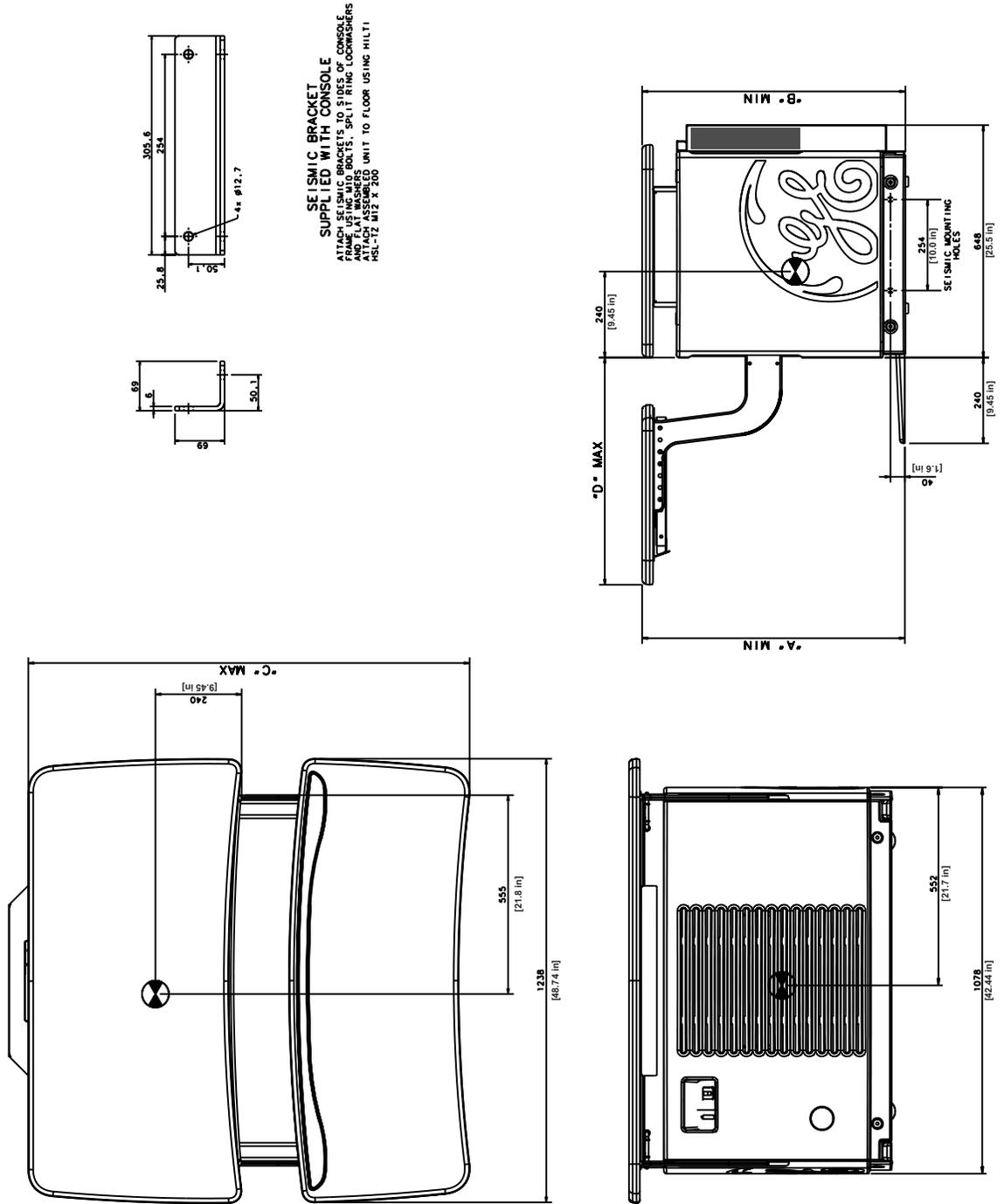


Figure 6-10 Operator's Console

Chapter 7

Delivery Data

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

Section 1.0 Van Delivery

The CT system is packed for van shipment with minimum tear-down of components. It consists of approximately 8 shipping containers, which include dollies, skids and boxes without skids.

Section 2.0 Delivery/Shipping Requirements & Considerations

The 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 12.7 mm (0.5 in.) may induce structural damage to the frame or other major components. Damage resulting from a drop (e.g., bent frame, misalignment) may not be obvious until after system installation is complete.

To avoid dropping the Gantry, Dock to Dock shipment is recommended. Other methods are acceptable, provided that the system is not dropped or otherwise mishandled. For example, the system may be moved via flat-bed wrecker or by rolling it across SMOOTH sidewalks or other paved surfaces.

When moving Gantry off of a flat-bed wrecker, attach the straps to the lowest point possible on the dolly. Lower the Gantry at the slowest reasonable rate. See [Figure 7-1](#).

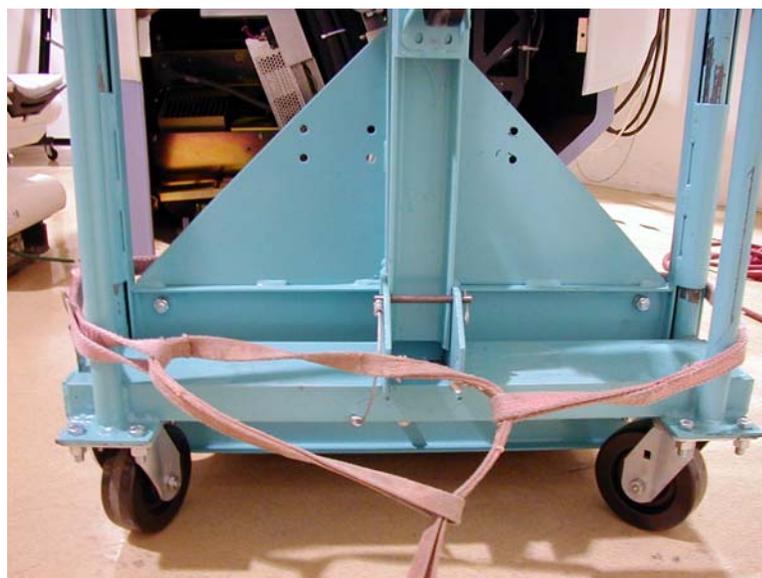


Figure 7-1 Gantry Strap Location

The System—including Gantry, Console, Table and PDU—is not designed to tolerate the excessive shock or vibration that may occur during unloading. For example, rolling the Console across a “washboard” style ramp may vibrate components to the extent of loosened or broken connections, etc. Damage resulting from shock or vibration (e.g., monitor, CD-ROM, hard-drive or octane failure) may not be evident until after system installation is complete.

All system components must remain upright at all times, and must not be tipped. Nor should the Gantry be hoisted. The Gantry should be moved by rolling it on its dollies only. Movement through hallways, doorways, elevators, etc., must be done without tipping or lifting the Gantry.

Protection for flooring along the move path (from dock to scan room) is advised.



NOTICE Lifting a gantry requires engineering approval for each occurrence. Your Project Manager Installation should contact CT Engineering for all special lifting requirements.

- Do Not lift the gantry with a Forklift
- Unauthorized gantry lifting will cause Gantry Bearing Damage

Section 3.0 Site Environmental Considerations

3.1 Dust/Dirt Contamination

System (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.



NOTICE The act of installing a GE CT scanner in a construction (i.e., unfinished) site will likely result in the following adverse effects:

- Increased installation time
- Decreased installation quality
- Increased scanner downtime, due to increased service calls

3.2 Chemical Contamination

Wet film processors must never be installed in the same room as the scanner, due to the possibility of chemical contamination of LightSpeed RT¹⁶ CT scanner 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’s 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 4.0

Storage Requirements



NOTICE Failure to adhere to Storage Requirements will likely result in equipment damage.

SHORT TERM STORAGE (LESS THAN 6 MONTHS)

If the CT 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 4° to 27° C (40° to 80° 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 3° C/hr. (5° F/hr.)



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

LONG TERM STORAGE (6 MONTHS OR MORE)

If the CT 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 10° to 32° C (50° to 90° F).
- Maintain relative humidity (non-condensing) between 20% and 70%.

Systems stored longer than six (6) months, but less than 12 months, should contact CT Engineering for installation start-up instructions. Storage longer than 12 months is not recommended.

Section 5.0

Extreme Temperature Transportation and Deliveries



NOTICE Failure to adhere to Extreme Temperature Transportation and Delivery requirements will likely result in equipment damage.

Extreme temperatures should be avoided during system transportation and delivery.

Extreme temperatures are defined as below Zero degrees Fahrenheit (-18° C) or above 49° C (120 degrees Fahrenheit), without humidity control.

Section 6.0

System Transportation

When transporting the CT system, ensure that the system is not exposed, for an extended period of time, to temperatures or humidity outside of the following specifications.

Temperature: 0° to +120° F (-18° to +49° C)

Humidity: 0% to 80%

**NOTICE**

Component Freezing occurs if CT system is exposed to temperatures below -18° C (0° F) for a period longer than two days.

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

Section 7.0

Gantry Considerations

The gantry is shipped with most covers installed. The assembly is mounted between two dollies. See [Figure 7-2](#). Two side rails are bolted to the dollies to stabilize dollies and protect gantry. Use dolly elevating casters to lift gantry off its base and roll it into position.



Figure 7-2 Gantry with Shipping Dollies and Side Rails

Door Openings. Clear door openings for moving equipment into building must be 1067 mm X 2083mm (42 in. X 82 in.) minimum; 2439 mm (8 ft.) corridor width is helpful.

Elevator requirements. To move the gantry from the receiving location to the scanning room, consider elevator capacity and size. By removing side rails and one dolly after the gantry is placed in the elevator, the gantry width/length and elevator depth requirements are reduced. All weights are average due to gantry component weight differences. This change can be ± 18.14 kg (± 40 lb). Contact a representative of the elevator manufacturer if the gantry weight (see Table 7-1) exceeds elevator capacity.

CONFIGURATION	LENGTH	WIDTH	HEIGHT	WEIGHT
Dollies On, Side Rails On	3100 mm (122 in.)	1290 mm (51 in.)	2030 mm (79 in.)	2016 kg (4445 lb)
Dollies On, Side Rails Removed	3100 mm (122 in.)	1010 mm (39.4 in.)	2030 mm (79 in.)	1993 kg (4395 lb)
Dollies Off, Covers Off	2160 mm (85 in.)	860 mm (34 in.)	1870 mm (73 in.)	1655 kg (3648 lb)

Table 7-1 Size of Gantry & Dollies, with and without Side Rails

Minimum hallway and door size for gantry with covers and dollies attached, but side rails removed, is 1016 mm (40 in.).

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

Dollies: Typically, dollies are used on the gantry, table, and console for domestic shipments. Once the gantry, table and console are installed at the site, return dollies to GE using the shipping document located in Box #1.

Dollies can be purchased for international shipments (B7850LD) to be used at the customer site. After the system has been removed from the crates, dollies shipped with international shipments **only** are not to be shipped back to GE in Milwaukee, WI, USA, but to be retained to the local GE office or warehouse.

Zero clearance dollies are available. For information on zero clearance dollies, please go to: <http://www.umi-dollyshop.com>.

Section 8.0 Table Considerations

The table is shipped without side covers installed. Covers are shipped in four separate boxes. The table is mounted between two dollies.

Table shipping dimensions are 3200 mm (126 in.) long, 650 mm (25.6 in.) wide, and 1200 mm (47.2in.) high.

	LENGTH		WIDTH		HEIGHT	
	MM	IN	MM	IN	MM	IN
GT2000 and GT 650lbs w/Dollies	2997	118	762	30	1143	45
GT1700 w/Dollies	2489	98	762	30	1143	45
GT2000 and GT 650lbs w/o Dollies	2997	118	660	26	889	35
GT1700 w/o Dollies	2489	98	660	26	889	35

Table 7-2 GT Table Dimensions - with and without dollies

	LENGTH		WIDTH		HEIGHT		WEIGHT	
	MM	IN	MM	IN	MM	IN	KG	LB
GT2000 and GT 650lbs Dollies	2210	87	762	30	127	5	132	290
GT1700 Dollies	2210	87	762	30	127	5	132	291
GT2000 and GT 650lbs Tilting	762	30	762	30	889	35	136	300
GT1700 Tilting	762	30	762	30	889	35	132	291

Table 7-3 GT Table Dolly Dimensions

	LENGTH		WIDTH		HEIGHT		WEIGHT	
	MM	IN	MM	IN	MM	IN	KG	LB
GT2000	2997	118	762	30	1143	45	632	1390
GT1700	2489	98	762	30	1143	45	602	1325
GT650lbs	2489	98	762	30	1143	45	682	1502
GT2000 - Tilting (approx. dimensions)	2489 - 2921	98 - 115	660	26	1778 - 2032	70-80	636	1400

Table 7-4 GT Table Elevator Delivery Dimensions

Section 9.0

Tilt Dollies

A very limited number of tilt dollies are available for U.S. deliveries. For information on ordering tilt dollies, please go to: <http://www.umi-dollyshop.com>.

Systems that are to be stored prior to installation should avoid ordering tilt dollies.

If tilt dollies are not available for delivery, riggers are required in their place.

Section 10.0

Console Considerations

The console is shipped without the keyboard table installed. The keyboard table is shipped with the console.

- 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.
- Console shipping dimensions (on the shipping skid) are 1016 mm (40 in.) deep, 1346 mm (53 in.) wide, and 1041 mm (41 in.) high.

Note: The dimensions of the operator console alone (as shipped) are 888 mm (34.95 in.) deep, 1238 mm (48.74in.) wide, and 750 mm (29.5 in.) high.



NOTICE Do not lift the console by the monitor table top to remove from the shipping skid.



Figure 7-3 Console ready to be unloaded from shipping skid.

Chapter 8

Power Requirements

Section 1.0

Introduction

The power distribution unit (PDU) supplied with the LightSpeed RT¹⁶ and Xtra system transforms and distributes power to all system components. The PDU is the only power entry point required to operate system.

To minimize voltage regulation effects, power wiring between the facility main distribution panel and the PDU should be kept as short as possible.

When routing the power wiring all three phase wires and ground must be run in the same conduit or raceway duct. Power wires should be routed separately from system control and signal cables, using a separate conduit or trough in raceway duct.

Metallic conduit, floor duct or surface raceway may be used for running cables, depending upon local codes and practices. However, cable passageways should be large enough to install any cable with all other cables already installed. Use of non-metallic conduit is not recommended.

Section 2.0 System Input Power

2.1 Power Source Configuration

The LightSpeed RT¹⁶ and Xtra CT Scanner is designed to operate on a three-phase, four-wire wye power source. A solidly grounded wye source is preferred. The neutral wire does not need to be run to the system, i.e., four-wire connection. If a neutral wire is run, then it should be terminated in the A1 box.

A dedicated feeder from the nearest Main Distribution Panel (MDP) should supply power to the scanner. In accordance with the National Electric Code (U.S.) and similar applicable national and local codes, a protective disconnect device must be provided in the power line supplying the PDU. It must be located within 10 m (32 ft.) of the PDU, visible to PDU service personnel, and must have "lockout / tagout" provisions. This disconnect device is identified as "A1" in the interconnection schematic diagrams.

2.2 Rating

The system operates on three-phase power meeting the following specifications.

Voltage	380 to 480 VAC
Capacity	150 kVA
Frequency	50 or 60 Hz +/- 3 Hz

- Maximum power demand = 150 kVA @ 0.85 PF at a selected technique of 140 kV, 715 mA.
- Average (continuous) power demand at maximum duty cycle = 25 kVA.

The "A1" disconnect device referenced above must provide overcurrent protection for the system and facilitate multi-point remote "Emergency Off" control of system power. A disconnect utilizing undervoltage release control is preferred over shunt trip devices. The rating of the "A1" disconnect device depends on the nominal line voltage at the site. Refer to [Section 3.0: Recommended Power Distribution System](#), for minimum rating requirements and suggested disconnect devices.

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 DOWN-STREAM OVERCURRENT PROTECTION DEVICES (E.G. GE A1 PANEL) CLEAR THE FAULT BEFORE ANY UP-STREAM OVERCURRENT PROTECTION DEVICE OPENS.

2.3 Regulation

Total load regulation as measured at the PDU input terminals must not exceed 6%. The capacity of the facility transformer and size & length of feeder wires directly affect the load regulation presented to the system. Refer to [Section 3.0: Recommended Power Distribution System](#), for recommended single-unit installation specifics.

2.4 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.

2.5 Sags, Surges & Transients

Sags and surges of the power line must not exceed the absolute range limits shown in Table 8-1. Maximum transient voltages should be limited to 1500V peak.

2.6 Grounding

Metal conduit, raceway or the armor of armored cable used to power the system should be bonded to the PDU cabinet. However, in addition to such mechanical grounding, a dedicated 1/0 (55 mm²) or larger insulated copper ground wire must be run with the phase wires from the main distribution panel to the PDU.

Note: The shield or armor of armored cable is not sufficient for this purpose.

The ground wire should be bonded to intermediate distribution panels through which it passes in accordance with local codes. 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.

Section 3.0 Recommended Power Distribution System

A dedicated feeder run from the facility main isolation transformer is recommended to power the CT scanner. If the scanner 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 that use rapid film changers should be avoided. These changers use a large number of high powered, closely spaced exposures, which may coincide with the CT scan and produce image artifacts.



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 INTERRUPTION 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 a dedicated distribution transformer is provided for the scanner, the minimum recommended transformer size is 225 kVA, rated 2.4% regulation at unity power factor. For this configuration, the minimum recommended feeder size and overcurrent protection device based on line voltage is shown in Table 8-3 Minimum Feeder Wire Size.

In all cases, qualified personnel must verify that the transformer and feeder, at point of take-off, plus the run to the CT scanner meet all the requirements stated in this document.

SYSTEM CHARACTERISTICS

- Maximum power demand = 150kVA @ 0.85 PF: at a Selected Technique of 140 kV, 715 mA.
- Continuous (average) power demand at maximum duty cycle = 25kVA.
- Maximum allowable total source regulation is 6%.
- Minimum recommended transformer size: 225 kVA, with 2.4% rated regulation at unity power factor. Resultant maximum allowable feeder regulation is 3.4%

NOMINAL LINE VOLTAGE

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

Nominal Line Voltage	380	400	420	440	460	480
Hi-Line Limit, +10%	418	440	462	484	506	528
Lo-Line Limit, -10%	342	360	378	396	414	432
Continuous Line Current	38	36	34	33	31	30
Momentary Line Current	228	217	206	197	188	180
Maximum Line Current	253	241	229	219	209	200
Minimum Recommended Circuit Protection Rating	150	150	150	125	125	125

Table 8-1 Nominal Line Voltage

PURCHASABLE OPTIONS

OPTION	CAT NUM
225 kVA Transformer	E4500AW
Isolation Transformer	E4500BC

Table 8-2 Purchasable Options (not required but available)

MINIMUM FEEDER WIRE SIZE

FEEDER LENGTH (MDA TO A1) FEET (METERS)	MINIMUM FEEDER WIRE SIZE, AWG OR MCM (SQ. MM)/ VAC					
	380 VAC	400 VAC	420 VAC	440VAC	460VAC	480VAC
15 m (50 ft)	1/0 (55)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)
30 m (100 ft)	1/0 (55)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)
46 m (150 ft)	1/0 (55)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)
61 m (200 ft)	1/0 (55)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)
76 m (250 ft)	2/0 (70)	2/0 (70)	1/0 (55)	1/0 (55)	1 (45)	1 (45)
91 m (300 ft)	3/0 (85)	3/0 (85)	2/0 (70)	2/0 (70)	1/0 (55)	1/0 (55)
107 m (350 ft)	4/0 (100)	3/0 (85)	3/0 (85)	2/0 (70)	2/0 (70)	1/0 (55)
122 m (400 ft)	250 (125)	4/0 (100)	3/0 (85)	3/0 (85)	3/0 (85)	2/0 (70)

Table 8-3 Minimum Feeder Wire Size

MINIMUM SUB-FEEDER WIRE SIZE

SUB-FEEDER LENGTH (A1 TO PM) FEET (METERS)	MINIMUM SUB-FEEDER WIRE, AWG OR MCM (SQ. MM)					
	380 VAC	400 VAC	420 VAC	440VAC	460VAC	480VAC
9.7536 m (32 ft)	1/0 (55)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)

Table 8-4 Minimum Sub-Feeder Wire Size

- 1.) Table 8-1, Table 8-3, and Table 8-4 above are based on the use of copper wire, rated 75 C and run in steel conduit. Ampacity is determined in accordance with the National Electrical 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.

8- Power Req's

Section 4.0 Ground System

The LightSpeed RT¹⁶ and Xtra CT Scanner has been designed to use an equal potential grounding system. The required ground system is shown in Figure 8-1. There are three primary grounding points:

- A system power ground point located in the PDU.
- A reference ground point located between gantry and table base.
- A patient ground point located at the front of the table base.

All exposed metal surfaces in the patient vicinity are grounded to the reference ground point.

For additional information, refer to Electrical Safety Equipment, Direction 46-014505.

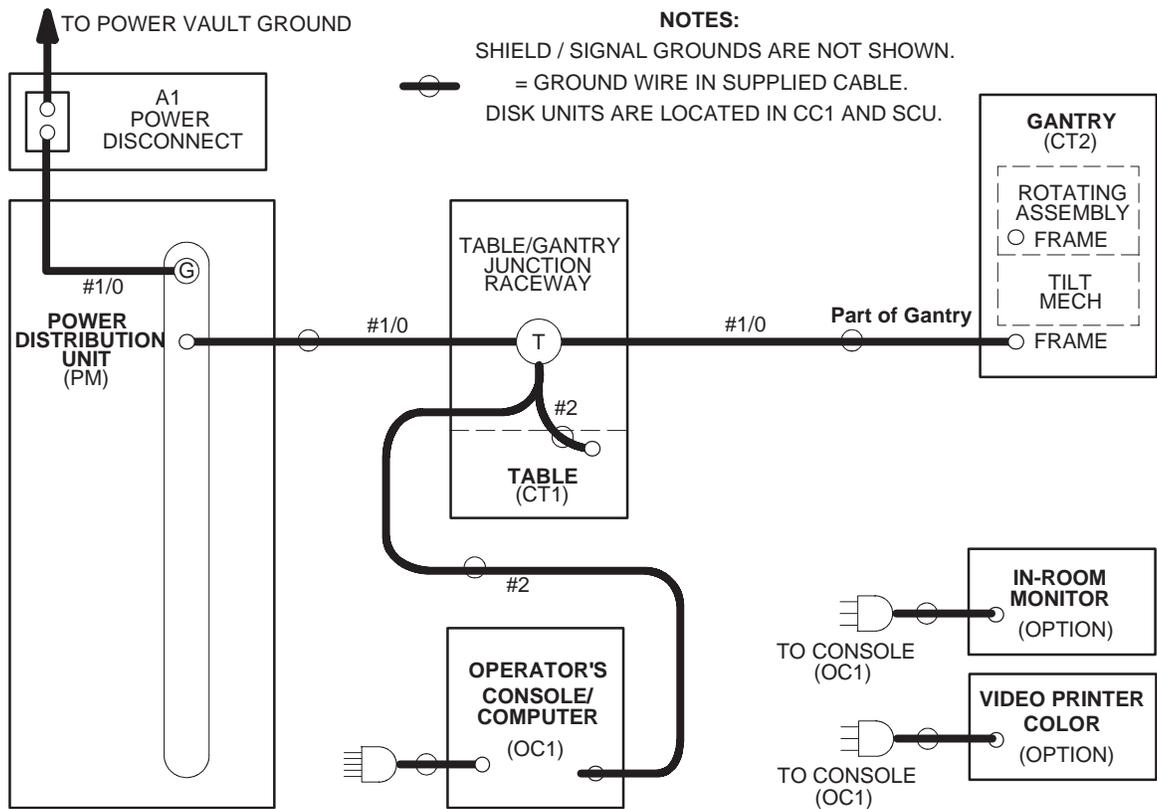


Figure 8-1 System Ground Map

Chapter 9

Interconnection Data

Section 1.0 Introduction

Figure 9-2 shows interconnection runs for a 50/60 Hz system.

Table 9-1 shows component designators for supplied equipment and options and wall power outlets.

Table 9-5 lists customer-installed wiring and supplied cables. 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 9-2 and Table 9-3 list details for connection to LightSpeed Series equipment, using standard (short) length and non-standard (long) length cables, respectively. Details are listed for the following types of runs as appropriate:

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

Need for additional junction boxes is minimized by use of either a cable raceway system or a raised computer floor. Systems use prefabricated cables with large plugs. Therefore, conduit or pipe is not recommended for cable runs.

Note: Use dry cleaning for electro components.

Section 2.0 Component Designators

DESIGNATOR	APPLIES TO	SOURCE
A1	Primary power disconnect	Contractor supplied
CT1	Patient table	System
CT2	Gantry	System
ITL	InSite telephone lines	Contractor supplied
LP	Line printer	Option
OC1	Operator's console/computer	System
PDU	Power distribution unit	System
SEO	System emergency off	Contractor supplied
SM	Slave monitor	Option
WL	"X-ray on" warning light	Contractor supplied
DS	Door Interlock Switch	Contractor supplied
XCVR	Ethernet transceiver	System
BBNC	Broad-Band Network Connection	Contractor supplied

Table 9-1 Component Designators

Section 3.0 Interconnect Runs, Wiring and Cables

3.1 GE Healthcare Supplied (Standard Length)

RUN #	LENGTH, ACTUAL (USABLE)		PART #	DESCRIPTION	UL CABLE INFORMATION							PULL SIZE MM (INCHES)	
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia. mm (inch)	# of Cond		Size AWG
050	28 (20)	8.5 (6.1)	2343529-2	HVDC, PDU to Gantry	2587	FT4	600	+ & - 350VDC	90	19 (.751)	3	(2) 4 (1) 8	22 (.87) Dia
051	28 (20)	8.5 (6.1)	2343530-2	HVAC, PDU to Gantry	2587	FT4	600	440Y/254	90	15.3 (.604)	4	14	11.2 (.44) Dia
052	28 (20)	8.5 (6.1)	2343528-2	LVAC, PDU to Gantry	2587	FT4	600	208Y/120	90	13.8 (.542)	5	8	56.4 (2.22) Dia
053	65 (60)	19.8 (18.3)	2343531-2	LVAC, PDU to Console	2587	FT4	600	120VAC	90	12.3 (.483)	3	10	56.4 (2.22) Dia
054			2343596	LVAC, Gantry to Table	1015		600	120VAC			3	14	
055	28 (20)	8.5 (6.0)	2371450-2	Ground, PDU to Raceway	1284	VW-1 (FT-1)	600	0	105	15.5 (.608)	1	1/0	15.8 (.62) Dia
056	68 (57)	20.8 (17.4)	2371450-4	Ground, Raceway to Console	1283	VW-1 (FT-1)	600	0	105	11.9 (.467)	1	2	12.2 (.48) Dia
100	32.5 (20)	9.9 (6.1)	5120646-2	Signal, Gantry MSUB or TGPU to PDU		FT-4	300	<30VDC	80	11.2 (.440)	25	22	17 x 58 (.68 x 2.30) 19 x 51 (.75 x 2.01)
101	71 (60)	21.7 (18.3)	5120645-2	Signal, Gantry MSUB or TGPU to OC		FT-4	300	<30VDC	80	11.2 (.440)	25	22	17 x 58 (.68 x 2.30) 19 x 51 (.75 x 2.01)
102	71 (63)	21.7 (19.3)	2373436-3	Signal (LAN), Gantry to OC			1900	<30VDC		5.9 (.234)	8	24	15 (.59) Dia
103	68 (60)	20.7 (18.3)	2117848-7	Fiber Optic, Gantry to OC			N/A	N/A			1	N/A	10 (.39) Dia
104			2333151	Signal, Gantry to Table		FT-4	300		80		25	22	

Table 9-2 GE Healthcare Supplied Cables (Standard Run) - UL Information

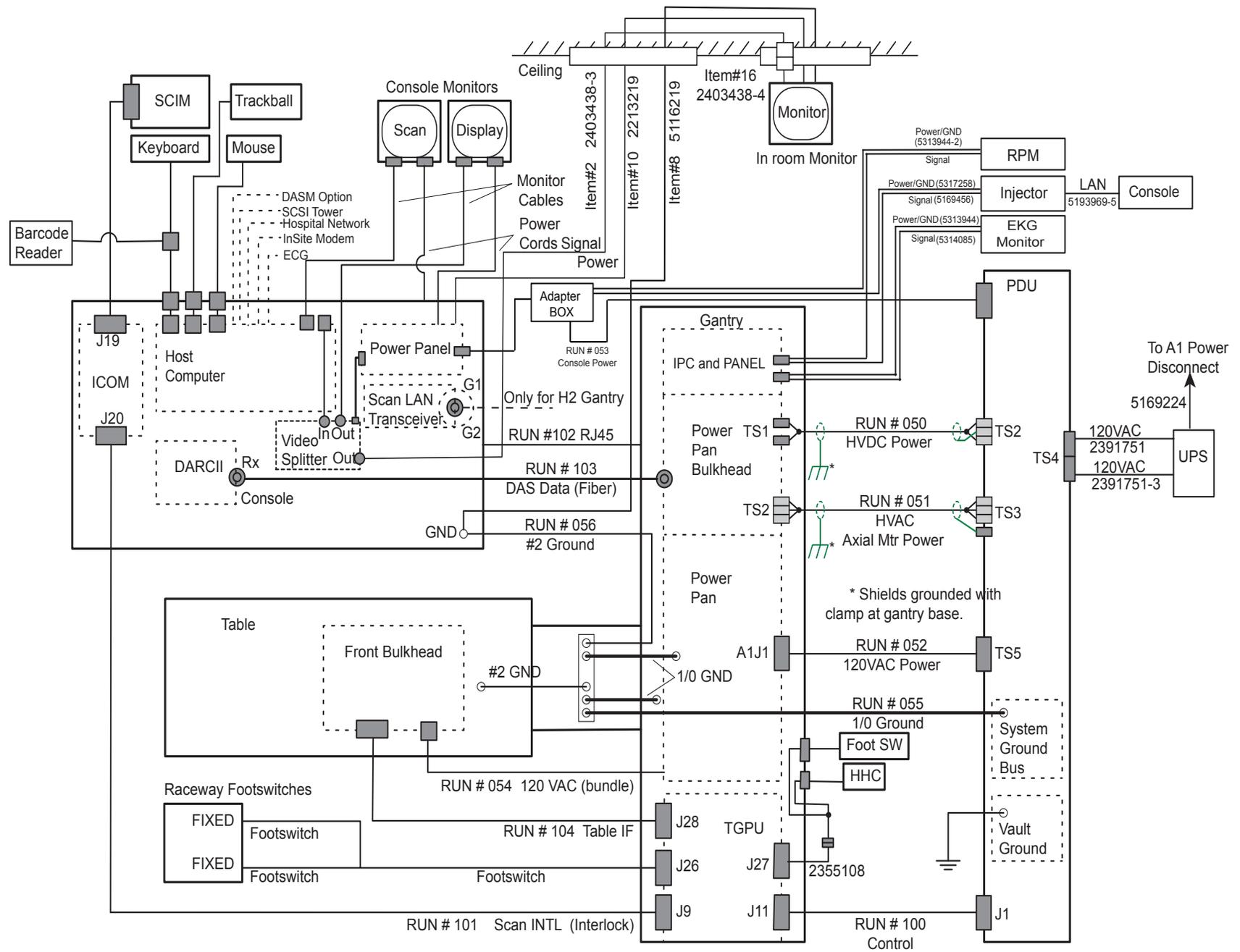


Figure 9-1 System Interconnect Diagram

3.2 GE Healthcare Supplied (Optional, Long Run)

RUN #	LENGTH, ACTUAL (USABLE)		PART #	DESCRIPTION	UL CABLE INFORMATION								PULL SIZE MM (INCHES)
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia. mm (inch)	# of Cond	Size AWG	
050	63 (55)	19.3 (16.76)	2343529	HVDC, PDU to Gantry	2587	FT4	600	+ & - 350VDC	90	19 (.751)	3	(2) 4 (1) 8	22 (.87) Dia
051	62.5 (55)	19 (16.76)	2343530	HVAC, PDU to Gantry	2587	FT4	600	440Y/254	90	15.3 (.604)	4	14	11.2 (.44) Dia
052	63 (58)	19.3 (17.56)	2343528	LVAC, PDU to Gantry	2587	FT4	600	208Y/120	90	13.8 (.542)	5	8	56.4 (2.22) Dia
053	80 (75)	24.5 (22.86)	2343531	LVAC, PDU to Console	2587	FT4	600	120VAC	90	12.3 (.483)	3	10	56.4 (2.22) Dia
055	63 (55)	19.3 (16.76)	2371450	Ground, PDU to Raceway	1284	VW-1 (FT-1)	600	0	105	15.5 (.608)	1	1/0	15.8 (.62) Dia
056	83 (75)	25.5 (22.86)	2371450-3	Ground, Raceway to Console	1283	VW-1 (FT-1)	600	0	105	11.9 (.467)	1	2	12.2 (.48) Dia
100	70 (62)	21.4 (18.86)	5120646	Signal, Gantry MSUB or TGPU to PDU		FT-4	300	<30VDC	80	11.2 (.440)	25	22	17 x 58 (.68 x 2.30) 19 x 51 (.75 x 2.01)
101	86 (78)	26.35 (23.71)	5120645	Signal, Gantry MSUB or TGPU to OC		FT-4	300	<30VDC	80	11.2 (.440)	25	22	17 x 58 (.68 x 2.30) 19 x 51 (.75 x 2.01)
102	86 (81)	26.3 (24.84)	2373436-2	Signal (LAN), Gantry to OC			1900	<30VDC		5.9 (.234)	8	24	15 (.59) Dia
103	80 (75)	24.3 (22.86)	2117848-2	Fiber Optic, Gantry to OC			N/A	N/A			1	N/A	10 (.39) Dia

Table 9-3 GE Healthcare Supplied Cables (Optional, Long Run) - UL Information

3.3 GE Healthcare Supplied (Cables of Options)

OPTION	LENGTH, ACTUAL (USABLE)		PART #	DESCRIPTION	UL CABLE INFORMATION								PULL SIZE MM (INCHES)
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia. mm (inch)	# of Cond	Size AWG	
Fluoro	75	22.9	2403438-3	5 BNC MALE TO HD 15 MALE 75 FEET	1015	FT4		1Vp-p	75	9.1 (0.358)	5	26	
	70	21.2	2213219	POWER CABLE FOR LCD-CONSOLE TO LCD		FT1	120	120VAC	105	9.3 (0.366)	3	14	
	71	21.5	5116219	Grounding Cable For LCD Console To LCD		VW-1	600	0V	105		1	8	
	15	4.6	2403438-4	HD 15 FEMALE TO HD 15 MALE 15 FEET				1Vp-p	60	8.0 (0.315)	5	26	
	1.3	0.4	2355108	JUMPER CABLE FOR ADAPTING 2286150 TO WORK WITH H-POWER MSUB							8	22	
UPS	15	4.6	2391751	POWER CABLE, NGPDU TO UPS	2587	FT4	600	208VAC	90	5.8 (0.228)	5	8	
	15	4.6	2391751-3	POWER CABLE, UPS DISCONNECT PANEL TO NGPDU	2587	FT4	600	208VAC	90	5.8 (0.228)	4	8	
	45	13.6	5169224	UPS CONTROL CABLE	2587	FT4	600	120VAC	90	10.3 (0.406)	5	18	

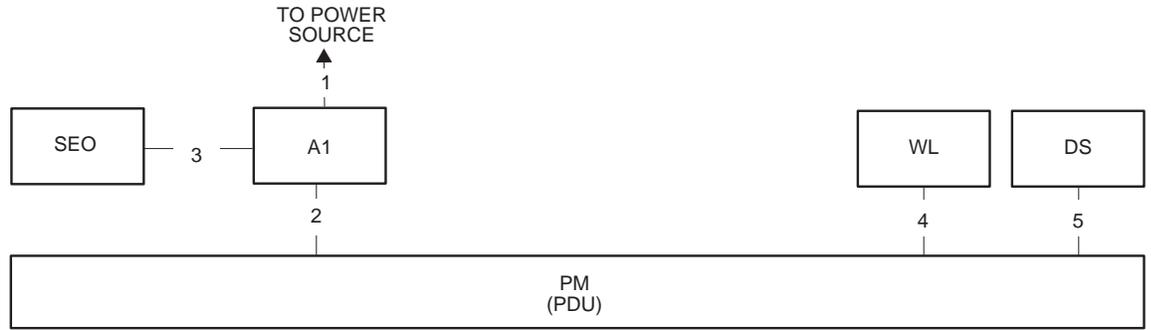
Table 9-4 GE Healthcare Supplied Cables for Options - UL Information

3.4 Contractor (Customer) Supplied

CUSTOMER INSTALLED WIRING		DESCRIPTION	CABLES SUPPLIED			PLUG PULLING DIMENSIONS		WIRE & CABLE PIGTAILS FT. (M.)	
QTY	SIZE AWG (MM ²)		PART NO	LENGTH FT. (M.)	DIA. IN (MM)	FROM	TO	FROM	TO
RUN NO. 1 FROM PRIMARY POWER SOURCE TO FACILITY DISCONNECT (POWER SOURCE - A1)									
Maximum Run Length *									
3	*	POWER						3 (1)	3(1)
1	1/0 (50)	GROUND						3 (1)	3 (1)
RUN NO. 2 FROM FACILITY DISCONNECT TO POWER MODULE (A1 - PM) MAXIMUM RUN LENGTH *									
3	*	POWER						3 (1)	3(1)
1	1/0 (50)	GROUND						3 (1)	3 (1)
1	*	NEUTRAL						3 (1)	3 (1)
RUN NO. 3 FROM FACILITY DISCONNECT TO SYSTEM EMERGENCY OFF (A1 - SEO)									
2	14 (2)	POWER						6 (2)	6 (2)
1	14 (2)	GROUND						6 (2)	6 (2)
RUN NO. 4 POWER MODULE TO WARNING LIGHT CONTROL (PM - WL)									
2	14 (2)	WARNING LIGHT 24 VOLT CONTROL A3J2-1,2,3,4							
RUN NO. 5 POWER MODULE TO SCAN ROOM DOOR INTERLOCK (PM - DOOR SWITCH)									
2	14 (2)	SCAN ROOM DOOR INTER LOCK A3J6-1,2							
*	REFER TO Table 8-3 on page 111 FOR AWG (MM2) WIRE SIZES.								

Table 9-5 Runs 1, 2, 3, 4 and 5 Connections

9 - Interconnection Data



NOTES:

- 1) Used for remote diagnostics - Option
- 2) Refer to the appropriate Pre-installation / Installation documents for the Laser Camera
- 3) Category 5 cable. Use one of the following patch cords:

CA T Num	GE Part Num	Length
K9000WB	2215028-10	20 m
K9000KP	2215028-5	10 m
K9000JR	2215028-4	5 m
K9000WA	2215028-9	3 m
- 4) In order to avoid any violation of each National Regulation (NEC in USA, CCC in China, etc.), use of the complied cable/wire is recommended. For China market, China end-user shall purchase the power supply cable that has the CCC mark.

Only one phone connection is required for the system.

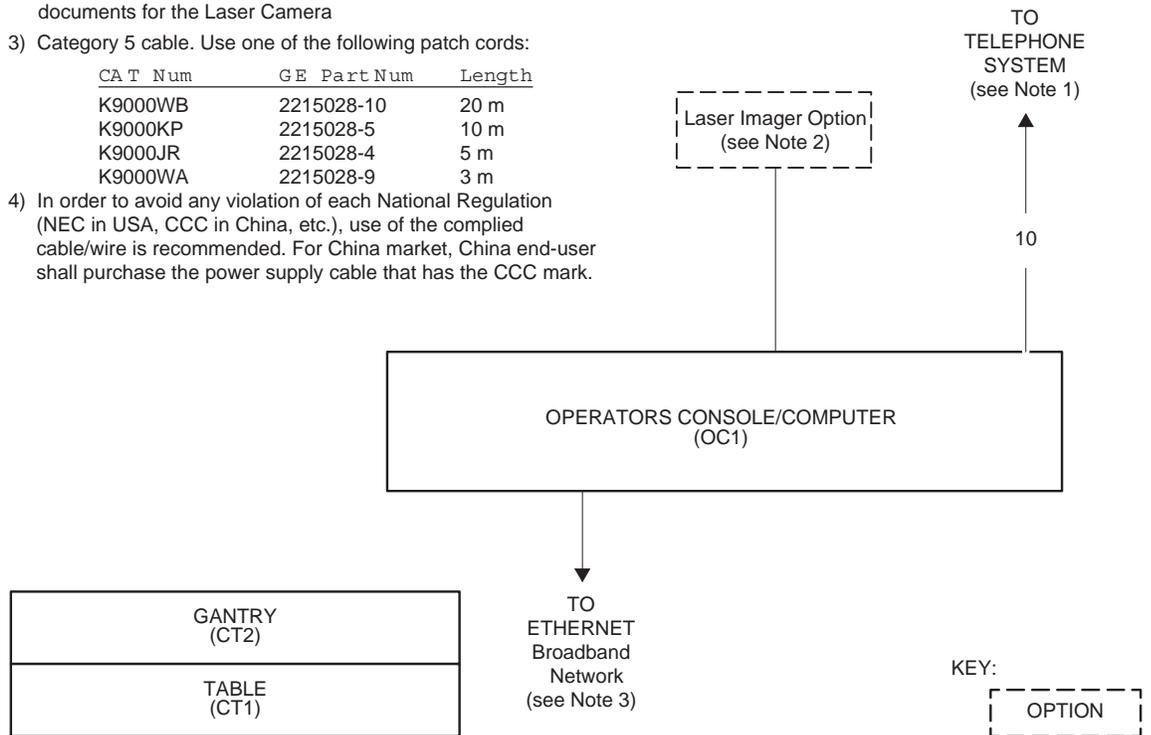


Figure 9-2 Interconnection Runs

Section 4.0 Contractor Supplied Components

REFERENCE	ASSOCIATED EQUIPMENT	MATERIAL/LABOR SUPPLIED BY CUSTOMER CONTRACTOR	USA VENDOR / CAT NO. GE CATALOG
A1 380-480V 50/60Hz	Circuit Breaker with Magnetic Contactor	3 Pole, 380V-480V, Combination breaker with magnetic contactor. Includes control transformer, optional UPS interface, On/Off controls and auto-restart feature. Must be LOTO compatible.	Recommend*: <ul style="list-style-type: none"> E4502AE (125A) E4502AF (150A) Optional remote operator control available from GE Supply, Cat# GESCTR0CS1
BBNC (required)	Broad-Band Network Connection	Broad-Band network connection wall jack, located within 1m (39inches) of console location, for internal hospital networking and InSite Broad-Band connectivity. Cabling to conform to facility's IT standards.	
ITL (optional)	In-suite Telephone Lines	Supply 2 voice-grade telephone lines. One 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 customer.	
	System Components	Reference the system installation drawings supplied by Installation Support Services within your geographic area.	

*Refer to [Section 3.0 - Recommended Power Distribution System](#) .

Table 9-6 Contractor-Supplied Components

Section 5.0 Fuse

MARK	NUMBER	QTY	FRU	DESCRIPTION/NAME
1	2351492	1.0	Yes	200A FUSE
2	2364059	1.0	Yes	GLASS FUSE
3	46-170021P50	1.0	Yes	FUSE 12 AMPS 250 VOLTS
4	46-170021P106	1.0	Yes	FUSE 8 AMPS 250 VOLTS
5	2336517-2	1.0	Yes	FUSE 25 AMPS 700 VOLTS 2.
6	46-170021P52	5.0	Yes	FUSE 3 AMPS 250 VOLTS
7	46-170021P10	2.0	Yes	006.000A 0250V 3AG
8	46-170021P101	1.0	Yes	FUSE 20 AMPS 700 VOLTS
9	46-170021P11	1.0	Yes	7.0A, 250V SLO-BLO FUSE.
10	46-170021P31	2.0	Yes	1/2A, 250V SLO-BLO FUSE.
11	2106993-5	2.0	Yes	FUSE 20 AMPS 500 VOLTS .3

Table 9-7 H-Power Fuse Kit (2218570-2 BOM, rev 3)

MARK	NUMBER	QTY	FRU	DESCRIPTION/NAME
12	46-327160P1	1.0	Yes	12.0A, 125VAC, DUAL ELEME
13	2379651	1.0	Yes	FUSE - 700 V, 200 A, FAST

Table 9-7 H-Power Fuse Kit (2218570-2 BOM, rev 3) (Continued)

Section 6.0 UPS Interconnect

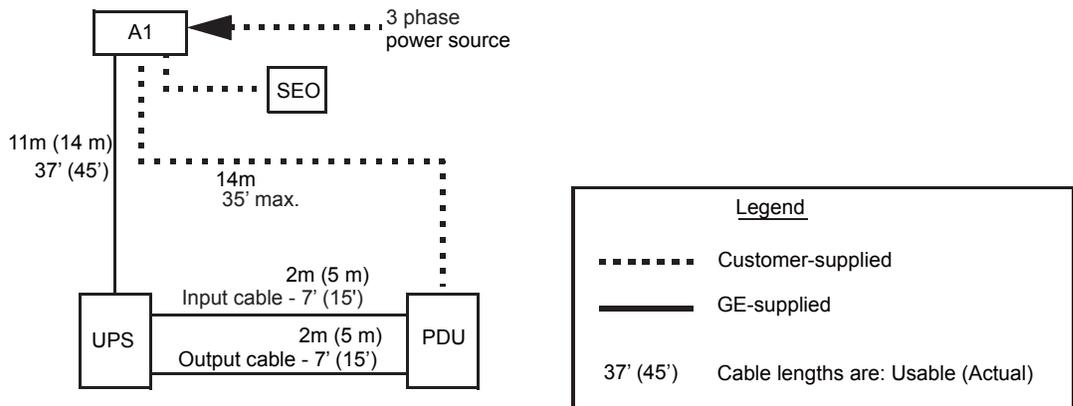


Figure 9-3 Typical UPS Interconnect

The UPS Kit catalog number is B7999ZA. See table below, for detail.



NOTICE UPS Kit B7999ZA **REQUIRES** installation of one of the A1 Panels listed below.

PDU Type & Model #	Max. Mom. kVA Rating	Recommended Main Disconnect (A1) Cat #		Optional Partial UPS Kit Cat #
		Europe & Asia (380-400V or 420V)	North America (440V or 460-480V)	
NGPDU 2326492	150kVA	E4502AF (150A) (incl. Auto Restart & Integrated UPS Control)	E4502AE (125A) (incl. Auto Restart & Integrated UPS Control)	B7999ZA alt. E4502KY (Includes PW 9155-10GE10kVa, 2ph. UPS, & hardware kit) REQUIRES one of the A1 Panels shown at left, or equal.

Table 9-8 LightSpeed RT¹⁶ and Xtra Partial UPS Back-up Options

Conduit is required between:

- A1 and UPS
- UPS and PDU
- PDU and A1

Section 7.0

Typical Customer Supplied Wiring - U.S.

7.1 Primary Power Disconnect



Figure 9-4 Primary Power Disconnect (A1) - Typical GE A1 shown

Installing this system requires a Lockout/Tagout-compatible disconnect. If a UPS is required, a GE Disconnect is strongly recommended for safe operation. The GE disconnect and UPS are designed to work together.

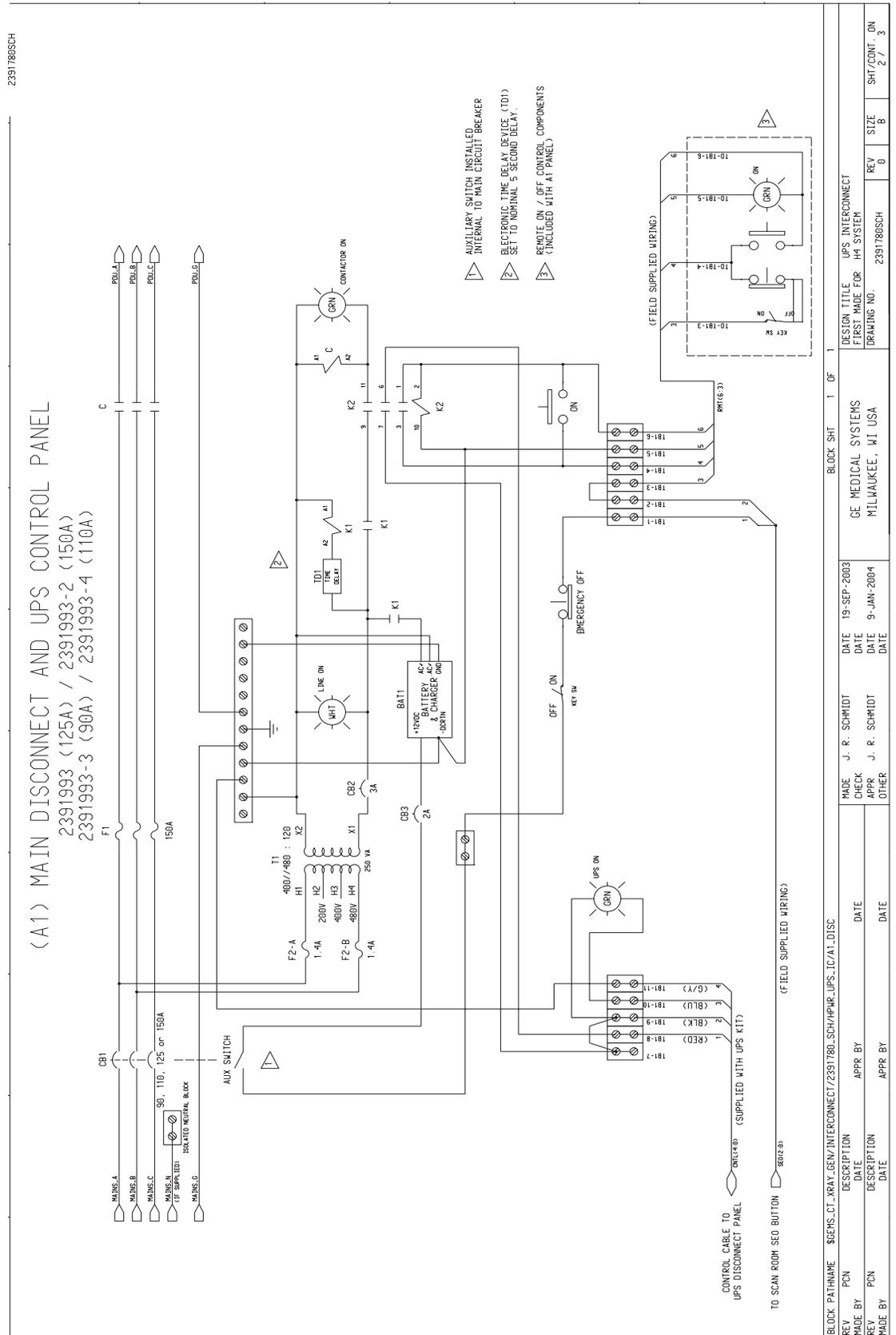


Figure 9-5 Primary Power Disconnect (A1)-Fusible Disconnect and Magnetic Contactor

7.2 Scan Room Warning Light & Door Interlock

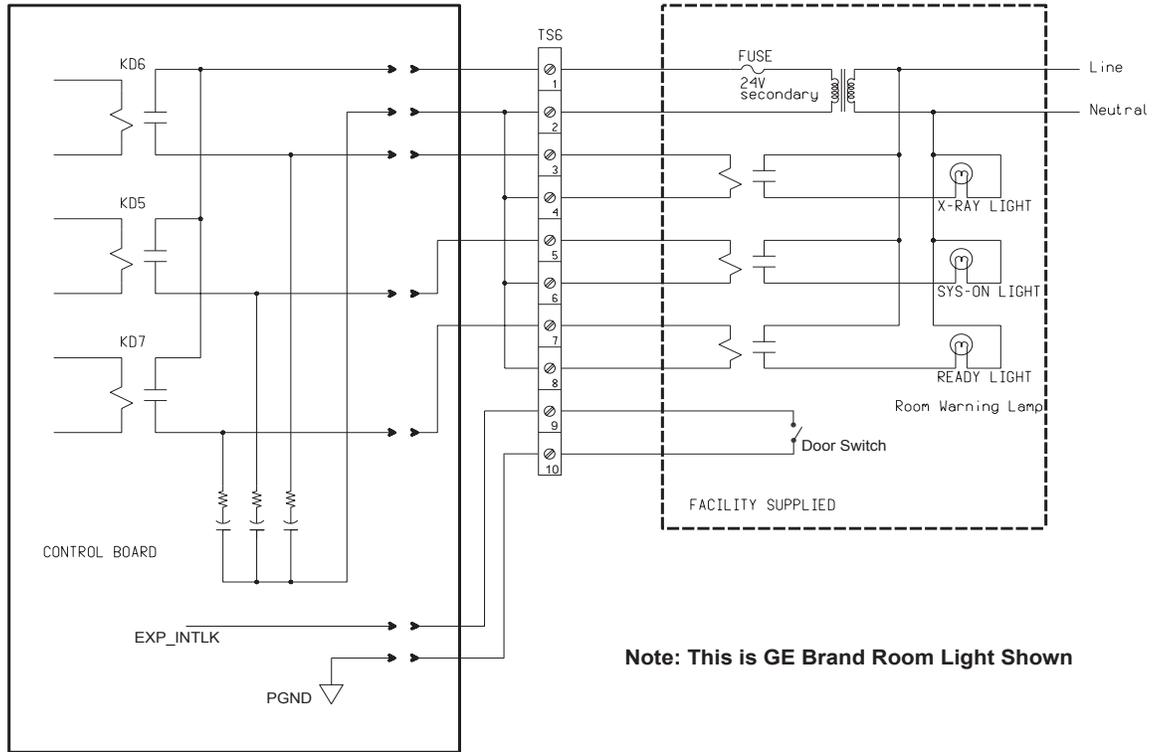


Figure 9-6 TS6 X-Ray Warning Light Connections

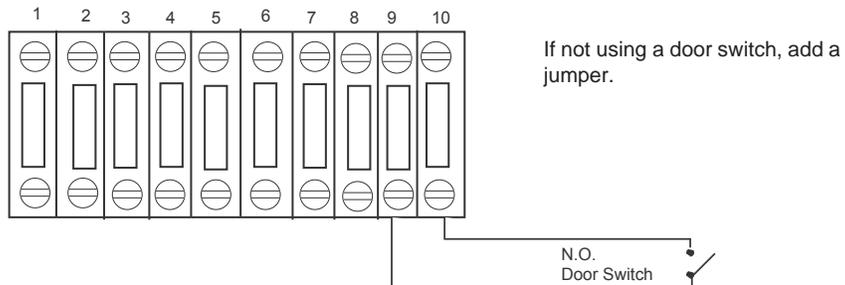


Figure 9-7 TS6 Room Door Interlock Connections - With a Door Interlock

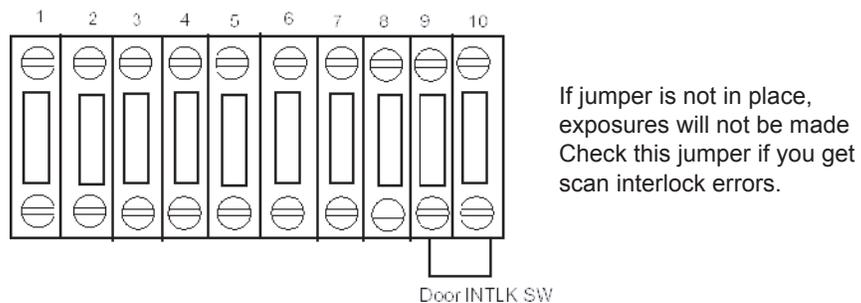


Figure 9-8 TS6 Room Door Interlock Connections - Without a Door Interlock

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Imagination at work