Discovery™ MI Digital Ready PET/CT

Discovery™ PET/CT 710 (2.0) | Discovery™ PET/CT 710 Clarity (2.0) (China only)

Pre-Installation Manual

5746684-1EN
Revision 5

Important...X-Ray Protection

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

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

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

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

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

Important...Radioactive Material Handling

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

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

Rev 2 (July 21, 2005)

Language Policy

DOC0371395 - Global Language Procedure

PARALAJ-MËRIM (SQ-AL)	Ky manual është i disponueshëm në disa gjuhë. • Nëse një ofrues shërbimi klientësh kërkon një gjuhë të ndryshme nga ato që mundësohen në Portalin e dokumentacionit të klientit, është përgjegjësia e klientit që të ofrojë shërbime përkthimi. • Mos u përpiqni të kryeni shërbime në pajisje, pa lexuar dhe kuptuar paraprakisht manualin e shërbimit. • Mosrespektimi i këtij paralajmërimi mund të çojë në lëndim të ofruesit të shërbimit, operatorit ose pacientit si pasojë e goditjes elektrike, mekanike ose një rreziku tjetër.
تحذير (AR-SA)	هذا الدليل متوفر بعدة لغات • إذا كان مقدم الخدمة التابع للعميل يطلب لغة غير تلك المتوفرة في بوابة توثيق العميل، فإنه يقع على عاتق العميل مسؤولية تقديم خدمات الترجمة • لا تحاول صيانة الجهاز ما لم تتم استشارة دليل الخدمة هذا وفهمه • قد يؤدي عدم مراعاة هذا التحذير إلى إصابة مقدم الخدمة أو المشغل أو المريض من جراء الصدمات الكهربائية أو المخاطر الميكانيكية أو غيرها من المخاطر
ПРЕДУПРЕЖДЕНИЕ (BG)	Това ръководство е налично на няколко езика. • Ако доставчикът на услуги на даден клиент изисква език, който е различен от осигурените в портала с документация за клиенти, отговорност на клиента е да предостави преводачески услуги. • Не се опитвайте да обслужвате оборудването, освен ако не сте се консултирали с това сервизно ръководство и сте го разбрали. • Несъблюдаването на това предупреждение може да доведе до нараняване на предоставящия услугите, оператора или пациента вследствие на токов удар, механична или други опасности.
警告 (ZH-CN)	本手册有多种语言版本。 • 如果客户的服务提供商要求使用 Customer Documentation Portal（客户文档门户）未提供的其他语言，则客户有责任提供相应的翻译服务。 • 请勿尝试检修设备，除非已明确参考并理解本检修手册。 • 不遵循此警告可能会导致检修服务提供者、操作员或患者受到触电、机械或其他危害的损伤。
警告 (ZH-HK)	本手冊備有多個語言版本。 • 若客戶的服務提供者所需語言版本不在 Customer Documentation Portal（客戶文件入口網站）所列語言之中，客戶需自行負責提供翻譯服務。 • 除非已查閱並理解本檢修手冊，否則，請勿嘗試檢修設備。 • 不遵循此警告可能會導致服務提供者、操作員或患者因為觸電、機械或其他危險而受傷。

警告 (ZH-TW)	本手冊備有多個語言版本。 • 若客戶的服務提供者所需語言版本不在 Customer Documentation Portal（客戶文件入口網站）所列語言之中，客戶需自行負責提供翻譯服務。 • 除非已查閱並理解本檢修手冊，否則，請勿嘗試檢修設備。 • 不遵循此警告可能會導致服務提供者、操作員或患者因為觸電、機械或其他危險而受傷。
UPOZOR-ENJE (HR)	Ovaj je priručnik dostupan na nekoliko jezika. • Ako serviser klijenta zahtijeva jezik koji nije jedan od jezika dostupnih na portalu s korisničkom dokumentacijom (Customer Documentation Portal), odgovornost je klijenta pružiti uslugu prevođenja. • Nemojte pokušavati servisirati opremu ako niste proučili i razumjeli ovaj servisni priručnik. • Nepoštovanje ovog upozorenja može izazvati ozljede servisera, rukovatelja ili pacijenta kao posljedicu strujnog udara, mehaničkih ili drugih opasnosti.
VÝSTRAHA (CS)	Tato příručka je k dispozici v několika jazycích. • Pokud zákazníkův poskytovatel služeb vyžaduje jiný jazyk než jazyky, které jsou k dispozici na portálu s uživatelskou dokumentací, je odpovědností zákazníka poskytnout překladatelské služby. • Nepokoušejte se provádět servis zařízení, aniž byste prostudovali tuto servisní příručku a porozuměli jí. • Nedodržení tohoto varování může vést ke zranění poskytovatele služeb, obsluhy nebo pacienta, způsobenému úrazem elektrickým proudem či mechanickým nebo jiným nebezpečím.
ADVARSEL (DA)	Denne vejledning fås på flere sprog. • Hvis en kundes tjenesteudbyder kræver et andet sprog end dem, der er til rådighed i Kundedokumentationsportalen, er det kundens ansvar at levere oversættelsestjenester. • Undgå at forsøge at udføre service på udstyret, medmindre du har læst og forstået denne servicevejledning. • Hvis du undlader at overholde denne advarsel, kan det føre til skader på servicemedarbejderen, operatøren eller patienten på grund af elektrisk stød, mekaniske eller andre farer.
WAAR-SCHUWING (NL)	Deze handleiding is in verschillende talen beschikbaar. • Als de serviceprovider van een klant een andere taal vereist dan de talen die beschikbaar worden gesteld in het Customer Documentation Portal (Klantdocumentatieportaal), is het de verantwoordelijkheid van de klant om vertaalservices te leveren. • Probeer geen service op de apparatuur uit te voeren zonder de servicehandleiding te hebben gelezen en begrepen. • Het negeren van deze waarschuwing kan leiden tot letsel bij de serviceprovider, de operator of de patiënt door elektrische schokken, mechanische of andere gevaren.

WARNING (EN)	This manual is available in several languages. • If a customer's service provider requires a language other than those provided in the Customer Documentation Portal, it is the customer's responsibility to provide translation services. • Do not attempt to service the equipment unless this service manual has been consulted and is understood. • Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.
HOIATUS (ET)	Käesolev juhend on saadaval mitmes keeles. • Kui kliendi teenusepakkuja vajab juhendit mõnes muus keeles, mida pole kliendidokumentatsiooni portaalis, on kliendi kohustuseks tõlketeenuste osutamine. • Ärge hakake seda seadet hooldama enne, kui olete käesolevat hooldusjuhendit lugenud ja selle sisu mõistnud. • Selle hoiatuse eiramine võib põhjustada hooldusteenuse pakkujale, operaatorile või patsiendile elektrilöögist, mehhaanilistest või muudest ohtudest tulenevaid vigastusi.
VAROITUS (FI)	Tämä opas on saatavilla useilla kielillä. • Jos asiakkaan palveluntarjoaja edellyttää muita kuin asiakkaan asiakirjaportaalissa saatavilla olevia kieliä, käännöspalveluiden tarjoaminen on asiakkaan vastuulla. • Lue huolto-opas huolellisesti ennen laitteen huoltotoimenpiteiden suorittamista. • Tämän varoituksen huomiotta jättäminen voi johtaa huollon suorittajan, laitteen käyttäjän tai potilaan loukkaantumiseen sähköiskun, mekaanisen vaaran tai muun vaaran vuoksi.
ATTENTION (FR)	Ce manuel est disponible en plusieurs langues. • Si le prestataire de services d'un client nécessite que le manuel soit rédigé dans une autre langue que celles fournies sur le Portail de Documentation Client, il incombe au client de le faire traduire. • Ne pas essayer d’assurer la maintenance de l’équipement sans avoir au préalable consulté et compris les informations contenues dans ce manuel. • Le non-respect de cet avertissement peut entraîner chez le technicien, l’opérateur ou le patient des blessures dues à des dangers électriques, mécaniques ou autres.
WARNUNG (DE)	Dieses Handbuch ist in mehreren Sprachen erhältlich. • Wenn ein Dienstleister des Kunden dieses in einer anderen Sprache als der im Kundendokumentationsportal verfügbaren benötigt, liegt es in der Verantwortung des Kunden, Übersetzungsdienstleistungen zu erbringen. • Wartungsarbeiten am Gerät dürfen nur durchgeführt werden, nachdem dieses Wartungshandbuch gelesen und verstanden wurde. • Andernfalls besteht Verletzungsgefahr für den Dienstleister, Bediener oder Patienten durch Stromschlag, mechanische Gefahren oder andere Gefahren.

ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)	Αυτό το εγχειρίδιο διατίθεται σε διάφορες γλώσσες. • Εάν ο πάροχος υπηρεσιών συντήρησης ενός πελάτη χρειάζεται διαφορετική γλώσσα από αυτές που διατίθενται στο Customer Documentation Portal (Πύλη τεκμηριώσεων πελάτη), ο πελάτης είναι υπεύθυνος για την παροχή υπηρεσιών μετάφρασης. • Μην επιχειρήσετε να εκτελέσετε συντήρηση του εξοπλισμού, εάν δεν έχετε διαβάσει και κατανοήσει το παρόν εγχειρίδιο συντήρησης. • Εάν δεν τηρήσετε αυτήν την προειδοποίηση, μπορεί να προκληθεί τραυματισμός του παρόχου υπηρεσιών συντήρησης, του χειριστή ή του ασθενούς λόγω ηλεκτροπληξίας, μηχανικής βλάβης ή άλλου κινδύνου.
אזהרה (HE)	מדריך זה זמין במספר שפות • אם ספק שירות של לקוח זקוק לשפה שאינה מסופקת ב-Customer Documentation Portal (פורטל תיעוד ללקוחות), באחריות הלקוח לספק את שירותי התרגום) • אסור לנסות להעניק שירות לציוד לפני עיון במדריך שירות זה והבנת התוכן שלו • פעולה שלא בהתאם לאזהרה זו עלולה לגרום לפציעה של ספק השירות, המפעיל או המטופל כתוצאה מהתחשמלות, סיכונים מכניים או סיכונים אחרים
FIGYELMEZTETÉS (HU)	Ez a kézikönyv több nyelven is rendelkezésre áll. • Ha az ügyfél szervizszolgáltatója azoktól eltérő nyelvű kézikönyvet szeretne, mint amelyeket az Ügyféldokumentációs portálon biztosítunk, akkor az ügyfél feladata, hogy gondoskodjon a megfelelő fordításról. • Ne próbálkozzon a berendezés szervizelésével anélkül, hogy a jelen szervizkézikönyvet elolvasta és megértette volna. • Ennek a figyelmeztetésnek a figyelmen kívül hagyása áramütés, mechanikai vagy egyéb veszélyek következtében a szervizszolgáltató, a kezelő vagy a páciens sérülését okozhatja.
AÐVÖRUN (IS)	Þessi handbók er fáanleg á mörgum tungumálum. • Ef þjónustuaðili viðskiptavinar þarfnast annars tungumáls en þessara tungumála er það á ábyrgð viðskiptavinarins að veita þýðingarþjónustu. • Ekki reyna að þjónusta búnaðinn fyrr en búið er að lesa og skilja þessa þjónustuhandbók. • Sé ekki farið eftir þessari viðvörun getur það valdið meiðslum á þjónustuaðila, notanda eða sjúklingi af völdum raflosts, vélrænna áverka eða annarar hættu.
PERINGATAN (IN)	Manual ini tersedia dalam beberapa bahasa. • Jika penyedia layanan pelanggan membutuhkan bahasa selain dari yang disediakan dalam Portal Dokumentasi Pelanggan, merupakan tanggung jawab pelanggan untuk menyediakan layanan penerjemahan. • Jangan berupaya untuk melakukan servis pada peralatan sebelum menyimak manual servis dan memahami isinya. • Jika peringatan ini tidak ditaati, ini dapat menyebabkan cedera penyedia layanan, operator, atau pasien, akibat sengatan listrik, bahaya mekanis, atau bahaya lainnya.

AVVERTEN-ZA (IT)	Il presente manuale è disponibile in varie lingue. • Qualora un fornitore di servizi del cliente richieda una lingua diversa da quelle fornite nel Portale con la documentazione per il cliente, sarà responsabilità del cliente fornire il servizio di traduzione corrispondente. • Non tentare di riparare l'apparecchiatura se non si è prima consultato e compreso il presente manuale di servizio. • Il mancato rispetto di questa avvertenza può provocare lesioni per il fornitore dei servizi, per l'operatore o per il paziente, a causa di scosse elettriche, meccaniche o altri pericoli.
警告 (JA)	本マニュアルは多言語で提供されています。 • お客様のサービスプロバイダが、お客様ドキュメントポータルページで使用されていない言語を必要とする場合は、お客様の責任で翻訳サービスを提供してください。 • 機器の保守を行う場合は、必ず本サービスマニュアルを読み理解した上で行ってください。 • この警告に従わない場合は、サービスプロバイダー、オペレータ、または患者が、感電、機械的異常、またはその他の有害要因によって負傷する恐れがあります。
경고 (KO)	이 설명서는 여러 언어로 제공됩니다. • 고객의 서비스 제공자가 고객 문서 포털에 제공된 언어가 아닌 다른 언어를 요구하는 경우 번역 서비스를 제공하는 것은 고객의 책임입니다. • 이 서비스 설명서를 참고했고 이해하지 않는 한은 해당 장비를 수리하려고 시도하지 마십시오. • 이 경고를 지키지 않으면 감전, 기계상의 위험 또는 다른 위험으로부터 서비스 제공자, 사용자 또는 환자가 다칠 수 있습니다.
BRĪDINĀ-JUMS (LV)	Šī rokasgrāmata ir pieejama vairākās valodās. • Ja klientu apkalpošanas speciālistam ir nepieciešama cita valoda, kas nav piedāvāta klientu dokumentācijas portālā, klienta pienākums ir nodrošināt tulkošanas pakalpojumus. • Nemēģiniet veikt aprīkojuma apkopi, kamēr nav izlasīta un izprasta apkopes rokasgrāmata. • Ja šis brīdinājums netiek ņemts vērā, pakalpojumu sniedzējs, operators vai pacients var tikt savainots elektriskās strāvas trieciena, mehāniskas vai citas bīstamības rezultātā.
ĮSPĖJIMAS (LT)	Šis vadovas yra išverstas į keletą kalbų. • Jei kliento paslaugų teikėjui reikalingas vertimas į kitą kalbą, kurios nėra kliento dokumentacijos portale, už vertimo paslaugų suteikimą atsako klientas. • Neatlikite įrangos techninės priežiūros, kol neperžiūrėjote ir neišsiaiškinote šio techninės priežiūros vadovo. • Nepaisant šio įspėjimo dėl elektros smūgio, mechaninio arba kitokio pavojaus gali būti sužalotas paslaugų teikėjas, operatorius arba pacientas.

TWISSIJA (MT)	Dan il-manwal huwa disponibbli f'diversi lingwi. • Jekk fornitur tas-servizz ta' klijent ikun jeħtieġ lingwa għajr dawk ipprovduti fil-Portal tad-Dokumentazzjoni tal-Klijent, hija r-responsabbiltà tal-klijent li jipprovdi servizzi ta' traduzzjoni. • Tippruvax tagħmel service fuq it-tagħmir sakemm ma jkunx ġie kkonsultat u mifhum dan il-manwal għas-service. • Jekk wieħed jonqos milli josserva din it-twissija, dan jista' jwassal f'korriment lill-fornitur tas-servizz, lill-operatur jew lill-pazjent minn xokk elettriku, mekkaniku, jew perikli oħra.
ADVARSEL (NO)	Denne håndboken er tilgjengelig på flere språk. • Hvis en kundes tjenesteleverandør krever et annet språk enn de som finnes i dokumentasjonsportalen for kunder, er det kundens ansvar å levere en oversettelsestjeneste. • Ikke prøv å utfør service på utstyret med mindre man har konsultert og forstått service-håndboken. • Om denne advarselen ikke følges kan det føre til skade på tjenesteleverandør, operatør eller pasient fra elektrisk støt, mekanisk eller annen fare.
OSTRZEŻE-NIE (PL)	Niniejszy podręcznik jest dostępny w kilku językach. • Jeżeli serwisant klienta wymaga języka, który nie został udostępniony w portalu dokumentacji klienta, obowiązkiem klienta jest zapewnienie usług tłumaczeniowych. • Nie podejmować prób serwisowania urządzenia bez uprzedniego zapoznania się z niniejszym podręcznikiem serwisowym i zrozumienia jego treści. • Nieprzestrzeganie tego ostrzeżenia może spowodować obrażenia u serwisanta, operatora lub pacjenta, spowodowane porażeniem prądem, zagrożeniami mechanicznymi lub innymi.
ATENÇÃO (PT-BR)	Este manual está disponível em vários idiomas. • Se o prestador de serviços de um cliente necessitar de um idioma diferente dos fornecidos no Portal da Documentação do Cliente, o fornecimento dos serviços de tradução é de responsabilidade do cliente. • Não tente realizar manutenção do equipamento a menos que o manual de serviço tenha sido consultado e seja entendido. • O não cumprimento deste aviso resultará em lesões ao provedor de serviço, operador ou paciente de choque elétrico, mecânico ou outros riscos.
ATENÇÃO (PT-PT)	Este manual está disponível em vários idiomas. • Se o fornecedor de serviços de um cliente necessitar de um idioma diferente dos fornecidos no Portal de Documentação do Cliente, é da responsabilidade do cliente assegurar os serviços de tradução. • Não experimente reparar o equipamento sem primeiro consultar, e compreender, o presente manual de assistência. • O incumprimento deste aviso pode resultar em ferimentos para o técnico de reparação, o operador ou o paciente decorrentes de perigos de eletrocussão, mecânicos ou outros.

ATENȚIE (RO)	Acest manual este disponibil în mai multe limbi. • Dacă furnizorul de servicii al unui client necesită o limbă diferită de cele furnizate în Customer Documentation Portal (Portalul cu documentație pentru clienți), este responsabilitatea clientului să furnizeze servicii de traducere. • Nu încercați să efectuați întreținerea echipamentului decât dacă ați consultat și ați înțeles acest manual de service. • Nerespectarea acestei avertizări poate duce la rănirea furnizorului de servicii, a operatorului sau a pacientului din cauza șocurilor electrice, mecanice sau a altor pericole.
ПРЕДУПРЕЖДЕНИЕ (RU)	Это руководство доступно на нескольких языках. • Если поставщику услуг заказчика требуется языковая версия, отличная от предложенных на портале документации для заказчиков, перевод руководства на необходимый язык осуществляется стороной заказчика. • Не начинайте эксплуатацию оборудования без предварительного надлежащего ознакомления с этим руководством. • Если вы проигнорируете это предупреждение, поставщик услуг, оператор или пациент могут получить механические травмы, травмы вследствие поражения электрическим током или другие увечья.
UPOZOR-ENJE (SR)	Ovaj priručnik je dostupan na nekoliko jezika. • Ako korisnikov serviser zahteva neki drugi jezik osim onih koji su dostupni na portalu sa korisničkom dokumentacijom (Customer Documentation Portal), klijent mora da obezbedi prevod. • Nemojte pokušavati da servisirate opremu ako niste proučili i razumeli ovaj priručnik za servisiranje. • Nepoštovanje ovog upozorenja može da izazove povrede servisera, operatera ili pacijenta kao posledicu strujnog udara, mehaničkih ili drugih opasnosti.
UPOZORNE-NIE (SK)	Táto príručka je k dispozícii v niekoľkých jazykoch. • Ak poskytovateľ služieb daného zákazníka požaduje jazyk odlišný od jazykov dostupných na portáli s dokumentáciou pre zákazníkov, za prekladateľské služby zodpovedá zákazník. • Nepokúšajte sa vykonávať servis na zariadení, pokiaľ ste si neprečítali a nepochopili pokyny v servisnej príručke. • Nedodržanie tohto varovania môže byť príčinou úrazu poskytovateľa servisu, obsluhy alebo pacienta v dôsledku zásahu elektrickým prúdom alebo v dôsledku mechanických alebo iných nebezpečenstiev.
OPOZORILO (SL)	Ta priročnik je na voljo v več jezikih. • Če ponudnik storitev stranke potrebuje priročnik v jeziku, ki ni na voljo na portalu z dokumentacijo stranke, mora stranka zagotoviti prevod. • Opreme ne poskušajte servisirati, če niste prebrali in razumeli tega servisnega priročnika. • V primeru neupoštevanja tega opozorila lahko pride do telesnih poškodb ponudnika storitev, upravljavca ali pacienta zaradi električnega udara, mehanskih ali drugih nevarnosti.

ADVERTEN-CIA (ES)	Este manual se encuentra disponible en varios idiomas. • Si el proveedor de servicios de un cliente requiere un idioma distinto de los proporcionados en el Customer Documentation Portal (Portal de documentación para clientes), es responsabilidad del cliente proporcionar los servicios de traducción. • No intente realizar el mantenimiento del sistema a menos que haya consultado y comprendido este manual de servicio. • El incumplimiento de esta advertencia puede causar lesiones al suministrador de servicios, el operador o el paciente debido a descarga eléctrica, mecánica u otros riesgos.
VARNING (SV)	Denna manual är tillgänglig på flera språk. • Om en kunds tjänsteleverantör behöver ett annat språk än de som tillgängliggjorts på portalen för kunddokumentation är det kundens ansvar att erbjuda översättningstjänster. • Försök inte att reparera utrustningen utan att först rådfråga och förstå denna servicehandbok. • Om denna varning inte beaktas kan det leda till skada för tjänsteleverantör, operatör eller patient genom elektrisk stöt, mekaniska eller andra faror.
DİKKAT (TR)	Bu kılavuz birden fazla dilde sunulmaktadır. • Bir müşterinin servis sağlayıcısı Müşteri Belgeleri Portalı'nda sağlananlardan farklı bir dil talep ederse çeviri hizmeti sağlamak müşterinin sorumluluğundadır. • Bu servis kılavuzuna başvurmadan ve içeriğini anlamadan ekipman üzerinde servis işlemi yapmayı denemeyin. • Bu uyarıya uyulmaması; elektrik çarpması, mekanik tehlikeler veya başka tehlikelerden ötürü servis sağlayıcı, operatör veya hastanın yaralanmasıyla sonuçlanabilir.
ПОПЕРЕДЖЕННЯ (UK)	Цей посібник доступний кількома мовами. • Якщо постачальник послуг замовника використовує мову, яку не вказано на порталі з документацією для замовників, послуги з перекладу має забезпечити замовник. • Не починайте роботу з обладнанням без попереднього належного ознайомлення з посібником із використання. • Якщо ви проігноруєте це попередження, постачальник послуг, оператор або пацієнт можуть зазнати механічних травм, ураження електричним струмом або інших тілесних ушкоджень.
CẢNH BAO (VI)	Tài liệu hướng dẫn này có sẵn ở một số ngôn ngữ. • Nếu nhà cung cấp dịch vụ của khách hàng yêu cầu ngôn ngữ khác với ngôn ngữ được cung cấp trong Cổng Thông Tin Tài Liệu Khách Hàng, khách hàng có trách nhiệm cung cấp dịch vụ dịch thuật. • Không cố bảo dưỡng thiết bị trừ khi đã tham khảo và hiểu rõ hướng dẫn sử dụng này. • Việc không chú ý đến cảnh báo này có thể dẫn đến thương tích cho nhà cung cấp dịch vụ, người vận hành hoặc bệnh nhân do điện giật, nguy hiểm cơ học hoặc các mối nguy hiểm khác.

Revision History (5746684-1EN)

Revision	Date	Reason for Change
5	11-February-2022	Updated Language Policy with new general version. ***Chapter 1:*** Updated Section 1.1.1 Table 1 s-cat numbers. Updated Section 1.2 with note about concrete strength. ***Chapter 2:*** Updated Section 2.1.1 Table 7 specs: for bolts. Updated Section 2.1.2; added new figure and table for Z8G4 dimensions. Updated Section 2.1.3; added new figure for Z8G4 center-of-gravity. ***Chapter 3:*** Updated Section 3.3.2 Figure 47 frequency spec. ***Chapter 5:*** Updated Section 5.3.1.2 Table 25 Table 26 with updated cable length. ***Chapter 7:*** Updated Section 7.1 with revised overview statement.
4	23-November-2020	Added address to back cover.
3	3-September-2020	***All:*** Updated terminology: “PARC4” to “PARC4.X”. ***Chapter 1:*** Updated Section 1.1.1 with text and table about system configurations. Updated Section 1.2 with NOTE on weldmant gantry floor strength. ***Chapter 2:*** Updated Section 2.1.1 Table 7 specs: pet-ct gantry, parc 4.x and workspace table. Updated Section 2.1.2, Figs. 11 and 12 for gantry height; Fig. 14 for parc 4.x dimensions; Fig. 17 for workspace table dimensions. Updated Section 2.3.1.3 with x-ray tube box specs and text. Updated Section 2.3.1.4 with new ceiling height text. Updated Section 2.3.7 with new text for parc4.x. Updated Section 2.4.1.1, Figs 40 and 41 with new images and tables. Updated Section 2.4.1.4 with new anchor quantities. ***Chapter 4:*** Updated Section 4.1.1, Table 16 with max rate of change in temperature; Table 17 with max rate of change in relative humidity.

2	23-September-2019	***All:*** Updated terminology: “PM” to “PMI”, “Dia.” to “Outer Dia”. ***Chapter 1:*** Updated Table 1-3 to add weldment gantry and open console values. Added text to clarify legacy aluminum gantry and NIO64 console values. Added Illustrations 1-3 and 1-5 and text for weldment gantry systems. Updated Illustration 1-4. Added text to clarify legacy aluminum gantry. ***Chapter 2:*** Updated Table 2-1 and 2-2 to add weldment gantry and open console values; update service cabinet value. Added text to clarify legacy aluminum gantry and NIO64 console values. Updated Illustration 2-1 text for aluminum gantry. Added Illustration 2-2 and text for weldment gantry. Added Illustration 2-6 and text for open console. Updated Illustration 2-9 with new service cabinet value. Updated Illustration 2-10 text for aluminum gantry. Added Illustration 2-11 and 2-14 text for weldment gantry. Updated Illustration 2-13 text for aluminum gantry. Added Illustration 2-20 for open console. Updated Table 2-5 with new service cabinet value. Updated text in Sections 3.3.1 and 3.3.3 to reference typical room layout illustrations 2-24 and 2-25; removed text. Updated floor template part # in Sections 4.1.1. Updated 4.1.4 for aluminum vs weldment gantry. Updated Illustration 2-24 text for aluminum gantry; added notes on extender and casters. Added Illustration 2-25 and table below for weldment gantry; added notes on extender and casters. Updated table below Illustration 2-26 for IEC 3.1 text. Added Illustration 2-31 for weldment gantry. ***Chapter 3:*** Per SPR HCSDM00539271, updated equipment range from PDU. Per SPR HCSDM00531255, updated Table 3-2 for IEC 4.0. Added Table 3-3 for IEC 4.0. Updated all frequency range references from “2.5GHz” to “2.7GHz” for IEC 4.0. Updated IEC standards reference for IEC 4.0. ***Chapter 4:*** Updated Section 1.2 with new altitude operating range. ***Chapter 5:*** Update Illustration 5-1 with new “typical” MDP. Per SPR HCSDM00496990, updated dedicated distribution transformer value. Updated average power demand at maximum duty cycle, maximum power demand and continuous (average) power demand in System Power Requirements section. Added Section 1.5.6 for Idle Power Demand. Updated Table 5-1 for nominal line voltage rates. Updated Tables 5-2 and 5-3 for minimum feeder and sub-feeder wire sizes. Updated Table 5-5 for new A1 panel designator. Updated Table 5-9 for new A1 panel cat. numbers. Table 5-10, Run No. 3 (A1 - SEO), for new A1 panel per CAPA 17083282. Updated 5-11 for new A1 panel cat. numbers; updated title for “UPS Catalog Numbers”. ***Chapter 6:*** Updated broadband interface type: from “10Gb” to “100Mb”.
1	17-November-2016	Initial release.

Contents

Chapter 1 General Requirements

1.1 Introduction

1.1.1 Objective and Scope of this Manual

NOTE

This manual contains data that is applicable for several system configurations. Please refer to the S-CAT number of the system you are going to install to understand which data is applicable.

Table 1 S-Cat Numbers

Catalog Number	Description	Configuration
S3200AW	Discovery MI-DR Weldment	Weldment
S3200SW	Discovery MI-DR Weldment	Weldment
S9130HW	Discovery MI-DR Weldment Mobile	Weldment
S3200A	Discovery MI-DR	Aluminum (Non-weldment)
S3200ES	Discovery MI-DR	Aluminum (Non-weldment)
S3200AC	Discovery MI-DR (China, Kazakhstan only)	Aluminum (Non-weldment)
S3200RU	Discovery MI-DR ((Russia only)	Aluminum (Non-weldment)
S3200BW	Discovery 710 Clarity	Weldment

This manual is the official guide and informational resource for planning and preparing a location for the installation of the Discovery MI Digital Ready system. The responsibility of arranging and paying for all work associated with site planning, site preparation, and system installation rests solely with the buyer/purchaser of the system.

This manual guides you through the pre-installation siting and regulatory requirements. Keep in mind, this manual cannot address or answer each and every site specific question or concern. Contact your GE Healthcare Project Manager of Installation (PMI) for answers to any additional questions or concerns not addressed in this manual. Prior to any construction or approval, General Electric Headquarters Architectural Planning must review all PET/CT preliminary concepts, site plans, and final working drawings associated with the installation of the system. Contact your GE PMI or complete information regarding your site-specific room layout.

1.1.2 Responsibility of the Customer

It is the responsibility of the customer (buyer/purchaser) to prepare the site in accordance with all the specifications provided in this manual and in conjunction with site-specific drawings and applicable regulations. It is essential to verify all aspects of the site configuration before construction has begun, as subsequent changes can be costly or impractical. A detailed pre-installation checklist is provided in this manual. It is the responsibility of the customer to ensure all requirements on the checklist are fulfilled and that the site conforms to all specifications and requirements detailed in this manual.

Pre-Installation requirements shall include the procurement and installation of all required materials and services necessary to prepare the room to be ready for installation of the PET/CT system. The customer is responsible for all aspects of site preparation, including:

- Assigning a project coordinator.
- Planning and construction requirements for the installation of the PET/CT system in accordance with all national, state, or local regulatory requirements for the country in which the installation occurs, for example:
    - Fire control devices as required by local codes.
    - Permits, inspections, radiation licensing, etc.
    - Earthquake-related regulations.
- Selecting a location suitable for the installation of the PET/CT system.
- Constructing or renovating the site.
- All design work associated with preparing the installation site for the PET/CT system and all architectural, mechanical, and electrical drawings associated with the design of the site.
- All alterations or modifications to products not specifically included in the sales contract.
- A clean and safe work environment for installation of the PET/CT system.
- A location with proper lighting, a level finished floor, finished walls, and a finished ceiling.
- A support structure in the floor, walls, and ceiling suitable for mounting all system components as specified in the site design.
- Installation of all required conduit, ducts, and raceways to safely route all cables and coolant lines.
- Supplying electrical power of the required voltage, all necessary power supply cables and grounds, all necessary power cables and grounds to the PDU, and an Emergency-Off switch in the scan room.
- Installation of all properly-sized junction boxes, outlets with covers, line safety switches, and fittings installed at the locations specified in the site design.
- All Non-GE wires and cables as specified in this document:
    - The electrical contractor shall ring out and tag all wires at both ends.
    - Wires shall be continuous and without splices.
    - Ground wires shall conform to product requirements.
    - Color-coded wires shall be used whenever possible, to enable easier identification.

- All work shall conform to IBC (International Building Code) and local building and safety codes.

NOTE

GE Healthcare does not provide or install the wires, conduits, junction boxes, or ducting illustrated in this publication, unless specifically stated.

1.1.3 Site Project Coordinator

The site project coordinator is the primary contact and liaison between GE Healthcare and all site related functions, between the purchaser, the construction planners, architects, contractors, and any other site administrative personnel.

To ensure a successful installation, it is recommended that a single/individual site project coordinator manage the entire project. Ideally, the project coordinator is a person familiar with all phases of pre-installation and installation of similar medical device construction projects, from conceptual planning through to system start up. The site project coordinator shall be responsible for working closely with GE Healthcare to ensure the client (buyer/purchaser) upholds all requirements in this manual.

1.2 System Siting Requirements

- ***System Site Print***

  A system installation, relocation, or move requires a site print. The PET/CT room layout shall match the layout detailed on the site print.

- ***Regulatory Code & System Requirements***

  A site shall meet all regulatory code and system requirements associated with; service, structural, flooring, vibration, HVAC, electrical, IT network, radiation protection, operational clearance requirements, and all applicable codes.

- ***Floor Specification***

  The floor shall have a minimum concrete thickness of 127 mm (5 in.).

  The floor shall be no greater than 6 mm (0.250 in.) out of level over a 3048 mm (10 ft.) range, with level defined as the horizontal surface between the highest and lowest points.

  NOTE

  For minimum concrete strength required, please refer to the latest version of the Revolution EVO Pre-Installation Manual, 5866663-1EN (Section 3.4).

  NOTE

  If the concrete floor has a floor covering installed over it (such as floor tile), 17 or more openings 101.6 mm (4 in.) in diameter will be cut into the floor covering to ensure the table and gantry rest on the concrete. (Openings are cut during installation.)

  Shims shall not be used to level the gantry or patient table.

NOTE

The PET weldment gantry moves backwards during service on detachable rails, therefore concrete floor strength and levelness should be met behind the PET gantry as well. Please refer to the floor mounting details section for detachable rails position.

- ***Related Hospital Equipment Clearances***

  Carefully check/verify the room layout for the necessary clearances required of any related hospital equipment. Good judgment is required to avoid compromising important system features. There shall be ample maneuvering space around the patient table for a hospital cart, any emergency equipment, and all personnel, etc.

1.2.1 Project Manager of Installation (PMI) Tasks

GE Healthcare Project Manager of Installation (PMI) will assist buyer with system siting requirements.

1.2.2 Customer Requirements for Site Readiness

- ***Site Readiness Completion and Verification***

  Installation cannot proceed until all site-readiness requirements have been completed and verified. A site is ready when all renovations/modifications have been completed and the scan suite meets all regulatory, code, and system requirements, system delivery needs, and all requirements for any options.

- ***Contractor's Final Confirmation***

  Final confirmation of installation site readiness shall be made by all contractors associated with the project; structural engineer/architect, HVAC contractor, electrical contractor, qualified radiological health physicist, cleaning service, etc.

- ***Schedule of Site-Ready Visit***

  To ensure timely system delivery and installation, the customer shall complete all necessary work listed in this Pre-Installation Manual and schedule a site-ready Project Manager of Installation (PMI) visit prior to system delivery.

- ***Pre-installation Checklist***

  The customer shall also verify site readiness by filling out and signing the following Pre-Installation Checklist. The checklist shall be completed *six weeks prior to scheduled delivery date.*

Table 2 Customer Pre-Installation Checklist - Required Information for Site

Complete prior to scheduled delivery date. Today's Date:	
Hospital Name:	
(as it appears on the system screen)	
Network ID numbers/IP Addresses:	List IP Numbers and Address

☐ AW			
AW Direct Connect Address:			
☐ Camera			
Camera Setup Information			
☐ PACS			
☐ Other _____			
☐ Other _____			
Do you want HIPAA enabled?	☐ Yes	☐ No	
Do you want automatic downloads enabled?	☐ Yes	☐ No	

Commitment Dates:

Action Item	Action Item Completed?		Comments
	Yes	No	
Have the facilities department, contractor, and GE Healthcare certified the project schedule?			
Will committed site-ready date be met?			
Does construction completion date meet or precede the delivery date?			
Is the Power & Ground survey complete? Hospital Contact Name/No. _____ _____			
Is the site-ready visit scheduled?			
Is the delivery date scheduled?			
Does the delivery date require adjustment?			
Is the installation date scheduled?			
Does the installation date require adjustment?			
Is the installation timing determined?			
☐ Weekdays			

☐ Weekend			
☐ Quick Install			
If Weekend or Quick Install selected, have all sub-contractors been notified?			
Is the system first-use date scheduled?			
Are system applications/training dates scheduled?			
☐ On-Site Training Date: _____			
☐ Healthcare Institute Training Date: _____			

Equipment Compatibility:

Action Item	Action Item Completed?		Comments
	Yes	No	
Has the order been reviewed for completeness and compatibility with existing equipment?			
☐ Remote Monitors			
☐ AW Relocation			
☐ Cardiac Option			
☐ Injectors			
Are interfaces to existing or new accessories ordered and planned accordingly?			
Are cables of the correct length on order?			
Have the locations of the following peripherals (or options) been included in the site drawings?			
☐ EKG Monitor			
☐ Injector Control			
☐ Laser camera			
☐ UPS			
☐ 2nd Monitor			

☐ Respiratory Gating			
Site Planning Requirements:			
Action Item	Action Item Completed?		Comments
	Yes	No	
Were final drawings approved and distributed to the contractors?			
Are final drawings signed off to approve equipment layout and orientation?			
Has the surface penetration permit been obtained and signed?			
Do the actual room dimensions match those on the final drawings?			
Has VQC Phantom been ordered by customer?			
Has DQA (Annulus) Phantom been ordered by customer?			
Optional: Has customer purchased Annulus Phantom safe accessory?			
Is RAM license valid?			
Is Radiation Safety Officer ready to receive the Annulus and VQC Phantoms?			
Has the radiologist health physician reviewed and approved the room layout shielding requirements?			
Have any additional requirements or questions about the installation been discussed with GE Healthcare?			List additional items:
Is there a person assigned to review and verify that all installation requirements are met?			
Have the specific site requirements been discussed with all contractors?			
Has the responsibility of cabling, installing, and interfacing any GE approved accessories not on the order been discussed with GE Healthcare?			

Are all third-party vendors identified, notified, and scheduled?			
Have all Regulatory, Code, & System Requirements been met?			
Has it been verified there is no metallic (e.g., copper) plumbing or any grounded surface within 1.83 m (6 ft.) of the table or gantry?			
Will the existing network, broadband, and camera cable drops reach all required locations for the PET/CT scanner?			List any issues or concerns:
Is this installation using the system anchoring method defined by GE or an alternate Method?			
Optional: Has the Storage Cabinet (B77292CA) been purchased with the system? If not verify that adequate storage space has been defined for all service tools purchased with the system. Refer to Chapter 2, Section 3.9, Service Storage Cabinet Requirements.			
Network Installation:			
Action Item	Action Item Completed?		Comments
	Yes	No	
Have IP address and host names been obtained?			
Will a network camera be used?			
Required: Is the network installed, are the network jacks installed, and is the entire network tested?			
Required: Is the broadband VPN installed and setup?			
Required: Are network software options ordered?			
☐ HIS RIS Option			
☐ DICOM Print			
☐ AW			

Delivery and Miscellaneous:			
Action Item	Action Item Completed?		Comments
	Yes	No	
Have arrangements been made in the schedule to allow adequate time for re-modeling, if required (such as construction, floor or ceiling work, painting, or other cosmetic work)?			
Have arrangements been made to clean the floor after equipment removal and prior to the installation of the new equipment?			
Is de-installation of existing equipment required?			
Is there a trade-in of existing equipment?			
☐ GoldSeal			
Has the delivery route been identified with the proper hospital personnel?			
Have the elevators and doors been checked for size and weight constraints?			
Have the appropriate arrangements been made with traffic for delivery?			
Will any acceptance, performance, or bio-medical testing be required?			
Are trash and recycling bins available for the disposal of paper, cardboard, etc.			

1.3 Regulatory Requirements

1.3.1 Building Codes, Regulations and Permits

Building Codes and Regulations

The customer shall be responsible to ensure the scan suite meets all building codes and applicable regulations.

Compliance to specifications defined in this manual as well as all federal, state, territory, province, city or local regulations (building codes, etc.) shall be the responsibility of the customer. If a federal, state, territory, province, city, or local regulation is in conflict with a specification defined in this manual the most restrictive of the two specifications shall be applied.

GE Surface Penetration Permit

Prior to GE personnel drilling holes in the floor, conduit or any customer surface, a penetration permit for customer approval of the penetrations is required. A GE surface penetration permit shall be approved by the appropriate facility or building representative. (Drilling holes into a concrete floor is an example of surface penetration.) The GE surface penetration permit can be obtained through GE Service Operations. Consult with your GE PMI to obtain a copy of this document.

A GE Penetration Permit is not required if the customer has made other arrangements to drill holes, install anchors, and provide the necessary mounting hardware as specified in this manual.

1.3.2 Clearance Regulations

Federal & National Association Regulations

Clearance regulations for all systems installed in the U.S. are determined by various federal agencies and the National Fire Protection Association (NFPA). The regulating publications are: OSHA 29 CFR 1910, NFPA 70E (Standard for Electrical Safety in the Workplace), NFPA 101: (Life Safety Code), NFPA 99: (Standard for Health Care Facilities), and the ADA Amendments Act of 2008 (Americans with Disabilities Act).

NOTE

CFR: Code of Federal Regulation

OSHA: Occupational Safety and Health Administration

Federal and Foreign Regulations

All systems installed within the U.S. and its territories shall comply with all federal, state, and local regulations. Compliance to specifications defined in this manual as well as all federal, state, territory, province, city or local regulations shall be the responsibility of the customer. If a federal, state, territory, province, city, or local regulation is in conflict with a specification defined in this manual the most restrictive of the two specifications shall be applied.

1.3.3 Codes, Clearances, and Service Space Regulation

Federal, State, and Local Codes The diagrams and dimensions used throughout this manual, detail required clearances for proper system operation and servicing only. The customer shall be responsible for ensuring all federal, state, and local codes and clearances are followed and maintained, regarding facility egress and all other related requirements.

1.4 Delivery and Handling

1.4.1 Installation Tasks

The following tasks are to be done by the GE Project Manager of Installation (PMI).

NOTICE

This document should be reviewed by the GE Program Manager of Installation (PMI) and site service personnel a minimum of 6 weeks prior to the actual installation.

NOTICE

it is highly recommend that the PMI review the product Installation manual prior to starting an installation to ensure no major changes to the install process requires additional pre-work.

Task	Description
Site Dimensions	Project manager shall measure and verify all site dimensions to ensure the facility can accommodate the delivery of the system (and any related components or equipment), from the delivery drop-off point to the scan suite. **NOTE** Refer to Minimum Clear Doorway Opening Widths and Hallway Widths on page 12 and Minimum Clear Doorway Opening Heights and Unobstructed Hallway Heights on page 13 for details.
Delivery Type	Project manager shall determine type of delivery: ground level, loading dock, or tilt-bed truck.
Delivery Equipment	Project manager shall determine if delivery requires special dollies, lifting crates, or riggers. PMI shall order any additional delivery equipment and all necessary delivery personnel. **NOTE** The PET/CT gantries or their sections cannot be lifted or transported by any means other than the GE support cradle and dolly system on which is was shipped. Otherwise, serious damage to the PET/CT gantries could result.

Identify Delivery Route	Project manager shall identify the delivery route, which may include any elevators, doorways, and hallways necessary to accommodate the delivery of all system components. **NOTE** The buyer or buyer's Structural Engineer of record is responsible for making sure the floor material and design along the delivery route (loading dock, halls and rooms) meets the forces and weight requirements for the delivery of the individual subsystems to the final installation location within the facility.
Non-Construction-Zone Route to Scan Suite	Project manager shall verify an accessible, dust-free, non-construction-zone delivery route to the scan suite.
Packaging Requirements	Project manager shall order any construction site packaging requirements prior to shipment. Packaging cannot be modified once the system is shipped.
Floor Protection	Project manager shall determine if floor protection is required along facility delivery route and communicates requirement to delivery company/personnel.

1.4.1.1 Minimum Clear Doorway Opening Widths and Hallway Widths

The scan room shall have at least one doorway with a minimum unobstructed clear doorway opening width of 1067 mm (42 in.). This accommodates the CT Gantry with covers and dollies attached, but side rails removed. This also accommodates the PET Gantry Image Ring with dollies attached, but side protective braces removed. The customer is responsible for removing or protecting any doorway threshold (if one exists) in order to move the scanner subsystems in and out of the room.

Often the table and the PET/CT gantries will need to be turned in the hallway to enter the scan room. If there is enough room in the hallway, the minimum doorway width will be smaller. If the hallway is smaller in width, the doorway width must increase. Table 3 on page 12 represents the minimal requirements when combined with average door width sizes.

Table 3 Minimum Clear Doorway Openings and Hallway Widths

Doorway Clear Opening	Hallway
Minimum Width	
1067 mm (42 in.)	No hallway or need to turn subsystems to enter the room
Minimum Width Needed to Turn Subsystem	
1067 mm (42 in.)	3048 mm (120 in.)
1219 mm (48 in.)	2591 mm (102 in.)

1397 mm (55 in.)	2438 mm (96 in.)
1829 mm (72 in.)	1803 mm (71 in.)

1.4.1.2 Minimum Clear Doorway Opening Heights and Unobstructed Hallway Heights

The minimum clear doorway opening heights shall be 2032 mm (80 in.) and unobstructed hallway heights shall be 2439 mm (96 in.) in the path of the subsystems.

1.4.2 Shipping Dimensions and Weight

1.4.2.1 Delivery Sizes and Weights

Table 4 Estimated Loading Dock Delivery Sizes and Weights

Item	Height mm (in.)	Width/Depth mm (in.)	Length mm (in.)	Weight kg (lb)
CT Gantry with Dollies On, Side Rails On	2000 (79)	1290 (51)	2810 (111)	2050 (4520)
CT Gantry with Dollies On, Side Rails Off	2000 (79)	1039 (40.9)	2810 (111)	2022 (4458)
CT Gantry with Dollies Off	1850 (73)	860 (34)	1970 (77)	1671 (3684)
PET Base and Retractor Assembly with Dollies (Aluminum Gantry)	990 (39)	1054 (41.5)	2438 (96)	678 (1495)
PET Base Assembly with Dollies (Weldment Gantry)	670 (26.3)	1080 (42.5)	496 (19.5)	287 (632.7)
PET Base Assembly without Dollies (Weldment Gantry)	NA	NA	NA	207.5 (457.4) See Note 1.
PET Image Ring with Dollies On, Side Protective Braces On (Aluminum Gantry)	1880 (74)	1118 (44)	2794 (110)	1315 (2899)
PET Image Ring with Dollies On, Side Protective Braces On (Weldment Gantry)	1880 (74)	1118 (44)	2794 (110)	1295 (2855)
PET Image Ring with Dollies On, Side Protective Braces Off (Aluminum Gantry)	1880 (74)	1040 (41)	2794 (110)	1282 (2820)
PET Image Ring with Dollies On, Side Protective Braces Off (Weldment Gantry)	1880 (74)	1040 (41)	2794 (110)	1259 (2776)
PET Image Ring without Dollies (Aluminum Gantry)	1819 (72)	720 (28)	1931 (76)	954 (2110)
PET Image Ring without Dollies (Weldment Gantry)	1825 (72)	720 (28)	2136 (84)	966 (2130)

Estimated Loading Dock Delivery Sizes and Weights continued				
Item	**Height mm (in.)**	**Width/Depth mm (in.)**	**Length mm (in.)**	**Weight kg (lb)**
PET Image Ring Dolly (assembled)	1358 (54)	1118 (44)	2794 (110)	327 (720)
PET Trailer with Dollies	1092 (43)	1054 (41.5)	2438 (96)	216 (475)
Table (Blue Dollies On)	1410 (55.5)	864 (34)	3836 (151)	1241 (2736)
Table (Blue Dollies Off, Red Castors On)	1410 (55.5)	1016 (40)	3086 (121.5)	1295 (2856)
Table (Tilting Dollies On)	1778-2032 (70-80)	965 (38)	2489-2921 (98-115)	1147 (2530)
Power Distribution Unit (with shipping crate)	1092 (43)	584 (23)	762 (30)	413 (910)
PARC4.X Reconstruction Cabinet (on skid)	1655 (65.2)	1480 (58.3)	980 (38.6)	304 (670)
NIO64 Console (on skid)	1067 (42)	635 (25)	864 (34)	87 (192)
OC Console (on skid)	576 (22.7)	400 (15.7)	671 (26.4)	91 (200.6)
Annulus Phantom Safe (option; on skid)	914 (36)	914 (36)	914 (36)	217 (480)
Service Storage Cabinet (option; with shipping crate)	1207 (48)	673 (27)	978 (39)	61 (135)
Note 1: Detachable Rail Assembly Left: 16.6 kg (36.6 lb); Detachable Rail Assembly Right: 16.4 kg (36.2 lb)				

1.4.2.2 Shipping Methods (Dollies, Skids)

1.4.2.2.1 CT Gantry

The CT Gantry ships with the front and rear covers attached to its front and rear cover brackets. During installation, the rear cover is transferred to the PET Gantry, and the rear cover brackets are removed from the CT Gantry. The assembly is mounted between two dollies Figure 1 on page 15.

Two side rails are bolted to the dollies to stabilize dollies and protect the CT Gantry. The dolly elevating casters lift the CT Gantry off its base and roll it into position.

Figure 1 CT Gantry with Shipping Dollies and Side Rails

1.4.2.2.2 PET Components

The PET Gantry consists of:

- PET Base and Retractor Assembly Figure 2 on page 16(Aluminum Gantry). The PET Base dollies have a center stabilizing frame to protect the exposed components.
- PET Base (Figure 3 on page 16) (Weldment Gantry). The PET Base dollies have a center stabilizing frame to protect the exposed components.
- PET Image Ring Figure 4 on page 17(Aluminum Gantry).
- PET Image Ring (Figure 5 on page 18) (Weldment Gantry).
- PET Trailer Figure 6 on page 19

Figure 2 PET Base and Retractor Assembly, with Shipping Dollies (Aluminum Gantry)

Figure 3 PET Base, with Shipping Dollies (Weldment Gantry)

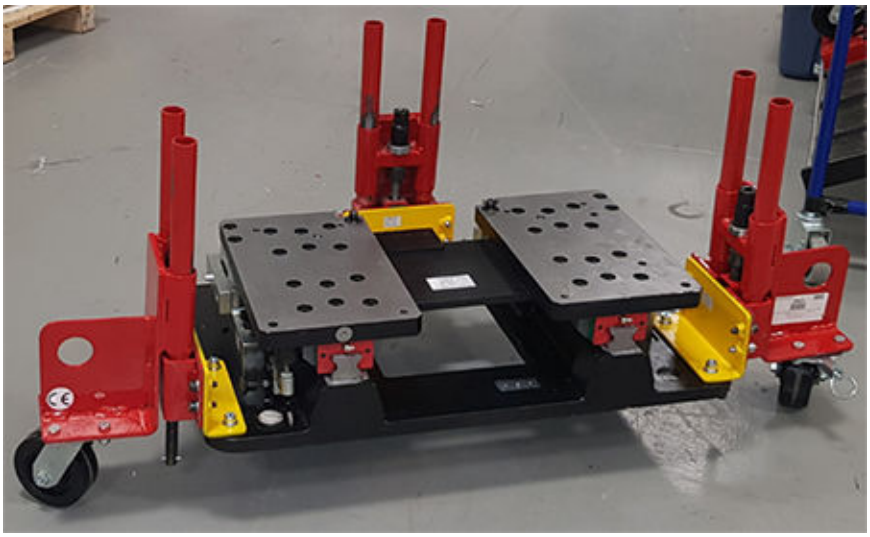


Figure 4 PET Gantry Image Ring, with Shipping Dollies and Side Rails (Aluminum Gantry)

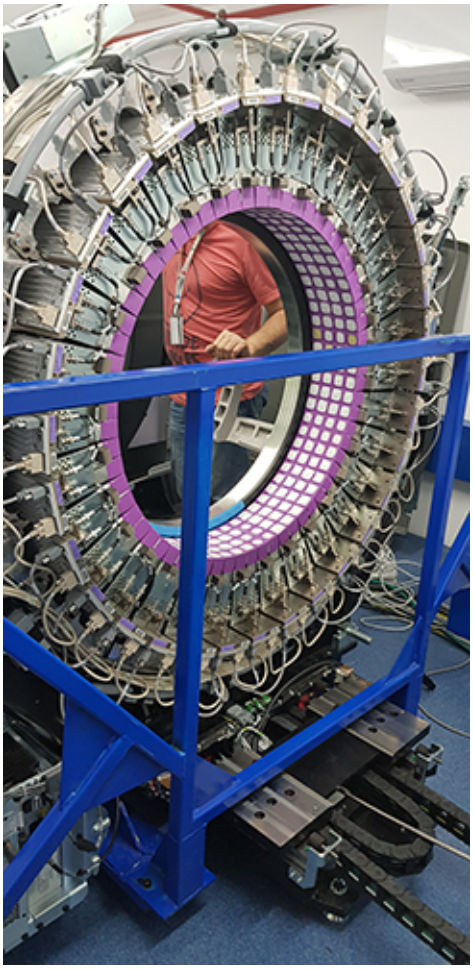


Figure 5 PET Gantry Image Ring, with Shipping Dollies and Side Rails (Weldment Gantry)

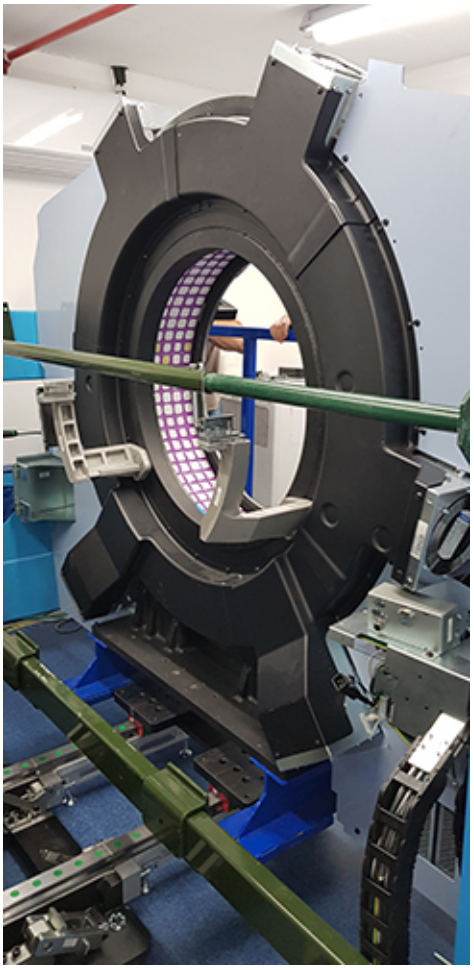


Figure 6 PET Trailer, with Shipping Dollies and Side Rails

1.4.2.2.3 Patient Table

The patient table ships to domestic (North American) installations on a set of dollies with stabilizing side rails Figure 7 on page 19. The secondary base covers ship separately.

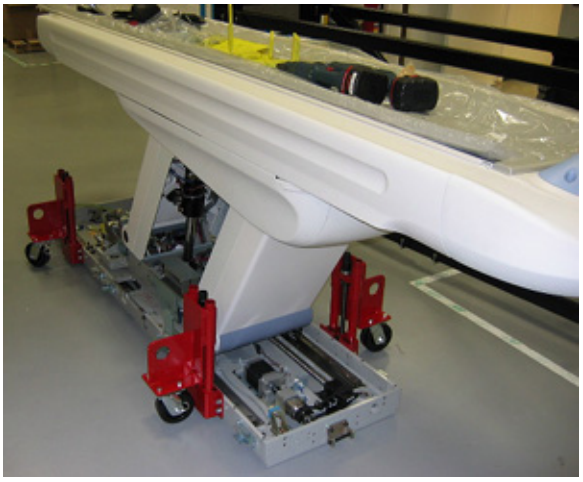
Red caster towers ship attached to the ends of the dollies Figure 7 on page 19. They are used for fitting the Table in an elevator and for final positioning of the Table in front of the Gantry Figure 8 on page 20.

NOTE

The patient table ships to international sites in a crate. The installation team uncrates the table and attaches the dollies at the site.

Figure 7 Patient Table with Shipping Dollies

Figure 8 Patient Table on Red Caster Towers



1.4.2.2.4 PDU

The PDU is shipped on a skid. Do not remove the PDU from the skid until it is in the room ready for installation.

1.4.2.2.5 PARC4.X Reconstruction Cabinet

The PARC4.X is shipped on a skid. Do not remove the PARC4.X from the skid until it is in the room ready for installation.

Figure 9 PARC4.X Packaging

1.4.2.2.6 Operator Console

The Console is shipped on a skid. Do not remove the Console from the skid until it is in the equipment room. The keyboard table is shipped with the Console, but not assembled.

1.4.2.2.7 Annulus Phantom Safe (option)

The Annulus Phantom Safe is shipped on a combined crate/skid.

Figure 10 Annulus Phantom Safe on Skid

1.4.3 Delivery Types and System Lifting and Rigging Restrictions

Lift-Gate and Rollback Truck Deliveries

DANGER

PERSONAL INJURY OR DEATH, EQUIPMENT DAMAGE. TIP HAZARD.

Gantry is very heavy and may tip over if tilted past 10 degrees.

When transporting a system to the final destination, do not exceed tilt angle equal to, or greater than 10 degrees in either direction of axis.

Loading Dock Deliveries (Preferred method)

Facilities with a loading dock in the receiving areas can generally accommodate delivery of the system by semi-tractor trailer. This is the preferred method for system delivery. Dock-to-dock shipment minimizes the possibility of dropping the PET/CT gantries or damaging other subsystems during the transition from the trailer to the facility. This method also allows for the most efficient packing and unpacking of the system.

Ground (Non-Loading Dock) Deliveries

Facilities without a loading dock require a Lift Gate or Tilt Bed truck. Such deliveries require unloading the system components from the truck bed to ground level and then transported to the facility over a smooth surface such as a concrete sidewalk or driveway or paved area. These paved surfaces must be able to support the weight of the subsystems. It may be necessary to protect these surfaces as well.

Lift-Gate Truck

If a truck equipped with a lift-gate is used, the delivery truck requires a lift gate rated for at least a 2722.0 kg (3.0 Tons) capacity. When the PET/CT gantries and table are lowered to ground level, it should be lowered at a steady rate using the slowest speed as possible to minimize G-loads when the lift gate reaches the ground. Keep PET/CT gantries and table level during movement to avoid flipping. Failure to smoothly transition the table and PET/CT gantries to ground level may cause serious damage to the table, PET/CT gantries, or their transport dollies.

Tilt Bed Truck Delivery

Use a tilt bed truck is permitted provided that the tilt does not exceed 10 degrees pitch.

If a tilt bed delivery truck is used, a GE representative shall supervise the delivery of the PET/CT scanner to ensure the system is safely delivered without damage. To avoid damaging the table and PET/CT gantries, the representative shall direct the driver to attach strapping to the lowest point (not the wheels) of each dolly. When the table and PET/CT gantries are moved from the back of the delivery truck to ground level, both shall be lowered at the slowest reasonable steady rate until wheel contact is made at ground level. Movement should be temporarily halted when the dolly wheels come in contact with the ground. Further movement should resume minimizing any G-loads as the final wheels meet ground level. Failure to smoothly transition the table and PET/CT gantries to ground level may cause serious damage to the table, PET/CT gantries, or their transport dollies.

Rigging

The PET/CT gantry assemblies shall not be lifted by their dollies. The PET/CT gantry assemblies shall not be transported across any surface by any means other than the dollies provided by GE. The PET/CT gantry assemblies have no lifting points on them and are not designed to be lifted by any special rigging attached to the PET/CT gantry assemblies themselves.

DANGER

POSSIBLE SEVERE PERSONAL INJURY OR DEATH.

The dollies are not designed to be used as an attachment point for any method of lifting the subsystems.

attaching lifting straps, cables or mechanisms to the dolly handles or any other part of the dolly is strictly prohibited.

NOTICE

If it is determined that the subsystems must be lifted by crane or other lifting method the PMI or person responsible for local siting of the system shall NOT proceed with the installation without consulting directly with GE Engineering.

Lifting the subsystems by crane or other lifting method should always be avoided. All alternate methods of delivery should be evaluated including the removal of any obstructions, doorways, walls, and windows.

If lifting is still required:

1. The entire PET/CT gantry assemblies and both gantry transport side dollies must be placed on a lifting platform. GE does not provide a lifting platform.

   The CT Stationary Assembly shall be lowered to its transport position with the gantry base in contact with the platform. The CT Rotating Assembly shall be lowered to its transport position resting on the dolly transport pads in contact with the platform.

   NOTE

   If the platform has limited space, the gantry transport side dollies may be removed during the lift. Once the lift is completed, the gantry transport side dollies must be installed back on the gantry assembly.

2. The entire patient table must be on its dollies and lifted while sitting on a lifting platform.

   The patient table on its dolly shall be lowered to its transport position so the table base is in contact with the platform.

3. The platform must be designed such that no lifting straps or cables come in contact with any part of the PET/CT gantries or table subsystems or their side dollies.

4. The lifting platform shall bear the entire load. No part of the subsystem shall bear any load during the lift.

NOTE

If delivery requires vertical or horizontal lifting, the PMI needs to add the necessary identifier to the order.

1.4.4 Shipping and Receiving

1.4.4.1 Handling Restrictions

- *Forklift Restrictions:* Never lift the gantry using a forklift under the gantry frame.
- *Shock Restrictions:* The system cannot tolerate shock or vibration. System components cannot be tipped, dropped, or hoisted. The PMI shall communicate these restrictions to everyone involved with handling the system components.

- *Rolling on Surfaces:* System components shall be rolled across smooth surfaces (sidewalks, parking lots, tile flooring, etc.) only. If a smooth surface is not available (such as a sidewalk or driveway with cracks or uneven joints, or across a tiled floor with deep or rough joint lines), then floor protection shall be used to move the system across the uneven surface.
- *Shipping Crate/Packaging Integrity:* Do not damage or puncture the shipping crate or packaging.

1.4.4.2 Floor Protection

To protect the floor during delivery, floor protection shall be used along the entire delivery path and throughout the scan suite, where necessary.

1.4.4.3 Door Threshold Not Allowed

The customer is responsible for removing or protecting any doorway threshold (if one exists), in order to move the scanner subsystems in and out of the room.

1.4.4.4 Floor Load Along Delivery Route

The customer's structural engineer of record is responsible for making sure the floor material and design along the delivery route (loading dock, halls and rooms) meets the forces and weight requirements for the delivery of the individual subsystems to the final installation location within the facility.

1.4.4.5 Dollies

- U.S. Installations – Shipments within the United States typically involve the use of dollies (pre-installed on the gantry sections and table) for moving the gantry sections and table to the can suite and lean carts and pallets for other parts. After completing the installation, return all dollies, the gantry shipping cage, and lean carts to UMI using the shipping document found in Box #1. http://www.umi-dollyshop.com. Pallets are not re-usable.
- Zero Clearance Dollies (Mini) (For CT Gantry only) – Deliveries involving small elevators with a depth of at least 2692 mm (106 in.) require zero clearance dollies. Zero clearance dollies allow movement of the gantry in tight areas; avoid using them for normal dock or van deliveries. To order zero clearance dollies, go to: http://www.umi-dollyshop.com.
- Tilting Dollies (for Patient Table) – Deliveries involving small elevators with a depth of at least 2438 mm (96 in.) require tilting dollies. If storing the patient table prior to installation, do not order tilting dollies as there is a limited number of dollies available. If you are unable to obtain tilting dollies, substitute riggers in place of the dollies to deliver the table. To order tilting dollies for the patient table, go to: http://www.umi-dollyshop.com.
- Installations Outside U.S. – For shipments outside the United States, customers may purchase dollies at: http://www.umi-dollyshop.com. DO NOT return dollies or the gantry shipping cage to the U.S. Instead, forward dollies and cage to the local GE office or warehouse. The gantry sections and table subsystems are shipped with dollies attached placed on a pallet for transport. Pallets are not re-usable.

1.4.4.6 Delivery Temperature and Humidity Tolerance

NOTICE

Failure to adhere to temperature requirements during delivery and storage will likely result in equipment damage.

Avoid extreme temperatures during system transportation and delivery. Prevent extended exposure of the system (maximum two weeks) to temperatures or humidity outside of the following specifications:

- Temperature: When transporting the system, excluding any scanner desktop LCD display monitors, water-filled calibration/IQ phantoms, and chiller coolant, the temperature shall be maintained within the range of -40º to +50º C (-40º to +122º F), inclusive.

  NOTE

  See the table below for the shipping temperature and humidity ranges of excluded items.

  Table 5 Shipping Temperature Ranges for Excluded Items

Items	Temperature
LCD Monitors	-20° to +60° C (-4° to +140° F)
Water-filled Calibration/IQ Phantoms	+5° to +70° C (+41° to +158° F)

- Humidity: When transporting the system, excluding water-filled calibration/IQ phantoms, all packing material shall remain intact and the relative humidity shall be maintained within the range of 10% to 90%, inclusive.

After delivery to the scan suite and before unpacking any system components, allow 12 hours for the equipment to adjust to room temperature to avoid condensation or rapid temperature change. This 12 hour warm up period is not required if the shipping environment meets the same temperature and humidity requirement as the Scan Room and the system components are already at steady room temperature.

1.4.4.7 Unpacking System

Do not remove any protective wrapper or packaging from any system component until all construction is complete and all construction dust is removed from the installation site.

Retain the packaging surrounding the scanner desktop and UPS.

Do not remove the Console and Chiller from their shipping skids or the PARC4.X from it's crate until after they have been delivered to the PET/CT equipment room.

1.4.5 Temporary Storage

If storing a system prior to installation, the system shall be stored in its original packaging in a temperature and humidity controlled environment protected from water and dust. It is advised that storage of the system be *no longer than six months*. If storage is going to exceed six months, contact your PMI for long-term storage procedures.

Table 6 Humidity and Ambient Temperatures for Storage*

Ambient temperature shall be maintained within a range of:	0 to +30° C (+32° to +86° F)
Maximum rate of change in the temperature shall be no greater than:	3°C (5.4°F) per hour
Relative humidity (non-condensing) shall be maintained within a range of:	Up to 70% RH
Maximum rate of change in the relative humidity shall be no greater than:	5% RH per hour
* Delivery van/truck storage shall meet these same requirements.	

NOTICE

Storage exceeding six months is not advised.

Chapter 2 Equipment Requirements

2.1 System Components

2.1.1 Component Weight/Load, Dimensions, and Center of Gravity

Table 7 System Component Weight/Load

System Component	Net Weight kg (lb)	Maximum Uplift Load N (lb)	Maximum Compressive load N (lb)	Load Pattern mm (in.)	Normal Method of Mounting mm (in.) (GE-supplied; Note 1)
CT Gantry	1787 (3940)	0	4588 (1031)	Rectangular base plate 700 x 1966 (28 x 77) with four round pads, each 64 (2.5) in contact with floor.	Hilti Kwik-Bolt II 12.7 mm (1/2 in.) diameter by 216 mm (8.5 in.) long per P/N 5867778 at four leveling pads into the concrete floor.
PET Gantry (Aluminum Gantry)	1808 (3986)	0	6101 (1250)	While in the imaging position, the effective PET load area is 398 x 645 (15.7 x 25.4) with 7 pads each 63.5 (2.5) as well as 2 pads that do not get anchored (support only)	Hilti Kwik-Bolt II 12.7 mm (1/2 in.) diameter by 216 mm (8.5 in.) long per P/N 5867778 at four leveling pads into the concrete floor.
PET Gantry (Weldment Gantry)	1253 (2762)	0	3332 (749)	While in the imaging position, the effective PET load area is 398 x 645 (15.7 x 25.4) with 4 pads each 63.5 (2.5)	Hilti Kwik-Bolt II 12.7 mm (1/2 in.) diameter by 216 mm (8.5 in.) long per P/N 5867778 at four leveling pads into the concrete floor.
Patient Table	1049 (2308) Includes 227 (500) Patient	890 (200)	4926 (1107)	Rectangular base 550 x 2134 (21.7 x 84.0) with 6 round pads, each 64 (2.5) in contact with the floor.	Hilti Kwik-Bolt II 12.7 mm (1/2 in.) diameter by 216 mm (8.5 in.) long per P/N 5867778 at four leveling pads into the concrete floor.
Power Distribution Unit (PDU)	370 (813)	0	1070 (240)	Four Casters support area of 711 x 559 (28 x 22).	Casters are for positioning and service. **See Note 2.**
PARC4.X	246 (540)	0	737 (166)	Rectangular base with four castors.	Casters are for positioning and service. **See Note 2.**

System Component Weight/Load continued					
System Component	**Net Weight kg (lb)**	**Maximum Uplift Load N (lb)**	**Maximum Compressive load N (lb)**	**Load Pattern mm (in.)**	**Normal Method of Mounting mm (in.) (GE-supplied; Note 1)**
NIO64 Op Console Computer	72 (159)	0	318 (71)	Rectangular base with four castors.	
OC Op Console Computer	65.1 (143.5)	0	287.5 (64.6)	Rectangular base with four castors.	
Monitor - LCD (each)	3.2 (7)				
Workspace Table (with 2 monitors)	70 (154)				
Optional Components					
Universal Power Supply (UPS)	281 (619)	0	689 (155)	Rectangular base with four castors in contact with the floor.	Casters for positioning. Adjust six leveling pads on the floor.
Annulus Phantom Safe	149 (330)	0		Rectangular base with four castors in contact with the floor.	Casters are for moving safe and can be locked to prevent motion.
Service Storage Cabinet	41 (90)	0			
Notes: 1.) Use the GE-supplied mounting hardware only if anchoring the system to 127 mm (5 in.) concrete floors. 2.) May be anchored to floor with supplied angle brackets in seismic zones.					

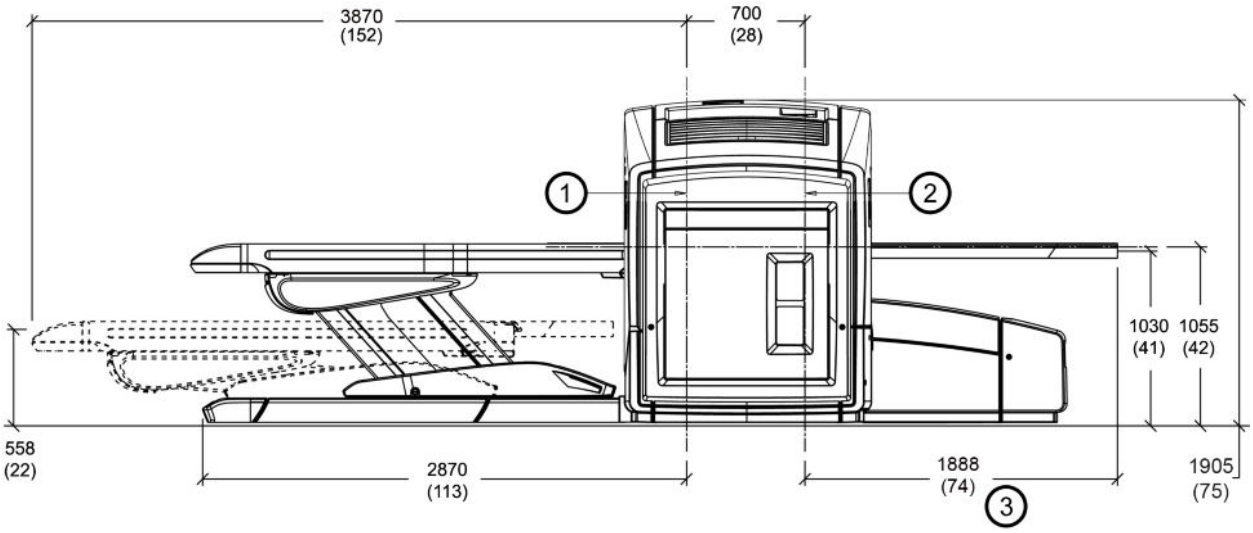
Table 8 System Component Dimensions

System Component	A	B	C
	Width mm (in.)	Depth mm (in.)	Height mm (in.)
PET-CT Gantry (overall) without Trailer (Aluminum Gantry)	2235 (88)	1473 (58)	1905 (75)
PET-CT Gantry (overall) without Trailer (Weldment Gantry)	2235 (88)	1473 (58)	1930 (76)
Table (at max elevation; 1" [25 mm] below Gantry ISO center)	660 (26)	3454 (136)	1067 (42)
Power Distribution Unit (PDU)	700 (27.6)	550 (21.7)	1062 (41.8)

System Component Dimensions continued			
System Component	**A**	**B**	**C**
	Width mm (in.)	**Depth mm (in.)**	**Height mm (in.)**
PARC4.X Reconstruction Cabinet	614 (24.1)	1358 (53.5)	1420 (55.9)
NIO64 Operator Console Computer	470 (18.5)	736 (29)	656 (25.8)
OC Operator Console Computer	400 (15.7)	616 (24.3)	576 (22.7)
Workspace Table 5486188-10 (adjustable height)	1486 (58.5)	902 (35.5)	688-1139 (27.1-44.8)
UPS (option)	305 (12)	813 (32)	1219 (48)
Service Storage Cabinet (option)	914 (36)	610 (24)	1067 (42)
Annulus Phantom Safe	406 (16)	406 (16)	665 (26.2)

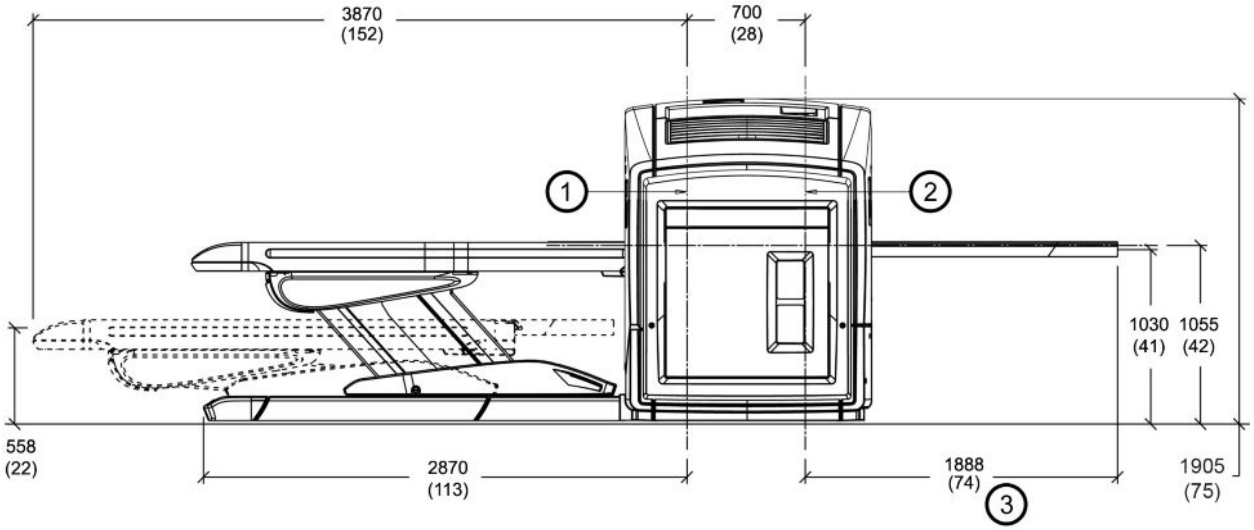
2.1.2 System Component Diagrams

Figure 11 Gantry and Table Dimensions (Aluminum Gantry)



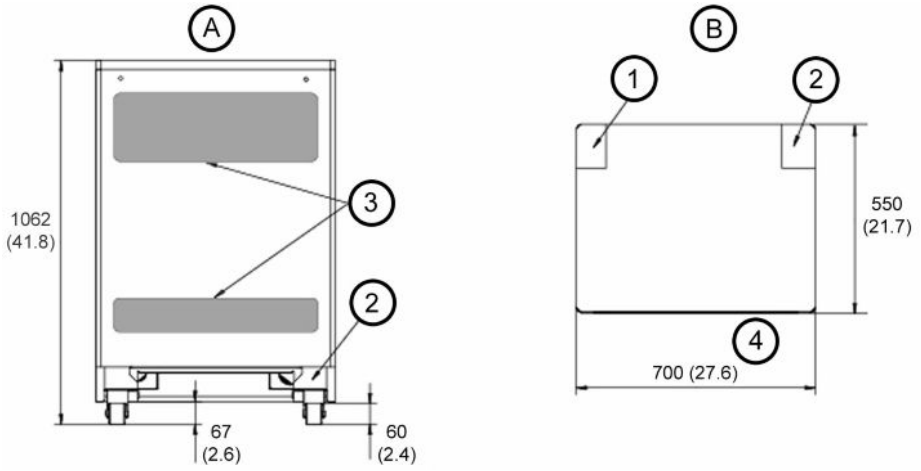
All dimensions are in millimeters; bracketed dimensions are in inches.	
1	CT scan plane centerline
2	PET primary scan plane centerline
3	With Head Extender

Figure 12 Gantry and Table Dimensions (Weldment Gantry)



All dimensions are in millimeters; bracketed dimensions are in inches.	
1	CT scan plane centerline
2	PET primary scan plane centerline
3	With Head Extender

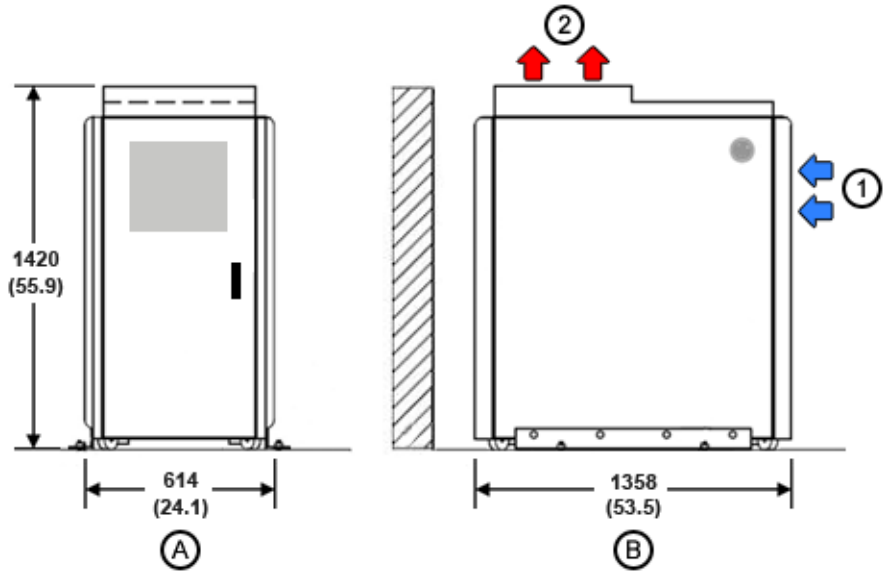
Figure 13 Power Distribution Unit (PDU) Dimensions



All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Rear View	1	I/O Connections Panel
B	Top View	2	AC Power Input Box

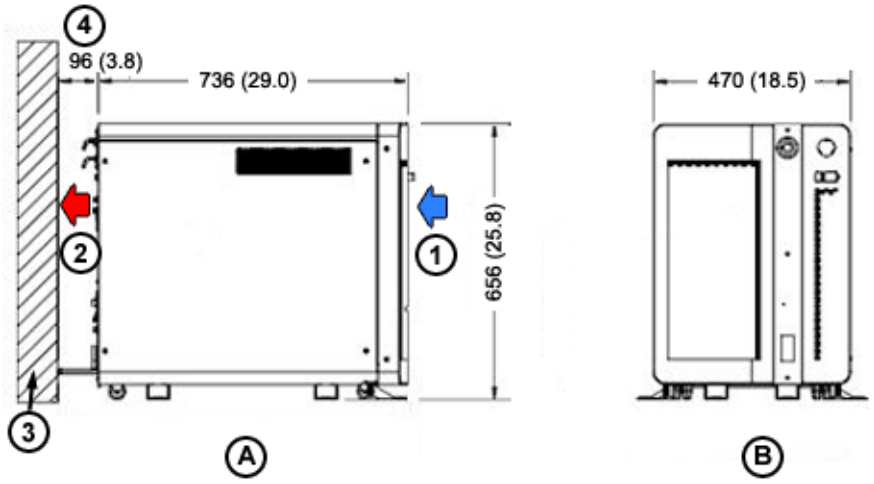
		3	Rear vent access
		4	Front

Figure 14 PARC4.X Reconstruction Cabinet Dimensions



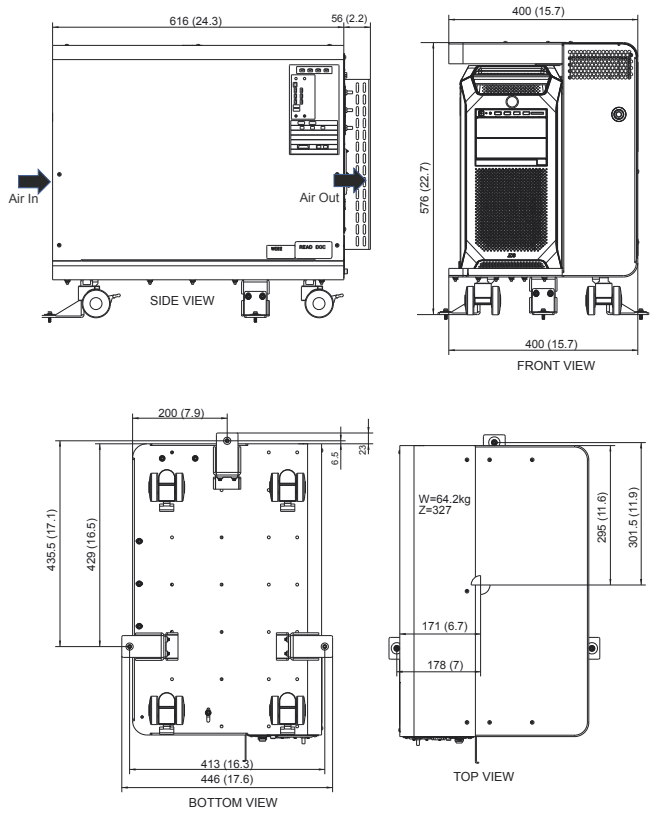
All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Front View	1	Air in (front of cabinet)
B	Side View	2	Air out (top of cabinet)

Figure 15 Operator Console Computer Dimensions (NIO64)



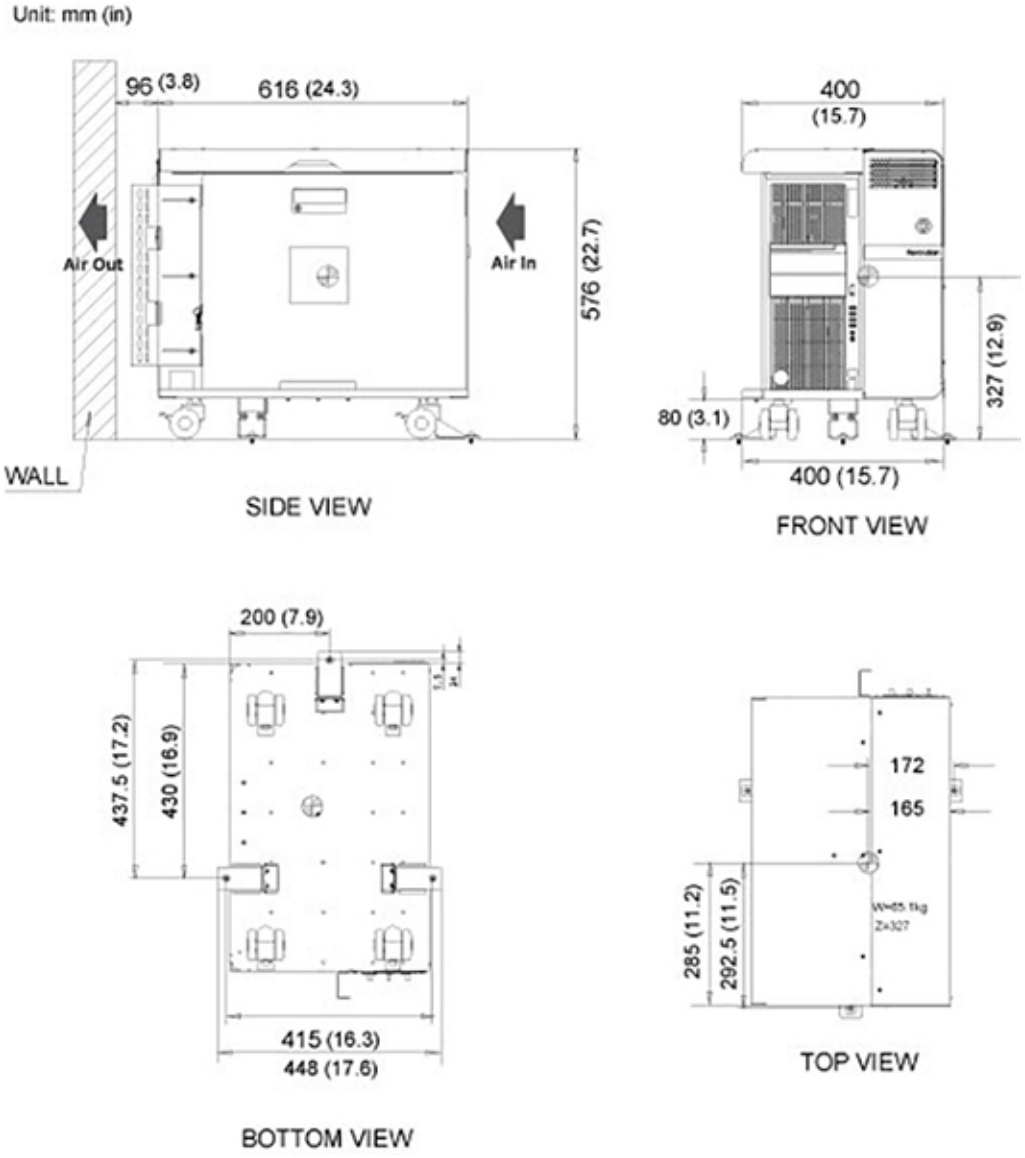
All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Side View	1	Air in (front of cabinet)
B	Front View	2	Air out (rear of cabinet)
		3	Wall
		4	Clearance (minimum)

Figure 16 Open Console with Z8G4 Dimensions



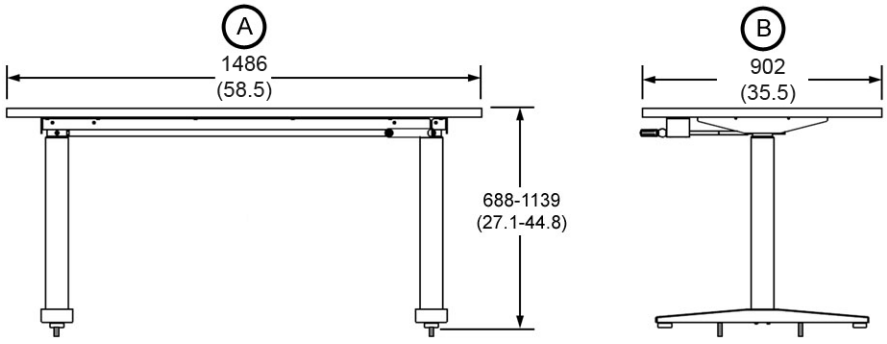
Description	Width	Depth	Height	Weight
Open Console with Z8G4	400 mm (15.7 in)	672 mm (26.5 in)	576 mm (22.7 in)	64.2 kg (142 lb) (w/o package) 90.5 kg (199.5 lb) (with package)

Figure 17 Operator Console Computer Dimensions (Open Console)



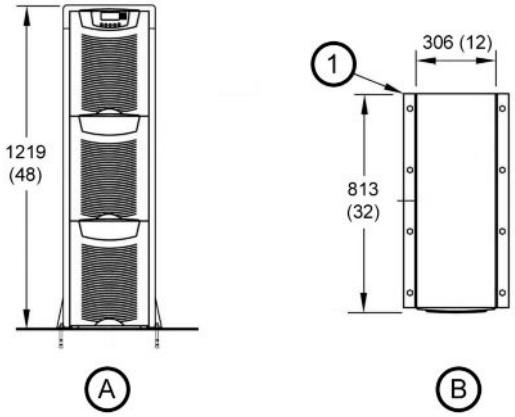
All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Side View	1	Air in (front of cabinet)
B	Front View	2	Air out (rear of cabinet)
		3	Wall
		4	Clearance (minimum)

Figure 18 Workspace Table Dimensions (5486188-10)



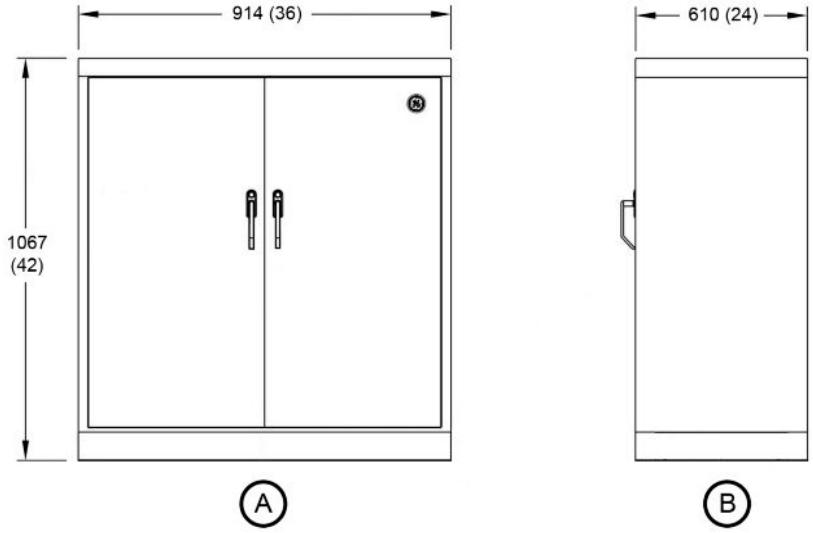
All dimensions are in millimeters; bracketed dimensions are in inches.	
A	Front View
B	Side View

Figure 19 Uninterruptible Power Supply (UPS) Dimensions (Optional)



All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Front View	1	Pre-manufactured mounting bracket (by GE)
B	Top View		

Figure 20 Service Storage Cabinet Dimensions (Optional)

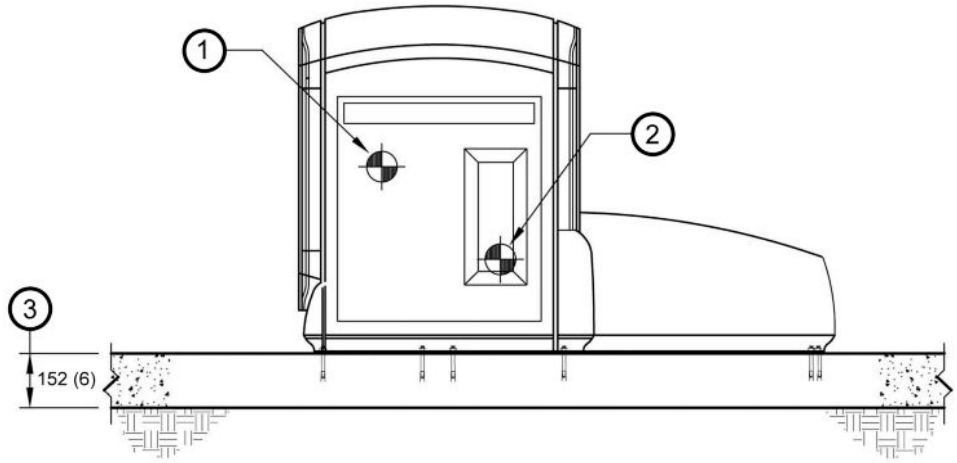


All dimensions are in millimeters; bracketed dimensions are in inches.	
A	Front View
B	Side View

2.1.3 System Component Center-of-Gravity Diagrams

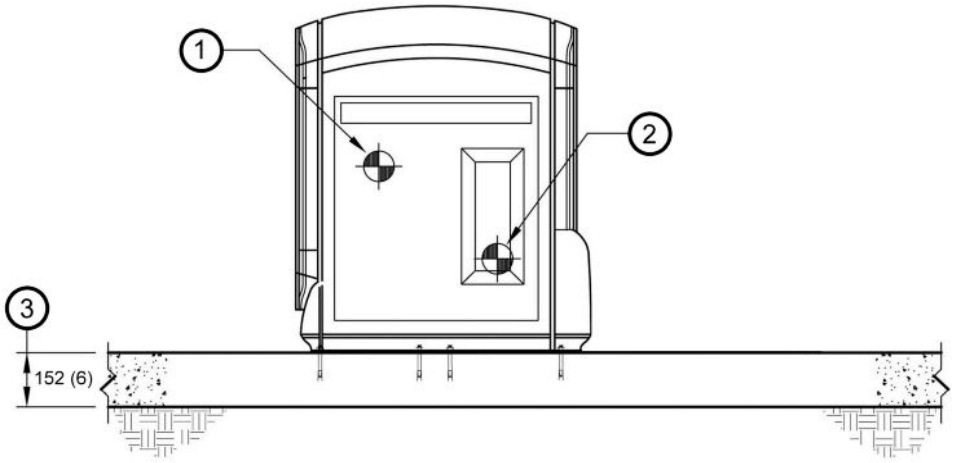
Refer to Figure 21 on page 35 through Figure 35 on page 43 for the individual system component center-of-gravity dimensions for the PET/CT system.

Figure 21 CT/PET Gantry Center-of-Gravity (Side View) (Aluminum Gantry)



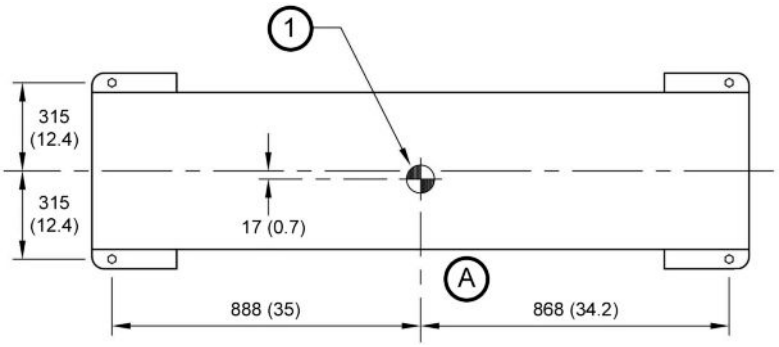
All dimensions are in millimeters; bracketed dimensions are in inches.	
1	Center of gravity for CT Gantry (also see Figure 23 on page 36)
2	Center of gravity for PET Gantry (also see Figure 24 on page 37)
3	Minimum thickness

Figure 22 CT/PET Gantry Center-of-Gravity (Side View) (Weldment Gantry)



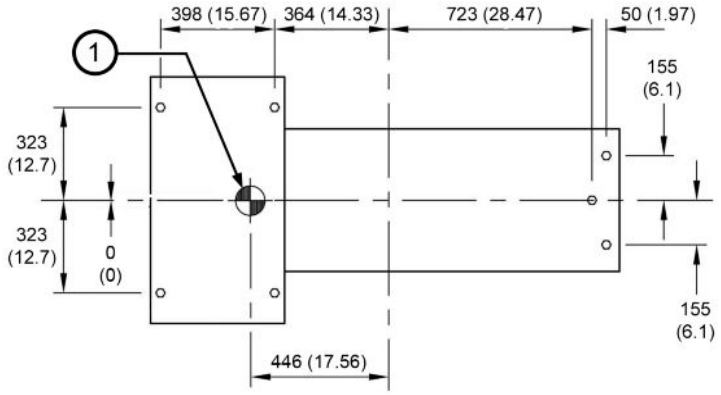
All dimensions are in millimeters; bracketed dimensions are in inches.	
1	Center of gravity for CT Gantry (also see Figure 23 on page 36)
2	Center of gravity for PET Gantry (also see Figure 24 on page 37)
3	Minimum thickness

Figure 23 CT Gantry Center-of-Gravity (Top View – Plan at Base)



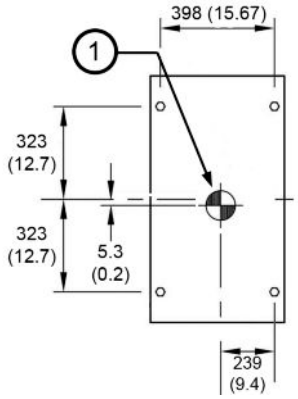
All dimensions are in millimeters; bracketed dimensions are in inches.	
1	Center of gravity weight = 1820 kg (4012 lb); Y = 912 mm (35.9 in.)
A	Front of CT Gantry

Figure 24 PET Gantry Center-of-Gravity (Top View – Plan at Base) (Aluminum Gantry)



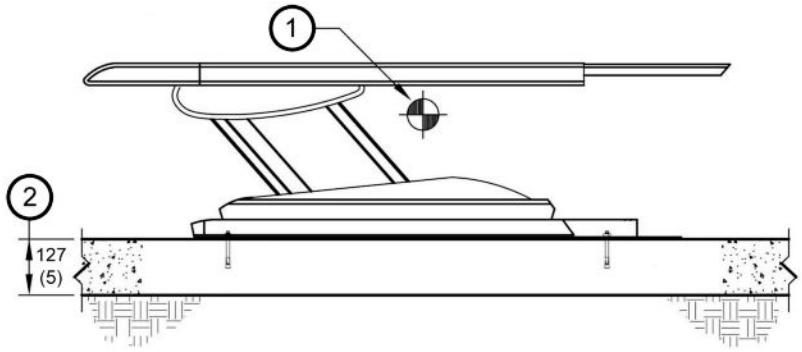
All dimensions are in millimeters; bracketed dimensions are in inches.	
1	Center of gravity weight = 1808 kg (3986 lb); Y = 581 mm (22.87 in)

Figure 25 PET Gantry Center-of-Gravity (Top View – Plan at Base) (Weldment Gantry)



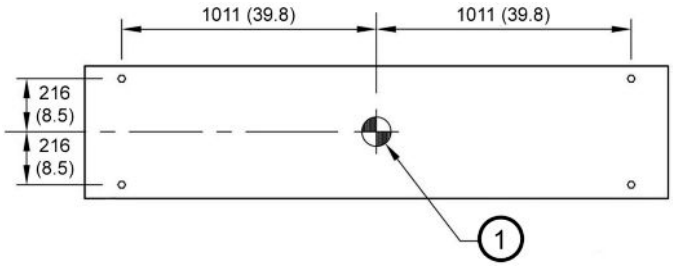
All dimensions are in millimeters; bracketed dimensions are in inches.	
1	Center of gravity weight = 1253 kg (2762 lb); Y = 700 mm (22.87 in)

Figure 26 Patient Table Center-of-Gravity (Side View)



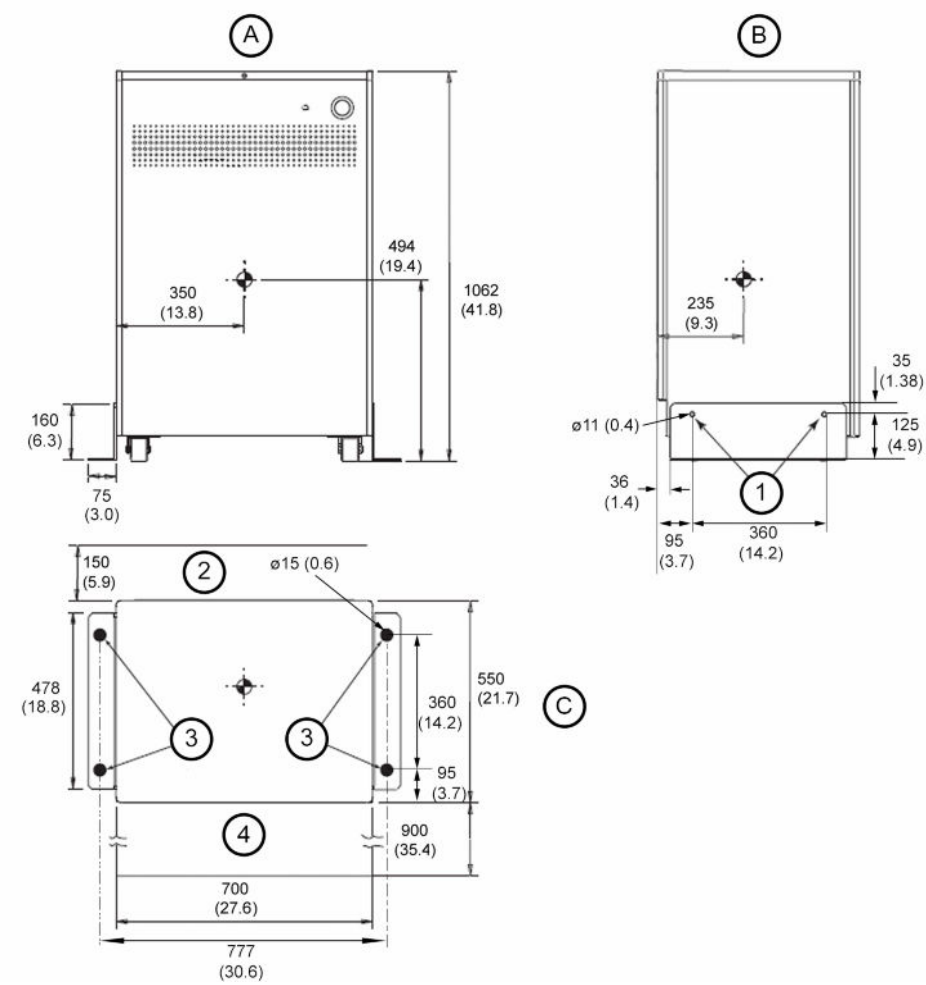
All dimensions are in millimeters; bracketed dimensions are in inches.	
1	Center of gravity weight = 1049 kg (2308 lb); includes 227 kg (500 lb) patient
2	Minimum thickness

Figure 27 Patient Table Center-of-Gravity (Top View – Plan at Base)



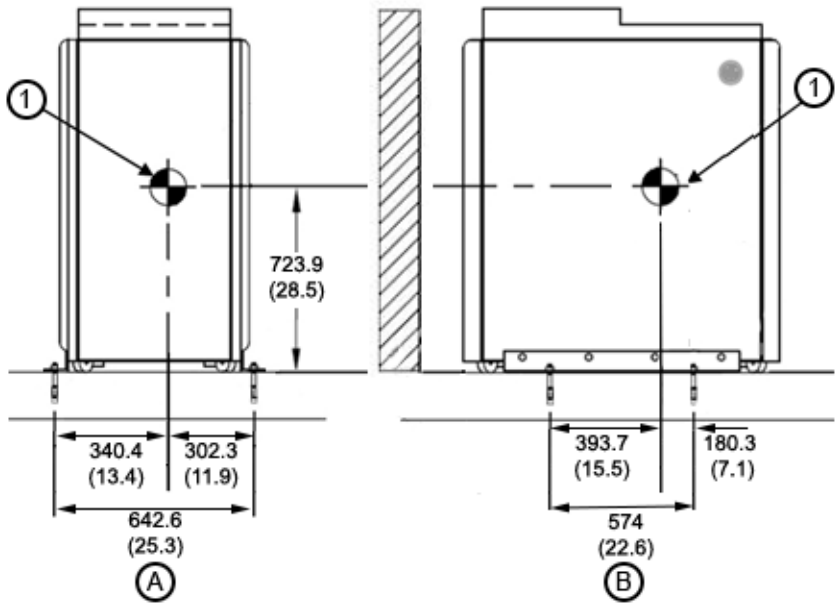
All dimensions are in millimeters; bracketed dimensions are in inches.	
1	Center of gravity weight = 1049 kg (2308 lb); includes 227 kg (500 lb) patient. Y (height) = 541 mm (21.3 in.)

Figure 28 Power Distribution Unit Center-of-Gravity (NGPDU)



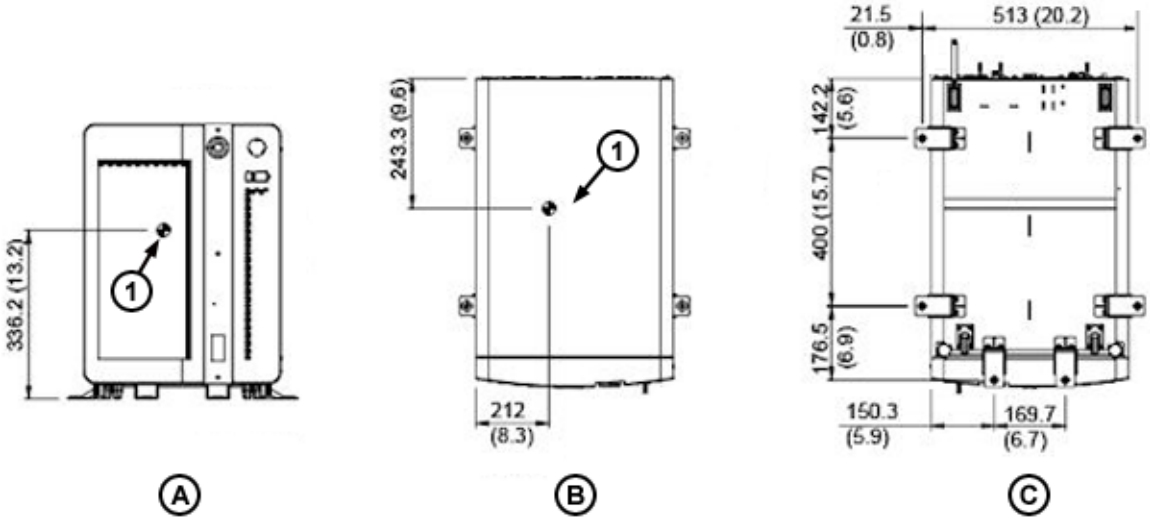
All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Front View	1	Seismic mounting holes on PDU
B	Side View	2	Minimum air flow clearance (back of cabinet)
C	Top View	3	Seismic floor mounting holes; 15 mm (0.6 in.)
		4	Front Clearance (minimum)

Figure 29 PARC4.X Reconstruction Cabinet Center-of-Gravity



All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Front View	1	Center of gravity weight = 246 kg (540 lb)
B	Side View		

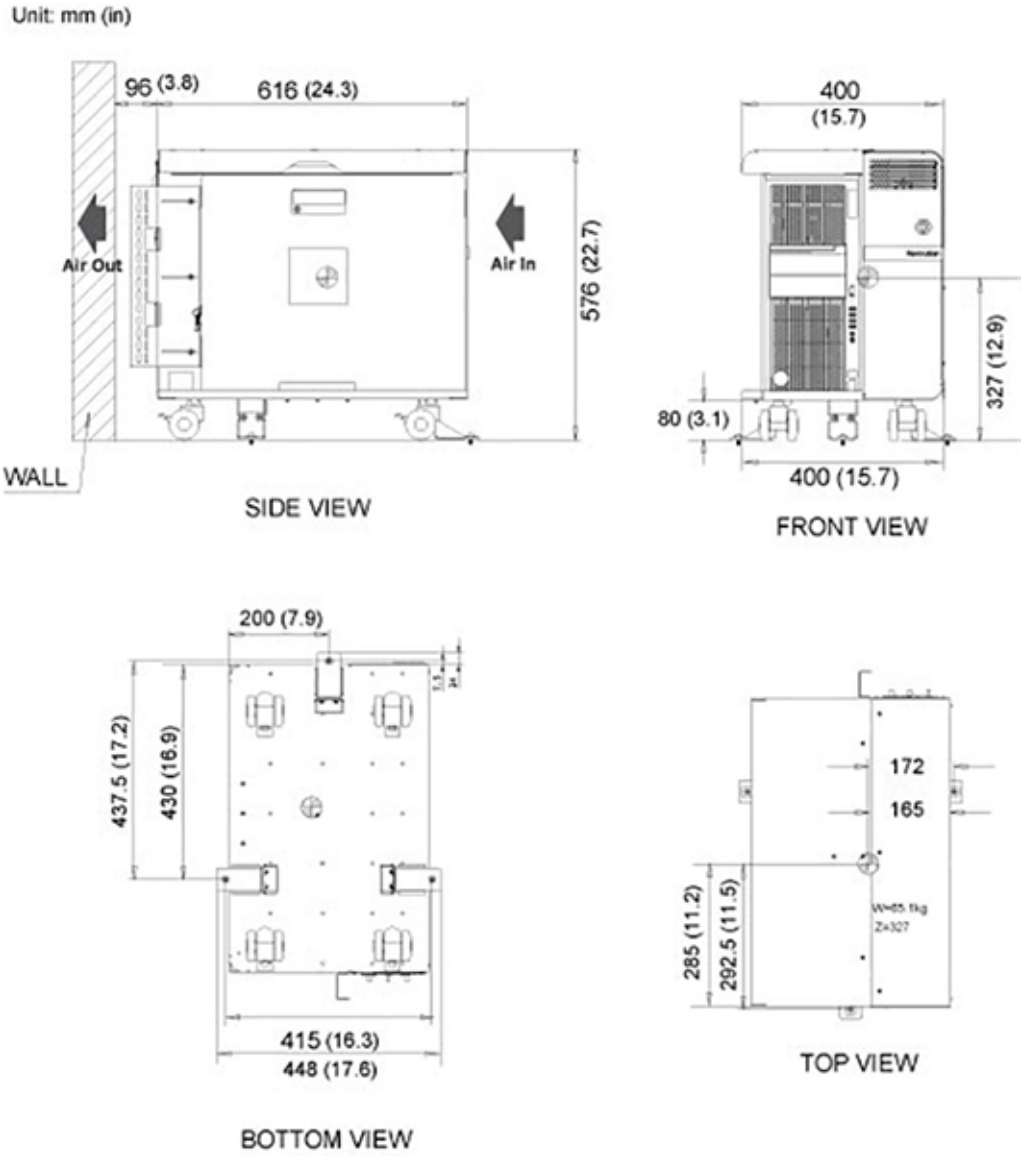
Figure 30 Operator Console Computer Center-of-Gravity (NIO64)



All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Front View	1	Center of gravity weight = 72 kg (159 lb)

B	Top View		
C	Bottom View		

Figure 31 Operator Console Computer Center-of-Gravity (Open Console)



All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Front View	1	Center of gravity weight = 65.1 kg (143.5 lb)
B	Top View		
C	Bottom View		

Figure 32 Operator Console Computer Center-of-Gravity (Z8G4)

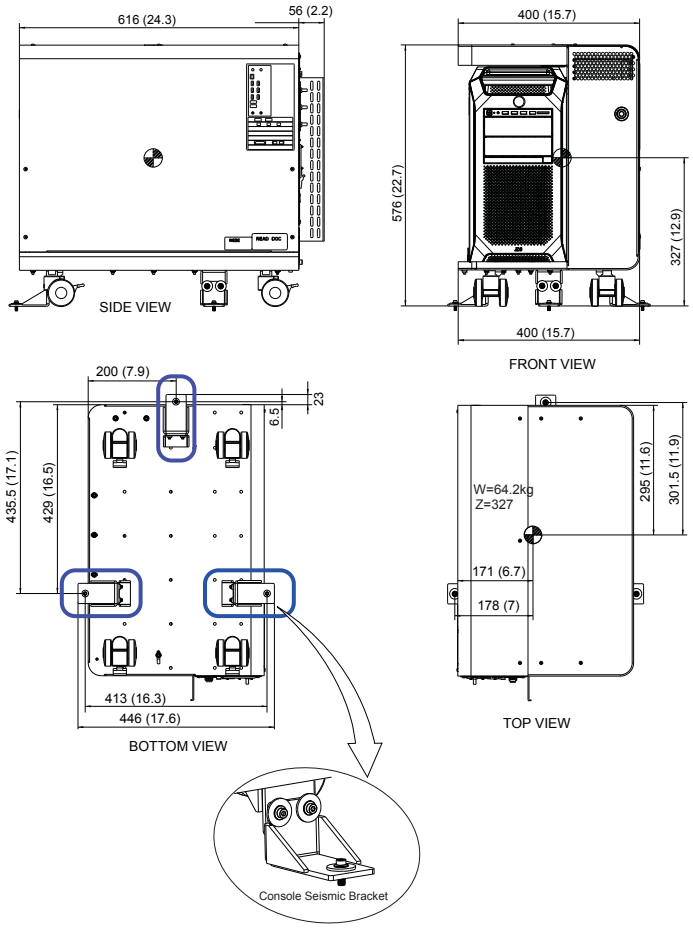
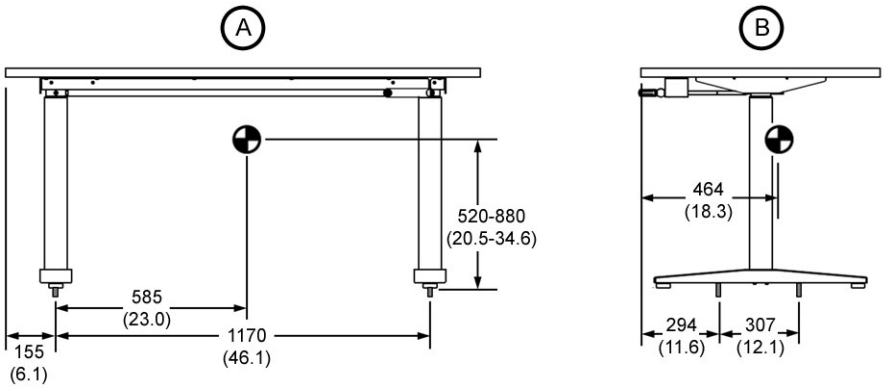


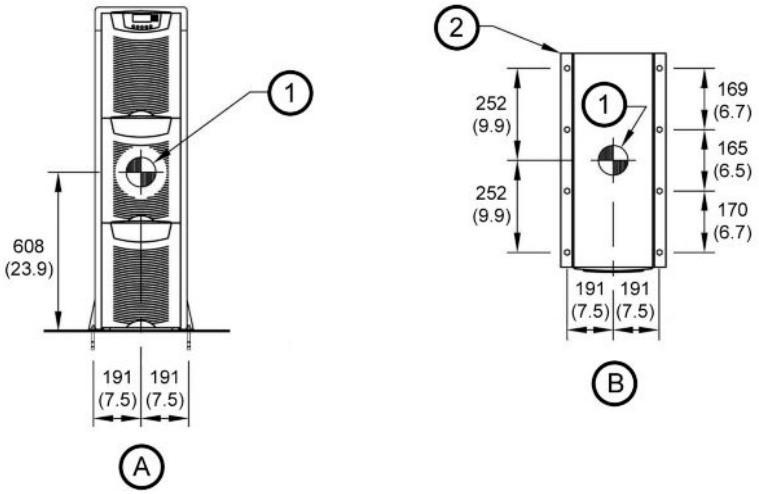
Figure 33 Workspace Table (5486188-10) Center-of-Gravity



All dimensions are in millimeters; bracketed dimensions are in inches.	
A	Front View

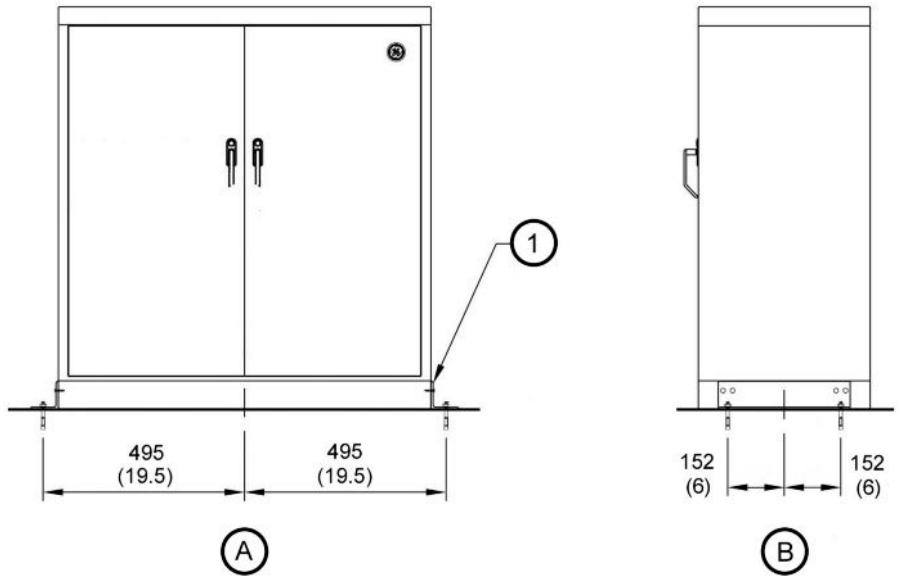
B	Side View
Note: Center of gravity weight = 63.5 kg (139 lb). Y (typical) = 580 mm (22.8 in.) for table height of 765 mm (30 in.)	

Figure 34 Uninterruptible Power Supply (UPS) Center-of-Gravity (Optional)



All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Front View	1	Center of gravity weight = 281 kg (619 lb)
B	Top View (plan at base)	2	Pre-manufactured mounting bracket (by GE)

Figure 35 Storage Cabinet Center-of-Gravity (Optional)



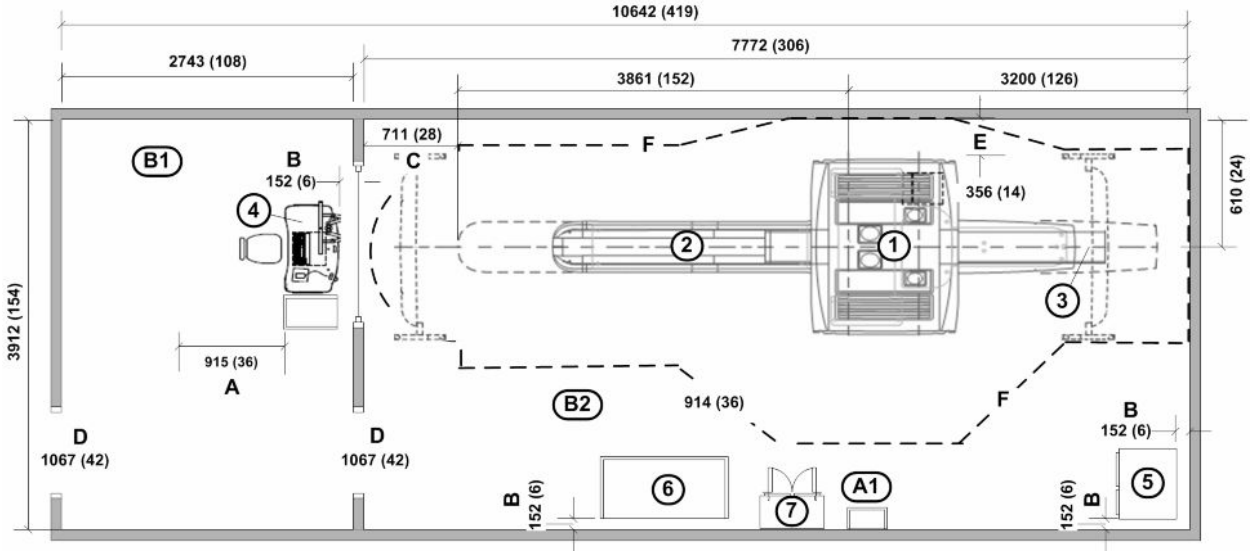
All dimensions are in millimeters; bracketed dimensions are in inches.	
A	Front View
B	Side View
1	L 3" x 3" x 1/4" x 14" bracket mounted to cabinet frame with 4 - #12 S.M. screws (each side)
Note: The Center of Gravity for the optional Storage Cabinet is site specific. It depends on the weight and location of items placed in the cabinet.	

2.2 Room Layout

2.2.1 Scan Suite Configuration

A scan suite, which includes a control room and a scan room, requires a minimum room size to safely support all PET/CT service activities. An example of a typical system configuration is detailed in Figure 36 on page 44 and Figure 37 on page 45.

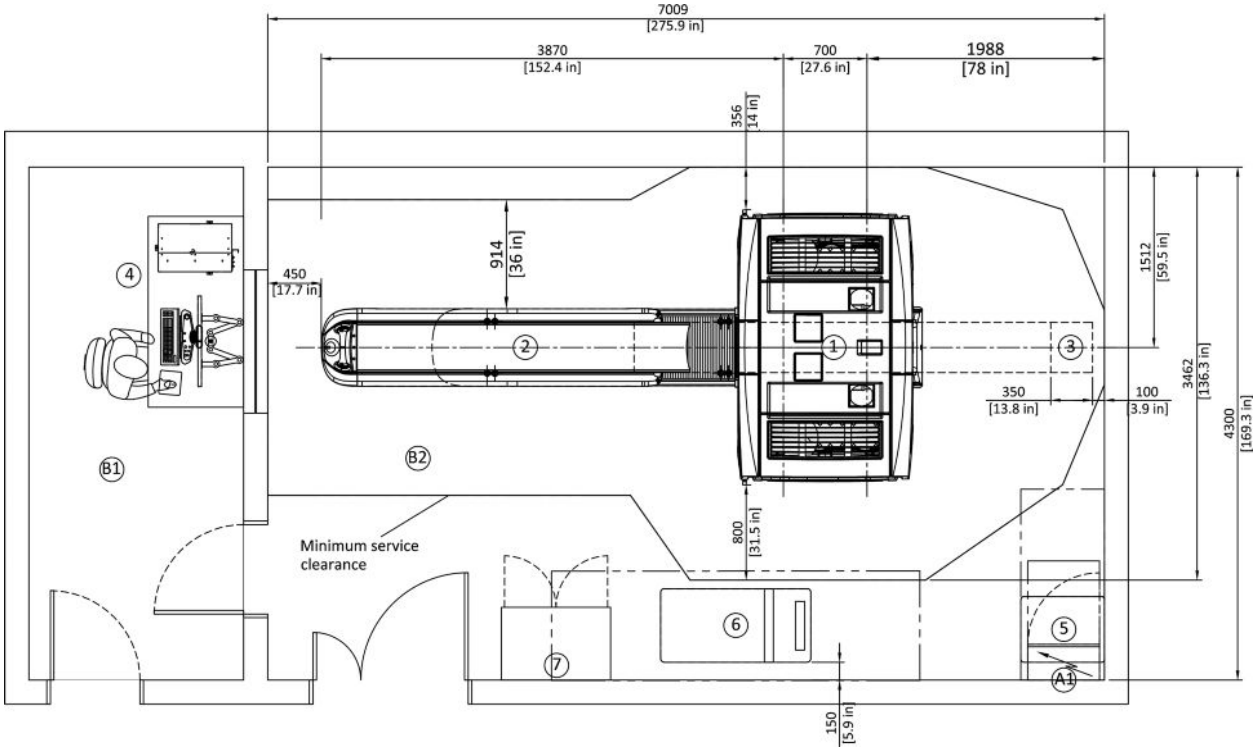
Figure 36 Typical Scan Suite Layout Configuration (Aluminum Gantry)



All dimensions are in millimeters (mm) and inches (in.).			
A1	Mains Disconnect	1	Gantry
B1	Control Room	2	Table
B2	Scan Room	3	Cradle Extender
A	NEC (Powered Service Clearance)	4	Scanner Desktop/Computer
B	NEC (Minimum Equipment Clearance)	5	Power Distribution Unit (PDU)

C	Safe Work space Egress	6	PARC4.X Reconstruction Cabinet
D	Clear door opening sized for minimum clearance needed for installation and removal of subsystems only	7	Service Storage Cabinet (option)
E	Small Room Dimension (gantry base without cover cannot be any closer to wall than this distance)		
F	Cover Management Clearance Envelope		
* 2m extender option adds 65cm to the table travel. Room clearance area should be considered accordingly.			
** Equipment on casters (such as PARC4.X) can penetrate into the system service clearance area, as long as it's possible to clear this area from any equipment during service activity.			

Figure 37 Typical Scan Suite Layout Configuration (Weldment Gantry)



All dimensions are in millimeters (mm) and inches (in.).			
A1	Mains Disconnect	3	Cradle Extender
B1	Control Room	4	Scanner Desktop/Computer
B2	Scan Room	5	Power Distribution Unit (PDU)
1	Gantry	6	PARC4.X Reconstruction Cabinet
2	Table	7	Service Cabinet (option)
* Defines the minimum area required to enable installation, operation and service of the system in safe conditions.			

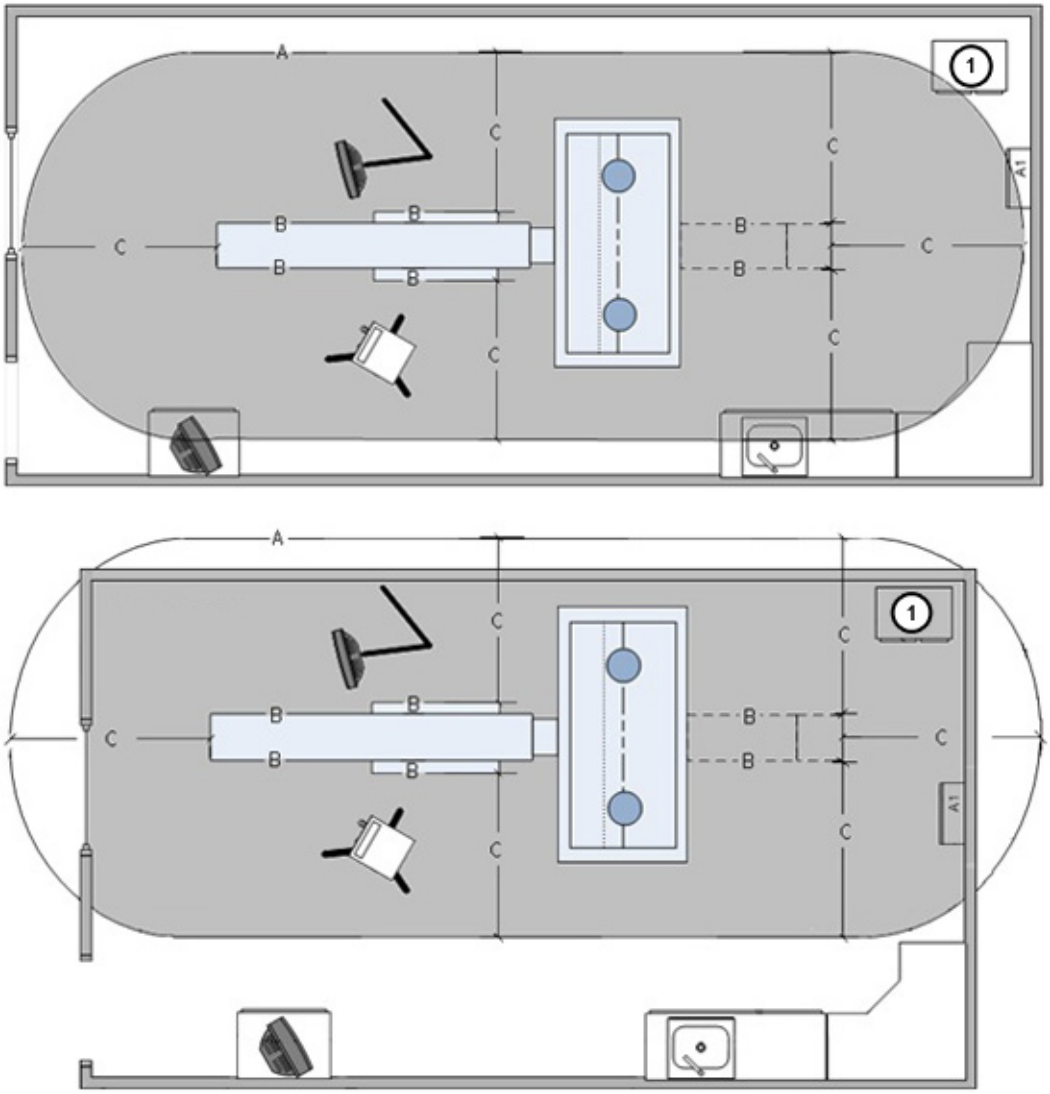
** Does not take into account local requirements. If local requirements are stricter, they should be followed. See Regulatory Requirements.
*** No option for permanent objects around the CT (i.e. wall ducts, sink, cabinet, etc.).
**** 2m extender option adds 65cm to the table travel. Room clearance area should be considered accordingly.
***** Equipment on casters (such as PARC4.X) can penetrate into the system service clearance area, as long as it's possible to clear this area from any equipment during service activity.

The enclosure (Patient Touch) Leakage Envelope, as detailed in Figure 38 on page 47, defines a zone in the Scan Room only, where the enclosure leakage must be tested. Areas that fall outside of this envelope DO NOT need to be tested. The intent of this graphic is to provide the PMI with a view of potential electrical devices, plumbing fixtures, hospital gas outlets, and metal surfaces that may fall within this scan room envelope, which may require additional grounding prior to customer turnover. [Height of envelope from floor-to-ceiling: IEC-3 = 1829.0 mm (6.0 Ft.). UL60601-1 (2.12.20 DV Addition) and GE Healthcare requirement.]

NOTE

The enclosure leakage envelope has nothing to do with Regulatory Work Space Clearance or Safe Egress requirements for Service Personnel (NFPA 70E).

Figure 38 Leakage Envelope – Scan Room



1 = PDU, A = Patient Care Perimeter Envelope, B = Equipment Perimeter, C = Width and Height		
Reference	Dimension [C]	
—	Width	Height
IEC Ed 3.1	1829.0 mm (6.0 Ft.)	1829.0 mm (6.0 Ft.)

2.2.2 Minimum Scan Room Sizing

2.2.2.1 Scan Room Operational Space Requirement

For a minimum scan room layout, the customer should consider room workflow, patient care accessibility, critical-care equipment space requirements, and applicable local building codes. Refer to the dimensions detailed in Figure 36 on page 44 and Figure 38 on page 47.

2.2.2.2 Scan Room Equipment Accessibility

Minimum scan room layout provides limited equipment accessibility on the left side of the gantry, particularly when loading patients or when positioning equipment between the gantry and wall. Refer to the dimensions detailed in Figure 36 on page 44 and Figure 38 on page 47.

2.2.3 Minimum Control Room Sizing

2.2.3.1 Control Room Considerations and Requirements

The control room shall be suitably sized for the scanner desktop. Refer to the dimensions detailed in Figure 36 on page 44. The control room should also provide a comfortable working environment for the operator. Refer to 4.1 HVAC Requirements on page 81.

2.2.3.2 Autoinjector Control Placement

Provide a suitable work area for placement of the autoinjector control, within reach of the scanner desktop. Autoinjector controls vary in size, depending on the manufacturer. Refer to the manufacturer's installation instructions.

2.2.4 Control Room Scanner Desktop Requirements

2.2.4.1 Scanner Desktop Configuration

The scanner desktop shall remain in the same configuration it was shipped. System components shall not be disassembled, removed, or rearranged.

Once the system is installed, do not relocate any system or operator components to a different counter, table, or location in the room.

2.2.4.2 Scanner Desktop Clearance

To ensure the exhaust fans located on the back of the scanner desktop vent without obstruction, maintain 152 mm (6 in.) of clear, unobstructed space along the sides of the desktop.

2.2.4.3 Scanner Desktop Power

No other electrical devices may be connected to the scanner desktop components. All other devices shall be connected to their own electrical outlet or power source.

2.2.4.4 Scanner Desktop Cables

Scanner desktop cables shall remain as shipped. Cables cannot be cut or lengthened to relocate the desktop monitor to a remote table or counter.

2.3 Hospital Equipment and Service Space Requirements

2.3.1 Clearances

2.3.1.1 Operational Clearances

Review operational clearances to verify daily use items will properly fit (beds, carts, wheelchairs, etc.).

2.3.1.2 Emergency Medical Equipment Clearances

Consider clearances for emergency medical equipment.

2.3.1.3 Replacement Parts and Service Equipment Space

Prior to the installation of the system, verify there will be adequate space in the scan room to receive and install all replacement parts and provide room for all service equipment that will be used during the installation.

X-ray Tube Box has W x L x H dimensions of 700mm x 1015mm x 737mm (27.5" x 39.88" x 29.00"), and room design should ensure adequate access to deliver the tube box to the right side of the CT Gantry.

2.3.1.4 Ceiling Height Requirements

The minimum ceiling height above the table and gantry shall measure at least 2286.0 mm, within the entire service clearance area.

2.3.2 Workplace Requirements

2.3.2.1 U.S. Code Requirements

The required service space, as noted in Figure 39 on page 52Figure 39 on page 52 and Figure 40 on page 53, has several conditions defined by the (U.S.) National Electrical Code (NEC). These conditions are defined by the wall type and accessibility/exposure to: electrical power panels, electrical outlets, surface mounted conduits, plumbing, hospital gases, or surface ground points directly opposite exposed CT equipment.

Work space clearances apply to equipment operating at 600V or less, where examination, adjustment, servicing, and maintenance is likely to occur with live parts exposed. System servicing requires a space

for one service engineer to accomplish all system component replacement tasks without the need of special tools or equipment.

There shall be sufficient working space in the scan room to allow adequate egress during service operations that require both front and rear cover removal. If the customer and PMI have any concern that the site will not provide adequate work space for egress under these conditions, the necessary provisions should be made to accommodate this event.

The customer shall maintain the required regulatory clearance distances and not use these areas for storage. This applies during normal system operation and during service inspection and routine maintenance.

This work space is defined where the cover has been removed in an area where service is performed, with power applied to the system. The conditions of this space are as follows:

Service Space: Also defined as Working Space by: IEC/NFPA 70e (Table 110.26) 2011 Edition. GE Healthcare also requires the following minimum work space requirements for the safe servicing of the product:

Working Space: Work space for equipment operating at 600 Volts, nominal, or less, to ground, and likely to require examination, adjustment, servicing, or maintenance while energized. Refer to the conditions in Table 9 on page 51 and Table 10 on page 51.

IEC/NFPA 70e (Table 110.26) 2011 Edition GE Healthcare requires the following minimum work space requirements for the safe servicing of the product.

Terms Defined for “Work Space Conditions”

- **Grounded Surface/Wall:** Made of concrete, masonry, brick, ceramic tile, or a wall that contains surface mounted electrical boxes, conduits, or ducting.
- **Ungrounded Surface/Wall:** Made of wood or other insulated construction material that will not create a path to ground when touched.
- **Obstructions:** Surface mounted floor ducts or other trip hazards, walls, pilasters, support columns, and equipment covers stored temporarily that would block direct access to an exit from the room.
- **Head Clearance:** Head clearance represents the height dimension of the work space, as measured from the floor directly in front of the equipment to the ceiling (or overhead obstruction). It requires a minimum of 1981 mm (78.0 in.), or the height of the equipment, whichever is greater.
- **Powered On Service – Work Space Egress - 712.0 mm (28.0 in.):** Any work space around the perimeter of the system or subsystem, shall have at least one unobstructed route to a direct exit of the room. The width of the exit route shall not be less than 712.0 mm (28.0 in.) along the entire length of the route. This emergency egress route must be free of obstructions and trip hazards, including equipment covers that may have been removed for service.
- **Small Room – (Not Recommended):** A condition of installation where the gantry may be placed a minimum of 356.0 mm (14.0 in.) from a wall where access to electrical power or the wall is not required. (Limited to the side of the gantry, opposite the Tube-Change side of the gantry.)

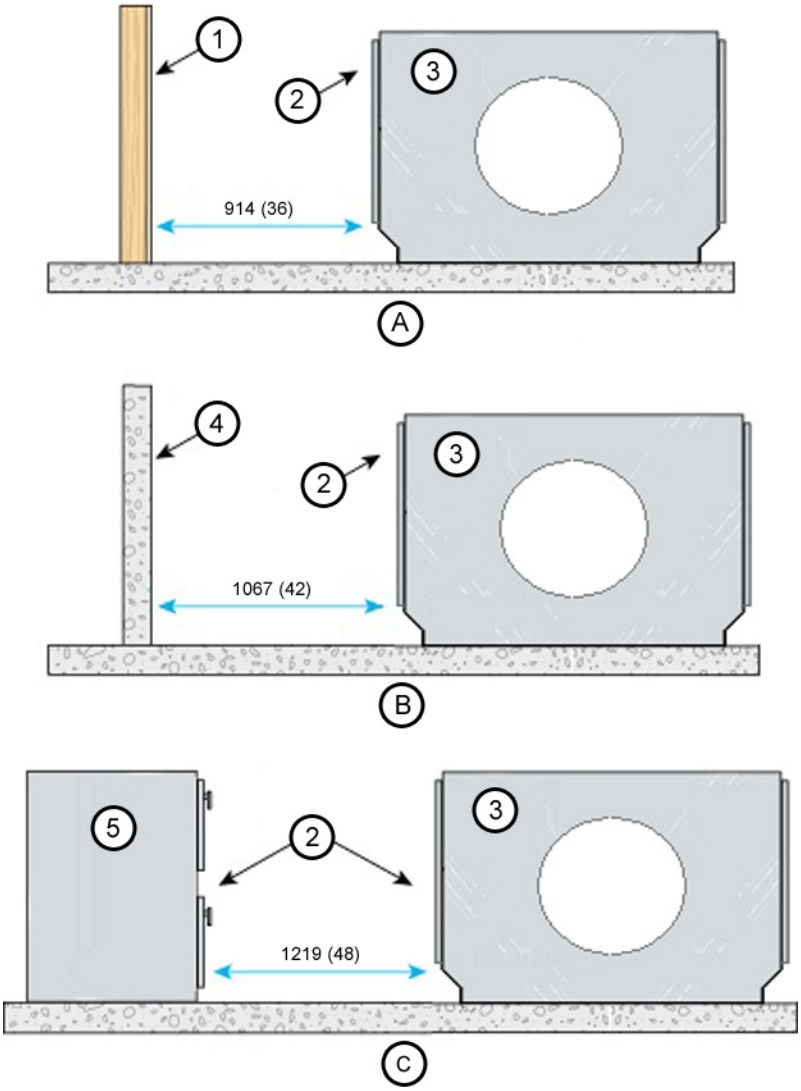
Table 9 Work Space Conditions

Dimension	Condition Number	Condition	Separation Distance mm (in.)
Length/ Depth	1	If the depth of the working space is directly facing an ungrounded surface or wall without live voltage panels (600V or less) and without surface mounted ducts or conduits.	914.0 (36.0)
	2	If the depth of the working space is directly facing a grounded surface or wall.	1067.0 (42.0)
	3	If the depth of the working space is directly facing a surface or wall with live voltage panels (600V or less), grounded surface mounted ducts, or conduits.	1219.0 (48.0)
Width	4	Minimum width of the working space in front of the electrical equipment, unless the width of the equipment is larger.	762.0 (30.0)
		If the equipment is wider than 762.0 mm (30.0 in) the width of the equipment shall become the width of working space.	Size of Equipment
		The working space shall permit at least a 90 degree opening of equipment doors.	—
Height	5	Minimum Height of the working space shall be clear and extend from the grade (floor), unless the height of the equipment is higher.	2000.0 (78.0)
		If the equipment is taller than 2000.0 mm (78.0 in.), the required height of the working space shall become the height of the equipment.	Height of Equipment

Table 10 Small Room Condition

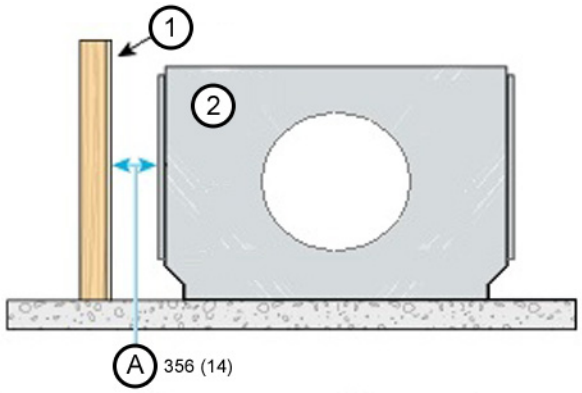
Small Room Condition	Separation Distance mm (in.)
Minimum distance required on the side of the gantry, opposite the Tube-Change side of the gantry.	356.0 (14.0)

Figure 39 Work Space Conditions



All dimensions are in millimeters; bracketed dimensions are in inches.			
A	Condition 1	2	Exposed live parts
B	Condition 2	3	Scanner or subsystem
C	Condition 3	4	Grounded parts, concrete, etc.
1	Effectively insulated	5	A1, other electrical equipment power panels

Figure 40 Small Room Condition



All dimensions are in millimeters; bracketed dimensions are in inches.	
1	Effectively insulated
2	Scanner or subsystem
A	Small Room Condition. No live parts to service on this side.

2.3.2.2 Cover Removal Clearance

System servicing requires sufficient space to remove all covers from the system.

2.3.3 Cover Clearance Requirements

2.3.3.1 Gantry Front Cover – Removal Clearance

Front cover removal requires a minimum clearance space, as specified in Figure 36 on page 44 and Figure 37 on page 45. The cover is removed using a pair of dollies that allow the service engineer to remove the cover from the gantry, tilt the cover 90° to roll it to the foot end of the table, and then tilt the cover an additional 90° so it is upsidedown, relative to its normal installation position.

2.3.3.2 Gantry Front Cover – Service Clearance

Once the front cover of the gantry is removed, the service engineer shall have the ability to reposition the cover to an area that satisfies the minimum regulatory service clearance. The cover cannot be placed in an area where it will encroach on the minimum service area.

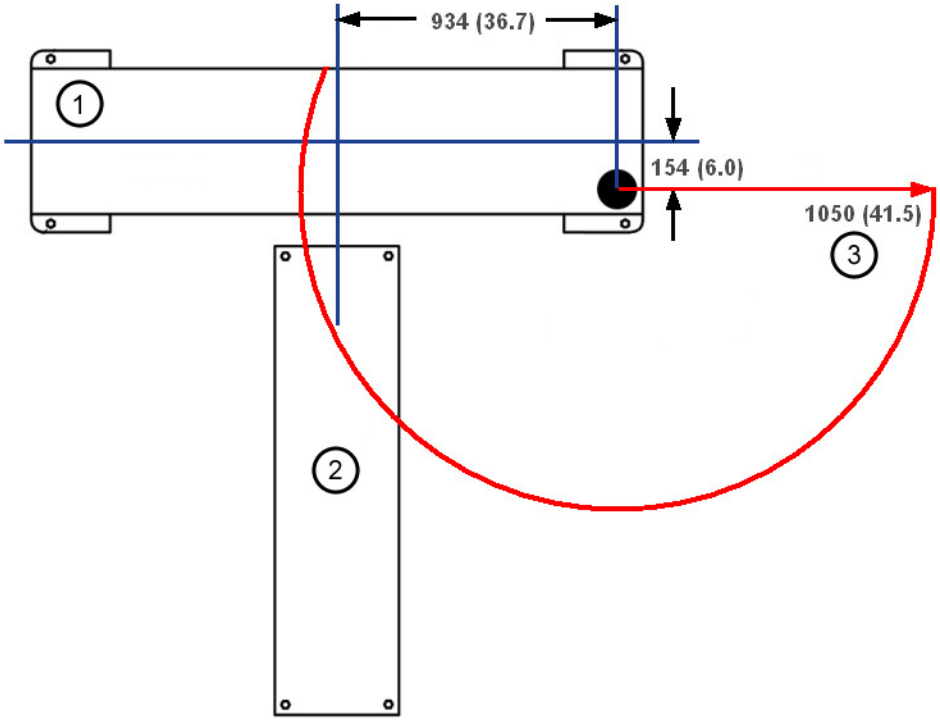
2.3.3.3 Gantry Rear Cover – Removal Clearance

Rear cover removal requires a minimum clearance space, as specified in Figure 36 on page 44 and Figure 37 on page 45. Minimum service clearance space allows the service engineer to move the cover either straight back or off to one side of the table. The rear cover and dollies cannot extend into the service clearance space, even if the system is positioned diagonally.

2.3.4 Gantry Space Requirements

Specifications for Boom Assembly clearance arc are defined in Figure 41 on page 54. The Boom Assembly is used during Tube and Detector replacement.

Figure 41 Boom Assembly Clearances



All dimensions are in millimeters; bracketed dimensions are in inches.	
1	CT Gantry
2	Table
3	Clearance radius

2.3.5 PDU Placement Requirements

When positioning the PDU, consider regulatory compliance. Also, refer to the room layout illustrations in Room Layouts.

2.3.6 Scanner Desktop Placement Requirements

2.3.6.1 Scanner Desktop Depth

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 scanner desktop for service activity.

2.3.6.2 Scanner Desktop Operating Space

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.

2.3.7 PARC4.X Reconstruction Cabinet Placement Requirements

The PARC4.X is on wheels and can be pulled away from the wall for service. Upon completion of service, the PARC4.X shall be placed no closer than 152.4 mm (6.0 in.) on any side near a wall.

On both ends of the PARC4.X, a clearance of 600 mm (23.6 in) is required to open the doors for service. If replacing components inside the PARC4.X, the PARC4.X can be pulled away into an area that has 960 mm (37.7 in) of clearance space.

Do not block upwards exhaust flow and thermostats shall not be in the PARC4.X exhaust.

2.3.8 Trailer Requirements

Trailer is serviced from the right and left sides with power on and the gantry in the home position. Gantry-expanded power-on service is not recommended.

2.3.9 Service Storage Cabinet Requirements

An optional storage cabinet (B77292CA) is available to store all supplied service equipment. (See Table 11 on page 55 for equipment list.) This storage cabinet should be located in the scan room suite area for easy service access.

A storage cabinet or defined storage space is required to store service equipment purchased with the system. If the optional storage cabinet has not been ordered with the system (See Pre-Install Checklist—Site Planning Requirements) adequate space must be provided to store this equipment. GE Healthcare recommends that the storage of the service equipment be located as close as possible to the scan suite.

Table 11 Storage Cabinet and Equipment

Item	Size	Weight (total)
Storage Cabinet	61 x 91 x 107 cm (24" D x 36" W x 42" H)	45.3 kg (100 lb) (approximately)
QA Phantom (water filled)	23 x 15 cm (9" x 6")	4.5 kg (10 lb)
Phantom Holder	25 x 25 cm (10" x 10")	3.6 kg (8 lb)
FE Documents & CD/DVD		4.5 kg (10 lb)
35 CM Poly (Circle)	35 x 8 cm (14" x 3")	6.8 kg (15 lb)
48 CM Poly (Circle)	48 x 8 cm (19" x 3")	11.3 kg (25 lb)

Storage Cabinet and Equipment continued		
Item	**Size**	**Weight (total)**
Stool	48 x 48 cm (19” x 19”)	1 kg (2 lb)
Blue Tote	81 x 51 x 32 cm (30" x 20’ x 17")	2 kg (4 lb)
Install Support Kit (box)	30 x 30 x 38 cm (12" x 12" x 15")	9.1 kg (20 lb)
Tube Hoist Kit	77 x 8 cm and 38 x 15 cm (30" x 3" and 15" x 6")	13.6 kg (30 lb)
Balance Weight Kit	(2 boxes)	33 kg (73 lb)
Spatial Resolution Phantom	18 x 15 x 8 cm (7" x 6" x 3")	

2.3.10 Verify Site Print

The customer shall ensure all equipment, storage cabinets, countertops, and sinks appear on the site print, in their proper location.

2.4 Anchoring

2.4.1 Anchoring Requirements – Non-Seismic Installation

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.

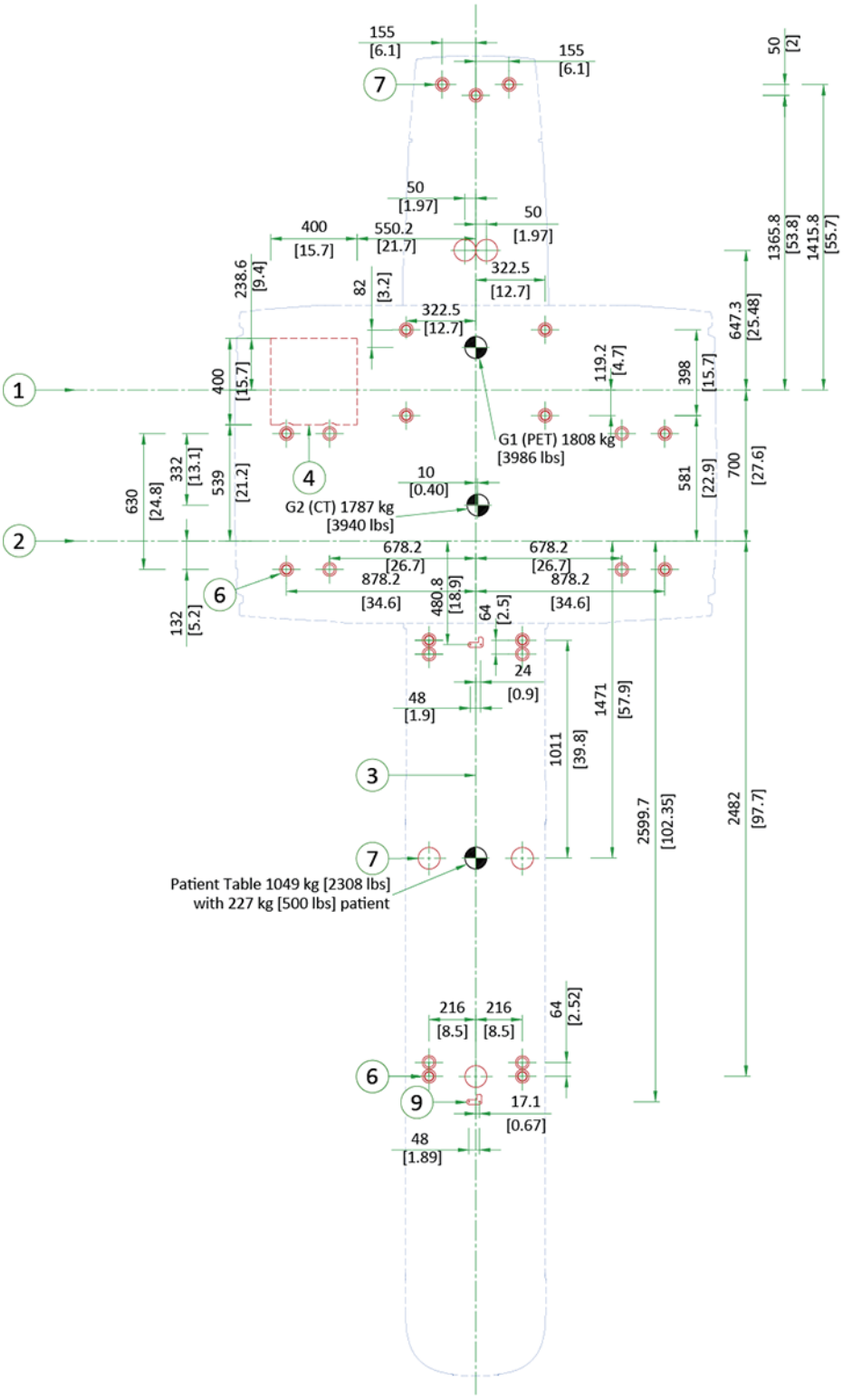
2.4.1.1 Gantry, Patient Table, and Trailer Anchoring – Non-Seismic

The CT Gantry, Patient Table, and Trailer shall be securely anchored to the floor Figure 42 on page 57. The Operator Console, Power Distribution Unit, and PARC4.X Reconstruction Cabinet do not require anchoring to the floor in a non-seismic installation. Use the floor template (p/n 5992810) or its dimensions to locate the CT Gantry, Patient Table, and Trailer 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.

It is the responsibility of the buyer/purchaser of the system to have a licensed structural engineer work in conjunction with a qualified contractor to use either the GE-supplied floor anchor hardware or provide an equivalent anchoring system to mount the gantry and patient table to the floor.

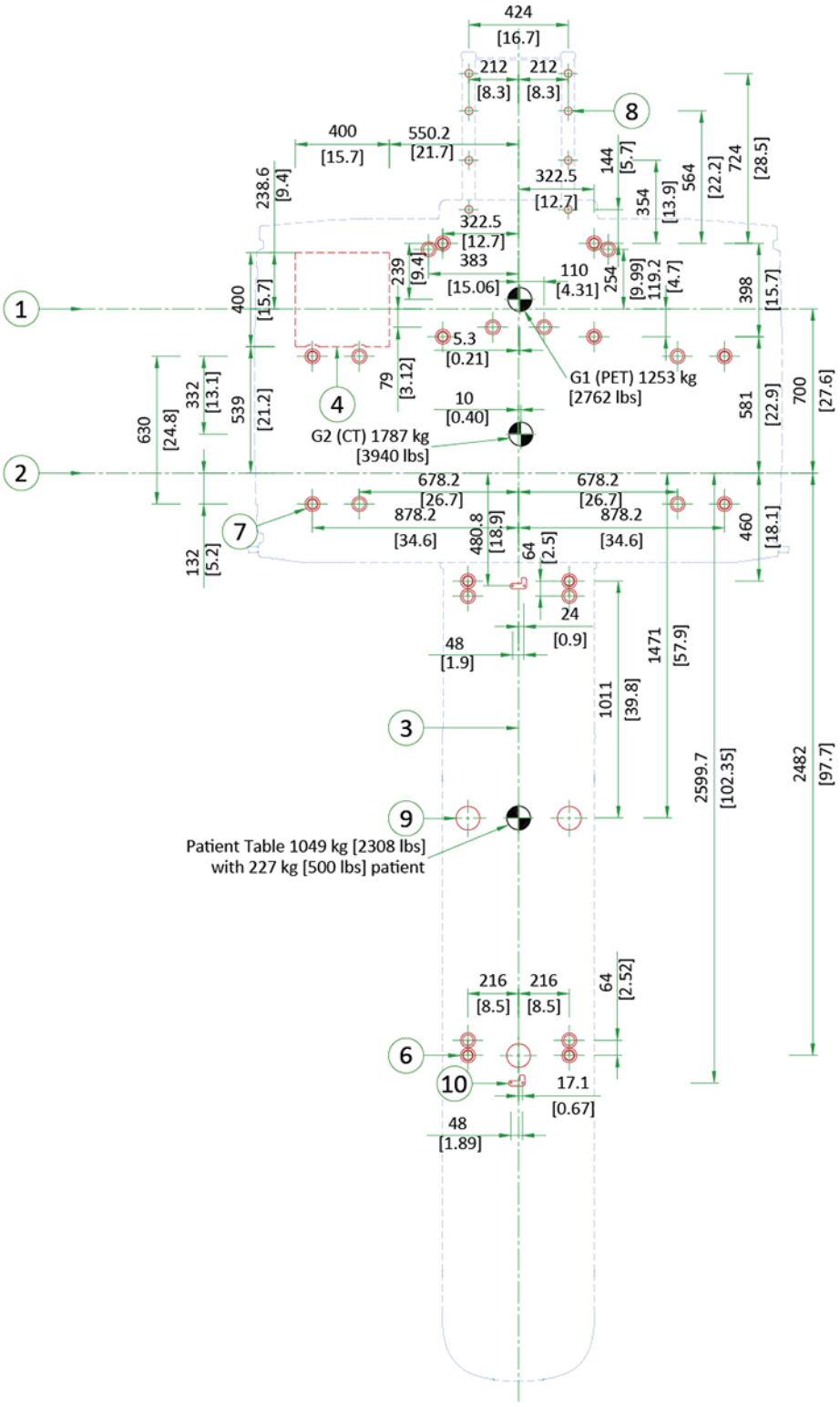
The buyer/purchaser shall consult a licensed architect, licensed structural engineer, qualified contractor, or the PMI to resolve all anchoring issues.

Figure 42 Floor Mounting Detail (Aluminum Gantry)



All dimensions are in inches; bracketed dimensions are in millimeters.			
1	PET primary scan plane axis	6	Twelve (12) anchoring points for the gantry
2	CT scan plane axis	7	Three (3) anchoring points for the trailer
3	Longitudinal axis	8	Five (5) adjuster / leveling pads
4	Cable and hose access	9	Two (2) table calibration brackets
5	Eight (8) anchoring points for the table		Main anchoring points
	Center of gravity		Backup anchoring points
Patient Table 1049 kg (2308 lbs) including 227 kg (500 lbs) patient.			

Figure 43 Floor Mounting Detail (Weldment Gantry)

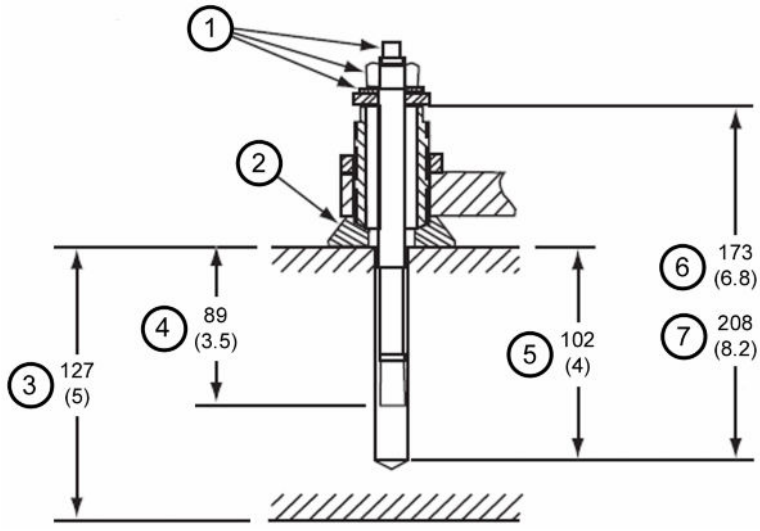


All dimensions are in inches; bracketed dimensions are in millimeters.			
1	PET primary scan plane axis	6	Eight (8) anchoring points for the table
2	CT scan plane axis	7	Sixteen (16) anchoring points for the gantry
3	Longitudinal axis	8	Eight (8) detachable rail leveling pads used only during service
4	Cable and hose access	9	Three (3) adjuster / leveling pads
5	Cable access only	10	Two (2) table calibration brackets
	Center of gravity		Main anchoring points
	Backup anchoring points		
Patient Table 1049 kg (2308 lbs) including 227 kg (500 lbs) patient.			

2.4.1.2 GE-Supplied Anchors

The GE-supplied anchors for the Gantry, Patient Table, and Trailer shall only be used for mounting components to a concrete floor, in a non-seismic application. Refer to Figure 44 on page 60 for anchoring requirements.

Figure 44 GE-Supplied Floor Anchor Cross-Section



All dimensions are in millimeters; bracketed dimensions are in inches.	
1	Anchor Assembly

2	63.5 mm (2.5 in) diameter leveling pad 9.7 mm (0.38 in) height for short 8 inch rod 44.5 mm (1.75 in) height for long 10 inch rod
3	Floor depth
4	Minimum anchor embedment
5	Drill depth
6	For short 8 inch rod
7	For long 10 inch rod

2.4.1.3 Anchor Placement

Each floor anchor shall be installed to clear any structural object hidden or buried in the floor. (Hidden objects could be floor beams, rebar, and concrete wire mesh.)

2.4.1.4 Minimum Number of Anchors

Non-Seismic installations shall use a minimum of fours floor anchors to mount the CT Gantry, four floor anchors to mount the Patient Table, four anchors to mount the PET Base - Aluminum Gantry (four anchors to mount the PET Base - Weldment Gantry), and three anchors to mount the PET Trailer. Any anchors showing more than 21 mm (~0.9 in.) of thread above the torqued nut shall require the installation of a second anchor in the closest adjacent mounting location. The second anchor shall meet the same requirements in Figure 44 on page 60.

2.4.2 Anchoring Requirements – Seismic Installation

For a seismic installation, the buyer shall refer to all applicable state/local laws and building codes. Buyer shall consult with structural engineer, site contractor, or architect for seismic installation requirements. The purchaser can also contact a GEHC Project Manager to obtain additional seismic calculations and information.

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Chapter 3 Special Construction Requirements

3.1 Radiation Protection

3.1.1 X-Ray Radiation Protection

3.1.1.1 Shielding Requirements

A qualified radiological health physicist shall verify the scan room radiation barrier is properly designed and installed, taking into consideration:

- Scatter radiation levels within the scanning room (see Figure 45 on page 65 and Figure 46 on page 66)
- Equipment placement
- Weekly projected workloads (# patient/day technique (kvp*ma))
- Materials used for construction of walls, floors, ceiling, doors, and windows
- Activities in surrounding scan room areas
- Equipment in surrounding scan room areas (such as film developer, film storage)

The illustrations in this Chapter depict measured radiation levels within the scanning room, while scanning a 32 cm or 16 cm CTDI phantom with the technique shown. Use the mAs, kV and aperture scaling factors shown in Table 12 on page 63 to adjust exposure levels to the scan technique used at the site.

Example (from Figure 45 on page 65): The exposure level for a 120 kV, 800 mA, 1 sec. scan at 1270 mm (50 in.) away from the scan plane is: 10.4 µGy × 0.71 × 800/100 = 59.2 µGy.

NOTE

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

Table 12 Shielding Requirements Scaling

Changed Parameter	Multiplication Factor	Changed Parameter	Multiplication Factor
mAs	new mAs/100	1 mm aperture	0.20
80 kV	0.24	3 mm aperture	0.22
100 kV	0.45	5 mm aperture	0.27

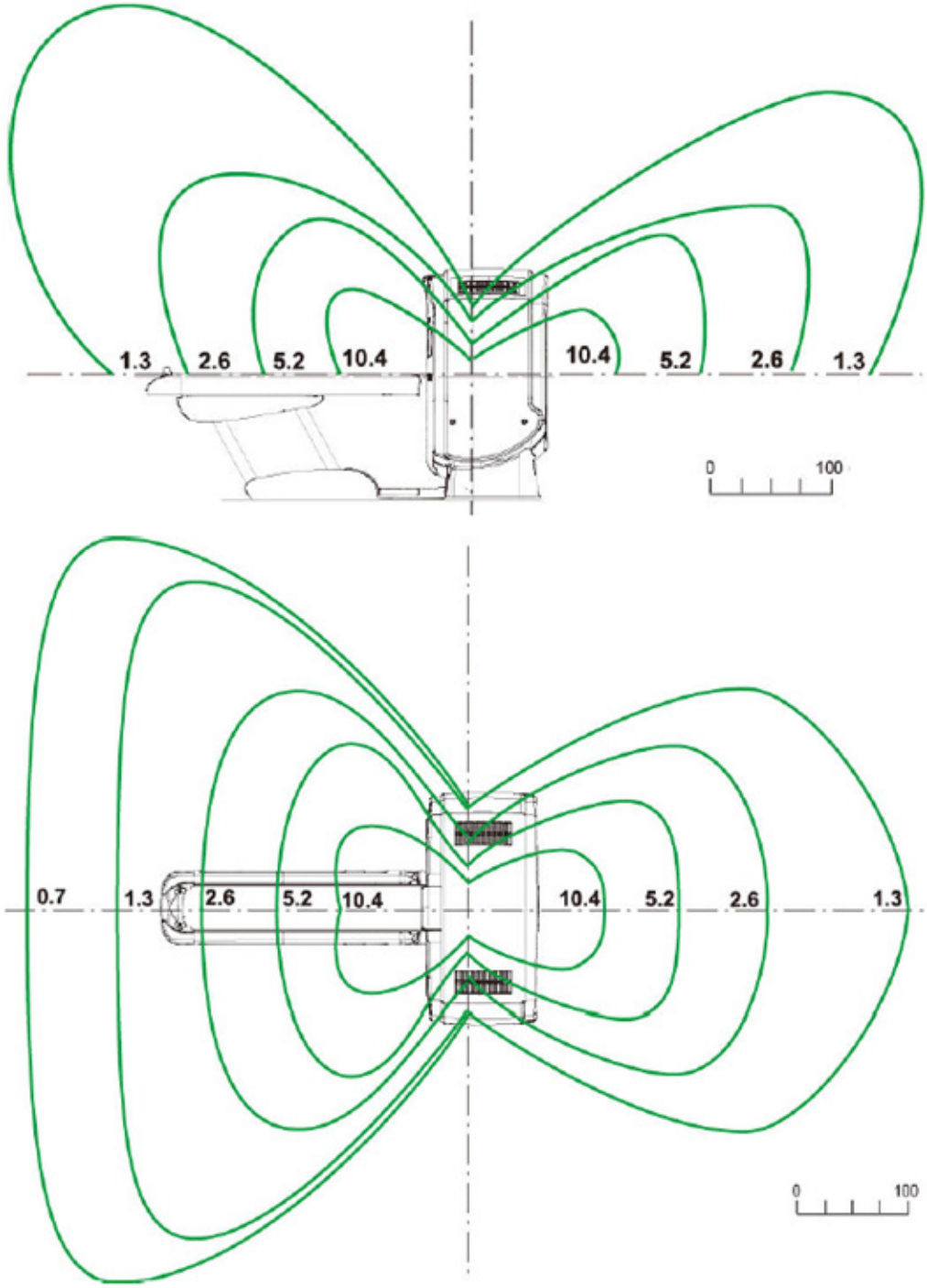
Shielding Requirements Scaling continued			
Changed Parameter	**Multiplication Factor**	**Changed Parameter**	**Multiplication Factor**
120 kV	0.71	10 mm aperture	0.38
140 kV	1.00	15 mm aperture	0.48
		20 mm aperture	0.59
		30 mm aperture	0.79
		40 mm aperture	1.00

NOTICE

This publication uses µGy (micrograys) to measure radiation levels. The conversion factor from mR to µGy (micrograys) is: 1 mR = 8.69 µGy.

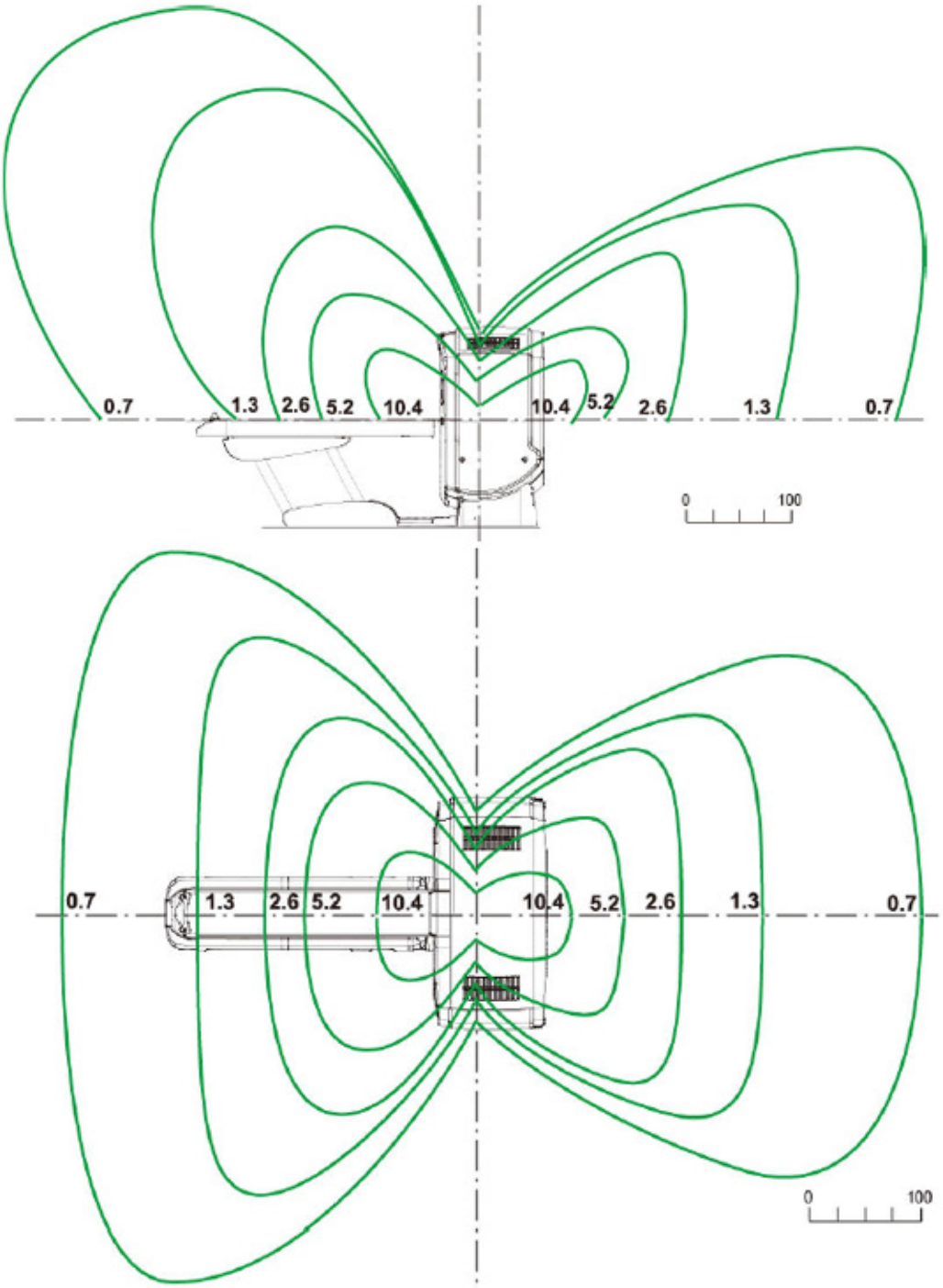
3.1.1.2 System X-ray Scatter Envelope

Figure 45 Typical Scatter Survey (Large Filter)



Scale units: centimeters. ISO-contour level units: µGy/scan. Technique: 140 kV, 100 mA, 1 sec, 40 mm
Note: The 32 cm CTDI Phantom should be placed on the patient table.

Figure 46 Typical Scatter Survey (Small Filter)



Scale units: centimeters. ISO-contour level units: µGy/scan. Technique: 140 kV, 100 mA, 1 sec, 40 mm
Note: The 16 cm CTDI Phantom should be placed on the patient table.

3.1.2 Gamma Ray Protection

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

NOTE

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

3.1.2.1 Protection of Equipment

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

Radioactive sources must be stored in approved shielded containers or be stored in a separate room (hot lab) adjacent to, and accessible from, the Scan Room. This hot lab should be near the cyclotron (if used). Doses should be prepared in the same area.

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

3.1.2.2 Protection of Personnel

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

3.1.2.3 Barriers, Partitions and Shielding

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

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

3.1.2.4 External Sources of Radiation

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

3.1.2.5 PET Alignment (VQC) Phantom

The PET Alignment (VQC) phantom is used during the Check Image Alignment procedure. This special phantom contains spheres (commonly referred to as “marbles”). The five (5) small spheres embedded in the phantom are a source of very low radiation (0.7 MBq Germanium-68 per sphere; total 3.5 MBq for p/n 5308767 phantom). The average life of the phantom is 2.5 to 4.0 years. Individuals using this phantom must be trained to handle radioactive materials as well as maintain proper source handling procedures while handling the phantom. This may include local site-specific procedures for the safe handling of radioactive material.

3.1.2.6 PET Annulus Phantom

The PET Annulus phantom (DQA Phantom) is used for the Daily Quality Assurance (DQA) procedure. The Annulus Phantom is made of ABS plastic and filled with Epoxy Ge-68 radioactive resin material (nominal activity 55.0 MBq (±20%)). Individuals using this phantom must be trained to handle radioactive materials as well as maintain proper source handling procedures while handling the phantom. This may include local site specific procedures for the safe handling of radioactive material.

3.2 Electromagnetic Interference (EMI) Consideration

3.2.1 Electromagnetic Interference (EMI) System Placement

If you know of, or suspect, the presence of excessive electromagnetic interference (EMI), consult your GE Healthcare PMI or GE Sales and Service for recommendations to reduce EMI fields. Consider the following to reduce EMI:

- EMI field strength decreases rapidly with distance from the source of the electromagnetic field.

- EMI from a three-phase transformer is much less than a bank of three single-phase transformers of equivalent power.
- Large electric motors are a substantial source of EMI.
- High-powered radio signals are a source of EMI.
- Maintain good shielding of cables and electronic cabinets.
- Consider and measure EMI where the facility power is running near the scan room.
- Pay attention to power substations and high-voltage power lines near the scan facility.
- If you have any concerns, measure for all EMI to confirm the site meets all required specifications.

3.2.1.1 EMI – Gantry

The gantry shall be located in an area where the ambient static magnetic field is less than 10E-4 tesla (1000 milligauss) and the ambient AC magnetic field is less than 10E-6 tesla (10 milligauss); otherwise, EMI will affect the image quality of the scanner.

3.2.1.2 EMI – PDU

The gantry, sensitive electronics (i.e. PARC4.X) or patient table shall not be placed within 0.3 meters (12 in.) of the power distribution unit.

3.2.1.3 EMI – PARC4.X/Scanner Desktop/Computer Equipment

The PARC4.X, scanner desktop, and its associated computer equipment shall be located in an area where the ambient static magnetic field is less than than 10E-3 tesla (10,000 milligauss).

3.2.1.4 Electromagnetic Immunity

The system is intended for use in the electromagnetic environment specified in Table 13 on page 70. The customer, or the user of the system, shall ensure the system is used in such an environment.

Table 13 Electromagnetic Immunity

Immunity Test	EC 60601–1–2 Test Level	Compliance Level	Electromagnetic Environment Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air ±8 kV contact ±15 kV air	[Edition 2 and 3] ±6 kV contact ±8 kV air [Edition 4] ±8 kV contact ±15 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 100Khz rate ± 1 kV for input/output lines 100Khz rate	[Edition 2 and 3] ± 2 kV for power supply lines, 100Khz rate ± 1 kV for input/output lines, 100Khz [Edition 4] ±2 kV for power supply lines, 100Khz rate ±1 kV for input/output lines, 100Khz rate	Mains power quality should be a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line-line ±2 kV line-earth	[Edition 2,3, and 4] ±1 kV line-line ±2 kV line-earth	Mains power quality should be a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4- 11	0% UT for 5 sec	[Edition 2 and 3] < 5 % UT (> 95% dip in UT) for 5 sec [Edition 4] 0% UT for 5 sec	Mains power quality should be a typical commercial or hospital environment. If the user of the system requires continued operation during power mains interruptions, it is recommended that the system is powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m 30 A/m	[Edition 2 and 3] 3 A/m [Edition 4] 30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE UT equals the alternating current mains voltage prior to application of the test level.			

Electromagnetic Immunity continued			
Immunity Test	**EC 60601–1–2 Test Level**	**Compliance Level**	**Electromagnetic Environment Guidance**
Conducted RF IEC 61000-4-6	3 VRMS 150 kHz to 80 MHz 6Vrms in ISM bands 150 kHz to 80 Mhz	[Edition 2, 3, and 4] 3 VRMS 150 kHz to 80 MHz [Edition 4] 6 Vrms in ISM bands 150 kHz to 80 Mhz	Do not use portable and mobile RF communications equipment closer to any part of the system, including cables, than the recommended separation distance (d) calculated from the equation appropriate for the frequency of the transmitter. Recommended Separation Distance (d): $d = [\frac{3.5}{3}]\sqrt{P}$ See #/SL16653604-1321234 where P is the maximum output power rating of the transmitter in watts (W), according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 

Electromagnetic Immunity continued			
Immunity Test	**EC 60601–1–2 Test Level**	**Compliance Level**	**Electromagnetic Environment Guidance**
Radiated RF Fields / Proximity Fields from Wireless Transmitters IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz 80% AM 1 kHz 9V/m to 28 V/m spot frequencies 385/450/710 /745/780/810 /870/ 930/ 1720/1845/1970 / 2450/5240/5500 / 5785 MHz PM 18 Hz or 217 Hz (50% duty cycle) see #/ SL16653620-1321234 for more details.	[Edition 2 and 3] 3 V/m 80 MHz to 2.5GHz 80% AM 1 kHz [Edition 4] 3 V/m 80 MHz – 2.7 GHz 80% AM 1 kHz [Edition 4] 9 V/m to 28 V/m spot frequencies 385/450/710/745 /780/ 810/870/930/1720/1845 / 1970/2450/5240/ 5500/ 5785 MHz PM 18 Hz or 217 Hz (50% duty cycle) see #/ SL16653628-1321234 for more details.	Do not use portable and mobile RF communications equipment closer to any part of the system, including cables, than the recommended separation distance (d) calculated from the equation appropriate for the frequency of the transmitter. Recommended Separation Distance (d) : $d = [\frac{3.5}{3}]\sqrt{P}$ (800 MHz to 2.7 GHz) $d = [\frac{7}{3}]\sqrt{P}$ Refer to #/SL16653624-1321234 where P is the maximum output power rating of the transmitter in watts (W), according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 

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

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

Table 14 Spot Frequencies

Spot Frequency (Mhz)	Band (Mhz)	Service	Maximum Power (Watts)
385	380-390	TETRA 400	1,8
450	430-470	GMRS 460 FRS 460	2,0
710	704-787	LTE Band 13, 17	0,2
745			
780			
810	800-960	GSM 800/900 TETRA 800 IDEN 820 CDMA 850 LTE Band 5	2
870			
930			
1720	1700-1990	GSM 1800 CDMA 1900 GSM 1900 DECT LTE Band 1, 3, 4, 25 UTMS	2
1845			
1970			
2450	2400-2570	Bluetooth WLAN 802.11 b/g/n RFID 2450 LTE Band 7	2
5240	5100-5800	WLAN 802.11 a/n	0,2
5300			
5785			

3.2.1.5 Electromagnetic Separation Distance

Maintain the electromagnetic separation distance as described in Table 15 on page 74 (between 150K to 2.7G Hz).

Table 15 Recommended Separation Distances

Rated Maximum Output Power (P) of Transmitter Watts (W)	Separation Distance (Meters) by Frequency of Transmitter		
	150 kHz to 80 MHz $d = [\frac{3.5}{3}]\sqrt{P}$	80 MHz to 800 MHz $d = [\frac{3.5}{3}]\sqrt{P}$	800 MHz to 2.7 GHz $d = [\frac{7}{3}]\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74
1	1.17	1.17	2.33
10	3.69	3.69	7.38
100	11.7	11.7	23.3

For transmitters rated at a maximum output power not listed above, the separation distance can be estimated using the equation in the corresponding column, where power (P) is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE

At 80 MHz to 800 MHz, the separation distance for the higher frequency range applies.

NOTE

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

As an example, keep a 1 W mobile phone (800 MHz to 2.7 GHz carrier frequency) at least 2.3 m from the PET/CT system (to avoid image interference risks).

Limitations Management:

Adhering to the distance separation recommended in (150 KHz to 2.7 GHz) reduces disturbances recorded at the image level, but may not eliminate all disturbances. However, when installed and operated as specified, the system maintains its essential performance by continuing to acquire, display, and store diagnostic quality images safely.

3.2.1.6 Cable Shielding and Grounding

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

GE Healthcare is not responsible for any interference caused by using other than recommended interconnect cables or panels, or by unauthorized changes or modifications to this equipment.

Unauthorized changes or modifications could void the users' authority to operate the equipment.

3.2.2 Electromagnetic Emission

This equipment complies with IEC 60601-1: 2: 2004, IEC 60601-1: 2: 2007 and IEC 6061-1-2: 2014; EMC standards for medical devices.

NOTE

This system complies with the EMC standard when used with supplied cables. If cables of different lengths are required, contact your PMI. Cables cannot be cut, shortened, lengthened, or spliced.

The system is suitable to be used in an electromagnetic environment, in compliance with the limits and recommendations provided in Table 16 on page 75.

Table 16 Electromagnetic Compliance

Emissions Test	Compliance	Electromagnetic Environment Guidance
RF emissions CISPR 11	Group 1	The system uses RF energy only for its internal function. Therefore, its RF emissions are very low and not likely to cause interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	When installed in such a shielded location, the scanner 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.
Harmonic emissions IEC 61000-3-2	N/A	N/A
Voltage fluctuation/ flicker emissions IEC 61000-3-2	N/A	N/A

3.3 Vibration Isolation

3.3.1 Scanning Facility Vibration Isolation

The scanning facility shall be isolated from vibration such as; hospital power plants, pumps, motors, air handling equipment, air conditioning units, nearby rooms with exercise equipment or where exercise occurs, hallway foot traffic, elevators, parking lots, roads, subways, trains, and heliports; otherwise, vibration will affect the image quality of the scanner.

3.3.2 Frequency/Vibration Range

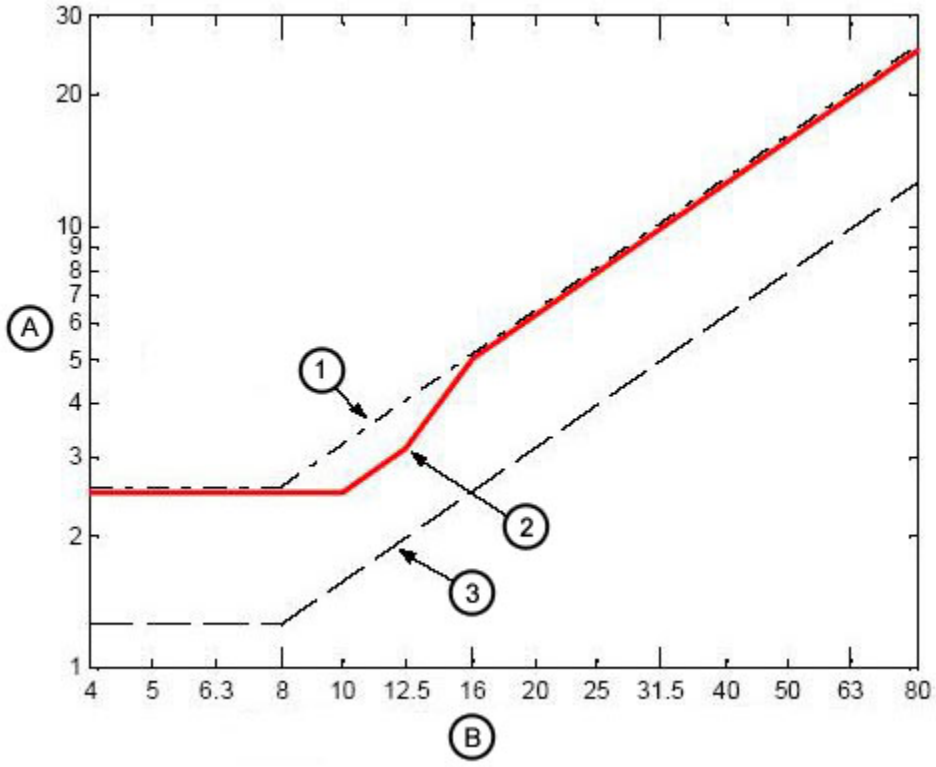
CT systems are sensitive to vibration and may display limited performance if exceeding the vibration limits listed below. The band of frequencies in which systems exhibit the most sensitivity appears at or near the resonant frequencies of the gantry and the patient table, the latter of which varies depending on patient mass and location. These frequencies fall within the following ranges:

- Patient Table: 2 – 10 Hz

- Gantry: 8 – 14 Hz

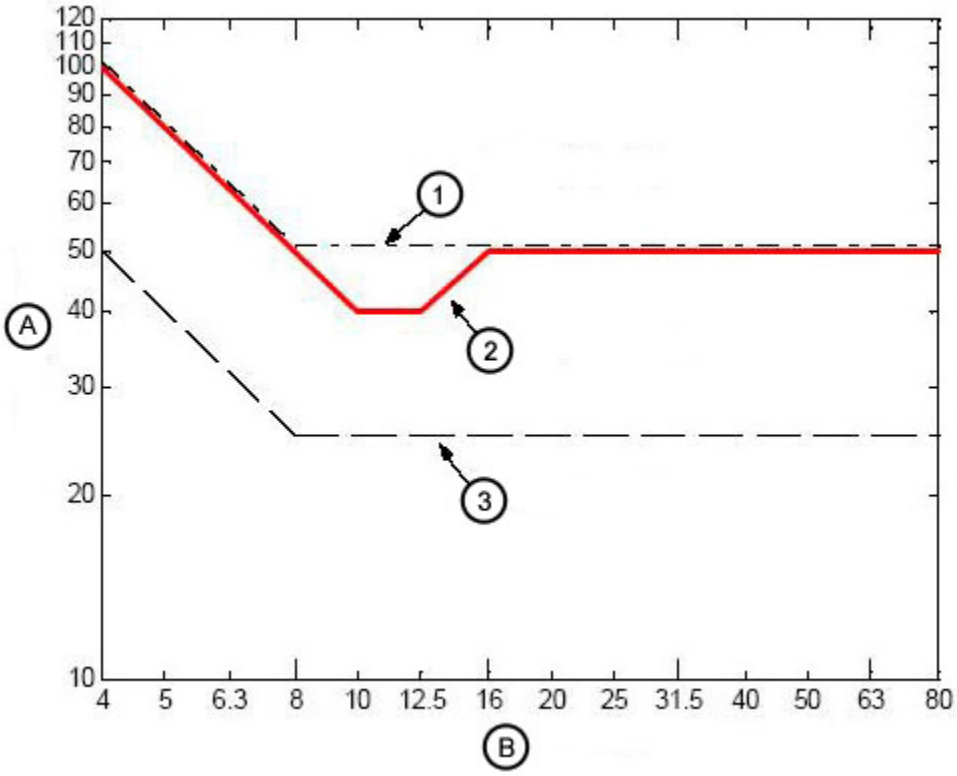
Floor vibration from any source shall not exceed the levels detailed in Figure 47 on page 76 and Figure 48 on page 77, as represented by the solid line labeled CT Scanner/Table. These illustrations compare this limit to the limits of what the AISC (American Institute of Steel Construction) and the ISO (International Organization for Standardization) call Class A (VC-A) and Class B (VC-B).

Figure 47 Allowable floor vibration in acceleration units compared to ISO class A and B limits



A	Acceleration [mm/s², rms]	Frequency [Hz]	Acceleration [mm/s^2, rms]
B	One-Third-Octave Band Center Frequency [Hz]	4	2.5
1	VC-A (50 µm/s)	10	2.5
2	CT Scanner/Table	12.5	3.1
3	VC-B (25 µm/s)	16	5
		80	25

Figure 48 Allowable floor vibration in velocity units compared to ISO class A and B limits



A	Velocity [µm/s, rms]	Frequency [Hz]	Velocity [um/s, rms]
B	One-Third-Octave Band Center Frequency [Hz]	4	100
1	VC-A (50 µm/s)	10	40
2	CT Scanner/Table	12.5	40
3	VC-B (25 µm/s)	16	50
		80	50

3.4 Other Construction Considerations

3.4.1 Patient Viewing Window Dimensions

The recommended patient viewing window is: 1219 mm wide x 1067 mm high (48 in. x 42 in.).

3.4.2 Support Structure Installation

Approved steelwork or equivalent support structure for mounting equipment to walls, ceilings, and floors shall be installed prior to the system installation.

3.4.3 Chemical Contamination Concerns

WARNING

THE SILVER, COPPER, GOLD FILMS USED IN THE CT SYSTEM ARE ESPECIALLY SENSITIVE TO CHEMICAL CONTAMINATION.

the presence of sulfide, chloride and nitrate contaminates (with Sulfur being the most damaging), can damage the ct system.

If high levels of contaminates exist, consider installing an appropriate air filtration system.

The scanner shall not be installed in the same room with a wet film processor. Certain scanner components could become contaminated by the chemicals contained in the processor.

Ensure any sulfide, chloride, or nitrate contaminate levels are at acceptable levels (Class 1). See IEC 60654-4 for air quality guidelines.

3.4.4 Finished Wall Requirement

3.4.4.1 Wall Paint

The scan and control room walls shall be painted prior to the system installation.

3.4.4.2 Wall Paint - Exception

A primer coat of paint is acceptable for system installation. After the system is installed, any final coats of paint shall be applied by brush. Spray painting in not permitted as it can seriously damage CT system components.

NOTE

Spray painting in not permitted. Spray painting can seriously damage CT system components.

3.4.5 System Noise Level

The maximum noise level produced by the system in the scan room is less than 80 dBA at all times at one meter from any surface of the system.

3.4.6 Option Requirements

3.4.6.1 Non-GE Installed Options

Buyer/purchaser shall confirm all non-GE installed options have been reviewed and final locations determined. Prior to system installation, the buyer/purchaser shall be responsible for pre-installing all ceiling mounting plates/pedestals for non-GE installed options prior to system delivery.

3.4.6.2 GE Options

Buyer/purchaser shall confirm all GE-installed options have been reviewed and final locations determined.

3.4.6.3 Options Power and Control Cables

Buyer/purchaser shall install all power source/connections and all control cables for all options prior to system delivery.

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Chapter 4 Environmental Requirements (HVAC)

4.1 HVAC Requirements

4.1.1 Temperature and Humidity

Ensure the site provides an HVAC system capable of maintaining the temperature and humidity requirements as specified in Table 17 on page 81 and Table 18 on page 82. The environmental conditions at the site shall be maintained at all times (including overnight, weekends, and holidays). Environmental conditions apply to the Table, Gantry, Power Distribution Unit, PARC4.X, and scanner desktop. Consider patient comfort needs when designing or modifying the HVAC system for the scan suite. To prevent cold air from venting onto patients, position air supply ducts in exam room so they do not discharge onto the patient Table. Position ducts over Gantry.

To verify the environmental conditions of the site are met, the temperature and humidity of the installation site shall be recorded before and after system installation. Any necessary changes shall be made to maintain the proper environmental conditions.

NOTE

Exceeding the environmental specifications may adversely affect system operation and image quality.

Table 17 System Temperature Limits

Maximum rate of change in temperature shall be no greater than:	3°C (5.4°F) per hour
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)

NOTE

Be certain to account for ANY cooling equipment cycle-control range, ensuring that the maximum and minimum ambient room temperatures do not exceed those shown in Table 17 on page 81 during room thermal cycling. For example, if the HVAC is capable of ± 2° C control, then the limits would be 20° C - 24° C to maintain absolute limits.

Table 18 Humidity (Scan and Control Rooms)

Maximum rate of change in relative humidity shall be no greater than:	5% per hour
Maximum allowable non-condensing relative humidity:	60%
Minimum allowable non-condensing relative humidity:	30%

4.1.2 Altitude Operating Range

The system shall be operated within an altitude range of -150 m to 4000 m (-492 ft. to 13,123 ft.) sea level.

4.1.3 Heat Output

Table 19 on page 82 details the heat load produced by the PET/CT system and its various components. Use the BTU/Wattage ratings listed to determine the requirements of the HVAC system.

- Gantry air INTAKE occurs along the BOTTOM of the Gantry. Gantry air EXHAUST occurs along the TOP of the Gantry.
- PARC4.X air INTAKE occurs along the FRONT of the PARC4.X. PARC4.X air EXHAUST occurs at the TOP of the PARC4.X.

Table 19 System Heat Load*

System Components	Maximum BTU/HR	Maximum Kilowatts
Scan Room:		
CT Gantry	18766	5.5 kW
PET Gantry	5971	1.8 kW
Table	1024	0.3 kW
Power Distribution Unit (PDU)	3400	1.0 kW
PARC4.X (Reconstruction Cabinet)	4436	1.3kW
Scan Room Subtotal:	33597	9.9 kW
Control Room:		
Operator Console	2860	0.84 kW
LCD Monitor (2 units, 170 BTU/50 Watts each)	340	0.10 kW
Peripheral Media Tower (PMT)	425	0.13 kW

Control Room Subtotal:	3625	1.1 kW
System Total	37222	11.0 kW

* Does not include heat load from room lighting, non-PET/CT equipment, personnel, etc.

4.1.4 Air Quality

See IEC 60654-4 for air quality guidelines.

4.1.4.1 Construction Dust Concerns

All construction and cleanup work to the scanner suite must be completed prior to the installation of the CT system. Damage to or early failure of the CT scanner can occur if the scanner is exposed to construction material particles. Ensure NO construction dust occurs in or immediately around the scan suite. Avoid the following:

- concrete dust
- drywall dust
- ceiling tile dust
- sawdust or wood shavings
- dust tracked into PET/CT suite from adjoining rooms

4.1.4.2 Air-Handling System Initial Start-Up Considerations

Prior to the initial startup, ensure the air-handling system ducts and filters are thoroughly clean and free of dust and other potential airborne contaminants. The air-handling ventilation system could blow dust and other airborne contaminates throughout the scan suite, potentially damaging the CT scanner.

4.1.4.3 Chemical Contamination Concerns

The silver, copper, gold films used in the CT system are especially sensitive to chemical contamination. The presence of sulfide, chloride, and nitrate contaminates (with sulfur being the most damaging), can damage the CT system. If high levels of contaminates exist, consider installing an appropriate air filtration system.

The scanner shall not be installed in the same room with a wet film processor. Certain scanner components could become contaminated by the chemicals contained in the processor.

Ensure any sulfide, chloride, or nitrate contaminate levels are at acceptable levels (Class 1).

Asbestos contamination of the working environment caused by the materials used to cover the concrete floor. The customer is responsible for ensuring that the flooring material does not contain asbestos and if necessary, abatement measures prior to install for the purpose of providing a safe work environment.

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Chapter 5 Electrical Requirements

5.1 Power Requirements

5.1.1 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 personnel or by a person or persons trained by GE for the purpose of installing, de-installing, moving, servicing and maintaining the CT scanner. 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.

5.1.2 Regulations

NFPA 70E Standard

All electrical work shall comply with NFPA 70E: Standard for Electrical Safety in the Workplace.

5.1.3 Disconnects

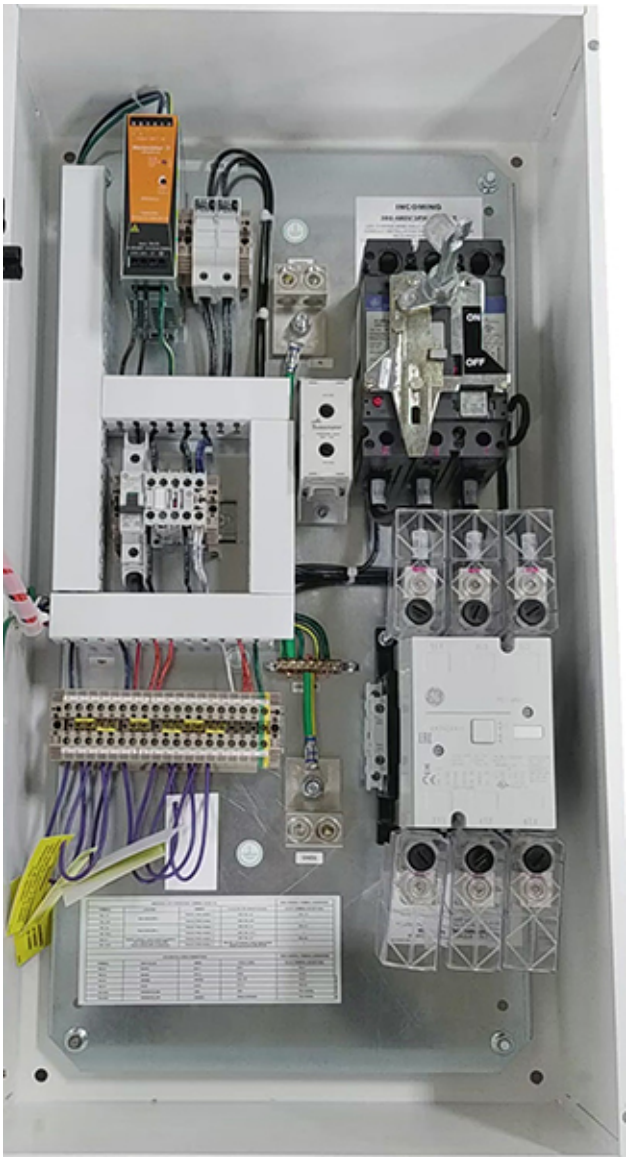
5.1.3.1 Emergency Off Switch

The A1 mains disconnect shall provide over-current protection for the entire system and have at least one Emergency OFF switch within the scan suite, near the scanner desktop.

5.1.3.2 Local Disconnects

The A1 mains disconnect with Lock-out and Tag-out (LOTO) capability shall be installed within the scan suite "(OSHA Title 29 CFR). See Figure 49 on page 86.

Figure 49 Typical Primary Power Disconnect (A1) – Fusible Disconnect and Magnetic Contactor



5.1.4 Electrical and Junction Boxes

All electrical boxes and junction boxes shall be installed as specified by the architectural, mechanical, or electrical drawings associated with the design of the site.

5.1.5 Power Feed and Overcurrent Requirements

5.1.5.1 Power Feed

The system shall operate on a three-phase electrical power supply input that is provided with a 4-wire grounded-wye configuration. No delta configuration is available. Qualified personnel shall verify the

power transformer and feeder lines (at the point of take-off) leading to the PET/CT scanner, meet all requirements stated in this document.

5.1.5.2 Voltage

Voltage range: 380 to 480 VAC

5.1.5.3 Frequency

Frequency ranges: 50 or 60 Hz, +/- 3 Hz

5.1.5.4 Average Power Demand at Maximum Duty Cycle

Average power demand at maximum duty cycle: 30.0 kVA.

5.1.5.5 Maximum Power Demand

Maximum power demand is 100 kVA at 0.85 PF at the maximum selected technique of 120 kV and 600 mA.

5.1.5.6 Idle Power Demand

Idle power demand is 6 kVA without rotation and X-ray.

5.1.5.7 Under voltage Release Control

The preferred disconnect, will utilize under voltage release control, rather than shunt trip devices.

5.1.5.8 Overcurrent Protection

To prevent power loss to other loads during an unexpected system fault, the power feeder shall have overcurrent protection such that the downstream overcurrent protection devices clear the fault before an up-stream overcurrent protection device opens.

5.1.5.9 Voltage Regulation Effects

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

5.1.5.10 Load Regulation

Total load regulation, measured at the PDU input terminals, shall not exceed 6%.

5.1.6 Phase Imbalance

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

5.1.7 Sags, Surges, and Transients

5.1.7.1 Sags and Surges

Sags and surges of the power line shall not exceed the absolute range limits show in Table 20 on page 89.

5.1.7.2 Transient Voltage

The maximum transient voltage is 1500 V peak.

5.1.8 Power Source Configuration

5.1.8.1 Neutral Wire

If a neutral wire is used, it shall be terminated in the A1 disconnect.

5.1.8.2 Dedicated Feeder (A1 Mains)

A dedicated main distribution panel (A1 Mains) or MDP (Mains Disconnect Panel), shall be used to supply power to the scanner. The A1 mains shall be located in the same room as the PDU.

5.1.8.3 Protective Disconnect Device Location

The protective disconnect shall be located within 10 m (32 ft.) of the PDU and be visible to personnel servicing the PDU.

5.1.8.4 Protective Disconnect Device with LOCK-OUT/TAG-OUT

The National Electrical Code (NFPA 70) states there shall be a protective disconnect device with a LOCK-OUT and TAG-OUT provision in the power supply line leading to the PDU.

5.1.9 Dedicated Distribution Transformer

5.1.9.1 Dedicated Feeder (A1 Mains)

It is recommended a dedicated distribution transformer from the facility's main isolation transformer supply power to the PET/CT Scanner.

5.1.9.2 Power Distribution Transformer

The minimum recommended size for a dedicated distribution transformer is: 125 kVA, rated 2.4% regulation at unity power factor. Resultant maximum allowable feeder regulation is 3.4%.

5.1.9.3 Using an Existing Distribution Transformer

Do not use an existing distribution transformer to power a system if other X-ray equipment, using rapid film changers, is connected to the existing transformer.

5.1.10 System Power Requirements

The customer shall ensure the site meets all minimum system power requirements listed below before installation can begin.

- Maximum power demand = 100 kVA @ 0.85 PF: at a Selected Technique of 120 kV, 600 mA.
- Continuous (average) power demand at maximum duty cycle = 30 kVA.
- Maximum allowable total source regulation is 6%.

Table 20 Nominal Line Voltage Ranges

Nominal line voltage MUST fall within ONE of these ranges.						
Nominal Line Voltage	380	400	420	440	460	480
Hi-Line Limit, +10%	418	440	462	484	506	528
Lo-Line Limit, -10%	342	360	378	396	414	432
Continuous Line Current	30	29	27	26	25	24
Momentary Line Current	152	144	137	131	126	120
Maximum Line Current	169	160	153	146	139	134
Minimum Recommended Circuit Protection Rating	110	110	100	100	90	90

Table 21 Minimum Feeder Wire Size

Feeder Length (Power Substation to A1 Disconnect)	Minimum Feeder Wire Size, AWG or MCM (sq. mm)/ VAC					
	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
15 m (50 ft)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)
30 m (100 ft)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)
46 m (150 ft)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)
61 m (200 ft)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)
76 m (250 ft)	1 (45)	1 (45)	2 (35)	2 (35)	2 (35)	3 (30)
91 m (300 ft)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	2 (35)	2 (35)
107 m (350 ft)	2/0 (70)	1/0 (55)	1/0 (55)	1 (45)	1 (45)	1 (45)
122 m (400 ft)	2/0 (70)	2/0 (70)	1/0 (55)	1/0 (55)	1/0 (55)	1 (45)

NOTE

In all cases the recommended ground wire is a 1/0 (55 sq. mm) ground wire.

Table 22 Minimum Sub-Feeder Wire Size

Sub-feeder Length (A1 to PDU)	Minimum Sub-feeder Wire, AWG or MCM (sq. mm)					
	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
9.75 m (32 ft)	2 (35)	2 (35)	3 (30)	3 (30)	3 (30)	3 (30)

The information in Table 20 on page 89, Table 21 on page 89, and Table 22 on page 90 (above) assumes the use of copper wire, rated 75° C and run in steel conduit. All ampacity is determined in accordance with the National Electrical Code (NFPA 70), Table 310-16 (2002). The ampacity of the circuit protection device listed above determines the minimum feeder size, except where total source regulation limits require a larger size.

NOTE

Power feeders running under the scan room floor, as well as power vault substations under the floor, above the scan suite, or in adjacent rooms, may cause excessive EMI fields. The responsibility for meeting all site EMI requirements rests with the customer.

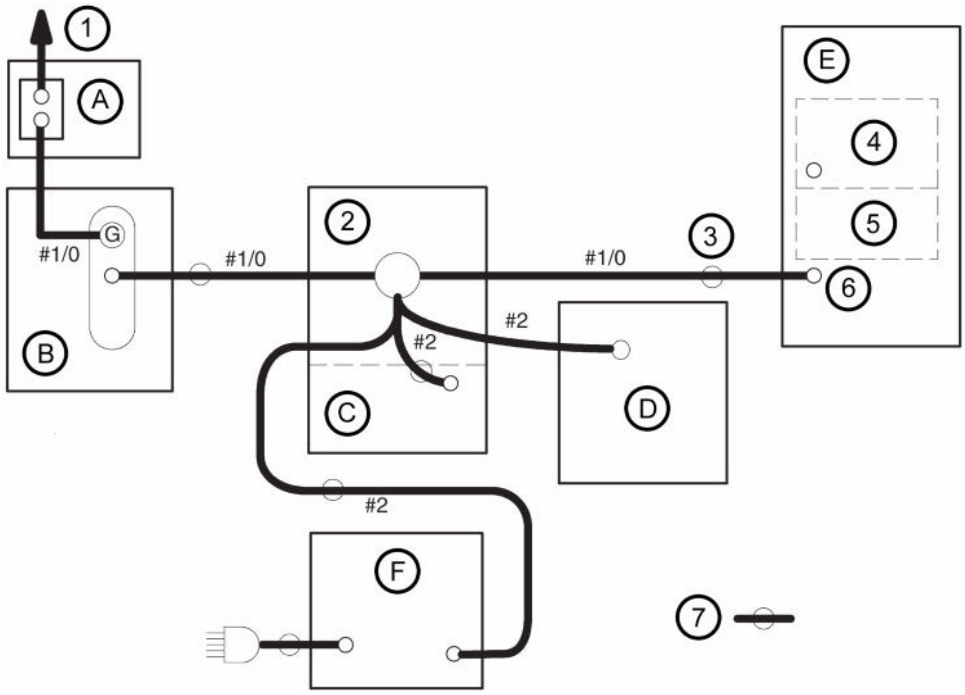
5.2 Grounding

The design of the scanner uses an equal potential grounding system. Figure 50 on page 91 and Table 23 on page 91 detail the required ground system. Three primary grounding points exist, they include:

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

The electrical contractor shall ground ALL patient-accessible metal surfaces to the same potential as the A1 Disconnect. The electrical contractor shall bond the ground wire to any intermediate distribution panel the ground wire passes through, in accordance with all local codes.

Figure 50 System Ground Map



Note: Shield/signal grounds are not shown.			
A	A1 Power Disconnect	1	To power vault ground
B	Power Distribution Unit (PDU) ground terminal	2	Table/Gantry junction raceway
C	Table (CT1)	3	Part of Gantry
D	PARC4.X Reconstruction Cabinet (PRC4)	4	Rotating Assembly frame
E	Gantry (CT2)	5	Tilt Mech
F	Operator's Console/Computer (OC1)	6	Frame
		7	Ground wire in supplied cable

Table 23 System Ground Points

Ground Points	Description
Bonding Power from A1 to PDU	The metal conduit, raceway, or armored cabling used to run power from the A1 Disconnect to the PDU shall be bonded in accordance to the NEC.
Dedicated Ground	A dedicated 1/0 (55 mm^2), or larger, insulated copper ground wire shall be installed between the main distribution panel and the PDU, in accordance with the NEC.

Grounding Power, A1, and PDU	All three-phase wires with ground running between the power source, the A1 Disconnect, and the PDU shall be installed in accordance to the NEC.
Maximum Resistance Between PDU and Facility Ground	The resistance between the PDU ground and the facility Earth ground shall not exceed 0.5 ohm.
Maximum Resistance Between PDU and Earth	The resistance between the PDU ground and Earth ground shall not exceed 2 ohms.
Cable Shielding and Grounding	All interconnect cables to peripheral devices shall be shielded and properly grounded, except where technologically prohibited.

5.3 System Interconnection and Cabling

5.3.1 Component Interconnections

The customer and electrical contractor shall refer to the following system, network, and power interconnection requirements:

- Table 24 on page 92 defines the component designators for system equipment, electrical components, options, and communication outlets.
- Table 25 on page 93 details the Standard-Length Cable Kit 5491000-3 (P5051TE) – Supplied by GE Healthcare.
- Table 26 on page 96 details the Long-Length Cable Kit, Optional 5491000-4 (P5051TF) – Supplied by GE Healthcare.
- Table 27 on page 100 details the PDU/UPS Cables (Standard-Length) – Supplied by GE Healthcare.
- Table 28 on page 100 details the A1/UPS Cables – Supplied by GE Healthcare.
- Table 29 on page 101 details the Miscellaneous Electrical Cables – Supplied by Customer/Contractor.
- Table 30 on page 102 details the Miscellaneous Electrical Components – Supplied by Customer/Contractor.

5.3.1.1 Component Designators

Table 24 Component Designators

Designator	Applies to:	Source
A1	Primary power disconnect	Contractor-supplied
BBNC	Broadband Network Connection	Contractor-supplied
CT1	Patient Table	System
CT2	Gantry	System

Component Designators continued		
Designator	**Applies to:**	**Source**
DS	Door Interlock Switch	Contractor-supplied
EPO	Emergency Power Off	Contractor-supplied
OC1	Operator Console (Scanner Desktop)/computer	System
PDU	Power Distribution Unit	System
PRC4	PARC4.X Reconstruction Cabinet	System
SEO	System Emergency Off	Contractor-supplied
WL/AD	X-ray on warning light/ Audible Device	Contractor-supplied

5.3.1.2 Cable Specifications

Table 25 Standard-Length Cable Kit 5491000-3 (P5051TE) – Supplied by GE Healthcare

Run #	Length, Actual [Usable] m (ft)	Part Number	Description	UL Cable Information								Pull Size mm (in.)
				UL Style	Flame Rating	Voltage Rating	Actual Voltage	Temp. Rating (C)	Outer Dia. mm (in.)	# of Cond.	Wire Size (AWG)	
PET/CT Gantry to Console Cables												
56	25.5 (83.7) [22.1 (73)]	5339979-3	Console GND to Raceway GND	1238	VW-1 (FT-1)	600	0	105	11.9 (0.47)	1	2	12.2 (0.5)
102	26.4 (86.6) [22.9 (75)]	2373436-2	Gantry to Console LAN	RG-22	FT-4	1900	<30 VDC		5.9 (0.23)	8	24	15 (0.6)
101	26.4 (86.6) [22.9 (75)]	5419981	Console to MSUB J9	RG-22	FT-4	300	<30 VDC	80	11.2 (0.44)	25	22	17x58 (0.7x2.3) 19x51 (0.7x2.0)
103	25 (82) [21.9 (72)]	2117848-2 **Note 1**	Fiber Optic - Console to Gantry			NA	NA			2	NA	
103	20.2 (66.1) [17.1 (56.1)]	5478856-2	Fiber Optic - Console to Gantry			NA	NA			2	NA	18 (0.7)

Standard-Length Cable Kit 5491000-3 (P5051TE) – Supplied by GE Healthcare continued												
Run #	**Length, Actual [Usable] m (ft)**	**Part Number**	**Description**	**UL Cable Information**								**Pull Size mm (in.)**
				UL Style	**Flame Rating**	**Voltage Rating**	**Actual Voltage**	**Temp. Rating (C)**	**Outer Dia. mm (in.)**	**# of Cond.**	**Wire Size (AWG)**	
103	25 (82) [21.9 (72)]	5432019 **Note 1**	Fiber Optic - Console to Gantry			NA	NA			2	NA	
200	30.5 (100) [22.9 (75)]	5313938-6	J7 to Console, Respiratory	UL	FT-4	300	<30 VDC	60	6.8 (0.26)	4 pair	24	13 (0.5)
XX	28.2 (92.5) [24.8 (82)]	5193969-4	Cable - LAN	UL	FT-4			60			24	40 (1.5)
XX	30.5 (100) [27.7 (91)]	5169456	Gantry to Injector	2464	FT-4	300		80	6.6 (0.26)		22	40 (1.5)
XX	30.5 (100) [7.6 (25)]	5199717	Gantry to RPM Unit	UL	FT-4	300	<15 VDC		5.9 (0.23)	4	22	15 (0.5)
PET/CT Gantry to PDU Cables												
52A	8.6 (28.2) [6.1 (20)]	2343528-2	PDU to Gantry 120VAC	2587	FT-4	600	208Y/120	90	13.8 (0.54)	5	8	56.4 (2.2)
52A	8.6 (28.2) [6.1 (20)]	2343528-4 **Note 1**	PDU to Gantry 120VAC	2587	FT-4	600	208Y/120	90	13.8 (0.54)	5	8	56.4 (2.2)
50A	8.6 (28.2) [6.1 (20)]	2343529-2	HVDC from PDU to Gantry	2587	FT-4	600	350 VDC	90	19 (0.75)	3	(2) 4, (1) 8	22 (0.9)
51A	8.6 (28.2) [6.1 (20)]	2343530-2	Axial Drive Power PDU to Gantry	2587	FT-4	600	440Y/254	90	12.3 (0.48)	4	14	

Standard-Length Cable Kit 5491000-3 (P5051TE) – Supplied by GE Healthcare continued												
Run #	**Length, Actual [Usable] m (ft)**	**Part Number**	**Description**	**UL Cable Information**								**Pull Size mm (in.)**
				UL Style	**Flame Rating**	**Voltage Rating**	**Actual Voltage**	**Temp. Rating (C)**	**Outer Dia. mm (in.)**	**# of Cond.**	**Wire Size (AWG)**	
55A	8.6 (28.2) [6.1 (20)]	5339979-2	Raceway GND to PDU - GND	1238	VW-1 (FT-1)	600	0	105	11.9 (0.47)	1	2	12.2 (0.5)
100A	9.9 (32.5) [6.1 (20)]	5120646-2	PDU to MSUB J11		FT-4	300	<30 VDC	80	11.2 (0.44)	25	22	17x58 (0.7x2.3) 19x51 (0.7x2.0)
PET/CT Gantry to PARC4.X Cables												
209A	13 (42.6) [9.3 (30.5)]	5339979-6	PARC4.X GND to Raceway GND	1015, 1063, 1284, 1283	VW-1 (FT-1)	600	0	105	11.9 (0.47)	1	2	12.2 (0.5)
203	13 (42.6) [9.9 (33)]	5313938-7 **Note 1**	SBA J7 to Q.Core J6	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)
201	13 (42.6) [6.8 (22.3)]	5313938-8	PARC4.X J4 to Switch Port 5	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)
202	13 (42.6) [8.4 (28)]	5313938-9 **Note 1**	PARC-II J5 to Switch Port 7	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)
206	13 (42.6) [8.3 (27.2)]	5313938-13	PARC4.X J5 to SBA J1	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)
208	13 (42.6) [8.3 (27.2)]	5452158-3	Fiber Optic - PARC4.X J6 to SBA BH J8			NA	NA			2	NA	13 (5)

Standard-Length Cable Kit 5491000-3 (P5051TE) – Supplied by GE Healthcare continued												
Run #	**Length, Actual [Usable] m (ft)**	**Part Number**	**Description**	**UL Cable Information**								**Pull Size mm (in.)**
				UL Style	**Flame Rating**	**Voltage Rating**	**Actual Voltage**	**Temp. Rating (C)**	**Outer Dia. mm (in.)**	**# of Cond.**	**Wire Size (AWG)**	
210	13 (42.6) [6.8 (22.3)]	5313938-15	PARC4.X J7 to Switch Port 7	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)
Miscellaneous Cables												
203	13 (42.6) [12.4 (40.7)]	5313941-2	PDU TS5 to PARC4.X Bulkhead	2587	FT-4	600	208Y/120	60	19 (0.75)	5	10	25 (1.0)
203	13 (42.6) [9.6 (32)]	2343531-4 **Note 1**	Q.Core Power from PDU, short	2587	FT-4	600	120 VAC	90	11.7 (0.46)	3	10	56.4 (2.2)
053A	19.9 (65.3) [16.6 (54)]	2343531-2	PDU TS5 to Console Power	2587	FT-4	600	120 VAC	90	12.2 (0.48)	3	10	56.4 (2.2)
Note 1: Extra Cable. Not used for **Discovery MI Digital Ready** systems.												

Table 26 Long-Length Cable Kit, Optional 5491000-4 (P5051TF) – Supplied by GE Healthcare

Run #	**Length, Actual [Usable] m (ft)**	**Part Number**	**Description**	**UL Cable Information**								**Pull Size mm (in.)**
				UL Style	**Flame Rating**	**Voltage Rating**	**Actual Voltage**	**Temp. Rating (C)**	**Outer Dia. mm (in.)**	**# of Cond.**	**Wire Size (AWG)**	
PET/CT Gantry to Console Cables												
56	25.5 (83.7) [22.1 (73)]	5339979-3	Console GND to Raceway GND	1238	VW-1 (FT-1)	600	0	105	11.9 (0.47)	1	2	12.2 (0.5)
102	26.4 (86.6) [22.9 (75)]	2373436-2	Gantry to Console LAN	RG-22	FT-4	1900	<30 VDC		5.9 (0.23)	8	24	15 (0.6)

Long-Length Cable Kit, Optional 5491000-4 (P5051TF) – Supplied by GE Healthcare continued												
Run #	**Length, Actual [Usable] m (ft)**	**Part Number**	**Description**	**UL Cable Information**								**Pull Size mm (in.)**
				UL Style	**Flame Rating**	**Voltage Rating**	**Actual Voltage**	**Temp. Rating (C)**	**Outer Dia. mm (in.)**	**# of Cond.**	**Wire Size (AWG)**	
101	26.4 (86.6) [22.9 (75)]	5419981	Console to MSUB J9	RG-22	FT-4	300	<30 VDC	80	11.2 (0.44)	25	22	17x58 (0.7x2.3) 19x51 (0.7x2.0)
103	25 (82) [21.9 (72)]	2117848-2 **Note 1**	Fiber Optic - Console to Gantry			NA	NA			1	NA	
103	25 (82) [21.9 (72)]	5432019 **Note 1**	Fiber Optic - Console to Gantry			NA				1	NA	10 (0.4)
103	24.6 (80.7) 21.5 (70.7)]	5478856	Fiber Optic - Console to Gantry			NA	NA			2	NA	18 (0.7)
200	30.5 (100) [22.9 (75)]	5313938-6	J7 to Console, Respiratory	UL	FT-4	300	<30 VDC	60	6.8 (0.26)	4 pair	24	13 (0.5)
XX	28.2 (92.5) [24.8 (82)]	5193969-4	Cable - LAN	UL	FT-4			60			24	40 (1.5)
XX	30.5 (100) [27.7 (91)]	5169456	Gantry to Injector	2464	FT-4	300		80	6.6 (0.26)		22	40 (1.5)
XX	30.5 (100) [7.6 (25)]	5199717	Gantry to RPM Unit	UL	FT-4	300	<15 VDC		5.9 (0.23)	4	22	15 (0.5)
PET/CT Gantry to PDU Cables												
52	19.4 (63.6) [17.2 (56)]	2343528	PDU to Gantry 120VAC	2587	FT-4	600	208Y/120	90	13.8 (0.54)	5	8	56.4 (2.2)

Long-Length Cable Kit, Optional 5491000-4 (P5051TF) – Supplied by GE Healthcare continued												
Run #	**Length, Actual [Usable] m (ft)**	**Part Number**	**Description**	**UL Cable Information**								**Pull Size mm (in.)**
				UL Style	**Flame Rating**	**Voltage Rating**	**Actual Voltage**	**Temp. Rating (C)**	**Outer Dia. mm (in.)**	**# of Cond.**	**Wire Size (AWG)**	
52	19.4 (63.6) [17.2 (56)]	2343528-3 **Note 1**	PDU to Gantry 120VAC	2587	FT-4	600	208Y/120	90	13.8 (0.54)	5	8	56.4 (2.2)
50	19.4 (63.6) [17.2 (56)]	2343529	HVDC from PDU to Gantry	2587	FT-4	600	350 VDC	90	19 (0.75)	3	(2) 4, (1) 8	22 (0.9)
51	19.4 (63.6) [17.2 (56)]	2343530	Axial Drive Power PDU to Gantry	2587	FT-4	600	440Y/254	90	12.3 (0.48)	4	14	
55	19.4 (63.6) [17.2 (56)]	5339979	Raceway GND to PDU - GND	1238	VW-1 (FT-1)	600	0	105	11.9 (0.47)	1	2	12.2 (0.5)
100	21.4 (70.2) [18.9 (62)]	5120646	PDU to MSUB J11		FT-4	300	<30 VDC	80	11.2 (0.44)	25	22	17x58 (0.7x2.3) 19x51 (0.7x2.0)
PET/CT Gantry to PARC4.X Cables												
209	25.5 (83.6) [21.8 (71.5)]	5339979-5	PARC4.X GND to Raceway GND	1015, 1063, 1284, 1283	VW-1 (FT-1)	600	0	105	11.9 (.47)	1	2	12.2 (0.5)
203	30.5 (100) [27.4 (90)]	5313938 **Note 1**	SBA J7 to Q.Core J6	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)
201	30.5 (100) [24.3 (79.7)]	5313938-2	PARC4.X J4 to Switch Port 5	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)

Long-Length Cable Kit, Optional 5491000-4 (P5051TF) – Supplied by GE Healthcare continued												
Run #	**Length, Actual [Usable] m (ft)**	**Part Number**	**Description**	**UL Cable Information**								**Pull Size mm (in.)**
				UL Style	**Flame Rating**	**Voltage Rating**	**Actual Voltage**	**Temp. Rating (C)**	**Outer Dia. mm (in.)**	**# of Cond.**	**Wire Size (AWG)**	
202	30.5 (100) [25.9 (85)]	5313938-3 **Note 1**	PARC-II J5 to Switch Port 7	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)
206	30.5 (100) [25.8 (84.6)]	5313938-12	PARC4.X J5 to SBA J1	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)
208	30.5 (100) [25.8 (84.6)]	5452158-4	Fiber Optic - PARC4.X J6 to SBA BH J8			NA	NA			2	NA	13 (0.5)
210	30.5 (100) [24.3 (79.7)]	5313938-14	PARC4.X J7 to Switch Port 7	UL	FT-4	300	<30 VDC	60	6.6 (0.26)	4 pair	24	13 (0.5)
Miscellaneous Cables												
203	19.4 (63.6) [18.8 (61.7]	5313941	PDU TS5 to PARC4.X PDU cable	2587	FT-4	600	208Y/120	60	19 (0.75)	5	10	25 (1.0)
203	19.4 (63.6) [16 (52.6)]	2343531-3 **Note 1**	Q.Core Power from PDU, long	2587	FT-4	600 V	120 VAC	90	11.7 (0.46)	3	10	56.4 (2.2)
053	24.5 (80.4) [21.2 (69)]	2343531	PDU TS5 to Console Power	2587	FT-4	600	120 VAC	90	12.3 (0.48)	3	10	56.4 (2.2)
Note 1: Extra Cable. Not used for **Discovery MI Digital Ready** systems.												

Table 27 UPS Cables (Standard-Length) – Supplied by GE Healthcare

Run #	Cable Length, Actual [Usable] m (ft)	Part Number	Description	UL Cable Information								Pull Size mm (in.)
				UL Style	Flame Rating	Voltage Rating	Actual Voltage	Temp. Rating (C)	Outer Dia. mm (in.)	# of Cond.	Wire Size (AWG)	
060	6 (19.7) [5 (16)]	5125079	Power Distribution Box to UPS	2587	FT4	600	208Y/120	90	19 (0.75)	5	8	19.5 (0.8)
061	6 (19.7) [5 (16)]	5125079-2	UPS to Power Distribution Box	2587	FT4	600	208Y/120	90	15 (0.60)	5	8	19.5 (0.8)
110	14 (46) [13.7 (45))	5169224	A1 to UPS	2587	FT4	600	120 VAC	90	14 (0.54)	5	18	25 (1.0)

Table 28 A1 and UPS Catalog Numbers

PDU Model No.	Maximum Nominal kVA Rating	Required Mains Disconnect (A1) Catalog No.		Optional Partial UPS Kit Catalog No. (See Note 2)
		Europe and Asia (380-400V or 420V) (See Note 1)	North America (440V or 460-480V)	
NGPDU-61	150 kVA	E4502AC (110A) E4502BC (110A) Includes Auto Restart and Integrated UPS Control	E4502AB (90A) E4502BB (90A) Includes Auto Restart and Integrated UPS Control	B7864PZ PowerWare 9355-15-14GE (14.4 kVa - 40A)

Note 1: Additional A1 Disconnects for Europe available through European Sales Team

Note 2: REQUIRES one of the A1 mains disconnect detailed at left, or equivalent.

Table 29 Miscellaneous Electrical Cables – Supplied by Customer/Contractor

Customer Installed Wiring		Description	Cables Supplied			Plug Pulling Dimensions		Wire and Cable Pigtails m (ft)	
Qty	Size AWG (mm^2)		Part No	Length m (ft)	Dia. in. (mm)	From m	To	From	To
RUN NO. 1 FROM PRIMARY POWER SOURCE TO FACILITY DISCONNECT (POWER SOURCE - A1) Maximum Run Length *									
3	*	POWER						1 (3)	1 (3)
1	1/0 (50)	GROUND						1 (3)	1 (3)
RUN NO. 2 FROM FACILITY DISCONNECT TO POWER DISTRIBUTION UNIT (A1 - PM) Maximum Run Length *									
3	*	POWER						1 (3)	1 (3)
1	1/0 (50)	GROUND						1 (3)	1 (3)
-	-	NEUTRAL - Not Required						1 (3)	1 (3)
RUN N0. 3 FROM FACILITY DISCONNECT TO SYSTEM EMERGENCY OFF (A1 - SEO)									
2	14 (2)	Partial UPS EPO Circuit						2 (6)	2 (6)
2	14 (2)	Facility Disconnect EPO Circuit						2 (6)	2 (6)
1	14 (2)	GROUND						2 (6)	2 (6)
RUN NO. 4 POWER DISTRIBUTION UNIT TO WARNING LIGHT / AUDIBLE DEVICE CONTROL (PDU - WL/AD)									
2	14 (2)	WARNING LIGHT / AUDIBLE DEVICE 24 VOLT							
		CONTROL TS6 1, 2, 3, 4, 5, 6, 7, 8							
RUN NO. 5 POWER DISTRIBUTION UNIT TO SCAN ROOM DOOR INTERLOCK (PDU - DOOR SWITCH)									
2	14 (2)	SCAN ROOM DOOR INTER LOCK TS6 9, 10							
*REFER TO LOCAL BUILDING CODES FOR AWG (MM^2) WIRE SIZES.									
RUN NO. n/a BBNC									
1	customer determined	Hospital Broadband Network Connection (Wall Jack: Placed on the wall behind the console.)							

Table 30 Miscellaneous Electrical Components – Supplied by Customer/Contractor

Reference	Associated Equipment	Material/Labor Supplied by Customer Contractor	USA Vendor / CAT No. GE Catalog
A1 380V - 480V 50/60 Hz	Circuit Breaker with Magnetic Contactor	Three Pole, 380V - 480V, Combination breaker with magnetic contactor. Includes control transformer, optional UPS interface, On/Off controls and auto-restart feature, if GE-supplied.	Recommend: • E4502AC (110A) • E4502AB (90A) • E4502BC (110A) • E4502BB (90A) Optional remote operator control available from GE Supply, Cat # GESCTR0CS1
BBNC (required)	Broad-band Network Connection	Broad-Band network connection wall jack, located within 1m (39inches) of Operator Console location, for internal hospital networking and InSite Broad-Band connectivity. Cabling to conform to facility's IT standards.	
	System Components	Reference the system installation drawings supplied by Installation Support Services within your geographic area.	
		Room Warning Light Controller	E4500AM

5.3.2 Cable Routing Requirements

5.3.2.1 Properly Sized Conduit, Duct Work, and Floor Troughs

Install appropriate conduits, duct work, and floor troughs for all system cables. Refer to Table 25 on page 93 through Table 29 on page 101.

NOTE

To minimize the need for additional junction boxes, use either a cable raceway system or a raised computer floor. The system uses prefabricated cables with large plugs.

5.3.2.2 Future Expansion

Ensure all cable passageways have additional capacity for future cable installations.

5.3.2.3 Routing Power Wiring

All three-phase power wires and ground line shall run in the same conduit or raceway duct.

5.3.2.4 Power and System Control Wire Separation

Power supply wires and system control lines shall be located in separate conduit or ductwork. Do NOT run coolant lines in cable conduits/ductwork.

5.3.2.5 Cabling External to CT components

All customer supplied equipment and GE options with cables outside the covers of the CT system components need to be taken into account for room planning. Ensure routing of cables avoids trip hazards and cable damage during system operation.

5.4 Scan Room Warning Light and Door Interlock

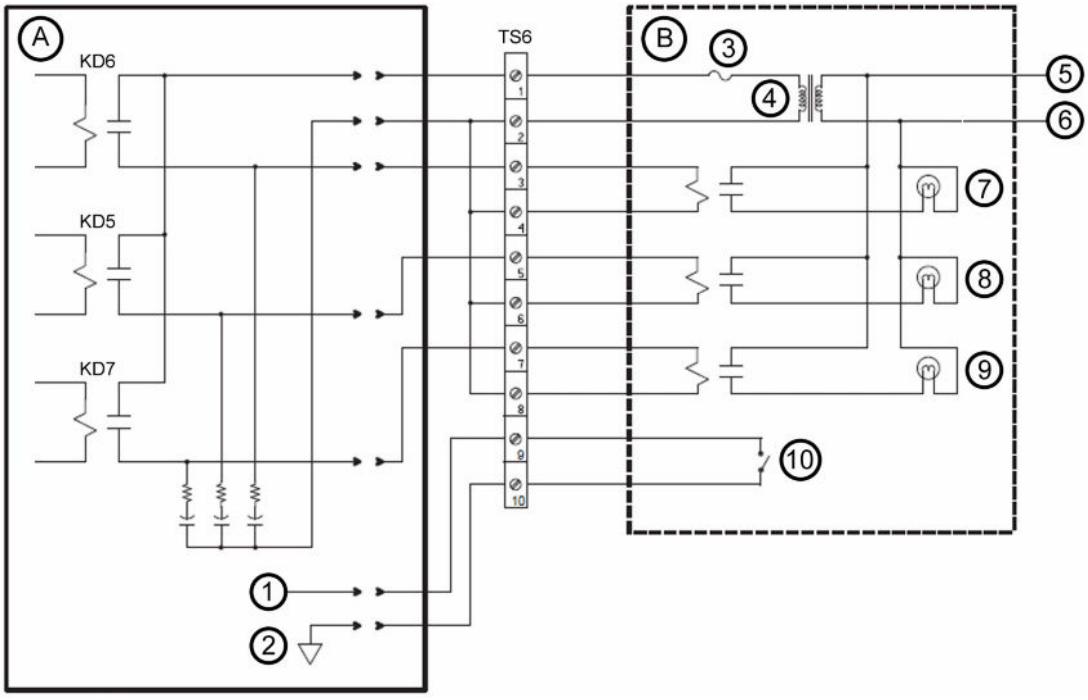
The scan room shall have a scan warning light and door interlock connected to the scan system as detailed in the following diagrams.

NOTE

The x-ray door contact (supplied by the customer) is: 15V DC @ 10 ma.

5.4.1 X-Ray Warning Light

Figure 51 TS6 X-Ray Warning Light Connections



A	PDU	5	Line
B	Facility supplied room light	6	Neutral

1	EXP_INTLK signal	7	X-RAY light or Audible Device
2	PGND	8	SYS-ON light
3	Fuse	9	READY light (Room Warning lamp)
4	24V secondary	10	Door Switch

5.4.2 Scan Room Door Interlock Connections

NOTE

The terminal blocks detailed in Figure 52 on page 104 and Figure 53 on page 104 are located in the power distribution unit (PDU).

Figure 52 TS6 Room Door Interlock Connections – without Door Interlock

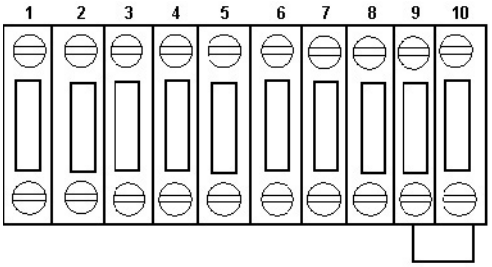
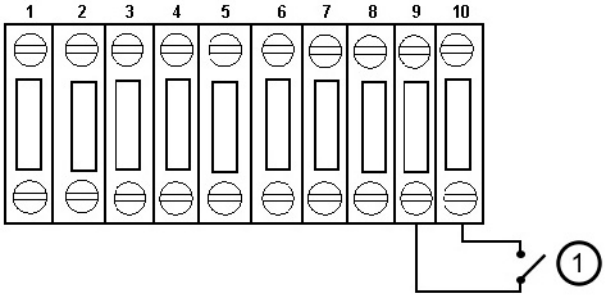


Figure 53 TS6 Room Door Interlock Connections – with Door Interlock



1	Normally open door switch

Chapter 6 Communications Requirements

6.1 Network Requirements

6.1.1 Communication Network

6.1.1.1 Network Wall Outlet

The customer shall provide an RJ45 wall outlet within 2 m (6.6 ft.) of the scanner desktop location.

6.1.1.2 Network Speed

Broadband interface type: 100 Mb Ethernet connection.

6.1.1.3 Network Communication

The customer shall ensure a network broadband line is installed and active.

6.1.1.4 Patch Cable

The customer shall provide a patch cable, not to exceed 3.05 m (10 ft.), to connect the scanner desktop to a wall outlet.

6.1.1.5 Cable Duct Work

The customer shall complete any cable duct work or conduit installation required for routing network cables to workstation, camera, and scanner desktop.

6.1.1.6 Communication Run to RJ45 Wall Outlet

The customer shall ensure the communication run from the hospital/facility network switch to the RJ45 wall outlet does not exceed 88 m (290 ft.).

6.1.2 Broadband Connectivity Information

The customer is responsible for providing the dedicated network IP address for the CT scanner. The nearest GE Zone Broadband Specialists typically become involved to ensure that the needs for the broadband connection and connectivity has been met. Not all areas of the globe have a zone broadband specialist. Typically, these individuals are trained to ensure that all required information is provided by the customer in support of the installation. If the zone does not have a broadband specialist then the PMI should work with the customer to gather the required information in support of the installation.

The CT scanner is typically installed in a medical facility. The facility may or may not have dedicated ***In house*** network IT support personnel for the facility. If there is dedicated In House network IT personnel the customer and PMI should work with the zone broadband specialists (If one exists) to acquire the

required broadband information to support the installation. Refer to the *Customer Pre-Installation Checklist* for details.

For smaller facilities and clinics there may not be dedicated in house network IT personnel. If that is the case, the PMI should work with zone broadband specialist (If one exists) in advance to obtain the required broadband information and ensure that then needs of the broadband connection and connectivity have been met prior to the installation. Refer to the *Customer Pre-Installation Checklist* for details.

- Customer shall contact PMI to obtain the name of a zone broadband specialist.
- IT Infrastructure Changes- Zone broadband specialist and PMI will work with customer to complete identified infrastructure changes.
- VPN Compatable Appliance- Zone broadband specialist shall provide a VPN compatible appliance to support the IPSec tunneling protocol and 3DES data encryption.
- Coordinate VPN activities- Site IT contact shall coordinate VPN activities between radiology/ cardiology department and Information Technology department.
- Internet Service Provider- Customer and/or zone broadband specialist or dedicated in house network personnel responsible for providing the system IP address shall utilize an Internet Service Provider that supports static routing.
- Customer, Site and System Contact information- Customer shall provide GE PMI with an accurate site address, contact name, contact phone number, and contact email address for customer IT person or network support personnel.
- Ensuring Broadband Infrastructure Requirements- Site IT contact will work as liaison to assure site broadband connectivity meets GE requirements, as determined by mutual assessment with GE connectivity team.
- Equipment Assessment- Site IT contact shall complete an equipment assessment with GE connectivity team to determine site broadband readiness.

Chapter 7 System Upgrade Requirements

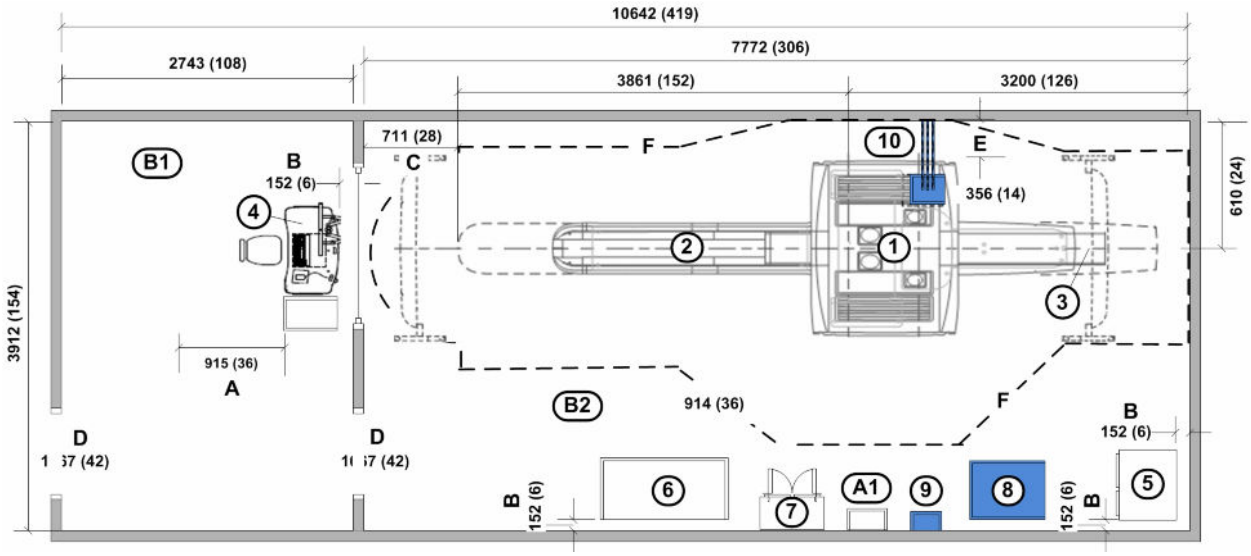
7.1 System Upgrade Requirements

When upgrading a Discovery MI Digital Ready system to a Discovery MI or Discovery MI Gen2 system, the following system requirements must be considered when preparing for an installation.

Table 31 System Upgrade Matrix

System Upgrade Requirement	Specification	Discovery MI Digital Ready	Discovery MI (Refer to the Discovery MI Pre-Installation Manual for details)
Power	Inline Voltage	380 - 440VAC; Must use 150kVA	380 - 440VAC; Must use 150kVA
	A1 Disconnect Panel	460-480VAC: 90A breaker 420-440VAC: 100A breaker 380-400VAC: 110A breaker	460-480VAC: 90A breaker 420-440VAC: 100A breaker 380-400VAC: 110A breaker
Temperature	HVAC Capacity	Total BTUs/Hr = 33,597 * May need scanner suite to accommodate 56,842 Total BTUs/Hr when upgrading to Discovery MI.	Total BTUs/Hr = 56,842
Scan Room	Chiller and Coolant Lines Routing	No Chiller or Coolant Lines * May need scanner suite to accommodate them when upgrading to Discovery MI.	Chiller and Coolant Lines Routing
	Chiller Power Distribution Box (PDB)	No PDB Required * May need scanner suite to accommodate them when upgrading to Discovery MI.	PDB Required

Figure 54 Typical Scan Suite Layout Configuration — Additional Components Needed for System Upgrades



NOTE

All dimensions in millimeters (mm) and inches (in).

1	Gantry
2	Table
3	Cradle Extender
4	Scanner Desktop/Computer
5	Power Distribution Unit (PDU)
6	PARC4.X Reconstruction Cabinet
7	Service Storage Cabinet (option)
8	* Chiller
9	* Chiller Power Distribution Box
10	* Coolant Lines
A1	Mains Disconnect
B1	Control Room
B2	Scan Room
A	NEC (Powered Service Clearance)
B	NEC (Minimum Equipment Clearance)

C	Safe Work space Egress
D	Clear door opening sized for minimum clearance needed for installation and removal of subsystems only
E	Small Room Dimension (gantry base without cover cannot be any closer to wall than this distance)
F	Cover Management Clearance Envelope
* These additional scan suite components are needed to upgrade the system.	

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