

# BrightSpeed Select Series

## Pre-Installation Manual

OPERATING DOCUMENTATION



## **Effectivity:**

The information in this manual applies to the following BrightSpeed Select Series CT Systems:

- BrightSpeed Elite Select
- BrightSpeed Edge Select
- BrightSpeed Excel Select

# IMPORTANT PRECAUTIONS

## LANGUAGE

<b>ПРЕДУПРЕЖДЕНИЕ</b> (BG)	<p>Това упътване за работа е налично само на английски език.</p> <ul style="list-style-type: none"><li>• Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод.</li><li>• Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа.</li><li>• 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.</li></ul>
<b>警告</b> (ZH-CN)	<p>本维修手册仅提供英文版本。</p> <ul style="list-style-type: none"><li>• 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。</li><li>• 未详细阅读和完全理解本维修手册之前，不得进行维修。</li><li>• 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。</li></ul>
<b>警告</b> (ZH-HK)	<p>本服務手冊僅提供英文版本。</p> <ul style="list-style-type: none"><li>• 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。</li><li>• 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。</li><li>• 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。</li></ul>
<b>警告</b> (ZH-TW)	<p>本維修手冊僅有英文版。</p> <ul style="list-style-type: none"><li>• 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。</li><li>• 請勿試圖維修本設備，除非您已查閱並瞭解本維修手冊。</li><li>• 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。</li></ul>
<b>UPOZORENJE</b> (HR)	<p>Ovaj servisni priručnik dostupan je na engleskom jeziku.</p> <ul style="list-style-type: none"><li>• Ako davatelj usluge klijenta treba neki drugi jezik, klijent je dužan osigurati prijevod.</li><li>• Ne pokušavajte servisirati opremu ako niste u potpunosti pročitali i razumjeli ovaj servisni priručnik.</li><li>• Zanimarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika.</li></ul>
<b>VÝSTRAHA</b> (CS)	<p>Tento provozní návod existuje pouze v anglickém jazyce.</p> <ul style="list-style-type: none"><li>• V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka.</li><li>• Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah.</li><li>• 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.</li></ul>

<b>ADVARSEL</b> (DA)	Denne servicemanual findes kun på engelsk. <ul style="list-style-type: none"><li>• Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse.</li><li>• Forsøg ikke at servicere udstyret uden at læse og forstå denne servicemanual.</li><li>• Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk stød, mekanisk eller anden fare for teknikeren, operatøren eller patienten.</li></ul>
<b>WAARSCHUWING</b> (NL)	Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar. <ul style="list-style-type: none"><li>• Als het onderhoudspersoneel een andere taal vereist, dan is de klant verantwoordelijk voor de vertaling ervan.</li><li>• Probeer de apparatuur niet te onderhouden alvorens deze onderhoudshandleiding werd geraadpleegd en begrepen is.</li><li>• 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.</li></ul>
<b>WARNING</b> (EN)	This service manual is available in English only. <ul style="list-style-type: none"><li>• If a customer's service provider requires a language other than english, it is the customer's responsibility to provide translation services.</li><li>• Do not attempt to service the equipment unless this service manual has been consulted and is understood.</li><li>• Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.</li></ul>
<b>HOIATUS</b> (ET)	See teenindusjuhend on saadaval ainult inglise keeles <ul style="list-style-type: none"><li>• Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest.</li><li>• Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist.</li><li>• Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.</li></ul>
<b>VAROITUS</b> (FI)	Tämä huolto-ohje on saatavilla vain englanniksi. <ul style="list-style-type: none"><li>• Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla.</li><li>• Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen.</li><li>• Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.</li></ul>
<b>ATTENTION</b> (FR)	Ce manuel d'installation et de maintenance est disponible uniquement en anglais. <ul style="list-style-type: none"><li>• 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.</li><li>• Ne pas tenter d'intervenir sur les équipements tant que ce manuel d'installation et de maintenance n'a pas été consulté et compris.</li><li>• 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.</li></ul>

<p><b>WARNUNG</b> (DE)</p>	<p>Diese Serviceanleitung existiert nur in englischer Sprache.</p> <ul style="list-style-type: none"> <li>• Falls ein fremder Kundendienst eine andere Sprache benötigt, ist es Aufgabe des Kunden für eine entsprechende Übersetzung zu sorgen.</li> <li>• Versuchen Sie nicht diese Anlage zu warten, ohne diese Serviceanleitung gelesen und verstanden zu haben.</li> <li>• Wird diese Warnung nicht beachtet, so kann es zu Verletzungen des Kundendiensttechnikers, des Bedieners oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.</li> </ul>
<p><b>ΠΡΟΕΙΔΟΠΟΙΗΣΗ</b> (EL)</p>	<p>Το παρόν εγχειρίδιο σέρβις διατίθεται μόνο στα αγγλικά.</p> <ul style="list-style-type: none"> <li>• Εάν ο τεχνικός σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει τις υπηρεσίες μετάφρασης.</li> <li>• Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό αν δεν έχετε συμβουλευτεί και κατανοήσει το παρόν εγχειρίδιο σέρβις.</li> <li>• Αν δεν προσέξετε την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στον τεχνικό σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.</li> </ul>
<p><b>FIGYELMEZTETÉS</b> (HU)</p>	<p>Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el.</p> <ul style="list-style-type: none"> <li>• Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészítése.</li> <li>• Ne próbálja elkezdni használni a berendezést, amíg a karbantartási kézikönyvben leírtakat nem értelmezték.</li> <li>• Ezen figyelmeztetés figyelmen kívül hagyása a szolgáltató, működtető vagy a beteg áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.</li> </ul>
<p><b>AÐVÖRUN</b> (IS)</p>	<p>Þessi þjónustuhandbók er aðeins fáanleg á ensku.</p> <ul style="list-style-type: none"> <li>• Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálaþjónustu.</li> <li>• Reynið ekki að afgreiða tækið nema að þessi þjónustuhandbók hefur verið skoðuð og skilin.</li> <li>• Brot á sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklings frá raflosti, vélrænu eða öðrum áhættum.</li> </ul>
<p><b>AVVERTENZA</b> (IT)</p>	<p>Il presente manuale di manutenzione è disponibile soltanto in lingua inglese.</p> <ul style="list-style-type: none"> <li>• Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione.</li> <li>• Procedere alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto.</li> <li>• 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.</li> </ul>
<p><b>警告</b> (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"> <li>• 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。</li> <li>• 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。</li> <li>• 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。</li> </ul>

<p><b>경고</b> (KO)</p>	<p>본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다 .</p> <ul style="list-style-type: none"> <li>• 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우 , 번역 서비스를 제공하는 것은 고객의 책임입니다 .</li> <li>• 본 서비스 매뉴얼을 참조하여 숙지하지 않은 이상 해당 장비를 수리하려고 시도하지 마십시오 .</li> <li>• 본 경고 사항에 유의하지 않으면 전기 쇼크 , 기계적 위험 , 또는 기타 위험으로 인해 서비스 제공자 , 사용자 또는 환자에게 부상을 입힐 수 있습니다 .</li> </ul>
<p><b>BRDINJUMS</b> (LV)</p>	<p>Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā.</p> <ul style="list-style-type: none"> <li>• Ja klienta apkopes sniedzējam nepieciešama informācija citā valodā, klienta pienākums ir nodrošināt tulkojumu.</li> <li>• Neveiciet aprīkojuma apkopi bez apkopes rokasgrāmatas izlasīšanas un saprašanas.</li> <li>• Šī brīdinājuma neievērošanas rezultātā var rasties elektriskās strāvas trieciena, mehānisku vai citu faktoru izraisītu traumu risks apkopes sniedzējam, operatoram vai pacientam.</li> </ul>
<p><b>ĮSPĖJIMAS</b> (LT)</p>	<p>Šis eksploatavimo vadovas yra tik anglų kalba.</p> <ul style="list-style-type: none"> <li>• Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba – ne anglų, suteikti vertimo paslaugas privalo klientas.</li> <li>• Nemėginkite atlikti įrangos techninės priežiūros, jei neperskaitėte ar nesupratote šio eksploatavimo vadovo.</li> <li>• Jei nepaisysite šio įspėjimo, galimi paslaugų tiekėjo, operatoriaus ar paciento sužalojimai dėl elektros šoko, mechaninių ar kitų pavojų.</li> </ul>
<p><b>ADVARSEL</b> (NO)</p>	<p>Denne servicehåndboken finnes bare på engelsk.</p> <ul style="list-style-type: none"> <li>• Hvis kundens serviceleverandør har bruk for et annet språk, er det kundens ansvar å sørge for oversettelse.</li> <li>• Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått.</li> <li>• Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer.</li> </ul>
<p><b>OSTRZEŻENIE</b> (PL)</p>	<p>Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.</p> <ul style="list-style-type: none"> <li>• Jeśli serwisant klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta.</li> <li>• Nie próbować serwisować urządzenia bez zapoznania się z niniejszym podręcznikiem serwisowym i zrozumienia go.</li> <li>• Niezastosowanie się do tego ostrzeżenia może doprowadzić do obrażeń serwisanta, operatora lub pacjenta w wyniku porażenia prądem elektrycznym, zagrożenia mechanicznego bądź innego.</li> </ul>
<p><b>ATENÇÃO</b> (PT-BR)</p>	<p>Este manual de assistência técnica encontra-se disponível unicamente em inglês.</p> <ul style="list-style-type: none"> <li>• Se outro serviço de assistência técnica solicitar a tradução deste manual, caberá ao cliente fornecer os serviços de tradução.</li> <li>• Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica.</li> <li>• A não observância deste aviso pode ocasionar ferimentos no técnico, operador ou paciente decorrentes de choques elétricos, mecânicos ou outros.</li> </ul>

<b>ATENÇÃO</b> (PT-PT)	<p>Este manual de assistência técnica só se encontra disponível em inglês.</p> <ul style="list-style-type: none"><li>• Se qualquer outro serviço de assistência técnica solicitar este manual noutra língua, é da responsabilidade do cliente fornecer os serviços de tradução.</li><li>• Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica.</li><li>• 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.</li></ul>
<b>ATENȚIE</b> (RO)	<p>Acest manual de service este disponibil doar în limba engleză.</p> <ul style="list-style-type: none"><li>• Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere.</li><li>• Nu încercați să reparați echipamentul decât ulterior consultării și înțelegerii acestui manual de service.</li><li>• Ignorarea acestui avertisment ar putea duce la rănirea depanatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.</li></ul>
<b>ОСТОРОЖНО!</b> (RU)	<p>Данное руководство по техническому обслуживанию представлено только на английском языке.</p> <ul style="list-style-type: none"><li>• Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует самостоятельно обеспечить перевод.</li><li>• Перед техническим обслуживанием оборудования обязательно обратитесь к данному руководству и поймите изложенные в нем сведения.</li><li>• Несоблюдение требований данного предупреждения может привести к тому, что специалист по техобслуживанию, оператор или пациент получит удар электрическим током, механическую травму или другое повреждение.</li></ul>
<b>UPOZORENJE</b> (SR)	<p>Ovo servisno uputstvo je dostupno samo na engleskom jeziku.</p> <ul style="list-style-type: none"><li>• Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge.</li><li>• Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo.</li><li>• Zanemarivanje ovog upozorenja može dovesti do povređivanja serviser, rukovaoca ili pacijenta usled strujnog udara ili mehaničkih i drugih opasnosti.</li></ul>
<b>UPOZORNENIE</b> (SK)	<p>Tento návod na obsluhu je k dispozícii len v angličtine.</p> <ul style="list-style-type: none"><li>• Ak zákazníkovi poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka.</li><li>• Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obsluhu a neporozumiete mu.</li><li>• Zanedbanie tohto upozornenia môže spôsobiť zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie.</li></ul>

<b>ATENCION</b> (ES)	<p>Este manual de servicio sólo existe en inglés.</p> <ul style="list-style-type: none"><li>• 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.</li><li>• No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio.</li><li>• 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.</li></ul>
<b>VARNING</b> (SV)	<p>Den här servicehandboken finns bara tillgänglig på engelska. .</p> <ul style="list-style-type: none"><li>• Om en kunds servicetekniker har behov av ett annat språk än engelska, ansvarar kunden för att tillhandahålla översättningstjänster.</li><li>• Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken.</li><li>• 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.</li></ul>
<b>OPOZORILO</b> (SL)	<p>Ta servisni priročnik je na voljo samo v angleškem jeziku.</p> <ul style="list-style-type: none"><li>• Če ponudnik storitve stranke potrebuje priročnik v drugem jeziku, mora stranka zagotoviti prevod.</li><li>• Ne poskušajte servisirati opreme, če tega priročnika niste v celoti prebrali in razumeli.</li><li>• Če tega opozorila ne upoštevate, se lahko zaradi električnega udara, mehanskih ali drugih nevarnosti poškoduje ponudnik storitev, operater ali bolnik.</li></ul>
<b>DIKKAT</b> (TR)	<p>Bu servis kılavuzunun sadece ingilizcesi mevcuttur.</p> <ul style="list-style-type: none"><li>• Eğer müşteri teknisyeni bu kılavuzu ingilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer.</li><li>• Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz.</li><li>• Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.</li></ul>

## 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 6.
- Fill out the GIQ workflow for any items missing, damaged, OBF/FOI for in process installs:  
[http://supportcentral.ge.com/ProcessMaps/form\\_new\\_request.asp?prod\\_id=268679&form\\_id=573167&node\\_id=1916016&map\\_id=&reference\\_id=&reference\\_type](http://supportcentral.ge.com/ProcessMaps/form_new_request.asp?prod_id=268679&form_id=573167&node_id=1916016&map_id=&reference_id=&reference_type)
- Contact your local service coordinator for more information on this process.

## 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 Medical 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, Medical Systems Group, will be glad to assist and cooperate in placing this equipment in use.

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

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

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

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

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## 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
15	10/11/21	<b>Chapter 7:</b> Section 4.0: Updated short term storage values.
14	05/11/17	<p><b>Chapter 4:</b> Section 4.2.3: Added Figure 4-18 for OpenOC</p> <p><b>Chapter 4:</b> Section 6.0: Added Figure 4-27 for OpenOC</p> <p><b>Chapter 5:</b> Section 5.0: Added Maximum OC Audible Noise Level</p> <p><b>Chapter 6:</b> Section 1.0: Added OpenOC information on Table 6-1                      Added section 1.1.1 for Anchor Edge Distance Definition</p> <p><b>Chapter 6:</b> Section 2.0: Added Figure 6-11 for OpenOC information</p> <p><b>Chapter 7:</b> Section 4.0: Updated Storage temperature according to SRS DOC0764704</p> <p><b>Chapter 7:</b> Section 6.0: Updated system transportation information according to SRS DOC0764704</p> <p><b>Chapter 7:</b> Section 9.0: Added OpenOC information for console delivery consideration</p> <p><b>Chapter 9:</b> Section 3.0: Added cable connections for OpenOC</p>
13	11/04/13	<b>Chapter 4:</b> Section 2.2.1: Added the Gantry Service Clearance information
12	06/28/13	<p><b>Chapter 5:</b> Section 5.0: Added section 5.0 system component noise levels per service design engineer comments</p> <p><b>Chapter 6:</b> Section 1.0: Updated Table 6-1 for Anchor design change</p> <p><b>Chapter 6:</b> Section 2.0: Updated Table 6-2 for Gantry and Table mounting requirements</p>
11	19/11/12	<p><b>Chapter 4:</b> Section 2.2.4: added the Note for service cabinet as option</p> <p><b>Chapter 9:</b> Section 3.3: Updated Table 9-6 for NIO16 console cable information</p>
10	03/07/12	<p><b>Chapter 1:</b>                      Section 4.0: Updated 4.1 General Scope for IEC3 requirements</p> <p><b>Chapter 9:</b>                      Section 3.0: Added Table 9-3 GEMS Supplied Cables (Short Run) (2281840-14)- UL Information and Table 9-8 GEMS Supplied Cables (Long Run) (2281840-13)- UL Information</p>

Revision	Date	Reason for change
9	11/03/11	<p><b>Chapter 1:</b>                      Section 4.0: Updated General Scope</p> <p><b>Chapter 3:</b>                      Section 2.0: Added Figure 3-6 NIO16 Console</p> <p><b>Chapter 4:</b>                      Section 4.0: Added Figure 4-16 NIO16 Operator's Console                      Section 6.0: Added Figure 4-23 NIO16 Console Host Computer Rear</p> <p><b>Chapter 6:</b>                      Section 2.0: Added Figure 6-10 NIO16 Console Center-of-Gravity</p> <p><b>Chapter 7:</b>                      Section 9.0: Added Console consideration for NIO16 Console</p> <p><b>Chapter 9:</b>                      Section 3.0: Added Table 9-5 GE Healthcare Supplied NIO16 Console Cables                      Added Figure 9-1 System Interconnect Diagram (with NIO16 Console)</p>
8	12/17/09	<p><b>Chapter 4:</b>                      Updated Figure 4-1 and Figure 4-3                      Added True-In-One Console Ctrl room size on Table 4-2                      Section 6.4: Added Figure 4-16 and 4-17 FWS table for True-In-One Console                      Section 9.0: Added Figure 4-19 True-In-One Console Rear Bulkhead</p> <p><b>Chapter 6:</b>                      Added True-In-One information on Table 6-1                      Added Figure 6-9 True-In-One Console seismic bracket illustration</p> <p><b>Chapter 7:</b>                      Section 9.0: Added Console consideration for True-In-One</p> <p><b>Chapter 8:</b>                      Section 2.2 and Section 3.0: Added WARNING Messages</p> <p><b>Chapter 9:</b>                      Added Section 3.3 GEMS Supplied (True-In-One Console Cables)</p>
7	11/04/08	<p><b>Chapter 3:</b> updated option list in Section 1.0</p> <p><b>Chapter 4:</b> updated injector AC power cable info in section 7.0                      Section 8.0 updated Floor Levelness                      Section 10.0 Updated Radiation Illustration for Head and Body</p> <p><b>Chapter 5:</b> Added the Notice for environmental requirement at beginning of Section 1.0                      Section 1.1: Updated Temperature (Scan Room &amp; Control Room) according to SRS requirement.                      Section 3.0: Updated Altitude values according to SRS requirement.                      Section 4.0 Updated Figure 5-1 of EMI requirement</p> <p><b>Chapter 6:</b> added FWS seismic info in section 2.0</p> <p><b>Chapter 8,</b> section 4.0: updated Figure 8-1 System Ground Map</p> <p><b>Chapter 9,</b> section 3.0: updated System Interconnect Diagram                      Section 3.4: updated table of GEMS Supplied Cables for Options</p>
6	06/03/08	<p><b>Updated for All-In-One (AIO) Console and new FWS Table.</b></p> <p><b>Chapter 3:</b> added BSD Global USB Modem to option list in Section 1.0</p> <p><b>Chapter 4:</b> added new FWS Table (part 5168666) illustration in Section 6.4</p> <p><b>Chapter 6:</b> added AIO and FWS floor loading specification in Section 1.0</p>
5	04/21/08	<p><b>Chapter 4:</b> updated Room Size description                      Section 3.0: updated Service Clearance</p>

Revision	Date	Reason for change
4	10/15/07	<p><b>Important Precautions:</b> updated multi-language warnings &amp; Damage In Transportation</p> <p><b>Chapter 1:</b> removed Site Readiness Checklist</p> <p><b>Chapter 4:</b> updated Room Size description and gantry width                      updated Service Clearance                      Added FWS Seismic information                      Added note to Section 8.4 Floor levelness                      Added network specs to Section 9.0 Network Connections</p> <p><b>Chapter 5:</b> updated room temperature                      updated Table 5-1 Cooling Requirements                      updated Altitude                      added EMI of color monitor and note                      updated Figure 5-1 Sample Room Layout, showing approximate EMI requirements</p> <p><b>Chapter 6:</b> updated gantry width</p> <p><b>Chapter 7:</b> updated components consideration information</p> <p><b>Chapter 9:</b> added LOTO requires to Section 7.1 Primary Power Disconnect</p>
3	06/01/07	<p><b>Chapter 5:</b> updated Table 5-1 Cooling Requirements</p> <p><b>Chapter 6:</b> updated Table 6-1 BrightSpeed Select System Floor Loading</p> <p><b>Chapter 9:</b> updated Table 9-3 Extended Cables</p>
2	04/17/07	<p>Updated measurements to metric to meet European standards and compliance. General revision of manual.</p> <p><b>Important Precautions:</b> updated multi-language warnings</p> <p><b>Chapter 1:</b> updated Figure 2-1 Table anchor hole</p> <p><b>Chapter 4:</b> updated Room Size, System Specifications and Room Layouts                      updated component dimensions.                      updated Figure 4-6, 4-7 Table side view                      added Section 8.7 Ceiling Requirement</p> <p><b>Chapter 5:</b> updated Cooling Requirement</p> <p><b>Chapter 7:</b> updated temperature and humidity requirements</p> <p><b>Chapter 8:</b> updated Recommended Power Distribution System</p> <p><b>Chapter 9:</b> updated UPS Interconnect</p>
1	2/15/07	Initial Release



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# Chapter 1

## Introduction

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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:

- BrightSpeed Select Floor template (Part Number is: 5193991)
- Pre-Installation check List
- Site Room Layouts
- Power and Grounding Inspection
- Pre-Installation Support

## Section 2.0

# Responsibility of Purchaser

### 2.1 Customer Room Prep Items

The CT system draws air in the machine, fine dust as listed below will clog the air filters inside the system and be deposited throughout the Gantry, Table, Operator 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.
- Existing floor anchors from a non-BrightSpeed Select system CANNOT be reused.
- New floor anchors must be a minimum of 102 mm (4") from any existing floor penetrations.

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

Global Site Readiness Checklist	
Customer Name: Customer Name	PMI Name:
GON Number:	FSE Name:
Equipment:	Country / City:
Required site assessment milestones	Date of completion (dd/mm/yy)
1) Check site before Delivery/Storage	Storage Site Ready Date
2) Check site before installation start	Actual Site Ready Date (SRD)

Place an "X" in either Y or N column

Site Ready Checks before Delivery/Storage	Y	N
Sufficient & secured storage space is planned with the customer.		
Environmental requirements for storage place are met per GE requirements.		
All permits, plans and permissions received for rigging and/or delivery.		
Rooms that will contain equipment, including staging areas if applicable, are dust free. Precautions must be taken to prevent dust from entering rooms containing equipment.		
Adequate delivery route from truck to final place of installation has been reviewed with all stakeholders, all communications/notifications have occurred, arrangements have been made for special handling (rigging, elevator, fork lift, etc.)		
All floors along delivery route will support weight of the equipment, temporary reinforcements arranged if needed.		
Site Ready Checks at Installation	Y	N
General Site Planning		
Room dimensions, including ceiling height, for all Exam, Equipment/Technical & Control rooms meets GE specifications.		
Ceiling support structure, if indicated on the GE drawing, is in the correct location, at the correct height, levelness and spacing has been measured.		
Rooms that will contain equipment, including staging areas if applicable, are construction debris free. Precautions must be taken to prevent debris from entering rooms containing equipment.		
Finished ceiling is installed. If applicable ceiling tiles installed per PMI discretion.		
Adequate delivery route from truck to final place of installation has been reviewed with all stakeholders, all communications/notifications have occurred, arrangements have been made for special handling (rigging, elevator, fork lift, etc.). All floors along delivery route will support weight of the equipment, temporary reinforcements arranged if needed.		
System power & grounding (PDB/MDP) is available as per GE specifications, installed at point of final connection and ready to use. Lock Out Tag Out is available.		
Adequate room illumination installed and working.		
Cable ways (floor/wall/ceiling/Access Flooring) are available for installation of GE cables and are of correct length and diameter. Surface floor duct can be installed at time of system installation.		
HVAC systems Installed, and the site meets minimum environmental storage requirements.		
Network outlets installed and computer network available and working.		
Floor levelness/flatness is measured and within tolerance, and there are no visible defects per GEHC specifications.		

Customer supplied countertops where GE equipment will be installed are in place.			
<b>Specific</b>			
Doors and windows complete or scheduled to be installed. If applicable, radiation protection (shielding) finished & radioprotection regulatory approval for installation obtained.			
	<b>STATUS OF WORK</b>		
<b>GENERAL COMMENTS</b>			
<b>SYSTEM CAN BE DELIVERED</b>		<b>PMI Name:</b>	
<b>SITE READY FOR INSTALLATION</b>		<b>PMI Signature:</b>	

# Section 4.0

## Medical Electrical Equipment for EMC

### 4.1 General Scope

This equipment complies with IEC60601-1-2: 2001+A1: 2004 (ED2.1) and IEC 60601-1-2: 2007 (ED3) (if the system rating plate of the scanner marked with IPX0) EMC standard for medical electrical equipment.

The BrightSpeed Select 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 4-1](#))
- Immunity Compliance level & recommendations to maintain equipment clinical utility (see [Table 4-2](#), [Table 4-3](#), and [Table 4-4](#)).

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 4-1 Emission Declaration**

<b>EMC Emissions Guidance &amp; Declaration for BrightSpeed Select System</b>		
The BrightSpeed Select System is intended for use in the electromagnetic environment specified below. The customer or the user of the BrightSpeed Select System should assure that it is used in such an environment.		
<b>Emissions Test</b>	<b>Compliance</b>	<b>Electromagnetic Environment Guidance</b>
RF emissions CISPR 11	Group 1	The BrightSpeed Select 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 BrightSpeed Select 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 4-2 Immunity Declaration**

<b>EMC Immunity Guidance &amp; Declaration for BrightSpeed Select System</b>			
The BrightSpeed Select System is intended for use in the electromagnetic environment specified below. The customer or the user of the BrightSpeed Select System should assure that it is used in such an environment.			
<b>Immunity Test</b>	<b>IEC 60601-1-2 Test Level</b>	<b>Compliance Level</b>	<b>Electromagnetic Environment Guidance</b>
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 BrightSpeed Select System requires continued operation during power mains interruptions, it is recommended that the BrightSpeed Select 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 4-3 Immunity Declaration con't**

<b>EMC Immunity Guidance &amp; Declaration for BrightSpeed Select System</b>			
<p>The BrightSpeed Select System is intended for use in the electromagnetic environment specified below. The customer or the user of the BrightSpeed Select System should assure that it is used in such an environment.</p>			
<b>Immunity Test</b>	<b>IEC 60601-1-2 Test Level</b>	<b>Compliance Level</b>	<b>Electromagnetic Environment Guidance</b>
<p>Conducted RF IEC 61000-4-6</p> <p>Radiated RF IEC 61000-4-3 (alternative method: IEC 61000-4-21)</p>	<p>3 <math>V_{RMS}</math> 150kHz to 80 MHz</p> <p>3 V/m 80 MHz to 2.5 GHz</p>	<p>3 V 150kHz to 80 MHz</p> <p>3 V/m 80 MHz to 2.5 GHz</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the BrightSpeed Select System, including cables, than the recommended separation distance calculated from the equation appropriate for the frequency of the transmitter.</p> <p><b>Recommended Separation Distance</b></p> <p><math>d = \left[ \frac{3.5}{3} \right] \sqrt{P}</math> (see <a href="#">Table 4-4</a>)</p> <p><math>d = \left[ \frac{3.5}{3} \right] \sqrt{P}</math> 80 MHz to 800 MHz (see <a href="#">Table 4-4</a>)</p> <p><math>d = \left[ \frac{7}{3} \right] \sqrt{P}</math> 800 MHz to 2.5GHz (see <a href="#">Table 4-4</a>)</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<sup>a</sup>, should be less than the compliance level in each frequency range<sup>b</sup>.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p><b>a</b> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the BrightSpeed Select System is used exceeds the applicable RF compliance level above, the BrightSpeed Select System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocation of the BrightSpeed Select System.</p> <p><b>b</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 4-4 Separation Distances**

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

1 – Introduction

**4.3.1 Limitations Management:**

Adhering to the distance separation recommended in [Table 4-4](#), 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 BrightSpeed Select 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 BrightSpeed Select 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 BrightSpeed Select System is predominantly intended for use, in non-domestic environments, and not directly connected to the Public Mains Network. The BrightSpeed Select 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 BrightSpeed Select System, must have all AC power supplied by the same power distribution panel & line.

### **4.5.4 Stacked Components & Equipment**

The BrightSpeed Select System should not be used adjacent to or stacked with other equipment; if adjacent or stacked use is necessary, the BrightSpeed Select 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 BrightSpeed Select System, the Gantry (digital detector) shall be apart 1meter from the generator cabinet, and 1meter 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 the BrightSpeed Select 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 BrightSpeed Select system can be installed, all pre-installation requirements must be complete.

- Chapter 4, Sections [5.0](#) and [6.0](#) Structural Requirements
- Chapter 4, Section [7.0](#) Radiation Protection
- Broadband standard
- Site Ready Visit
- [Chapter 5, Environmental Conditions](#), Sections [1.0](#) & [2.0](#) Temp. Humidity & Cooling
- [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 BrightSpeed Select 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 BrightSpeed Select 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. For structural requirement, refer to Chapter 4, [Section 5.0, on page 86](#).

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## Section 4.0 Broad-band

For information on Broad-band requirements, refer to Chapter 4, [Section 6.0, on page 89](#).

## 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 BrightSpeed Select systems use adjustable leveling pads to support the gantry and table. The gantry has four (4) primary leveling pads. The table has four (4) pads used for leveling it.

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 (P/N 5193991) 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 Gantry template—align per the GE print.
- 3.) Place the table template over the top of the Gantry template. Align the scan and table center-lines and secure the templates to the floor. Make sure there are no potential clearance issues.
- 4.) Check the level of the floor (See [Figure 2-1](#)) across the templates. This should be measured on the template over the table/gantry area, as shown in [Figure 2-1](#) below.  
FLOOR LEVELNESS SPECIFICATION: 6 mm (1/4 in.) over 3 m (10 ft.)

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

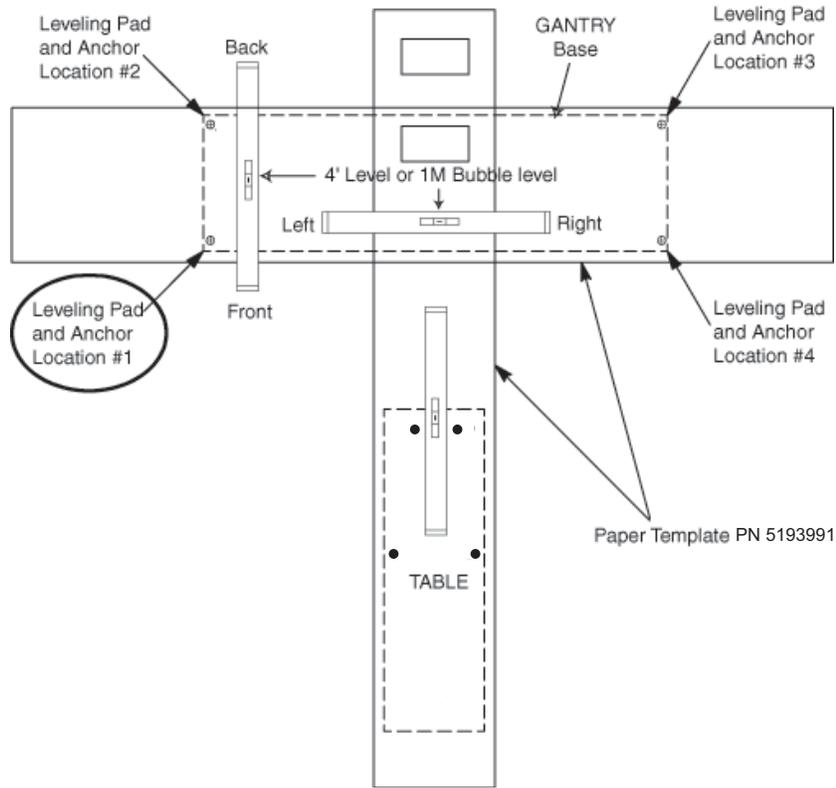


Figure 2-1 Hole Locations



# Chapter 3

## System Catalog

### Section 1.0

#### Option Catalog Numbers

The following is a list of system options requiring site planning work for the BrightSpeed Select system. *Contact your local GE Healthcare Sales representative for a complete list of all system options or visit us at [www.gehealthcare.com](http://www.gehealthcare.com). Refer to the instruction manuals supplied with specific options for respective details.*

CATALOG NUMBER	OPTION DESCRIPTION
B75222CA	Track Ball
B79382CA	Dicom MOD Drive for BSD
B7850GD	Dolly Collector
B79302CA	Single-piece desktop kit
B79312CA	Side-by-side desktop kit
B78442CA	Single-piece desktop kit for True-In-One Console
B78452CA	Freedom WorkSpace kit for True-In-One Console
B7866AB	SmartScore Pro Complete
B7500PL	ConnectPro Option (SW & Bar Code Reader)
B7540RB	Bar Code Reader
B7816KH	Gating Hardware for H-Power product
B7710LN	Boom in a Room monitor
B71182CA	Long Cable Set
B71172CA	Short Cable Set
B7850TC	Gantry Rear Raceway
B7840DD	Cardiac & Resp Gating HW
E8007RC	IVY 3150 EKG Monitor
B75792CA/B75022BS	Gantry Accessory I/F HW
B75802CA	AC Outlet Box for OC
B75822CA/B75002BE	Xtream Injector
B75832CA/B75012BE	Enhanced Xtream Injector

Table 3-1 BrightSpeed Select System Options

## 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.



**Figure 3-1 Base Scanner System**



**Figure 3-2 Base Scanner System ( Side View )**



**Figure 3-3 Global Operator Console**



**Figure 3-4 Freedom Workspace**



**Figure 3-5 True-In-One Console**



**Figure 3-6 NIO16 Console**



**Figure 3-7 PDU**



# Chapter 4

## Room Planning

### Section 1.0 Regulatory Clearances

#### 1.1 Regulations

Federal regulations and national standards that determine the minimum clearances for U.S. installations include:

- 29 CFR 1910 (OSHA)
- NFPA 70E (STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE)
- NFPA 101 (LIFE SAFETY CODE)
- AMERICANS WITH DISABILITIES ACT



**NOTICE**

All systems installed within the United States and United States territories, and within U.S. government facilities, regardless of country, must comply with all United States Federal and local regulations. All systems installed outside the United States must comply with either the national, state, or local regulatory clearance requirements for the country in which the installation occurs, or U.S. Federal regulations, whichever is greater.

#### 1.2 Clearance Requirements

A map of clearance requirements necessary for proper operation and servicing of the system is provided in [Figure 4-3, on page 58](#). This is for a standard layout in the suggested room size.



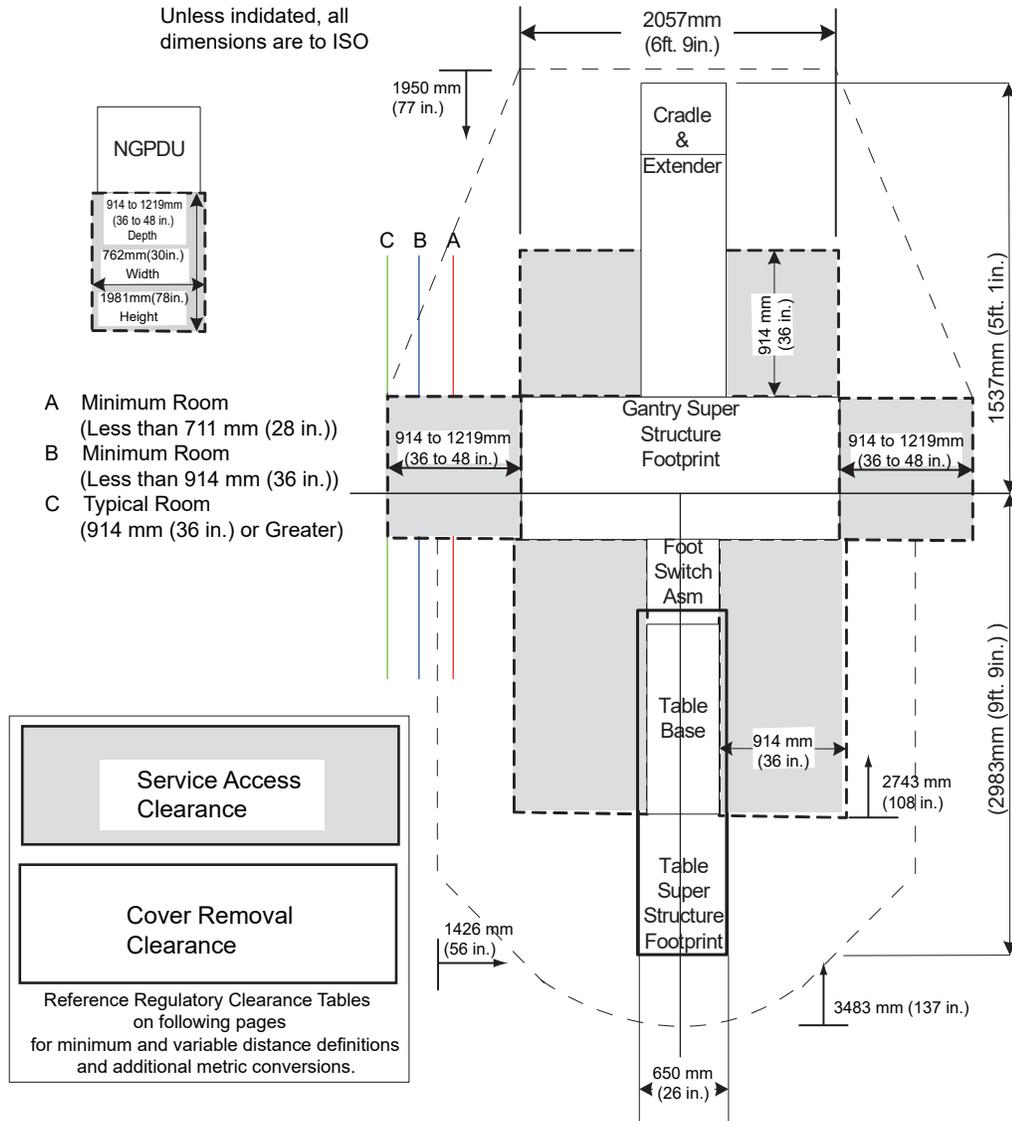
**NOTICE**

The maps and dimensions shown in this manual depict the required clearances for proper equipment operation and service only. The customer/purchaser is responsible for federal, state and/or local codes regarding facility egress and related facility requirements.



**NOTICE**

The use of alternative layouts from the appendix puts severe limitations on space for patient care and work flow. Customer approval of site drawings signifies customer agreement to these limitations.



**Figure 4-1 Regulatory Clearance Requirements for BrightSpeed Select System Configurations**

### 1.2.1 Minimum Regulatory Workspace Clearances by Major Subsystem

Note the following when referring to the tables below:

- These requirements apply to equipment operating at 600 V or less, where examination, adjustment, servicing, or maintenance is likely to be performed with live parts exposed.
- The customer **MUST** maintain the required regulatory clearance distances and may **NOT** use these areas for storage. This applies during normal system operation as well as during service inspection and maintenance.
- Direction of Service Access refers to a direction perpendicular to the surface of the equipment serviced.

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 4-1 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 4-2 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 4-2 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 4-3 Gantry Subsystem**

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Table Head)	N/A	
Direction of Service Access (Table Sides)	914 mm (36 in.)*	* Can reduce to 711 mm (28 in.) provided the local team obtains written and signed approval from the local AHJ (Authority Having Jurisdiction). GE must have the signed document on file.
Front Cover Removal (Table Foot)	686 mm (27 in.)	457 mm (18 in.) minimum for Front Gantry Cover removal. Refer to the appendix for alternate front cover removal options.
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	Refer to the width of working space in front of the equipment. 762 mm (30 in.) minimum or the equipment width, whichever is greater.
Head Clearance	1981 mm (78 in.)	Refers to the height of the workspace measured from the floor at the front edge of the equipment to the ceiling or any overhead obstructions.  1981 mm (78 in.) or the height of the equipment, whichever is greater.

**Table 4-4 Table Subsystem**

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of UPS)	914.4 mm (36 in.)*	<p>There are no exposed live part hazards with the cover in place.</p> <p>This component is typically serviced from the front with access to the rear.</p> <p>*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.</p> <p>*If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.</p>
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 4-5 UPS Subsystem**

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of A1 Disconnect)	914.4 mm (36 in.)*	<p>There are no exposed live part hazards with the cover in place.</p> <p>This component is typically serviced from the front with access to the rear.</p> <p>*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.</p> <p>*If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.</p>
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 4-6 A1 Disconnect Subsystem**

### 1.3 How to Measure

Figure 4-2 offers guidance on the proper way to measure to check minimum regulatory clearances.

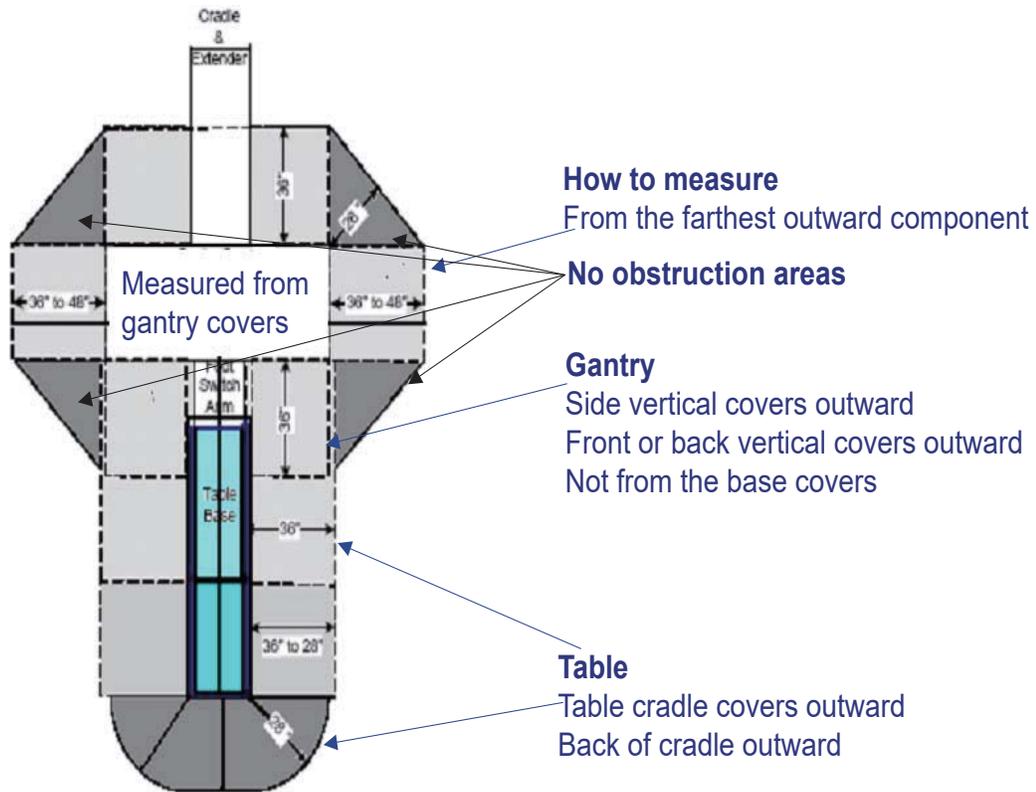


Figure 4-2 Measuring Minimum Regulatory Clearances

**CAUTION** **Regulatory Caution:** All system installations, relocations, and moves, require site prints. The CT room layout shall match the layout shown on your site print and meet all regulatory requirements described in the installation manual. Additional room components, such as cabinets and sinks, reduce room size. Consequently, equipment not shown on the site print may void the caution statement, making the room NON-COMPLIANT. Actual site measurements obtained by the mechanical installer before installation determines room size and compliance.

**CAUTION** **Operational Caution:** In the minimum room layout (356 mm to 686 mm [14 in. to 27 in.]) the customer should consider workflow, customer access for patient care, and critical-care operations space requirements. Additionally, this layout may offer only 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.

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## 1.4 NEC Conduit and Duct Fill Rate

Full operation, service, and safety of the system requires the maintenance of sufficient regulatory and service clearances around equipment.

Cable length is an important consideration in room layout. The system ships with standard (short) length cables, with a set of longer cables available as an option. Refer to the electrical page of your GE site print for the specific requirements of your site. The following rules govern cable usage for the system:

- When possible, use the rear cable cover assembly to let cables enter the gantry from the rear.
- Do not cut or otherwise shorten long cables.
- Do not store excess cable length behind the operator console, gantry, or PDU.
- Store excess cable in wall or floor ducts, if desired, provided that sufficient space exists. Refer to NEC code to determine cable fill rates for conduits and ducts.
- All installed systems shall comply with NEC 70-E Electrical Regulations governing conduit or duct fill.

## 1.5 Terms and Definitions

### CLEARANCES

Clearances are the clear space or distance between or around objects and equipment, governed by all applicable safety, service, and regulatory requirements and representing the lowest margin of freedom permissible for equipment siting.

### DIMENSIONS

Dimensions are the length, width, depth, and height of equipment.

### EGRESS



#### NOTICE

The maps and dimensions shown in this manual depict the required clearances for proper equipment operation and service only. The customer/purchaser is responsible for federal, state and/or local codes regarding facility egress and related facility requirements.

### PRE-INSTALLATION ESCALATION

Pre-installation escalation is the process used to consult CT Engineering, the Design Center, or EHS to resolve pre-installation issues related to siting concerns and requirements.

### GROUNDED WALL

A grounded wall is any wall with electrical conductivity to earth. Conductive materials generally found in walls include masonry, concrete, and tile. Treat as grounded additional elements commonly found in walls, including but not limited to:

- Medical gas ports and plates
- 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
- Surface raceway
- Exposed wall conduits
- Floor outlet boxes
- Floor HVAC boxes
- Floor medical gas

Common wall components NOT constituting grounded elements include:

- Standard wall outlet
- Light switches
- Telephones
- Communication wall jacks
- Ceiling tile grids

---

## HEAD CLEARANCE

*Head clearance* represents the height dimension of the workspace, measured from the floor at the front edge of the equipment to the ceiling or any overhead obstructions. It requires a minimum of 1981 mm (78 in.), or the height of equipment, whichever is greater.

## MINIMUM

Minimum indicates the lowest limit permitted by law or other authority.

## SERVICE ACCESS WIDTH

*Service access width* refers to the width of the working space in front of the equipment, and requires a minimum of 762 mm (30 in.) or the width of the equipment, whichever is greater.

## WORK SPACE

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

# Section 2.0 Service Clearances Requirements

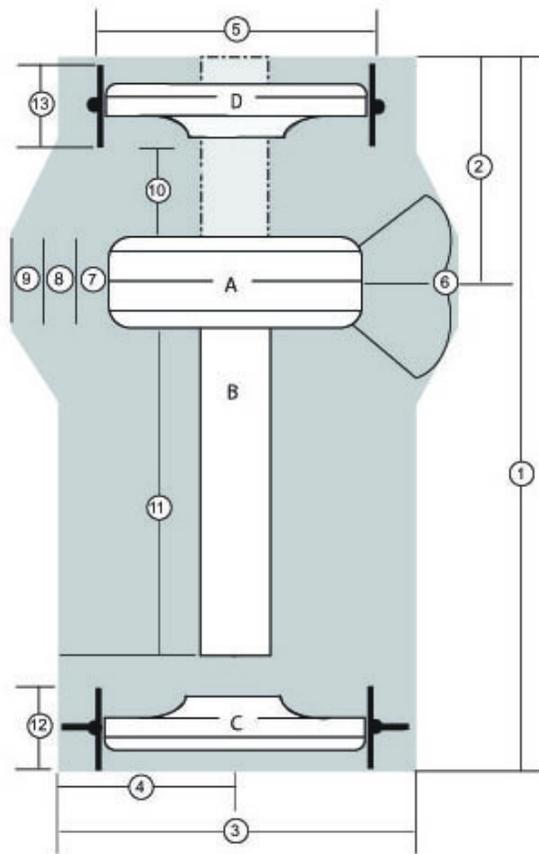
## 2.1 Measuring Service Clearances

The service envelopes defined in [Figure 4-3](#) provide enough space to safely allow CT System servicing. System Servicing requires:

- Sufficient space to remove the covers from the system.
- One service engineer to be able to accomplish all service component replacement tasks without needing special tools or equipment.
- ALL room layouts to provide service space and access around the table to the gantry right side. This is needed for replacement procedures that require components that ship in large boxes, such as the tube, detector, and HV tank.

### Minimum Clearances

Item	Dimension
1	5868 mm (231 in.)
2	2217 (87 in.) (cover with dolly)
3	2852 mm (112 in.)
4	1426 mm (56 in.)
5	2320 mm (91 in.)
6	914 mm (36 in.) minimum
7	356 mm (14 in.)
8	711 mm (28 in.)
9	914 mm (36 in.)
10	914 mm (36 in.)
11	2794 mm (110 in.)
12	851 mm (34 in.)
13	670 mm (26.3 in.)



### CT Components

Item	Description
A	Gantry with covers installed
B	Table cradle footprint, coverage as extended in both directions
C	Front gantry cover removed with dolly
D	Back gantry cover removed with dolly

Figure 4-3 Minimum Service Clearances

## 2.2 Special Service Clearances

Note: When calculating service clearances, refer to [Figure 4-3](#) for all service clearance needs.

### 2.2.1 Gantry Service Clearance

Specification for Boom Assembly clearance are defined in [Figure 4-4](#). The boom assembly is used during tube and detector replacement. The minimum ceiling height within the clearance radius is 2286 mm (90 in).

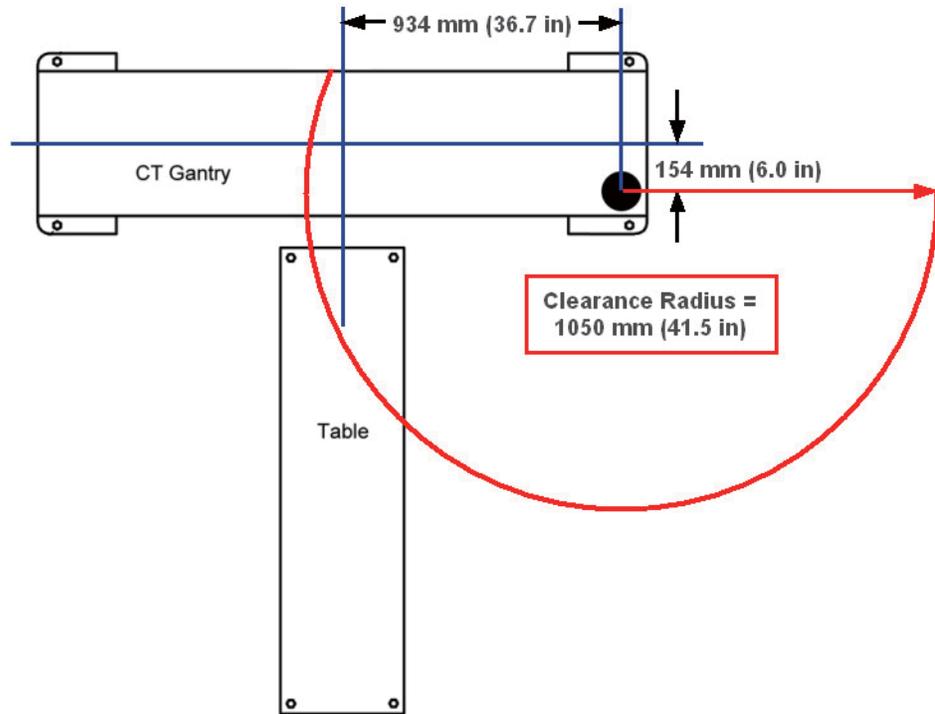


Figure 4-4 Boom Assembly Clearance

### 2.2.2 Cover Removal

- Gantry front cover removal requires the use of the Tilting Cover Dollies and a minimum clearance space of 2852 mm (112 in.) to maneuver the cover. The dollies allow the service engineer to separate the cover from the gantry, tilt it 90 degrees, roll it to the foot end of the table, and then tilt it an additional 90 degrees, so that it is upside-down relative to its normal system-mounted condition. After removal, the service engineer must then move the gantry front cover to a position that satisfies the minimum regulatory clearances.
- The gantry rear cover, with service dollies installed, requires a clearance width of 2320 mm (91 in.) and a depth of 914 mm (36 in.) for removal. Sufficient space to allow the service engineer to move the cover either straight back or to one side of the table to satisfy the minimum service clearances shown in [Figure 4-3](#) must be maintained. The rear cover with dollies cannot extend past the allowable clearance space within the room. If the system is not sited straight (it is positioned diagonally), full service space is still required. The PMI and customer should discuss this consideration and make the necessary provisions.
- The scan room must offer sufficient space to allow adequate egress during service operations that require both front and rear cover removal. If the customer and PMI have any concern that site will not provide adequate space for egress under these conditions, they should discuss these requirements and make the necessary provisions to accommodate this event.

- A single service engineer can safely perform servicing of the table. Ensure sufficient clear space to maintain egress clearances with the table covers or cradle removed.
- A single service engineer can safely perform servicing of the system. Ensure sufficient clear space to maintain egress clearances with covers or cradle removed.
- A tube change box is 737 mm x 1524 mm (29 in. x 5 ft.), with the handles extended. The box rolls like a wheelbarrow and must have access to the right side of the gantry. It is the PMI's responsibility to demonstrate that the tube change box can be positioned in the tube change area next to the gantry and that the front and rear covers can be removed.

### 2.2.3 Power Distribution Unit (NGPDU)

When positioning the Power Distribution Unit (NGPDU), consider regulatory compliance, as defined in [Section 1.0 - Regulatory Clearances](#). See [Table 4-2](#) in that section.

### 2.2.4 Console

The operator console does not present an exposed live parts hazard. However, the site shall maintain a working space at all times with a minimum depth of 1219 mm (48 in.), extending the full width of the operator console for service activity.

The console is on wheels. As some service activities require access to the rear of the console, be sure to maintain sufficient space for moving the console to allow rear service access.

See [Figure 4-9](#) for a typical control room layout.

### 2.2.5 Storage Cabinet

GE Healthcare provides a storage cabinet for storing all supplied service equipment (see [Table 4-7](#)). Situate this storage cabinet within the scan room suite area to allow easy service access. The dimensions of the cabinet measure 457 mm D x 914 mm W x 1067 mm H; ~ 41 kg (18 in. D x 36 in. W x 42 in. H; ~90 lbs).

Note: A storage cabinet is provided as option (B77292CA).

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 4-7 Equipment Stored in Storage Cabinet**

## Section 3.0 Room Size

### 3.1 Room Dimensions

Suggested Scan Room Size	Typical scan Room Size	Minimum Scan Room Size
3962 mm x 6299 mm (13 ft. x 20 ft. 8 in.)	3912 mm x 5868 mm <sup>1</sup> (12 ft. 10 in. x 19 ft. 3 in.)	3310 mm x 5583 mm <sup>2</sup> (10 ft. 10 in. x 18 ft. 4 in.)
Recommended Ctrl Room Size (Standard Console Table)	Recommended Ctrl Room Size (Freedom Workspace Console Table)	Recommended Ctrl Room Size (True-In-One Console)
3962 mm x 2743 mm (13 ft. x 9 ft.)	3861 mm x 2500 mm (12 ft. 8 in. x 8 ft. 2 in.)	3000 mm x 1700 mm (9 ft. 10 in. x 5 ft. 7 in.)

**Table 4-8 Suggested Room Size Dimensions**

<sup>1</sup>All service/regulatory requirements apply.

<sup>2</sup>All service requirements apply, with the addition of no energized left-side service.

#### 3.1.1 Suggested Room Size

The suggested room configuration offers the most flexibility for future upgrades. It provides both ample workspace and space to add millwork and still meet all regulatory requirements. When local regulations require a sink in the scan room, this room size also provides sufficient space for a sink. This room size accommodates the needs of larger hospitals and medical teaching facilities, where patients may require transportation to the scan area in beds, gurneys, and larger wheelchairs and where they may require the assistance of larger medical care teams. Likewise, this room offers adequate access for crash carts and other emergency medical equipment on both sides of the table.

The suggested size supports all service activities, including tube change, and accommodates all future two-step installations.

#### 3.1.2 Typical Room Size

The typical room configuration represents what is most commonly found at installation sites. It offers adequate workspace and may provide adequate space for a sink, but allows only LIMITED space to add millwork and still meet all regulatory requirements. The size of this room accommodates the needs of larger clinics and medium-sized hospitals, where patients may require transportation into the scan area using gurneys and wheelchairs, and where they may require the assistance of small medical care teams. It provides access for crash carts and other emergency medical equipment on only one side of the table.

The typical room size supports all service activities, including tube change, and may offer compatibility with SOME future upgrades and two-step installations.

### 3.1.3 Minimum Room Size

The dimensions shown for the minimum room size assume a room configuration in which the front and rear gantry covers are removed and stored straight back. Referenced in [Figure 4-3](#). Refer to the appendix for alternate cover removal options and room configurations.

The minimum room configuration represents the smallest functionally acceptable space for this product and represents the type of room often found at doctor's offices and smaller clinics and outpatient facilities. Due to its limited size, and to functional and regulatory requirements, this room usually provides only LIMITED workspace, and leaves to NO space to add in-room millwork and sinks and still meet the necessary regulatory and service requirements. This room can accommodate the transportation of patients into the scan area using wheelchairs, and provides access for crash carts and other emergency medical equipment on only one side of the table.

Sites considering a minimum room size may not have been designed with the structural requirements necessary to support the system and consequently may require upgrading prior to installation.

Customers considering a minimum room size should discuss their workspace requirements and future upgrade plans with their PMI, as the size and layout of these rooms often eliminates them from any future upgrade considerations and offers NO compatibility with future two-step installations.

If using the square meters (square footage) to determine regulatory compliance, please note that the front and rear cover clearances are wider than the regulatory clearance along the table length, and that the cover park position is behind the table in the home position.

Note: Sites must provide sufficient space to allow the removal of the rear cover, which is on wheels, from behind the gantry during service operations.



#### CAUTION

**Operational Caution:** In a minimum room layout (356 mm to 686 mm [14 in. to 27 in.]) the customer should consider workflow, customer access for patient care, and critical-care operations space requirements. Additionally, this room provides only 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.

### 3.2 Suggested and Typical Room Layouts

Figure 4-5, Figure 4-6 and Figure 4-7, Figure 4-8 show the suggested and typical room layouts. You need to be aware of locations for medical gas, surface ductwork, or other items that make a grounded wall.

Note: Your room layout may meet the suggested or typical room requirements but look different than Figure 4-5, Figure 4-6 and Figure 4-7, Figure 4-8. Your salesperson can provide a detailed room layout for your site.

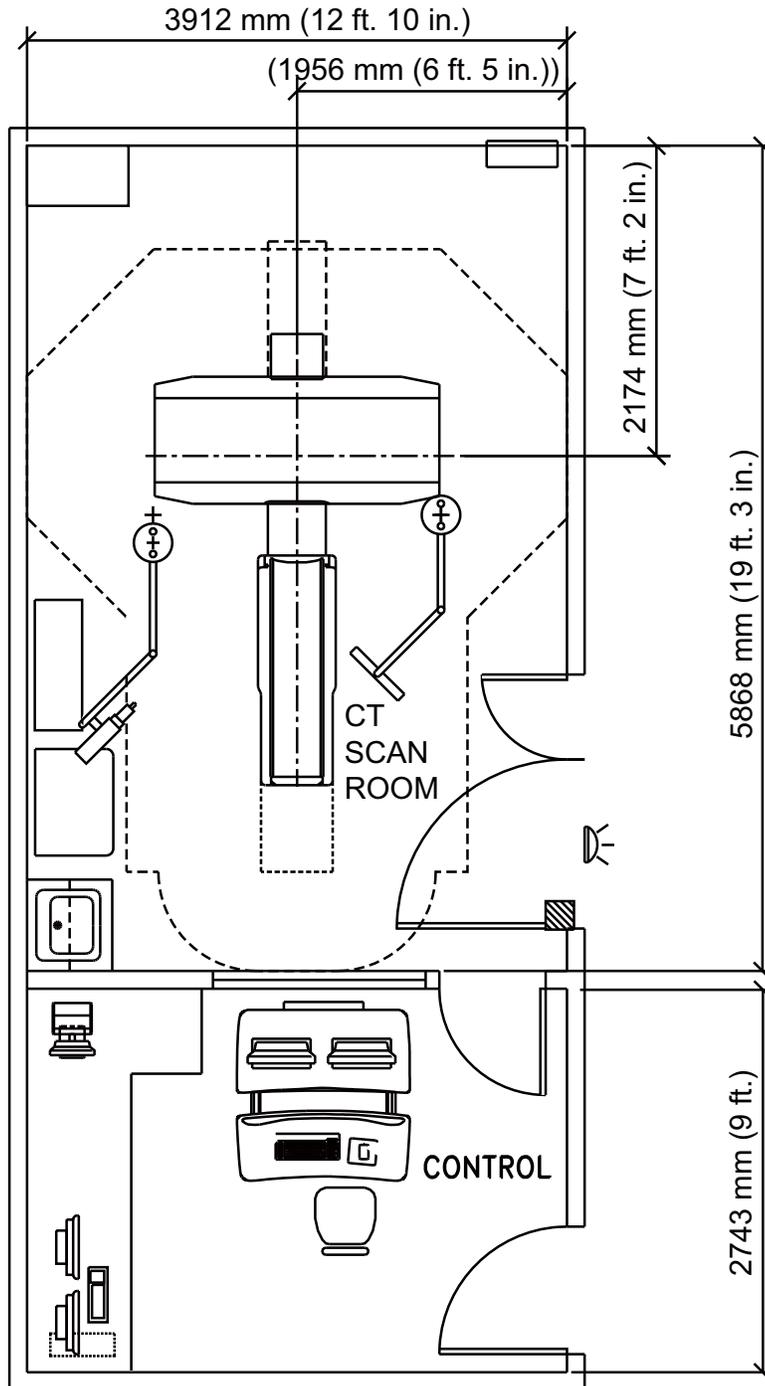
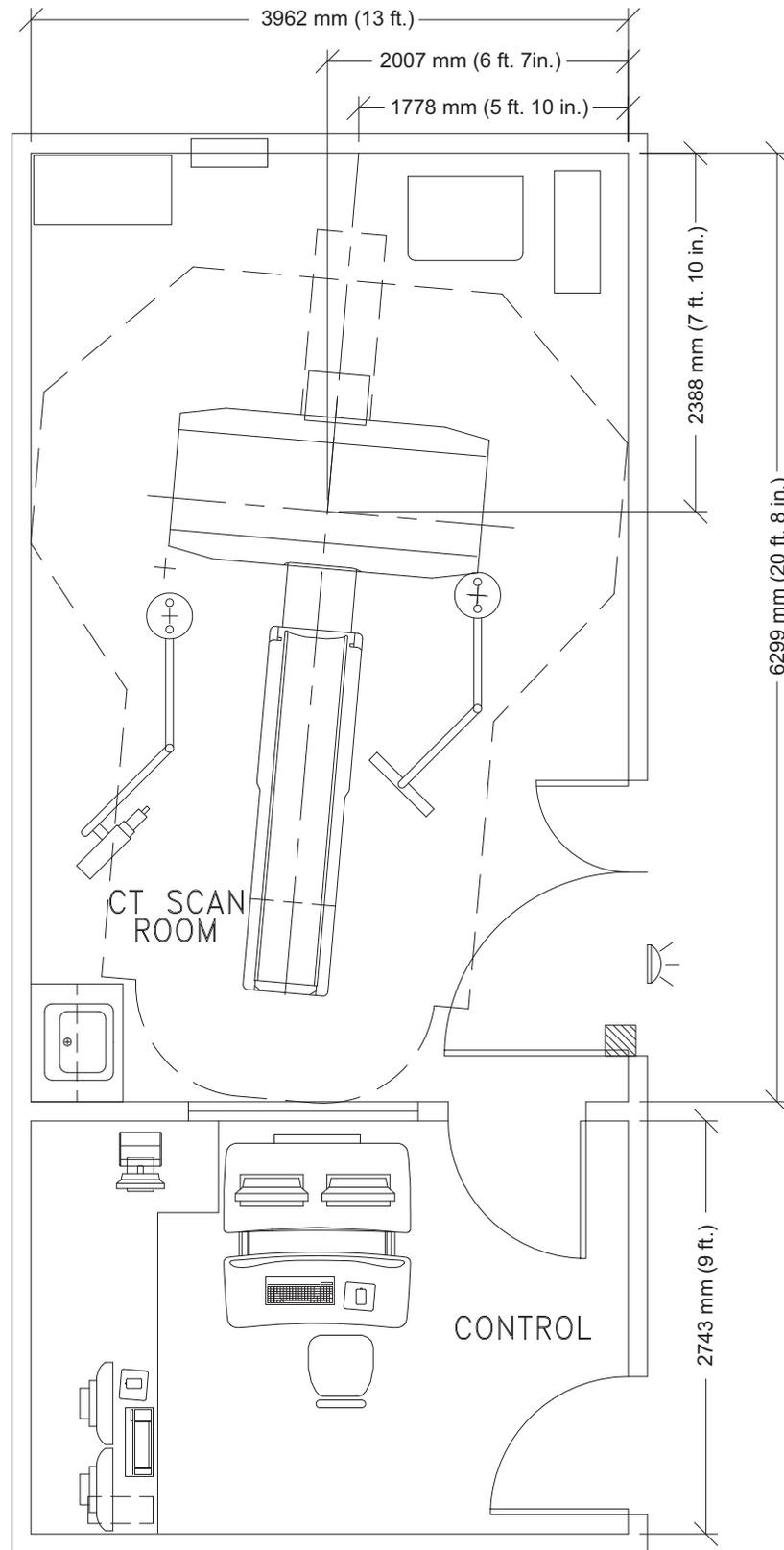


Figure 4-5 Typical Room Layout for BrightSpeed Select System



**Figure 4-6 Suggested Room Layout for BrightSpeed Select System**

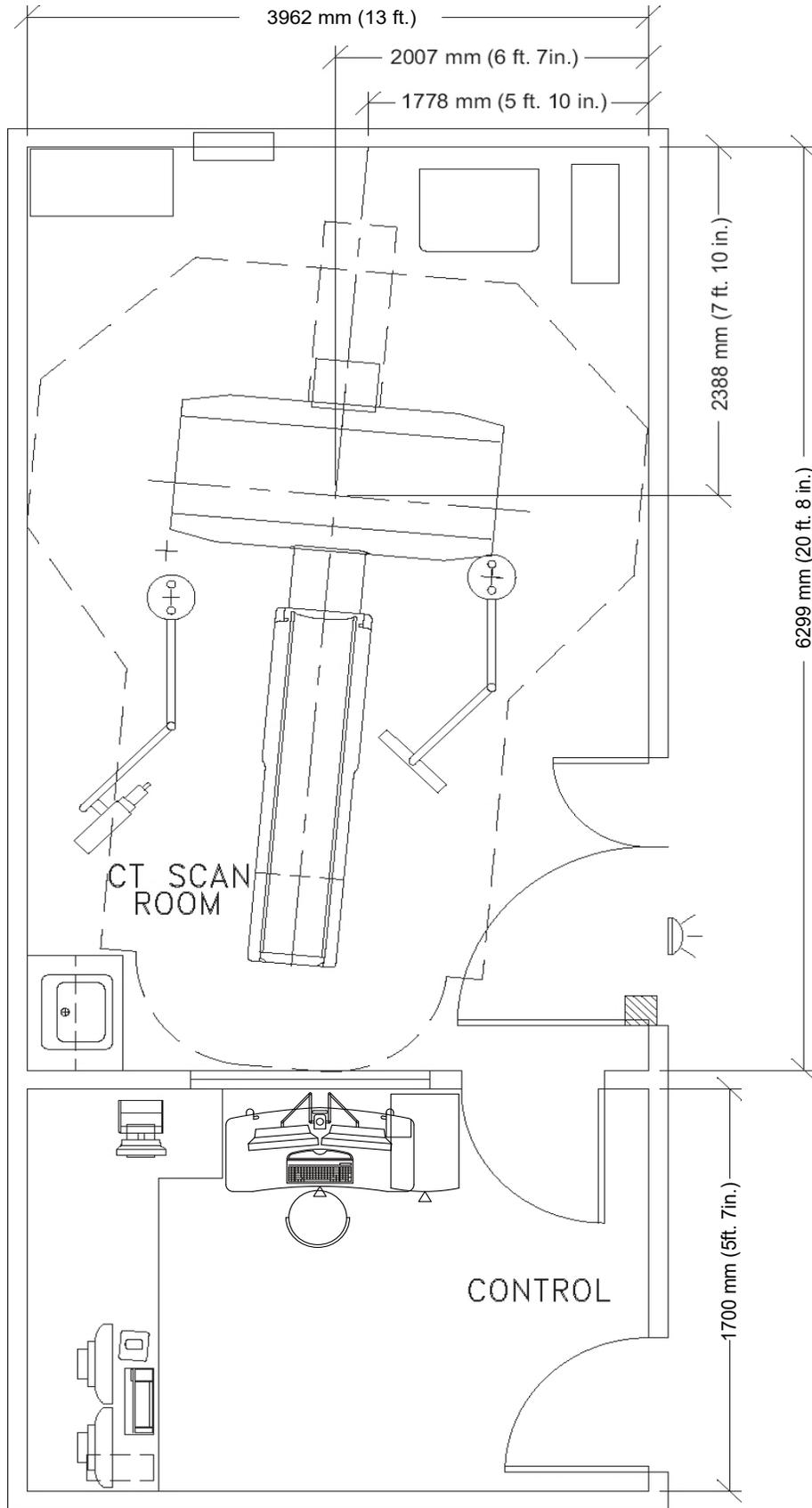


Figure 4-7 Suggested Room Layout for BrightSpeed Select System with True-In-One

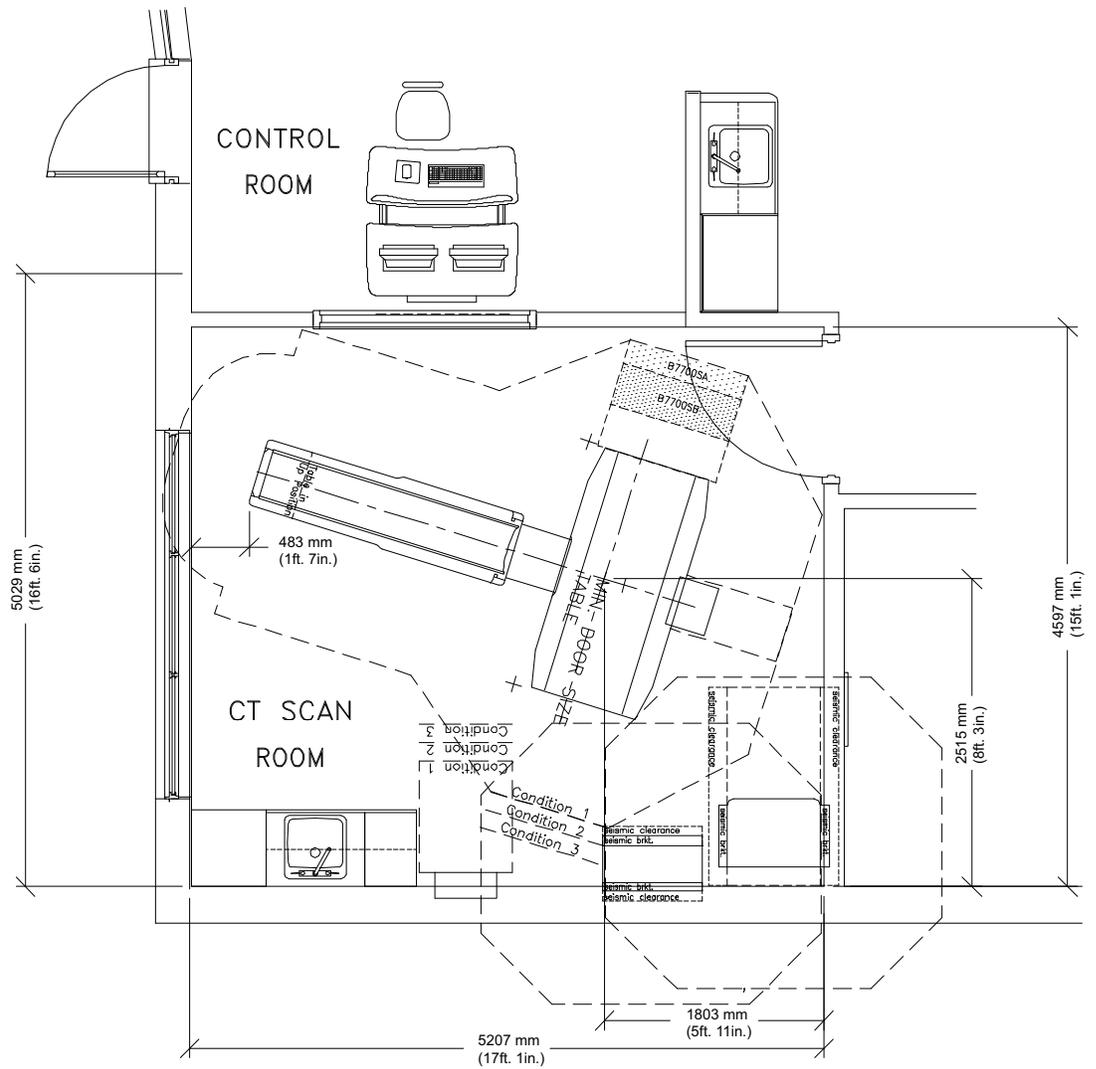
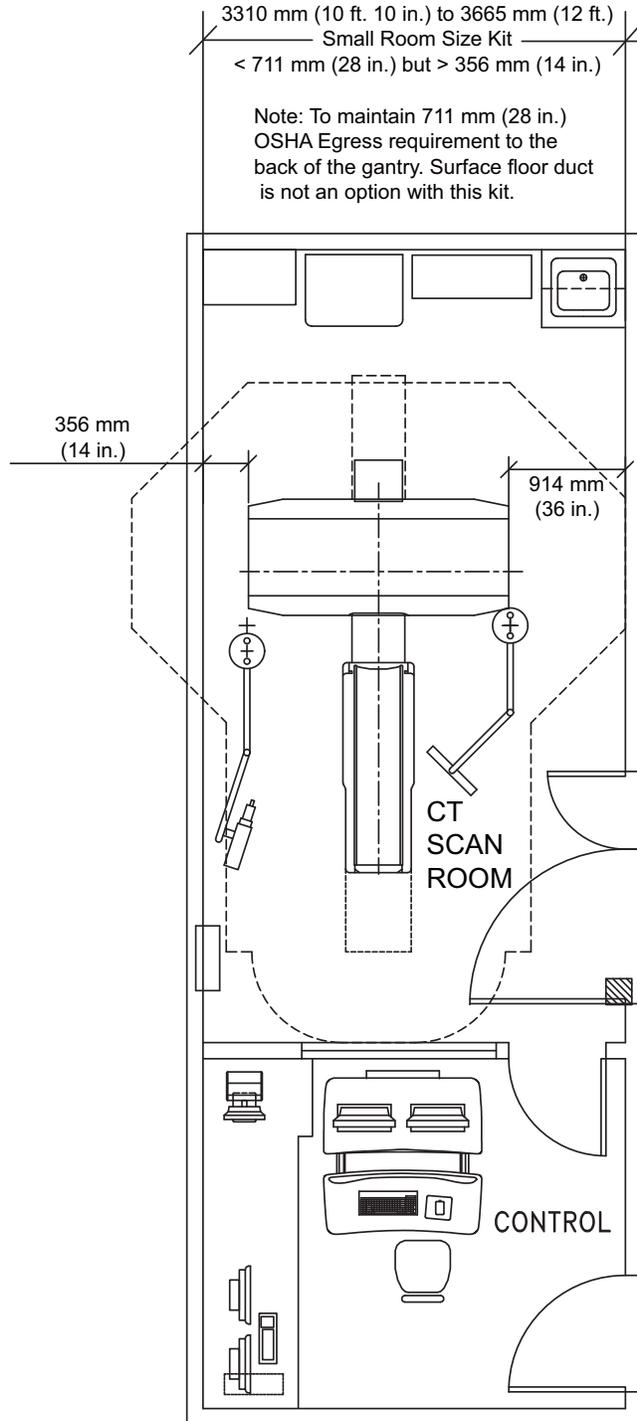


Figure 4-8 Suggested Room Layout for BrightSpeed Select System

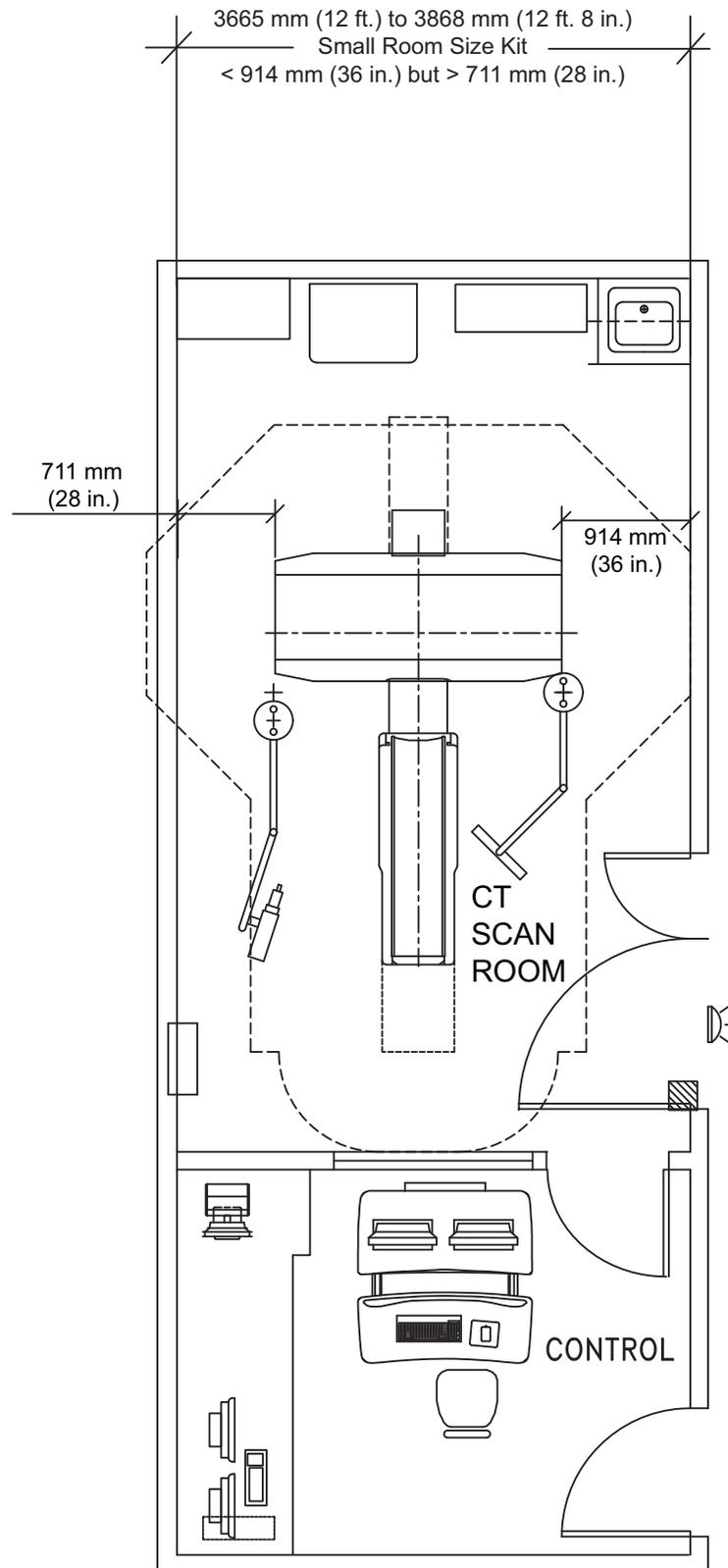
### 3.3 Minimum Room Layouts

**Room A** - Less than 711 mm (28 in.) but greater than 256mm (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 Control Room Considerations

- The control room must provide a suitable operating environment for the console electronic, and operator working comfort.
- The operator console must remain in the same configuration as shipped. Do not dismantle the console, or remove or rearrange its components except the peripherals.
- TIO should be placed side by side with FWS table considering cable length. Refer to [Chapter 9 - Interconnection Data Section 3.3](#) for cables information. The cables are shipped with TIO Console.
- 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.

#### 3.4.1 Typical Control Room Layout

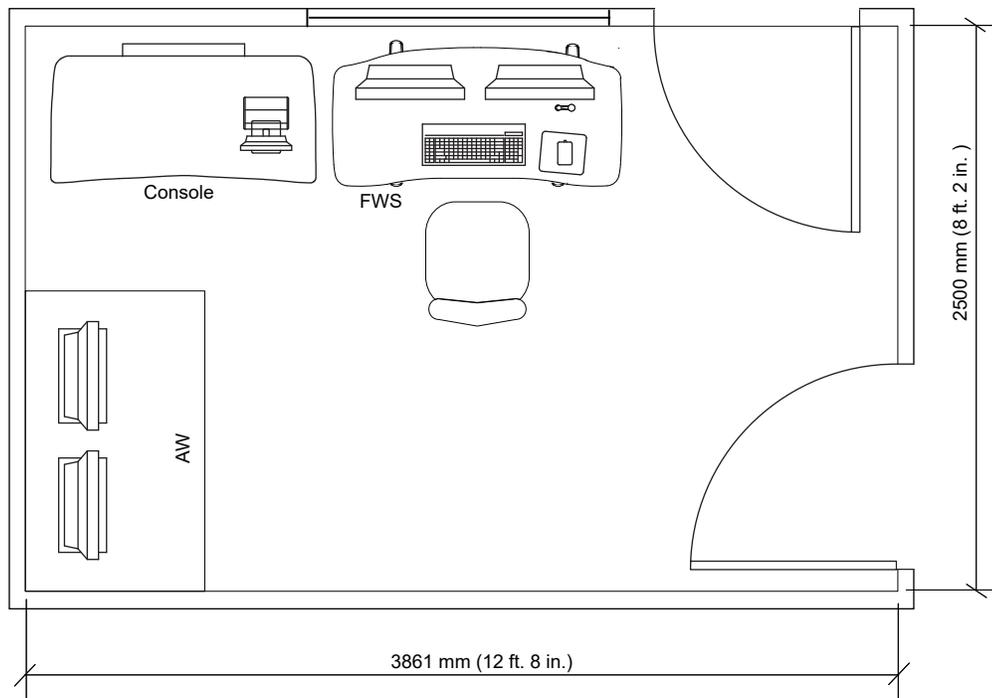


Figure 4-9 Typical Control Room Layout with Freedom Workspace (FWS)

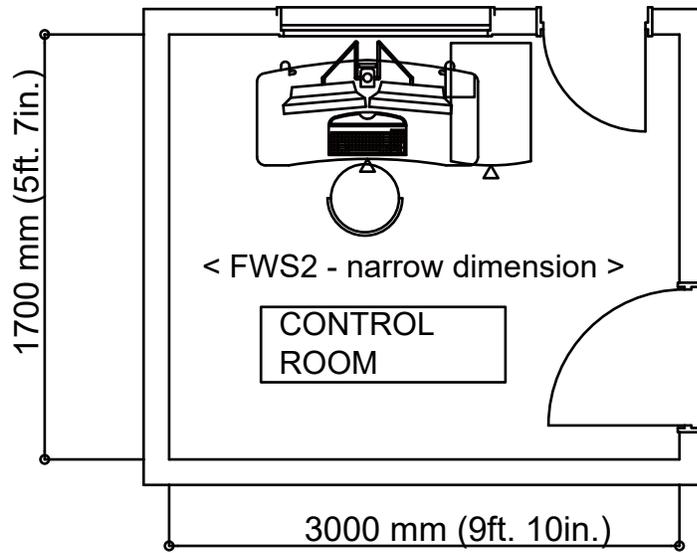


Figure 4-10 Typical Control Room Layout with True-In-One Console

## Section 4.0 System Component Dimensions

### 4.1 Minimum Operating Clearances

The sections in this chapter provide the minimum dimension and operating clearance information for each category of components listed. Be sure that the site conforms to each of these specifications.

#### 4.1.1 Ceiling Pedestal Mount Installation

The distance from the floor to the lowest point of the ceiling pedestal mount for the Injector or Monitor CANNOT measure LESS than 2286 mm (90 in.). Refer to the installation guides of those components for the length of the mounting post.



**NOTICE**

Failure to maintain a distance of at least 2286 mm (90 in.) from the floor to the lowest point of the Injector or Monitor ceiling pedestal mount may pose a safety hazard. For installations with a finished ceiling height that is less than suggested, consideration should be given to utilizing floor mounted components, or attaching the mounting plate in the overhead (for example, above dropped ceiling tiles).

#### 4.1.2 Injector Control Installation

Minimum dimensions and clearances include the following requirements for the injector control:

- Provision of a suitable work area for placement of the injector control, within reach of the operator console.
- Wall mounted, ceiling mounted, and pedestal units require routing of cables from the gantry area to the operator console area. The supplied cable measures 15.2 m (50 ft).
- Injectors require an AC power source that is powered from the console. The IEC power cord is supplied with the injector.
- Available mounts come in several different lengths and configurations. Refer to the injector documentation for detailed installation instructions.

#### 4.1.3 System Operation Clearances

The clearances listed in [Table 4-9](#) govern system operation; be sure that the site maintains each of these clearances.

SYSTEM OPERATION	MM	INCHES
Finished ceiling to floor (recommended)	2743 mm	108 in.
Finished ceiling to floor (minimum)	2438 mm	96 in.
Table extension head end w/extender to obstruction	152 mm	6 in.
Back of Console to wall	152 mm	6 in.
Back of PDU to wall	152 mm	6 in.

**Table 4-9 Minimum Dimensions and Clearances**

## 4.2 Component Dimensions

DESCRIPTION	WIDTH		DEPTH		HEIGHT	
	INCH	MM	INCH	MM	INCH	MM
Color printer	23	584	18	457	7	178
Remote Color Monitor (LCD)	16	402	10	247	16	411

Table 4-10 Dimensions of Accessories

### 4.2.1 Table and Gantry Dimensions

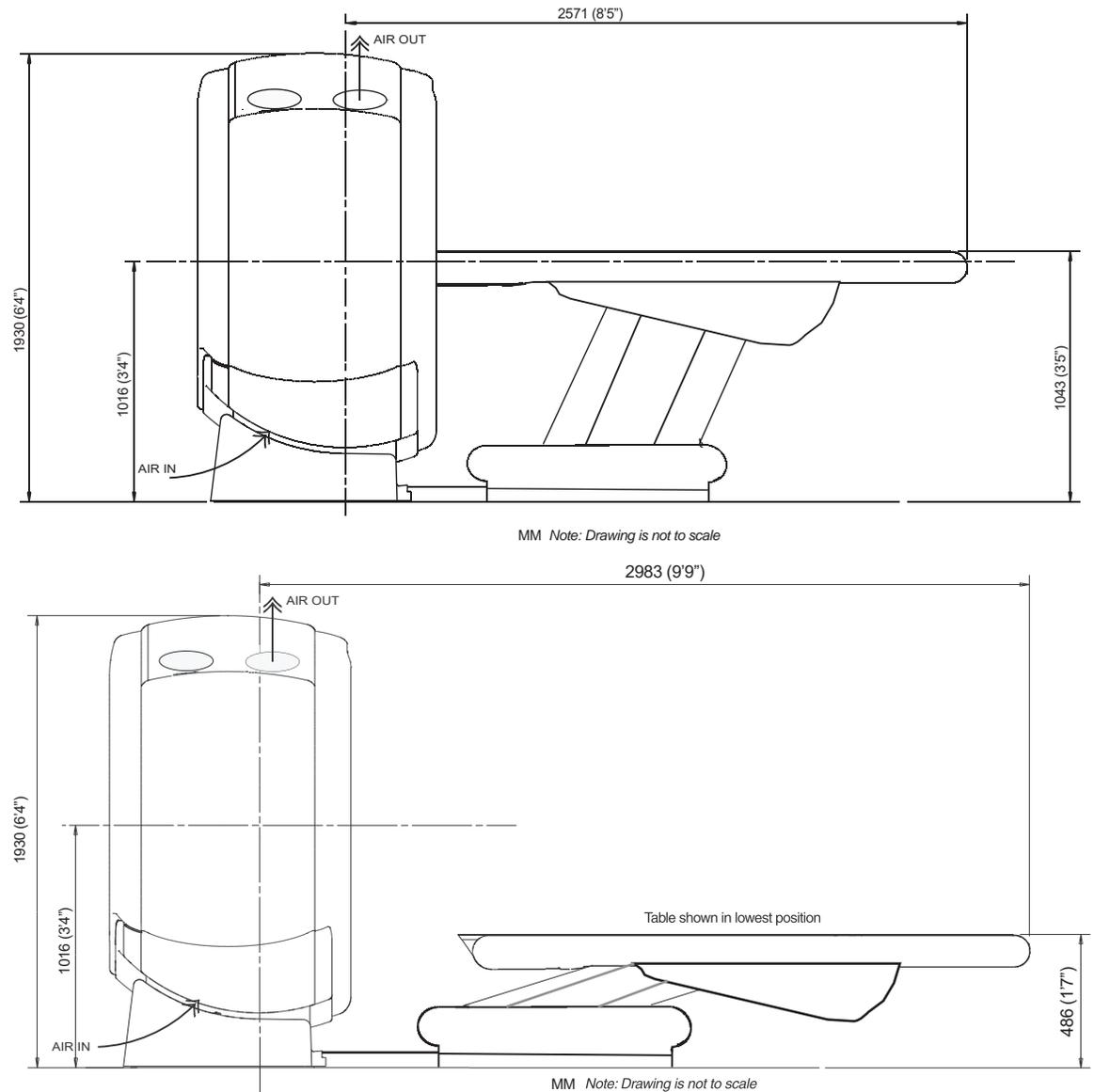
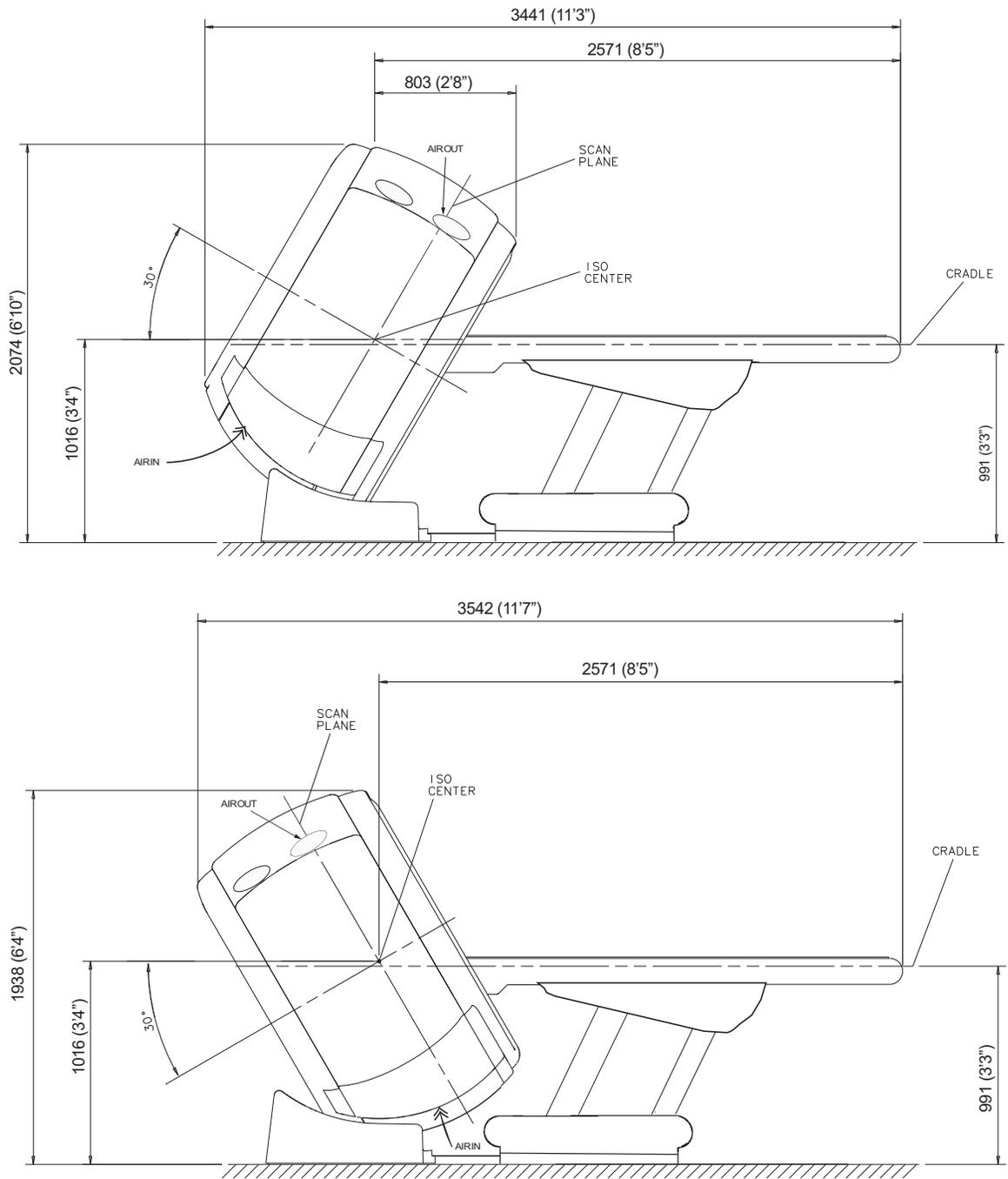
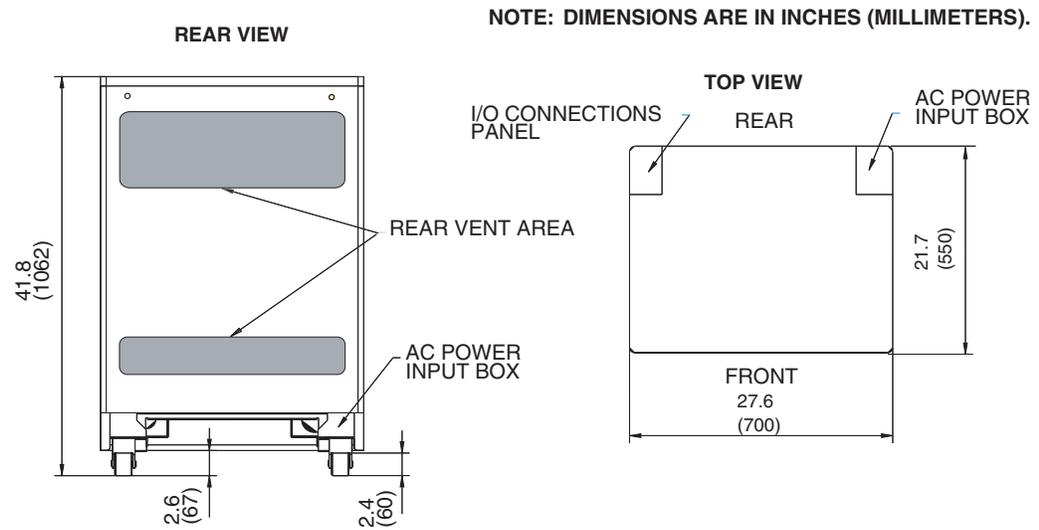


Figure 4-11 Table and Gantry (Side View)

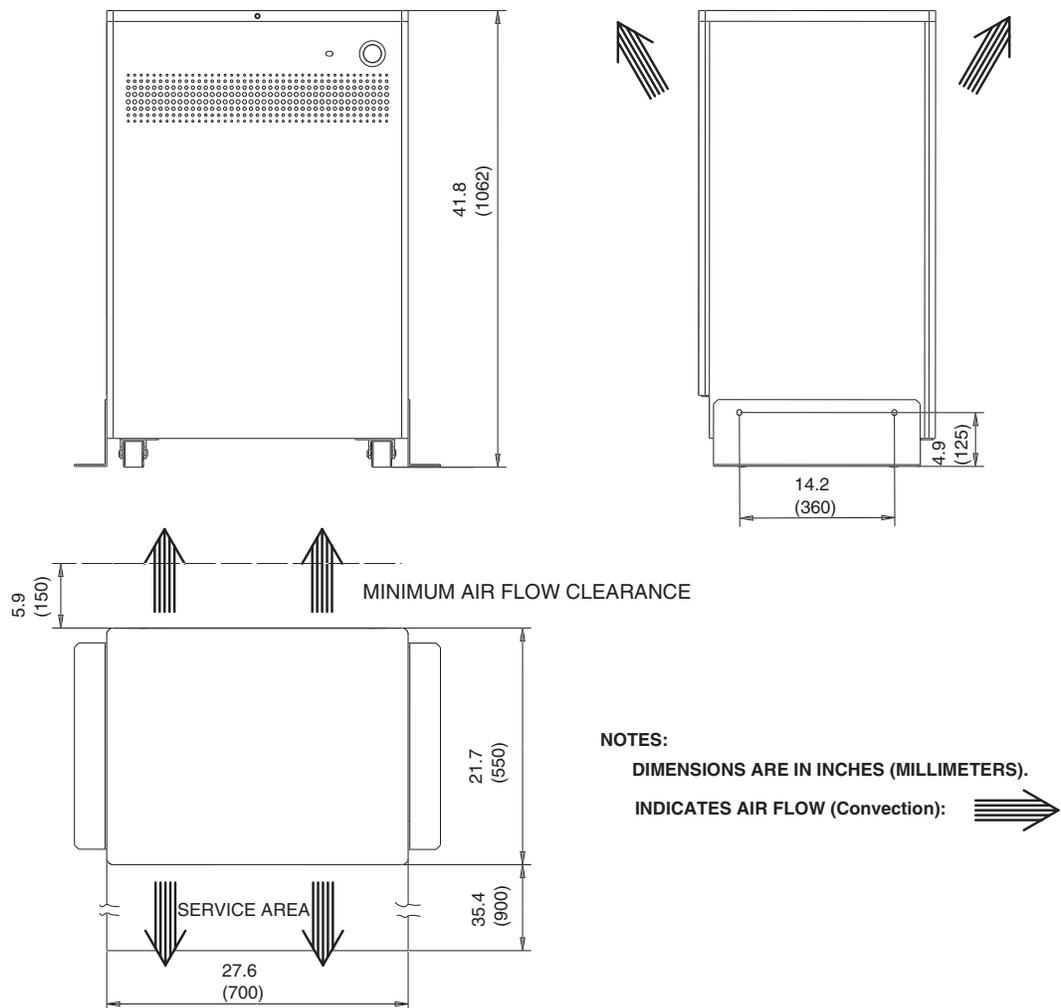


**Figure 4-12 Gantry shown tilted +30° (top) and -30° (bottom)**

### 4.2.2 Power Distribution Unit



**Figure 4-13 Power Distribution Unit (NGPDU)**



**Figure 4-14 Power Distribution Unit (NGPDU)**

### 4.2.3 Operator's Console with Standard Table

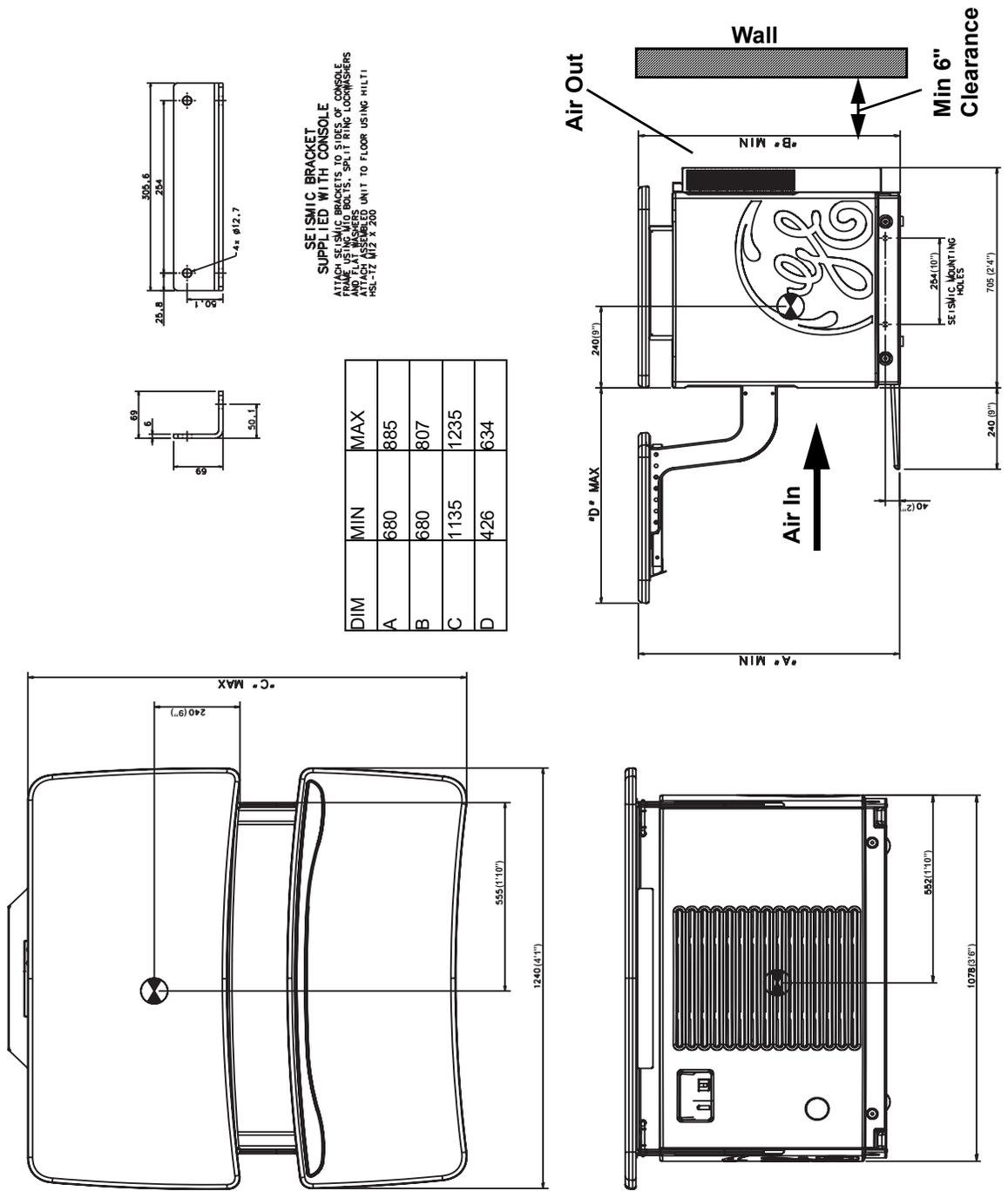
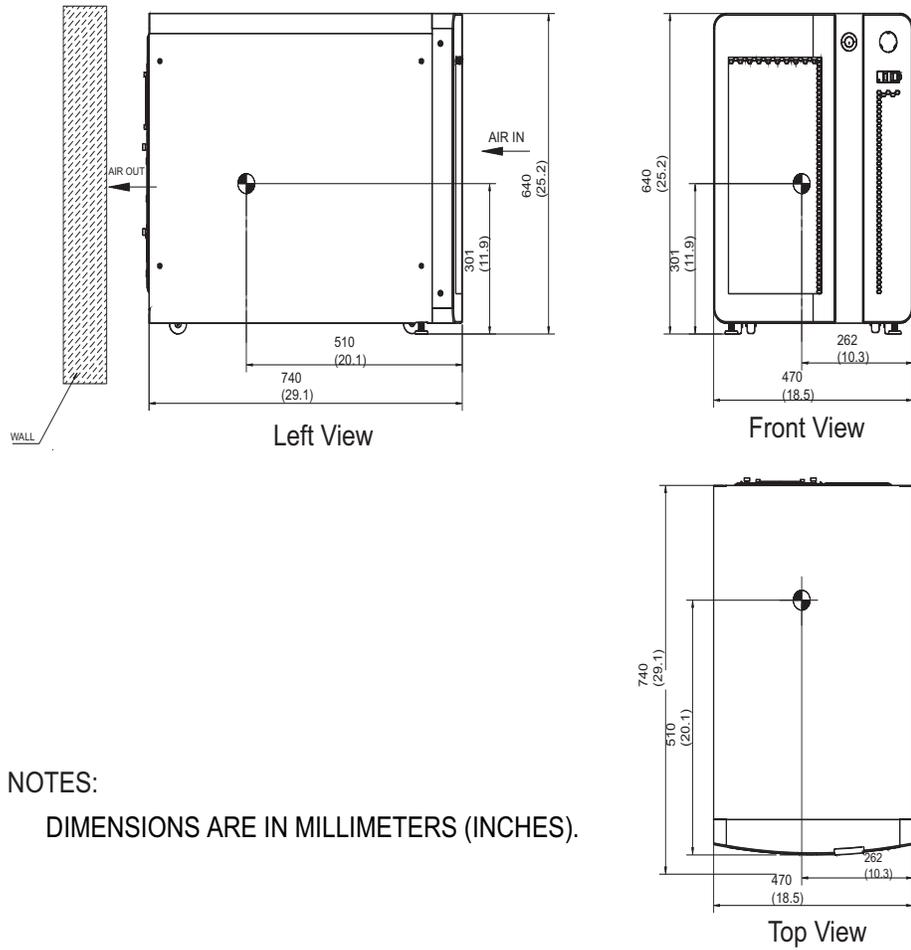


Figure 4-15 Global Operator Console



NOTES:  
DIMENSIONS ARE IN MILLIMETERS (INCHES).

Figure 4-16 True-In-One Operator's Console

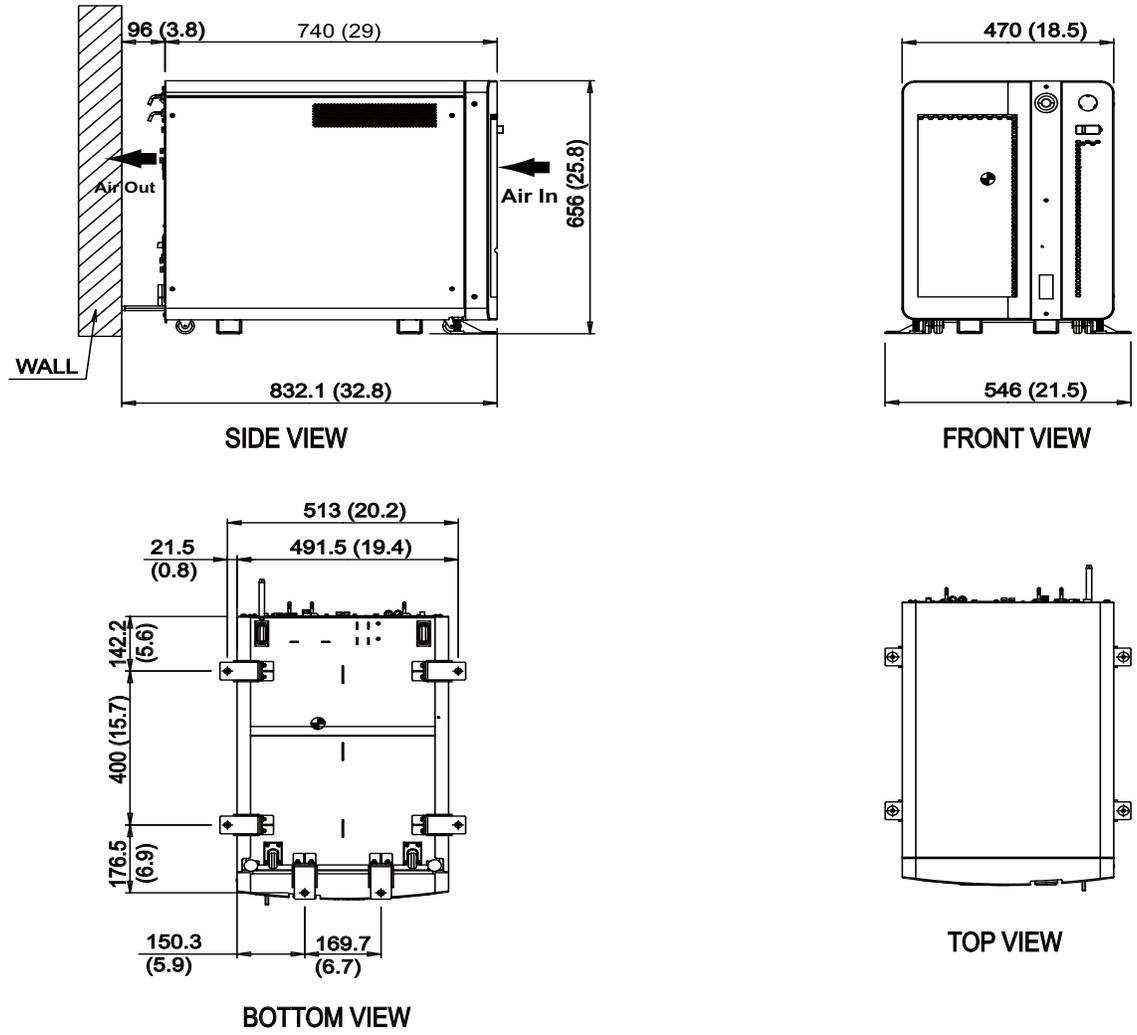
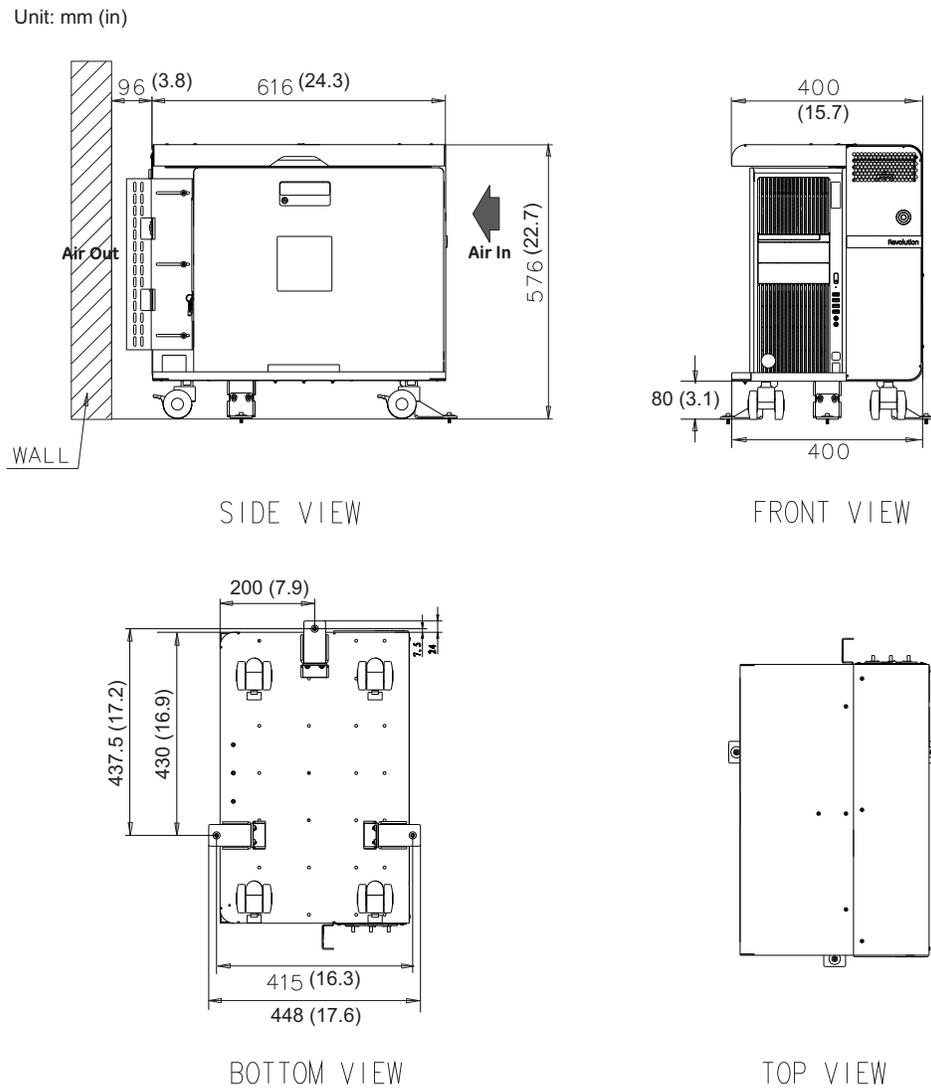


Figure 4-17 NIO16 Operator's Console



**Figure 4-18 OpenOC16 Console**

### 4.2.4 Freedom Workspace Table

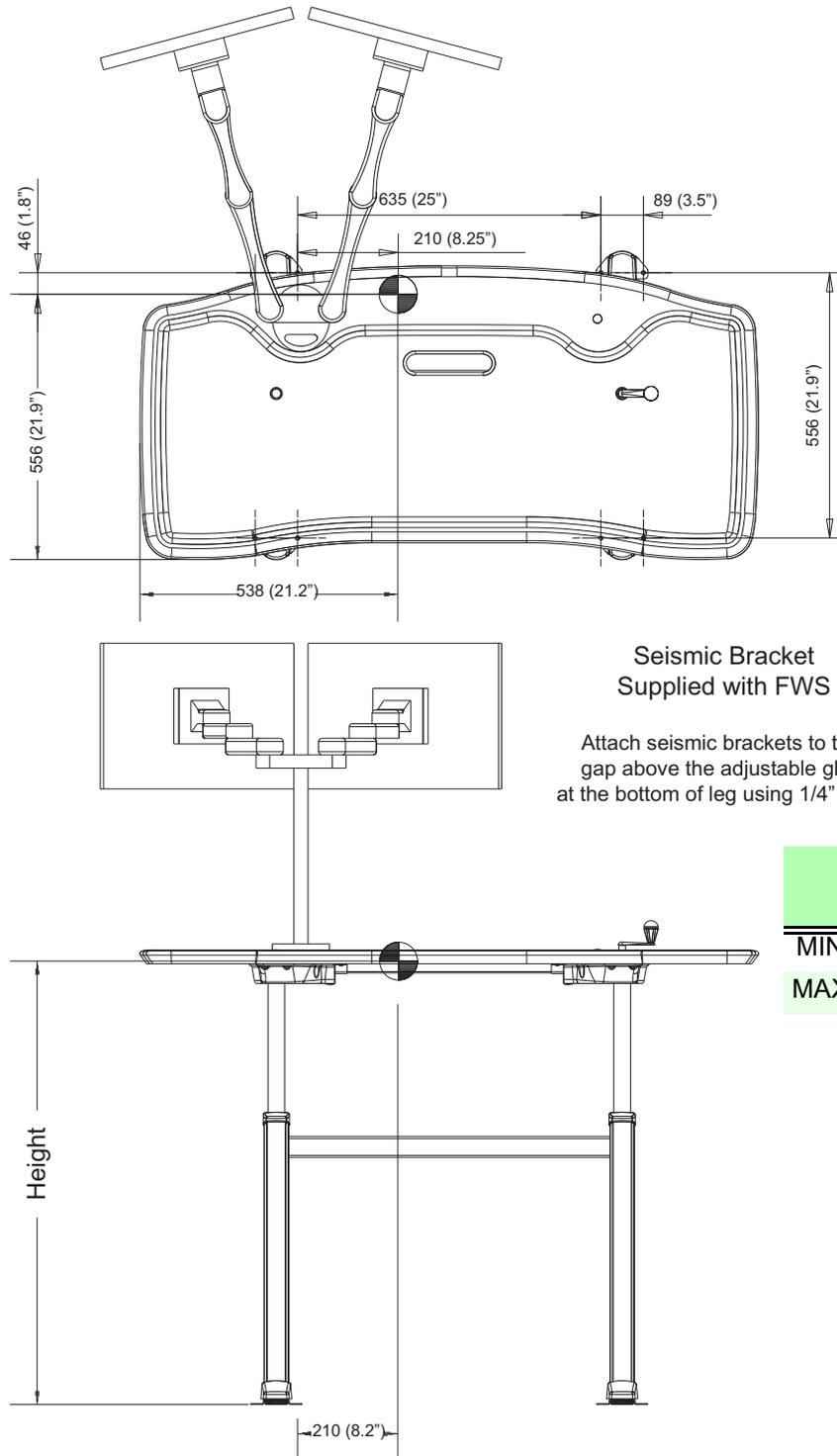


Figure 4-19 Height adjustable FWS - 5160735 (for AIO console)

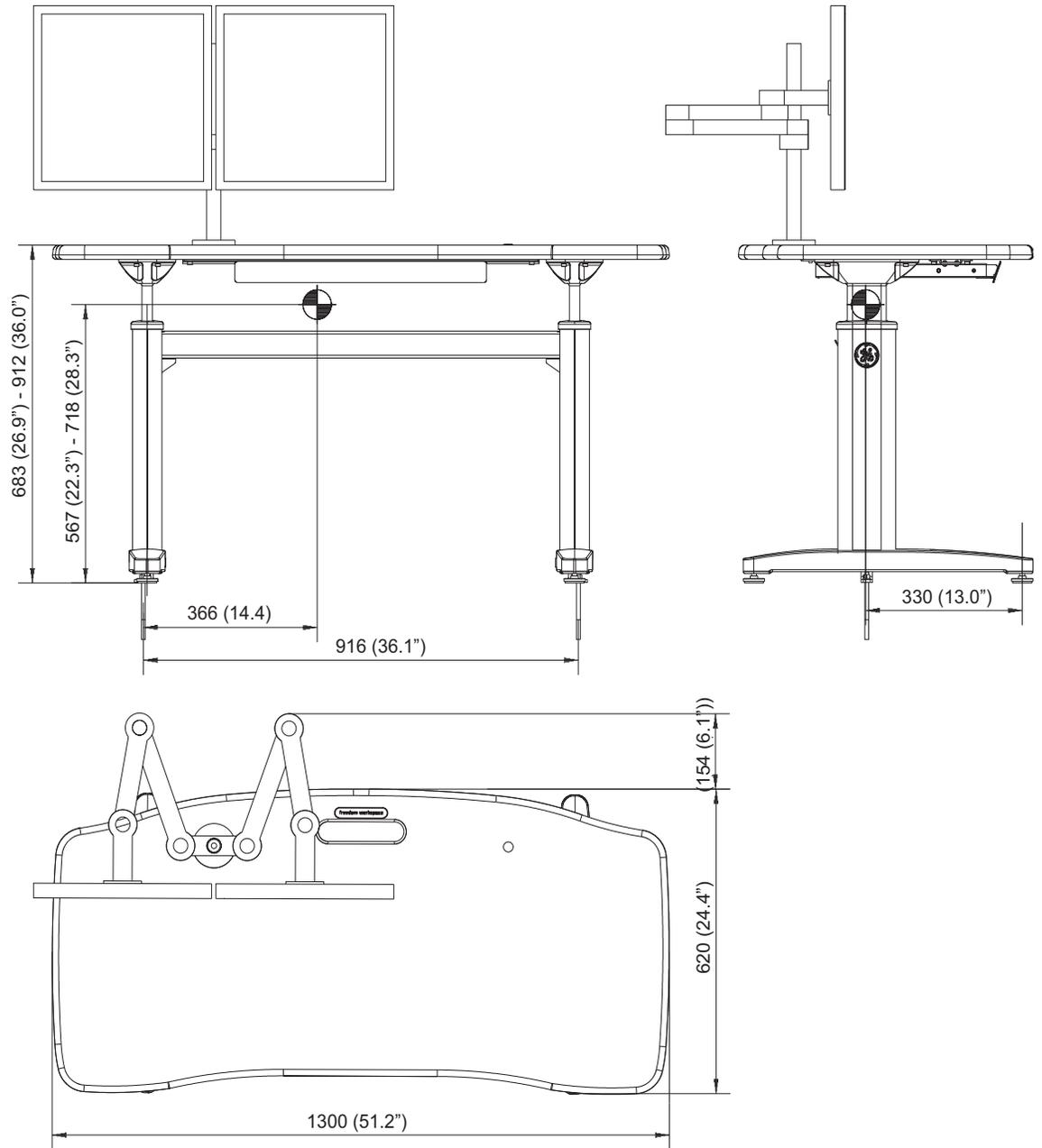
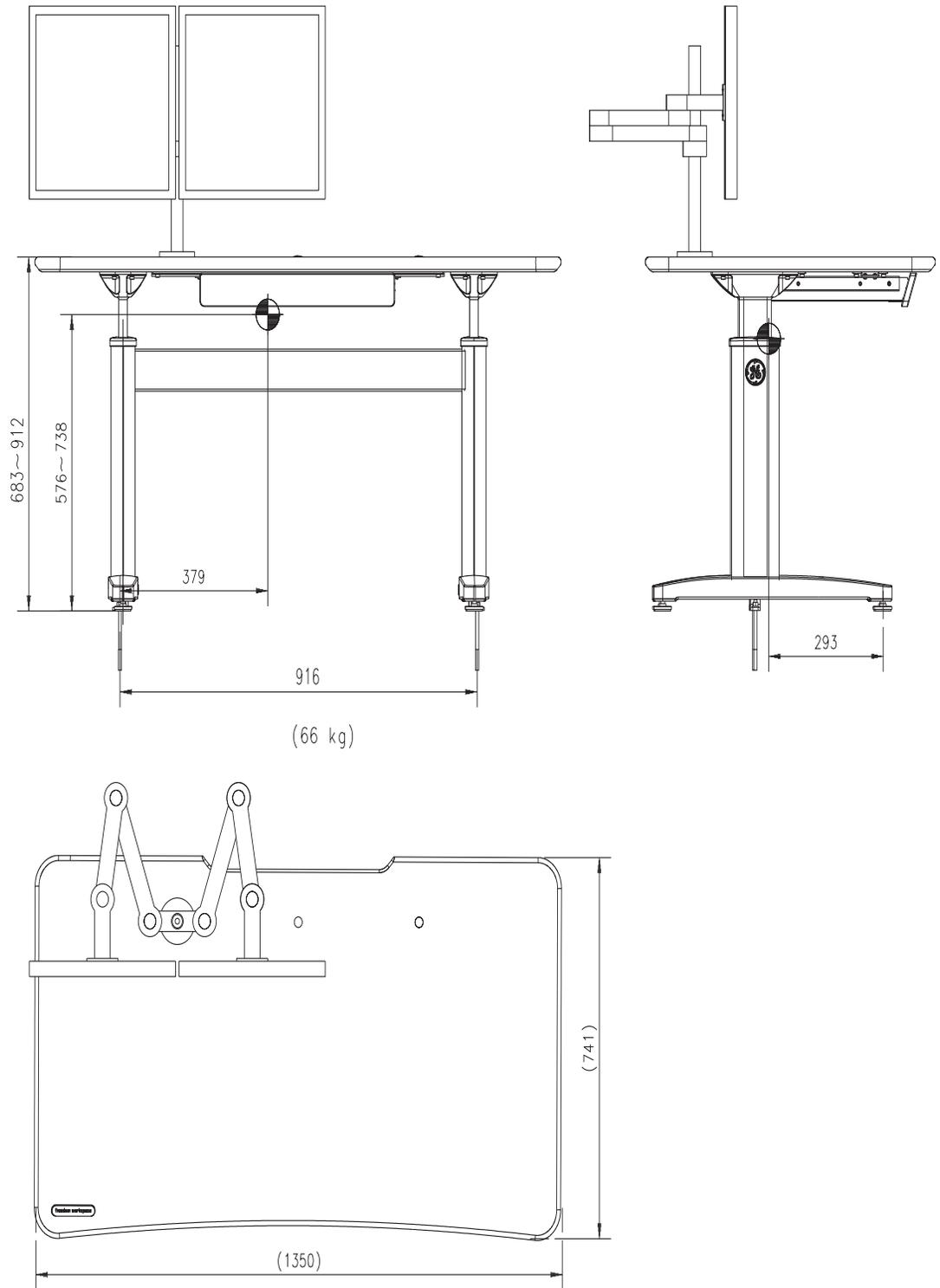
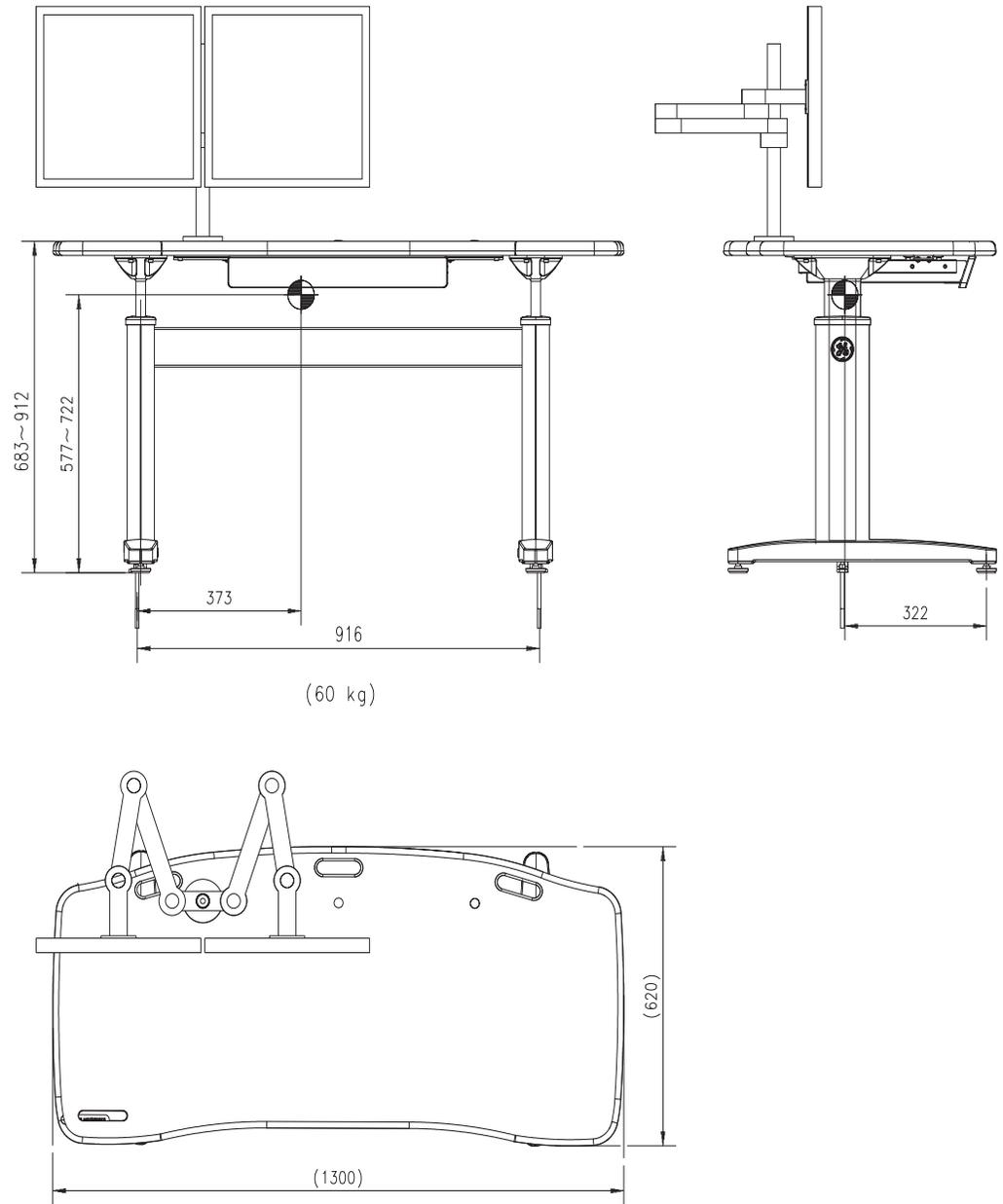


Figure 4-20 Height unadjustable FWS - 5168666 (for AIO console)



**Figure 4-21 Freedom Workspace Table - 5168666-2 (Wide FWS for TIO console)**



**Figure 4-22 Freedom Workspace Table - 5168666-3 (Standard FWS for TIO console)**

### 4.2.5 Optima Table

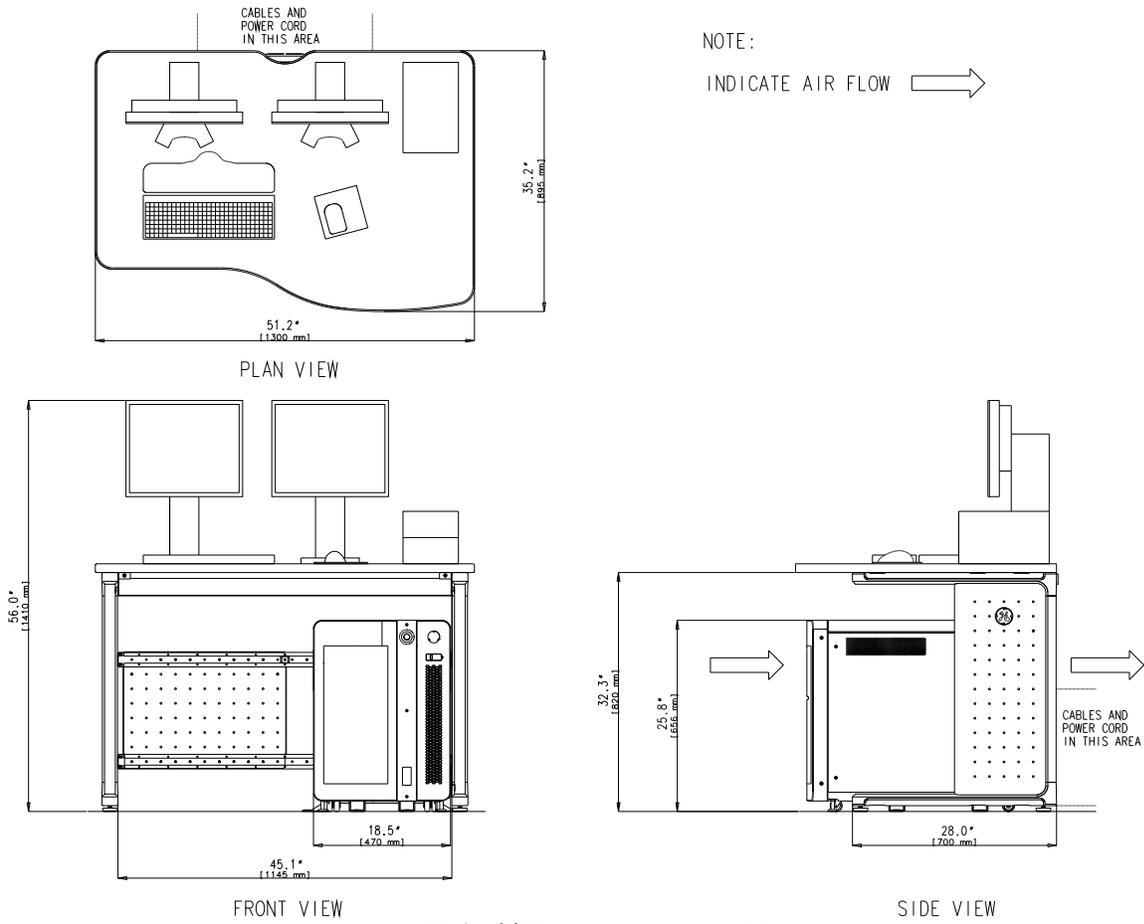


Figure 4-23 Console with Optima Table

### 4.2.6 Smart Workspace Desk

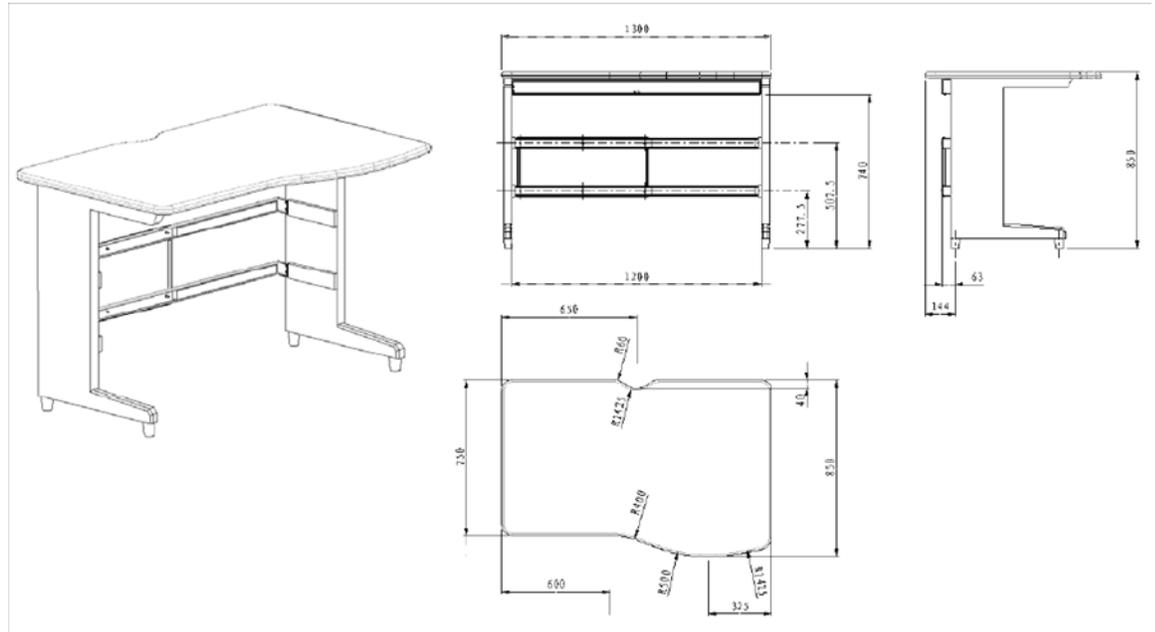


Figure 4-24 Smart Workspace Desk (SWS) (part 5449758-2)

## Section 5.0 Structural Requirements

### 5.1 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 4.0](#) for each of the three (3) major components of the BrightSpeed Select 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 450 lb (205 kilogram) 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.

### 5.2 Floor Anchors

Provided floor anchors are designed for use ONLY on concrete floors that meet the 101.6 mm (4 in.) 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.

## 5.3 Floor Strength

Concrete floors must have a minimum strength of  $f'c = 2610$  psi ( $1.8 \times 10^7$  Pa) 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 BS scanner on a floor type thinner than a 4-inch concrete floor, the purchaser, at their expense, shall provide acceptable anchoring and mounting methods that meet all structural specifications provided in sections 5.1 through 5.5 of this Pre-Installation Manual.

## 5.4 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 (0.25 in. ) between depression and high spots over any 3048 mm (120 in. ) distance within the area of the gantry/table template (see [Figure 2-1, on page 41](#)).

Note: Floor must meet levelness specification to properly align the table gantry. Minimum gantry height at this specification will be 1/2" (15 mm) to prevent cable crushing.

Table level may not be achievable if overall floor levelness is greater than the specification.

Overall floor level must be 0" to use under gantry cable entrance. Minimum gantry height will be 3/4" 20 mm 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.

## 5.5 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.

### 5.5.1 Steady State Vibration

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

### 5.5.2 Transient Vibration

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

---

### 5.5.3 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
- Trains
- Heliports
- Roadways
- Hallways
- Hospital power plants containing pumps, motors, air handling equipment and air conditioning units
- Subways
- Elevators

### 5.6 Walls: Scan Window

The recommended patient viewing window dimensions are 48 in. wide by 42 in. high (1219 mm x 1067 mm). The location of the window is dependent on the position of Operator Workspace position. Consult [Section 7.0](#) of this chapter and a **qualified radiological health physicist** for radiation protection requirements of glass (lead content and thickness).

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

### 5.7 Ceiling Requirement

The weight of "Boom in a room LCD monitor" assy is 50 kg., and ceiling shall have enough strength against the specification.

## Section 6.0 Network Connections

Broad-band is the standard network connection and is required for all BrightSpeed Select 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 10 feet) should be provided by the customer, and it is used to connect the console to a wall box. (See Notes on [Figure 9-5](#))
- 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 290 ft. (88m). Bandwidth performance is degraded when the length reaches 300 ft. (91m) 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.

Hospital Network    Advantage Window

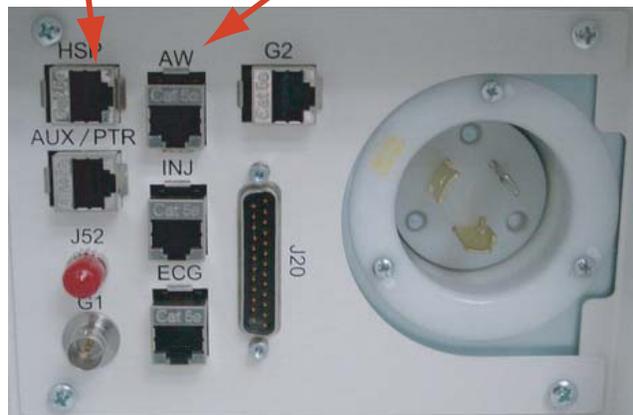
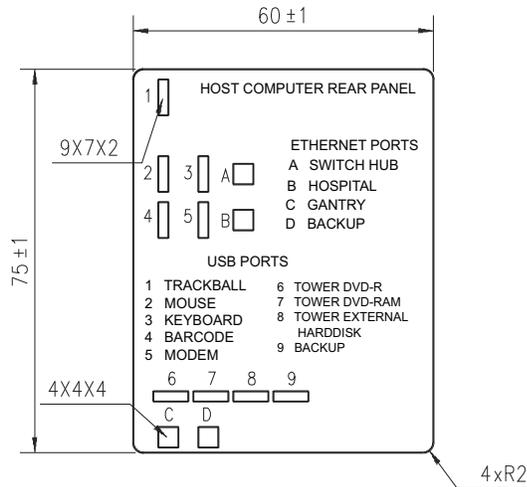
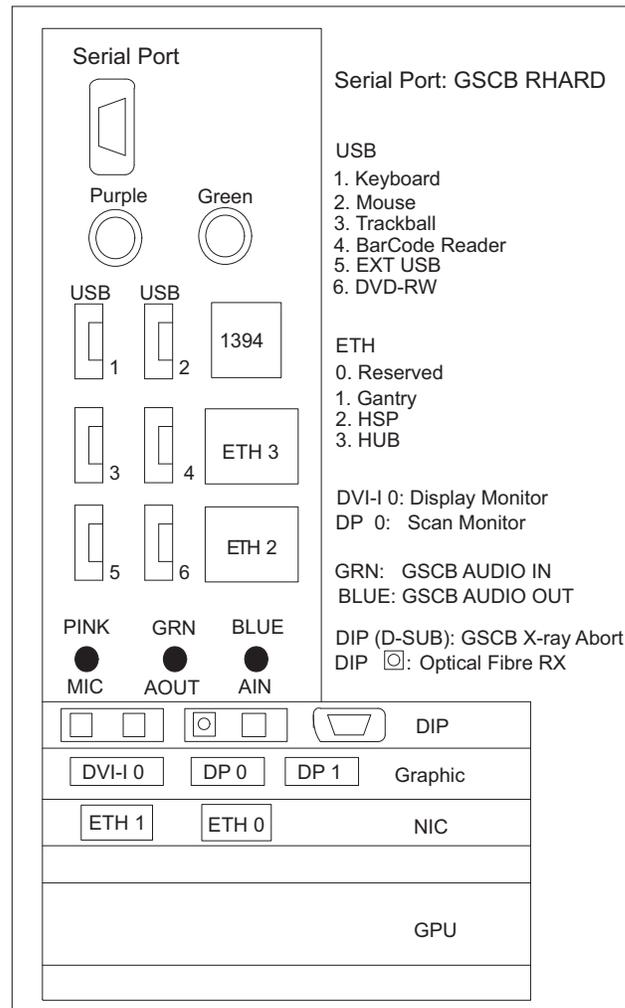


Figure 4-25 Global Console Rear Bulkhead



**Figure 4-26 True-In-One Console Host Computer Rear**



**Figure 4-27 NIO16 Console Host Computer Rear**

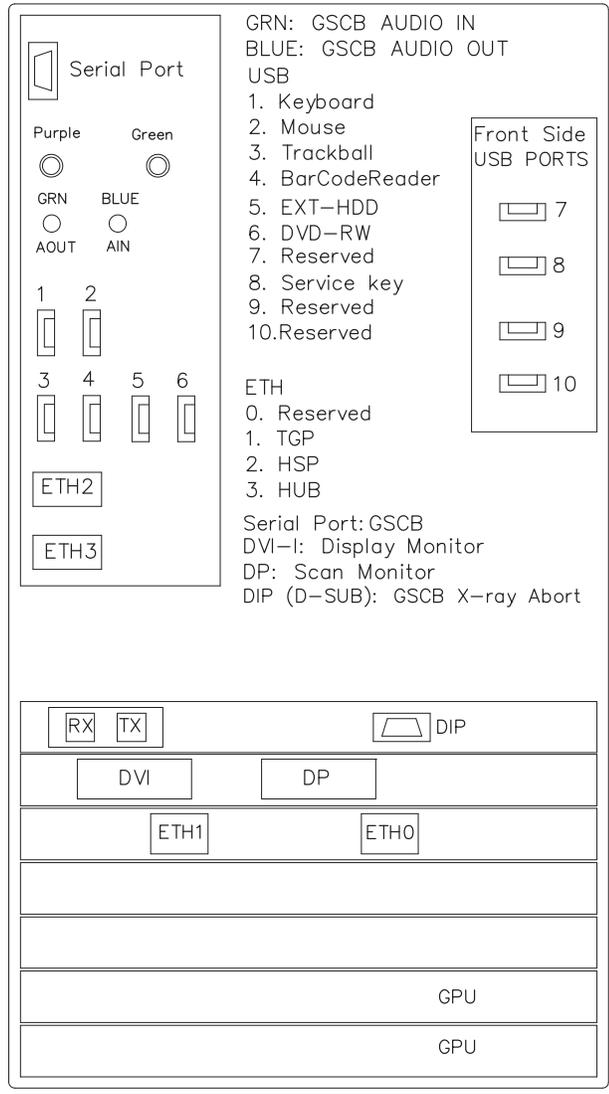


Figure 4-28 OpenOC16 with Z840 Host Computer Rear

## 6.1 US Broad Band Process Overview

The United States network connectivity requirement for this product is broad-band. The US process relies on the Project Manager Installation 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.

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## 6.2 Customer Broad-Band Responsibilities

Provide GE Healthcare Installation Project Manager with an accurate site address, telephone number, contact name, and e-mail 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 Installation Project Manager, for the name of the zone Broad-Band Specialist
  - 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
  - To utilize an Internet Service Provider that supports static routing

## Section 7.0 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 4-30](#))
- 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 4-29](#) to depict 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. The mAs, kV and aperture scaling factors shown in [Table 4-11](#) can be used to adjust exposure levels to the scan technique used at the site.

Note: Actual measurements can vary. All measurements have an accuracy of  $\pm 20\%$  because of measurement equipment, technique, and system-to-system variation.

Use the correction factors shown in [Table 4-11](#) to adjust exposure levels to the usual scan technique at your site.

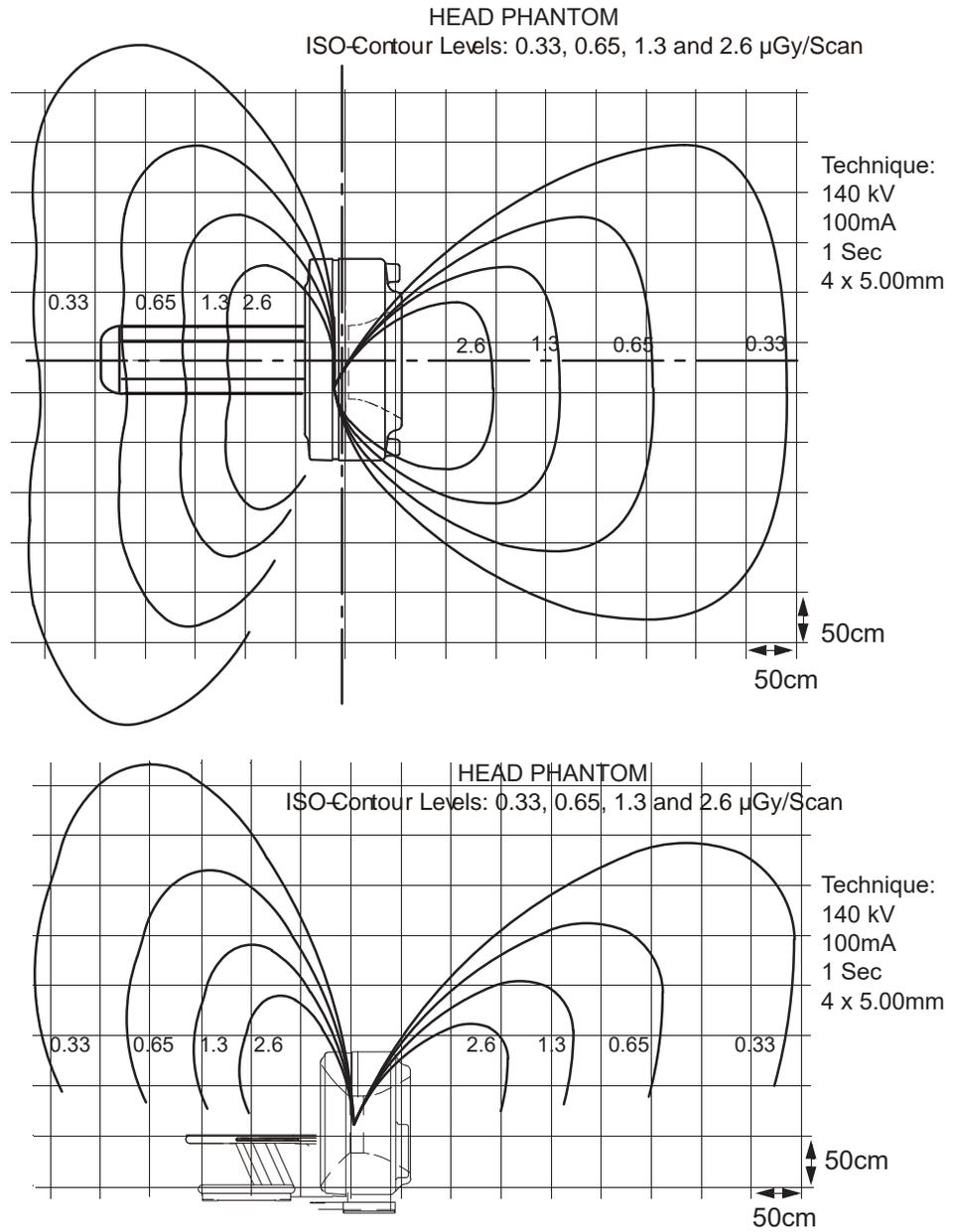
CHANGED PARAMETER	MULTIPLICATION FACTOR
mAs	new mAs/100
80 kV	0.21
120 kV	0.71
140 kV	1.0
4 x 3.75mm images	0.82
<u>16 x 0.625 LD</u>	<u>0.59</u>
<u>8 x 1.25 LD</u>	
<u>4 X 2.5 LD</u>	
<u>Fluro 5mm</u>	
4 x 1.25 LD 5mm (1i) Fluro 2.5 mm	0.40
1 x 1.25mm images	0.20
2 x 0.625 LD	0.10
1 x 1.25	

**Table 4-11 Shielding Requirements Scaling**

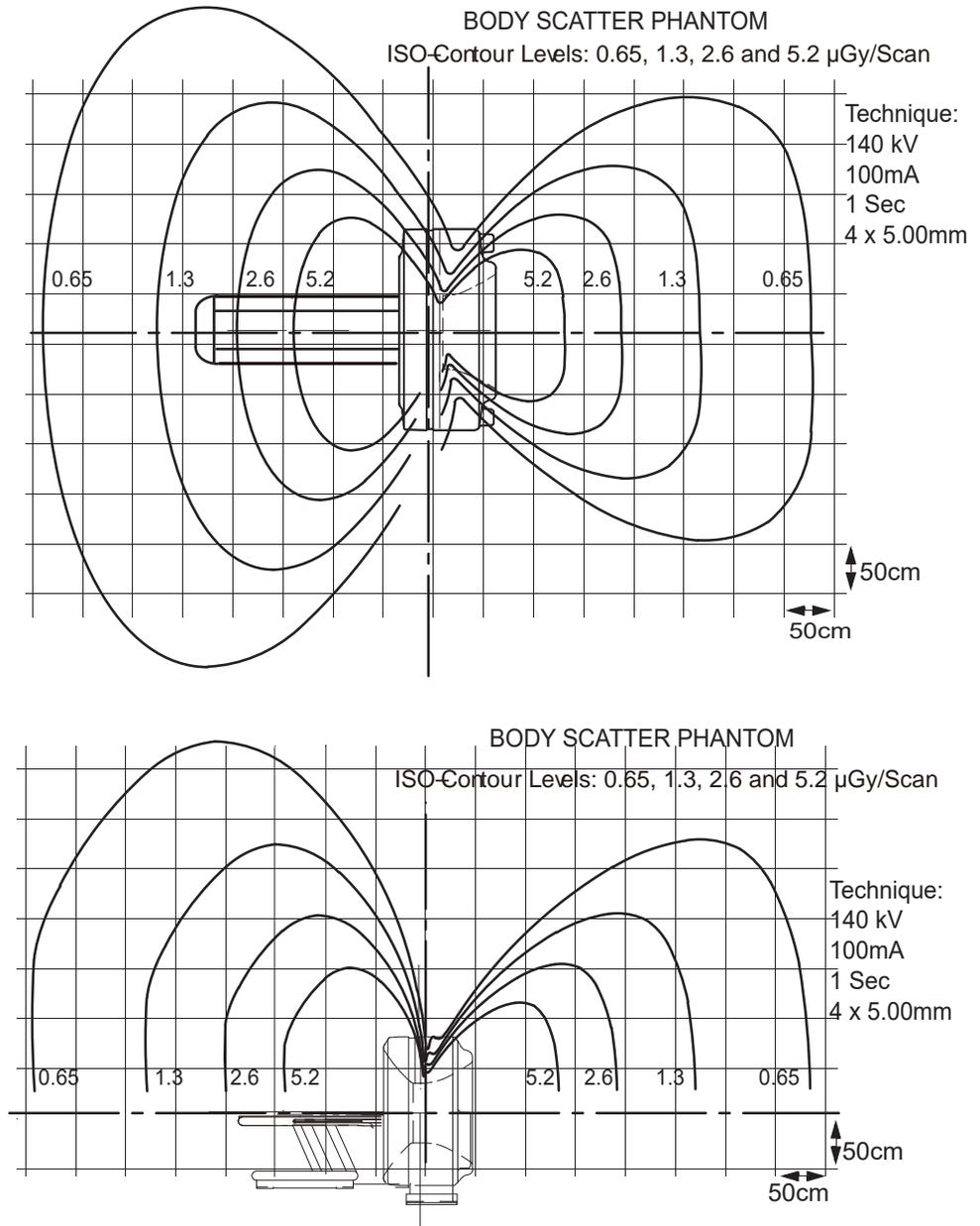


**NOTICE** The units of measure used for radiation levels have been changed in this publication, from mR (millirads) to  $\mu\text{Gy}$  (micrograys). The conversion factor is:

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



**Figure 4-29 Typical Scatter Survey (Head Filter)**



**Figure 4-30 Typical Scatter Survey (Body Filter)**

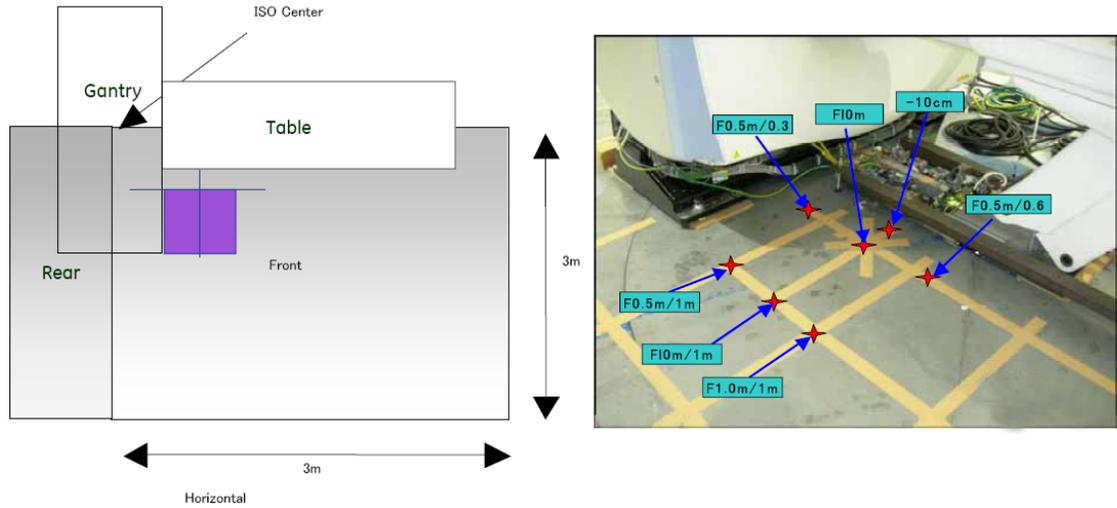


Figure 4-31 Fluoro Stand Position

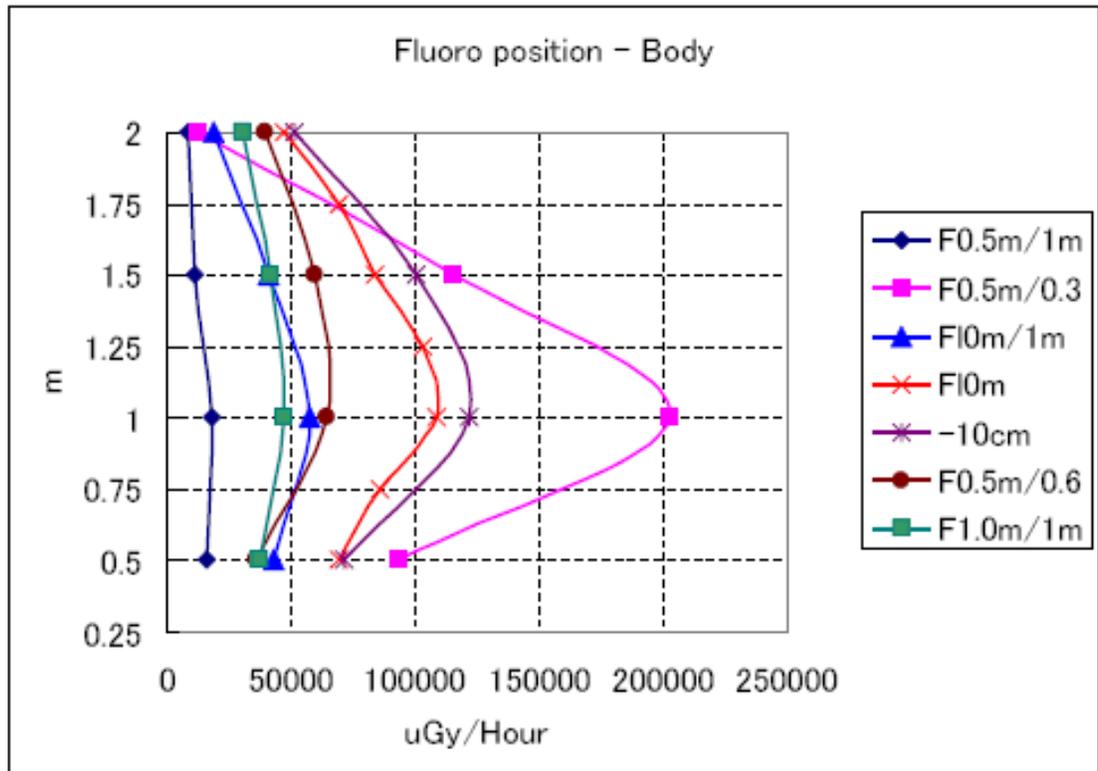


Figure 4-32 Scatter Plot of Fluoro - Body

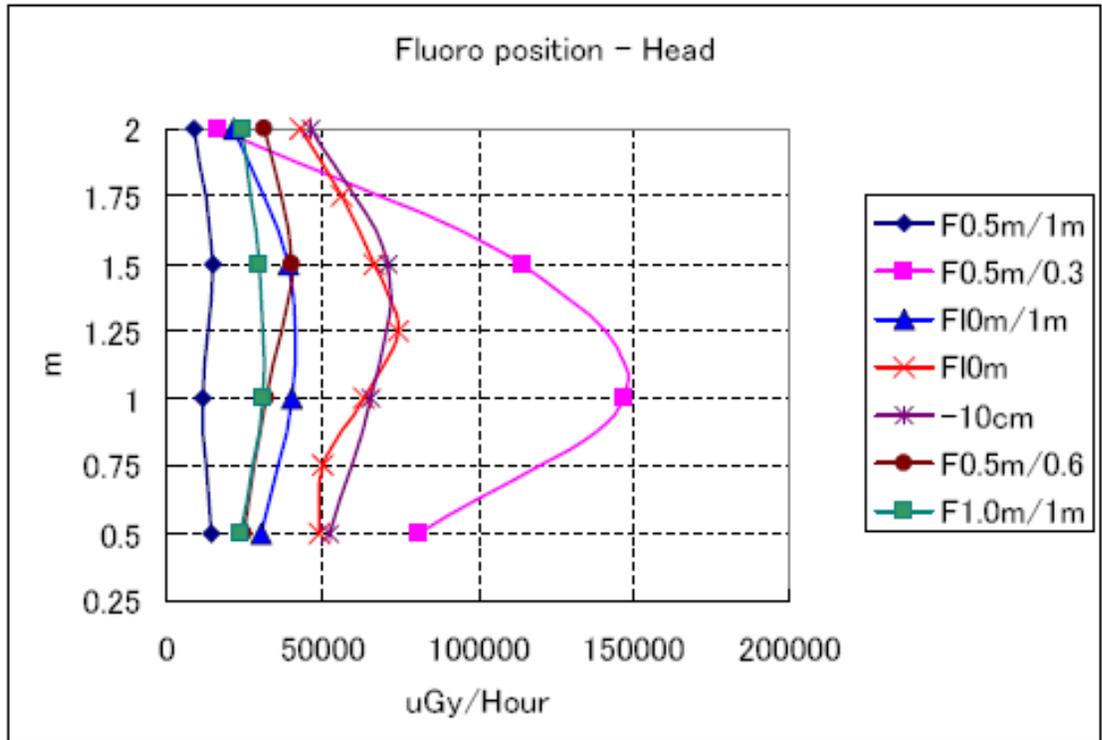


Figure 4-33 Scatter Plot of Fluoro - Head



# 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 contaminants. Sulfur is the most damaging. If high levels of contaminants 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/hr. (5° F/hr. )

**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 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
1. Gantry recommended (See NOTE 1)	18,766	5,500
2. Table	682	200
3. Power distribution unit	5,118	1,500
<b>Recommended Scan Room Subtotal (see notes):</b>	<b>24,566</b>	<b>7,200</b>
4. GOC console/computer with one IG	8,189	2,400
MOD Drive (Option)	682	200
IG Node, each (Option)	1,024	300
Remote Monitor (Option)	222	65
DASM (Option)	290	85
5. TIO Operator's console w/ 2 monitors & PMT	8,189	2,400
MOD Drive (Option)	682	200
Remote Monitor (Option)	222	65
<b>Recommended Control Room Subtotal (w/o option):</b>	<b>8,189</b>	<b>2,400</b>
<b>System Total (Recommended) (See NOTE 1)</b>	<b>32,755</b>	<b>9,600</b>
Option: Advantage Windows	256	75
Option: UPS	5,200	1,200
<b>ROOM TOTAL (SEE NOTE 2)</b>		
<b>NOTE 1:</b> 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.		
<b>NOTE 2:</b> Cooling requirements do not include cooling for room lighting, personnel or non-CT equipment.		

Table 5-1 Cooling Requirements (Worksheet)

## Section 3.0 Altitude

The system shall meet all functional and performance specification when placed in a room that is at an elevation of -150 m to 3000 m (-492 ft. to 9842.5 ft) above sea level.

## 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 would also include High voltage lines under the scan or control room floor.

### 4.1 Gantry and Table

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.



#### **WARNING REQUISITES FOR ROOM**

**GANTRY & TABLE ARE ALLOWED TO BE INSTALLED ONLY IN X-RAY PROTECTED ROOMS, WHICH PROVIDE AN ATTENUATION OF AT LEAST 12dB FOR RADIO DISTURBANCES FROM 30 MHz TO 1 GHz.**

(The Warning statement above is specified by IEC 60601-1-2, First Edition, 1993)

### 4.2 Color Monitor

Locate color monitors in ambient static magnetic fields of less than  $5 \times 10^{-5}$  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 1.0 meters (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).

## 4.8 Equipment EMI "Envelopes"

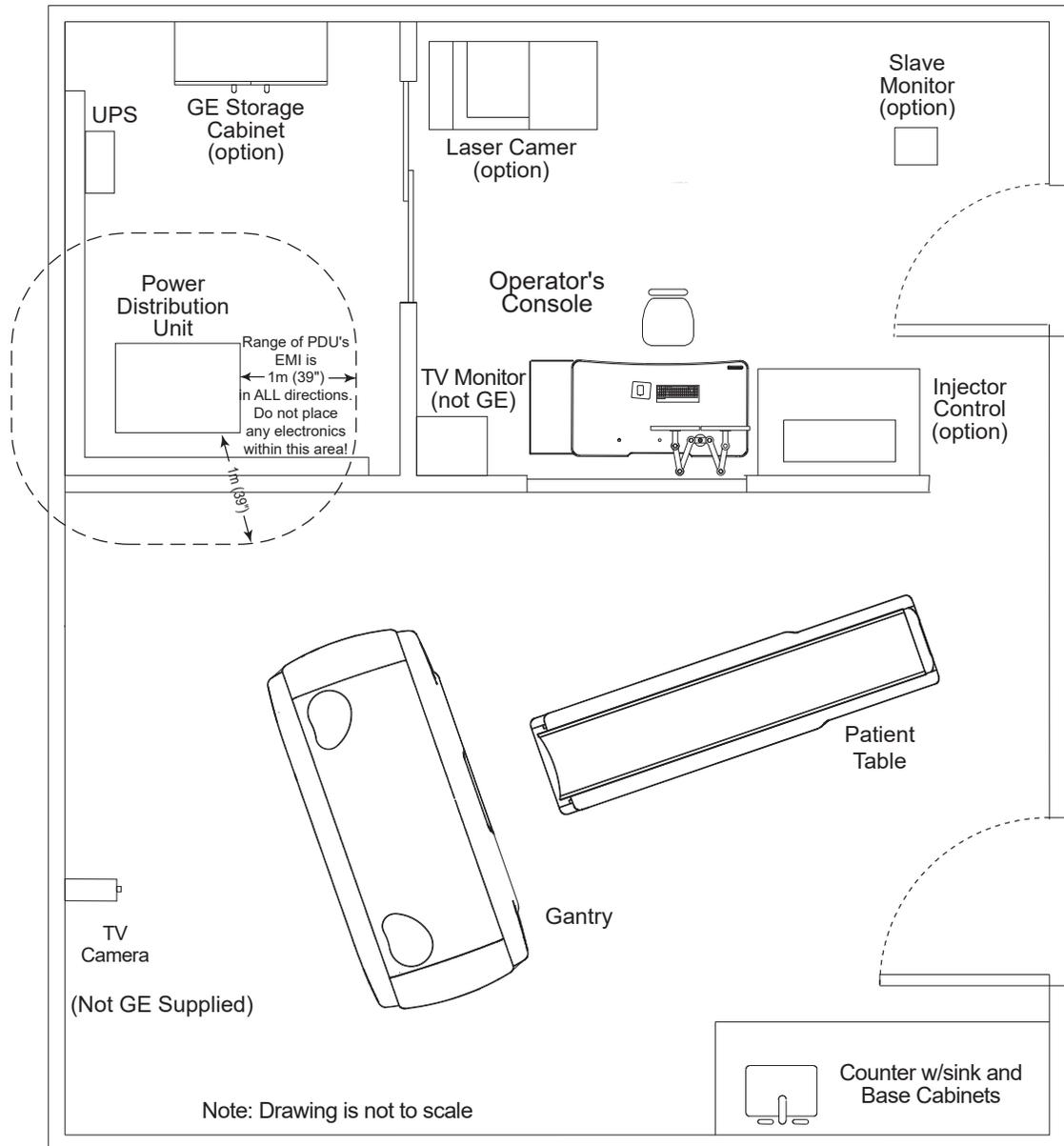


Figure 5-1 Sample Room Layout, showing approximate EMI requirements

## Section 5.0 System Component Noise Levels

**Maximum Gantry Audible Noise Level** The maximum ambient noise levels is produced by the gantry during a CT scan acquisition. It is less than 70 dBA when measured at a distance of one meter from the nearest gantry surface, in any direction.

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

# Chapter 6

## Floor Loading and Weights

### Section 1.0 Floor Loading

The BrightSpeed Select system has a total floor load of approximately 2840 kg (6260 lbs). About 2270 kg (5000 lbs), 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 <sup>2</sup> )	LOAD PATTERN MM (IN.)	NORMAL METHOD OF MOUNTING MM (IN.) (GE SUPPLIED) <sup>1</sup>
Gantry (w/ covers)	~1770 (~3899)	2057 x 1018 (81 x 40.1)	263 (1286)	Rectangular base plate 700 X 1966 (27.6 X 77.4) with four round pads, each 63.5 (2.5) in contact with floor.  Individual pad loadings are: 413 kg (910 lb), 436 kg (960 lb), 472kg (1040 lb), and 495 kg (1090 lb) (see Figure 6-4).	HSA - KA M12 x 220 Bolt (12 mm) diameter by 220 mm long per P/N 5479997 at four leveling pads into concrete floor.
Dollies (each)	114 (250)				
Top Cover (each)	7 (15.4)				
Side Cover (each)	5 (11)				
Front Cover	42 (92.5)				
Rear Cover	42 (92.5)				
Patient Table	525 (1157) Includes 205 (450) Patient	650 x 2347 (26 x 92)	367 (1851)	Base 3.0 SQ.FT (0.27M <sup>2</sup> ) with four round pads, each 50 (2.0) in contact with floor. Worst-case cantilever pull on any bolt is 360 kg (792 lb).	HSA-KA M12x120 Bolt(12mm) diameter by 120mm long per P/N 5479996 at four leveling pads into concrete floor.
Dolly	42 (92)				
Power Distribution Unit	350 (~770)	700 x 550 (28 x 22)	185 (909)	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 <sup>2</sup> in seismic zones.

**Notes:**

- 1.) Use the GE Supplied mounting hardware ONLY IF APPROVED by qualified personnel. [See statements in 5.1 - Table and Gantry Mounting Requirements, on page 86.]
- 2.) Seismic angle brackets are included and shipped with the PDU

**Table 6-1 BrightSpeed Select System Floor Loading**

ITEM	NET WEIGHT KG (LB)	OVERALL W X D MM (INCH)	WEIGHT/AREA LB/SQ. FT. (KG/M <sup>2</sup> )	LOAD PATTERN MM (IN.)	NORMAL METHOD OF MOUNTING MM (IN.) (GE SUPPLIED) <sup>1</sup>
Console w/ single-piece desktop & w/o monitors & w/ 1IG	195 (430)	1240 x 1235 (48.8 x 48.6)	134 (652)	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 <sup>2</sup>
Console w/o single-piece desktop & w/o monitors w/ 1IG	160 (352)	1240 x 705 (48.8 x 27.8)	110 (533)		
All-In-One Console w/ single-piece desktop & w/o monitors & w/o IG	165 (363)	1240 x 1235 (48.8 x 48.6)	113 (567)		
All-In-One Console w/o single-piece desktop & w/o monitors & w/o IG	130 (286)	1240 x 705 (48.8 x 27.8)	89 (447)		
True-In-One Console w/o monitors	87 (192)	470 x 740 (18.5 X 29.2)	99 (483)		
NIO16 Console	80 (176)	470 x 740 (18.5 X 29.2)			
OpenOC16	65.1 (143.5)	400 x 671 (15.7X 26.4)			
Monitor - LCD (each)	9 (20)	420 x 247 (16.5 x 9.7)			
Freedom Workspace (part 5160735)	39 (86)	1295 x 662 (51 x 26)			
Freedom Workspace (part 5168666)	45 (99)	1300 x 620 (51 x 24)			
Freedom Workspace (part 5168666-2)	49 (108)	1350 x 741 (53 x 29)			
Freedom Workspace (part 5168666-3)	44 (97)	1300 x 620 (51 x 24)			

**Notes:**

- 1.) Use the GE Supplied mounting hardware ONLY IF APPROVED by qualified personnel.  
 [See statements in 5.1 - Table and Gantry Mounting Requirements, on page 86.]
- 2.) Seismic angle brackets are included and shipped with the PDU

**Table 6-1 BrightSpeed Select System Floor Loading**

## 1.1 Floor Loading and Anchoring Guidelines

Follow the floor loading and anchoring guidelines below when preparing a site for system installation:

- The table and gantry require secure anchoring to the scan room floor. The power distribution unit and the console sit on the floor with casters; anchoring of these components to the floor is optional, unless required because of seismic considerations.
- Anchors mount through the table and gantry supports. Use the floor template or its dimensions to locate the table and gantry support positions within the scan room, making sure that any anchors that pass through the supports clear all structural beams and interferences in the floor.
- If a loading analysis determines that the gantry and table position should change relative to their position on the GE site print, be sure to take into account the clearance requirements when determining an appropriate location for the system.
- Hospitals and scanning facilities throughout the world may utilize a variety of floor types, and the disposition of different floor types may necessitate additional planning to adequately accommodate the system:
  - Wood floors often require substantial reinforcement. GE does not recommend using wood floors.
  - Temperature variation in blacktop or marble floors may allow anchor movement and pullout. GE does not recommend using these floors.
  - GE recommends using concrete floors with a minimum thickness of 102 mm (4 in.) when using GE-supplied anchoring or any other equivalent anchoring method.

### 1.1.1 Anchor Edge Distance Definition

The edge distance of Table floor anchor must have a minimum tension strength.

- **Lite Table:** Using Hilti KBIII 0.5inch DIA\*5.5 inch long anchor (P/N: 2106573-3)

The distance from CL of anchor to the edge of concrete basement of table should not be less than 178mm, which is necessary to keep anchor full tension strength  $f_{RN}$



#### NOTICE

Responsibility for providing an approved support structure and mounting method for all floor types other than the GE-recommended floor rests with the purchaser. General Electric accepts no responsibility for any failure of the support structure or anchoring method, including those used for seismic mounting. GE accepts no responsibility for methods other than those listed.

## 1.2 GE Supplied Anchoring

GE supplies anchors for mounting the table and gantry. The console and power distribution unit do not require anchoring to the floor. It is the responsibility of the customer to have a structural engineer and trained contractor use either the GE-supplied anchoring method or to provide an equivalent anchoring method to mount the table and gantry to the floor.

Consult your architect, structural engineer, contractor, or PMI to resolve any questions.



#### WARNING

#### POTENTIAL FOR PATIENT INJURY!

AN IMPROPERLY SECURED TABLE MAY TIP, DISLODGING THE PATIENT. PATIENT SAFETY DURING SYSTEM OPERATION REQUIRES PROPER ANCHORING OF SYSTEM COMPONENTS.

## Section 2.0 Mounting Data, Including Seismic

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

- Gantry: [Figure 6-3](#)
- Table: [Figure 6-5](#)
- Power Distribution Unit: [Figure 6-7](#)
- Operator's Console/Computer: [Figure 6-8](#)
- Freedom Workspace Table. [Figure 4-21](#) and [Figure 4-22](#)

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](#) and [Figure 6-2](#)) 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 for gantry and table at each anchor point. Any anchors having more than 1 inch of thread showing above the nut, when torqued to 50 N-m (37 ft.-lbs) for gantry and 50 N-m (37 ft.-lbs) for table, 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 concrete Floor Thickness:	102 mm (4 in.)	102 mm (4 in.)
Recommended Drilling Depth:	95 mm (3-3/4 in.)	100 mm (4 in.)
Average Anchor Embedment:	89 mm (3-1/2 in.)	90 mm (3-1/2 in.)
Minimum Anchor Embedment:	76 mm (3 in.)	80 mm (3 in.)
Available Alternate Anchor Locations:	Yes	Yes
Shipped Anchor Size:	205 mm (8 in.)	145 mm (5-3/4 in.)
Alternate Anchoring Methods:	Yes (see notes, below)	Yes (see notes, below)
Floor Levelness Requirement:	6 mm (1/4 in.) over 3 m (10ft)	6 mm (1/4 in.) over 3 m (10ft)

**Table 6-2 Gantry and Table Mounting Requirements**

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 scanner on a floor type other than a 4 inch concrete floor, all structural specifications in this document must be reviewed and met.

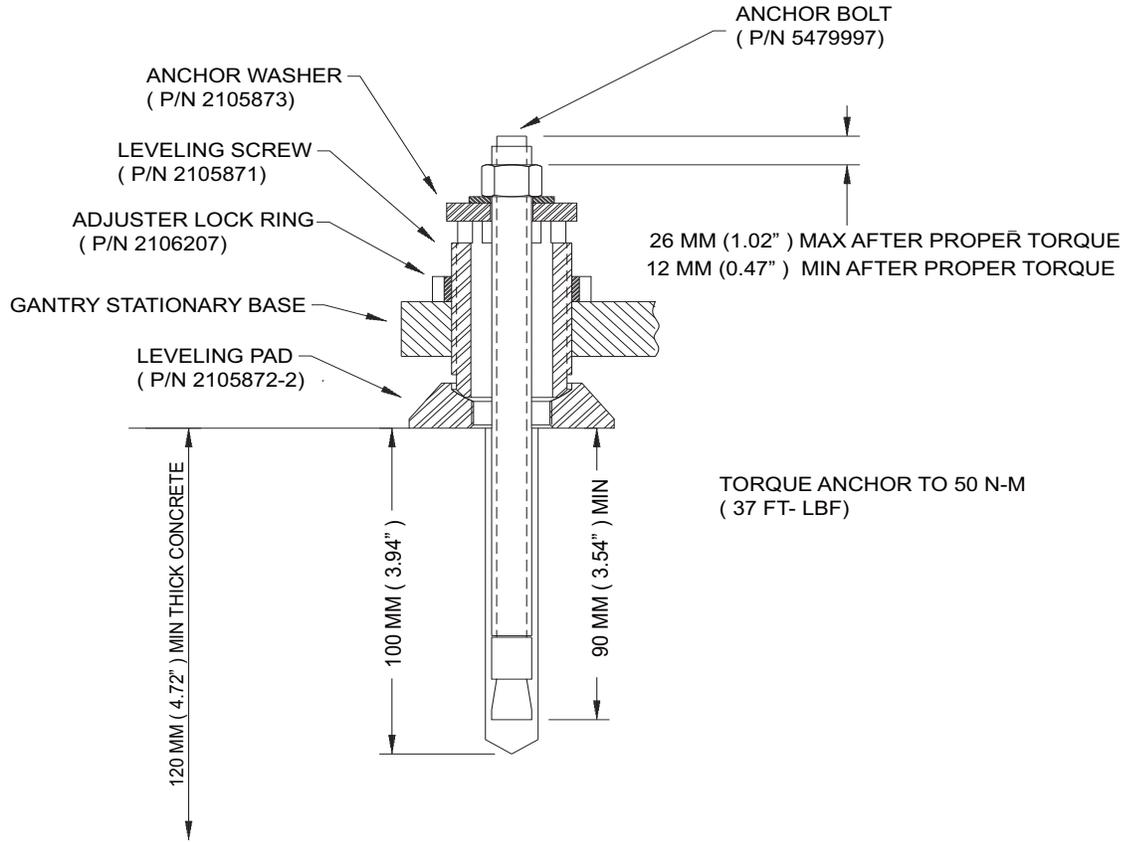


Figure 6-1 Typical Floor Anchor, Gantry

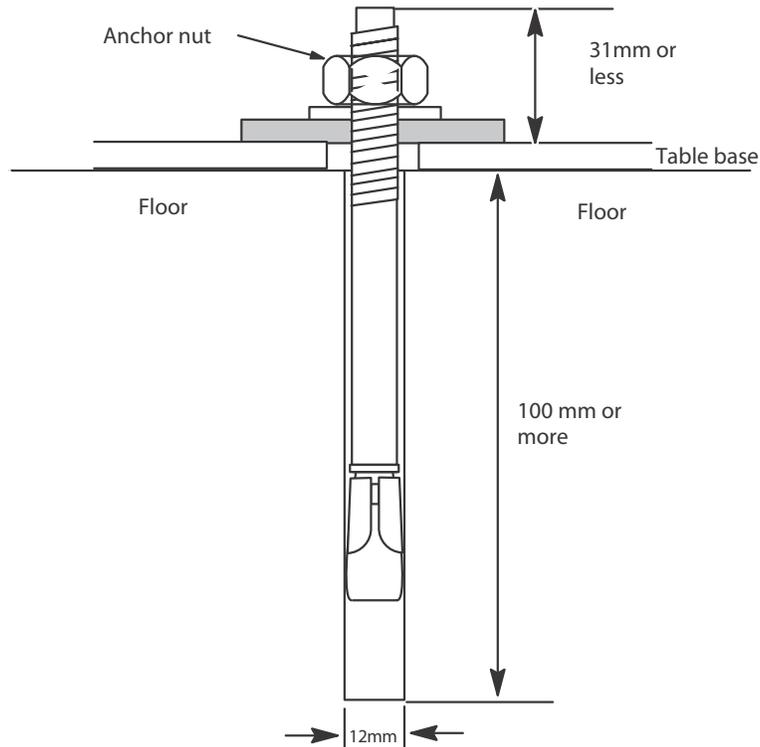
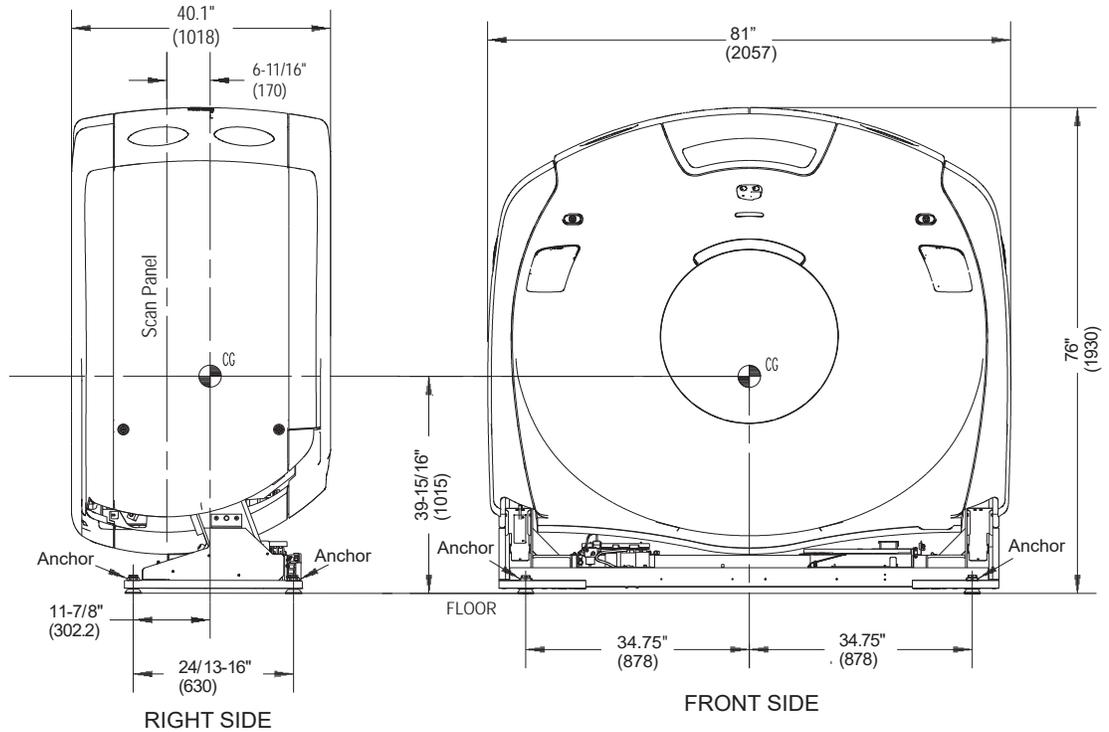
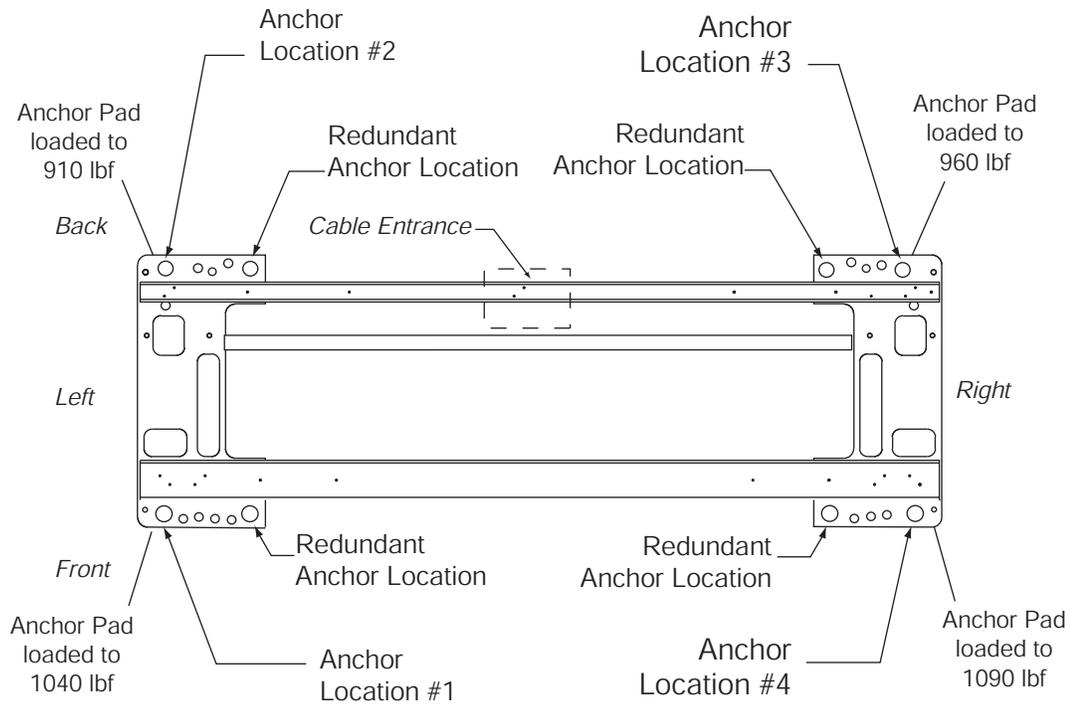


Figure 6-2 Typical Floor Anchor, Table



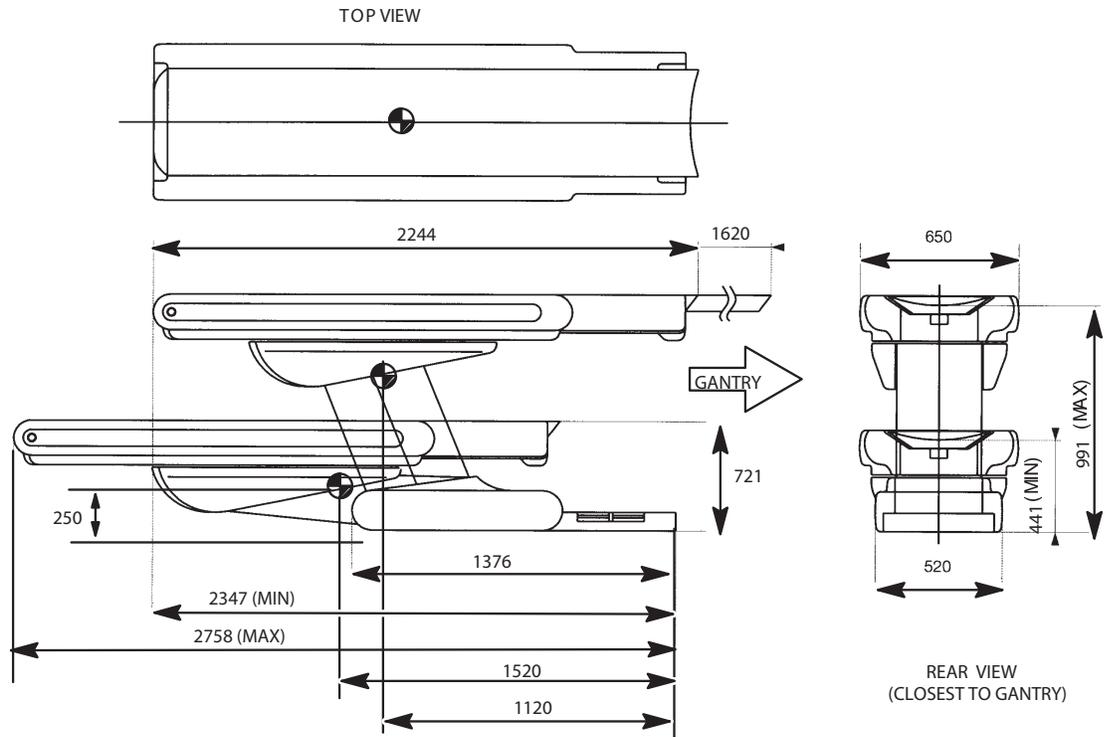
**Figure 6-3 Gantry (CT2)**



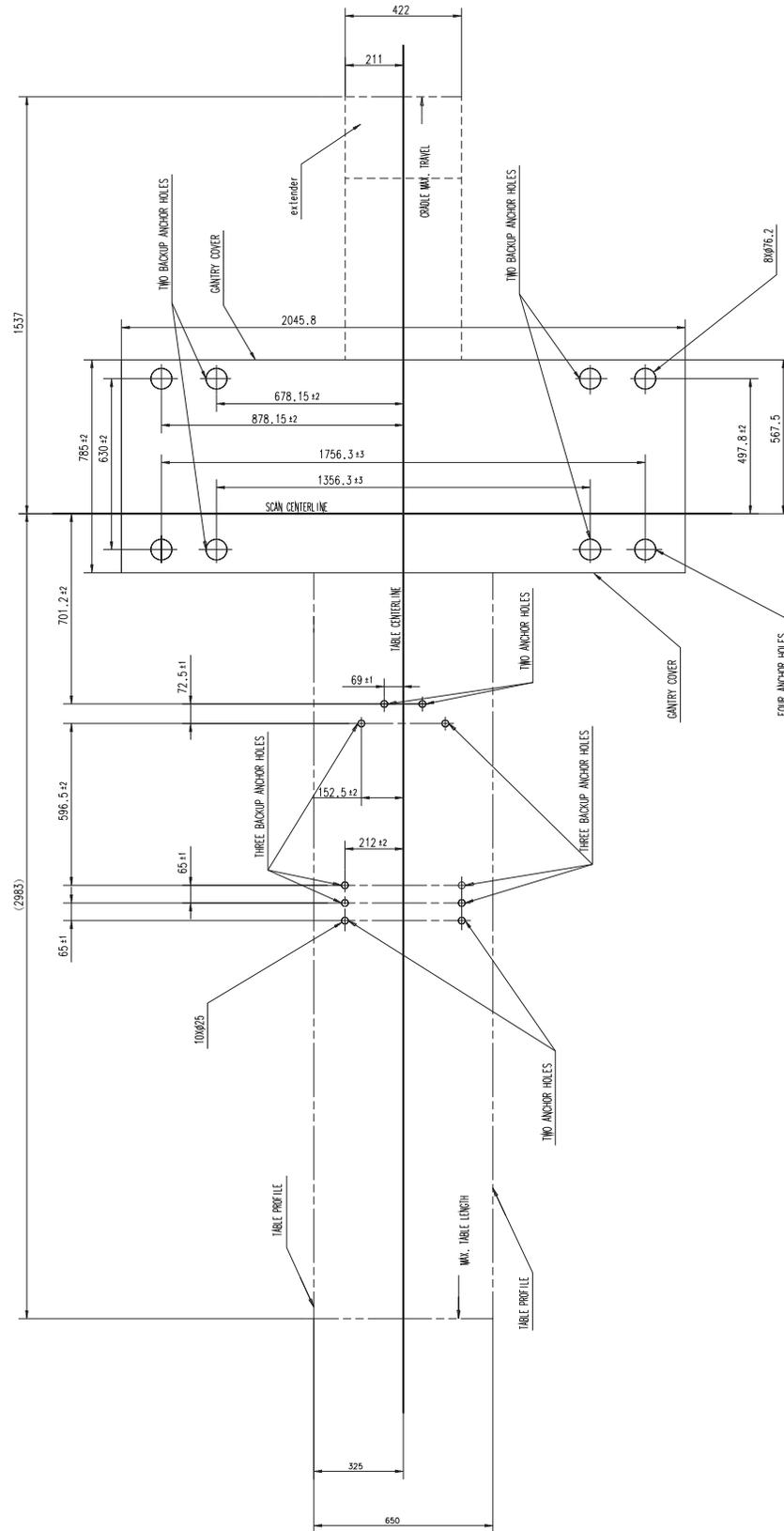
**Note:** Adjusters are used at each anchor location. Anchor hole ID is 1" (2.5 cm). Void between adjuster and anchor must be filled according to local building codes for seismic application.

**Figure 6-4 Gantry Anchor Locations**

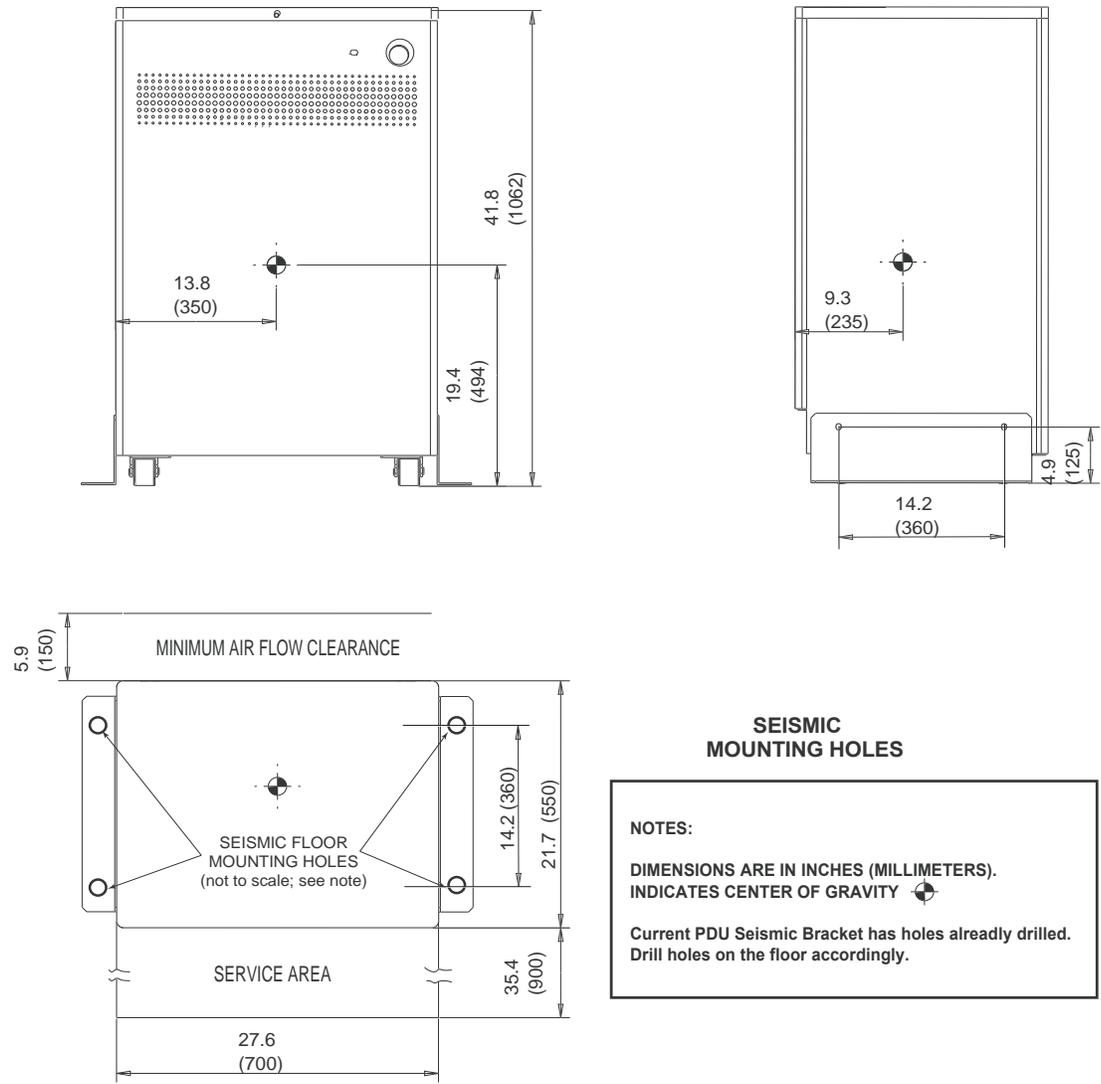
- NOTES:  
 \* ALL DIMENSIONS ARE IN MILLIMETERS  
 \* VETALATION : 115 watts (100 kcal/h)  
 \*  INDICATES CENTER OF GRAVITY



**Figure 6-5 Patient Table (CT1)**



**Figure 6-6 Floor Template - Gantry and Table Base**



**SEISMIC MOUNTING HOLES**

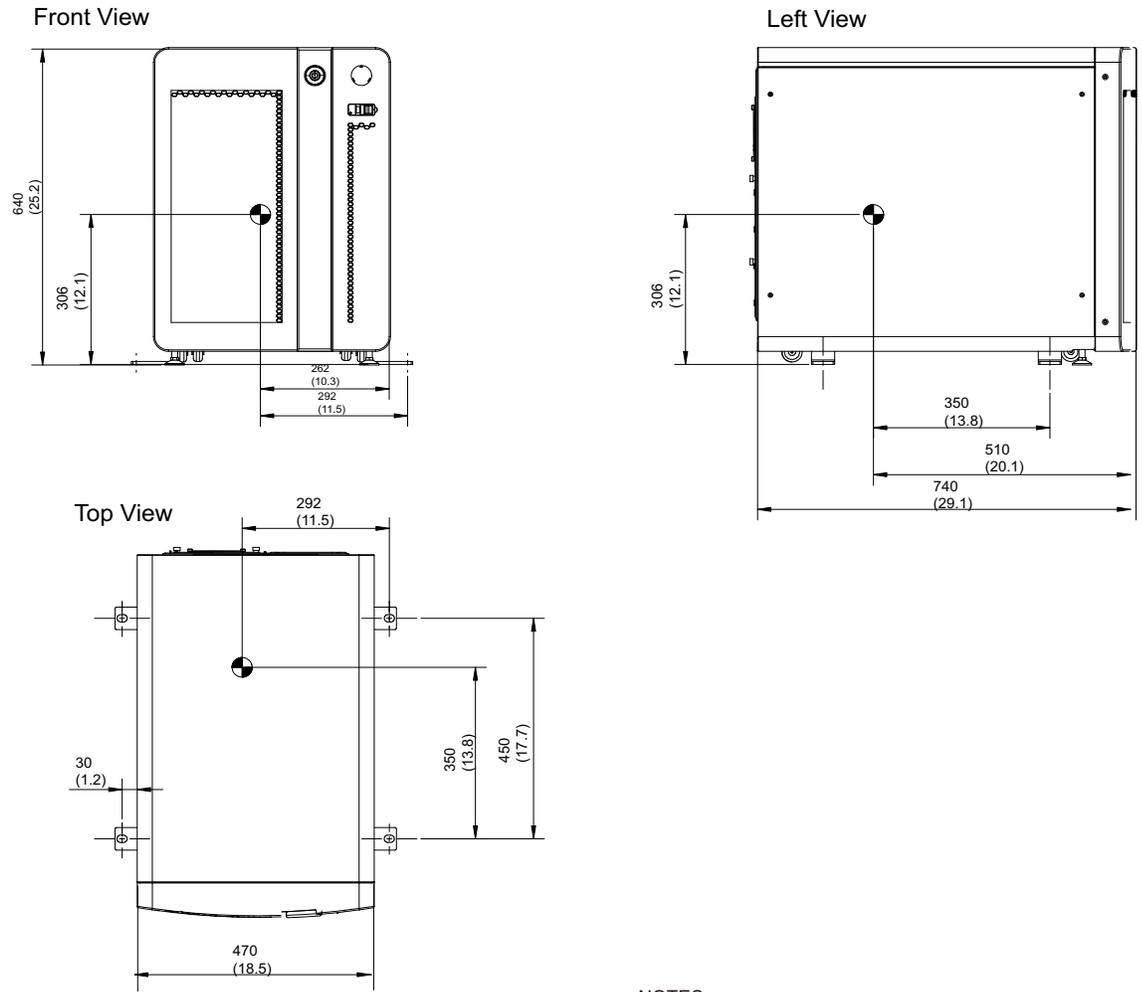
**NOTES:**

**DIMENSIONS ARE IN INCHES (MILLIMETERS). INDICATES CENTER OF GRAVITY**

Current PDU Seismic Bracket has holes already drilled. Drill holes on the floor accordingly.

**Figure 6-7 Power Distribution Unit (NGPDU)**





NOTES:  
 DIMENSIONS ARE IN MILLIMETERS (INCHES)

**Figure 6-9 True-In-One Console**

**6 – Floor Loading**

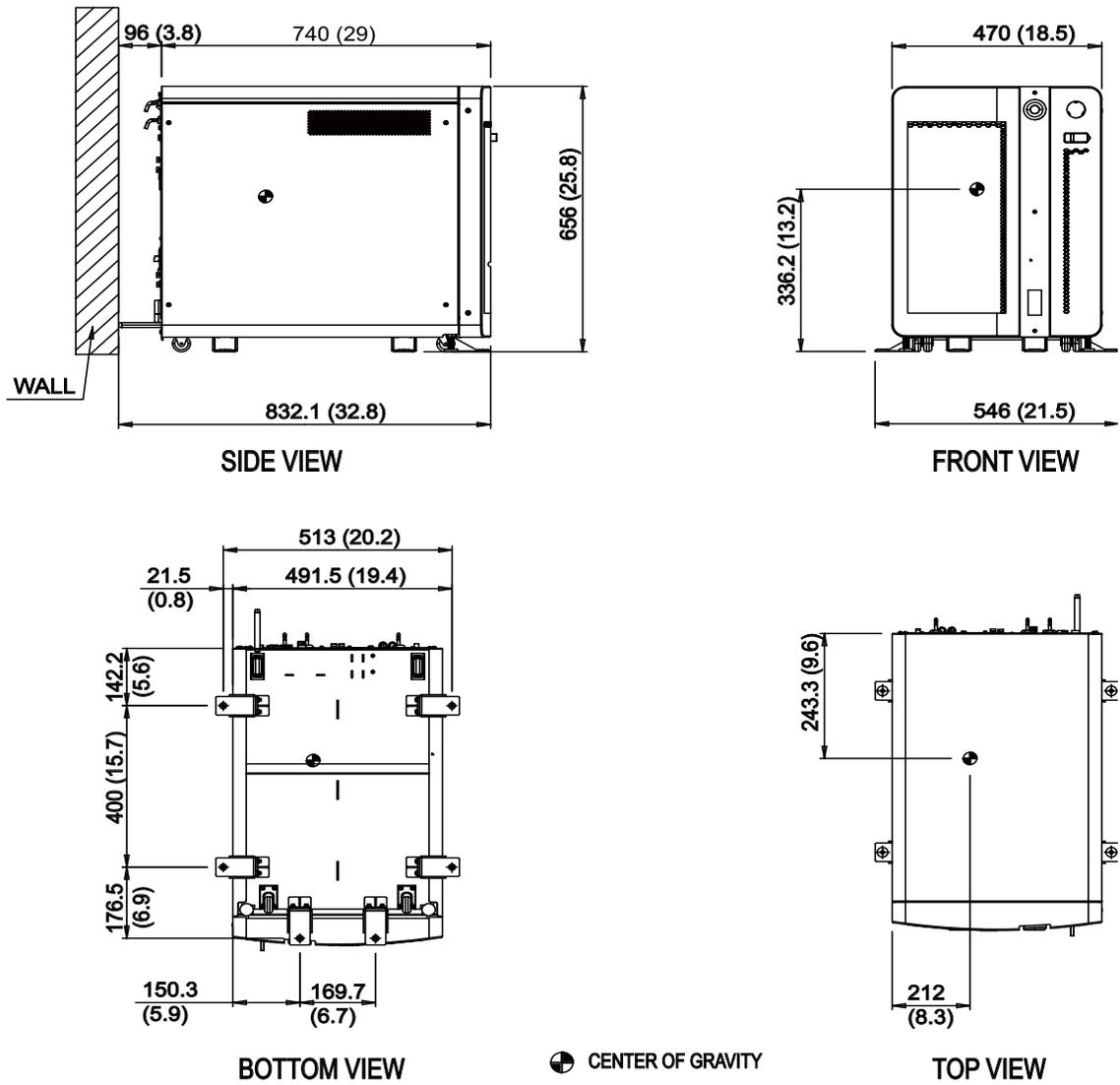


Figure 6-10 NIO16 Console Center-of-Gravity

Unit: mm (in)

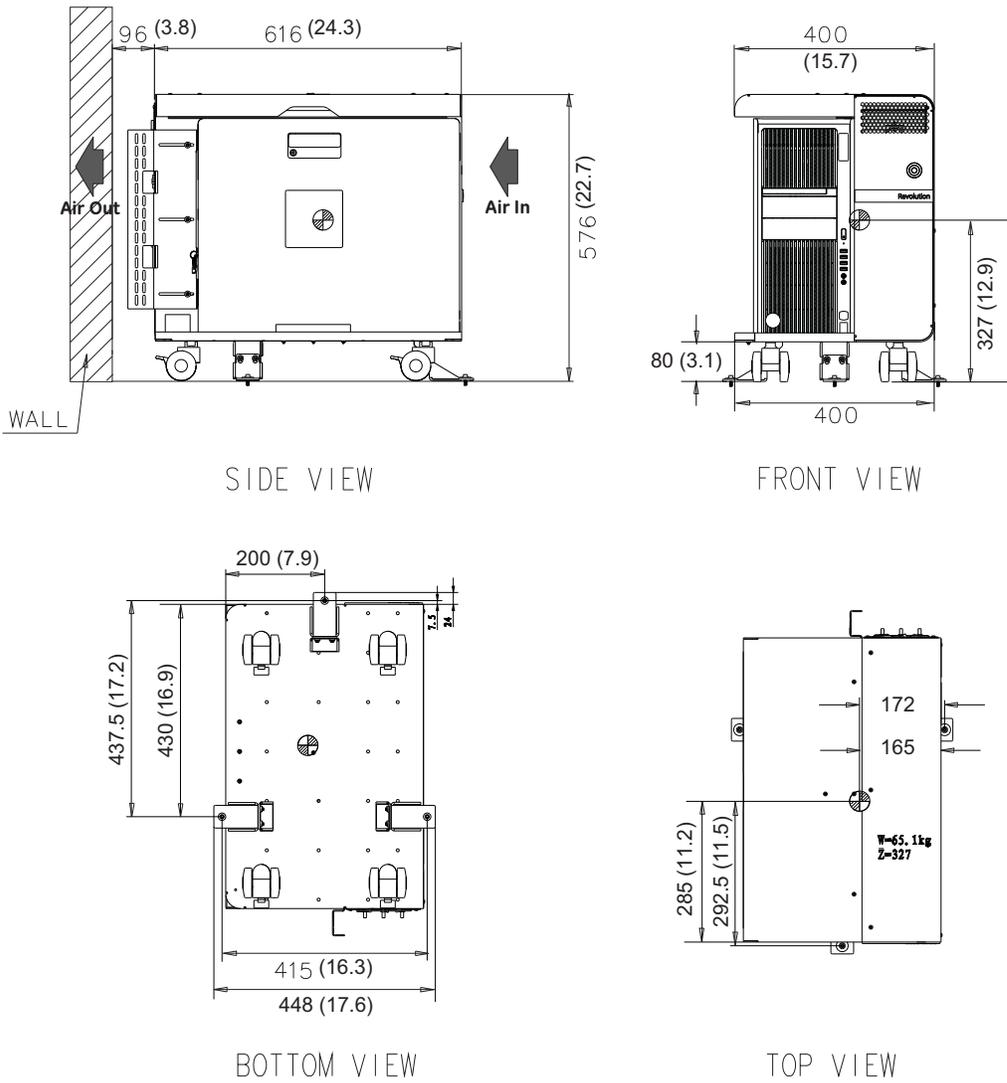


Figure 6-11 OpenOC16 Center-of-Gravity



# 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 10 shipping containers.

### Section 2.0 Delivery/Shipping Requirements & Considerations

The BrightSpeed Select 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 one half inch ( $\frac{1}{2}$ " ) 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 BrightSpeed Select 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 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

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



**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 BrightSpeed Select 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

### 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 0° to 30° C (32° to 86° F).
- Storage relative humidity up to 70%, non-condensing.
- Maximum relative humidity rate of change is 5%/hr.
- The maximum temperature rate of change is 5° F/hr. (3° C/hr.)
- Air pressure should be between 700hPa and 1060hPa.



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

If you are storing a system longer than six (6) months, but less than 12 months, contact CT Engineering for installation start-up instructions. Storage longer than 12 months is not recommended.



Figure 7-2 Package Symbols (Storage)

## 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 -40 degrees Fahrenheit (-40° C) or above 158 degrees Fahrenheit (70° C), 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.

- Time: Up to two weeks duration
- Temperature: -40° to +158° F (-40° to +70° C)
- Humidity: 10% to 100%, including condensing
- Altitude: -1,800ft to 18,000ft

-  **NOTICE** Component Freezing occurs if CT system is exposed to temperatures below 0° F (-18° C) 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 mounted between two dollies, see [Figure 7-3](#) . 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 7-3 Gantry with Shipping Dollies and Side Rails**

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

**Elevator requirements.** To move gantry from receiving location to scanning room, consider elevator capacity and size. By removing side rails and one dolly after gantry is placed in elevator, gantry width/length and elevator depth requirements are reduced. Contact a representative of elevator manufacturer if gantry weight exceeds elevator capacity.

CONFIGURATION	LENGTH CM (IN)	WIDTH CM (IN)	HEIGHT CM (IN)
Dollies On, Side Rails On	281 (111)	129 (51)	200 (79)
Dollies On, Side Rails Removed	281 (111)	100 (39.4)	200 (79)
Dollies Off, Covers Off	197 (77)	86 (34)	185 (73)

**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 inches).

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.

Gantry is shipped with 2 crates. The mainbody of Gantry is put in one crate. Bottom Cover, Side covers and accessories are shipped in another crate.

Gantry shipping dimensions are

- 2440mm (96") long, 1370mm (54") wide, 2200mm (86") high
- 1650mm (65") long, 1000mm (39") wide, 970mm (38") high

## Section 8.0 Table Considerations

The whole Lite table is shipped in one box. The side and base covers are disassembled and put on the table. The table is mounted between two dollies.

Table shipping dimensions are 2440 mm (96") long, 900 mm (35") wide, and 1430 mm (56") high.

---

## Section 9.0

### Console Considerations

#### **Global Operator Console:**

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

Dimensions of the console alone (as shipped) are 1170mm (46 in.) deep, 1340mm (53 in.) wide, and 1150mm (45 in.) high.

#### **True-In-One Console:**

True-In-One console has no table top. FWS table is shipped with the True-In-One console.

The dimensions of the console alone (as shipped) are 740mm (29 in.) deep, 470mm (19 in.) wide, and 640mm (25 in.) high.

#### **NIO16 Console:**

The console is shipped without covers installed. The covers are delivered in the Product Grade Collector.

The dimensions of the console alone (as shipped) measure 830 mm (33 in.) deep, 470 mm (19 in.) wide, and 656 mm (26 in.) high.

#### **OpenOC16:**

The console is shipped without covers installed.

The dimensions of the open console alone (as shipped) measure 850 mm (33.5 in.) deep, 550 mm (21.6 in.) wide, and 740 mm (29.1 in.) high.

## Section 10.0

### PDU Considerations

The PDU is shipped on a skid equipped with ramps for unloading.

PDU shipping dimensions (on the shipping skid) are 720 mm (28 in.) deep, 870 mm (34 in.) wide, and 1320 mm (52 in.) high.

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# **Chapter 8**

## **Power Requirements**

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### **Section 1.0**

#### **Introduction**

The power distribution unit (PDU) supplied with the 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 BrightSpeed Select 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 PDB or A1 box.

A dedicated feeder from the nearest Main Distribution Panel (MDP) should be used to 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, dedicate to CT system, visible to PDU service personnel, and must have lockout /tagout provisions.

### 2.2 Rating

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

(Note: The value in the brackets is for 50kVA, which is the rating of 16 slice standard system.)

Voltage	200 to 480 VAC
Capacity	75 kVA (50KVA)
Frequency	50 or 60 Hz +/- 3 Hz

- Maximum power demand = 75 kVA (50KVA)@ 0.85 PF at a selected technique of 140 kV, 300 mA (250mA).
- Average (continuous) power demand at maximum duty cycle = 20kVA.

The disconnect device referenced above must provide overcurrent protection for the system. A disconnect utilizing undervoltage release control is preferred over shunt trip devices. The rating of the 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.



**NOTICE** The electrical rating is described on the system rating label attached on the gantry; not on the PDU.

### **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 mm<sup>2</sup>) 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

## 3.1 Recommended Power Distribution System for 75KVA System

A dedicated feeder run from the facility main isolation transformer is recommended to power the BrightSpeed Select 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.



### WARNING

**IF THE POWER FEED FOR THE A1/PDB PANEL IS NOT ON A DEDICATED POWER TRANSFORMER ANY DEVICE THAT SHARES POWER FROM THAT TRANSFORMER MAY BE IMPACTED BY INADVERTENT POWER 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 93.5 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 8-2](#) 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 BrightSpeed Select CT scanner meet all the requirements stated in this document.

#### SYSTEM CHARACTERISTICS:

- Maximum power demand = 75kVA @ 0.85 PF: at a Selected Technique of 140 kV, 300mA.
- Continuous (average) power demand at maximum duty cycle = 20kVA .
- Maximum allowable total source regulation is 6%.
- Minimum recommended transformer size: 93.5kVA, with 2.4% rated regulation at unity power factor. Resultant maximum allowable feeder regulation is 3.4%.

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

Nominal Line Voltage	200	220	240	380	400	420	440	460	480
Hi-Line Limit, +10%	220	242	264	418	440	462	484	506	528
Lo-Line Limit, -10%	180	198	216	342	360	378	396	414	432
Continuous Line Current	58	52	48	30	29	27	26	25	24
Momentary Line Current	217	197	181	114	109	104	99	95	91
Maximum Line Current	241	219	201	127	121	115	110	105	101
Minimum Recommended Circuit Protection Rating	120	110	100	70	60	60	60	60	50

**Table 8-1 Nominal Line Voltage**

FEEDER LENGTH (MDATO A1) FEET (METERS)	MINIMUM FEEDER WIRE SIZE, AWG OR MCM (SQ. MM)/ VAC								
	200 VAC	220 VAC	240 VAC	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
50 (15)	1 (45)	2 (35)	3 (30)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
100 (30)	1/0 (55)	1/0 (55)	1 (45)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
150 (46)	3/0 (85)	2/0 (70)	2/0 (70)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
200 (61)	4/0 (100)	4/0 (100)	3/0 (85)	2 (35)	3 (30)	3 (30)	4 (22)	4 (22)	4 (22)
250 (76)	5/0 (125)	5/0 (125)	4/0 (100)	2 (35)	2 (35)	2 (35)	3 (30)	3 (30)	4 (22)
300 (91)	6/0 (170)	5/0 (125)	5/0 (125)	1 (45)	1 (45)	2 (35)	2 (35)	2 (35)	3 (30)
350 (107)	7/0 (215)	6/0 (170)	5/0 (125)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	2 (35)	2 (35)
400 (122)	7/0 (215)	7/0 (215)	6/0 (170)	2/0 (70)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)

Table 8-2 Minimum Feeder Wire Size

SUB-FEEDER LENGTH (A1 TO PM) FEET (METERS)	MINIMUM SUB-FEEDER WIRE, AWG OR MCM (SQ. MM)								
	200 VAC	220 VAC	240 VAC	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
32(9.7536)	1/0 (55)	1/0 (55)	1/0 (55)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)

Table 8-3 Minimum Feeder Wire Size

- 1.) Table 8-1, Table 8-2, and Table 8-3 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.

### 3.2 Recommended Power Distribution System for 50KVA System

A dedicated feeder run from the facility main isolation transformer is recommended to power the BrightSpeed Select 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 a dedicated distribution transformer is provided for the scanner, the minimum recommended transformer size is 62.5 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 8-2 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 BrightSpeed Select CT scanner meet all the requirements stated in this document.

**SYSTEM CHARACTERISTICS:**

- Maximum power demand = 50kVA@ 0.85 PF: at a Selected Technique of 140 kV, 250mA.
- Continuous (average) power demand at maximum duty cycle = 20KVA.
- Maximum allowable total source regulation is 6%.
- Minimum recommended transformer size: 62.5KVA, with 2.4% rated regulation at unity power factor. Resultant maximum allowable feeder regulation is 3.4%.

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

Nominal Line Voltage	200	220	240	380	400	420	440	460	480
Hi-Line Limit, +10%	220	242	264	418	440	462	484	506	528
Lo-Line Limit, -10%	180	198	216	342	360	378	396	414	432
Continuous Line Current	58	52	48	30	29	27	26	25	24
Momentary Line Current	145	132	121	76	73	69	66	63	61
Maximum Line Current	161	146	134	85	81	77	73	70	67
Minimum Recommended Circuit Protection Rating	80	80	70	50	50	50	50	50	50

**Table 8-4 Nominal Line Voltage**

FEEDER LENGTH (MDATO A1) FEET (METERS)	MINIMUM FEEDER WIRE SIZE, AWG OR MCM (SQ. MM)/ VAC								
	200 VAC	220 VAC	240 VAC	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
50 (15)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
100 (30)	2 (35)	2 (35)	3 (30)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
150 (46)	1/0 (55)	1 (45)	1 (45)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
200 (61)	3/0 (85)	2/0 (70)	1/0 (55)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
250 (76)	3/0 (85)	3/0 (85)	2/0 (70)	3 (30)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
300 (91)	4/0 (100)	3/0 (85)	3/0 (85)	3 (30)	4 (22)	4 (22)	4 (22)	4 (22)	4 (22)
350 (107)	5/0 (125)	4/0 (100)	3/0 (85)	2 (35)	3 (30)	3 (30)	3 (30)	4 (22)	4 (22)
400 (122)	6/0 (170)	5/0 (125)	4/0 (100)	1 (45)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)

**Table 8-5 Minimum Feeder Wire Size**

SUB-FEEDER LENGTH (A1 TO PM) FEET (METERS)	MINIMUM SUB-FEEDER WIRE, AWG OR MCM (SQ. MM)								
	200 VAC	220 VAC	240 VAC	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
32(9.7536)	1/0 (55)	1/0 (55)	1/0 (55)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)

**Table 8-6 Minimum Feeder Wire Size**

- 1.) [Table 8-1](#), [Table 8-2](#), and [Table 8-3](#) 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.
- A 1/0 (55 sq. mm) ground wire is recommended in all cases.

# Section 4.0 Ground System

The BrightSpeed Select 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.

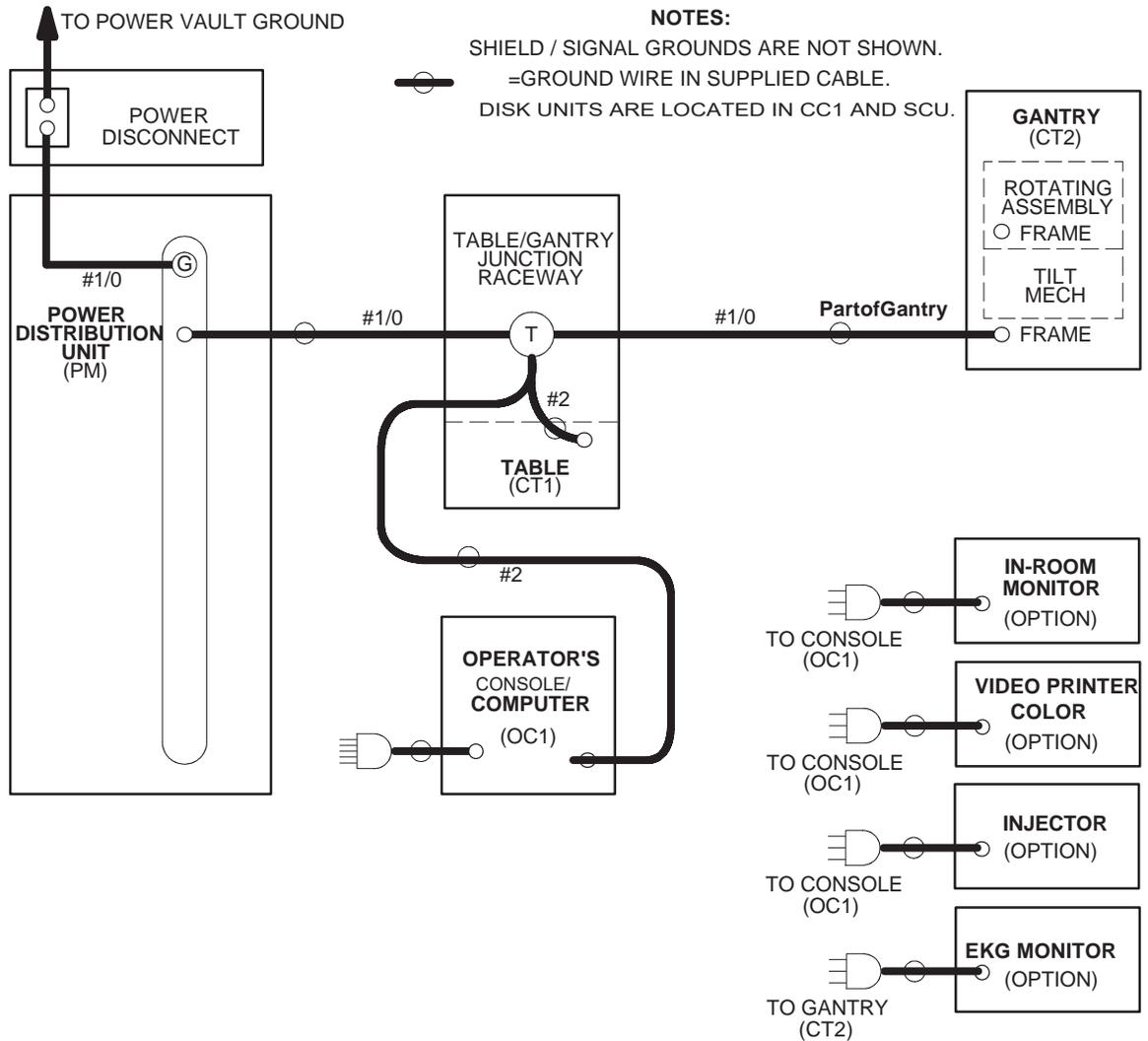


Figure 8-1 System Ground Map

# Chapter 9

## Interconnection Data

### Section 1.0 Introduction

Figure 9-5 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 9-9 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 9-8 list details for connection to BrightSpeed Select series equipment, using short length and 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. BrightSpeed Select series systems use prefabricated cables with large plugs. Therefore, conduit or pipe is not recommended for cable runs.

Long cable set (B71182CA) and short cable set (B71172CA) are both optional. Order the cable set that is required for your site.

### Section 2.0 Component Designators

DESIGNATOR	APPLIES TO	SOURCE
Disconnect Device	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
PM	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

Table 9-1 Component Designators

## Section 3.0 Interconnect Runs, Wiring and Cables

### 3.1 GEMS Supplied (Short 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	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			n/a	LVAC, Gantry to Table	1015		600	120VAC			3	14	
055	28 (20)	8.5 (5.97)	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 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 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			n/a	Signal, Gantry to Table		FT-4	300		80		25	22	

Table 9-2 GEMS Supplied Cables for GOC or TIO (Short Run) (2281840-5)- UL Information

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)	5419981-2	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)	5432019	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 9-3 GEMS Supplied Cables for NIO16 Console (Short Run) (2281840-14)- UL Information

Note: For short cable kits GEHW Cat# is B71022RT, WSO Cat# is B7580JY

### 3.2 GEMS Supplied (Freedom Workspace Table Extended Cables Kit)

Extended Cables Kit (5160577) is used for FWS:

PART #	DESCRIPTION	CONNECT TO	QUANTITY	LENGTH	
				MM	INCHES
5160573	DVI-A HD15 Video Cable	Monitor	1	4600+/-100	181.10+/-3.94
5160573-2	DVI-A HD15 Video Cable	Monitor	1	4600+/-100	181.10+/-3.94
5160574	USB Extension Cable	Trackball	1	3000+/-100	118.11+/-3.94
5160575	PS_2 Extension Cable	Keyboard	1	3000+/-100	118.11+/-3.94
5160575-2	PS_2 Extension Cable	Mouse	1	3000+/-100	118.11+/-3.94
5160576	SCIM CABLE	SCIM	1	6400+/-100	251.97+/-3.94
5162253	Power Code	Monitor	2	5500+/-100	216.54+/-3.94

**Table 9-4 Extended Cables**

Note: Freedom Workspace Table is only used for BrightSpeed and BrightSpeed Select series Systems.

### 3.3 GEMS Supplied (Console Cables)

PART #	DESCRIPTION	CONNECT TO	QUANTITY	LENGTH	
				MM	INCHES
5160575-2	PS_2 EXTENSION CABLE	Mouse	1	3000 ± 100	118.11 ± 3.94
5160574	USB EXTENSION CABLE	Keyboard	1	3000 ± 100	118.11 ± 3.94
5332107-2	CABLE, DVI to D-SUB VIDEO CABLE	Monitor	2	3000 ± 20	118.11 ± 0.79
5332093-2	CABLE, SCIM HD50-HD50	SCIM	1	3250 ± 25	127.95 ± 0.98
5315370	CABLE, USB TYPE A-B	PMT Tower	3	2000	78.74
5332100-2	Power Cord 3.5meter	PMT Tower/MOD Option Tower	2	3500 ± 30	137.80 ± 1.18
5315013-3	Power Cable, Right Monitor	Monitor	1	1500 ± 50	59.06 ± 1.97
5315013-4	Power Cable, Left Monitor	Monitor	1	1500 ± 50	59.06 ± 1.97

**Table 9-5 GE Healthcare Supplied Cables (True-In-One Console Cable)**

PART #	DESCRIPTION	CONNECT TO	QUANTITY	LENGTH	
				MM	INCHES
5366514-2	USB EXTENSION CABLE	Keyboard	1	3560 ± 30	140.16 ± 1.18
5450275	PS2 EXTENSION CABLE	Mouse	1	3500 ± 50	137.80 ± 1.97
5332107-2	CABLE, DVI to D-SUB VIDEO CABLE	Monitor	1	3000 ± 20	118.11 ± 0.79
5315370	CABLE, USB TYPE A-B	PMT media Tower, DVD-RW/USB external HDD	2	2000	78.74
5408703	DP to DVI cable, 3 meter	Monitor	1	3000 ± 50	118.11 ± 1.97
5432953-2	Power Cable, Peripheral Tower to NIO AC Box, IEC C14 to C13 Connectors	PMT media Tower	1	3050 ± 50	120 ± 1.97
5432953-3	Power Cable, Display monitor to NIO AC Box, IEC C14 to C13 Connectors	Monitor	1	3050 ± 50	120 ± 1.97
5432953-4	Power Cable, Scan monitor to NIO AC Box, IEC C14 to C13 Connectors	Monitor	1	3050 ± 50	120 ± 1.97

**Table 9-6 GE Healthcare Supplied NIO16 Console with Z800 Cables**

PART #	DESCRIPTION	CONNECT TO	QUANTITY	LENGTH	
				MM	INCHES
5431909	Cable, USB_Extend	Keyboard	1	3500 ± 50	137.8 ± 1.97
5458346	USB EXTENSION CABLE	Mouse	1	3500 ± 50	137.8 ± 1.97
5315370	CABLE, USB TYPE A-B	PMT media Tower, DVD-RW/USB external HDD	2	2000	78.74
5408703-2	DP to DVI cable, 3 meter	Monitor	1	3000 ± 50	118.11 ± 1.97
5366259	DV-I to VGA cable, 3 meter	Monitor	1	3000 ± 20	118.11 ± 0.79
5432953-6	Power Cable, Peripheral Tower to OpenOC J5	PMT media Tower	1	3050 ± 50	120 ± 1.97
5478299-6	Power Cable, Display monitor to OpenOC	Display Monitor	1	3050 ± 50	120 ± 1.97
5478299-5	Power Cable, Scan monitor to OpenOC	Scan Monitor	1	3050 ± 50	120 ± 1.97

**Table 9-7 GE Healthcare Supplied OpenOC16 with Z840 Cables**

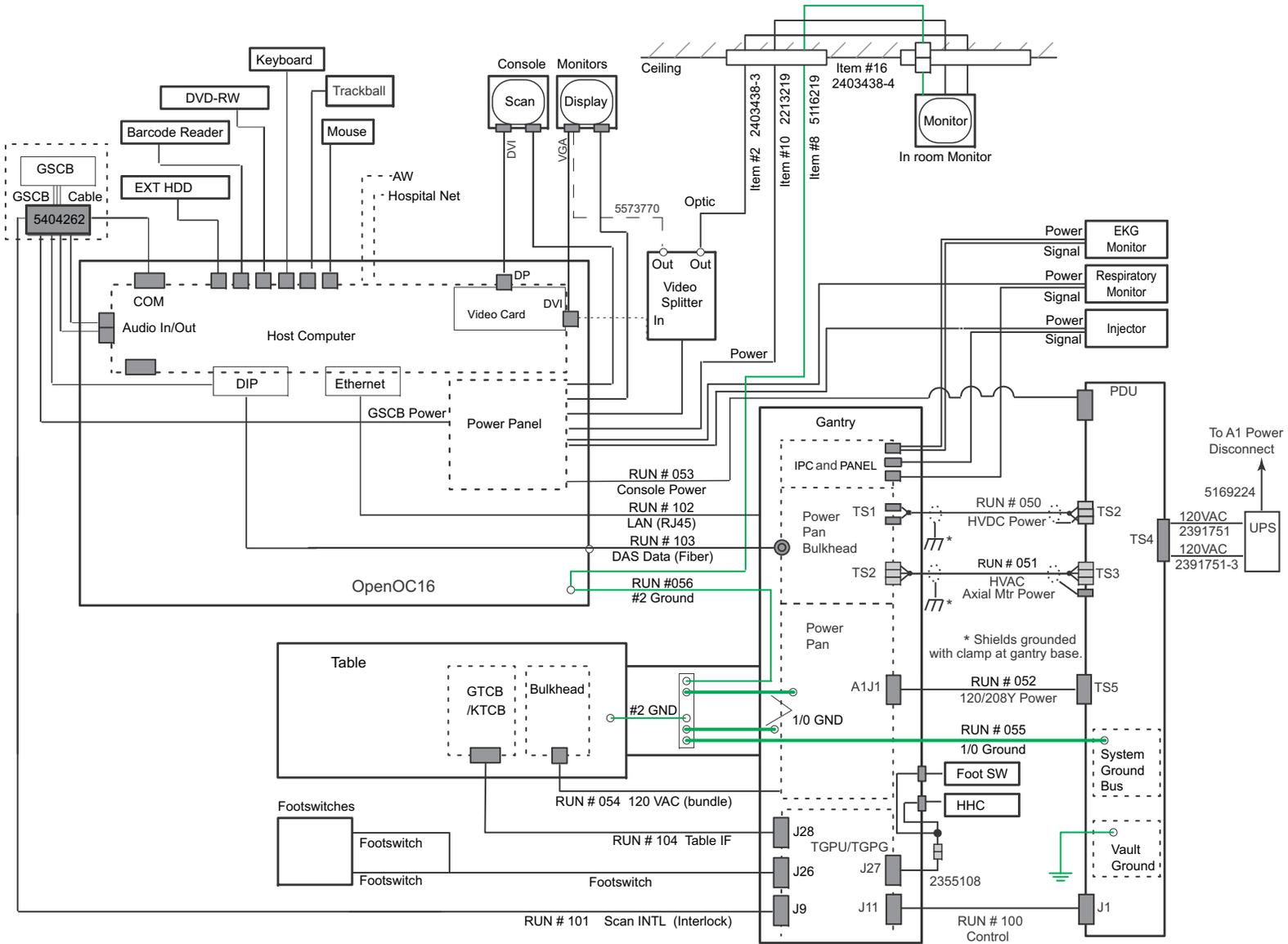
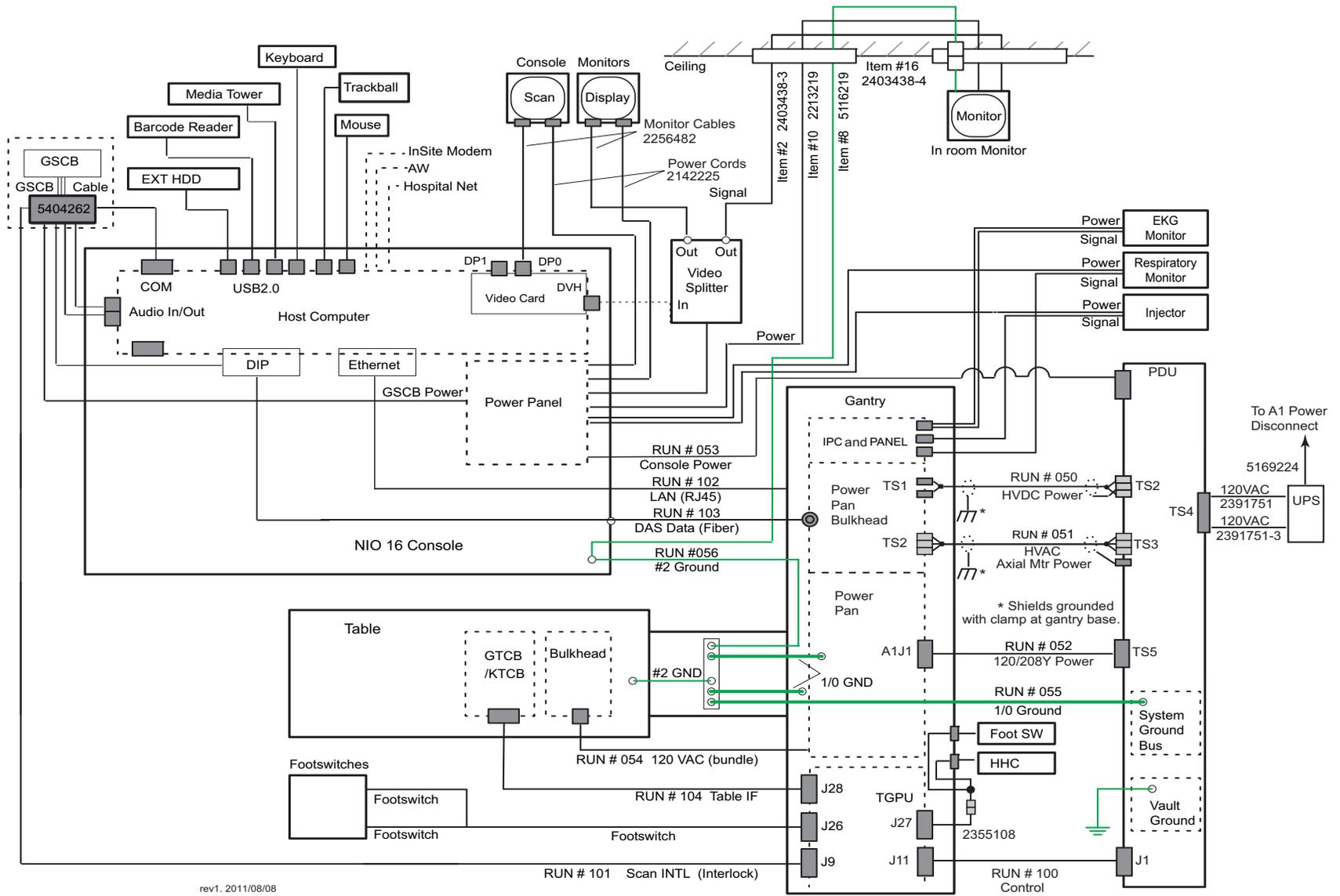


Figure 9-1 System Interconnect Diagram (OpenOC16 with Z840 Host PC)



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Figure 9-2 System Interconnect Diagram (with NIO16 Console)

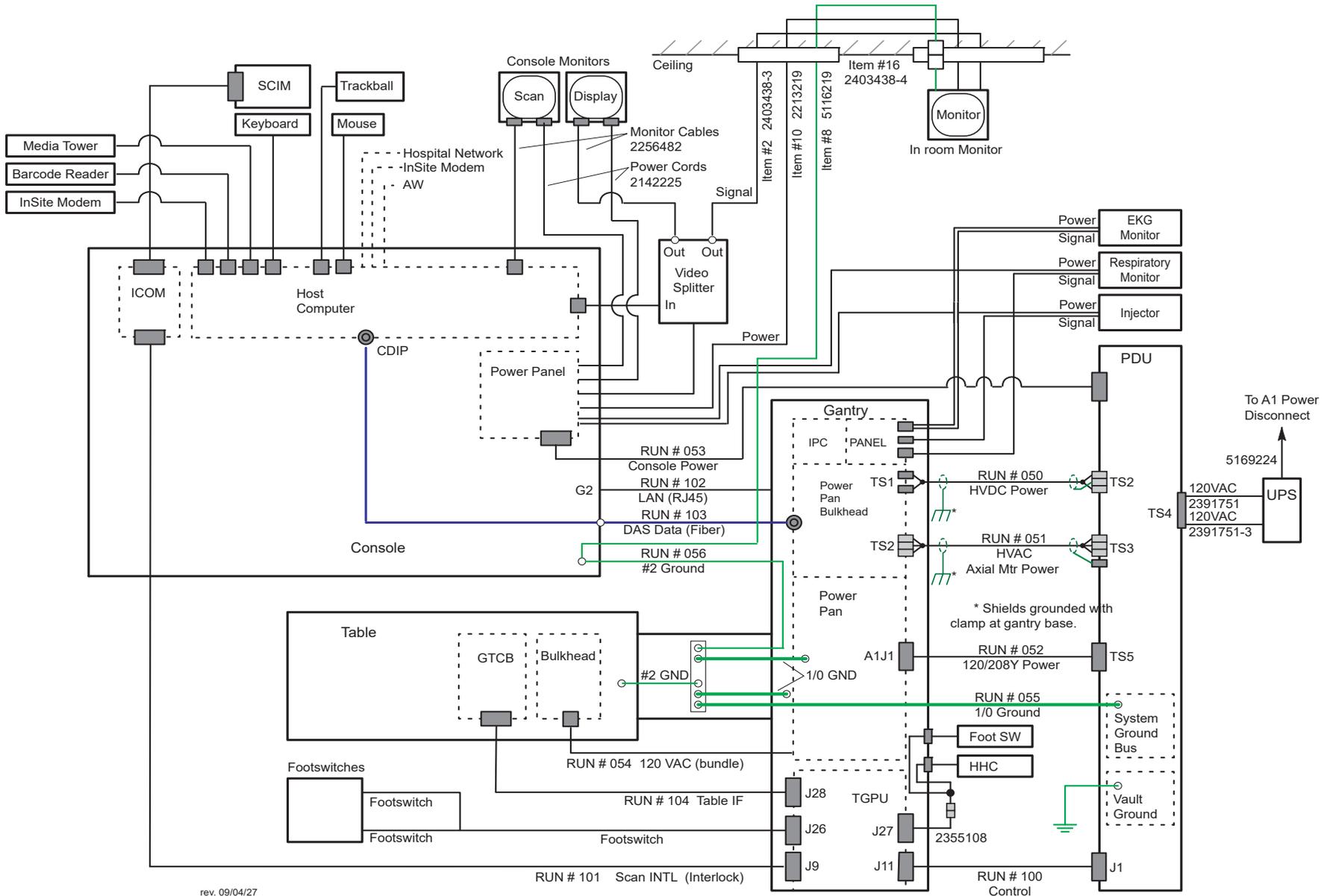


Figure 9-3 System Interconnect Diagram (with TIO Console)

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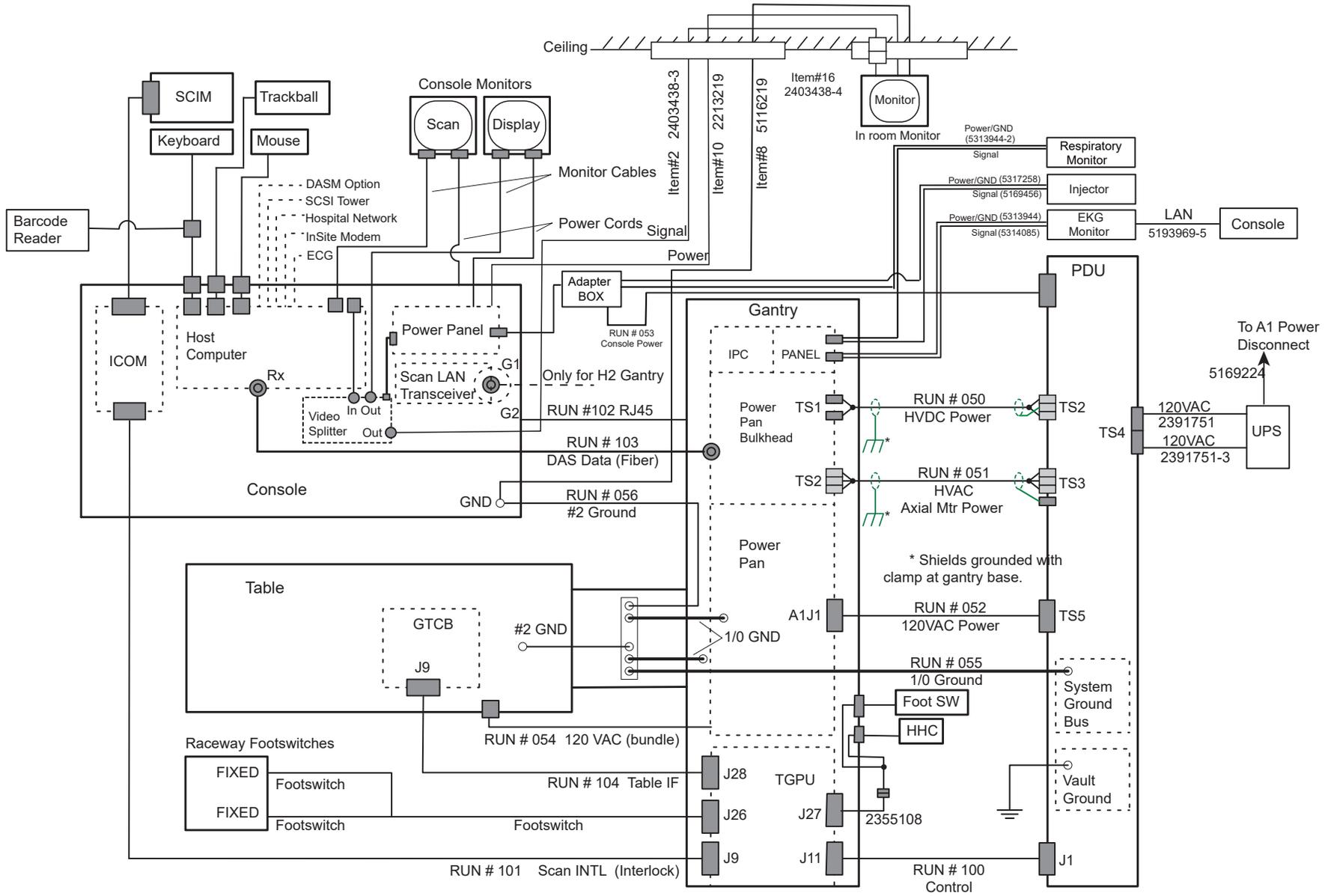


Figure 9-4 System Interconnect Diagram (with AIO Console)

### 3.4 GEMS Supplied (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 (57)	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 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 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 (24.86)	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 9-8 GEMS Supplied Cables for GOC or TIO (Long Run) (2281840-4)- UL Information

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)	5419981	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)	5432019	Fiber Optic, Gantry to OC			N/A	N/A			1	N/A	10 (.39) Dia

Table 9-9 GEMS Supplied Cables for NIO16 Console (Long Run) (2281840-13)- UL Information

Note: For long cable kits GEHW Cat# is B70992RT, WSO Cat# is B7580JZ

### 3.5 GEMS Supplied (Cables of Options)

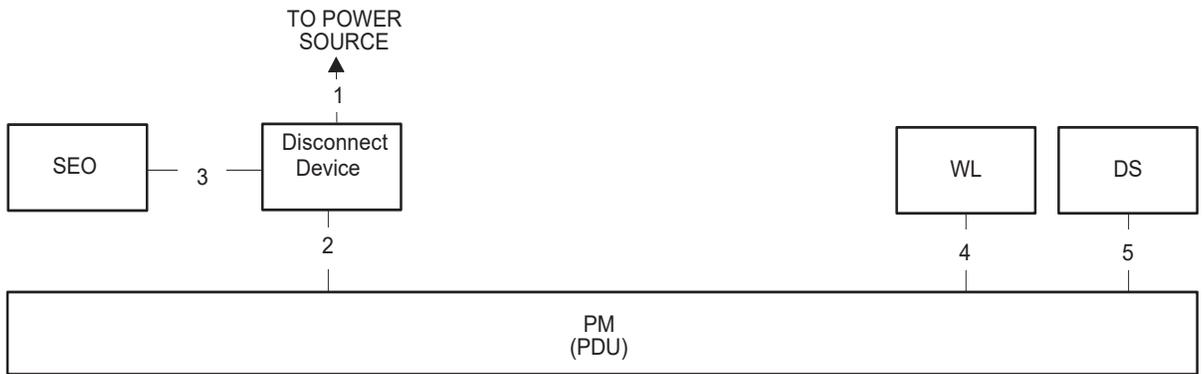
OPTION	LENGTH, ACTUAL (USABLE)		PART #	DESCRIPTION	UL CABLE INFORMATION								PULL SIZE MM (INCHES)
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia. mm (inch)	# of Cond	Size AWG	
Fluoro	75	22.9	2403438-3	5 BNC MALE TO HD 15 MALE 75 FEET		FT4		1Vp-p	75	9.1 (0.358)	5	26	
	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	1015	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	
Injector	100	30.5	5169456	GANTRY TO INJECTOR	1007	VW-1	300	<30VDC	80	1.57 (0.062)	3	22	45(1.78) Dia
	8.2	2.5	5317258	POWER CABLE INJECTOR TO CONSOLE	62	FT2	300	120VAC	60	9.4 (0.37)	3	14	36(1.41) Dia

Table 9-10 GEMS Supplied Cables for Options - UL Information

### 3.6 Contractor (Customer) Supplied

CUSTOMER INSTALLED WIRING		DESCRIPTION	CABLES SUPPLIED			PLUG PULLING DIMENSIONS		WIRE & CABLE PIGTAILS FT. (M.)	
QTY	SIZE AWG (MM <sup>2</sup> )		PART NO	LENGTH FT. (M.)	DIA. IN (MM)	FROM	TO	FROM	TO
<b>RUN NO. 1</b> 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)
<b>RUN NO. 2</b> 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 (Not Required)						3 (1)	3 (1)
<b>RUN NO. 3</b> 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)
<b>RUN NO. 4</b> POWER MODULE TO WARNING LIGHT CONTROL (PM - WL)									
2	14 (2)	WARNING LIGHT 24 VOLT CONTROL A3J2-1,2,3,4							
<b>RUN NO. 5</b> 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 129 FOR AWG (MM2) WIRE SIZES.								

Table 9-11 Runs 1, 2, 3, 4 and 5 Connections



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:

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

- 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.

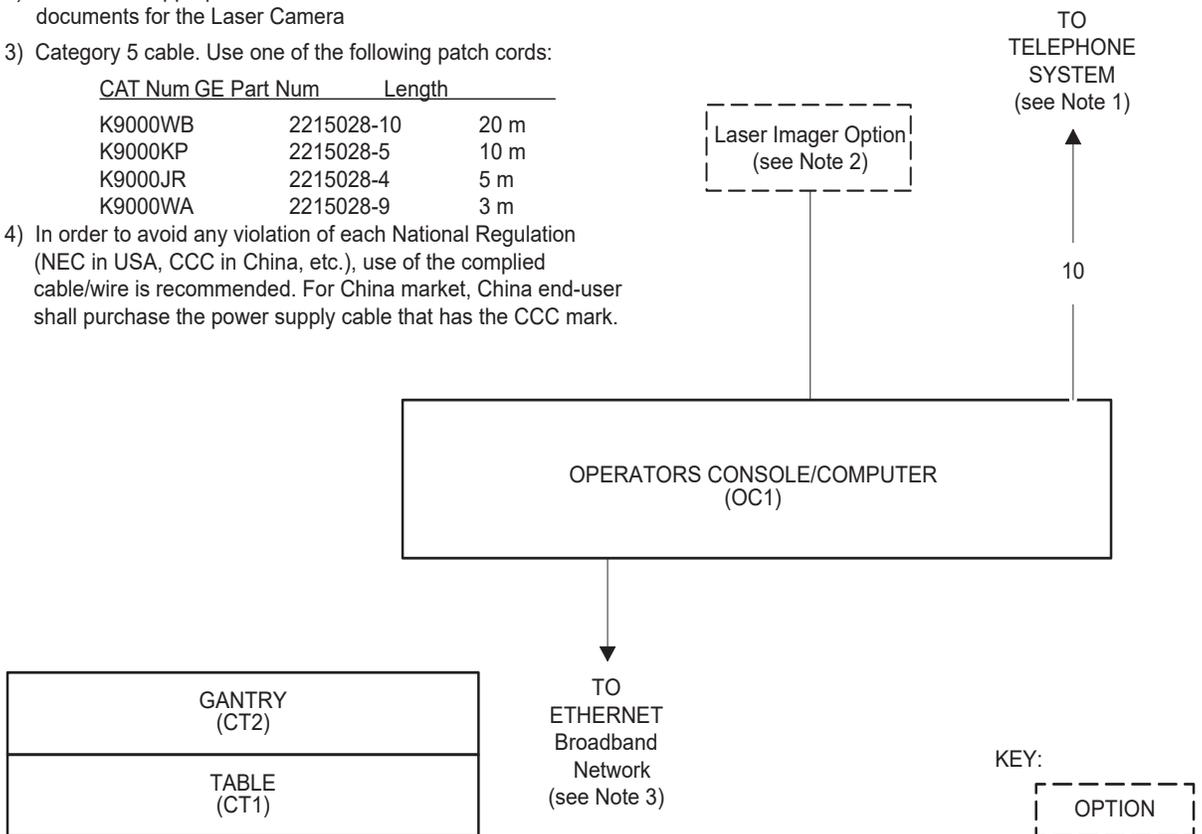


Figure 9-5 Interconnection Runs

## Section 4.0 Contractor Supplied Components

REFERENCE	ASSOCIATED EQUIPMENT	MATERIAL/LABOR SUPPLIED BY CUSTOMER CONTRACTOR	USA VENDOR / CAT NO. GE CATALOG
Disconnect Device 380 - 480V 50/60 Hz	Fusible Disconnect and Magnetic Contactor	3 Pole, 380V - 480V, Combination breaker with magnetic contactor. *	
ITL	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.	
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.	
	System Components	Reference the system installation drawings supplied by Installation Support Services within your geographic area.	

\*Refer to [Chapter 8 Section 3.0 - Recommended Power Distribution System](#), for minimum rating requirements and suggested disconnect devices..

Table 9-12 Contractor-Supplied Components

## Section 5.0 Fuse

ITEM	NUMBER	QTY	FRU CODE	DESCRIPTION/NAME
1	2351493	3.0	Yes	100A FUSE
2	2364059	2.0	Yes	GLASS FUSE
3	46-170021P50	2.0	Yes	FUSE 12 AMPS 250 VOLTS BUSSMAN MDA12 DUAL ELEMENT.
4	46-170021P15	2.0	Yes	Time Lag FUSE 8 AMPS 250 VOLTS (REVIEWED TK, 7/91).
5	2336517-2	2.0	Yes	FUSE 25 AMPS 700 VOLTS 2.5M SECONDS
6	46-170021P52	3.0	Yes	FUSE 3 AMPS 250 VOLTS (REVIEWED TK, 7/91).
7	46-170021P10	2.0	Yes	006.000A 0250V 3AG FAST UL/C (REVIEWED TK, 7/91).
8	46-170021P101	1.0	Yes	FUSE 20 AMPS 700 VOLTS 2~ LONG X 9/16~ DIA FAST BLOW
9	46-170021P106	2.0	Yes	FUSE 8 AMPS 250 VOLTS BUSSMANN ONLY
10	46-170021P31	2.0	Yes	1/2A, 250V SLO-BLO FUSE. TYPE 3AG, 1.25~ X 0.25~ GLASS BODY. (REVIEWED TK, 7/91).
11	2106993-5	2.0	Yes	FUSE 20 AMPS 500 VOLTS .3 SECONDS
12	46-327160P1	2.0	Yes	12.0A, 125VAC, DUAL ELEMENT TIME DLY FNM-12, 0.406 X 1.5 LG, FIBER BODY
13	2379651	1.0	Yes	FUSE - 700 V, 200 A, FAST SEMI

Table 9-13 P2030BE Fuse Kit HP60 90KVA (2385412-2 BOM, rev 2)

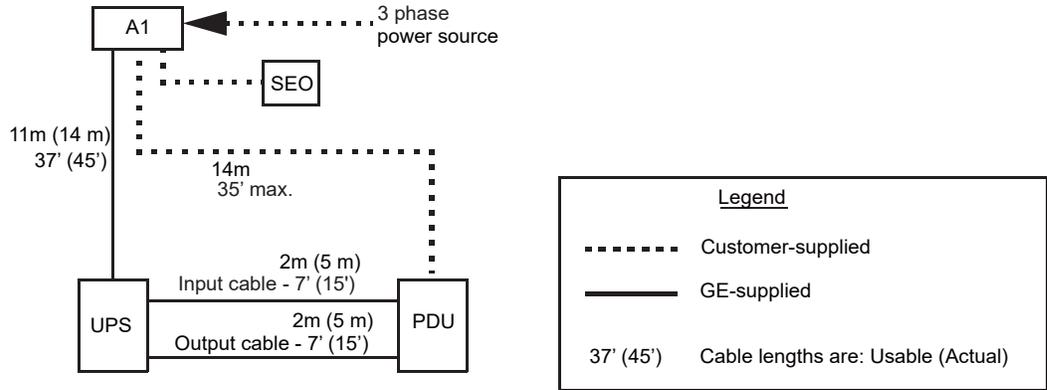
ITEM	NUMBER	QTY	FRU CODE	DESCRIPTION/NAME
15	2238207-3	1.0	Yes	FUS FF 14X51 2A 700VDC C 50KA ULR
16	99183979	1.0	Yes	SLOW BLOW FUSE HCP 6X32 10A 250V UL
17	U8009FF	3.0	Yes	FUSE 3.2A
18	U8008FF	3.0	Yes	FUSE 2.0A
19	U8006FF	3.0	Yes	FUSE 1.0A

**Table 9-13 P2030BE Fuse Kit HP60 90KVA (2385412-2 BOM, rev 2) (Continued)**

ITEM	NUMBER	QTY	FRU CODE	DESCRIPTION/NAME
1	2351493	1.0	Yes	100A FUSE
2	2364059	1.0	Yes	GLASS FUSE
3	46-170021P50	1.0	Yes	FUSE 12 AMPS 250 VOLTS BUSSMAN MDA12 DUAL ELEMENT.
4	46-170021P15	1.0	Yes	Time Lag FUSE 8 AMPS 250 VOLTS (REVIEWED TK, 7/91).
5	2336517-2	1.0	Yes	FUSE 25 AMPS 700 VOLTS 2.5M SECONDS
6	46-170021P52	5.0	Yes	FUSE 3 AMPS 250 VOLTS (REVIEWED TK, 7/91).
7	46-170021P10	2.0	Yes	006.000A 0250V 3AG FAST UL/C (REVIEWED TK, 7/91).
8	46-170021P101	1.0	Yes	FUSE 20 AMPS 700 VOLTS 2~ LONG X 9/16~ DIA FAST BLOW
9	46-170021P106	1.0	Yes	FUSE 8 AMPS 250 VOLTS BUSSMANN ONLY
10	46-170021P31	2.0	Yes	1/2A, 250V SLO-BLO FUSE. TYPE 3AG, 1.25~ X 0.25~ GLASS BODY. (REVIEWED TK, 7/91).
11	5329469	2.0	Yes	FUSE 20 AMPS 500 VOLTS .3 SECONDS--RoHS
12	46-327160P1	1.0	Yes	12.0A, 125VAC, DUAL ELEMENT TIME DLY FNM-12, 0.406 X 1.5 LG, FIBER BODY
13	2379651	1.0	Yes	FUSE - 700 V, 200 A, FAST SEMI
15	2238207-3	1.0	Yes	FUS FF 14X51 2A 700VDC C 50KA ULR
16	99183979	1.0	Yes	SLOW BLOW FUSE HCP 6X32 10A 250V UL
17	U8006FF	2.0	Yes	FUSE 1.0A
18	5118644	1.0	Yes	FAST ACTION 15 AMPS 250 VOLTS 0.01 SECONDS U0028FF
19	5327449	2.0	Yes	PROTECTION FUSE, 3.2A, NA, FAST ACTION, 250V, HM FUSE
20	5327448-2	1.0	Yes	PROTECTION FUSE, 2A, NA, FAST ACTION, 250V, HM FUSE, Not Preferred Part
21	2374694	2.0	Yes	8A TIME DELAY FUSES
22	5368105	1.0	Yes	1A Time_Delay fuse,10_4X38_1CLIP
23	5306477-3	1.0	Yes	PROTECTION FUSE, 15A, TIME DELAY, 300VDC, 600VAC, CARTRIDGE

**Table 9-14 FUSE KIT for BSD Meri (2385412-4 BOM, rev 2)**

# Section 6.0 UPS Interconnect



**Figure 9-6 Typical UPS Interconnect**

Note: If use UPS interconnect, A1 must be used as disconnect device, and 90KVA power capacity is required for hospital facility. Refer to [section 6.1](#) for detail requirements.



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

PDU Type & Model #	Max. Mom. kVA Rating	Required Main Disconnect (A1) Cat #			Optional Partial UPS Kit Cat #
		America	EMEA	Asia	
NGPDU-3 2326492-3	90kVA	<b>E4502AB (90A) or E4502AC (110A)</b> (incl. Auto Restart & Integrated UPS Control)	<b>E46001AC</b> (incl. Auto Restart & Integrated UPS Control)	<b>E4502AC (110A)</b> (incl. Auto Restart & Integrated UPS Control)	<b>B7999ZA</b> <b>alt.E4502KY</b> (includes 5169128 9155-10GE model 10KVA, 2ph UPS & hardware kit) requires one of the A1 Panels shown at left

**Table 9-15 BrightSpeed Select series Partial UPS Back-up Options**

Note: Conduit is required between:

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

## 6.1 Recommended Power Distribution System Used With A1

A dedicated feeder run from the facility main isolation transformer is recommended to power the BrightSpeed Select 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 a dedicated distribution transformer is provided for the scanner, the minimum recommended transformer size is 112.5 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 9-17 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 BrightSpeed Select CT scanner meet all the requirements stated in this document.

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

Nominal Line Voltage	200	220	240	380	400	420	440	460	480
Hi-Line Limit, +10%	220	242	264	418	440	462	484	506	528
Lo-Line Limit, -10%	180	198	216	342	360	378	396	414	432
Continuous Line Current	58	52	48	30	29	27	26	25	24
Momentary Line Current	260	236	217	137	130	124	118	113	108
Maximum Line Current	289	262	241	152	144	137	131	126	120
Minimum Recommended Circuit Protection Rating	150	150	150	110	110	100	100	90	90

Table 9-16 Nominal Line Voltage

FEEDER LENGTH (MDATO A1) FEET (METERS)	MINIMUM FEEDER WIRE SIZE, AWG OR MCM (SQ. MM)/ VAC								
	200 VAC	220 VAC	240 VAC	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
50 (15)	1/0 (55)	1/0 (55)	1/0 (55)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)
100 (30)	2/0 (70)	1/0 (55)	1/0 (55)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)
150 (46)	4/0 (100)	3/0 (85)	2/0 (70)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)
200 (61)	5/0 (125)	4/0 (100)	4/0 (100)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)
250 (76)	6/0 (170)	5/0 (125)	5/0 (125)	1 (45)	1 (45)	2 (35)	2 (35)	2 (35)	3 (30)
300 (91)	7/0 (215)	6/0 (170)	5/0 (125)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	2 (35)	2 (35)
350 (107)	8/0 (275)	7/0 (215)	6/0 (170)	2/0 (70)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)
400 (122)	8/0 (275)	7/0 (215)	7/0 (215)	2/0 (70)	2/0 (70)	1/0 (55)	1/0 (55)	1/0 (55)	1 (45)

Table 9-17 Minimum Feeder Wire Size

SUB-FEEDER LENGTH (A1 TO PM) FEET (METERS)	MINIMUM SUB-FEEDER WIRE, AWG OR MCM (SQ. MM)								
	200 VAC	220 VAC	240 VAC	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
32(9.7536)	1/0 (55)	1/0 (55)	1/0 (55)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)

**Table 9-18 Minimum Feeder Wire Size**

- 1.) Table 9-16, Table 9-17, and Table 9-18 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.

## Section 7.0 Typical Customer Supplied Wiring

### 7.1 Primary Power Disconnect

Requires LOTO compatible disconnect to install this system.

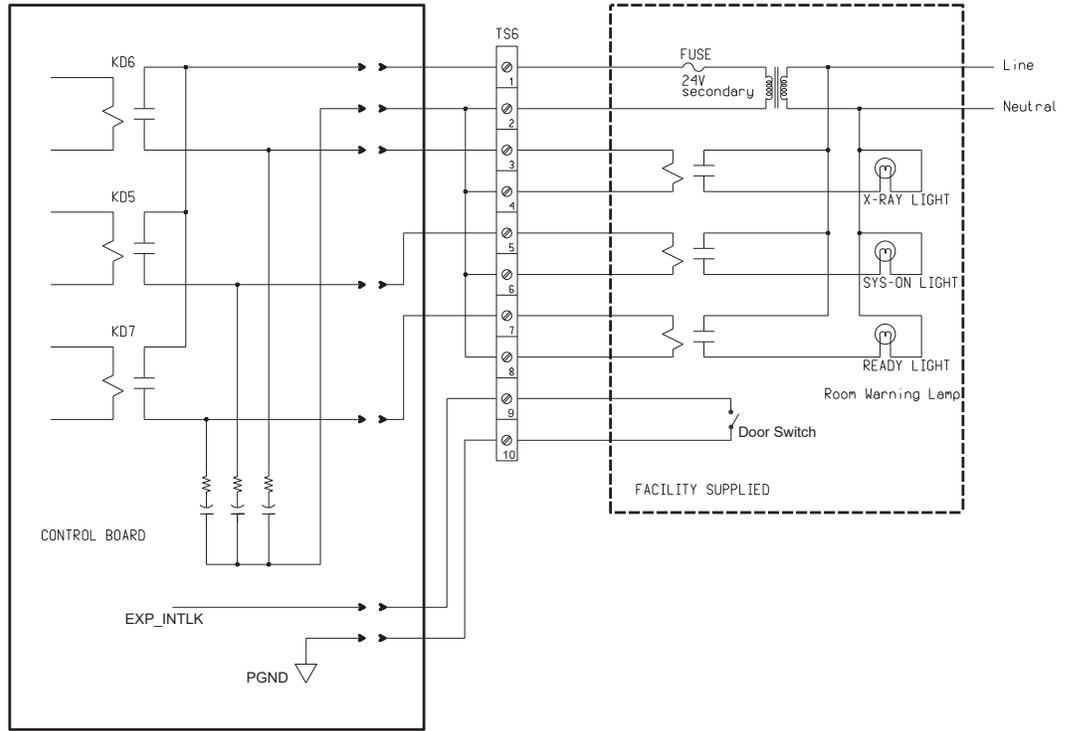
If a UPS is required, a GE Disconnect is strongly recommended for safe operation. The GE disconnect and UPS are designed to work together.



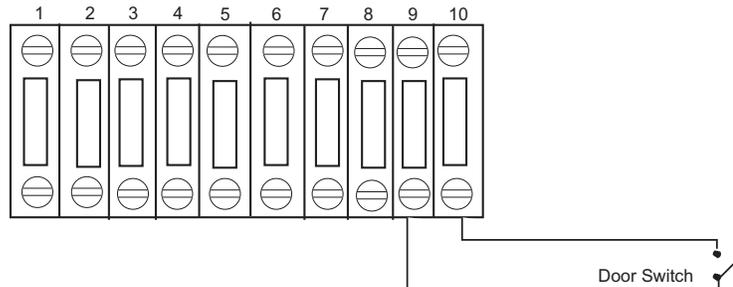
Figure 9-7 Primary Power Disconnect (A1)



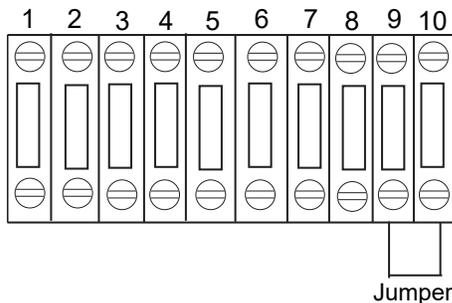
## 7.2 Scan Room Warning Light & Door Interlock



**Figure 9-9 Typical TS6 Warning Light & Door Interlock Connections**



**Figure 9-10 TS6 Room Door Interlock Connections - With a Door Interlock**



If not using a door switch, add a jumper.

If jumper is not in place, exposures will not be made. Check this jumper if you get scan interlock errors.

**Figure 9-11 TS6 Room Door Interlock Connections - Without a Door Interlock**





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