Innova™ IGS 620, Innova™ IGS 630
Preinstallation Manual

OPERATING DOCUMENTATION

5694389-1-1EN
Revision 2

ATTENTION

LES APPAREILS A RAYONS X SONT DANGEREUX A LA FOIS POUR LE PATIENT ET POUR LE MANIPULATEUR SI LES MESURES DE PROTECTION NE SONT PAS STRICTEMENT APPLIQUEES

Bien que cet appareil soit construit selon les normes de sécurité les plus sévères, la source de rayonnement X représente un danger lorsque le manipulateur est non qualifié ou non averti.
Une exposition excessive au rayonnement X entraîne des dommages à l'organisme.
Par conséquent, toutes les précautions doivent être prises pour éviter que les personnes non autorisées ou non qualifiées utilisent cet appareil créant ainsi un danger pour les autres et pour elles-mêmes.
Avant chaque manipulation, les personnes qualifiées et autorisées à se servir de cet appareil doivent se renseigner sur les mesures de protection établies par la Commission Internationale de la Protection Radiologique, Annales 26 : Recommandations de la Commission Internationale sur la Protection Radiologique et les normes nationales en vigueur.

WARNING

X-RAY EQUIPMENT IS DANGEROUS TO BOTH PATIENT AND OPERATOR UNLESS MEASURES OF PROTECTION ARE STRICTLY OBSERVED

Though this equipment is built to the highest standards of electrical and mechanical safety, the useful x-ray beam becomes a source of danger in the hands of the unauthorized or unqualified operator.
Excessive exposure to x-radiation causes damage to human tissue.
Therefore, adequate precautions must be taken to prevent unauthorized or unqualified persons from operating this equipment or exposing themselves or others to its radiation.
Before operation, persons qualified and authorized to operate this equipment should be familiar with the Recommendations of the International Commission on Radiological Protection, contained in Annals Number 26 of the ICRP, and with applicable national standards.

ATENCION

LOS APARATOS DE RAYOS X SON PELIGROSOS PARA EL PACIENTE Y EL MANIPULADOR CUANDO LAS NORMAS DE PROTECCION NO ESTAN OBSERVADAS

Aunque este aparato está construido según las normas de seguridad más estrictas, la radiación X constituye un peligro al ser manipulado por personas no autorizadas o incompetentes. Una exposición excesiva a la radiación X puede causar daños al organismo.
Por consiguiente, se deberán tomar todas las precauciones necesarias para evitar que las personas incompetentes o no autorizadas utilicen este aparato, lo que sería un peligro para los demás y para sí mismas.
Antes de efectuar las manipulaciones, las personas habilitadas y competentes en el uso de este aparato, deberán informarse sobre las normas de protección fijadas por la Comisión Internacional de la Protección Radiológica, Anales No 26: Recomendaciónes de la Comisión Internacional sobre la Protección Radiológica y normas nacionales.

ACHTUNG

RÖNTGENAPPARATE SIND EINE GEFAHR FÜR PATIENTEN SOWIE BEDIENUNGSPERSONAL, WENN DIE GELTENDEN SICHERHEITSVORKEHRUNGEN NICHT GENAU BEACHTET WERDEN

Dieser Apparat entspricht in seiner Bauweise strengsten elektrischen und mechanischen Sichereitsnormen, doch in den Händen unbefugter oder unqualifizierter Personen wird er zu einer Gefahrenquelle.
Übermäßige Röntgenbestrahlung ist für den menschlichen Organismus schädlich.
Deswegen sind hinreichende Vorsichtsmaßnahmen erforderlich, um zu verhindern, daßunbefugte oder unqualifizierte Personen solche Geräte bedienen oder sich selbst und andere Personen deren Bestrahlung aussetzen können.
Vor Inbetriebnahme dieses Apparats sollte sich das qualifizierte und befugte Bedienungspersonal mit den geltenden Kriterien für den gefahrlosen Strahleneinsatz durch sorgfältiges Studium des Hefts Nr. 26 der Internationalen Kommission für Strahlenschutz (ICRP) vertraut machen: Empfehlungen der Internationalen Kommission für Strahlenschutz und anderer nationaler Normenbehörden.

Important Information

LANGUAGE

ПРЕДУПРЕЖДЕНИЕ (BG)

Това упътване за работа е налично само на английски език.

- Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод.
- Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа.
- Неспазването на това предупреждение може да доведе до нараняване на доставчика на услугата, оператора или пациента в резултат на токов удар, механична или друга опасност.

警告 (ZH-CN)

本维修手册仅提供英文版本。

- 如果客户的维修服务人员需要非英文版本，则客户需自行提供翻译服务。
- 未详细阅读和完全理解本维修手册之前，不得进行维修。
- 忽略本警告可能对维修服务人员、操作人员或患者造成电击、机械伤害或其他形式的伤 害。

警告 (ZH-HK)

本服務手冊僅提供英文版本。

- 倘若客戶的服務供應商需要英文以外之服務手冊，客戶有責任提供翻譯服務。
- 除非已參閱本服務手冊及明白其內容，否則切勿嘗試維修設備。
- 不遵從本警告或會令服務供應商、網絡供應商或病人受到觸電、機械性或其他的危險。

警告 (ZH-TW)

本維修手冊僅有英文版。

- 若客戶的維修廠商需要英文版以外的語言，應由客戶自行提供翻譯服務。
- 請勿試圖維修本設備，除非 您已查閱並瞭解本維修手冊。
- 若未留意本警告，可能導致維修廠商、操作員或病患因觸電、機械或其他危險而受傷。

UPOZORENJE (HR)

Ovaj servisni priručnik dostupan je na engleskom jeziku.

- Ako davatelj usluge klijenta treba neki drugi jezik, klijent je dužan osigurati prijevod.
- Ne pokušavajte servisirati opremu ako niste u potpunosti pročitali i razumjeli ovaj servisni priručnik.
- Zanemarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika.

VÝSTRAHA (CS)

Tento provozní návod existuje pouze v anglickém jazyce.

- V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka.
- Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah.
- V případě nedodržování této výstrahy může dojít k poranění pracovníka prodejního servisu, obslužného personálu nebo pacientů vlivem elektrického proudu, respektive vlivem mechanických či jiných rizik.

ADVARSEL (DA)

Denne servicemanual findes kun på engelsk.

- Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse.
- Forsøg ikke at servicere udstyret uden at læse og forstå denne servicemanual.
- Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk stød, mekanisk eller anden fare for teknikeren, operatøren eller patienten.

WAARSCHUWING (NL)

Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar.

- Als het onderhoudspersoneel een andere taal vereist, dan is de klant verantwoordelijk voor de vertaling ervan.
- Probeer de apparatuur niet te onderhouden alvorens deze onderhoudshandleiding werd geraadpleegd en begrepen is.
- Indien deze waarschuwing niet wordt opgevolgd, zou het onderhoudspersoneel, de operator of een patiënt gewond kunnen raken als gevolg van een elektrische schok, mechanische of andere gevaren.

WARNING (EN)

This service manual is available in English only.

- If a customer's service provider requires a language other than English, it is the customer's responsibility to provide translation services.
- Do not attempt to service the equipment unless this service manual has been consulted and is understood.
- Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.

HOIATUS (ET)

See teenindusjuhend on saadaval ainult inglise keeles.

- Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest.
- Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist.
- Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.

VAROITUS (FI)

Tämä huolto-ohje on saatavilla vain englanniksi.

- Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla.
- Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen.
- Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.

ATTENTION (FR)

Ce manuel d’installation et de maintenance est disponible uniquement en anglais.

- Si le technicien d'un client a besoin de ce manuel dans une langue autre que l'anglais, il incombe au client de le faire traduire.
- Ne pas tenter d'intervenir sur les équipements tant que ce manuel d’installation et de maintenance n'a pas été consulté et compris.
- Le non-respect de cet avertissement peut entraîner chez le technicien, l'opérateur ou le patient des blessures dues à des dangers électriques, mécaniques ou autres.

WARNUNG (DE)

Diese Serviceanleitung existiert nur in englischer Sprache.

- Falls ein fremder Kundendienst eine andere Sprache benötigt, ist es Aufgabe des Kunden für eine entsprechende Übersetzung zu sorgen.
- Versuchen Sie nicht diese Anlage zu warten, ohne diese Serviceanleitung gelesen und verstanden zu haben.
- Wird diese Warnung nicht beachtet, so kann es zu Verletzungen des Kundendiensttechnikers, des Bedieners oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.

ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)

Το παρόν εγχειρίδιο σέρβις διατίθεται μόνο στα αγγλικά.

- Εάν ο τεχνικός σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει τις υπηρεσίες μετάφρασης.
- Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό αν δεν έχετε συμβουλευτεί και κατανοήσει το παρόν εγχειρίδιο σέρβις.
- Αν δεν προσέξετε την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στον τεχνικό σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.

FIGYELMEZTETÉS (HU)

Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el.

- Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészíttetése.
- Ne próbálja elkezdeni használni a berendezést, amíg a karbantartási kézikönyvben leírtakat nem értelmezték.
- Ezen figyelmeztetés figyelmen kívül hagyása a szolgáltató, működtető vagy a beteg áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.

AÐVÖRUN (IS)

Þessi þjónustuhandbók er aðeins fáanleg á ensku.

- Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálaþjónustu.
- Reynið ekki að afgreiða tækið nema að þessi þjónustuhandbók hefur verið skoðuð og skilin.
- Brot á sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklings frá raflosti, vélrænu eða öðrum áhættum.

AVVERTENZA (IT)

Il presente manuale di manutenzione è disponibile soltanto in lingua inglese.

- Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione.
- Procedere alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto.
- Il mancato rispetto della presente avvertenza potrebbe causare lesioni all'addetto alla manutenzione, all'operatore o ai pazienti provocate da scosse elettriche, urti meccanici o altri rischi.

警告 (JA)

このサービスマニュアルには英語版しかありません。

- サービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。
- このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないでください。
- この警告に従わない場合、サービスを担当される方、操作員あるいは患者 さんが、感電や機械的又はその他の危険により負傷する可能性があります。

경고 (KO)

본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다.

- 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우, 번역 서비스를 제공하는 것은 고객의 책임입니다.
- 본 서비스 매뉴얼을 참조하여 숙지하지 않은 이상 해당 장비를 수리하려고 시도하지 마십시오.
- 본 경고 사항에 유의하지 않으면 전기 쇼크, 기계적 위험, 또는 기타 위험으로 인해 서비스 제공자, 사용자 또는 환자에게 부상을 입힐 수 있습니다.

BRĪDINĀJUMS (LV)

Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā.

- Ja klienta apkopes sniedzējam nepieciešama informācija citā valodā, klienta pienākums ir nodrošināt tulkojumu.
- Neveiciet aprīkojuma apkopi bez apkopes rokasgrāmatas izlasīšanas un saprašanas.
- Šī brīdinājuma neievērošanas rezultātā var rasties elektriskās strāvas trieciena, mehānisku vai citu faktoru izraisītu traumu risks apkopes sniedzējam, operatoram vai pacientam.

ĮSPĖJIMAS (LT)

Šis eksploatavimo vadovas yra tik anglų kalba.

- Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba – ne anglų, suteikti vertimo paslaugas privalo klientas.
- Nemėginkite atlikti įrangos techninės priežiūros, jei neperskaitėte ar nesupratote šio eksploatavimo vadovo.
- Jei nepaisysite šio įspėjimo, galimi paslaugų tiekėjo, operatoriaus ar paciento sužalojimai dėl elektros šoko, mechaninių ar kitų pavojų.

ADVARSEL (NO)

Denne servicehåndboken finnes bare på engelsk.

- Hvis kundens serviceleverandør har bruk for et annet språk, er det kundens ansvar å sørge for oversettelse.
- Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått.
- Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer.

OSTRZEŻENIE (PL)

Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.

- Jeśli serwisant klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta.
- Nie próbować serwisować urządzenia bez zapoznania się z niniejszym podręcznikiem serwisowym i zrozumienia go.
- Niezastosowanie się do tego ostrzeżenia może doprowadzić do obrażeń serwisanta, operatora lub pacjenta w wyniku porażenia prądem elektrycznym, zagrożenia mechanicznego bądź innego.

ATENÇÃO (PT-BR)

Este manual de assistência técnica encontra-se disponível unicamente em inglês.

- Se outro serviço de assistência técnica solicitar a tradução deste manual, caberá ao cliente fornecer os serviços de tradução.
- Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica.
- A não observância deste aviso pode ocasionar ferimentos no técnico, operador ou paciente decorrentes de choques elétricos, mecânicos ou outros.

ATENÇÃO (PT-PT)

Este manual de assistência técnica só se encontra disponível em inglês.

- Se qualquer outro serviço de assistência técnica solicitar este manual noutro idioma, é da responsabilidade do cliente fornecer os serviços de tradução.
- Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica.
- O não cumprimento deste aviso pode colocar em perigo a segurança do técnico, do operador ou do paciente devido a choques eléctricos, mecânicos ou outros.

ATENŢIE (RO)

Acest manual de service este disponibil doar în limba engleză.

- Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere.
- Nu încercați să reparați echipamentul decât ulterior consultării și înțelegerii acestui manual de service.
- Ignorarea acestui avertisment ar putea duce la rănirea depanatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.

ОСТОРОЖНО! (RU)

Данное руководство по техническому обслуживанию представлено только на английском языке.

- Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует самостоятельно обеспечить перевод.
- Перед техническим обслуживанием оборудования обязательно обратитесь к данному руководству и поймите изложенные в нем сведения.
- Несоблюдение требований данного предупреждения может привести к тому, что специалист по техобслуживанию, оператор или пациент получит удар электрическим током, механическую травму или другое повреждение.

UPOZORENJE (SR)

Ovo servisno uputstvo je dostupno samo na engleskom jeziku.

- Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge.
- Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo.
- Zanemarivanje ovog upozorenja može dovesti do povređivanja servisera, rukovaoca ili pacijenta usled strujnog udara ili mehaničkih i drugih opasnosti.

UPOZORNENIE (SK)

Tento návod na obsluhu je k dispozícii len v angličtine.

- Ak zákazníkov poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka.
- Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obluhu a neporozumiete mu.
- Zanedbanie tohto upozornenia môže spôsobiť zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie.

ATENCION (ES)

Este manual de servicio sólo existe en inglés.

- Si el encargado de mantenimiento de un cliente necesita un idioma que no sea el inglés, el cliente deberá encargarse de la traducción del manual.
- No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio.
- La no observancia del presente aviso puede dar lugar a que el proveedor de servicios, el operador o el paciente sufran lesiones provocadas por causas eléctricas, mecánicas o de otra naturaleza.

VARNING (SV)

Den här servicehandboken finns bara tillgänglig på engelska.

- Om en kunds servicetekniker har behov av ett annat språk än engelska, ansvarar kunden för att tillhandahålla översättningstjänster.
- Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken.
- Om du inte tar hänsyn till den här varningen kan det resultera i skador på servicetekniker, operatören eller patienten till följd av elektriska stötar, mekaniska faror eller andra faror.

OPOZORILO (SL)

Ta servisni priročnik je na voljo samo v angleškem jeziku.

- Če ponudnik storitve stranke potrebuje priročnik v drugem jeziku, mora stranka zagotoviti prevod.
- Ne poskušajte servisirati opreme, če tega priročnika niste v celoti prebrali in razumeli.
- Če tega opozorila ne upoštevate, se lahko zaradi električnega udara, mehanskih ali drugih nevarnosti poškoduje ponudnik storitev, operater ali bolnik.

DİKKAT (TR)

Bu servis kılavuzunun sadece ingilizcesi mevcuttur.

- Eğer müşteri teknisyeni bu kılavuzu ingilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer.
- Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz.
- Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.

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Revision History

Part/Rev	Date	Reason for Change	Pages
5694389-1-1EN rev 1	November 30, 2015	Initial release of 5694389-1-1EN	210
5694389-1-1EN rev 2	March 10, 2016	Second release of 5694389-1-1EN	208

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Table of Contents

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Chapter 1 General Requirements

1 Objectives & Overview

1.1 Object and Scope of this manual

This document is intended as a guide and information resource to properly plan and prepare a site for the installation of an Innova system (Innova IGS 620, Innova IGS 630).

In addition, this document provides references to the pre–installation documents of the various product included with an Innova System.

These documents are intended to assist the Installation Specialist and the Site Planner in properly preparing a site for the installation of this system.

It provides pre–installation data, such as site preparation prior to the delivery of the Innova System, environmental and electrical requirements and some additional planning aids.

⚠WARNING

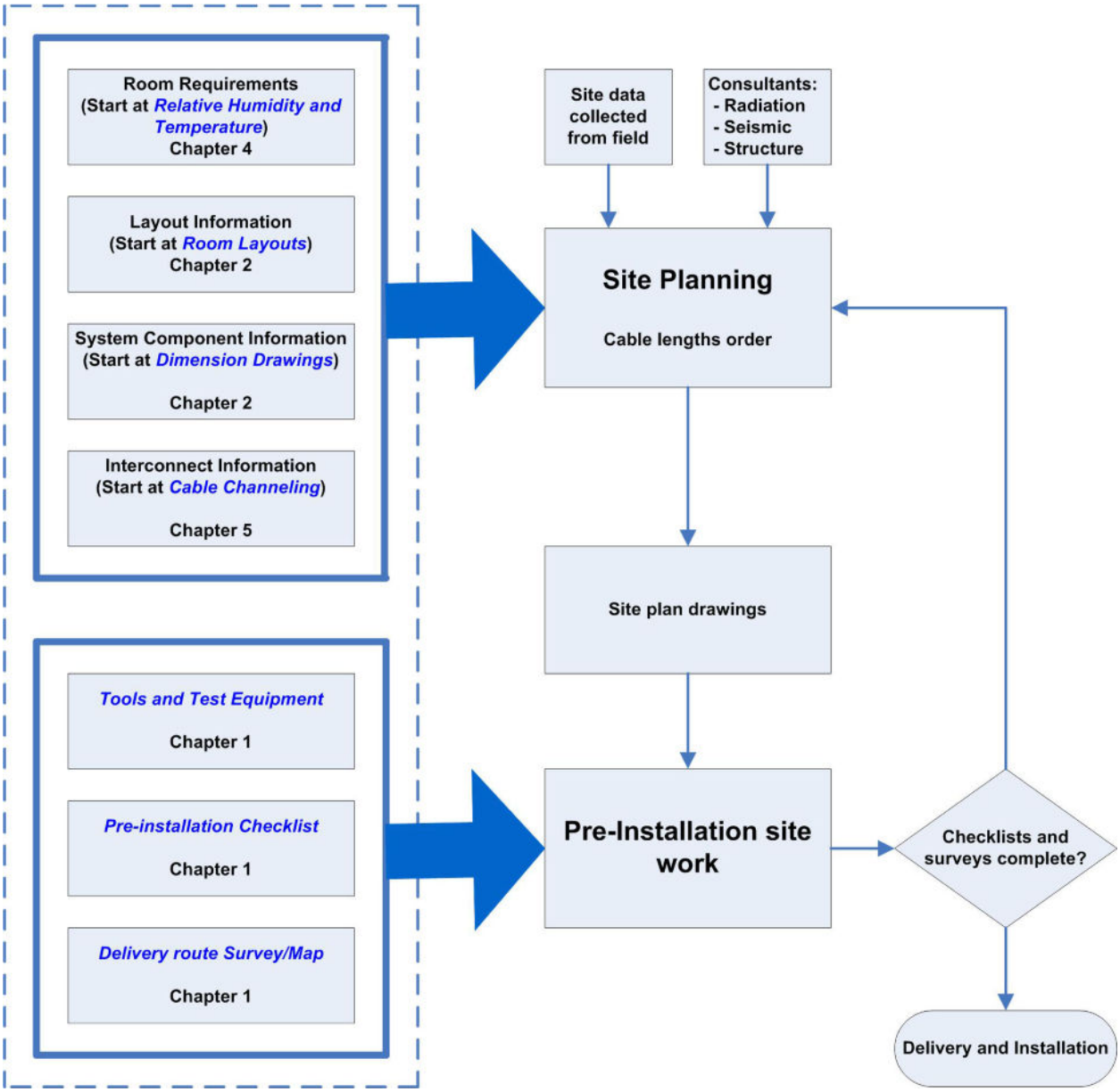
MAKE SURE THE ROOM PREPARATION COMPLIES WITH LOCAL REGULATIONS AS THE PIM IS NOT INTENDED TO REFLECT ALL OF THEM

1.2 Pre-Installation Process

Complete the checklists in *ROOM LAYOUTS*, *ELECTRICAL CONNECTIONS*, and *ADDITIONAL PLANNING AIDS* of this manual. They represent an important part of the pre–installation process. The checklists summarize the required preparations and allow to verify the proper completion of the pre–installation procedures.

You will find hereafter a chart of the information flow in the pre-installation process.

Illustration 1-1:



2 Customer Responsibilities

2.1 Responsibilities of the Purchaser/Customer

To ensure that the installation of an Innova System meets the purchaser or customer expectations, it is important to determine who will take responsibility for the various items during the system installation process. To help you in determining these responsibilities, review the following checklists with the customer and assign responsibilities as appropriate:

- Tool and Test Equipment (Tools and Test Equipment)
- Pre–Installation Checklist (Pre-Installation Checklist)

Contract Changes:

Be sure to inform the customer that the cost of any alteration or modification not specified in the sales contract are liable to the customer.

The following GE-supplied equipment must be installed by the Hospital's Contractors, per room drawings:

- PDB (Electrical Power Distribution Box or *Main Disconnect Panel*)
- Frontal Gantry & Table baseplate hole drilling (Per supplied template)
- Lateral Gantry Suspension stationary rails (centered on Frontal Gantry/table floor template)
- LCD Monitor suspension stationary rails
- Lateral Gantry cable drape rail(s)
- Frontal Gantry baseplate grout
- Frontal Gantry baseplate
- Table baseplate (if applicable)

NOTE: **For systems with Fluoro UPS CE cabinet only:** It is the customer responsibility to install a fire extinguisher (non-water type, ex. CO2) in the technical room, close to the Fluoro UPS CE cabinet location.

2.2 Equipment Classifications

The following equipment classifications are applicable to the product:

Classification category	Equipment classification
Protection against electric shock	Class I.  **WARNING** **TO AVOID THE RISK OF ELECTRIC SHOCK, THIS EQUIPMENT MUST ONLY BE CONNECTED TO A SUPPLY MAINS WITH PROTECTIVE EARTH.**
Degree of protection against electric shock	 Type B applied parts Applied parts complying with the specified requirements of the IEC 60601-1 standard to provide protection against electric shock, particularly regarding allowable patient leakage current and patient auxiliary current, include Mattress.
Degree of protection against harmful ingress of water	Ordinary equipment (enclosed equipment without protection against ingress of water), except footswitch which is a watertight device (protected against the effects of submersion, IPX8).
Method(s) of sterilization or disinfection recommended by the manufacturer	• Sterilization: not applicable • Disinfection: refer to Operator Manual (Chapter Safety and Regulatory, section Disinfection), Recommended disinfecting agents.
Degree of safety of application in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide	Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide
Mode of operation	Continuous operation with intermittent loading

NOTICE

The system can only be installed in an anesthetizing location if that location is classified as Other Than Hazardous as per NFPA 70 clause 517.60

NOTICE

The product is not classified as AP, APG (Equipment not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide).

2.3 Pre-Installation Checklist

GE Healthcare Site Readiness Checklist	
GEHC Global Order # :	Customer:
GEHC On-site Representative :	MI Supplier:
Name of customer reviewed with :	Lead Installer:
GEHC PMI :	Phone Number:
Target Site Prep Completion Date:	Helper:
The customer is responsible for proper site preparation and site readiness regardless of any GEHC inspections/assessments. It is under its responsibility to ensure electrical installation is compliant to local regulations.	
For MR Magnet Delivery: Ensure cryogen vents, power for the cooling system and exhaust fan system are installed and operational (0.7T, 1.5T & 3T) and chilled water supply is available 24x7 that meets system cooling equipment requirements.	
Inspection Date:	

Item #	GEHC Minimum Requirements	**Storage**: Is item ready?	**Predict (Pre-ship)**		**Verify (Delivery)**: Is item ready?	**Validate (Mech Install)**: Is item ready?	**Comments** If "N", please enter in comments or action plan
			Is this item ready?	Will item be ready?			
1	Equipment installation drawings must match actual room size and must meet clearance requirements. Deviations that meet installation requirements may be red-lined, if red-lining is allowed by local code. Seismic requirements are identified on construction drawings.	X					
2	Delivery route to installation or storage area meets requirements and has been discussed and scheduled with the customer. Ensure floor protection is discussed, requirements identified, and will be available at time of delivery and installation.					X	
3	Rooms that will contain equipment, including storage areas, are dust free. Room security to prevent unauthorized access and theft has been discussed with customer. The customer is aware of these security issues, implications and responsibility.						
4	In room HVAC ductwork and units (in room) must be mechanically installed and dust free. Installation rooms appear to meet environmental conditions (see Further Definitions) and observed issues have been communicated to the customer. If being stored, storage area must meet PIM storage criteria.						
5	Ceiling grid is installed, Unistrut is located per the installation drawings, and permanent lighting is installed and operational.	X					

6	Floor is clean and prepared for final floor covering. Customer has verified floor leveling meets the equipment installation drawings and PIM specs and no visible defects are observed. Gantry and table baseplate are installed prior to delivery (if applicable)	X					
7	Access to a working phone at the facility for emergency use, including MR magnet delivery.	X					
8	All walls primed (final coat not needed on Day 1), and counter tops that will support equipment must be installed. No dust-producing cabinetry work in installation areas.	X					
9	Mechanical supplier has been provided with a set of equipment installation drawings for reference. For California, permitted construction drawings or PMI-specified installation drawings are required.	X	X	X	X		
10	Conduit/electrical cable ducting/dividers/ access flooring installed, with the exception of surface-mounted floor ducting. Wiring to the main disconnect panel is installed and compliant with equipment installation drawings or pre-installation manual.	X	X	X	X		
Issued Date: 7/9/07 Rev 11		GEHC Only: COE # (888) 799.7266 Option 5 (PMI Support)					

3 Delivery Requirements

3.1 Shipping Information

3.1.1 Product Shipping Information

Refer to Table 1-1. To obtain shipping information for components not specified in Table 1-1, refer to the appropriate component Pre-Installation Manual listed in Chapter 2, System Compatibility.

Table 1-1:

PRODUCT OR COMPONENT	DIMENSIONS MILLIMETERS (INCHES)			WEIGHT POUNDS (KILOGRAMS)	METHOD OF SHIPMENT
	Height	Length	Depth		
Frontal Positioner	1950 (77)	2790 (110)	1160 (45.5)	2,340 (1060)	Shipping Dolly. See Illustration 1-2
	2300 (90.5)	2900 (114)	1380 (54.5)	2,645 (1200)	Air shipment. See Illustration 1-3
Lateral Positioner (on longer dolly)	2135 (84)	2954 (116.3)	1590 (62.5)	2700 (1225)	Shipping Dolly. See Illustration 1-4
Lateral Positioner (on shorter dolly)	2135 (84)	2790 (109.8)	1590 (62.5)	2700 (1225)	Shipping Dolly. See Illustration 1-5
C1 Frontal Cabinet	2140 (84.2)	1200 (47.2)	820 (32.2)	1008 (457.2)	In crate on pallet. See Illustration 1-7
C1 lateral Cabinet	2140 (84.2)	1200 (47.2)	820 (32.2)	891 (404.2)	
C2 Cabinet	2140 (84.2)	1200 (47.2)	820 (32.2)	776 (352.2)	
Omega Table Base Assembly	810 (32)	1950 (76.75)	820 (32.33)	1,290 (585)	On pallet See Illustration 1-8
Omega Table Top Assembly	220 (9)	3470 (137)	840 (33)	155 (70)	On pallet See Illustration 1-8
Power Distribution Box (PDB) CE	2040 (80.3)	940 (37)	720 (28.3)	525 (238)	See Illustration 1-9
Power Distribution Box (PDB) UL	762 (30)	2438 (96)	1067 (42)	1206 (548)	See Illustration 1-10
DL User parts	1040 (41)	860 (33.9)	680 (26.8)	220 (100)	On pallet
X-Ray tube housing	960 (37.7)	770 (30.3)	710 (28)	250 (113)	On pallet
Chiller Coolix 4100	1200 (47.2)	555 (21.8)	610 (24)	264.5 (120)	On pallet
Cables					On pallet
Monitor susp. bridge	640 (25.2)	980 (38.6)	3060 (120.5)	445 (210)	On pallet
Monitor susp. rails	380 (15)	300 (12)	5960 (235)	355 (160)	On pallet
UL Fluoro UPS cabinet (*)	2100 (82.7)	890 (35)	1000 (39.4)	1235 (561)	On pallet
CE Fluoro UPS cabinet (*)	1750 (68.9)	890 (35)	1000 (39.4)	1287 (585)	On pallet
Cabinets 3kVA UPS	570 (22.4)	320 (12.6)	485 (19.1)	(82.7) 37.5	
Large Display monitor	1050 (41.3)	1500 (59)	800 (31.4)	209 (95)	On pallet, see Illustration 1-12
Large Display cabinet	1600 (63)	950 (37.4)	750 (29.5)	423 (192)	On pallet, see Illustration 1-13
LD system suspension	1100 (43.3)	1100 (43.3)	1850 (72.8)	370 (168)	On pallet
LD system handle	400 (15.7)	950 (37.4)	1650 (65)	15 (7)	Cardbord box

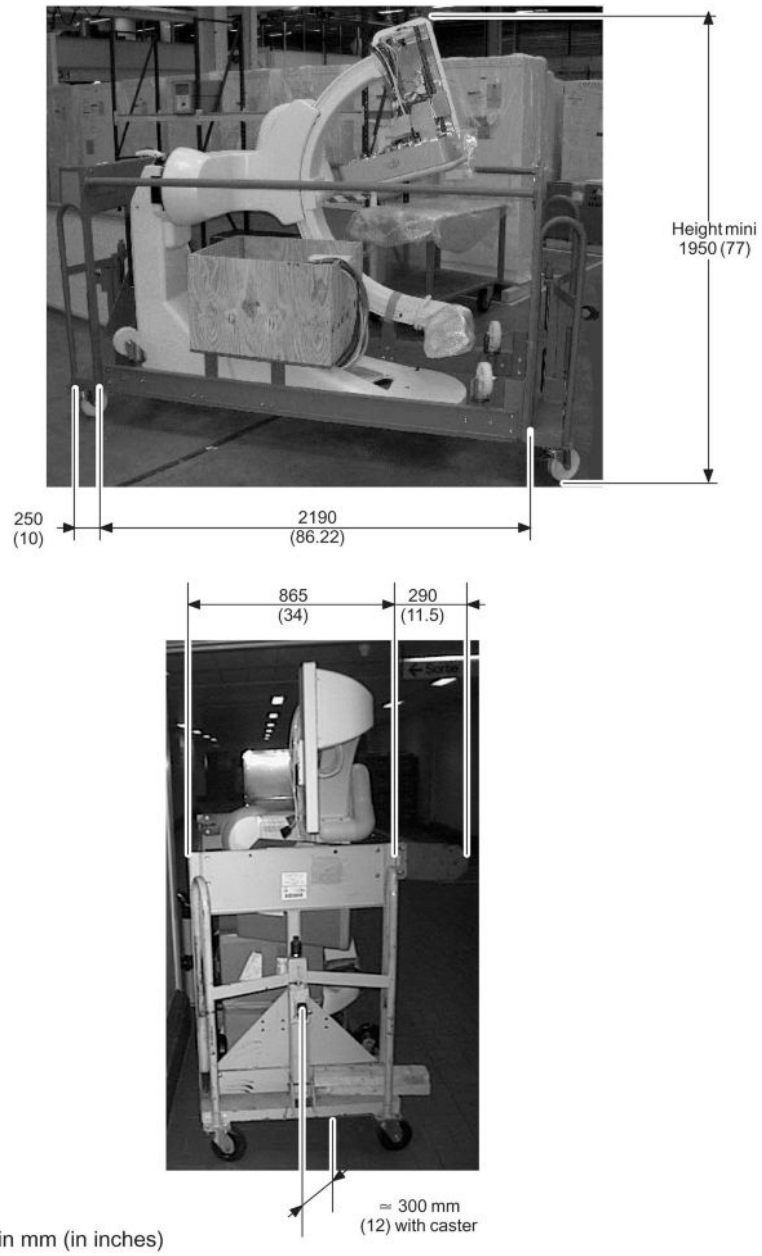
PRODUCT OR COMPONENT	DIMENSIONS MILLIMETERS (INCHES)			WEIGHT POUNDS (KILOGRAMS)	METHOD OF SHIPMENT
	Height	Length	Depth		
LD suspension 36m harness	230 (9)	800 (34.5)	800 (34.5)	134 (62)	On pallet
LDM UPS	570 (22.4)	320 (12.6)	485 (19.1)	(82.7) 37.5	

(*) Estimated values

3.1.2 Detail of Innova Shipping Information

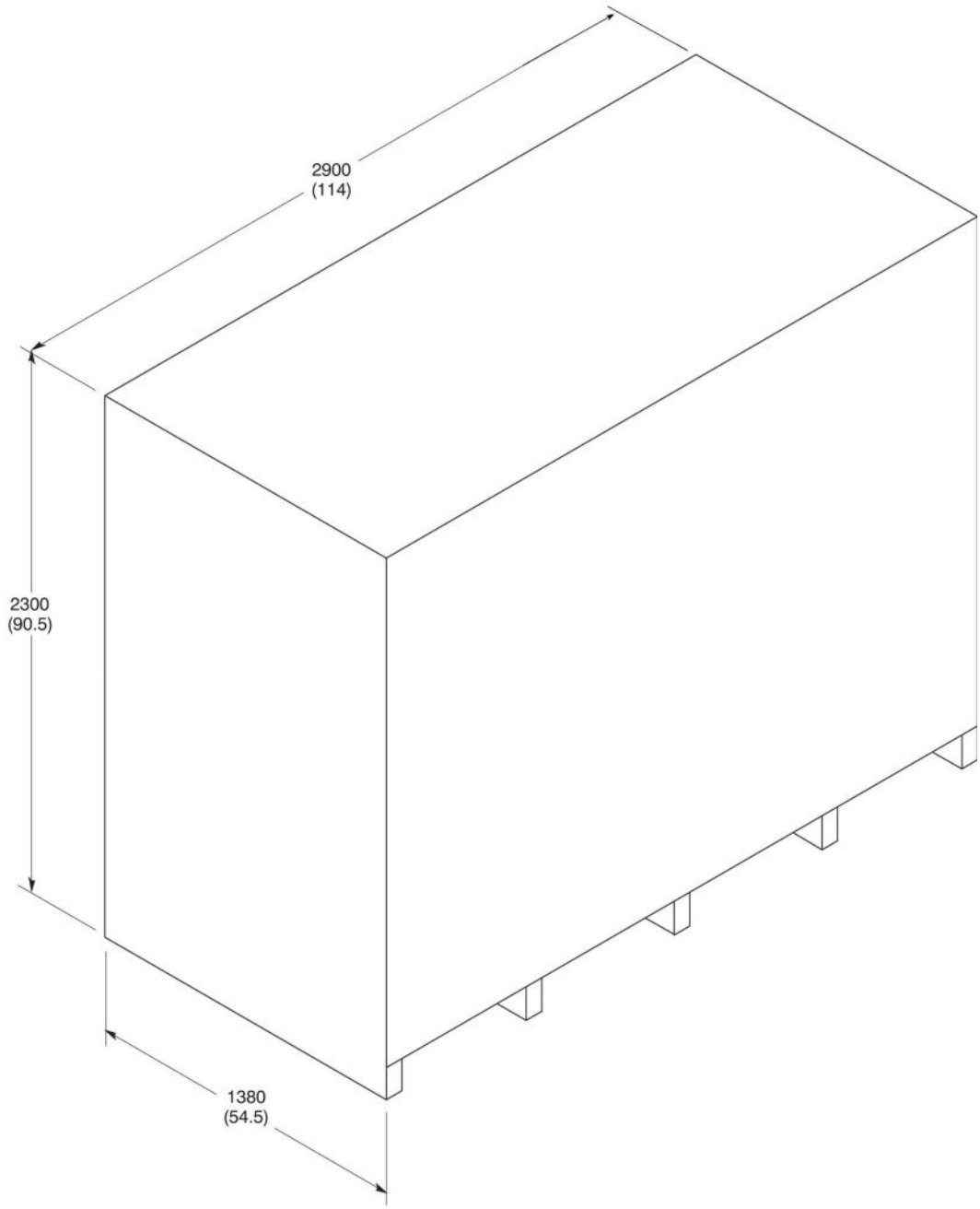
3.1.2.1 Frontal Positioner Gantry On Shipping Dolly

Illustration 1-2:



3.1.2.2 Frontal Positioner Air Shipment

Illustration 1-3:

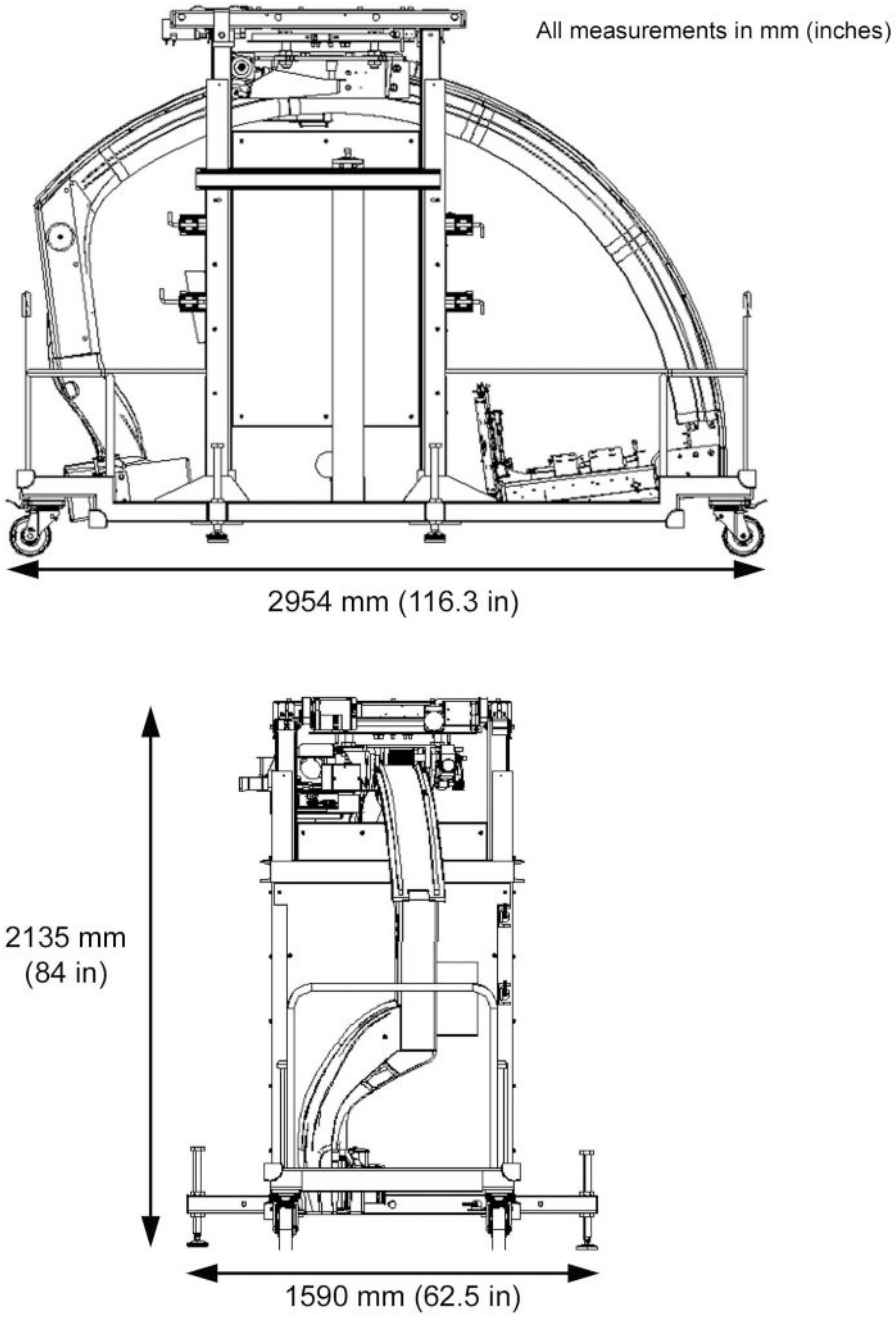


DIMENSIONS IN MM (INCHES)

NOT TO SCALE

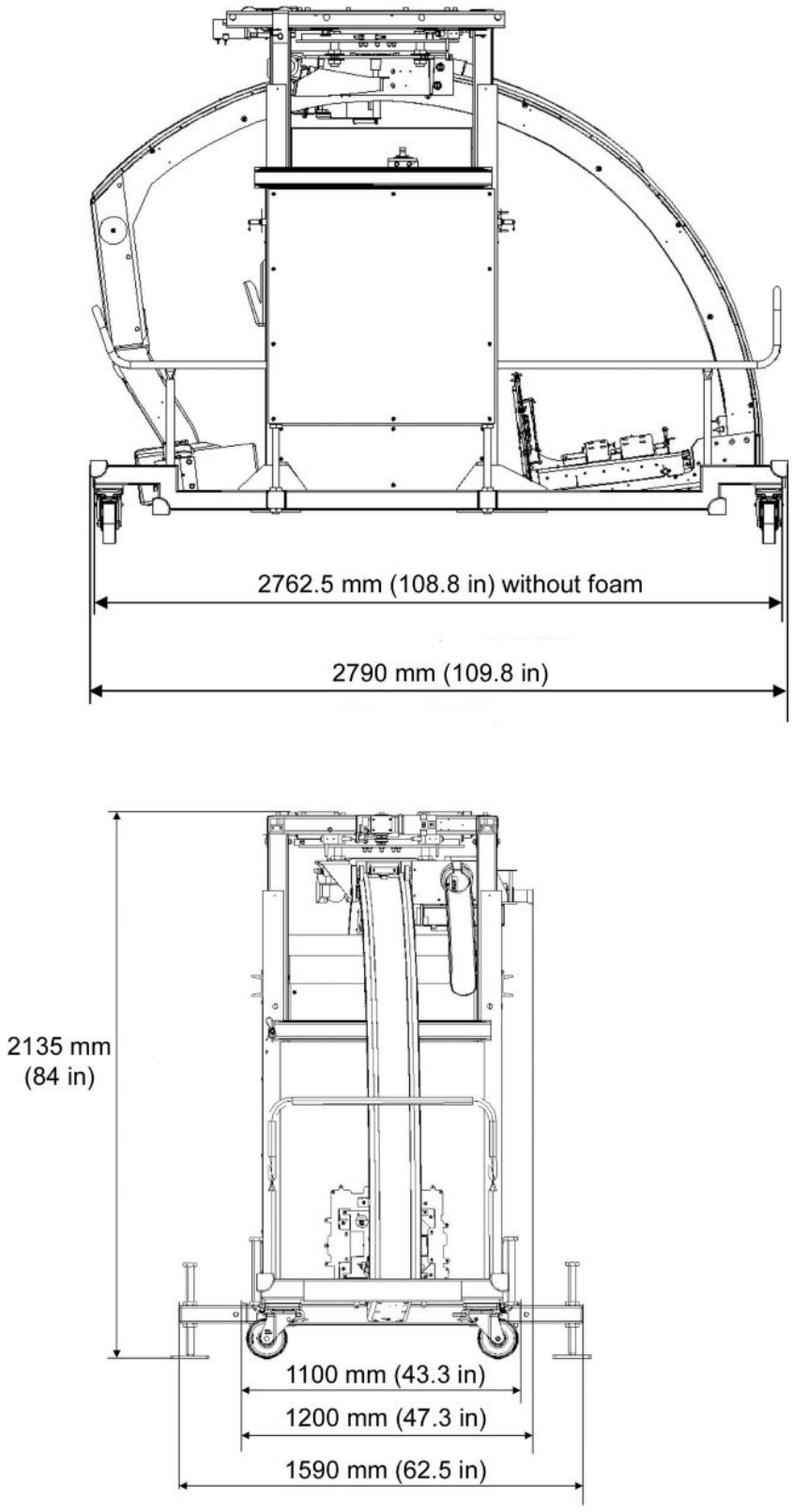
3.1.2.3 Lateral Positioner On Shipping Dolly (Longer and shorter dollies)

Illustration 1-4: On Longer type dolly



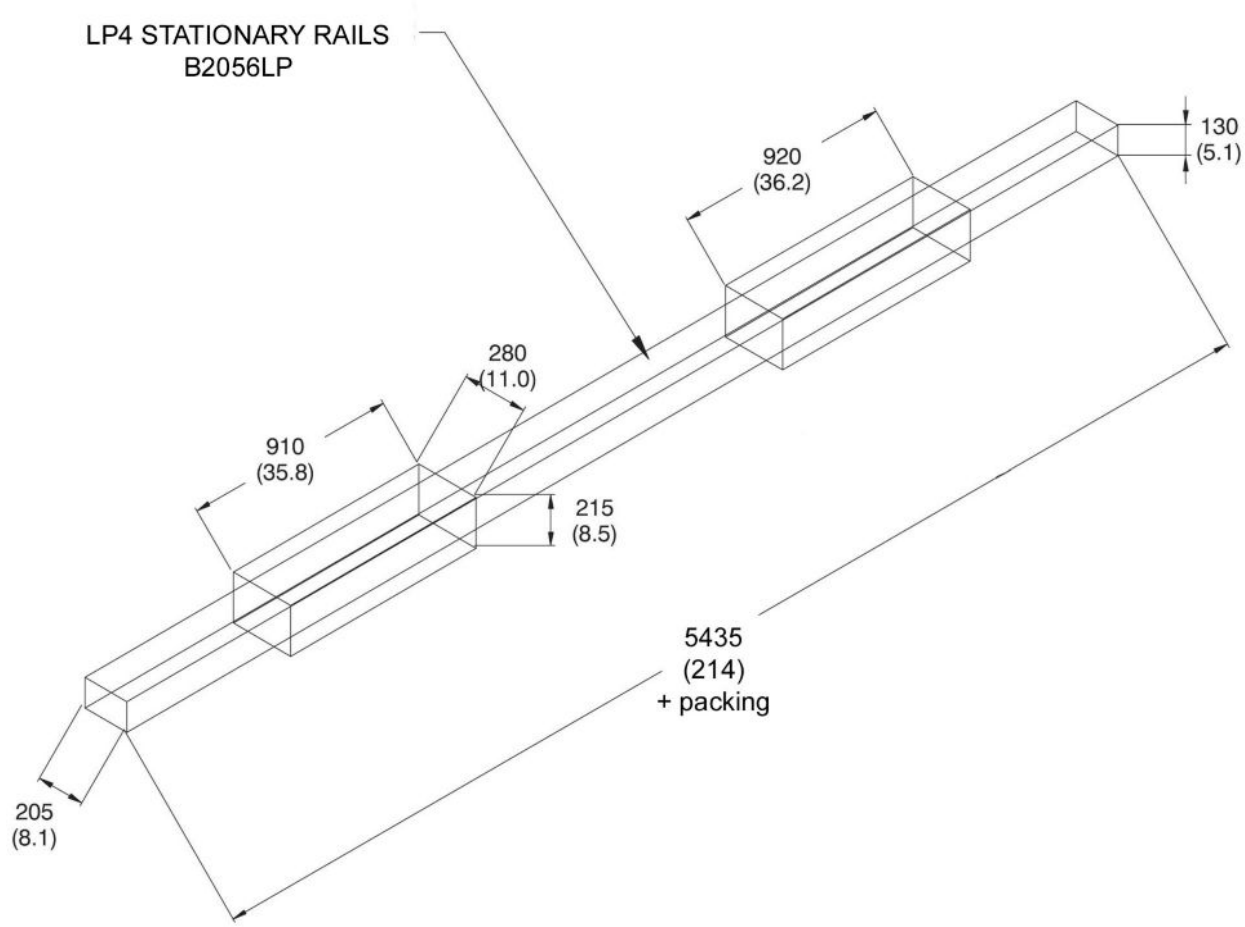
NOTE: The dimensions above are for shipping. When the Lateral Positioner and dolly are in rolling configuration for hospital access, the dimensions are Height : 2001 mm (78.8 in) and width : 1040 mm (41 in)

Illustration 1-5: On shorter type dolly



3.1.2.4 Lateral Positioner Stationary Rails Packaging

Illustration 1-6:



All dimensions are in mm (in inches)

3.1.2.5 Innova C1 Frontal, C1 Lateral, and C2 Cabinets (Frontal and Lateral)

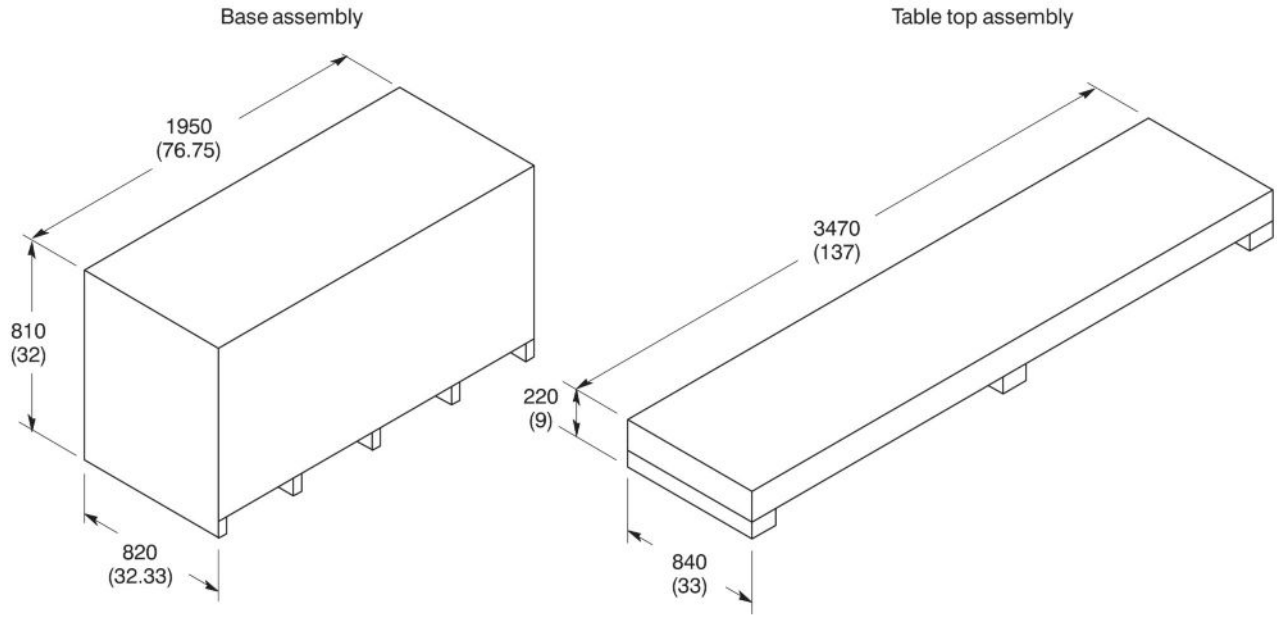
Illustration 1-7: C1 and C2 Cabinets in crate

The shipping weight is of about 90 kg (198.5 lbs) per cabinet.

NOTE: Please use appropriate transportation and lifting means when handling the system cabinets. Professional handling is required.

3.1.2.6 Omega Shipment

Illustration 1-8:

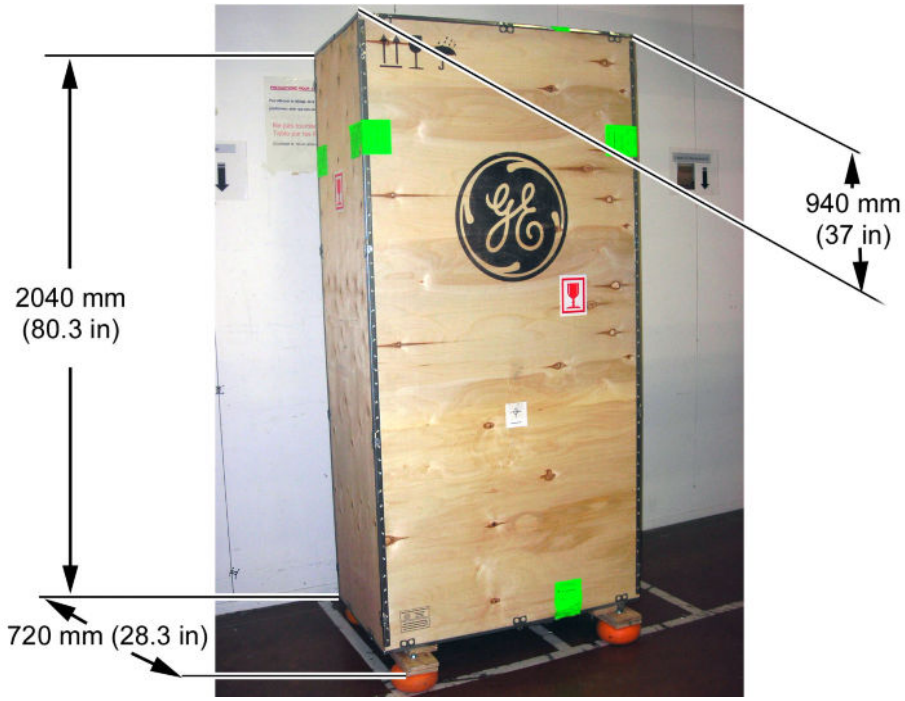


DIMENSIONS IN MM (INCHES)

NOT TO SCALE

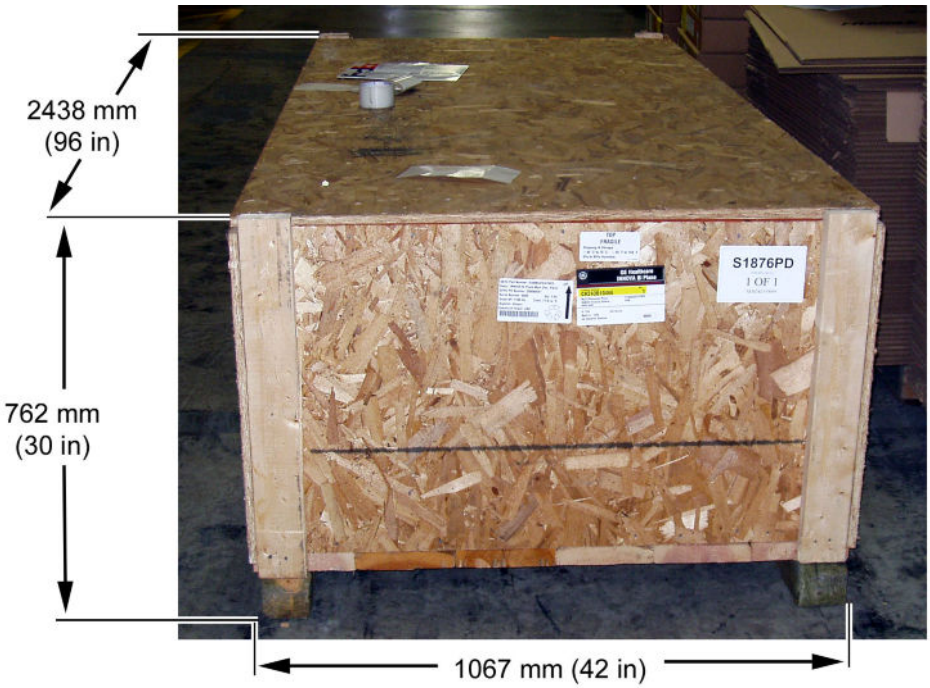
3.1.2.7 Power Distribution Box (PDB) CE

Illustration 1-9:



3.1.2.8 Power Distribution Box (PDB) UL

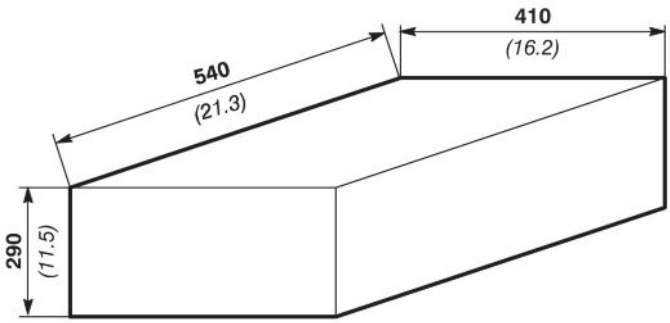
Illustration 1-10:



3.1.2.9 Other Elements Package

NOTE: All OEM parts are shipped inside there original boxes group as needed on pallets.

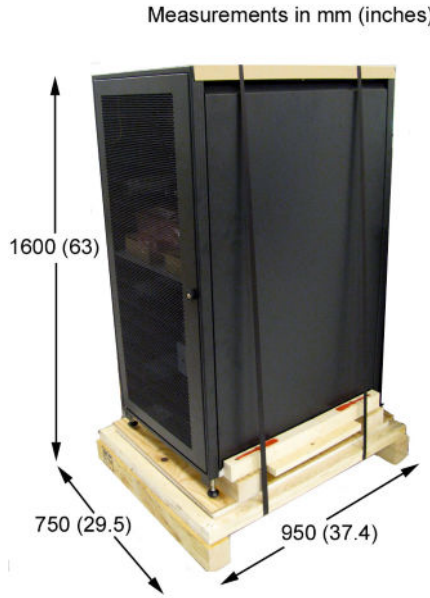
Illustration 1-11:



3.1.2.10 Large Display Option

Illustration 1-12: Large Display Monitor on pallet

Illustration 1-13: Large Display cabinet on pallet



3.2 Tools and Test Equipment

Refer to Table 1-2. To obtain a list of tools and test equipment for components not specified in Table 1-2, refer to the appropriate component Pre-Installation Manual listed in Chapter 2, System Compatibility.

Table 1-2:

PRODUCT OR COMPONENT	TOOL OR TEST EQUIPMENT	USED FOR	SOURCE	RECEIVED (DATE)
Frontal Positioner	Service Engineer's Tool Case	General Use		☐
	Level, Protractor Type	Positioner Checks		☐
	Plumb Line included in 46-216640G1	Positioner Checks		☐
	Torque Wrench 2 to 20 daN.m (15 ft. lbs. to 150 ft. lbs.)	Positioner Checks		☐
	1/2 inch Ratchet Wrench (2)	Raise and Lower Positioner shipping dolly		☐
	Wrench, Spanner (46-176584P1)	High Voltage Cable Installation		☐
	Laptop Computer (MS-DOS Windows)	Positioner Configura-tion and Calibration		☐
Lateral Positioner	Ladders	Installation		☐
	Lateral Positioner Toolcase (shipped with Lateral Positioner)	Installation		☐
	5-axis Laser Alignment tool (shipped with PIM kit)	Installation		☐
Status Display	Same as for Frontal Positioner (Service Engineer's Tool Case)			
Omega Table	Same as for Frontal Positioner (Service Engineer's Tool Case)			
				☐
				☐
				☐
C2 Cabinet (Frontal and Lateral)	Same as for Frontal Positioner (Service Engineer's Tool Case)			
				☐
				☐
X-Ray Head	Same as for Frontal Positioner (Service Engineer's Tool Case)			
				☐
				☐
C1 Cabinet	Same as for Frontal Positioner (Service Engineer's Tool Case)			
				☐
				☐
	Same as for Frontal Positioner (Service Engineer's Tool Case)			

PRODUCT OR COMPONENT	TOOL OR TEST EQUIPMENT	USED FOR	SOURCE	RECEIVED (DATE)
	Ethernet adaptation kit for laptop 2128794	General use **(to be ordered before delivery of system)**		☐
				☐
DL User parts				
				☐
				☐
Monitor Suspension	Ladders	Installation		☐
	XT Lifting Tool (x2) 46-156940G2	Installation		☐
Chiller	Phillips/Flathead screwdriver. Open chiller. Install wiring and hoses.			
				☐
				☐
Chiller Autotransformer (Coolix 4100)	Phillips/Flathead screwdriver. Open chiller autotransformer. Install wiring and hoses			
				☐
				☐
Large Display Lifting Tool (for Large Display Option)	Large Display Monitor Lifting Tool p/n 5418782	Raise Large Display Monitor for installation on Mavig suspension		

3.3 Door Size Requirements

Minimum door sizes also apply to hallways and elevators. For additional details, refer to Shipping Information

3.3.1 Door Height

The minimum door height (to accommodate Innova positioner on its dolly) is **2001 mm** (78.8 in).

3.3.2 Door Width

The minimum door width needed (to accommodate the Innova Frontal/Lateral shipping dolly) is 1040 mm (41 in) with the cable inlet and the dolly stabilizers removed.

NOTE: Door widths are based on a *straight–in* approach requiring a 2440 mm (96 in) wide corridor. Calculations need to be made for accommodation of equipment through narrower corridors.

3.3.3 Elevator Depth

The minimum elevator depth needed to accommodate the Innova Gantry shipping dolly is 2954 mm (116.3 in).

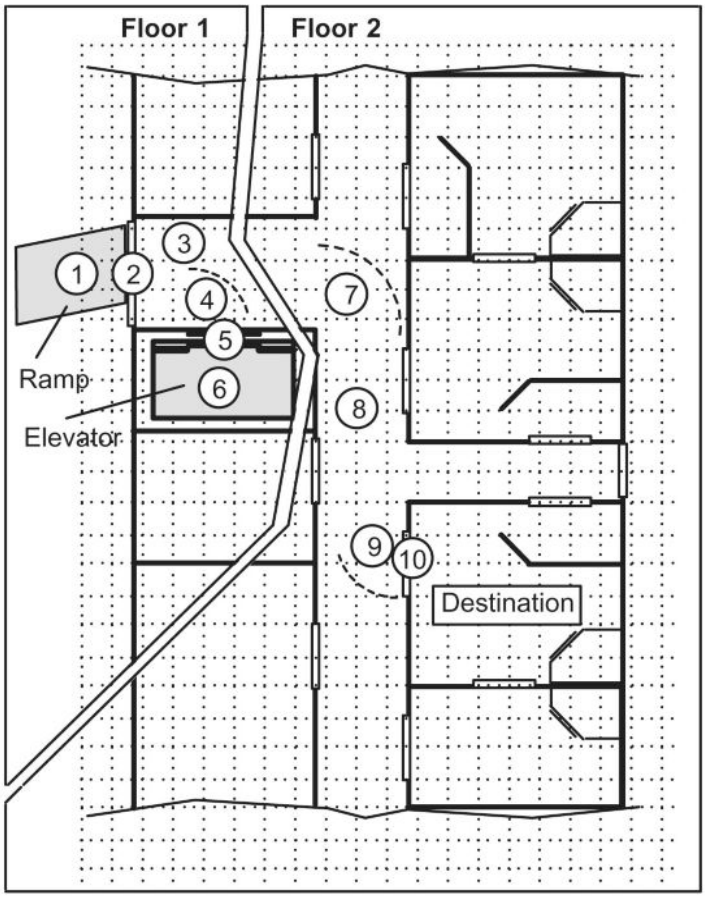
3.4 Route Survey

3.4.1 Step One — Sketch

Start preparing Route Survey by sketching a floor plan of the hospital or clinic which will receive the equipment. Include all areas on the delivery route from outside the building to destination. See Illustration 1-14.

Reference Numbers: Numbers in circles refer to Route Survey data. The Route Survey is a form on which site data are listed (see Section 3.4.2).

Illustration 1-14:



3.4.2 Step Two — Survey

Data concerning the intended delivery route are recorded on the Route Survey in the following pages. Record all loading capacities, corridor widths, door openings, turning radii, flooring materials, elevator sizes, obstructions and so on.

3.4.3 Step Three — Check

Verify equipment can be transported via the route specified in Section 3.4.1. Compare Route Survey compiled in Section 3.4.2 to equipment specifications in this and other applicable pre–installation directions.

Table 1-3:

Route Survey		
Ref. no.	Area: loading dock, doorway, hallway, turn, elevator, obstruction, etc.	Limitations: loading capacity, height, width, depth flooring material, radius, etc.

4 Product Storage and Handling Requirements

4.1 Product Storage and Handling limits

Relative Humidity and Temperature: Refer to Table 1-4. To obtain relative humidity and temperature requirements for components not specified in Table 1-4, refer to the appropriate component Pre–Installation Manual listed in Chapter 2, System Compatibility.

Atmospheric Pressure: Refer to Table 1-5. To obtain altitude and atmospheric pressure requirements for components not specified in Table 1-5 refer to the appropriate component Pre–Installation Manual listed in Chapter 2, System Compatibility.

NOTICE

Avoid extremes in temperatures

Table 1-4: Storage and transport – Relative Humidity and Temperature

SUB-SYSTEM COMPONENTS	RELATIVE HUMIDITY (NON-CONDENSING) (see NOTE (2))		TEMPERATURE	
	MIN	MAX	MIN	MAX
Frontal Positioner	5%	95%	-40°C -40°F	+70°C +158°F
Lateral Positioner	5%	95%	-40°C -40°F	+70°C +158°F
Table Omega IV, Omega V	5%	95%	-40°C -40°F	+70°C +158°F
TSUI (TSSC, Smart box, Smart handle, TPD)	5%	95%	-40°C -40°F	+70°C +158°F
Footswitch	10%	100%	-20°C -4°F	+60°C +140°F
Monitor LCD Eizo	5%	95%	-20°C -4°F	+60°C +140°F
Monitor LDM	10%	90%	-20°C -4°F	+55°C +131°F
Cabinets C1 Frt, C1 Lat, C2	10%	100%	-40°C -40°F	+70°C +158°F
UPS 3KVA	5%	90%	-20°C -4°F	+40°C +104°F
Power Distribution Box (PDB) CE	5%	95%	-30°C -22°F	+70°C +158°F
Power Distribution Box (PDB) UL	10%	95%	-30°C -22°F	+70°C +158°F
UL Fluoro UPS cabinet (*)	0%	95%	-20°C -4°F	+50°C +122°F
CE Fluoro UPS cabinet (*)	0%	95%	-20°C -4°F	+50°C +122°F
LDM cabinet LD core	5%	95%	-40°C -40°F	+70°C +158°F
Detector conditioner	5%	95%	-40°C -40°F	+70°C +158°F
Tube chiller Coolix 4100	10%	100%	-40°C -40°F	+70°C +158°F
VCIM	5%	95%	-40°C -40°F	+70°C +158°F
AW workstation Z800	8%	90%	-40°C -40°F	+60°C +140°F
Digital detector	Refer to NOTE (1) below			
Large Display Option Interface Box	10%	100%	-40°C -40°F	+70°C +158°F

NOTE: **(1)**: The **detector** should be stored at 10 to 40 °C (50 to 104 °F) and less than or equal to 90% RH in the plastic wrapped shipping box. (This should include two bags of desiccant as well). The lowest temperature (e.g. 10 ºC (50 °F)) and humidity is preferable. If they are to be stored outside of their shipping box or in the inner shipping box without plastic wrapping they should be stored at 20 °C (68 °F) or less and 30% RH or less. In terms of transportation, do not expose to temperatures below –20 ºC (–4 °F) **in its shipping box** for more than 15 hours. The detector will reach the ambient temperature after 20 to 25 hours. The detector should not be allowed to reach temperatures less than –10 ºC (14 °F) or irreparable damage to the detectors scintillator will occur. Care must be taken when removing a detector from a shipping box. If the detector has been subject to cold temperatures for an extended period the detector in the box should be allowed to sit in the plastic wrapped box to reach room temperature. This will prevent condensation from occurring. Condensation on the detector can cause irreparable damage to the electronics. Storage 10 to 40 ºC (50 to 104 °F); 10 to 90 % RH, 250 day storage transportation –20 to +60 ºC (–4 to 140 °F) and 10 to 80% RH. The Detector chiller is shipped within GE Healthcare packaging.

NOTE: **(2) Special Humidity Instructions:** The following parts can be can be shipped in standard shipment conditions with the requirement that on arrival to installation site, and before supplying power to these parts, they shall be kept in an environmental relative humidity equal or lower than their specified capability, and that's for a minimum of 48 hours.

- 3kVA UPS 110 V & 220 V (Maximum specified relative humidity capability = 90%)
- LDM Monitor (Maximum specified relative humidity capability = 90%)
- CVI Injector (Maximum specified relative humidity capability = 85%)
- Diamentor (Maximum specified relative humidity capability = 80%)
- 1MP MX191 LCD Monitor (Maximum specified relative humidity capability = 80%)

Table 1-5: Atmospheric Pressure - Storage and transport

SUB-SYSTEM COMPONENTS	ATMOSPHERIC PRESSURE (hPa)	
	MIN	MAX
Frontal Positioner	525	1013
Lateral Positioner	525	1013
Table Omega IV, Omega V	48	1220
TSUI (TSSC, Smart box, Smart handle, TPD)	500	1010
Footswitch	500	1060
Monitor LCD Eizo	540	1053
Monitor LDM	200	1050
Cabinets C1 Frt, C1 Lat, C2	500	1060
UPS 3KVA	697	1130
Power Distribution Box (PDB) CE	500	1060
Power Distribution Box (PDB) UL	500	1060

SUB-SYSTEM COMPONENTS	ATMOSPHERIC PRESSURE (hPa)	
	MIN	MAX
UL Fluoro UPS cabinet (*)	500	1013
CE Fluoro UPS cabinet (*)	500	1013
LDM cabinet LD core	700	1060
Detector conditioner	120	1060
Tube chiller Coolix 4100	500	1060
VCIM	525	1013
AW workstation Z800	724	1010
Large Display Option Interface Box	500	1060

4.2 Fluoro & 3KVA UPS Shipment Duration

NOTE: In the case the material shipped will be subject to different temperature values during shipment, the maximum shipment duration can be calculated, depending on the duration of different temperature values application, and using values given in the tables above

4.2.1 Fluoro UPS (CE and UL)

The maximum shipment duration is given in the table for both Fluoro UPS CE and UL. It depends on the temperature to which the material will be subject during shipment. This limitation is due to the capability of batteries included in UPS.

Table 1-6: Maximum shipment duration for Fluoro UPS

Temperature	Shipment max duration (Weeks)
55°C (131°F)	2
50°C (122F°)	3
40°C (104°F)	6
30°C (86°F)	12

4.2.2 3 KVA UPS (220 V and 110 V)

The maximum shipment duration is given in the table for both 3 KVA UPS 220 V and 110 V. It depends on the temperature to which the material will be subject during shipment. This limitation is due to the capability of batteries included in UPS.

Table 1-7: Maximum shipment duration for 3 KVA UPS

Temperature	Shipment max duration (Weeks)
55°C (131°F)	4
50°C (122F°)	7
40°C (104°F)	14
30°C (86°F)	25

4.3 PDB CE Labeling

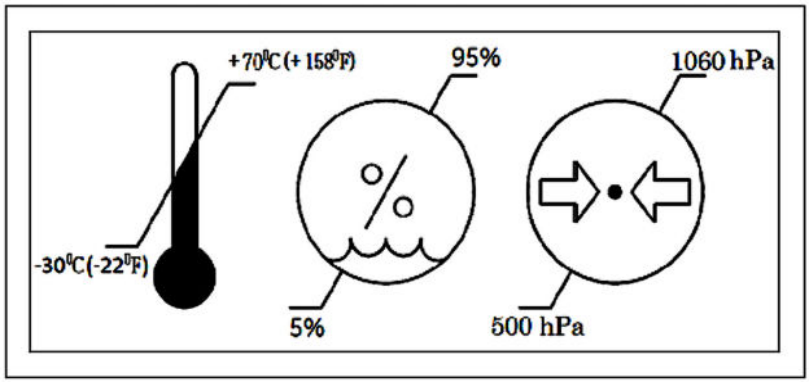
The PDB CE must be marked with special handling instructions for transport, storage and use.

4.3.1 Transport crate labeling

Packaging environmental condition for PDB CE :

The following markings shall be affixed on the packaging as per 5195050PSP.

Illustration 1-15: Temperature, Humidity and Pressure label

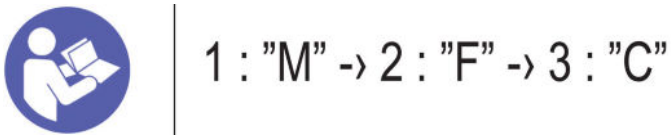


Refer the standard ISO 7000 for symbol. (Temperature, symbol n°0632 of standard ISO 7000, Humidity, symbol n°2620 of standard ISO 7000, Pressure, symbol n°2621 of standard ISO 7000).

Upper and lower limits of temperature/humidity/atmospheric pressure shall be indicated adjacent to the upper and lower horizontal lines. Temperature shall be indicated in Celsius units as follows:“XX °C”.It is recommended to indicate both Celsius and Fahrenheit units as follows “XX °C (YY °F).

4.3.2 PDB CE Cabinet front door labeling

Table 1-8: PDB CE front door Labels

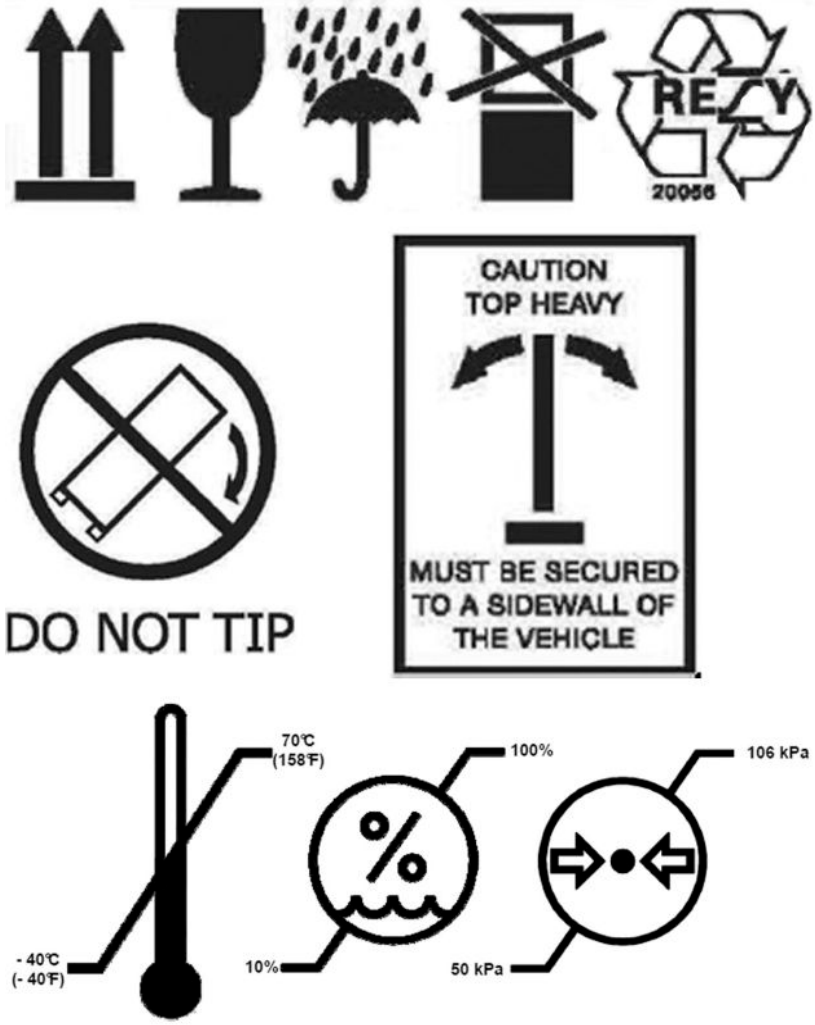
	**General warning sign**
	**General mandatory action sign** **I** = Close to the start button **O** = Close to the stop button
	**Follow instructions for use** **M** = Main circuit breaker **F** = Fluoro UPS circuit breaker **C** = Cabinet circuit breaker

4.4 Handling instructions

The packaging of the following components must be marked with special handling instructions for transport and storage.

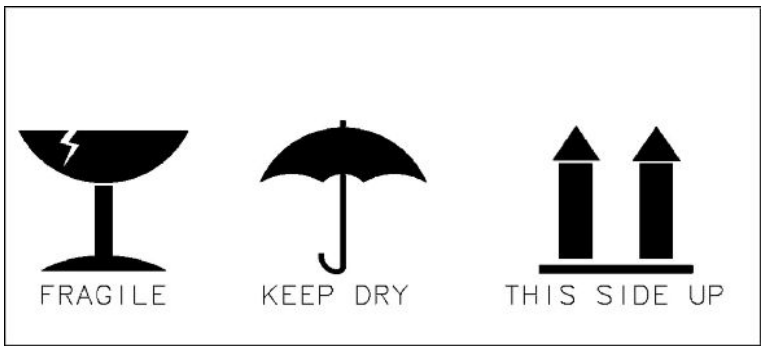
- C1 Frontal Cabinet, C1 Lateral Cabinet and C2 Cabinet:

Illustration 1-16:



- Frontal Gantry, Lateral Gantry and Omega Table:

Illustration 1-17:



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Chapter 2 Equipment Requirements

1 System Components

1.1 Presentation of the 3 Rooms

1.1.1 Examination room

- Frontal Positioner
- Lateral Positioner
- Omega Patient Table
- Performix X–Ray Tube Assembly (x 2)
- Collimator (x 2)
- Innova Digital Detector (x 2)

⚠WARNING

THE ELECTRONIC CABINETS (C1 FRONTAL, C1 LATERAL, C2, OPTIONAL LD CABINET, COOLIX 4100 CHILLERS, DETECTOR CONDITIONERS AND FLUORO UPS WHEN INSTALLED) INCLUDE FANS THAT ARE CREATING AIR–CIRCULATION OF PULSED–AIR. WHEN THIS PULSED AIR IS IN AN ENVIRONMENT THAT MAY CONTAIN AIRBORNE PATHOGENS LIKE AN EXAM ROOM/CONTROL ROOM, THERE IS A RISK OF TRANSMISSION OF THESE AIRBORNE PATHOGENS FROM PATIENTS TO OTHER PATIENTS OR CLINICAL PERSONNEL (NOSOCOMIAL DISEASES).
TO REDUCE THIS RISK, THE ELECTRONIC CABINETS MUST BE INSTALLED IN A ROOM SEPARATED FROM EXAM ROOM/CONTROL ROOM, I.E., TECHNICAL ROOM.

1.1.2 Technical room

- C2 Cabinet (Frontal/Lateral)
- C1 Frontal Cabinet and C1 Lateral Cabinet
- Coolix 4100 chiller (2 Cabinets)
- Detector Conditioner HEAT DRY 1 (2 Cabinets)
- Fluoro UPS (option) (1 Cabinet)
- Power Distribution Box (Main Disconnet Panel)
- 3 kVA cabinets UPS
- Large Display Cabinet and UPS (for Large Display Option)

1.1.3 Control room

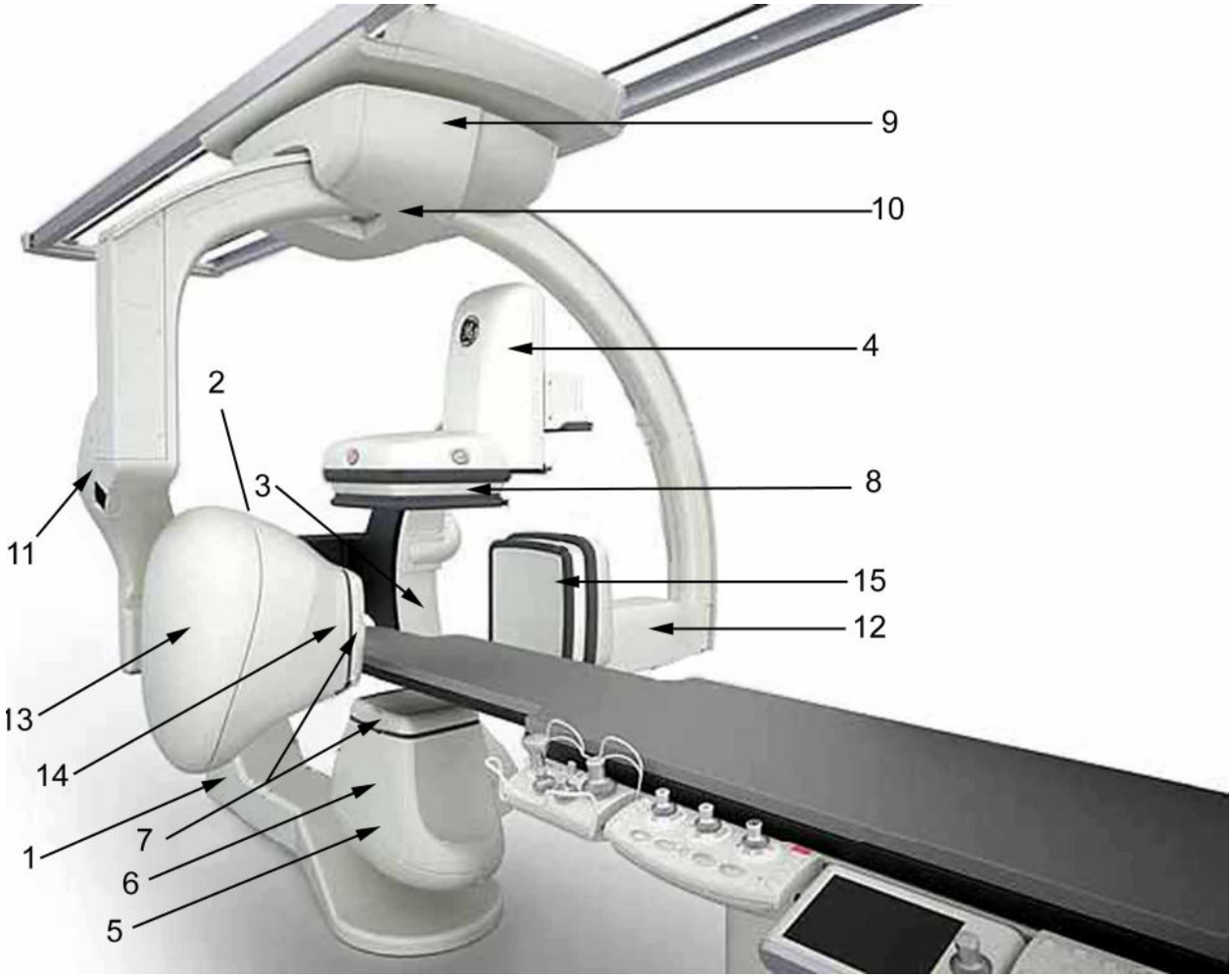
- VCIM
- DL Flat Panel
- DL Keyboard
- Monitors

1.2 Description of the System

1.2.1 Innova frontal and lateral positioner

The Innova frontal and lateral positioner system includes: C2 cabinet, two positioners, and TSUI.

Illustration 2-1: Frontal and Lateral System Product Layout



Innova frontal and lateral positioner including:

- Innova Frontal Positioner
  - L–arm (Item 1),
  - Pivot (Item 2),
  - C–arc (Item 3),
  - Motorized elevator (Item 4) for the Revolution Digital Detector,
  - X–ray tube (Item 5),
  - Collimator (Item 6),

- X-Ray Tube cover spacer (Item 7)

  NOTE: Depending on country regulation (i.e. USA and New Zealand), the tube cover Spacer must be installed over the X-ray tube cover.

- 21 cm Revolution Digital Detector (Item 8),
- 31 cm Revolution Digital Detector (Item 8).

- Innova Lateral Positioner
  - Carriage (Item 9),
  - Pivot (Item 10),
  - C–arc (Item 11),
  - Motorized elevator (Item 12) for the Revolution Digital Detector,
  - X–ray tube + tube elevator (Item 13),
  - X-Ray Tube cover spacer (Item 7)

    NOTE: Depending on country regulation (i.e. USA and New Zealand), the tube cover Spacer must be installed over the X-ray tube cover.

  - Collimator (Item 14),
  - 21 cm Revolution Digital Detector (Item 15),
  - 31 cm Revolution Digital Detector (Item 15).

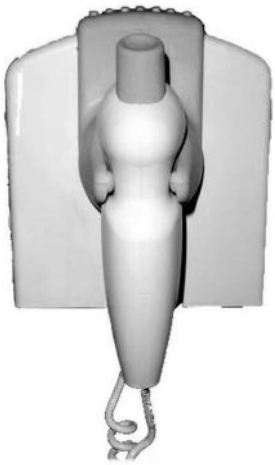
1.2.2 User Interface

Illustration 2-2: User interface devices

Table Side Control (TSSC)
with contour filtering

SmartBox

Smart Handle



Bolus Handle (Option)

3D Mouse (option)

Table Panning
Device (TPD)

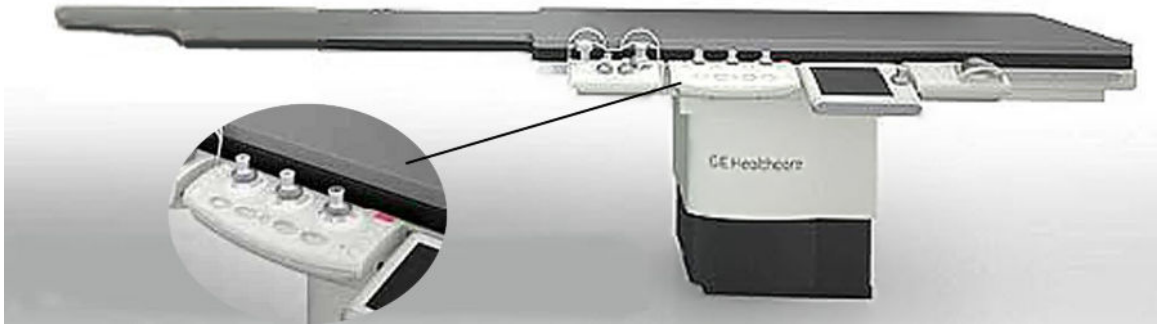
Table Footswitch

Intelligent Touch Screen (ITU)
(Option)

1.2.3 Innova Patient table

Innova Systems can be supplied with an Omega table, which includes a table side control with Contour Filter.

Illustration 2-3:



1.2.4 X–Ray generator

The Innova System uses two Innova High Voltage Generator System with component parts as follows according to the power requested (100 kW):

- Two Jedi – C1 Frontal and C1 Lateral cabinets,
- Two Ingrid H.V. tank mounted on the Ulysses X–Ray tube housing.
- Two External recirculating chillers (mandatory for each tube). It is mandatory to place the two Chillers in the Technical Room.

1.2.5 X–Ray head

The Innova System uses two Ulysses X–Ray tube housing including an X–Ray tube, a collimator, Ingrid HV tank, oil/water exchanger, contour filter, etc.

Illustration 2-4: Coolix 4100 chillers (Frontal and Lateral) with autotransformer

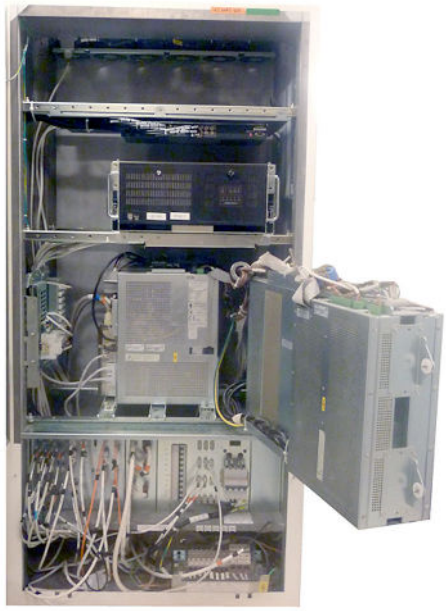
1.2.6 Innova Imaging System

An Innova Frontal and Lateral System is managed and controlled by a System including:

- Two C1 cabinets, inside which are located the RTAC, the DL, (DL in frontal C1 cabinet only), the HUB, the KVM
- C2 cabinet (frontal and lateral positioners)
- VCIM console
- Revolution Digital Detector mounted on frontal positioner
- Revolution Digital Detector mounted on lateral positioner
- Two external Digital Detector conditioners are mandatory
- A 3kVA cabinet UPS to be installed close to PDB (Main Disconnect Panel) whether the Fluoro UPS option is installed or not
- LCD 19” EIZO GmbH SMD 19100G Color Monitor
- LCD 19” EIZO GmbH SMD 19100G B&W Monitor
- LCD 19” EIZO HB color monitor
- LCD 58’’ EIZO GmbH LS580W Color Flat Panel (LDM option)

Illustration 2-5: Technical cabinets

C1 Frontal Cabinet



C1 Lateral Cabinet

C2 Cabinet

Illustration 2-6: Thermo-con chillers (Frontal and Lateral)

1.2.7 Monitor suspensions

GE provides as option several types of suspensions; alternatively, the customer can install the suspension of his choice (“open suspension”), provided all requirements in the paragraph Section 1.2.7.2 are met.

1.2.7.1 LCD monitor suspension

The common type of this suspension is an XT inboard monitor bridge.

A monitor frame support receiving 6 monitors: 4 B&W Monitors and 2 Color Monitors.

A monitor frame support receiving 8 monitors: 4 B&W Monitors and 4 Color Monitors or 6 B&W Monitors and 2 Color Monitors.

1.2.7.2 Open monitor suspension (option)

For Innova IGS systems product with Open Suspension Option, the overhead monitor suspension shall be installed by strictly following the GEHC installation instructions. The manufacturer specifically disclaims any and all liability arising out of or relating to the use or performance of the monitor suspension (including cables), including, without limitation, any liability or claims relating to patient injury, death, or the reliability of such monitors suspension(s).

Where a stand-alone monitor suspension(s) is supplied by the Purchaser of the Discovery System, the stand-alone monitors suspension(s) shall comply with the applicable Regulation enforced in the country (eg., when installed in an European Community country, the associated monitors suspension(s) shall be CE marked).

The association of Innova product delivered with Open Suspension Option and the purchaser’s (customer) monitors suspension(s), is not covered by product certification.

⚠CAUTION

The Innova System delivered with the Open Monitor Suspension option cannot presume on the mechanical constraints of non-GE monitor(s) suspension(s) introduced in the system.

For further details on Open monitor suspension Pre-installation, please refer to Regulatory Requirements and Pre-Installation Instructions contained in Open Monitor Suspensions – Service Instruction for Installation contained in the Service manual.

⚠CAUTION

Avoiding collision between gantry and third party equipment is under customer responsibilities.

Depending of the height of suspended elements of the open monitor suspension, collision must be avoided with the gantry components see Illustration *Potential collision between laser, detector lift and mast/chain* in Ceiling Requirements.

1.2.8 DL and associated devices

An Innova System uses the DL Digital Imaging system.

- The C1 Frontal Cabinet contains:
  - DL Computer,
  - Firewall unit,
  - Ethernet switch,
  - KVM–local,
  - Video Splitter.
- The user area is made of:
  - DL color LCD monitor (19”),
  - Keyboard,
  - Mouse,
  - Keypads for user dialogue,
  - Repeater monitors.

Illustration 2-7: Innova User Area devices

Remote control

Keypad

Innova VCIM with DL keyboard console

DL color LCD monitor

Post processing color LCD monitors (Options)

Repeator B&W LCD monitors (Options)

Advantage windows monitor

Centricity CA1000 monitor

1.2.9 AW workstation option

AW workstation option is composed of a workstation, 1 or 2 monitors 19'' flat panel in the Control Room and 1 monitor (flat panel) fixed on suspension (option) and 1 video switcher.

Check Innova Installation Service Manual (JobCard *IST0315 - Advantage Workstation Volume Share 5 Installation (AW and video splitter)* for switcher installation.

1.2.10 CENTRICITY CA1000 option

Refer to :*Centricity Cardiology CA 1000 V2.0 Preinstallation Guide DOC0241470* in the OEMs of the Innova™ IGS 620, Innova™ IGS 630 service manual.

1.2.11 Injectors

The recommended injectors are:

- ACIST CVI (Pedestal and Table mount)
- Mark V ProVis (pedestal or rack mounted)
- MEDRAD AVANTA (Pedestal and Table mount).

Other injectors (remote or pedestal) require S.O.I..

1.2.12 Fluoro UPS (Option)

The Innova frontal and lateral system can be protected with an optional Fluoro UPS.

There are two types of Fluoro UPS:

- UL for North America and other 480V – 60Hz countries.
- CE for Asia and Europe.

Illustration 2-8: UPS - UL

1.2.13 3kVA Cabinets UPS

Illustration 2-9: 3 kVA UPS - model 9130

1.2.14 Touch Screen

The Innova frontal and lateral system contains an InnovaCentral Touch Screen.

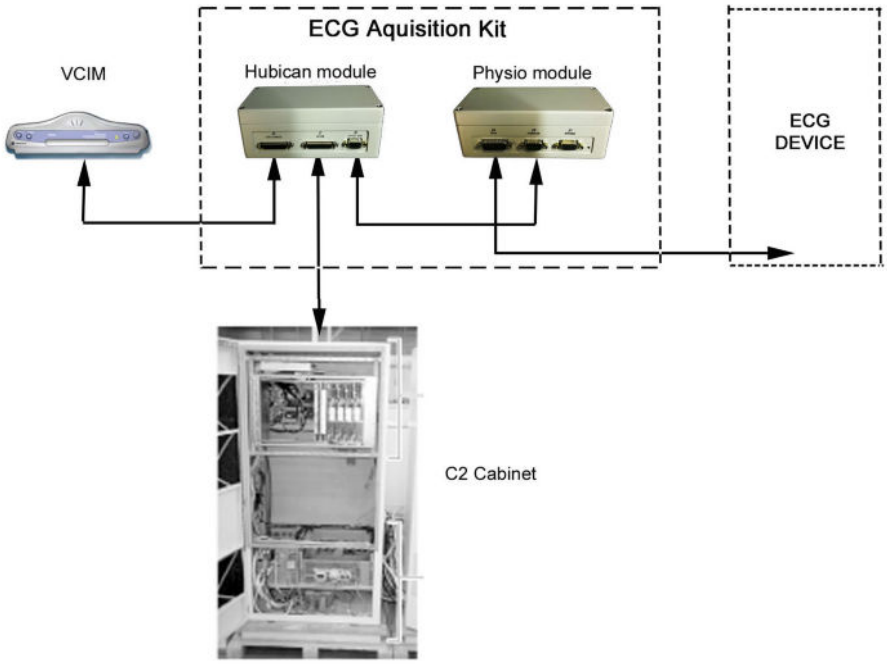
1.2.15 ECG Acquisition kit Option

The ECG Acquisition kit allows for the connection of an ECG device (such as GE ECG devices MacLab, CardioLab or ComboLab) to the Innova system (C2 cabinet). The ECG Acquisition kit hardware consists of a Hubican and Physio modules and their associated cables.

There are two possible configurations for the ECG Acquisition kit:

- ECG devices installed in Control Room (GE ECG devices like MacLab, CardioLab or ComboLab)
- ECG devices installed in Exam Room (Non-GE ECG device).

Illustration 2-10: ECG Acquisition kit layout



1.2.16 Large Display Subsystem option

The Innova system can integrate a Large Display solution to:

- See images larger at full IQ with greater flexibility in monitor distance in the procedure room
- Display multiple video images simultaneously at different sizes based on stage of workflow
- Conveniently switch operator defined video layouts at different points in procedure workflow.

The Large Display Subsystem option is addressing: 100, 110, 220, 230, 240 VAC (phase, neutral and ground) +/- 10% 50Hz +/-3Hz and 60Hz +/-3Hz countries.

Large Display Monitor Configuration:

- Large Display Monitor: 58” Eizo color
- Black and white monitors: 19” Eizo monitor.

1.3 Dimension Drawings

Refer to this section for the dimensional drawings of the components of the systems with 21 & 31 cm detector. This section also contains the Frontal Gantry, Lateral Gantry and patient table sweep volume curves. These systems include:

Frontal and Lateral Positioner, Omega Table, C2 Cabinet (Frontal/Lateral), C1 Frontal Cabinet / C1 Lateral Cabinet, 3kVA cabinets UPS, Chillers, Optional Fluoro UPS and PDB (main disconnect). In addition, refer to this section for Positioner/table relative position drawings.

Table 2-1:

Title	QTY	Illustration
Exam Room		
Frontal Positioner Dimensions:		
- Side View	1	Illustration 2-11
- Top View		Illustration 2-12
- Front View		Illustration 2-13
Lateral Positioner Dimensions: - Side View	1	Illustration 2-14
Lateral Positioner Dimensions: - Top View		Illustration 2-15
Lateral Positioner Dimensions: - Front View		Illustration 2-16
Omega IV Table Dimensions	1	Illustration 2-17
Omega V Table Dimensions	1	Illustration 2-18
Omega Table side clearence (CPR access)		Illustration 2-19
Table Head Extender	1	Illustration 2-20
Gas Box Outlets Omega Table	1	Illustration 2-21
Frontal and Lateral Positioner And Omega Patient Table Relative Positions: - Side View	1	Illustration 2-22
Frontal and Lateral Positioner And Omega Patient Table Relative Positions: - Top View	1	Illustration 2-23
Lateral Positioner Cable Drape Length	1	Illustration 2-24
Technical Room		
C2 Cabinet (Frontal and Lateral) Dimensions	1	Illustration 2-25
C1 Frontal Cabinet Dimensions	1	Illustration 2-26
C1 Lateral Cabinet Dimensions	1	Illustration 2-27
Coolix 4100 Chiller Dimensions and Floor Space Diagram	2	Illustration 2-28
Thermo-Con Detector Conditioner (and Mounting brackets) Dimensions	2	Illustration 2-29
3 kVA Cabinets and LDM UPS - model 9130	1	Illustration 2-30
Fluoro UPS Cabinets (Optional)	1 (UPS UL)	Illustration 2-31
	1 (UPS CE)	Illustration 2-32
ECG Acquisition Device Modules	2	Illustration 2-33
Large Display cabinet dimensions (Optional)	1	Illustration 2-34
Large Display suspension dimensions (Optional)	1	Illustration 2-35
Control Room		
DL Keypad Dimensions	1	Illustration 2-36

Title	QTY	Illustration
DL Image Monitor Dimensions	1	Illustration 2-37
VCIM	1	Illustration 2-38

Illustration 2-11: Frontal Positioner Dimensions - Side View

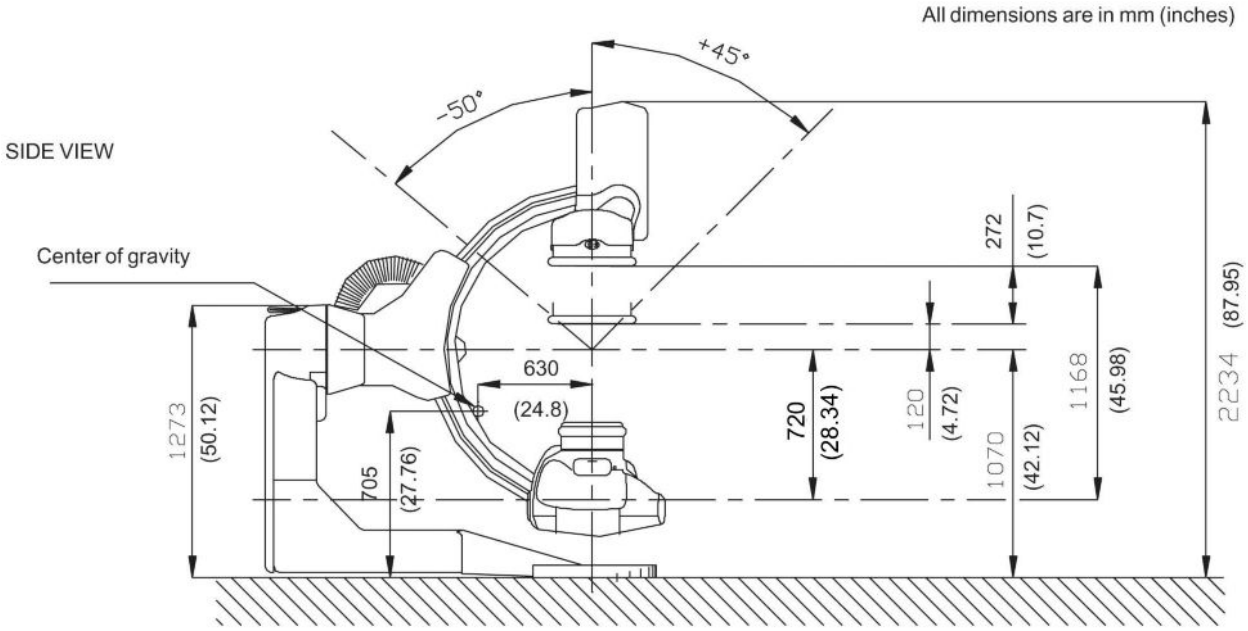


Illustration 2-12: Frontal Positioner Dimensions - Top View

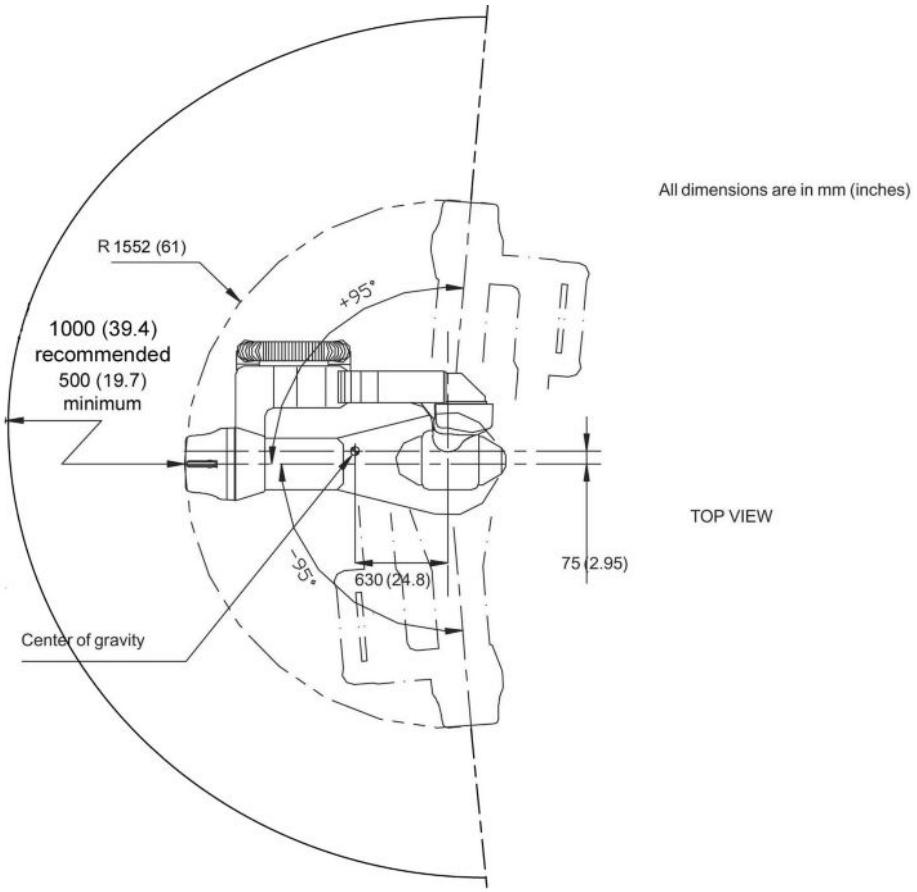


Illustration 2-13: Frontal Positioner Dimensions - Front View

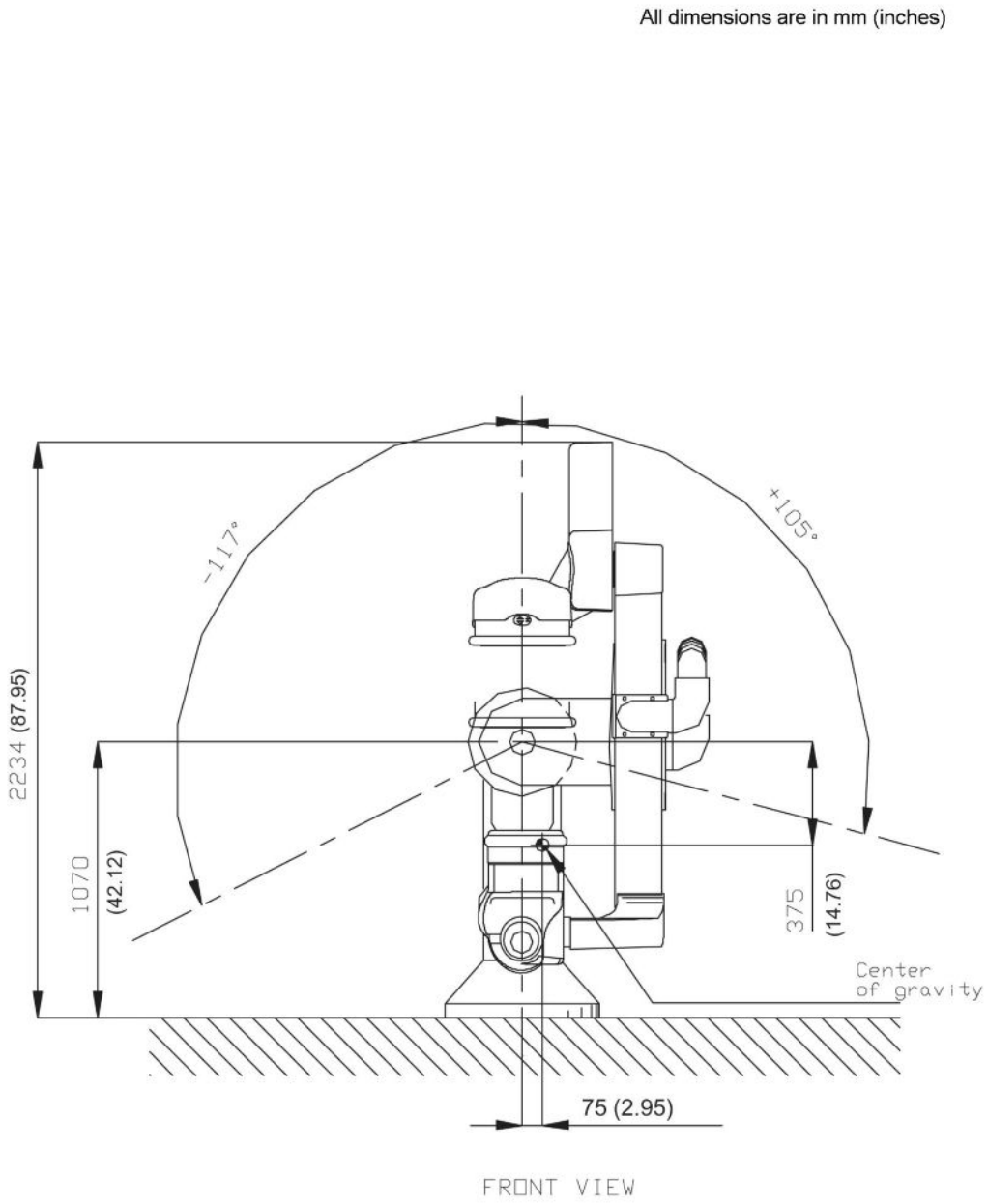


Illustration 2-14: Lateral Positioner Dimensions - Side View

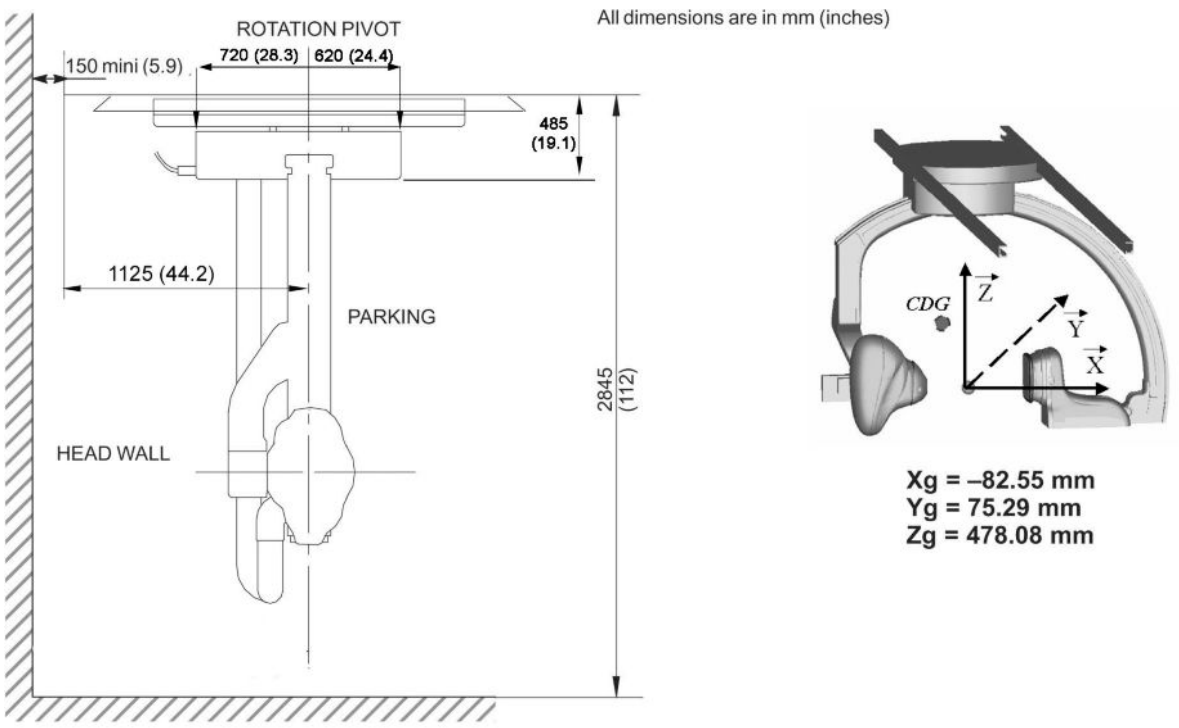


Illustration 2-15: Lateral Positioner Dimensions - Top View

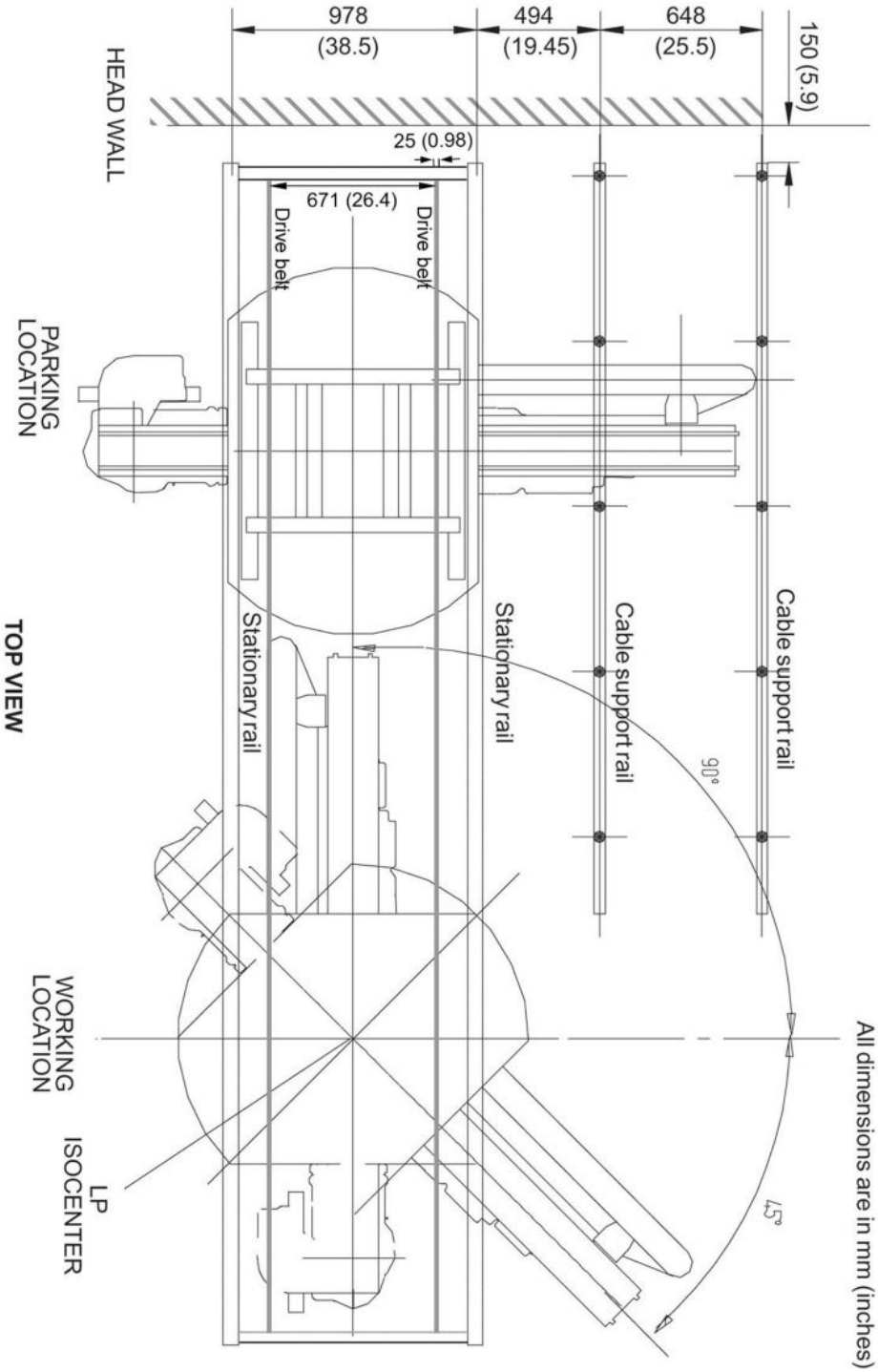


Illustration 2-16: Lateral Positioner Dimensions - Front View

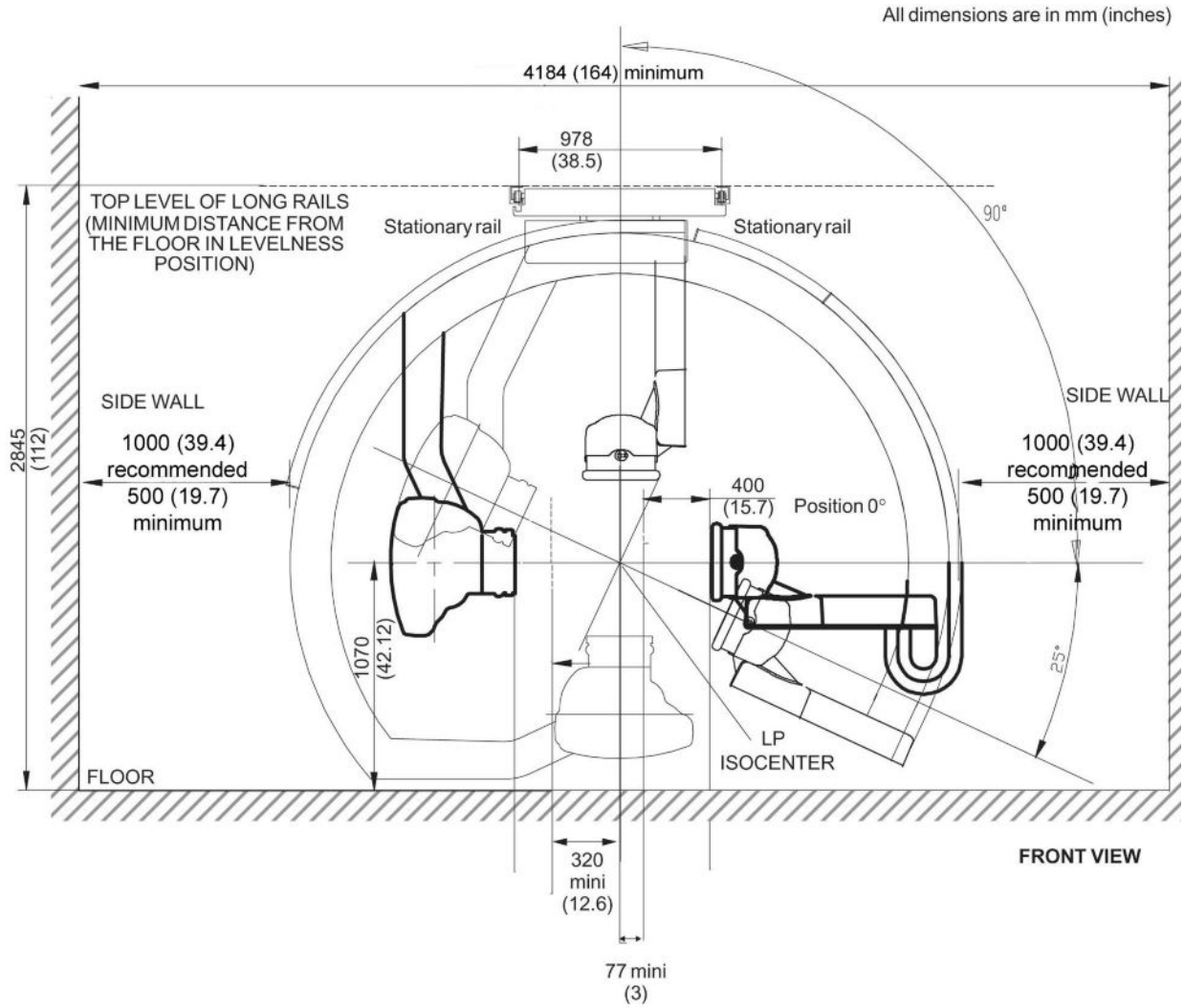
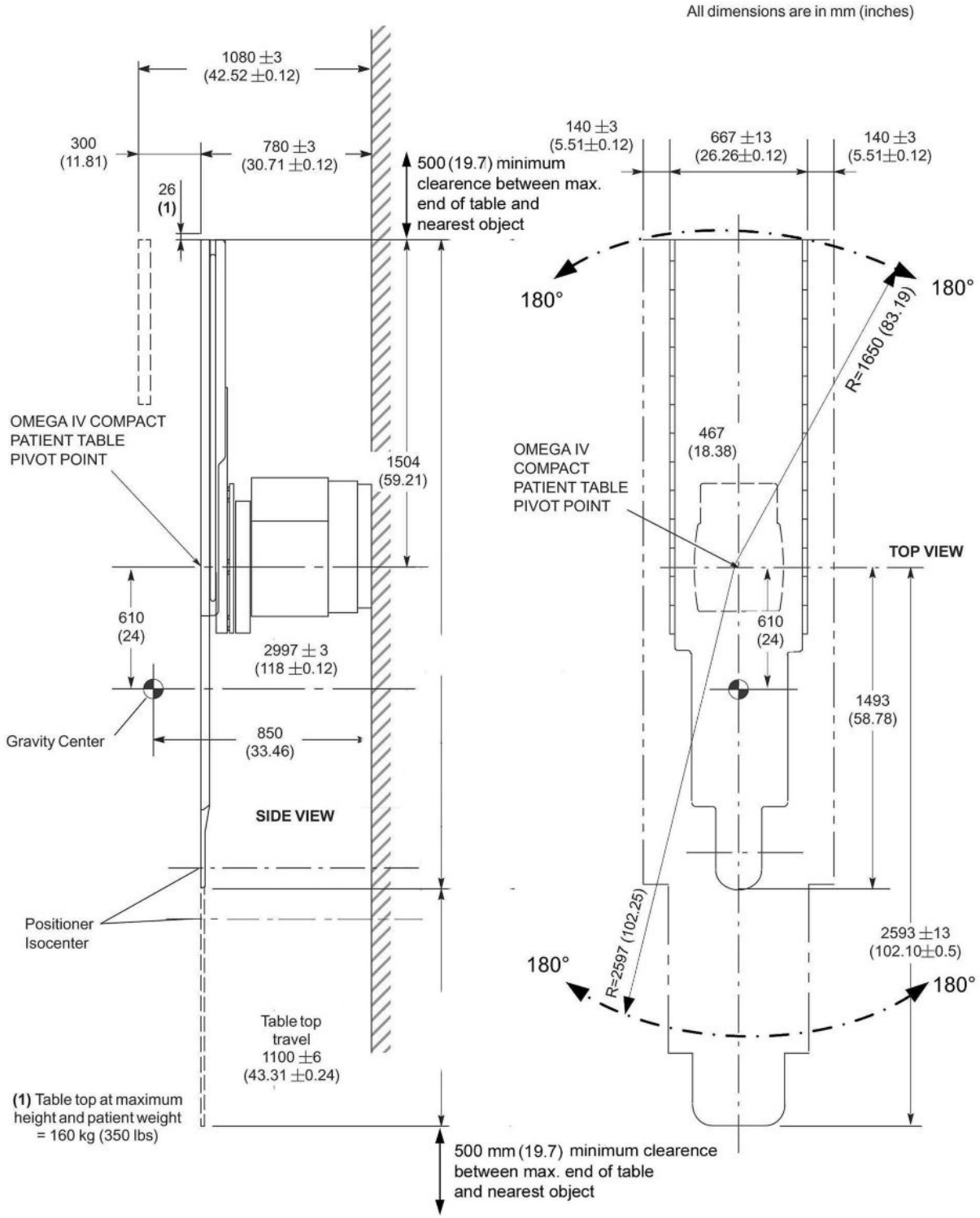
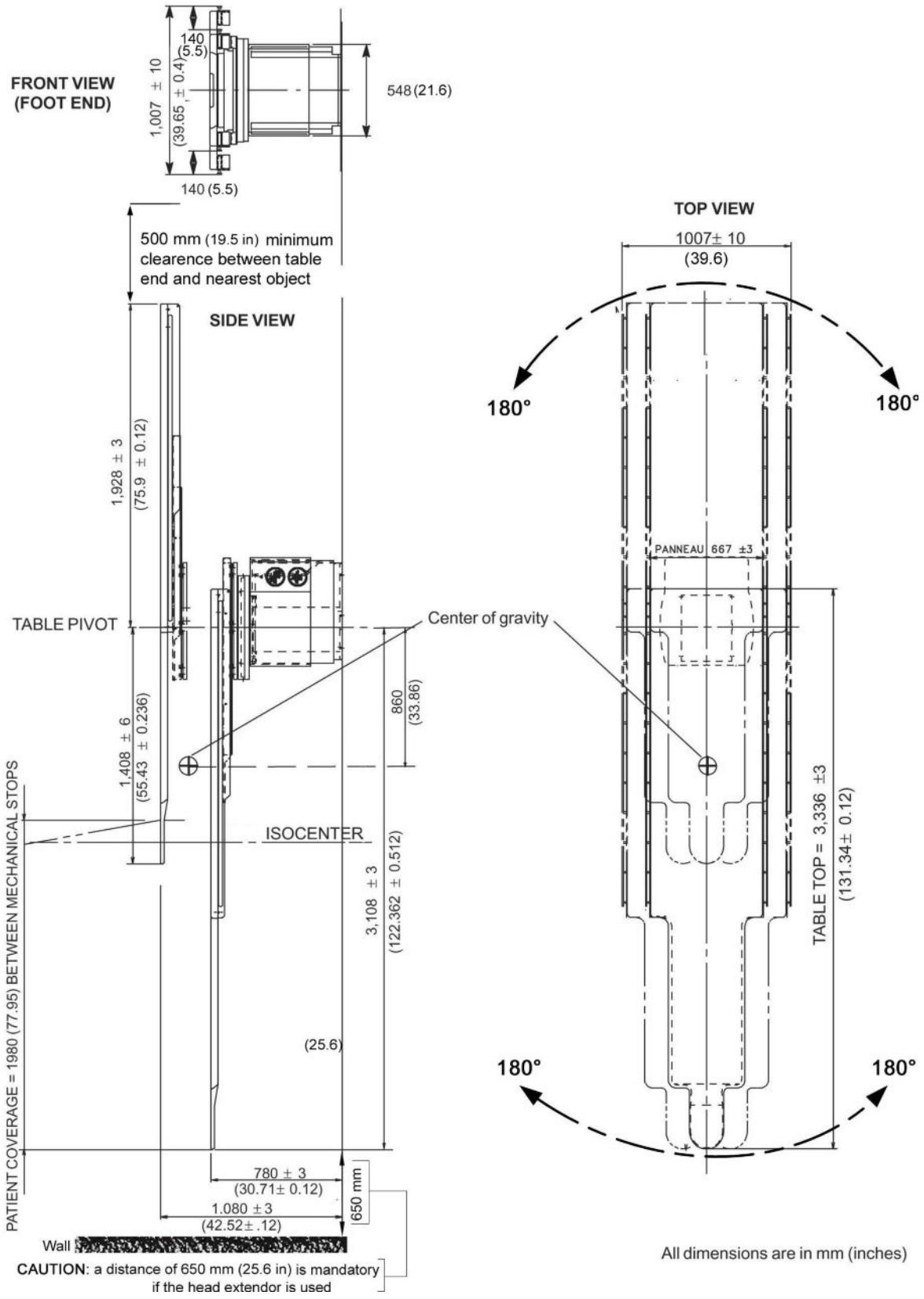


Illustration 2-17: Omega IV Table Dimensions



NOTE: The 500 mm (19.7 in) minimum clearance between the **table foot end** and nearest object must take Into account any table devices installed on the table end rail. If there are any devices installed on the table foot end, the width of these devices must be added to the existing 500 mm (19.7 in) to maintain absolute minimum distance of 500 mm (19.7 in).

Illustration 2-18: Omega V Table Dimensions



NOTE: The 500 mm (19.7 in) minimum clearance between the **table foot end** and nearest object must take Into account any table devices installed on the table end rail. If there are any devices installed on the table foot end, the width of these devices must be added to the existing 500 mm (19.7 in) to maintain absolute minimum distance of 500 mm (19.7 in).

Illustration 2-19: Omega Table side clearence (CPR access)

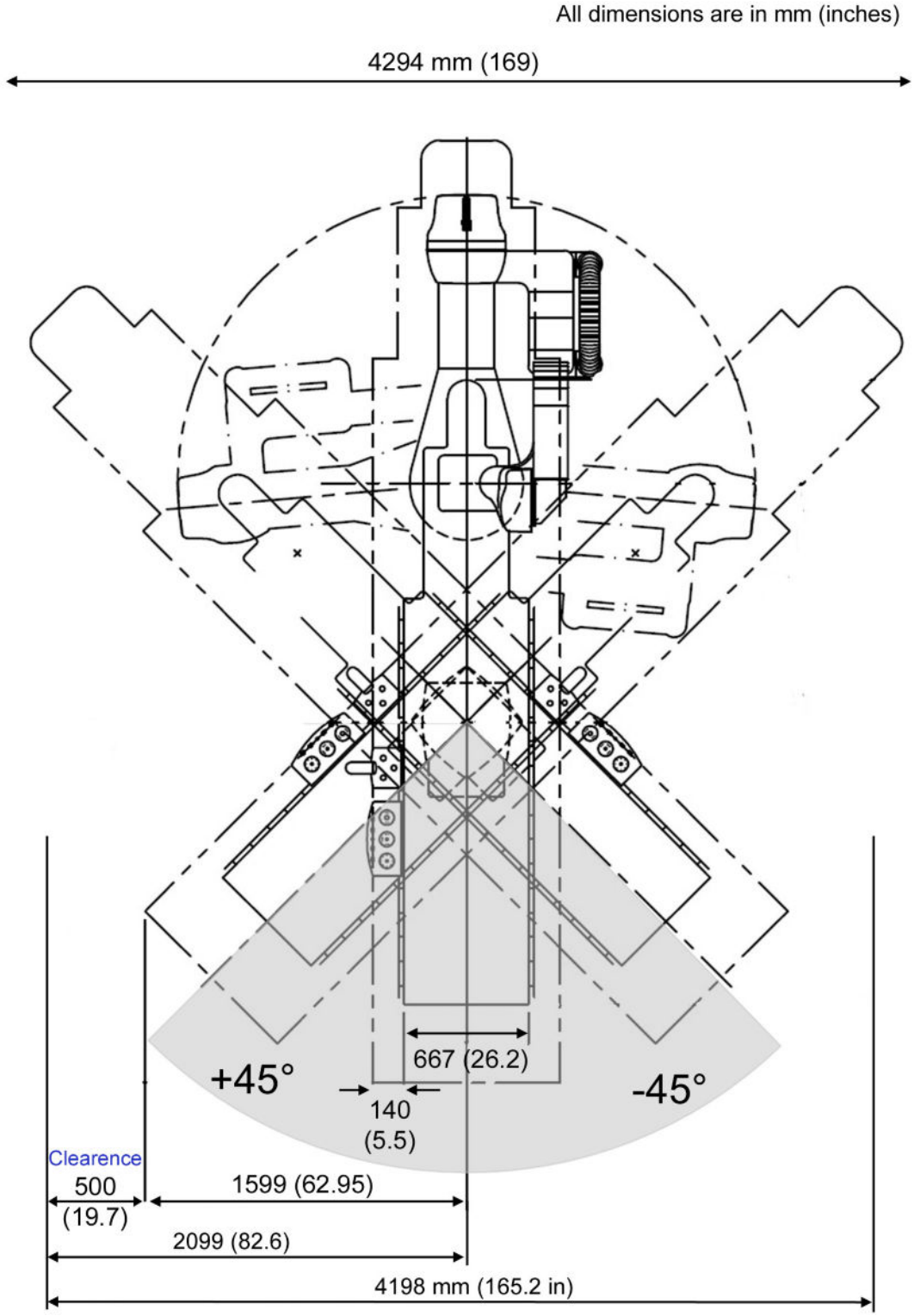


Illustration 2-20: Table Head Extender

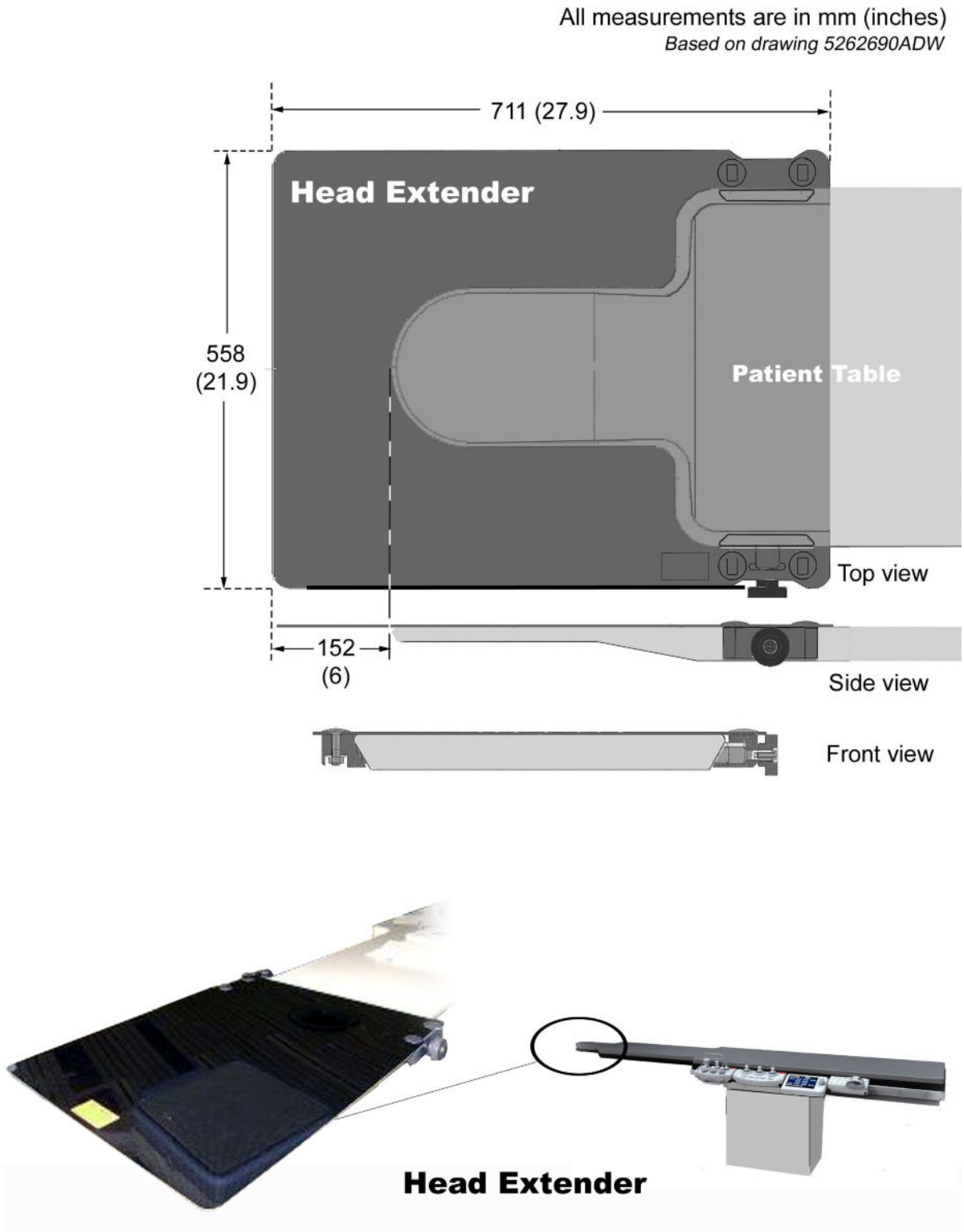


Illustration 2-21: Gas box outlets Omega table

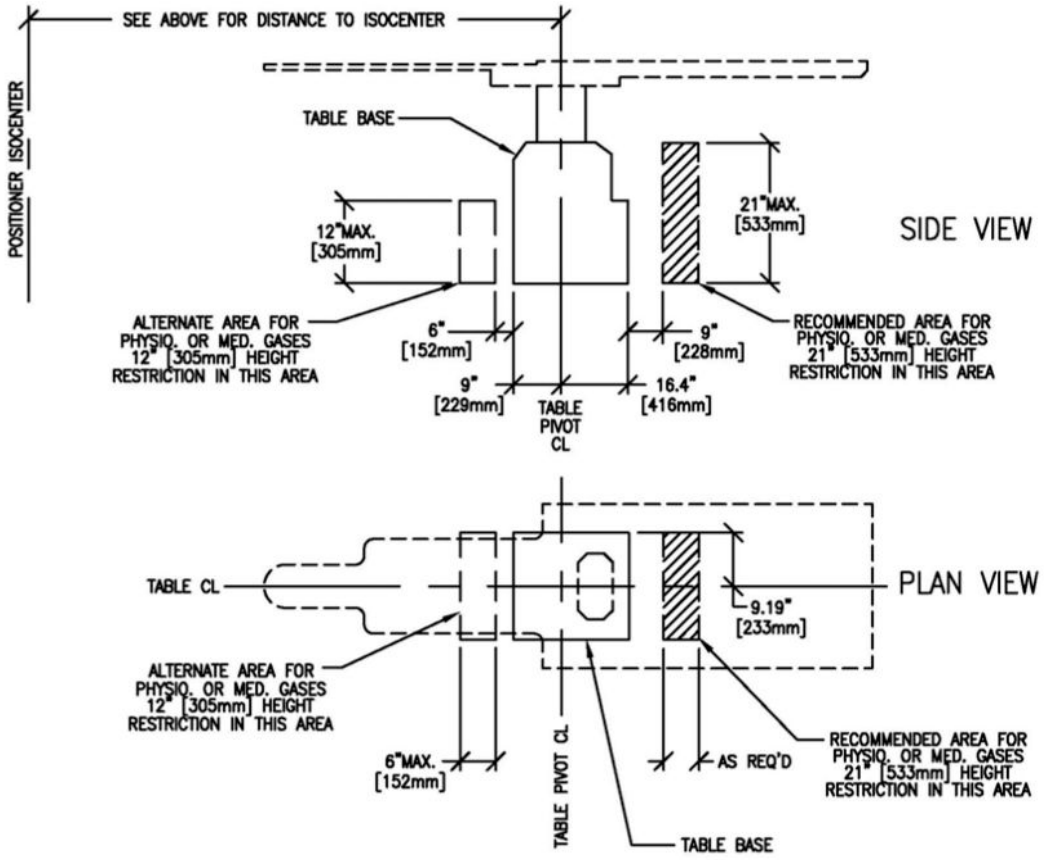
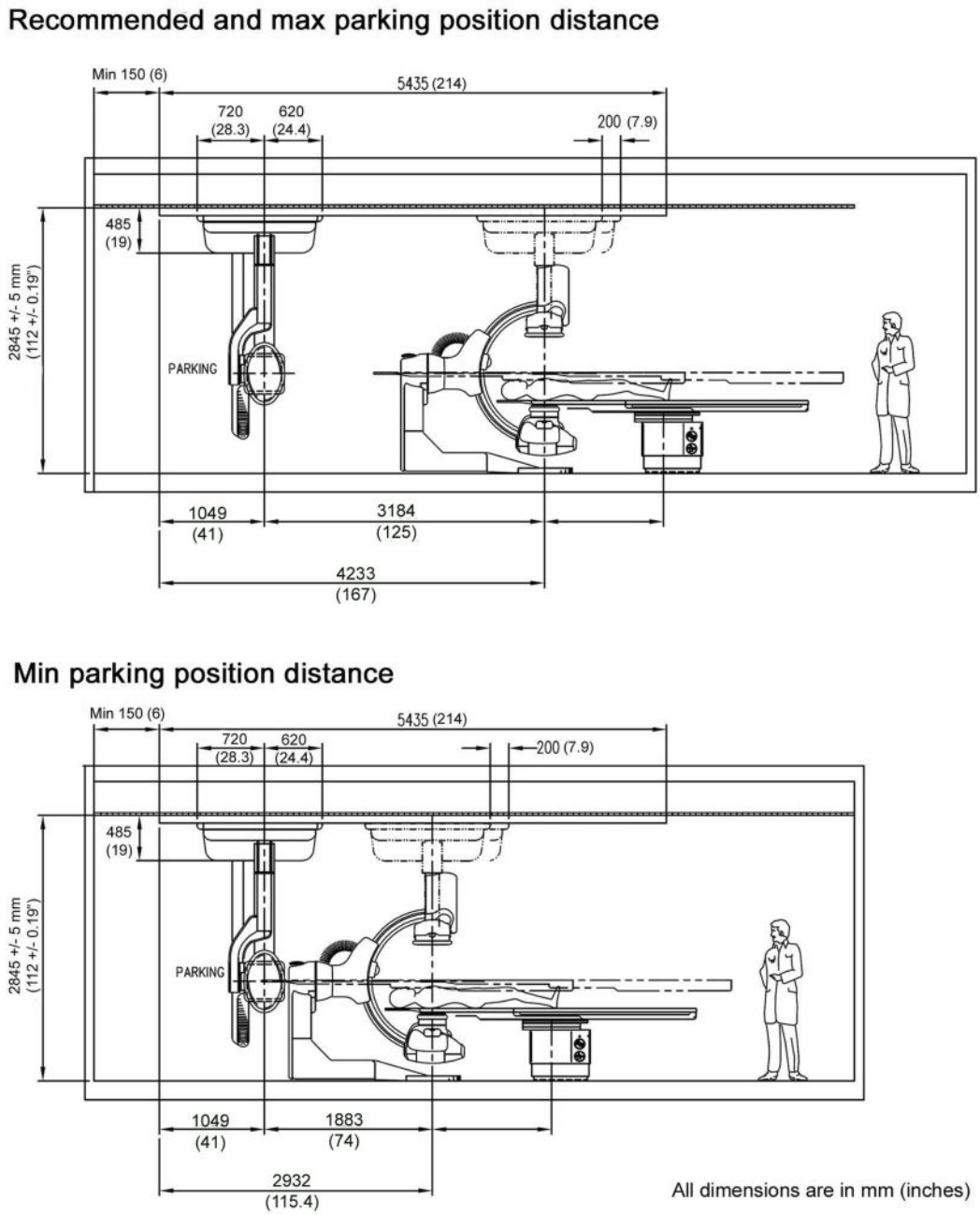


Illustration 2-22: Frontal and Lateral Positioner And Omega Patient Table Relative Positions - Side View



NOTE: (1) For Frontal Gantry isocenter to Table distance, refer to Table 2-2.

(2) in the case of Lateral Gantry Off iso feature installed, the Lateral Gantry will work in the range - 200 mm (7.9 in) and 200 mm (7.9 in) from isocenter.

(3) Lateral Gantry parking not allowed at patient foot end.

Illustration 2-23: Frontal and Lateral Positioner and Omega Patient Table Relative Positions - Top View

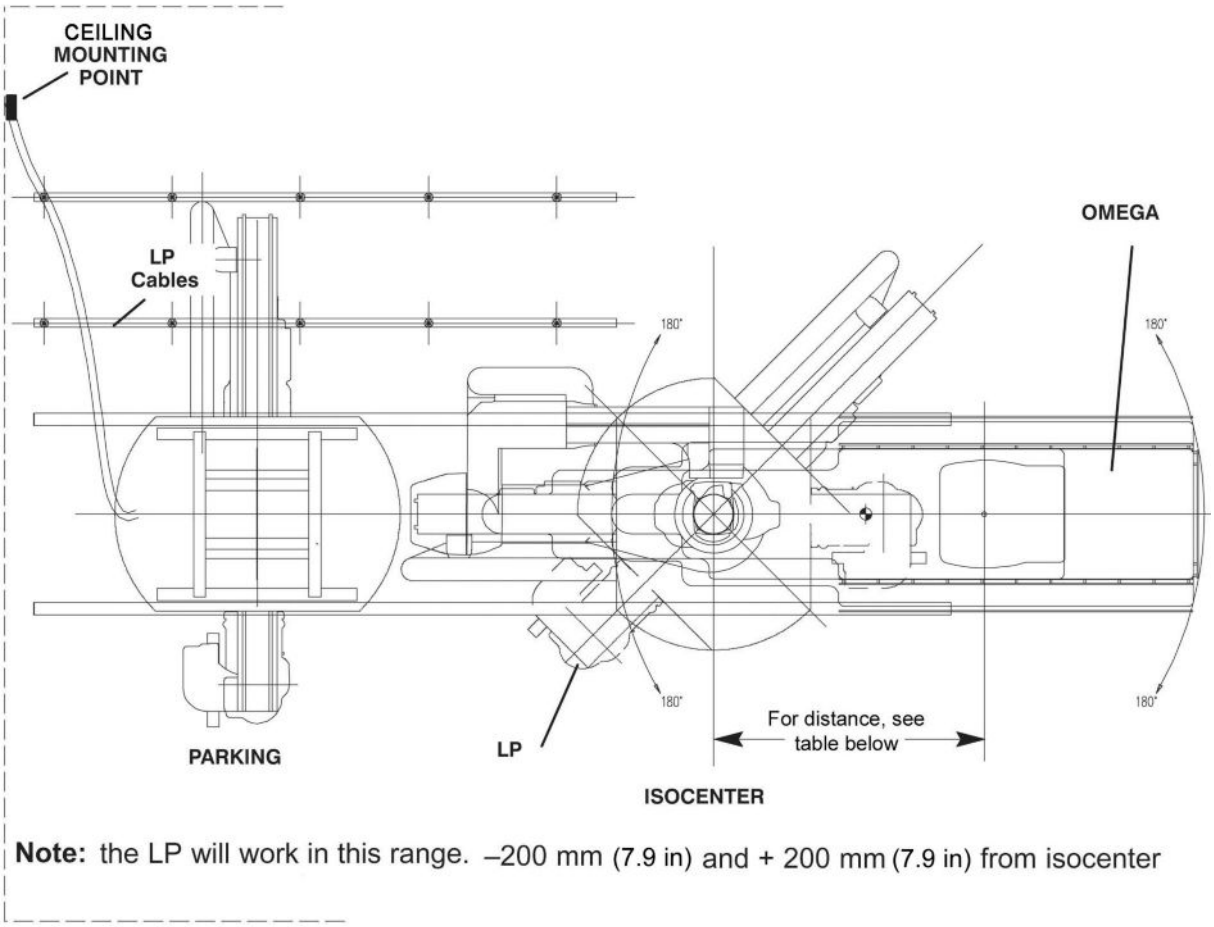
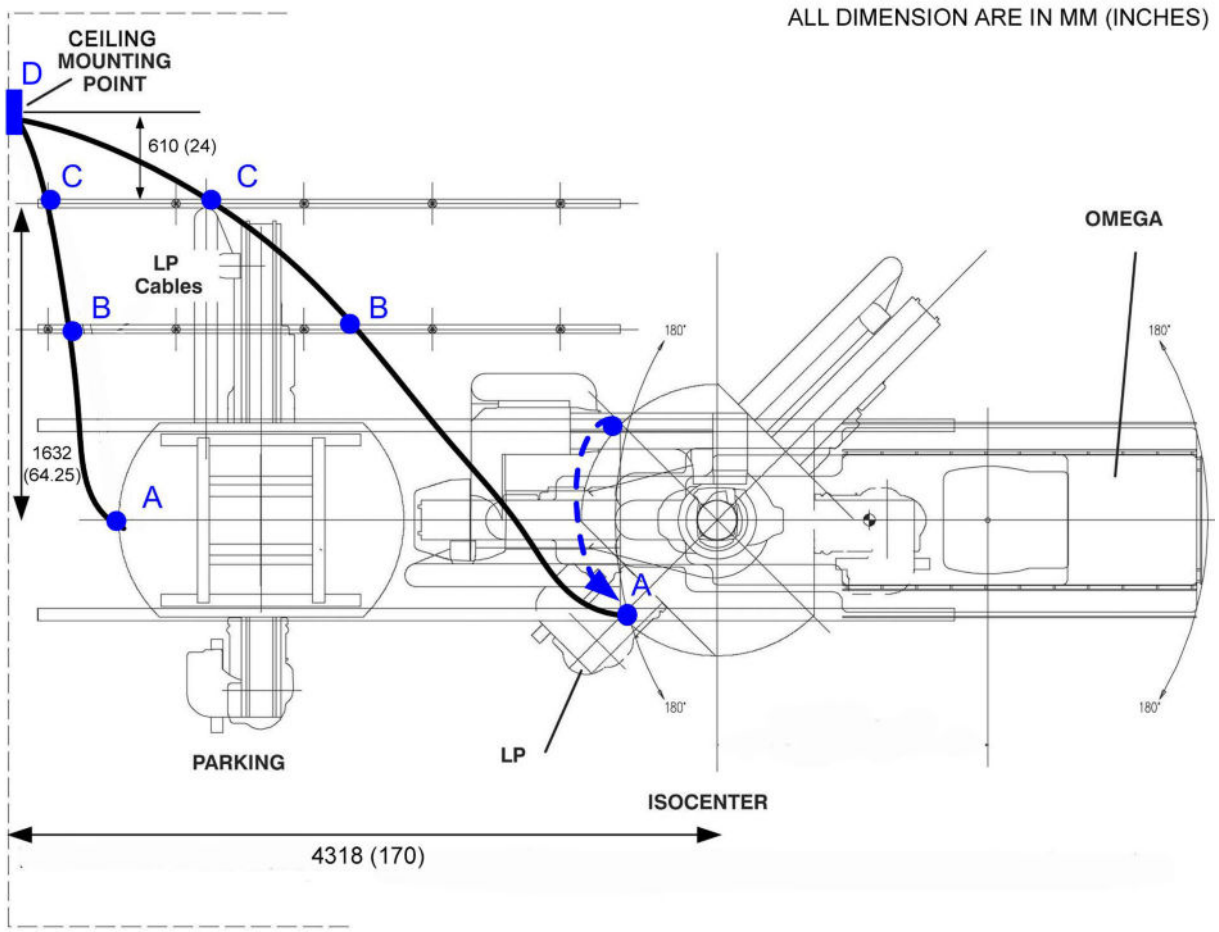


Table 2-2: Patient Table - Frontal Gantry isocenter distances

	ANGIO / CARDIO	CARDIO / NEURO
Omega IV	NA	1395 mm (54.9 in)
Omega V - non motorized	1278 mm (50.3 in)	1395 mm (54.9 in)
Omega V - motorized	1278 mm (50.3 in)	1395 mm (54.9 in)

Illustration 2-24: Lateral Positioner Cable Drape Length



Maximum cable drape length is 6 m / 236 in (with vinyl zipper cable cover of 6.2 m / 244 in) from Lateral Gantry to ceiling exit point. This includes sag between drape points (A, B, C and D).

The worst case Lateral Gantry cable drape extension, including sag, is:

- 1.85 m (72.8 in) between A and B
- 2.05 m (80.7 in) between B and C
- 2.30 m (90.5 in) between C and D

Illustration 2-25: C2 Cabinet (Frontal and Lateral) Dimensions

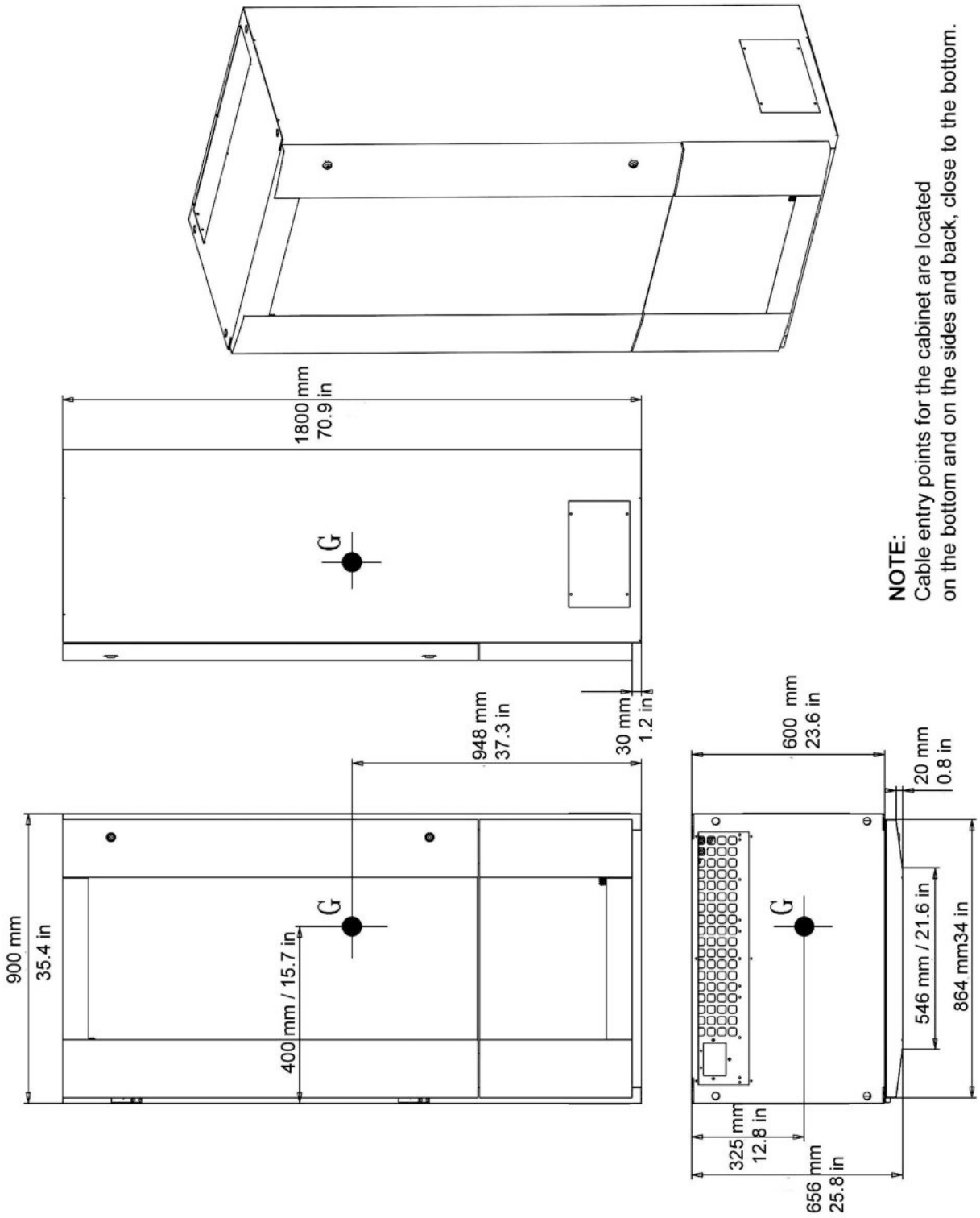


Illustration 2-26: C1 Frontal Cabinet Dimensions

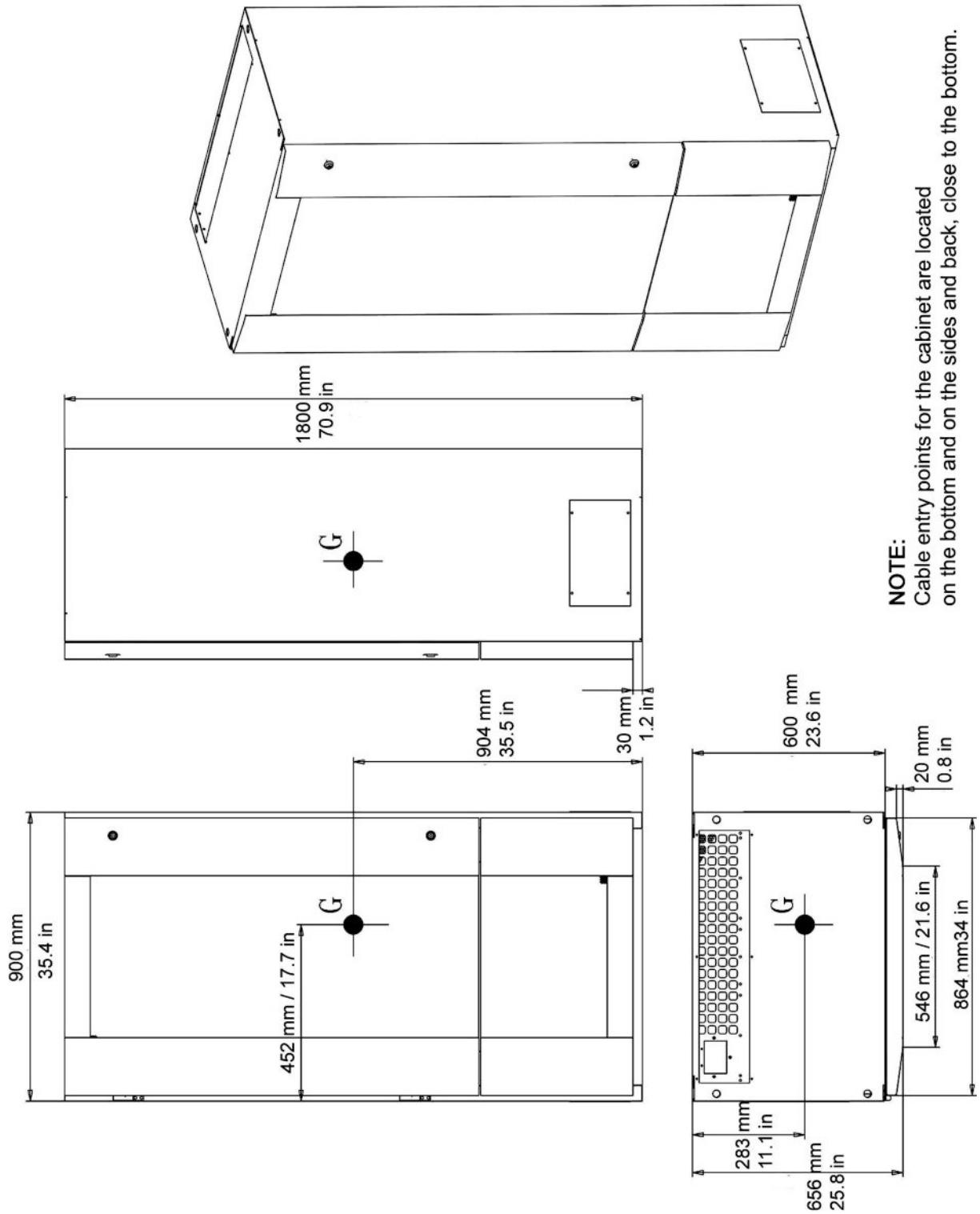


Illustration 2-27: C1 Lateral Cabinet Dimensions

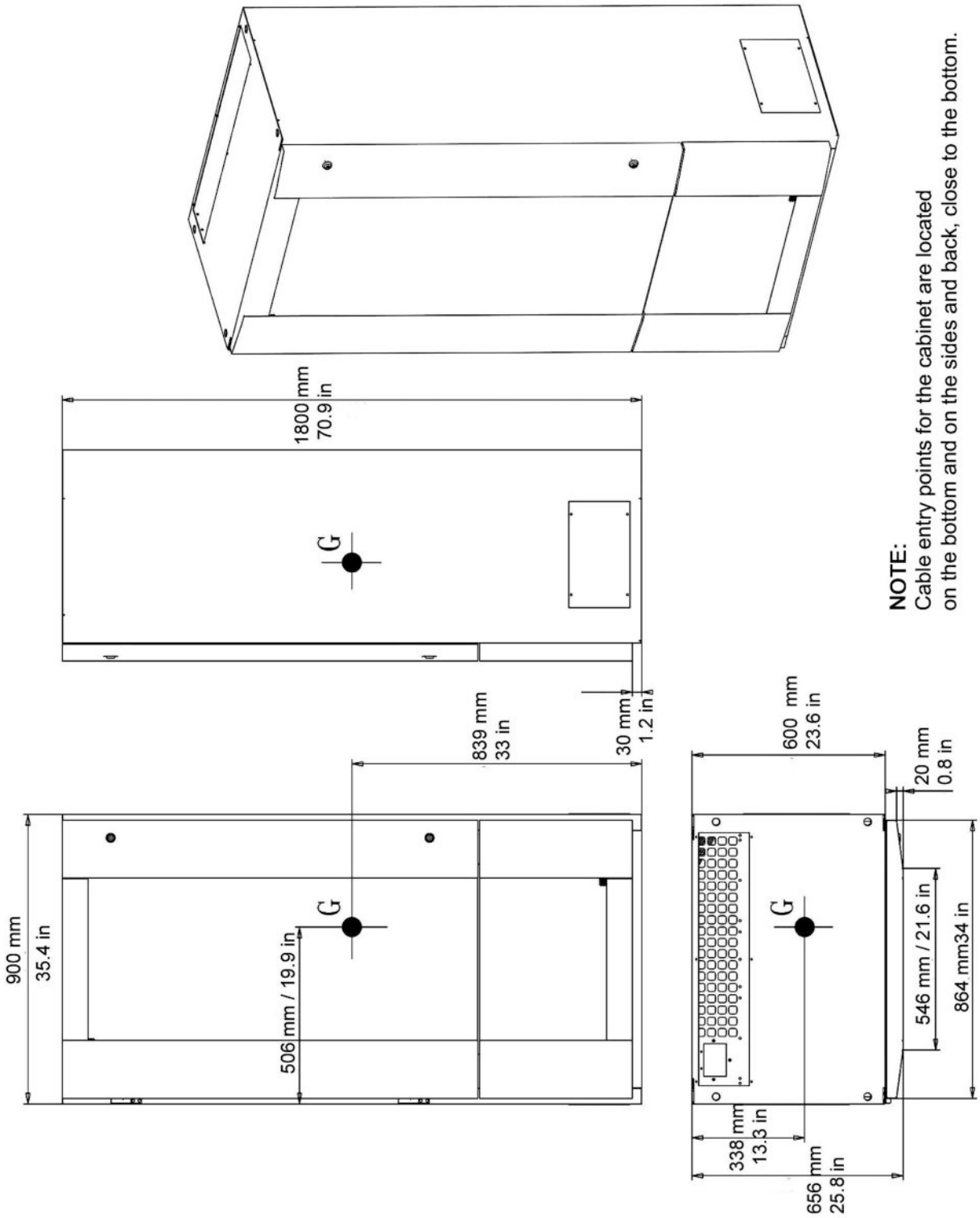
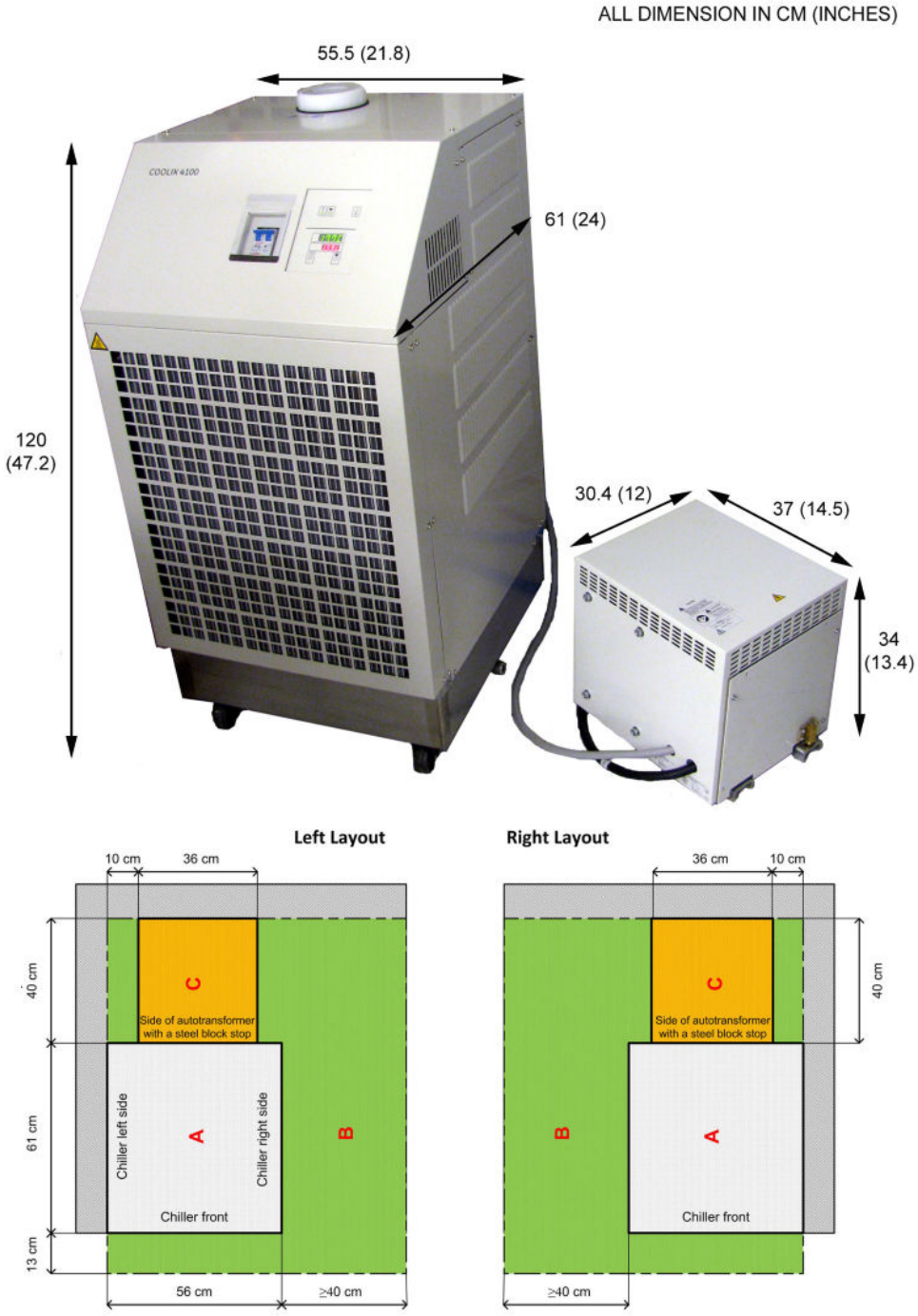


Illustration 2-28: Dimension Diagram for X-Ray Tube Chiller 4100



NOTE: Required floor space depends on ambient room temperatures. When in doubt, allow for maximum floor space.

Illustration 2-29: Thermo-Con Detector Conditioner (and Mounting brackets) Dimensions

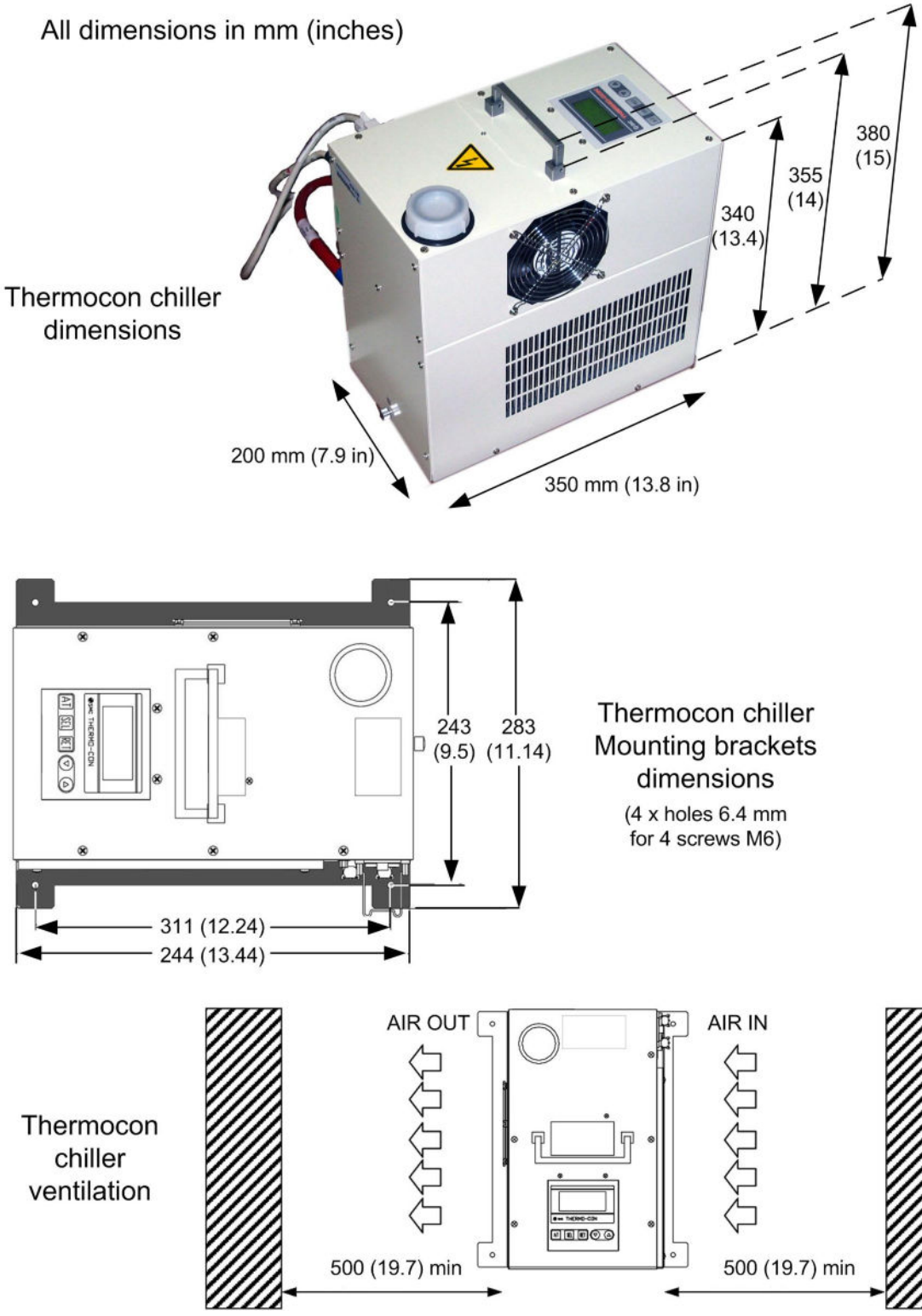
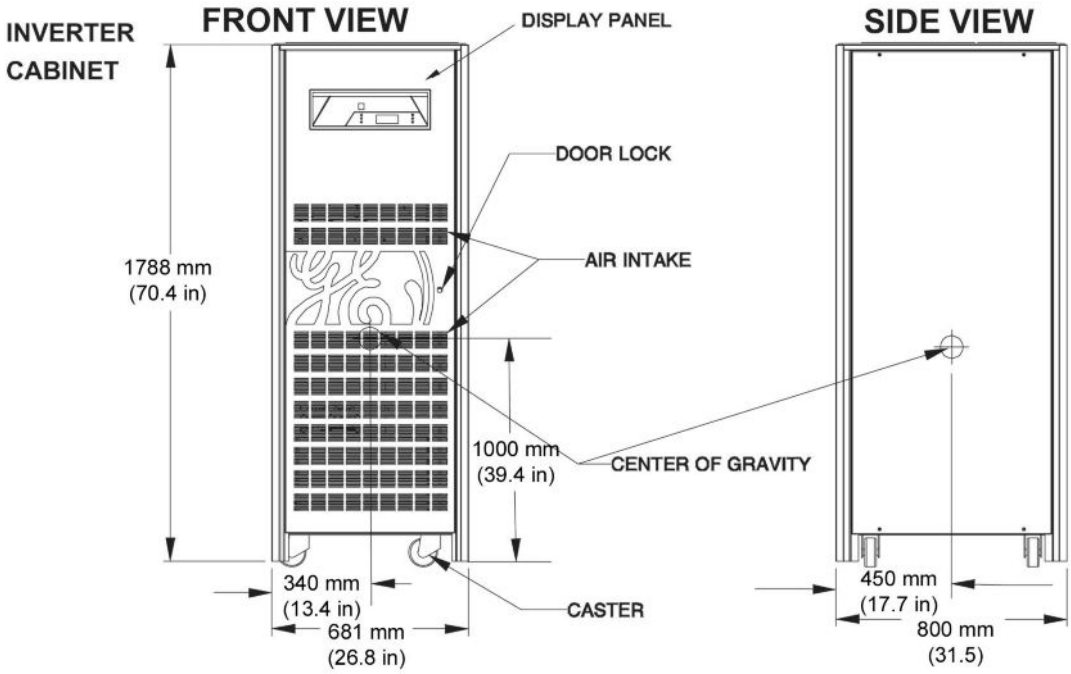


Illustration 2-30: 3 kVA Cabinets and LDM UPS - model 9130

Illustration 2-31: Fluoro UPS Cabinets (Optional) - UPS UL



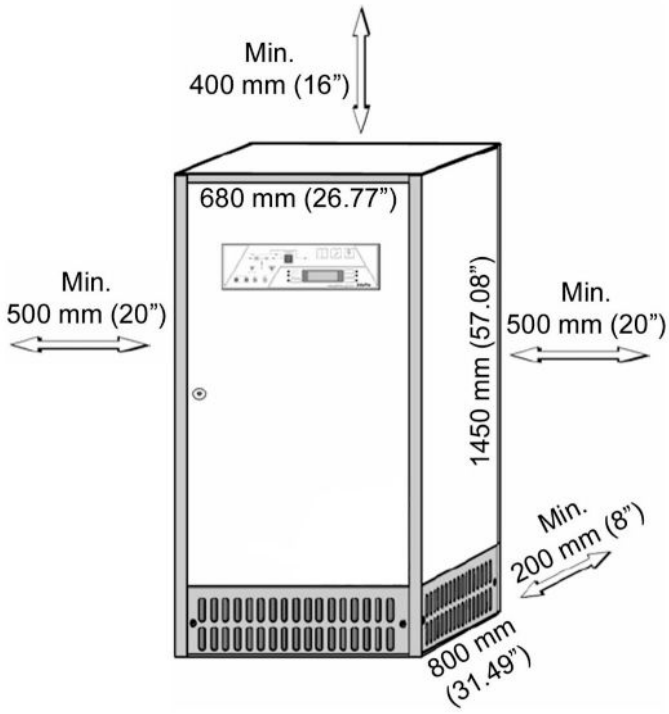
The left, right or back side of the UPS cabinet can be positioned against the wall.

The front side of the UPS cabinet must be accessible for maintenance operation.

In front of the cabinet, the clear width of the service area to insure electrical safety shall be at least 0.9 m. In cases where 2 cabinets are installed face to face (both sides of the access way), the clear width shall be at least 1.2 m.

Recommended minimum clearance between ceiling and top of the UPS should be 400 mm (16”) for proper cooling air exhaust.

Illustration 2-32: Fluoro UPS Cabinets (Optional) - UPS CE



The UPS cabinet can be positioned against the wall but, in order to improve the ventilation and to make easier the maintenance operations for UPS and battery, we recommend a minimum distance of 200 mm (8") from the wall.

For maintenance operations, a minimum clearance distance of 500 mm (20") is required for both left and right sides of the UPS cabinet.

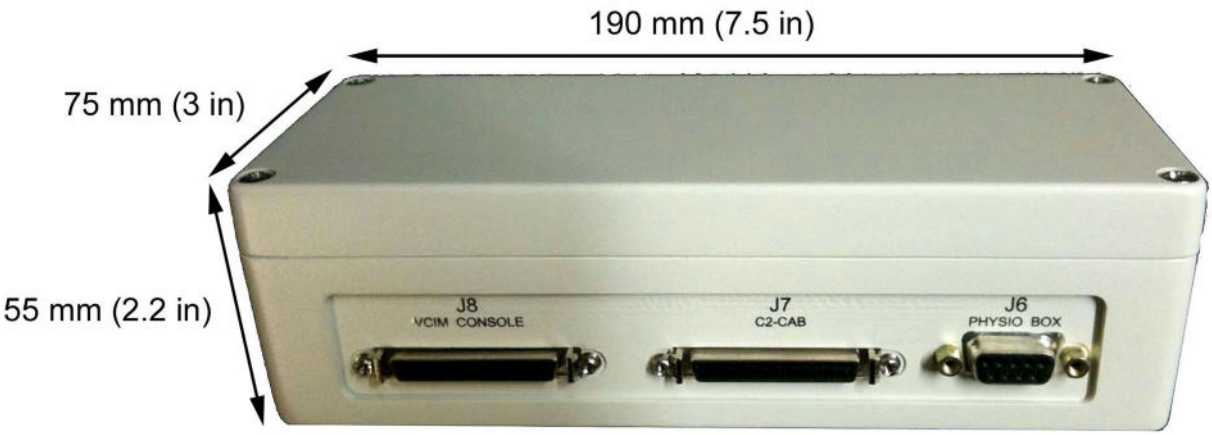
In front of the cabinet, the clear width of the service area to insure electrical safety shall be at least 0.9 m. In cases where 2 cabinets are installed face to face (both sides of the access way), the clear width shall be at least 1.2 m.

Recommended minimum clearance between ceiling and top of the UPS should be 400 mm (16") for proper cooling air exhaust.

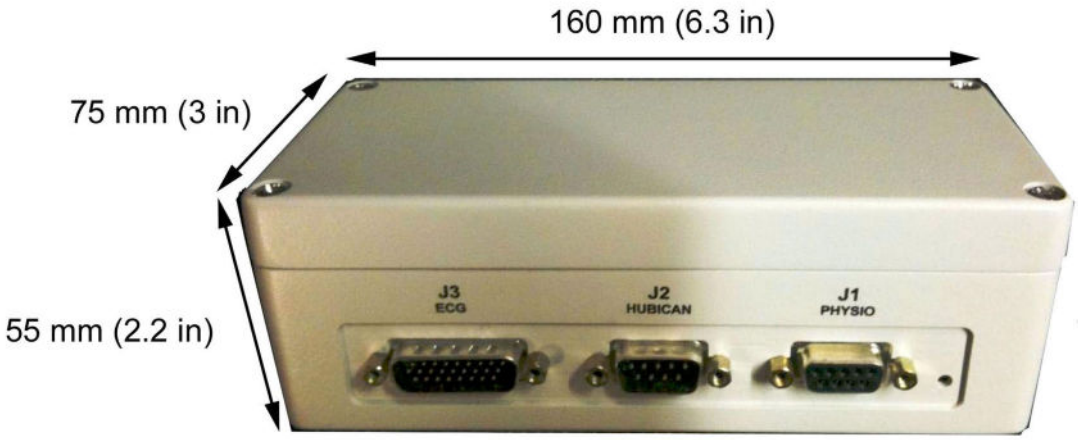
NOTE: A minimum distance of 2 m (79 in) between X-Ray tube Chiller and Fluoro UPS CE cabinet is required.

NOTE: A Fire extinguisher (non-water type, ex. CO2) shall be provided and installed by the customer close to the Fluoro UPS CE cabinet.

Illustration 2-33: ECG Acquisition Device Modules



Hubican Module



Physio Module

Illustration 2-34: Large Display cabinet dimensions (Optional)

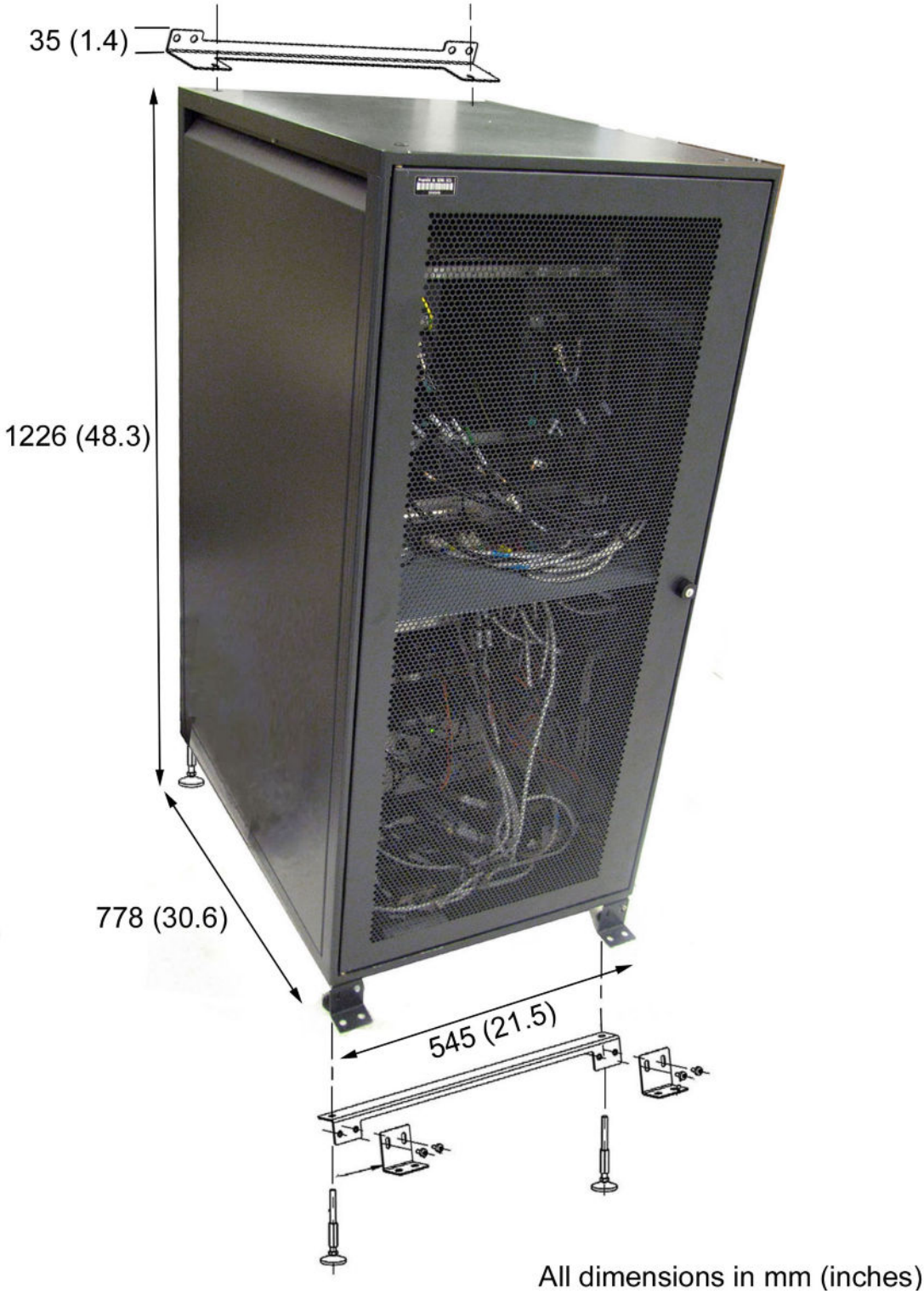


Illustration 2-35: Large Display suspension dimensions (Optional)

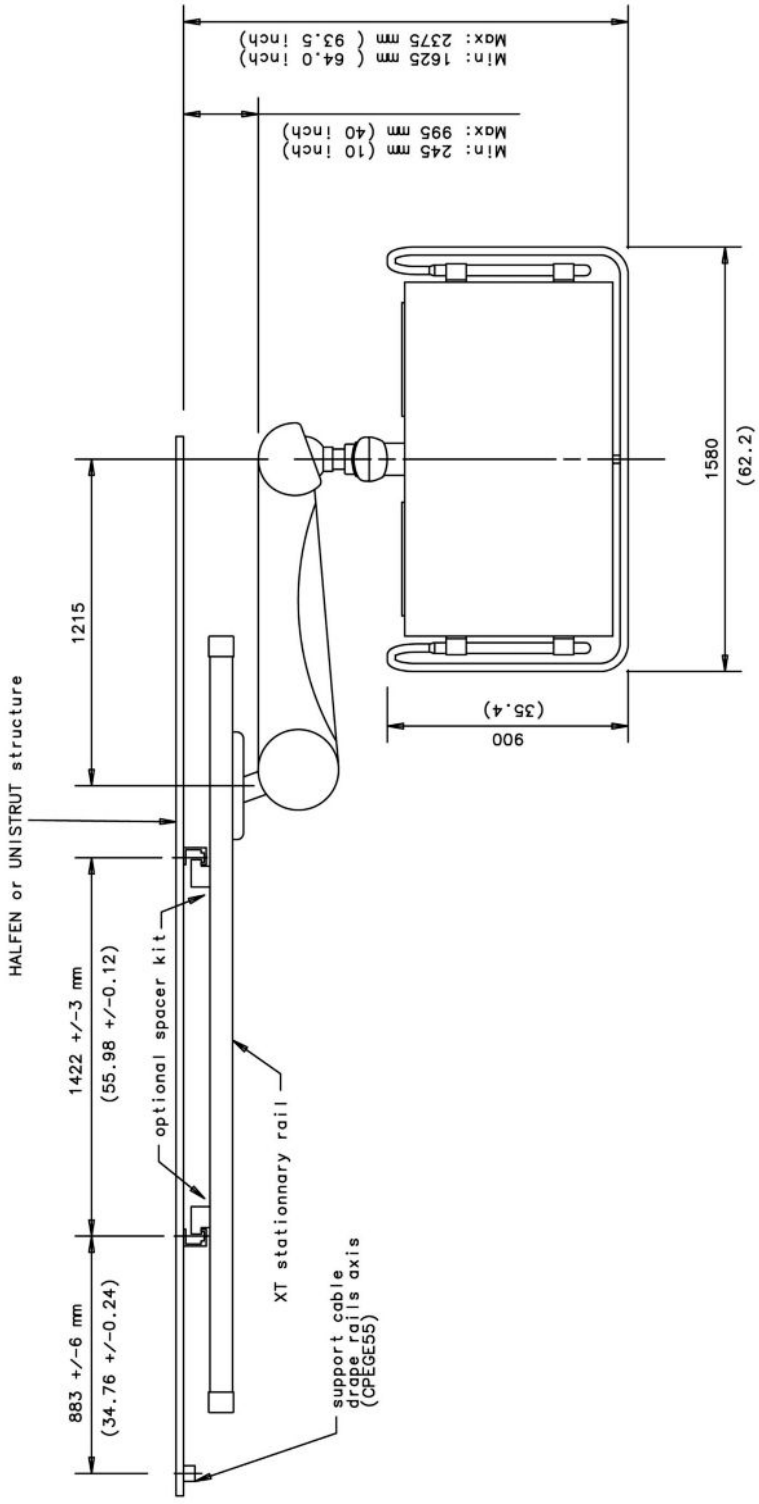


Illustration 2-36: DL Keypad Dimensions

ALL DIMENSIONS ARE IN MM (INCHES)

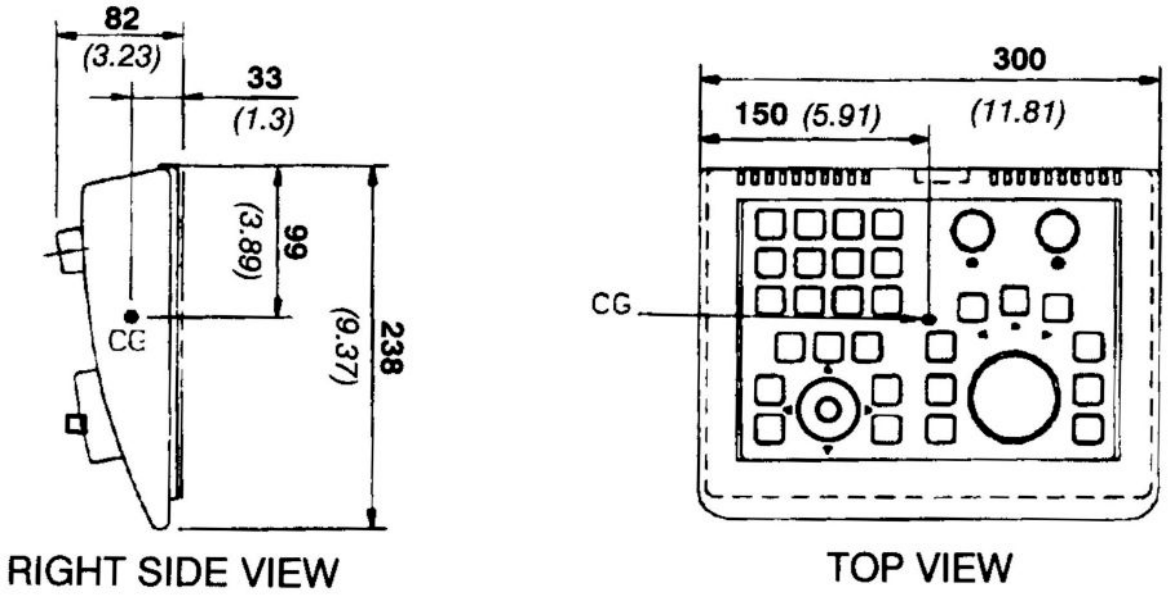


Illustration 2-37: DL Image Monitor Dimensions

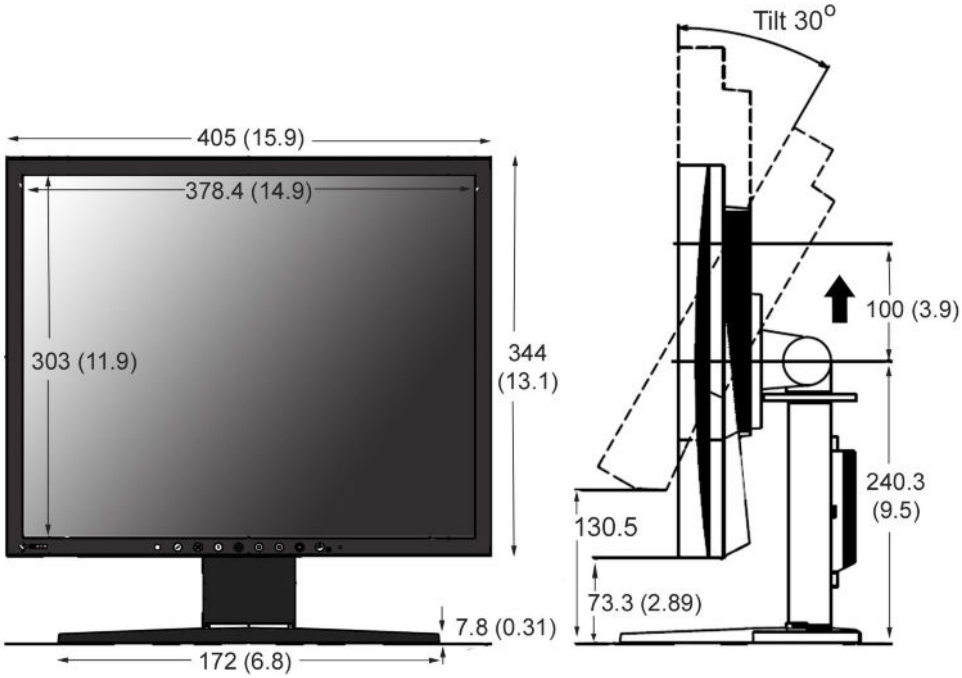


Illustration 2-38: VCIM

1.4 Monitor and Monitor Suspension References

1.4.1 System Compatibility Cross-Reference - Monitor Support & Suspension

PRODUCT NAME	MODEL NUMBER	PRE-INSTALLATION DOCUMENT NUMBER	CATALOG NUMBER
PRECABLED LCD 6 MONITOR SUSPENSION: • CABLE HARNESS 24 m • or CABLE HARNESS 36 m	5520086 • 5420085 • or 5420087	2393190-1–1EN	
OPEN MONITOR SUSPENSION • CABLE HARNESS 24M • or CABLE HARNESS 36M • or LDM power and video cables for open suspension	Non-GE supplied • 5420085 • or 5420087 • or 5449713	See manufacturer's documentation 5499175-1-1EN	
OEM LARGE DISPLAY SUSPENSION • HARNESS 36 m for LARGE DISPLAY SUSPENSION • Handle of LDM suspension	5410519 • 5410521 • 5415439	5422757-3-1EN	

1.4.2 System Compatibilities Cross-Reference - 19" Monitors

PRODUCT NAME	MODEL NUMBER	PRE-INSTALLATION DOCUMENT NUMBER	CATALOG NUMBER
LCD 19" - SMD19100G B& W with Stand	5148721-2	5219983-100	
LCD 19" - SMD19100G B& W without Stand	5148721-3		
LCD 19" - SMD19100G Color with Stand	5148720-2		
LCD 19" - SMD19100G Color without Stand	5148720-3		
Eizo 19" LCD HB color monitor RX150 GE		5499528-1-8EN	

1.5 System Compatibility

1.5.1 System Compatibility Cross–Reference – Innova Frontal and Lateral Positioner/Table Sub-System

Product Name	Pre-Installation Document Number	Notes
Frontal Gantry Combo Positioner (System with 31 cm detector)	This document	
Frontal Gantry Cardio Positioner (System with 21 cm detector)	This document	
Lateral Gantry Cardio Positioner	This document	
Lateral Gantry Neuro Positioner	This document	
C2 Cabinet (Frontal and Lateral)	This document	
Smart Handle (System with 21 cm detector)	This document	
Smart Handle + SP (System with 31 cm detector)	This document	
Smart Box (System with 21 cm detector)	This document	
Smart Box + Sp (System with 21 cm detector)	This document	
Bolus Handle	This document	Optional
Innova Central Touchscreen	This document	

1.5.2 System Compatibilities Cross–Reference – Tables Sub-System

Product Name	Pre-Installation Document Number	Notes
Omega V Long Table	This document	Includes tabletop
Omega IV Table	This document	Includes tabletop

1.5.3 System Compatibilities Cross–Reference – Jedi X–Ray Generator Sub-System

Product Name	Pre-Installation Document Number	Notes
JEDI 100 VASC	NA	Include in C1 Frontal Cabinet and C1 Lateral Cabinet

1.5.4 System Compatibility Cross–Reference – X–Ray Head Sub–System

Product Name	Pre-Installation Document Number	Notes
Performix 160 A X-Ray tube	Not applicable	
Cardio collimator	Not applicable	
Angio collimator	Not applicable	
COOLIX 4100 Chiller	Not applicable	
Coolix 4100 Autotransformer (UL version or IEC version)	Not applicable	

1.5.5 System Compatibility Cross–Reference – Innova Frontal and Lateral Imaging and X–Ray Control Sub-System

Product Name	Pre-Installation Document Number	Notes
VCIM	NA	
DL Liberty user interface	This document	
C1 Frontal Cabinet	This document	
C1 Lateral Cabinet	This document	
21 cm Revolution Digital detector	This document	
31 cm Revolution Digital detector	This document	
Detector Conditioner Thermo-Con	This document	
3 kVA Cabinets UPS	This document	
Power Distribution Box - CE	This document	
Power Distribution Box - UL	This document	

1.5.6 System Compatibility Cross–Reference – Monitor Support & Suspension Sub–System

Product Name	Pre-Installation Document Number	Catalog Number
Pre-cabled LCD 6 or 8 Monitor Suspension • Cable Harness 24 m (78 ft, 9 in) • or Cable Harness 36 m (118 ft, 2 in)	2393190-100	

1.5.7 System Compatibilities Cross–Reference – 19" LCD Monitors Sub–System

Product Name	Pre-Installation Document Number	Catalog Number
LCD 19" EIZO GmbH SMD 19100G Color Monitor	sm 5219983-100	
LCD 19" EIZO GmbH SMD 19100G B&W Monitor	sm 5219983-100	
Eizo 19" LCD HB color monitor RX150 GE	sm 5499528-1-8EN	

1.5.8 System Compatibilities Cross–Reference – Innova ECG Aquisition Option

PRODUCT NAME	MODEL NUMBER	PRE-INSTALLATION DOCUMENT NUMBER	CATALOG NUMBER
INNOVA ECG Acquisition Kit		This document	

2 Room Layouts

2.1 Room Dimension Requirements

For Room size dimensions, refer to Room Layout Drawings.

For additional details, refer to Room Layout Considerations.

2.2 Room Layout Drawings

2.2.1 Patient Room Layout

⚠WARNING

LOCATION IN TECHNICAL ROOM FOR ELECTRICAL CABINETS IS MANDATORY. THE ELECTRONIC CABINETS (C1, C2, OPTIONAL LD CABINET, COOLIX 4100 CHILLER, DETECTOR CHILLER AND FLUORO UPS WHEN INSTALLED) INCLUDE FANS THAT ARE CREATING AIR–CIRCULATION OF PULSED–AIR. WHEN THIS PULSED AIR IS IN AN ENVIRONMENT THAT MAY CONTAIN AIRBORNE PATHOGENS LIKE AN EXAM ROOM/CONTROL ROOM, THERE IS A RISK OF TRANSMISSION OF THESE AIRBORNE PATHOGENS FROM PATIENTS TO OTHER PATIENTS OR CLINICAL PERSONNEL (NOSOCOMIAL DISEASES).
TO REDUCE THIS RISK, THE ELECTRONIC CABINETS MUST BE INSTALLED IN A ROOM SEPARATED FROM EXAM ROOM/CONTROL ROOM, I.E., TECHNICAL ROOM.

Table 2-3: Exam room dimensions

Room Dimensions	Length x Width	Ceiling Height
Recommended:	11570 mm x 8000 mm (38 ft 0 in x 26 ft 2 in)	2845 mm ± 5 mm (9 ft 4 in ± 0.2 in) is mandatory ceiling height
Minimum:	6900 mm x 4400 mm (22 ft 8 in x 14 ft 5 in)	

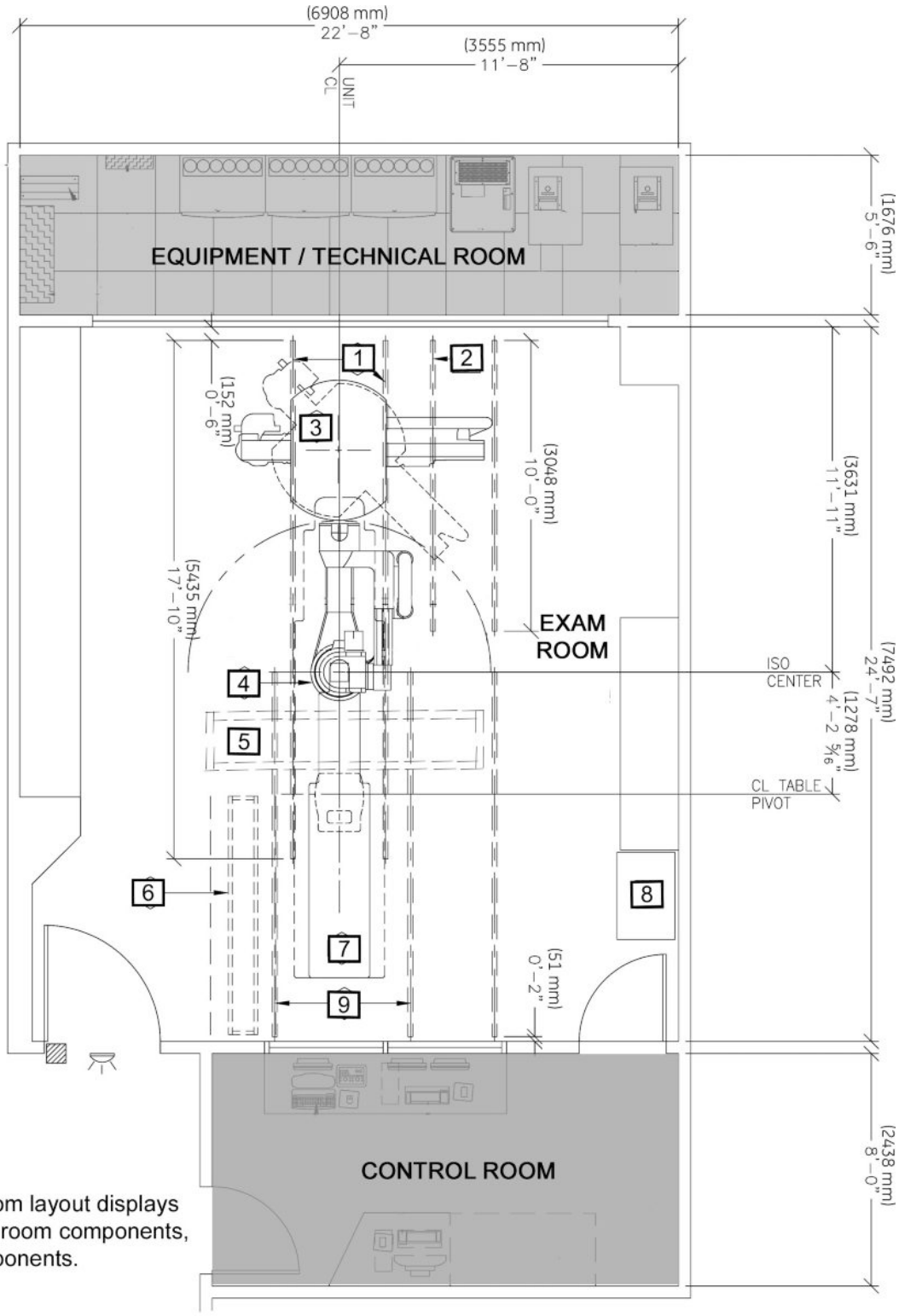
NOTE: The values above are calculated with the table without accessories, such as the **Table Head extender**. For details of Head Extender dimensions, see Dimension Drawings

Table 2-4: Room Layout components (see Illustration 2-39):

1		Lateral Gantry stationary rails
2		Cable drape rail
3	Lateral Gantry	Lateral Gantry
4	LC	Frontal Gantry
5		Monitor suspension
6		Counter balanced eye or thyroid shield
7	TBL	Omega table
8		Customer supplied storage cabinet
9		XT Stationary Rails

NOTE: The phone and/or Network drop outlet must be located less than 1 meter (3 feet) from the C1 Frontal Cabinet (20).

Illustration 2-39: Patient Room Layout for Innova System

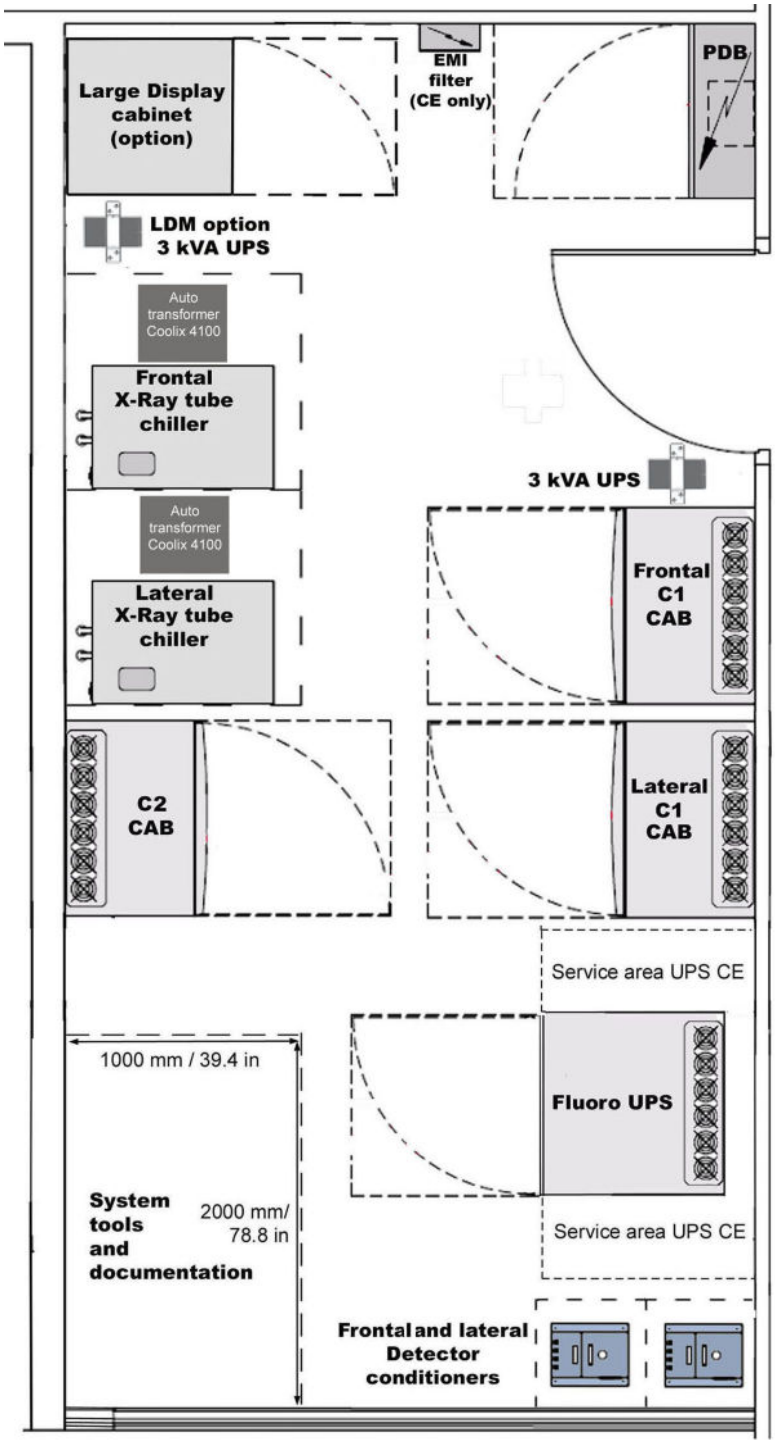


NOTE: This room layout displays mandatory test room components, but not all components.

2.2.2 Technical Room Layout

For the service access and ventilation restraint dimensions below, see Dimension Drawings and Room Layout Considerations.

Illustration 2-40:



2.2.3 ECG Device Room Configurations

The hardware delivered with the ECG acquisition kit will need to be installed in the Control Room and in Exam Room depending on the type of ECG Device used on the site.

The ECG Device/Room configurations need to be checked as this can impact ON the way parts and cables can be installed.

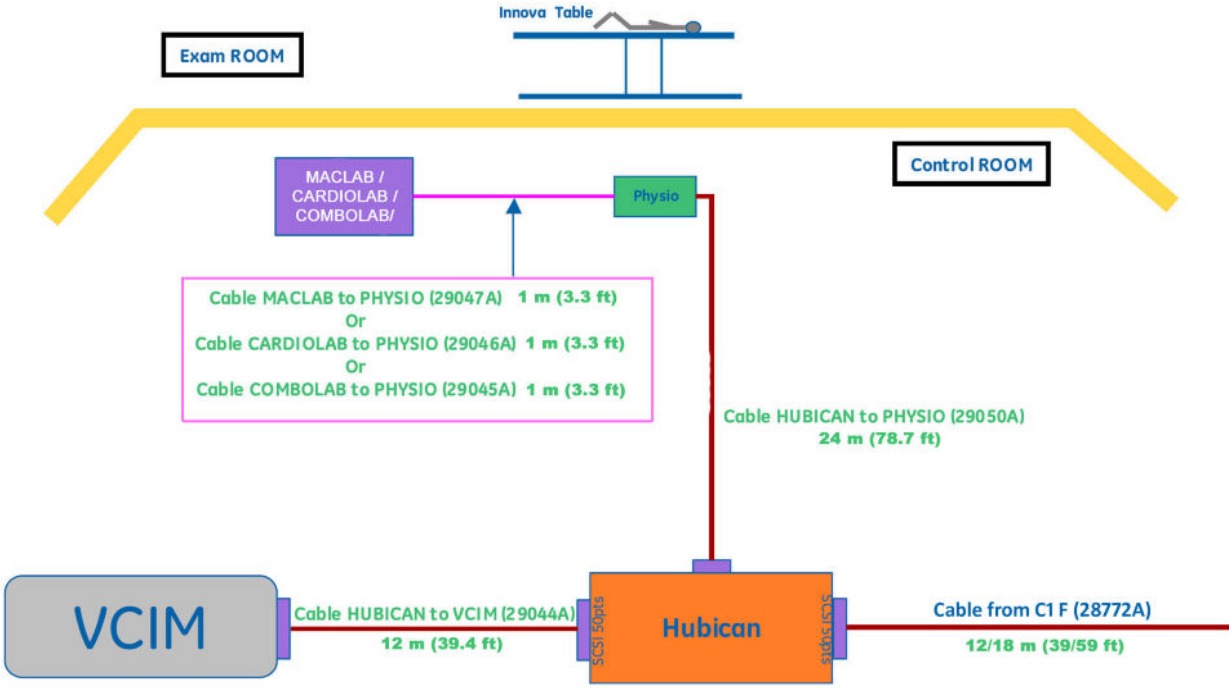
Basically, there will be two different Installation Configurations depending on the type of ECG device to connect to the Innova system:

2.2.3.1 Installation Configuration #1:

For ECG devices installed in Control Room (such as GE ECG like MacLab, CardioLab or ComboLab)

Both the Physio & Hubican modules are installed in the Control Room as shown below:

Illustration 2-41:

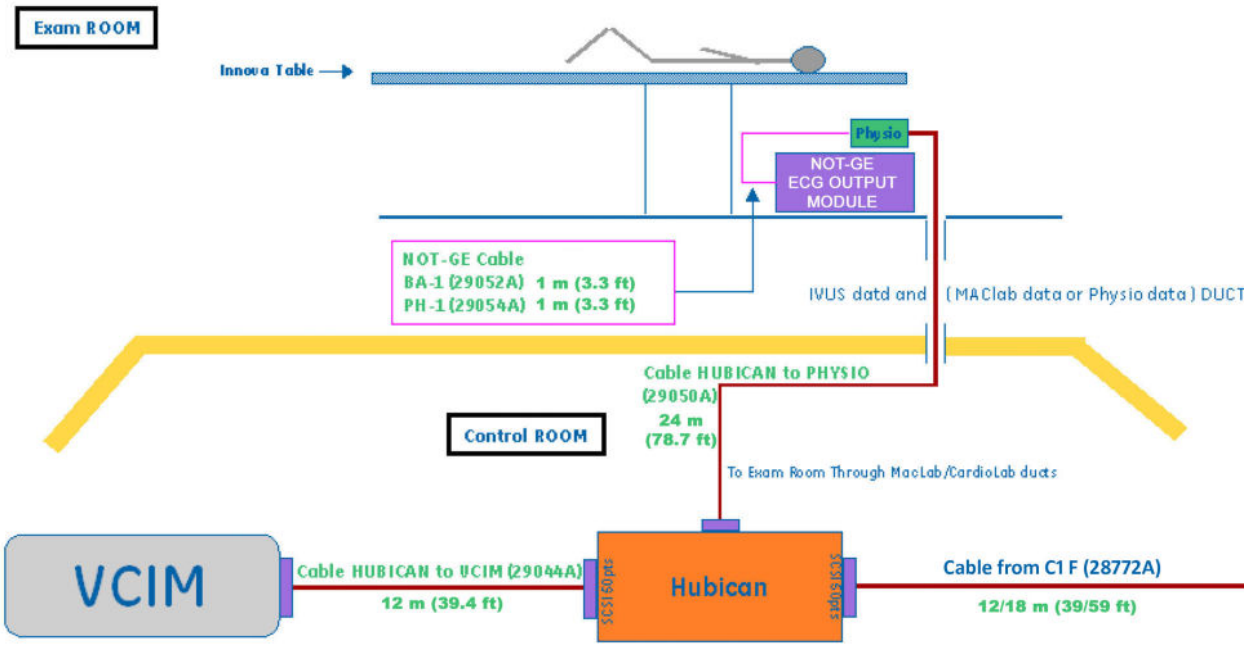


2.2.3.2 Installation Configuration #2:

For ECG devices installed in Exam Room (ECG device from the competitor)

Physio and/or Hubican modules will be installed in Exam Room as shown below:

Illustration 2-42:



2.3 Room Layout Considerations

2.3.1 Service Access

Allow appropriate space for service access of equipment. Consult component pre–installation directions for clearance information.

2.3.2 Clinical Access

Make sure that you plan the room with the following clinical access requirements:

- Provide easy access to the patient table. Stretchers and other mobile hospital equipment must reach the table quickly.
- Gantries installation shall make a provision so that the clearance is 500 mm (19.7in) around the Frontal and Lateral Gantries.
- The layout of the table in the room shall make a provision so that clearance between maximum table position (head side) and any object in the room (e.g. wall, device) be superior to 500 mm (19.68 in) (650 mm (25.5 in) if Head Extender is used).
- Provide sufficient space around the patient table for the unimpeded conduct of CPR (Cardiac Pulmonary Resuscitation). With the table in this position, the table must be capable of rotating +/- 45°.
- Clinicians at the patient table must be able to communicate with assistants in the control area.
- There must be an unrestricted view of the video monitors and physiological monitoring equipment from the vascular table.
- Operators in the control area must have easy access to the control console. However, position the controls (including handswitches) so that the operator cannot take exposures while looking around or standing outside the control booth’s lead glass window.
- Operators in the control area must have easy access to video recorders and injector programmers, film and video storage cabinets, and service and operating manuals.
- Consult customer on the number and location of nonelectrical lines (air, oxygen, vacuum, water, etc.) in the vascular room.
- For Large Display systems, in case of failure of the main monitor, the clearance around the main monitor suspension must assure that it can be immediately be flipped at 180°, exposing the backup monitors.

2.3.3 Peripheral Equipment

Consult hospital personnel regarding additional space requirements for the following types of hospital equipment:

- Storage cabinets.
- Sinks.
- Oxygen stations.
- IV apparatus.

- Injectors.
- Heart monitoring equipment.
- Crash cart.

2.3.4 Emergency Stop

It is recommended to install, in an accessible location, an additional EPO button that allows the instantaneous switching off of all power from the System (EXCEPT THE INPUT CABLE OF THE 3kVA UPS FOR CE CONFIGURATION WITHOUT FLUORO UPS), including UPS and Fluoro UPS outputs.

To remove input power from THE INPUT CABLE OF THE 3kVA UPS (FOR CE CONFIGURATION WITHOUT FLUORO UPS), turn OFF the PDB main breaker

Protect the Emergency Stop from accidental actuation.

2.3.5 Patient Environment Equipment

⚠WARNING

OPTIONAL LARGE DISPLAY SECONDARY MONITOR MUST BE INSTALLED OUTSIDE OF THE PATIENT VICINITY

The components that may be installed within patient vicinity need to be medical equipment (”patient vicinity is defined in the standardization as a space within the room 1.83 m (6 ft) beyond the perimeter of the examination table and extending vertically 2.29 m (7 ft, 6 in) above the floor.”). For the Innova System, the equipment are:

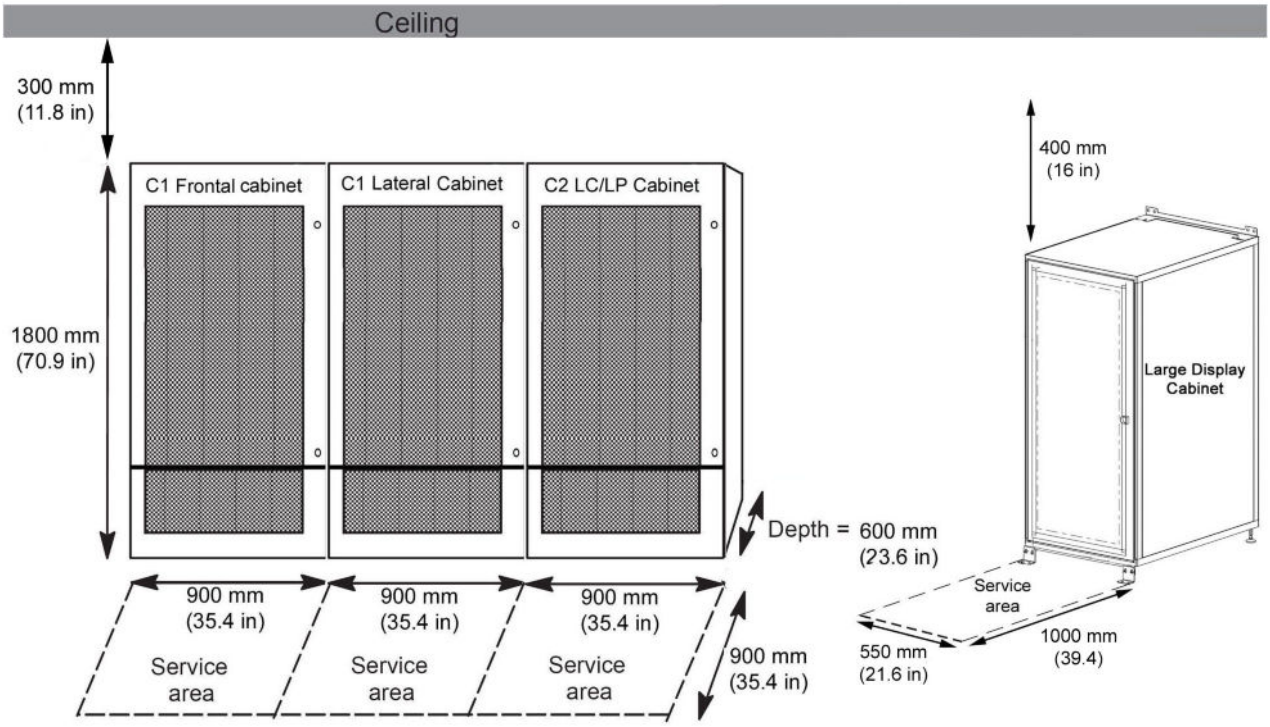
- Table
- C–arm
- Monitors
- Injector

2.3.6 Preference Cabinet locations

NOTE: This is applicable for all types of cabinets (including PDB).

The clear width of the service area in front of the cabinet doors to insure electrical safety shall be at least 0.9 m for all cabinets except the Large Display cabinet (1 meter is necessary for Large Display cabinet). In cases where 2 cabinets are installed face to face (both sides of the access way), the clear width shall be at least 1.2 m.

Illustration 2-43:



NOTE: The order of the cabinets above is C1 frontal, C1 lateral and C2 cabinets. This is just an example, cabinets can follow different orders.

⚠CAUTION

The service area dimensions shown above are minimum requirements. Service areas must comply with local regulations if more stringent.

2.3.7 Layout Constraints

Table 2-5: System Layout constraints Technical and Exam room on same floor

Location	Constraint Name	Parameter	Specification	Comment
Technical room	Cabinets location	Maximum relative distance	9 m (29 ft, 6 in)	Make sure to provide enough space for storing extra cable length (e.g. Plinth)
Technical room	Tube chillers location		The chiller shall be no more than 5 m (15 feet) below or 8 m (25 feet) above the X-ray tube	
Technical room	Detector conditioner location		In tech room Max. 3 m (9 ft, 10 in) below Lateral Gantry rails	
Technical room	PDB location		In Tech Room	

Location	Constraint Name	Parameter	Specification	Comment
Technical to Exam room	Distance between Frontal Gantry foot and C1 or C2 entry.	Relative distance	19.5 m (64 ft)	Tech and Exam room on same floor. 22 m (72 ft) for HV cables.
Technical to Exam room	Distance between Frontal Gantry foot and tube chiller	Relative distance	22 m (72 ft)	Tech and Exam room on same floor
Technical to Exam room	Distance between Frontal Gantry foot and Detector Conditioner	Relative distance	22 m (72 ft)	Tech and Exam room on same floor
Technical to Exam room	Distance between Lateral Gantry wall-box and C1 or C2 entry	Max relative distance (proj. on floor)	10.5 m (34 ft, 5 in)	Tech and Exam room on same floor
Technical to Exam room	Distance between Lateral Gantry wall-box and tube chiller	Max relative distance (proj. on floor)	11 m (36 ft, 1 in)	Tech and Exam room on same floor
Technical to Exam room	Distance between Lateral Gantry wall-box and Detector Conditioner	Max relative distance (proj. on floor)	19 m (62 ft, 4 in)	Tech and Exam room on same floor
Exam room	Minimum rail length past iso-centre towards foot end	Length	1.2 (3 ft 11 in)	In any case, Lateral Gantry parking is only possible at patient head

Table 2-6: Layout constraints Technical on above floor with respect to Exam room

Location	Constraint Name	Parameter	Specification	Comment
Technical room	Cabinets location	Maximum relative distance	9 m (29 ft, 6 in)	Make sure to provide enough space for storing extra cable length (e.g. Plinth)
Technical room	Tube chillers location		The chiller shall be no more than 5 m (15 feet) below or 8 m (25 feet) above the X-ray tube	
Technical room	Detector conditioner location		In tech room Max. 20 cm (7.9 in) above Lateral Gantry rails	
Technical room	PDB location		in Tech Room	
Technical to Exam room	Distance between Frontal Gantry and C1 or C2 entry.	Maximum relative distance	16.5 m (54 ft, 1 in)	Tech on floor above Exam room (assume Frontal Gantry foot to ceiling 3 m (9 ft, 10 in))
Technical to Exam room	Distance between Frontal Gantry foot and tube chiller	Relative distance	19 m (62 ft, 4 in)	Tech on floor above Exam room (assume Frontal Gantry foot to ceiling 3 m (9 ft, 10 in))
Technical to Exam room	Distance between Frontal Gantry foot and Detector Conditioner	Relative distance	19 m (62 ft, 4 in)	Tech on floor above Exam room (assume Frontal Gantry foot to ceiling 3 m (9 ft, 10 in))
Technical to Exam room	Distance between Lateral Gantry wall-box and C1 or C2 entry	Relative distance	13.5 m (44 ft, 3.5 in)	Tech on floor above Exam room
Technical to Exam room	Distance between Lateral Gantry wall-box and tube chiller	Maximum relative distance	14 m (45 ft, 11 in)	Tech on floor above Exam room

Location	Constraint Name	Parameter	Specification	Comment
Technical to Exam room	Distance between Lateral Gantry wall-box and Detector Conditioner	Relative distance	22 m (72 ft, 2 in)	Tech on floor above Exam room
Exam room	minimum rail length past iso-centre towards foot end	Length	1.2 (3 ft 11 in)	In any case, Lateral Gantry parking is only possible at patient head

For exam and control rooms, several configurations are possible.

The pre–installation instructions shall define a room layout where the location of the remote controls versus the moving parts of equipment. This layout shall define the maximum distance between the remote control location and equipment and the axis of the equipment (L axis) versus the remote controls (dead angles concern).

⚠WARNING

CARRIAGE COVERS CAN ENCLOSE DUST PARTICLES. CARE SHOULD BE TAKEN TO AVOID PROPAGATION.
IT IS RECOMMENDED TO AVOID DIRECT AIR FLOW BETWEEN LATERAL GANTRY RAILS.

NOTE: Motion controls installed in remote location from the table shall be installed at a location where all the positioner axis are visible by the operator.

Refer to Illustrations in Room Layout Drawings to see possible exam / control rooms layouts.

3 Room Structural Requirements

3.1 Floor Requirements

3.1.1 General Vascular GE Healthcare Policy

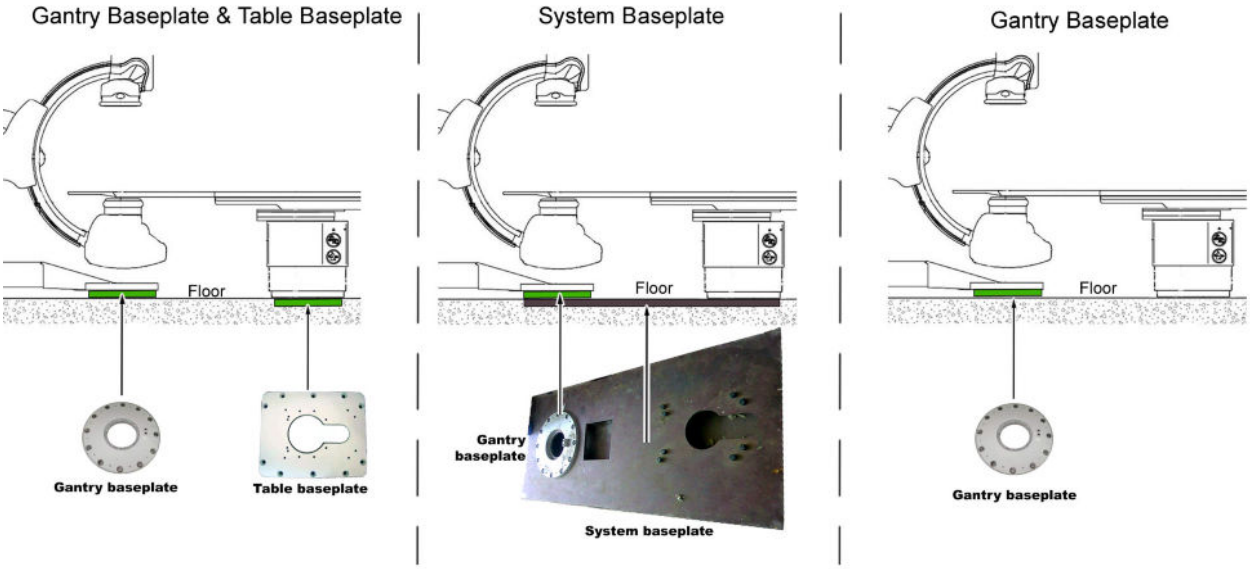
GE Healthcare's Customer is responsible for the structural analysis and mounting of the base plates. If GE Healthcare is forced to mount the base plate, the Local Customer Team must hire a structural engineer to design and approve the mounting method and provide GE Healthcare with an engineering report.

The floor level cannot exceed a general levelness of 5 mm (0.2 in) for any 2 meters (79 in).

NOTICE

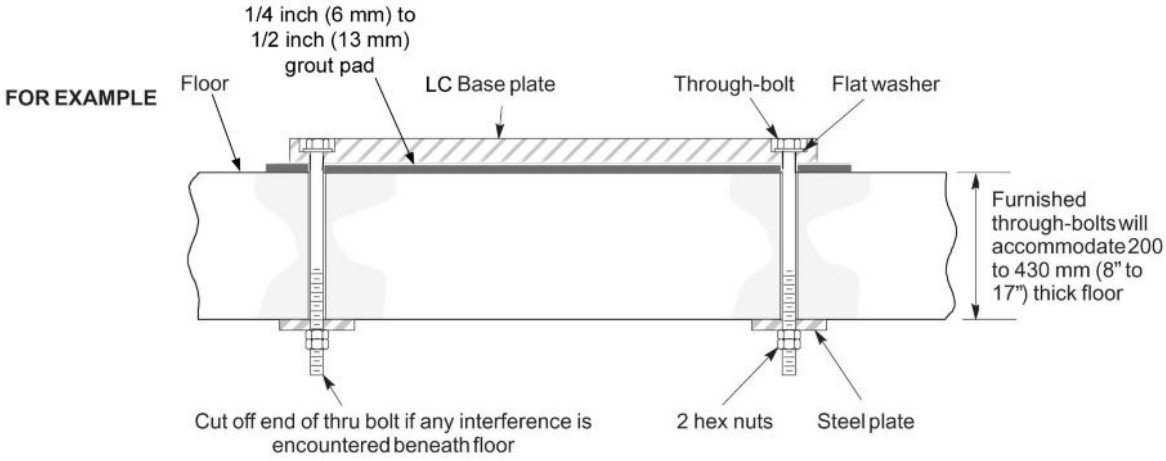
The floor slabs on which the equipment is to be installed must have a levelness of 1 mm (0.04 in) per meter (40 in). Position of baseplates and table basement depends on the type of installation. The three types of installation are given in Illustration 2-44.

Illustration 2-44:



The preferred installation method for the Innova Frontal and Lateral Positioner or the Omega tables is through-bolting. The through-bolting method can be used in all seismic zones. If through-bolting cannot be used, use provided floor anchors instead.

Illustration 2-45: Through–Bolt Supplied (Slab Type Floor Construction)



3.1.2 Floor requirements when using provided floor anchors

The maximum pullout force per provided anchor was calculated assuming:

- A concrete compression strength of **17.24 MPa** at 28 days (which is the minimum required compression strength).
- Anchors installed to the required hole depth of **165.1 mm (6.5 in)** minimum, and
- Center of anchor hole to concrete edge distance **79.4 mm (3.12 in)**.

Make sure to obtain data on compression strength of the concrete before using floor anchors.

3.1.3 Pan Type Floor Construction Requirement

For Pan type floor construction, steel channels must be designed by a local structural engineer to span floor joists. See Illustration 2-46.

NOTE: For specific floor preparation procedures, refer to *Single Plane and Biplane Innova Systems Pre–Installation Kit Installation Procedures*.

Illustration 2-46: Through–Bolt Supplied (Pan Type Floor Construction)

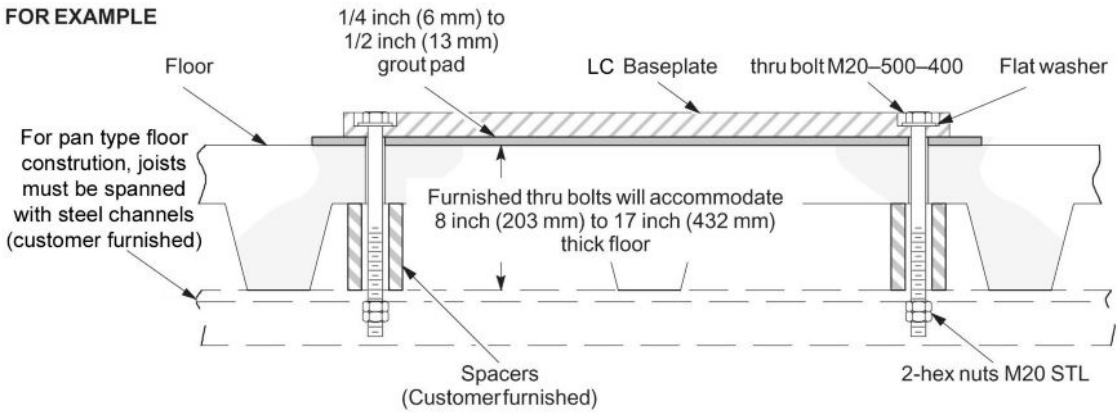
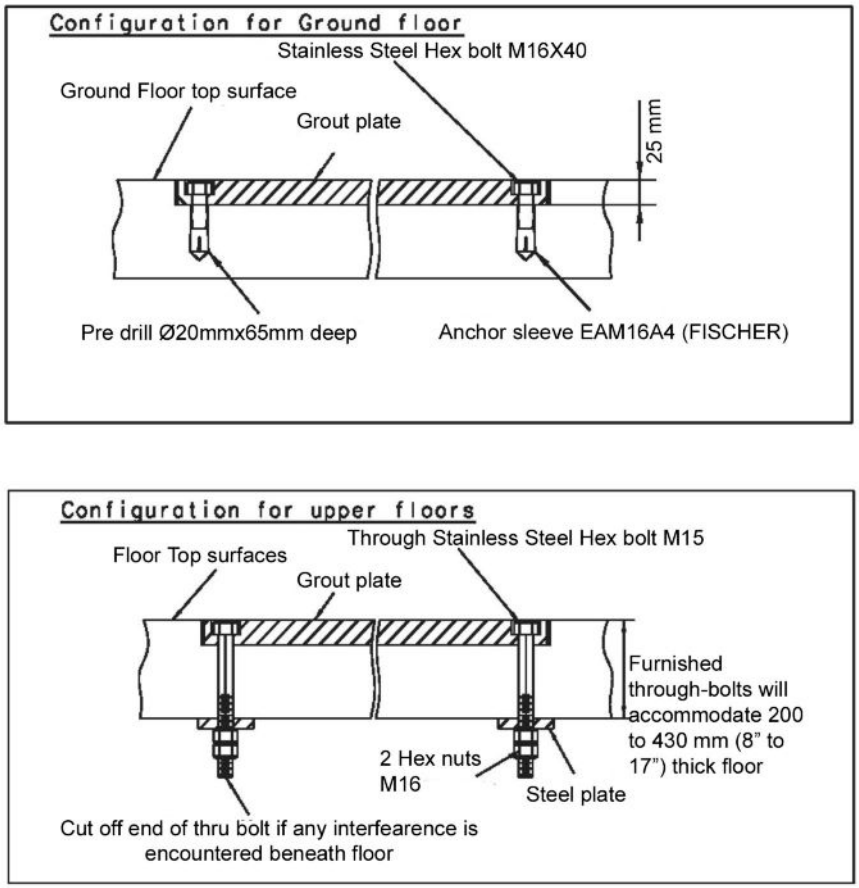


Illustration 2-47: Table baseplate



NOTE: Prepare the floor such that the Table baseplate will be flush with the floor surface.

For alternative table bolts or seismic area, refer to template drawing shown in Illustration *Gantry and table mounting holes* contained in Mounting Requirements.

3.1.4 Hole dimension and preferred location in concrete floor

In the examination room, the Innova Frontal Positioner is not placed on a computer floor but directly put on concrete floor, the location of the cable access needs to be carefully planned.

Otherwise, if the cable run is located under the concrete floor, the cables will have to come through the floor and in this case you will need two holes, one for the Frontal Positioner and the other for the patient table.

The diameter of both holes must be the same 225 mm or 9 in.

Illustration 2-48: Hole location in concrete floor

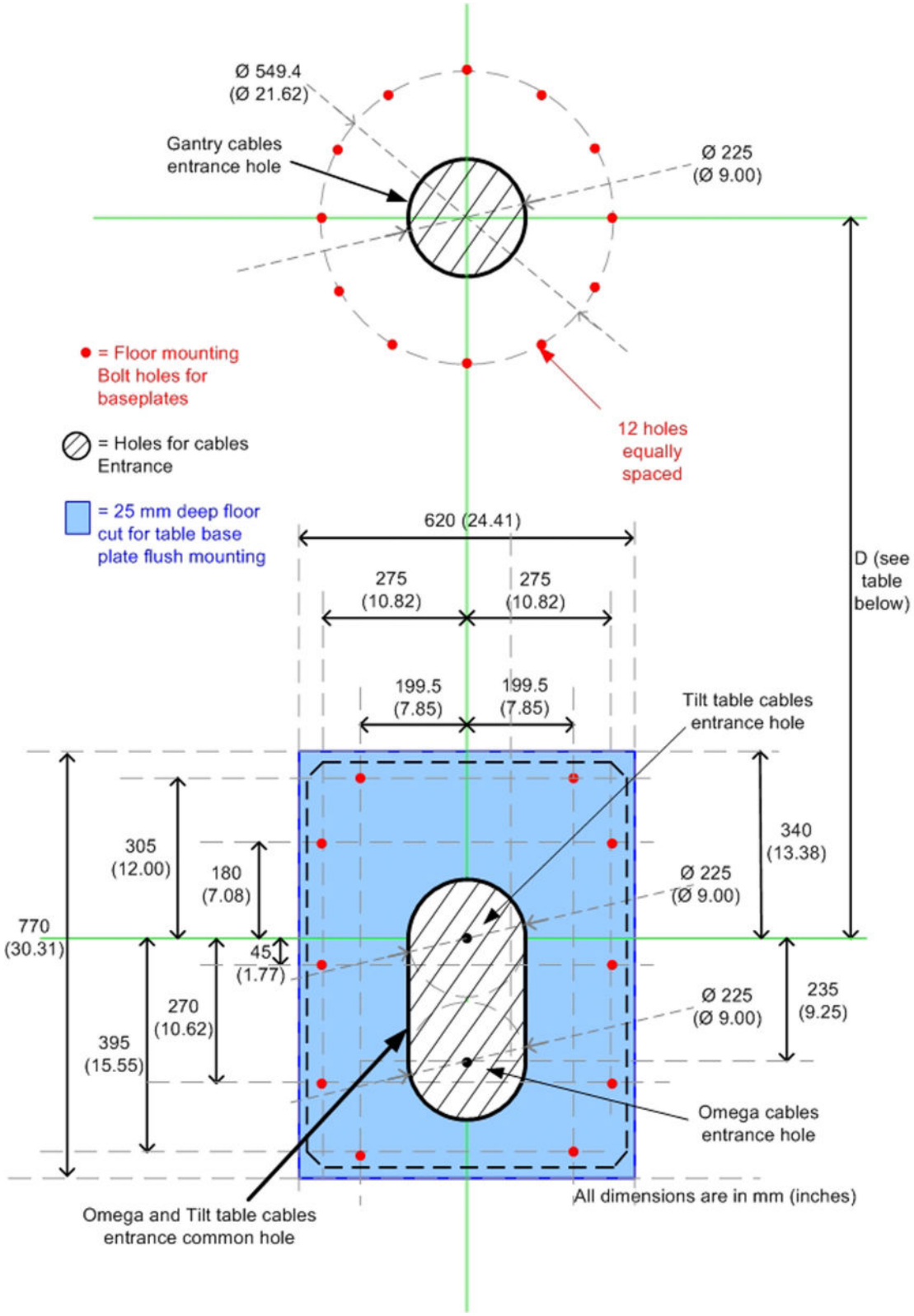


Table 2-7: D distance of Illustration 2-48

	ANGIO / CARDIO	CARDIO / NEURO
Omega IV Compact	NA	1395 mm (54.9 in)
Omega V Long	1278 mm (50.3 in)	1395 mm (54.9 in)
Omega V non motorized Long	1278 mm (50.3 in)	1395 mm (54.9 in)

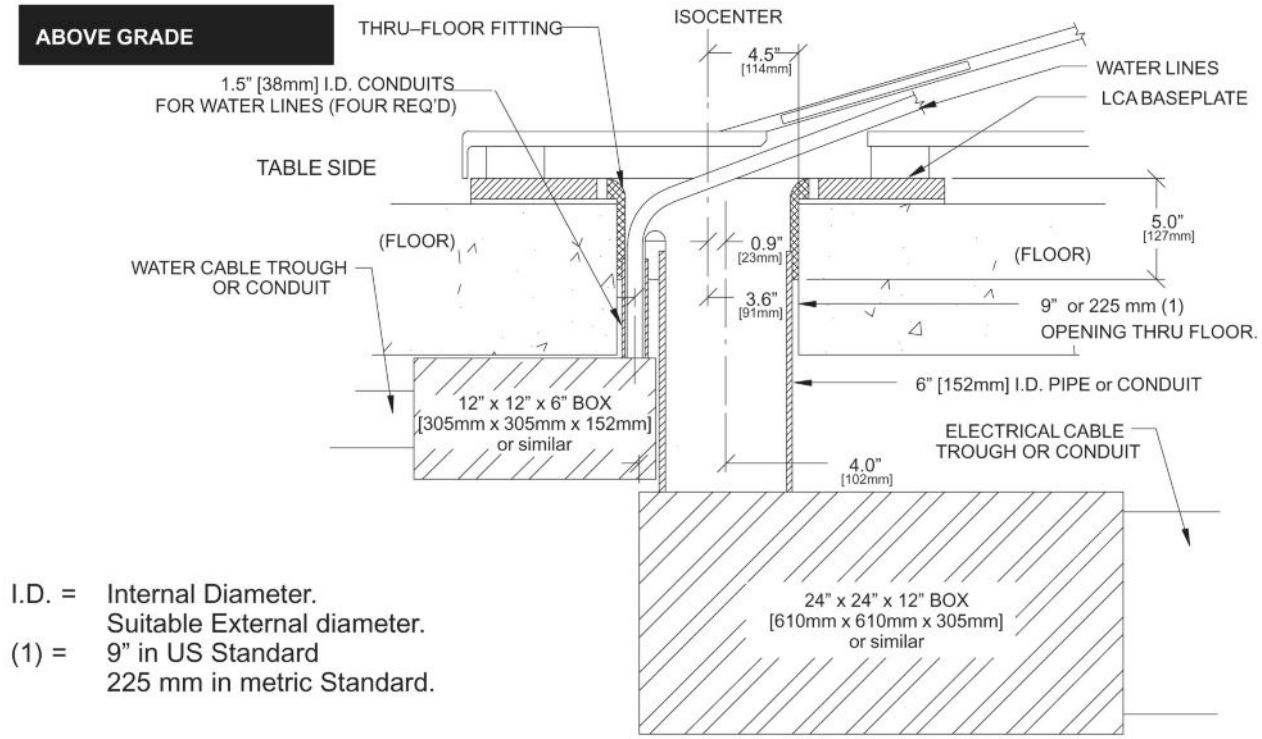
NOTICE

Due to the plastic bushing used in the USA to protect cables from the sharp edges of conduits it is necessary to place the cable conduit inside the table cable access opening but the height of the outcoming conduit plus bushing is limited to 12 mm (1/2 in).

NOTE: Refer to table *Chemical anchors Pull out efforts and recommendations* in Mounting Requirements for pull out effort on each fixation bolts.

3.1.5 Water Pipe Requirements

Illustration 2-49: Water Conduit location with “Above Grade” anchor kits

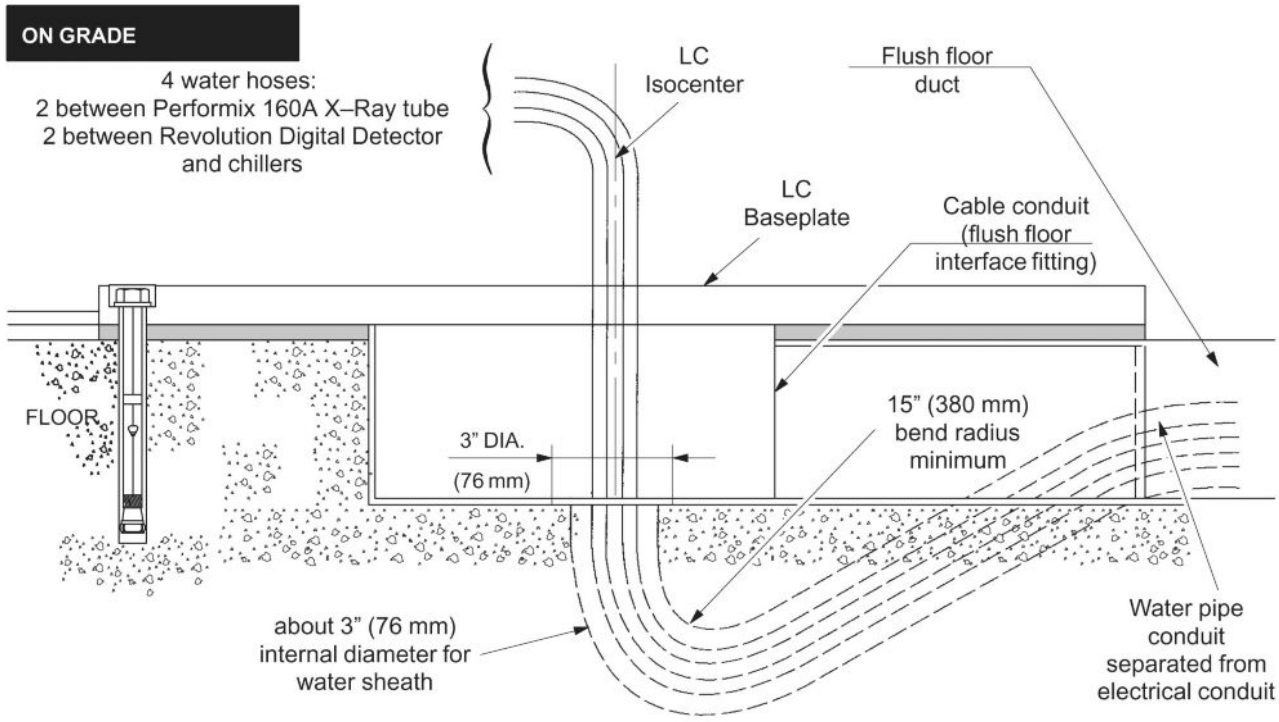


Note: Pipe, junction box and duct or conduit are to be supplied and installed by Customer or customer’s Contractor.

NOTICE

In some countries, depending on local regulations, it may be forbidden to run electrical cables and water pipes in the same conduit. In this case, two separate conduits are required.

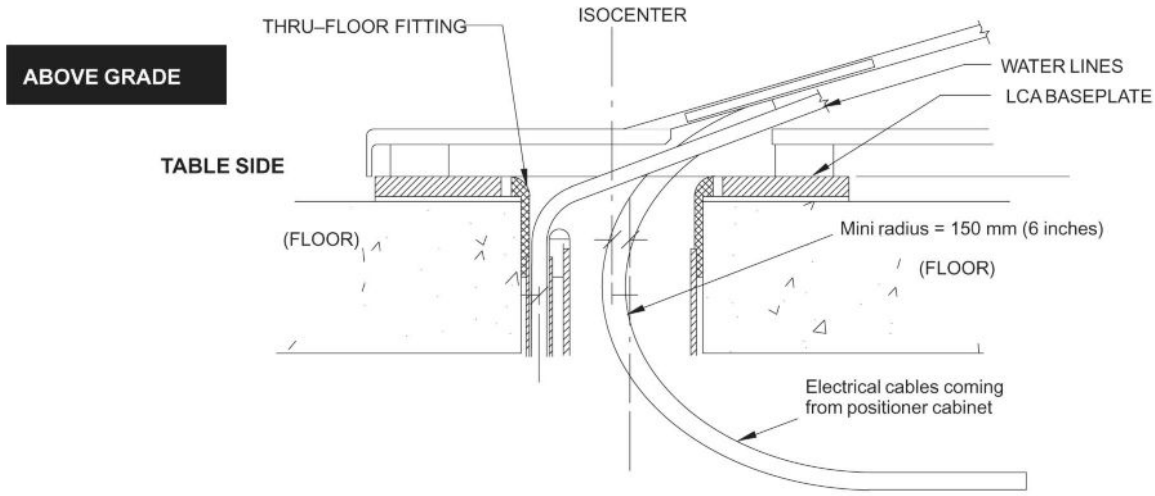
Illustration 2-50: Water Conduit location with “On Grade” anchor kits



Note: Flush floor interface fitting is part of GEMS installation kit 2286398 and is installed by Customer or customer’s Contractor.

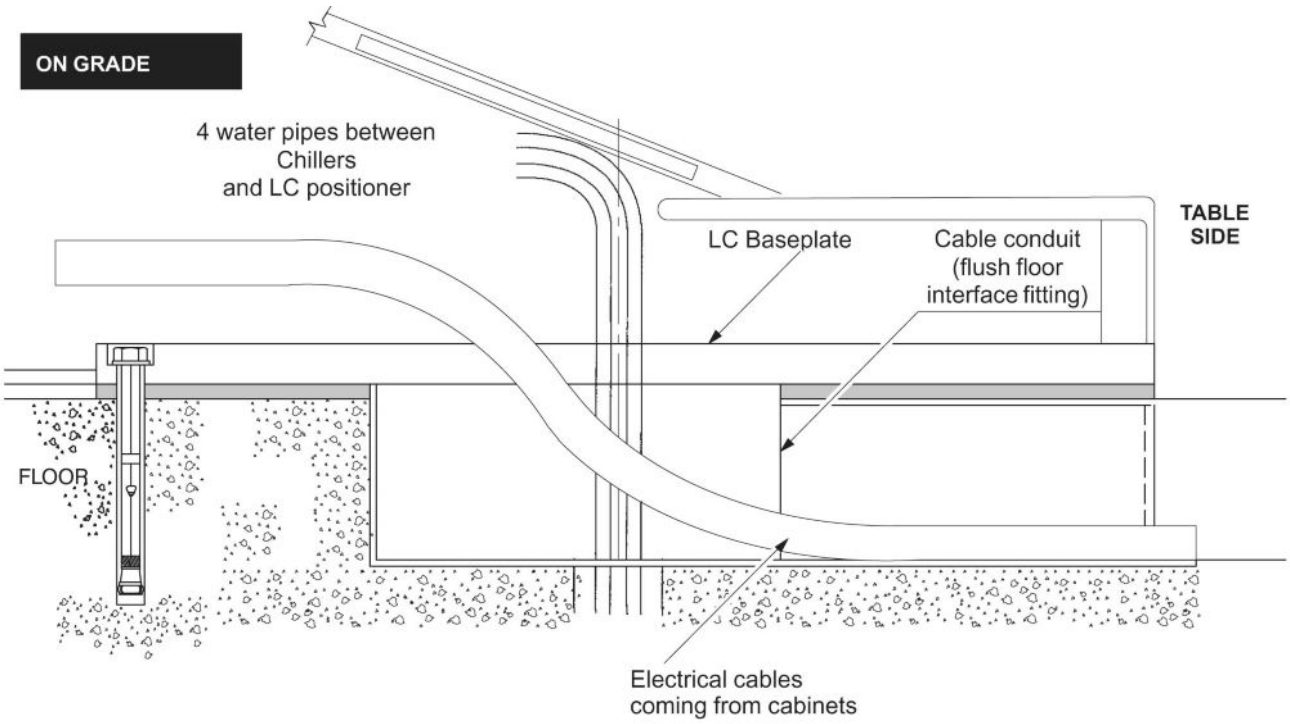
NOTE: For further information on kit 2286398 (S18101SK), refer to *Innova Frontal Positioner and Omega/Tilt Table Floor Preparation Kits (GE Healthcare supplied)* in Mounting Requirements.

Illustration 2-51: Cable Curvature with “Above Grade” anchor kits



Note: In case of thru–floor cabling, if the electrical cables are coming from the head side, they will need to have a minimum curvature with a minimum radius of 150 mm (6”).
In any other cases (i.e. flush floor) no such curvature is allowed.

Illustration 2-52: Cable Curvature with “On Grade” anchor kits



NOTE: In case of on grade cabling, because of the minimum curvature constraint of 150 mm (6”), the cable will have to come from the side between Innova Frontal/Lateral Positioner and patient table.

3.2 Mounting Requirements

3.2.1 Floor Loading and Recommended Mounting Methods

See Table 2-8. To obtain floor loading and recommended mounting methods for components not specified in Table 2-8, refer to the appropriate component Pre-Installation Manual listed in System Compatibility.

Table 2-8:

PRODUCT OR COMPONENT	NET WEIGHT KG (LBS)	DIMENSIONS MM (INCHES)			LOAD BEARING AREA MM (INCHES)	WEIGHT/ OCCUPIED AREA	MOUNTING METHOD
		WIDTH	DEPTH	HEIGHT			
Innova Frontal Positioner	670 (1477) for systems with 21 cm detector and 705 (1556) for systems with 31 cm detector	See Illustrations *Innova Frontal Position Dimensions*: • Side view • Top view • Front view in Dimension Drawings			Circle diameter 600 (23.62)		Recommended: • Through-Bolts (12) Alternates: • On Grade 5/8 in, Anchors (12) • Above Grade 3/4 in. Anchors (12) See Illustration 2-53, Illustration 2-54 and Illustration 2-56
Lateral Positioner	735 (1620) for systems with 21 cm detector and 797 (1757) for systems with 31 cm detector	See Illustrations *Lateral Positioner Dimensions*: • Side view • Top view • Front view in Dimension Drawings			NA		NA
Table	754.6 (1664) See NOTE 1	See Illustration *Omega Table Dimensions* in Dimension Drawings			571.5x429 (22.5x16.9)	2410 kg/m^2 (492.3 lb/ft^2)	Same as Innova Frontal Positioner
C2 Cabinet (Frontal and Lateral)	262 (578)	See Illustration *C2 Cabinet (Frontal and Lateral) Dimensions* in Dimension Drawings			600x900 (23.63x35.44)	485 kg/m^2 (99 lb/ft^2)	
C1 Frontal Cabinet	367 (809)	See Illustration *C1 Frontal Cabinet Dimension* in Dimension Drawings			600x900 (23.63x35.44)	680 kg/m^2 (139 lb/ft^2)	
C1 Lateral Cabinet	314 (692)	See Illustration *C1 Lateral Cabinet Dimension* in Dimension Drawings			600x900 (23.63x35.44)	581 kg/m^2 (119 lb/ft^2)	
COOLIX 4100	120 (264.5)	555 (21.8)	610 (24)	1200 (47.2)		424 kg/m^2 (87 lb/ft^2)	
Autotransformer (Coolix 4100)	30 (66)	370 (14.5)	304 (12)	340 (13.4)		312.50 kg/m^2 (64 lb/ft^2)	

PRODUCT OR COMPONENT	NET WEIGHT KG (LBS)	DIMENSIONS MM (INCHES)			LOAD BEARING AREA MM (INCHES)	WEIGHT/ OCCUPIED AREA	MOUNTING METHOD
		WIDTH	DEPTH	HEIGHT			
Detector Conditioner Thermo-Con	14.6 (32.2)	See Illustration *Detector Chiller Thermo–Con Dimensions* in Dimension Drawings			344x283 (13.5x11.14)		See NOTE 3
Fluoro UPS UL Inverter cabinet	541 (1065)	680.2 (26.78)	800 (31.5)	1800.9 (70.90)			
Fluoro UPS CE	483 (1064)	680 (26.8)	800 (31.5)	1450 (57.1)			
UPS 3 kVA - model 9130	36 (79)	214 (8.43)	412 (16.2)	346 (13.6) with feet			
Power Distribution Box CE	225 (496)	800 (31.5)	300 (11.8)	1800 (70.8)			
Power Distribution Box UL	389.5 (859)	1016 (40)	356 (14)	2120 (83)			
DL keypad	1.4 (3)	283 (11.55)	300 (11.8)	82 (3.25)			
DL LCD monitor	8.2 (18)	179 (7)	387 (15.2)	504 (19.8)			
VCIM	0.95 (2.09)	450 (17.7)	150 (5.9)	50 (2)			
6 monitors suspension	126 (277)						
8 monitors suspension	170 (375)						
LD cabinet	115 (254)	550 (22)	780 (31)	1250 (49)	550x780 (22x31)	268 kg/m^2	
Large Display monitor suspension boom and frame	267 (121)	See illustration *Large Display suspension dimensions* (Optional) in Dimension Drawings					
LD suspension precabled (self weight without monitor and accessories given)	474 (215)	See Illustration *Large Display suspension dimensions (Optional)* in Dimension Drawings					
LD monitor	47 (103)	1319 (52)	146 (6)	776 (31)			

NOTE: (1) including 353 lbs (160 kg) patient.

NOTE: (2) Depth.

NOTE: (3) For regions without seismic constraints, the Detector Conditioner Thermo-Con can be floor or wall mounted. For regions with seismic constraints, the Detector Conditioner Thermo-Con must be floor mounted.

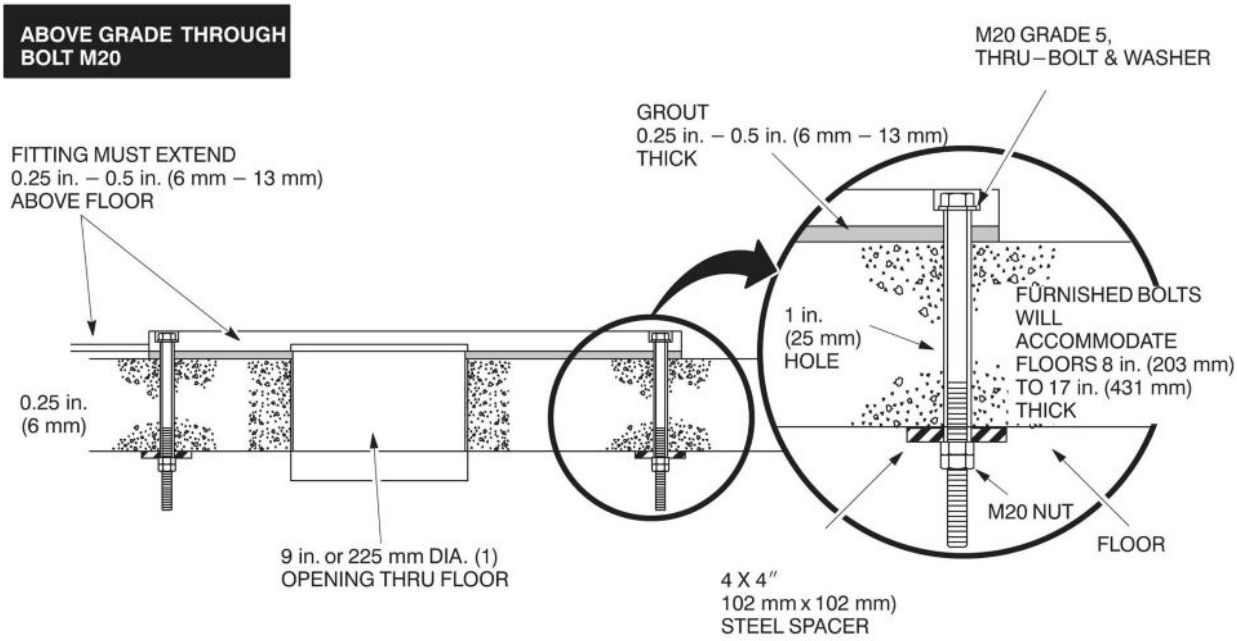
3.2.2 Positioner and Table Floor Mounting

The distances between the Innova Frontal Positioner and the Tables are critical for a proper clinical usage. For this reason, GE Healthcare provides two floor mounting templates to ensure these components are properly placed in relation to one another.

Table 2-9:

Title	Illustration
Innova Frontal Positioner Floor Mounting Methods	Illustration 2-53 and Illustration 2-54
Cable Conduit For On-Grade Floor Anchor Kit	Illustration 2-56
Inner Base Plate For Above Grade Floor Anchor Kit	Illustration 2-55
Fixing Bolt Overview	Illustration 2-57
Gantry and table mounting holes	Illustration 2-58

Illustration 2-53: Innova Frontal Positioner Floor Mounting Methods (1/2)



(1) The US or the METRIC standard for base plate inner

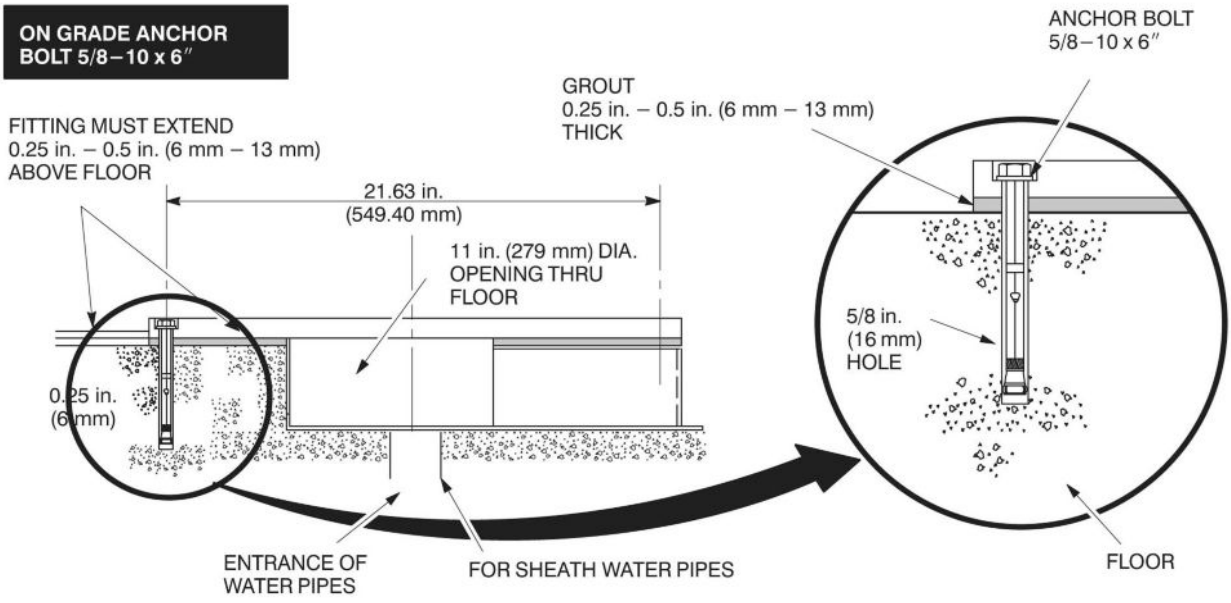
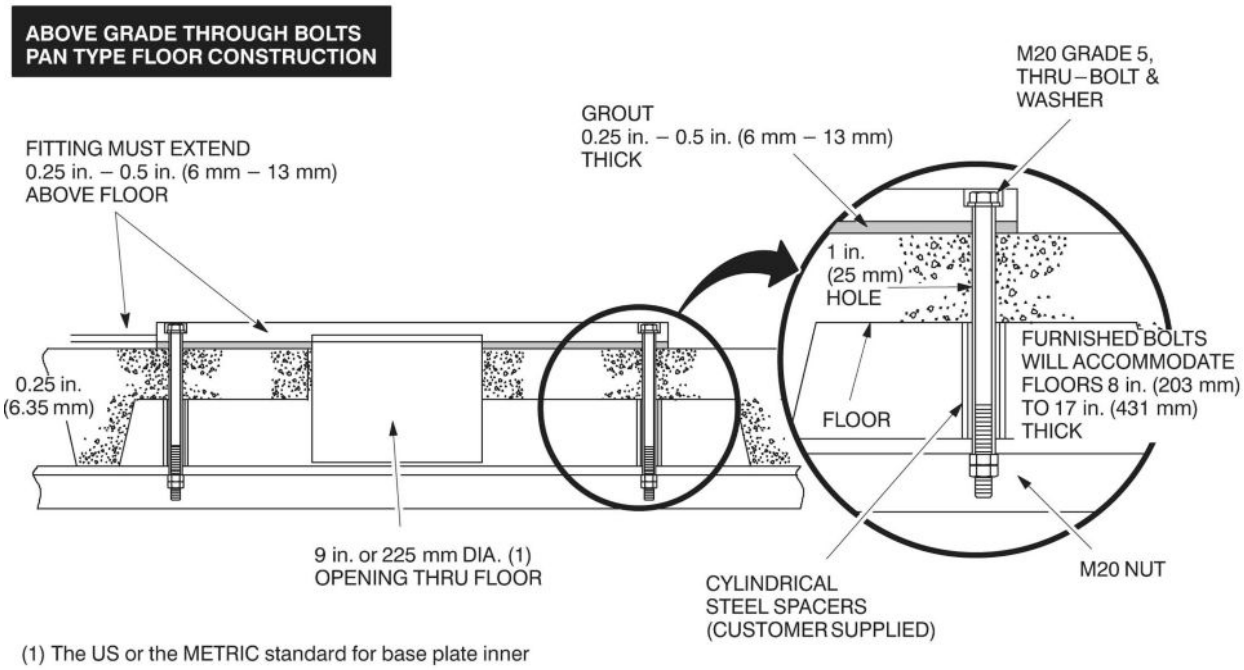
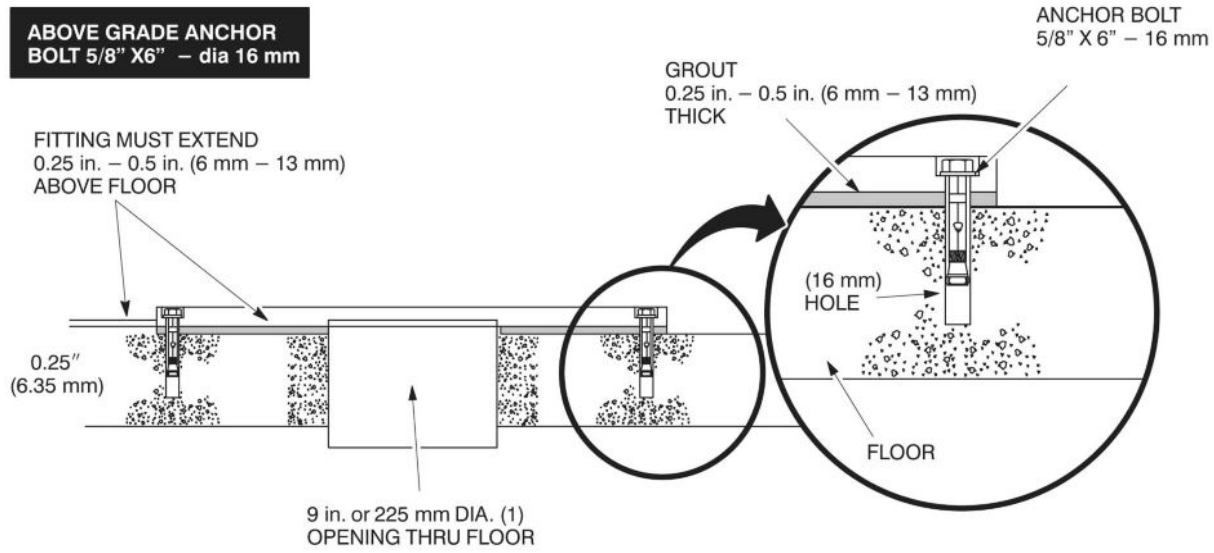


Illustration 2-54: Innova Frontal Positioner Floor Mounting Methods (2/2)



(1) The US or the METRIC standard for base plate inner



(1) The US or the METRIC standard for base plate inner

Illustration 2-55: Inner Base Plate For Above Grade Floor Anchor Kit

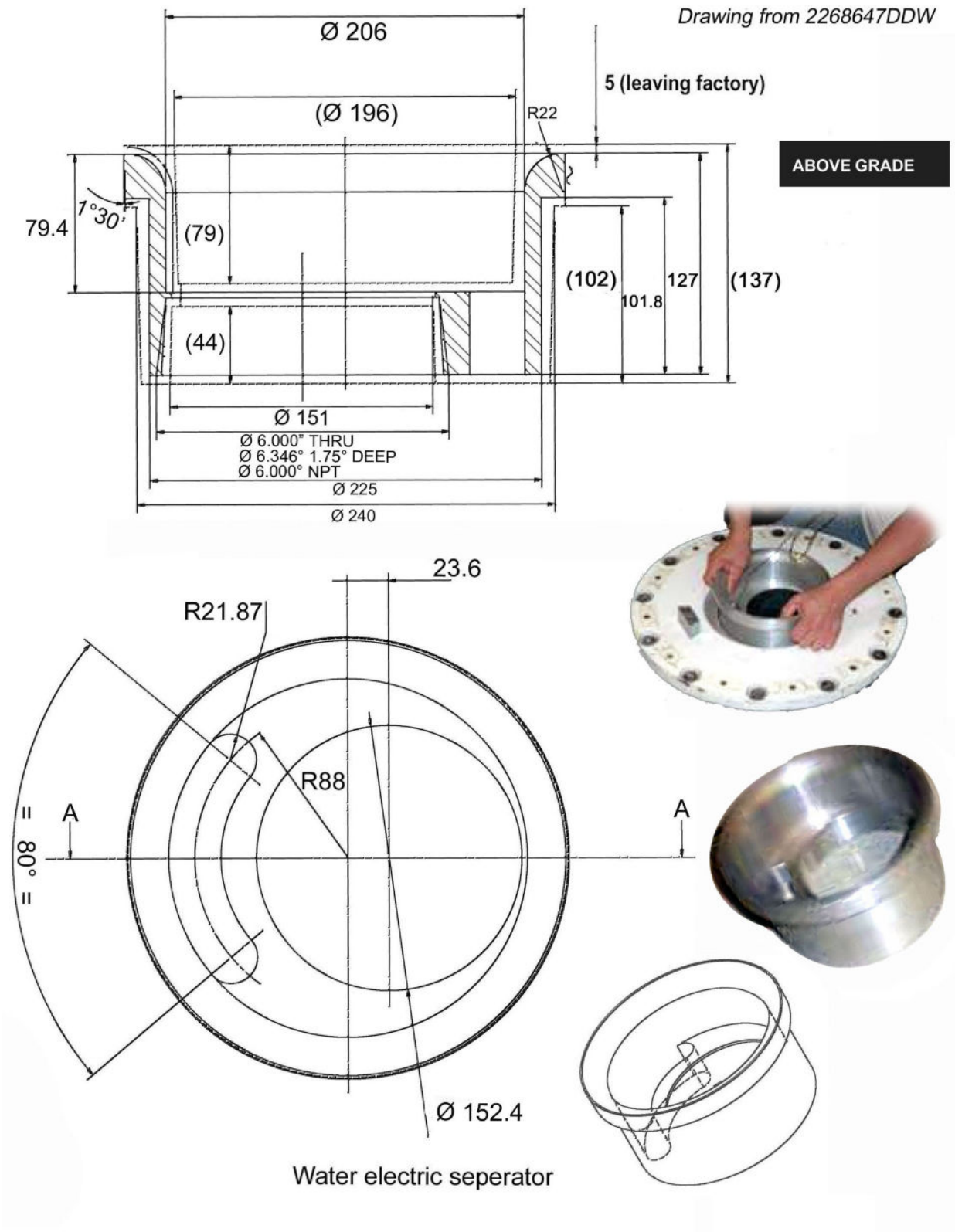


Illustration 2-56: Cable Conduit For On-Grade Floor Anchor Kit

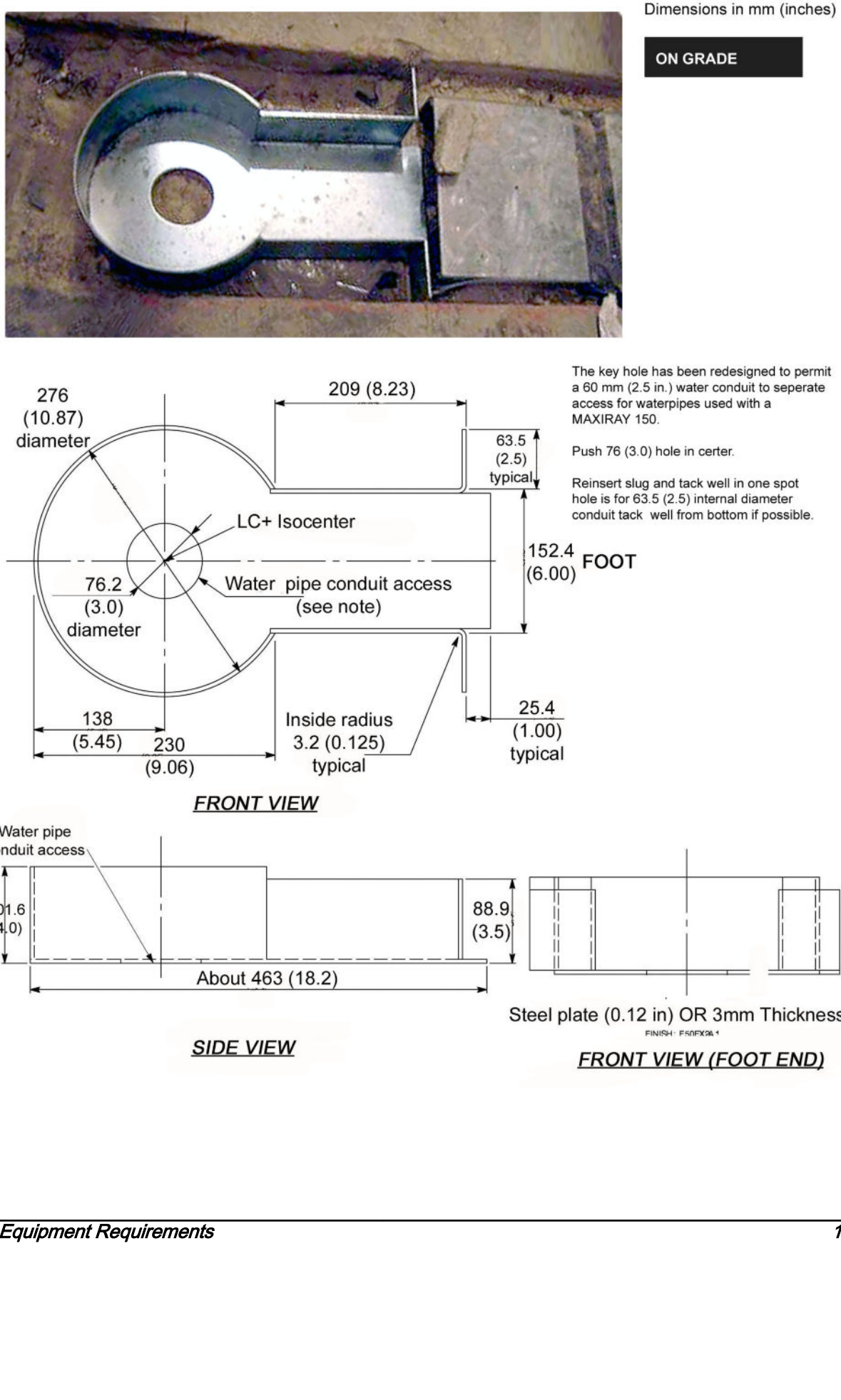
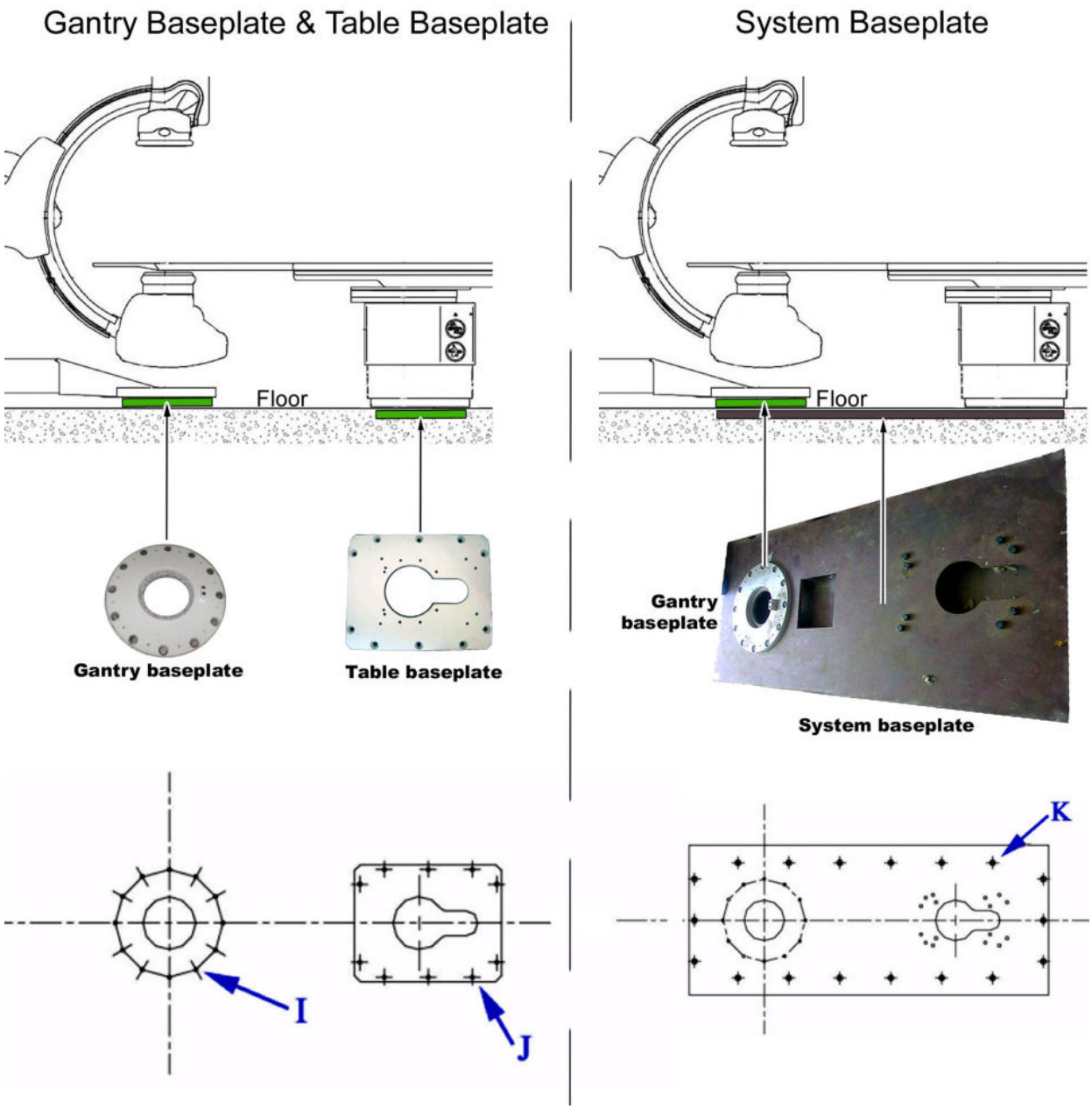


Illustration 2-57: Fixing Bolt Overview



NOTE: For more details on Table Baseplate, refer to Illustration 2-58.

NOTE: With any kind of fixation methods (Bolts M20, Mechanical anchors or Chemical anchors), the number of holes used mandatory is:

- Gantry baseplate : 12 max and 8 min holes used are acceptable
- Table baseplate : 10 max and 8 min holes used are acceptable
- Floor baseplate : 24 max and 12 min holes used are acceptable

we can have only 2 consecutive holes omitted.

Pull out efforts and recommendations about chemical anchors not provided by GE.

The following table provides the recommended chemical anchors for Table/Frontal baseplates and for the floor plate ordered locally that they could be used instead of bolts provided by GE.

Table 2-10: Chemical anchors Pull out efforts and recommendations

	Gantry baseplate	Table baseplate	Floor plate (to be ordered locally)	Table Omega
Mark	**I** on Illustration 2-57	**J** on Illustration 2-57	**K** on Illustration 2-57	**A** on Illustration 2-58
Pull out effort	736 daN per bolt if 12 used and 1992 daN per bolt if 8 used	1120 daN per bolt if 10 used and 2000 daN per bolt if 8 used	272 daN per bolt if 24 used and 2008 daN per bolt if 12 used	4432 daN per bolt with 4 bolts
Number of holes in the plate	12 max (8 min mandatory)	10 max (8 min mandatory)	24 max (12 min mandatory)	4 mandatory
Recommended chemical anchors example 1	Supplier HILTIHVU adhesive capsule + HAS Anchor rod	Supplier HILTIHVU adhesive capsule + HAS Anchor rod	Supplier HILTIHVU adhesive capsule + HAS Anchor rod	Supplier HILTIHVU adhesive capsule + HAS Anchor rod
Threaded rod	M16 A4-70 / 333 131 5/8	M20 A4-70 / 333 135 3/4	M16 A4-70 / 333 131 5/8	M20 A4-70 / 333 135 3/4
Hole diameter in the floor	18 mm (11/16 in)	24 mm (7/8 in)	18 mm (11/16) in	24 mm (7/8 in)
Hole depth in the floor	125 mm (5 in)	170 mm (6-5/8 in)	125 mm (5 in)	170 mm (6-5/8 in)
Minimum floor thickness	180 mm (7 in)	220 mm (8-1/2 in)	180 mm (7 in)	220 mm (8-1/2 in)
Max Tightening Torque	80 N.m (59 ft-lb)	150 N.m (110 ft-lb)	80 N.m (59 ft-lb)	150 N.m (110 ft-lb)

NOTE: The floor plate ordered locally needs to be in steel.

Refer to supplier technical documents for all specification and installation data about chemical anchors.

Illustration 2-58: Gantry and table mounting holes

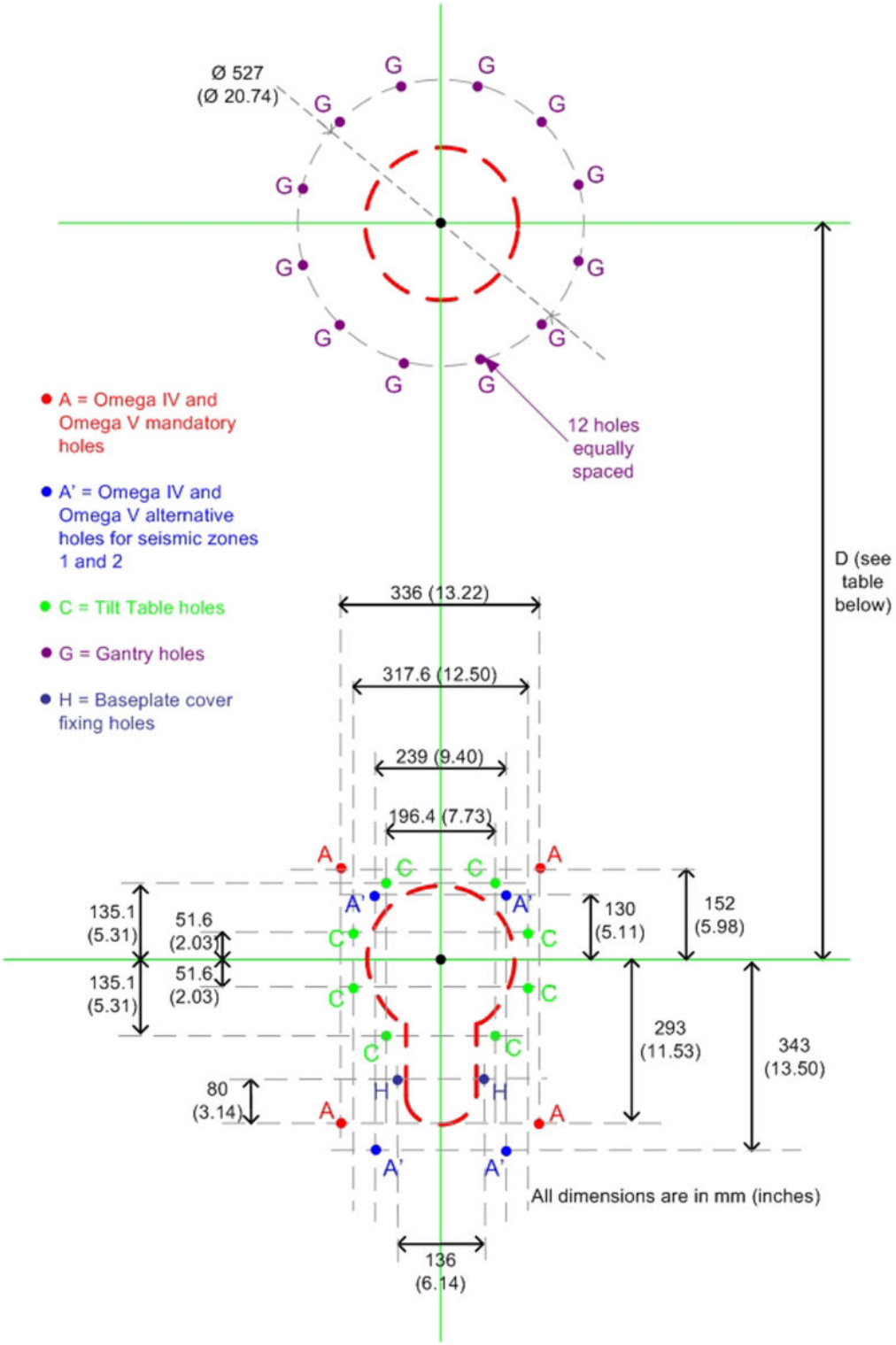


Table 2-11: D distance of Illustration 2-58

	ANGIO / CARDIO	CARDIO / NEURO
Omega IV Compact	NA	1395 mm (54.9 in)
Omega V Long	1278 mm (50.3 in)	1395 mm (54.9 in)
Omega V non motorized Long	1278 mm (50.3 in)	1395 mm (54.9 in)

3.2.3 Innova Frontal Positioner and Table Floor Preparation Kits (GE Healthcare supplied)

Illustration 2-59:

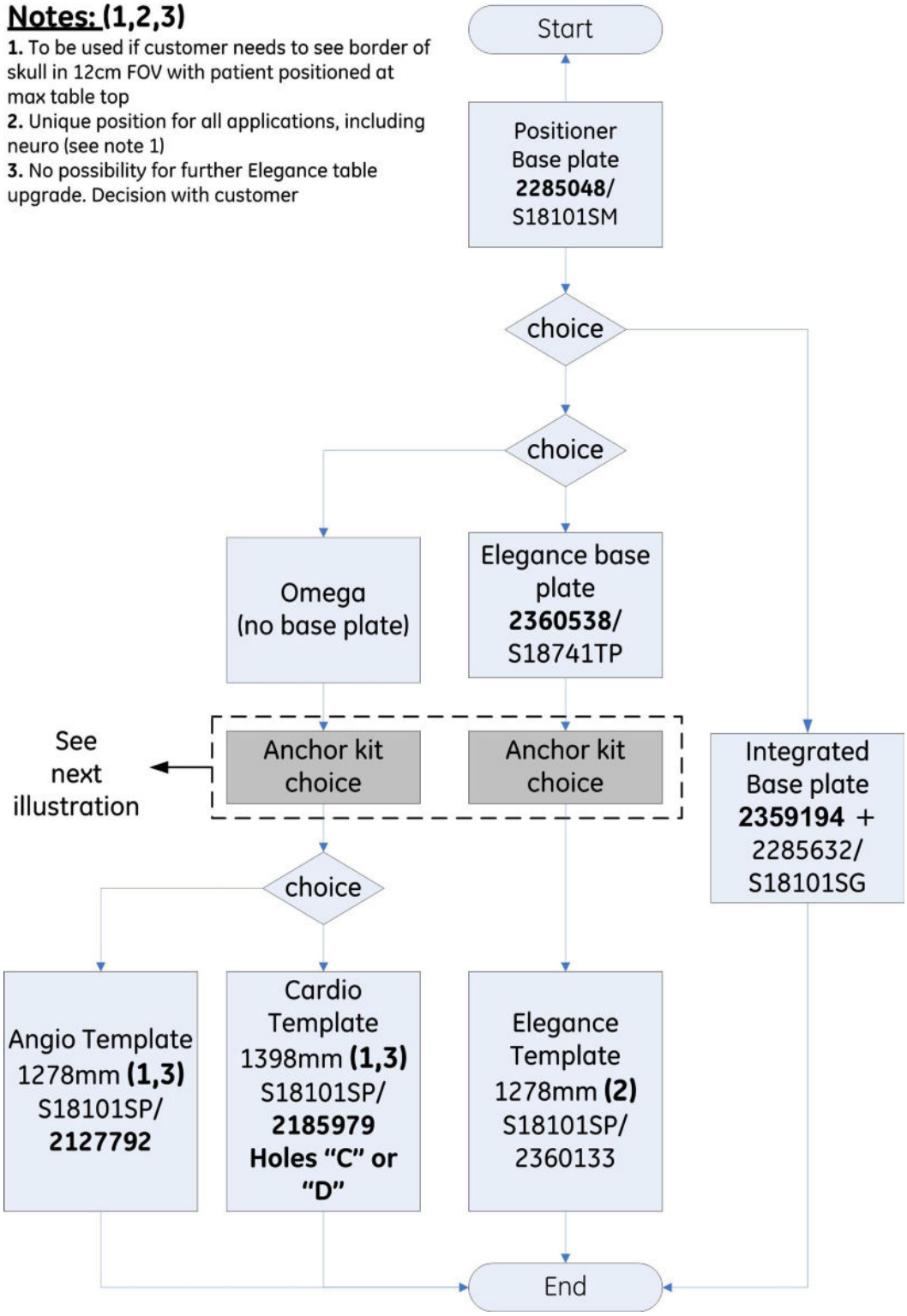
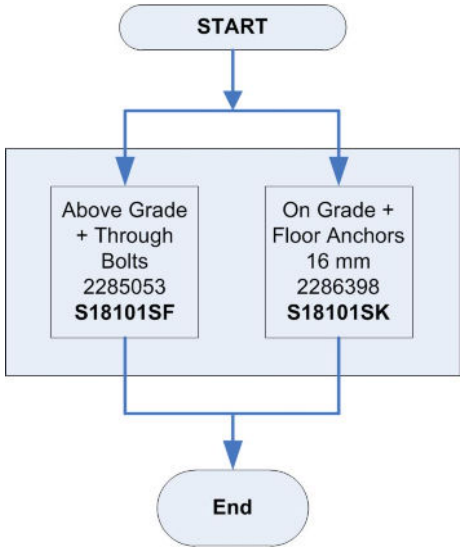


Illustration 2-60: Anchor kit choice



NOTE: 2285053 is kit for through bolts with water/electric separator.

All GE supplied vascular system floor preparation are contained in catalog. There are some additional gantry/table mounting kits based on each mounting method: through bolts or floor anchors.

- Base plate assembly (mandatory) 2285048 – Refer to Table 2-12
- If there is no integrated baseplate plan (2359194) delivered with S18101SG, please refer to drawings 2359194 (Illustration 2-61). Please order locally the integrated base plate based on this plan..
- Assembly and separation (Select kit) 2285050 – Refer to tables, Section 3.2.3.3
  - On grade, Floor anchors – 2286398.
  - Through bolts and insert – 2285053.
  - Floor plate / Base plate Assembly – 2285632.
- Templates (select kit) – 2285054 – Refer to Section 3.2.3.4

  Angio/Cardio/Neuro templates – 2285056 (containing 2185979, 2127792 and 2360133 templates).

3.2.3.1 2285048 - Base Plate Assembly

Table 2-12:

Item	Name	Part #	Description	Quan.	Notes
	Baseplate	2285059	12 Hole Floor Baseplate	1 pc	
	Lift Plate	2290939	Lifting Straps	2 pc	
	Hex Head Screw	5166535	Hex Head Screw 1/2”-13UNC L1 1/2” 12.9 Black	2 pc	
	Grease	2295599	Lithium grease lubricant 100g	2 pc	
	Doc	2230112-1-100	Vascular Gantry Baseplate and Table	1 pc	
	Doc	2229297-100	LCA/LCV+/LC+ System Baseplate and Omega IV/V/EP Table Floor Preparation	1 pc	
	Doc	2290880-2-100	Innova Pre-Installation Kit Install Procedure	1 pc	

NOTE: The 12 Frontal Gantry baseplate mounting screws are delivered with the system's Frontal Gantry. These screws are:

- cap screws 5166774; Screw Socket Head Cap 1/2”-20 UNF L1 1/2” 12.9 Black (used when installing new system on old baseplate (US threads))
- cap screws 2300939; Hex Head Cap screw; M12 40/40 Class 12.9 Black ; used to attach L-brackets on table shipping pallet to positioner dolly for table positioning (used when the new baseplate is metric threads)

3.2.3.2 2360538 – Table Add–On Kit

Table 2-13:

Item	Name	Part #	Description	Quan.	Notes
	Table Plate	2361993	Plate to be anchored under the table	1 pc	
	Hex Screws	5120708	Screw M16x40x40 Inox A4-70 Pass	10 pc	4 only are used for Omega
	Washer, Flat	99125091	Washer Plain - Large 17 mm/40 mm	10 pc	
	Floor Anchor	46-302265P1	5/8 diameter 6” floor anchor bolts	6 pc	
	Dowel	2290937-2	Wood Dowel; 16 mm diameter	6 pc	
	Bolt, Hex	2296892	Through bolt M20-500-400	6 pc	
	Washer, Flat	99142204	Washer plain 21 mm/40 mm for Through Bolts; one for each bolt	6 pc	
	Plate	2290941	Special Steel Spacer Plate; 4 in. x 4 in. (102 mm x 102 mm); one for each bolt	6 pc	
	Nut, Hex	99141607	Hex Nut M20 STL galvanized, two for each bolt	12 pc	
	Dowel	2290937	Wood Dowel; 24 mm diameter	6 pc	
	Cap	5130979	Plastic Cap	10 pc	
	M16 Plug	5130982	Plastic Plug	6 pc	see note *

NOTE: * M16 plug is needed only when Omega V table is replaced by Tilt table. Therefore, these plugs have to be kept (bag let inside the table base) until Tilt table is installed (no need to fit them with Omega table).

3.2.3.3 2285050 – Assembly and separation select kit

3.2.3.3.1 2286398 – On grade, Floor anchor (S18101SK)

Table 2-14:

Item	Name	Part #	Description	Quan.	Notes
	Floor Anchor	46-302265P1	Floor Anchor Bolt; 5/8-10 x 6 in. 12 anchors for Frontal Positioner and 4 anchors for Table	16 pc	On Grade anchor mounting method hardware
	Grout assy	2285055	- 10 kg Powdered Mortar Ardex K-15 - RTV Silicon Rubber Adhesive - 18 mm making tape adhesive - Open cell foam	1 kit	Used in constructing Frontal Positioner grout dam
	Dowel	2290937-2	Wood Dowel; 16 mm diameter	12 pc	
	Cable Conduit	2285057	Cable conduit - sheet metal part	1 pc	
	Vinyl Trim	2296890	Gripping Range; 1.5 to 3 mm THK	1 m	
	Vinyl Trim	2296891	Vinyl trim with segmented metal core 12 mm	1 m	

3.2.3.3.2 2285053 – Through bolts with insert (S18101SF)

Table 2-15:

Item	Name	Part #	Description	Quan.	Notes
	Bolt, Hex	2296892	Through Bolt; M20 - 500-400 12 bolts for Frontal Positioner and 4 bolts for Table	16 pc	Through Bolt mounting method hardware
	Washer, Flat	99142204	Special Flat Washer for Through Bolts; one for each bolt	16 pc	same as above
	Plate	2290941	Special Steel Spacer Plate; 4 in. x 4 in. (102 mm x 102 mm); one for each bolt	16 pc	same as above
	Nut, Hex	99141607	Hex Nut M20 STL galvanized two for each bolt	32 pc	same as above
	Grout assy	2285055	- 10 kg Powdered Mortar Ardex K-15 - RTV Silicon Rubber Adhesive - 18 mm making tape adhesive - Open cell foam	1 kit	Used in constructing Frontal Positioner grout dam
	Dowel	2290937	Wood Dowel; 24 mm diameter	12 pc	
	Water Electric Separator	2268647	Manufactured part introduced in Positioner key hole to fit 1 electrical conduit of 6”.	1 pc	Electrical and water conduits separated inch size.

3.2.3.3.3 2285632 – Floor plate / Base plate assembly (S18101SG)

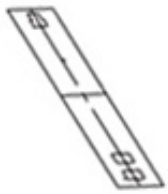
Table 2-16:

Item	Name	Part #	Description	Quan.	Notes
	Hex Screws	2360523	Screw M16x30x30 Inox A4-80 Pass	12 pc	For floor plate / Base plate assembly
	Washer	99125091	Washer P 17 mm/40 mm	34 pc	24 are used for the positioner integration
	Hex Screws	99133570	Screw M16x40x40 Inox A4-80 Pass	10 pc	4 only are used for Omega

NOTE: The kit 2285632 Floor plate / Baseplate assembly is needed when the floor plate is installed. This part isn’t GE part. It’s ordered locally.

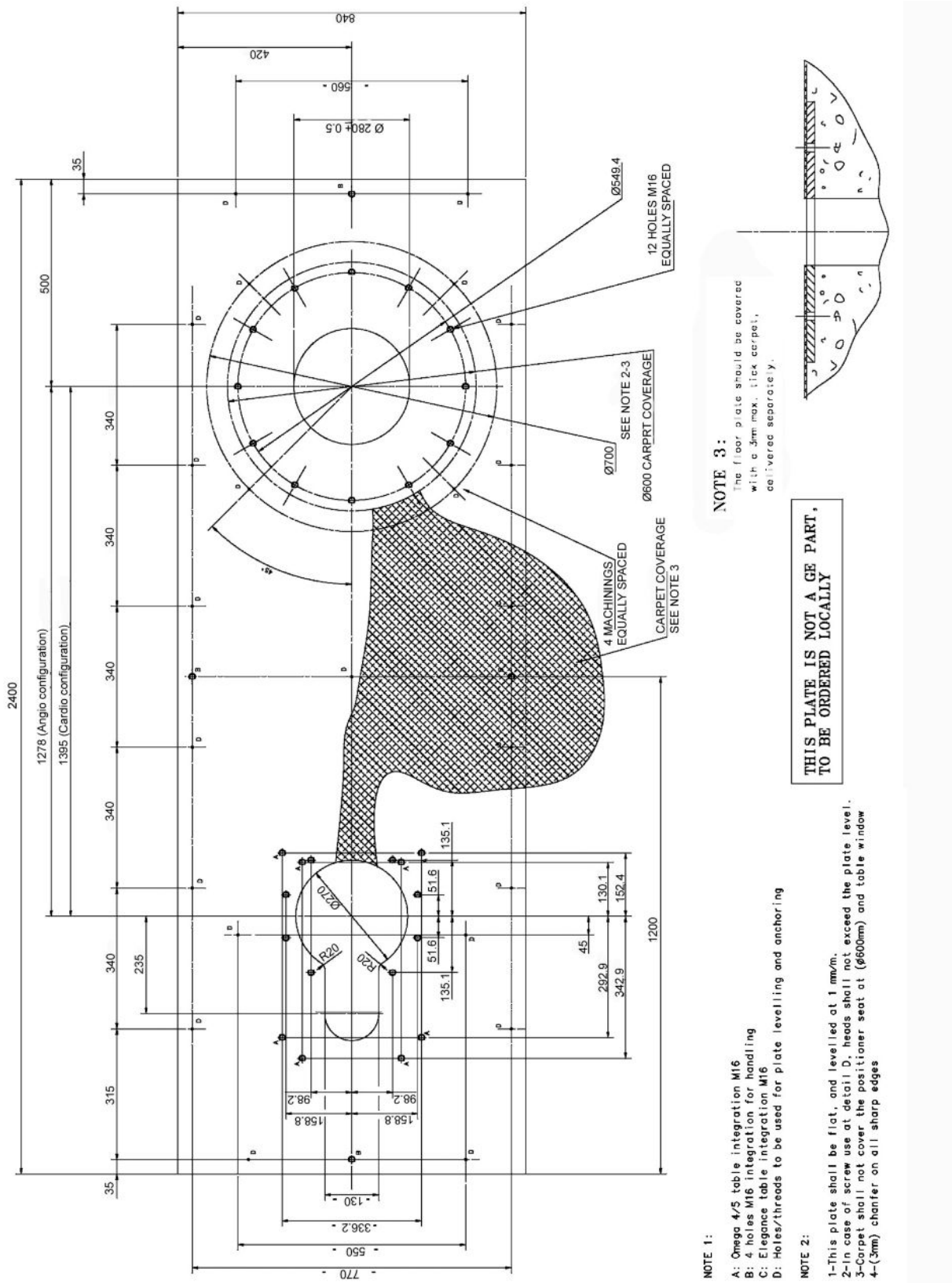
3.2.3.4 2285056 - A/C/N Templates

Table 2-17:

Item	Name	Part #	Description	Quan.	Notes
	A/C/N Templates	2185979	Frontal Positioner and Omega C/N Patient Table floor mounting template	1 pc	
		2127792	LCV+ Gantry and Omega A Patient Table floor mounting template	1 pc	
		2360133	Innova 4100 Template	1 pc	Specific for Innova 4100

NOTE: For further template details, refer to template drawing Illustration 2-58.

Illustration 2-61: Baseplate plan 2359194 - Angio and Cardio configurations



3.2.4 Injector Mounting Requirements

⚠CAUTION

Table accessory rail load consideration:

The maximum load per table accessory rail is 40 kg at 150 mm (60 N.m). Therefore:

- **Only light extra load not exceeding 5 kg at 100 mm (i.e IV pole with its accessories, pressure head...) is authorized on the same table accessory rail as the injector.**
- **Never install injector and radiation protection on the same table accessory rail.**
- **Typical installation on the front table accessory rail is Smart handle or Smart box, Table Side System Control (TSSC), InnovaCentral/Touchscreen, Table panning device and cables support.**
- **If needed an optional rail can be installed at table foot end of the Omega V table for other options.**

3.2.5 Prerequisites for ECG Acquisition Kit Installation

3.2.5.1 General Prerequisites for ECG Acquisition Kit Installation

Verify the following items to ensure easy mounting for the Hubican & Physio modules in all situations:

1. Check enough space can be managed to properly install the Hubican module in Control Room.
2. Check enough space can be managed to route/hide Hubican cable (VCIM-to-Hubican 12m long cable) in Control Room.

3.2.5.2 Specific Prerequisites for Installation Configuration #1

Verify the following items only in the case of Installation Configuration #1 with ECG Device in Control Room:

1. Check the environment of the ECG Device module located in Control Room provides enough space to install the Physio module at a max distance of 1 meter.
2. Check enough space can be managed to properly route/hide Physio cable (Physio-to-Hubican) in the Control Room
3. The Analog Output Box option is mandatory to provide on analog output connection to the Physio module (If not present, it can be ordered through the following FRUs):
    - 2018971-001 16CH ANALOG OUTPUT CPU INTERFACE OPTION
    - 2007557-002 KIT ANALOG OUTPUT BOX W/CABLES
    - 2010476-001 BOX CARDIOLAB/MACLAB ANALOG OUTPUT

3.2.5.3 Specific Prerequisites for Installation Configuration #2

Verify the following items only in the case of Installation Configuration #2 with ECG Device in Exam Room:

1. Check the environment of the ECG Device module located in Exam Room provides enough space to install the physio module at a max distance of 1 meter.
2. Check enough space can be managed to properly route/hide Physio cable (Physio-to-Hubican) at table base area.
3. Check the conduit normally designed for MacLab signal cables is present (see conduit illustration inChapter 5, Cable Channeling).

3.2.6 Large Display Subsystem option

NOTICE

General safety instructions

- **Move the LD Cabinet & LD Monitor in an upright position in their original packages to the final destination room. To lift the LD cabinet, use a forklift or lifting belts with spreader bars.**
- **Check for sufficient floor and elevator loading capacity.**
- **Check the integrity of the LD Subsystem equipment carefully.**
- **If you notice visible damage, do not install or start the LD Subsystem equipment. Contact the nearest Service Center immediately.**
- **All installation, maintenance and service work should be performed by qualified Service personnel.**

3.3 Ceiling Requirements

3.3.1 Gantry rails

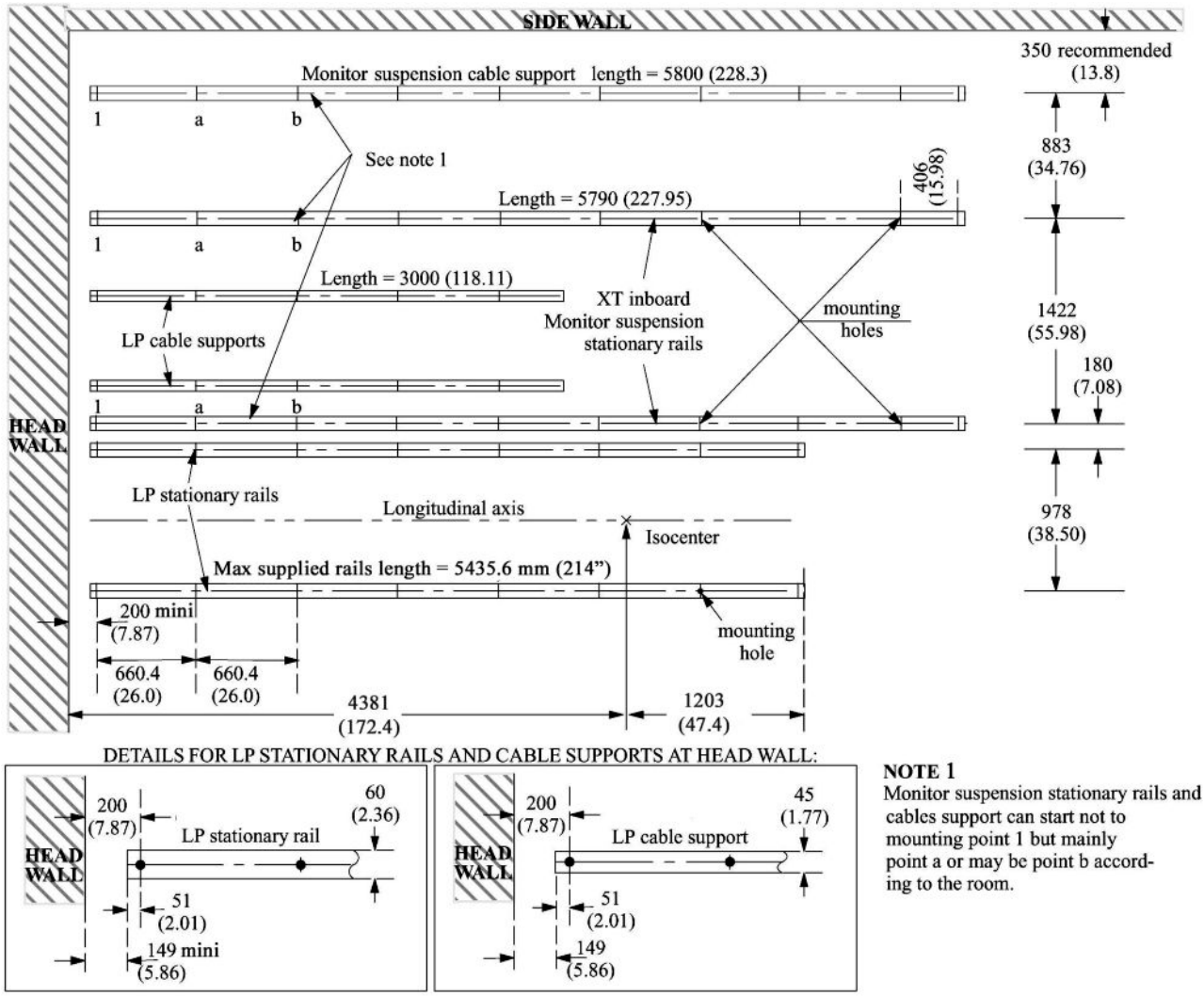
The required ceiling rail height for the Gantry is 2845 mm +/–5 mm (9 ft. 4 in +/–0.2 in). The rails must be mounted so that the distance from isocenter to the wall where the park position is designated is an absolute minimum of 3081 mm (10 ft. 1 in). The recommended distance is equal to 4.381 m (14 ft 5 in). This includes the 150 mm (6 in) clearance between the end of the rails and the wall. See Illustration 2-62 and Illustration 2-63 Potential Wall Interferences. Also, the lips on the rails must face toward isocenter.

NOTE: Do not attempt to install the Gantry at any height other than 2845 mm (9 ft. 4 in) without first contacting your General Electric Medical Systems representative.

The ceiling suspension rails must be parallel to each other. The distance between the center of the rail mounting holes must be 97.8 –0 +0.2 cm. (38–1/2, –0 +1/16, in). The rails must be level to 3 mm (1/8 in) over the entire length of the rail.

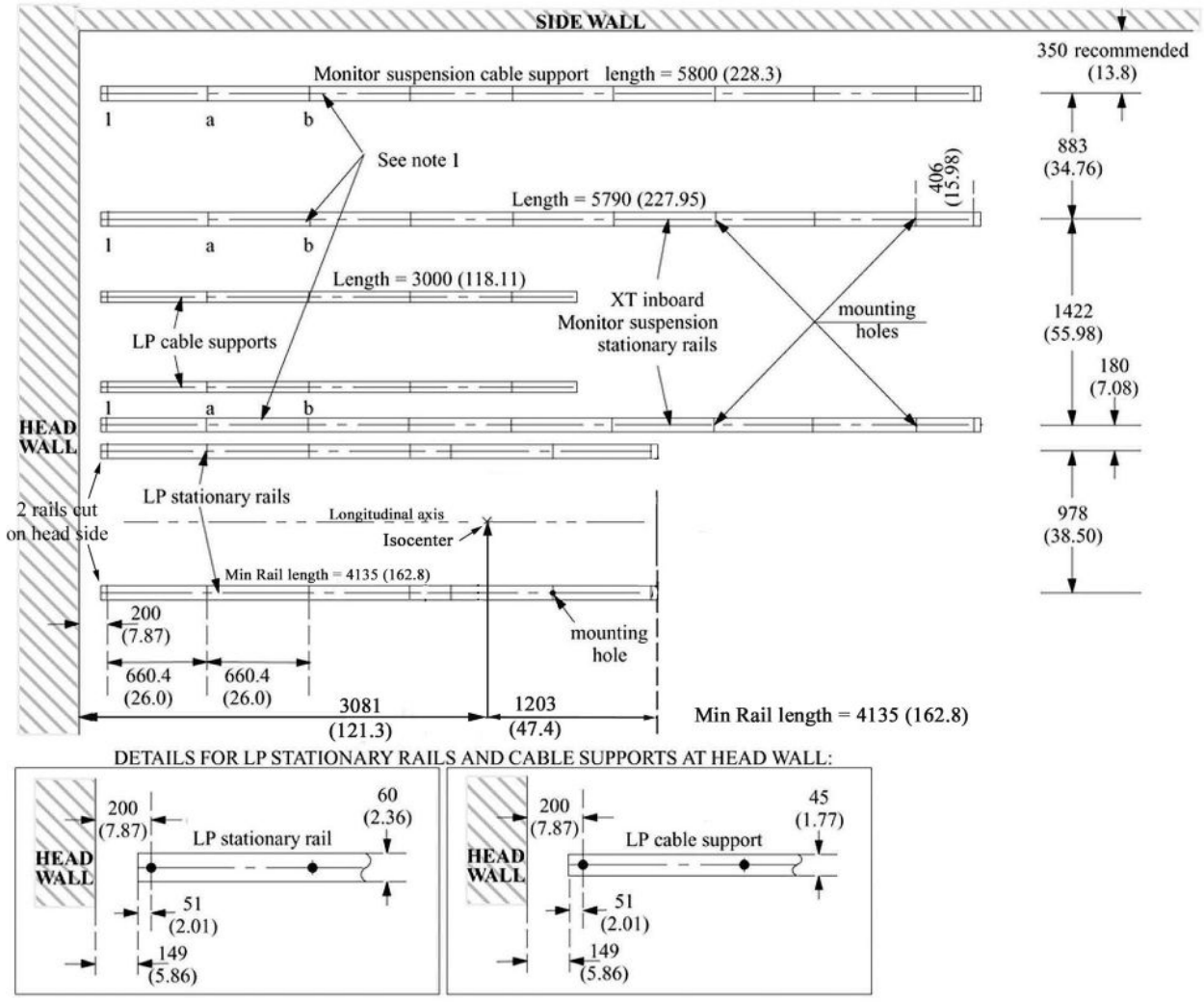
NOTE: It is the responsibility of the Hospital's Contractor to properly install the Gantry Stationary rails per the room drawings.

Illustration 2-62: Location of Stationary Rails on Ceiling – Delivered & Recommended max. configuration



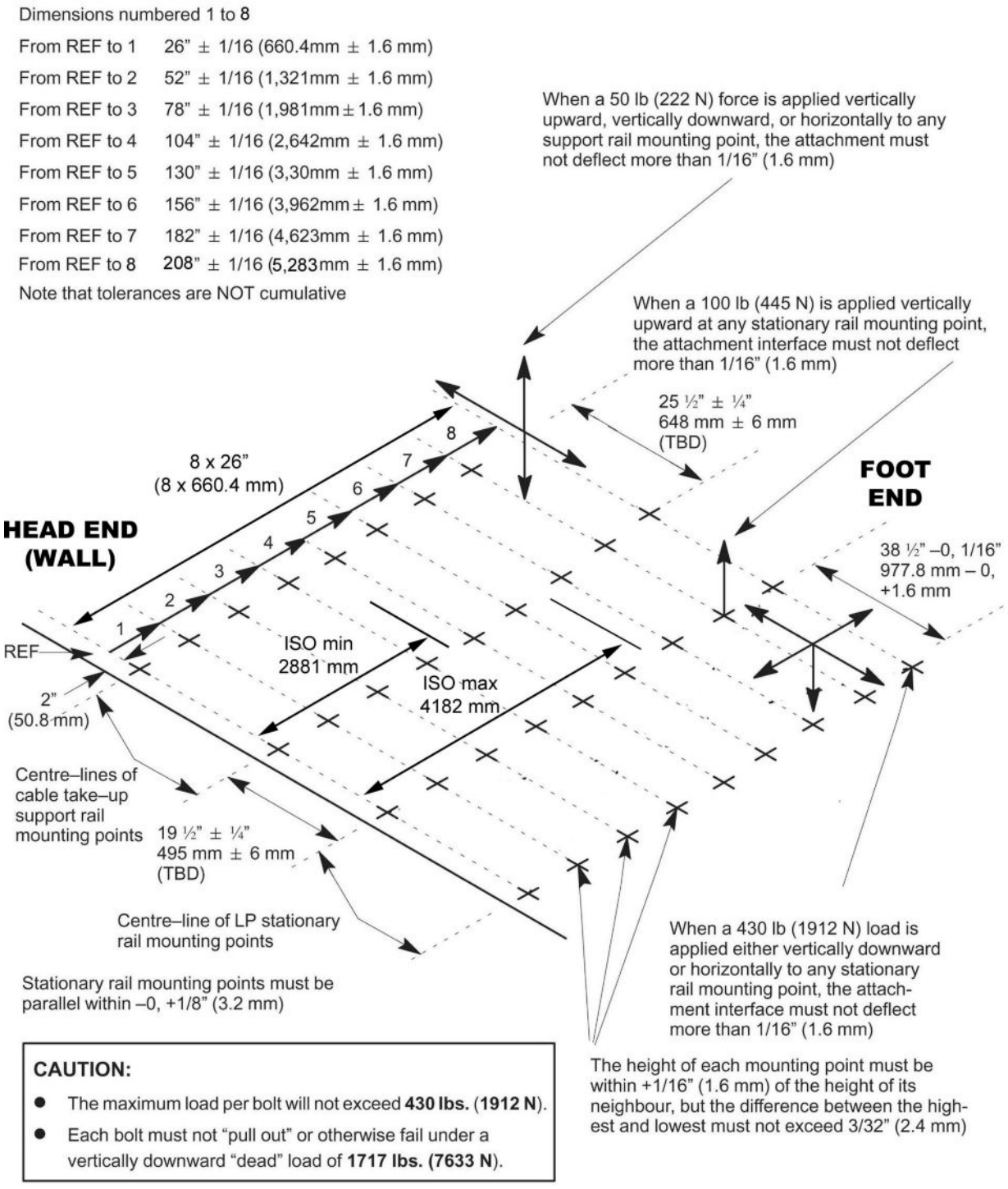
NOTE: It is recommended to install the Gantry Stationary Rails at the maximum configuration (Illustration 2-62). Some room configurations may require shorter configurations.Illustration 2-63 shows the *Absolute Minimum* configuration allowed.

Illustration 2-63: Location of Stationary Rails on Ceiling – Absolute min. configuration



NOTE 1
Monitor suspension stationary rails and cables support can start not to mounting point 1 but mainly point a or may be point b according to the room.

Illustration 2-64: Gantry Rail Mounting Specifications



3.3.2 Monitor Suspension Rails

Aluminum rails support the In-room Monitor Bridge used in systems with 21 and 31 cm detector X-Ray rooms.

3.3.2.1 Reference

For additional details on ceiling requirements for stationary rails, refer to:

- Direction 46–019639, *Advantx (VHLA) XT Stationary Rails Installation and Adjustment*.
- Direction 2393190-100, *Pre-Installation Manual for LCD Monitor Suspension with 4, 6, or 8 monitors*.

3.3.2.2 Rail Mounting

Attach stationary rails to structural steel with through-bolts in concrete ceilings. Do not use screw anchors in direct tension.

Mount stationary rails directly to the ceiling slab or to flush–mounted unistrut or halfen structure. In higher rooms with false ceiling, mount stationary rails to rigid vertical members hung from ceiling slab.

Securing a supplementary channel to the bottom of the vertical members and mounting the stationary rails to this channel can greatly reduce the number of vertical members.

The stationary rail support structure must be leveled before installation can begin. Do not assume that any support structure is level within specified tolerances, particularly after removing suspensions from an existing room.

3.3.2.3 Bolt Specifications

- The maximum load per bolt will not exceed **350 lbs (1557 N)**.
- Each bolt must not “pull out” or otherwise fail under a vertically downward *dead* load of **1400 lbs (6228 N)**.

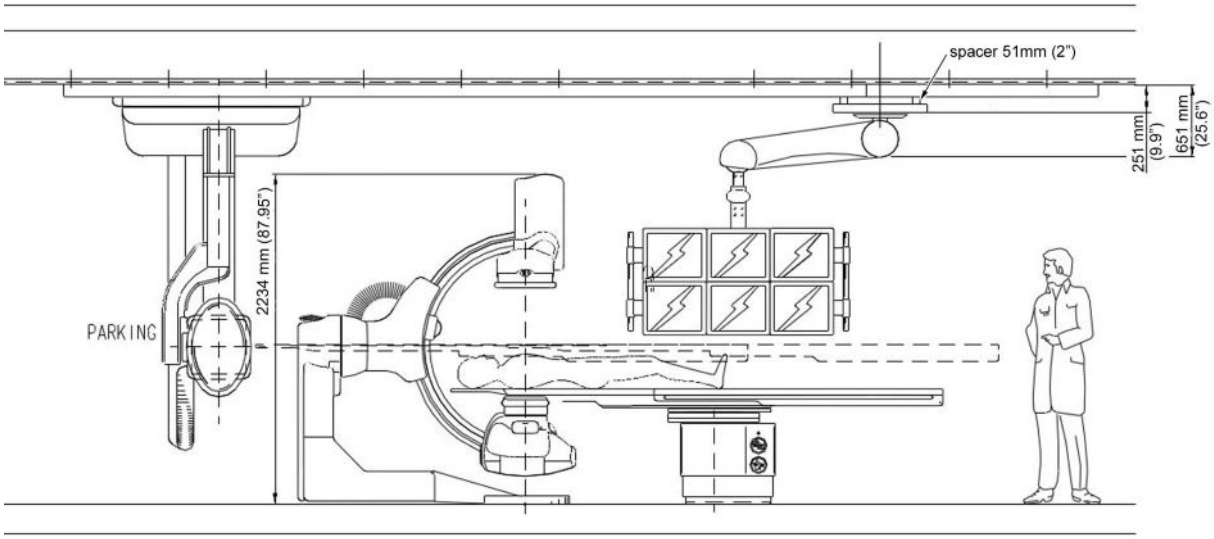
3.3.2.4 Rails selection

Monitor suspension rails in different lengths can be selected. Please refer to the GTC or contact the GE representative.

3.3.3 Open Monitor suspension (option)

Attention must be paid to the height of suspended elements of the open suspension, collision must be avoided with the gantry.

Illustration 2-65: Potential collision between Lateral gantry/carriage and detector lift



3.4 Wall Requirements

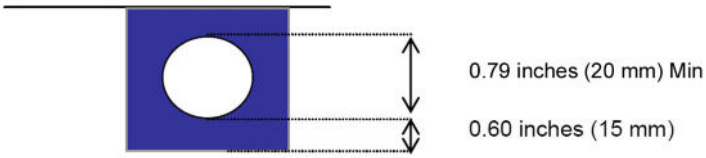
The C1 Cabinets, the C2 Cabinet, the PDB Cabinet and LD cabinet (optional) must be securely fastened to the wall to prevent them from tipping.

The optional LD secondary monitor outside the patient room is mounted on wall. The swingout arm that holds the LD additional monitor shall be mount according to the manufacturer mounting manual, see *Articulating Arm Wall Mount Installation Manual* in *OEM manuals list*.

An hooking point shall be provided in order to uplift the LD additional monitor at the swingout arm level during its installation:

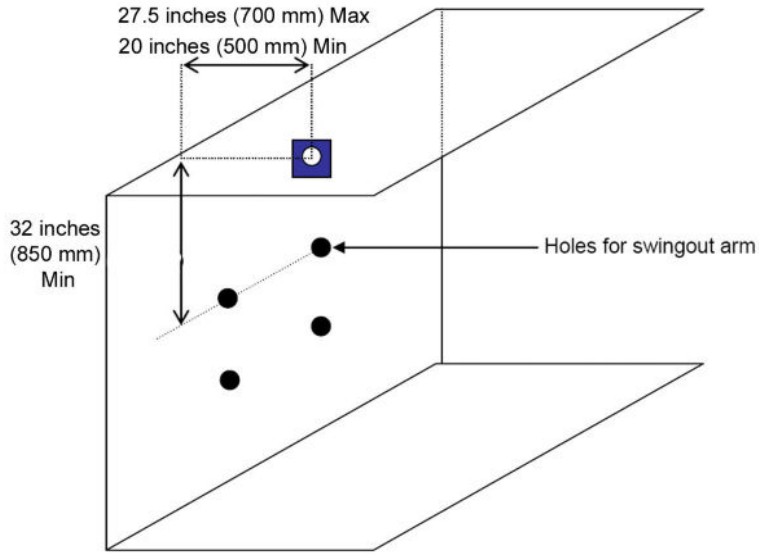
- Hooking point characteristic: It must withstand up to 440 lbs (200 Kgs)
- Hooking point position:

Illustration 2-66: Hooking point position



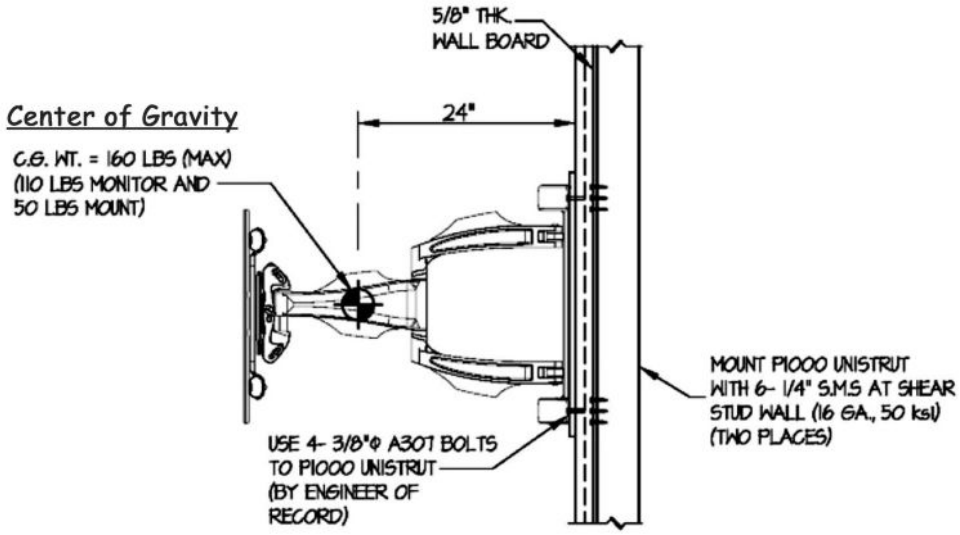
- Recommended hooking point dimensions:

Illustration 2-67: hooking point dimensions



The position of the Swing out arm Center of Gravity (with weights) is given below.

Illustration 2-68: Swing out arm Center of Gravity



4 Seismic

4.1 Seismic areas

4.1.1 Floors

Chiller: The seismic kit for both Chillers SMC is included with the chiller when shipped..

LD cabinet : the seismic kit to fasten the LD cabinet to the wall is included with the cabinet when shipped.

In Seismic areas all cabinets must be anchored to the floor. See System Compatibility for referential documents. Frontal C1, Lateral C1 & C2 Cabinets: Wall support 2285242.

Every sub–system is delivered on site with its proper seismic kit.

- Monitor Flat Panel Seismic Kit: 2353317
- VCIM seismic kit: 2365510.

4.1.2 Walls

Anti–seismic means be installed before opening the system for normal use.

Consider local seismic codes when planning cabinet mounting. Consult seismic expert to determine which mounting method is appropriate for the seismic region. Certain seismic regions require additional reinforcement in walls. See System Compatibility for referential documents.

4.2 Seismic Calculations

Seismic requirements are determined and specified by the hospital/ Design Professional of record and may require approval by the specific state or country agency.

Seismic attachment hardware shown on seismic calculations may differ from hardware supplied with system. Any additional hardware that is required will be the responsibility of the institution and/or their contractor. Contact your local GE Installation Program Manager to obtain seismic calculations.

Seismic calculations are per California Building Code (CBC) and International Building Code (IBC).

Chapter 3 Special Construction Requirements

1 Radiation Protection

Because x–ray equipment produces radiation, special precautions may be needed or special site modifications may be required. The General Electric Company does not make recommendations regarding radiation protection. It is the purchasers' responsibility to consult a radiation physicist for advise on radiation protection in x–ray rooms.

2 EMI Consideration

IEC60601-1-2 Electromagnetic Standard Compliance & Documentation

The information contained in this section is also found in the Innova system Operator Manual.

2.1 General Scope

This equipment complies with IEC-60601-1-2: Edition 2.1 and Edition 3 EMC standard for medical devices.

The Innova system is suitable to be used in the electromagnetic environment, as per the limits & recommendations described in the tables here after:

- Emission Compliance level & limits (Table 3-1).
- Immunity Compliance level & recommendations to maintain equipment clinical utility (see Table 3-2, Table 3-3 and Table 3-4).

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

2.2 Electromagnetic Emission

The Innova system is intended for use in the electromagnetic environment specified below. The purchaser or user of the Innova system should assure that it is used in such an environment.

Table 3-1:

Emissions	Test Compliance	Electromagnetic Environment
Radio–Frequency emissions CISPR11	Group1 Class A limits	The Innova system uses Radio Frequency energy only for its internal function. Therefore, its Radio Frequency emissions are very low and are not likely to cause any interference in nearby electronic equipment.
		The Innova system is suitable for use in all establishments other than domestic and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	The Innova system is suitable for use in all establishments other than domestic and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not applicable	The Innova system is suitable for use in all establishments other than domestic and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.

2.3 Electromagnetic Immunity

2.3.1 Electromagnetic Immunity IEC 60601-1-2

The Innova system is intended for use in the electromagnetic environment specified below. The purchaser or user of the Innova system should assure that it is used in such an environment.

Table 3-2:

Immunity Test	IEC 60601–1–2 Test Level	Compliance Level	Electromagnetic Environment
Electrostatic discharge (ESD) IEC 61000-4-2	+/-6 kV contact +/-8 kV air	+/-6 kV contact +/-8 kV air	Floors are wood, concrete, or ceramic tile, or floors are covered with synthetic material and the relative humidity is at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	+/-2 kV for power supply lines +/-1 kV for input/ output lines	+/-2 kV for power supply lines +/-1 kV for input/ output lines	Mains power quality is that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	+/-1 kV line(s) to lines(s) +/-2 kV line(s) to earth	+/-1 kV line(s) to lines(s) +/-2 kV line(s) to earth	Mains power quality is that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0 % U_n for 5 sec	0 % U_n for 5 sec	Mains power quality is that of a typical commercial or hospital environment. If the user of the Innova system requires continued operation during power mains interruptions, it is recommended that the Innova system be powered from an uninterruptible power supply.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields are at levels characteristic of a typical location in a typical commercial or hospital environment.
Note: U_n is the AC mains voltage prior to application of the test level.			

The Innova system is intended for use in the electromagnetic environment specified below. The purchaser or user of the Innova system should assure that it is used in such an environment.

Table 3-3:

Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment
Conducted Radio Frequency IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	V_1 = 3 V	Portable and mobile RF communications equipment is used no closer to any part of the Innova system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance:** $d = [3.5/V_1]\sqrt{P}$ $d = [3.5/E_1]\sqrt{P}$, from 80 MHz to 800 MHz $d = [7/E_1]\sqrt{P}$, from 800 MHz to 2.5 GHz 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(1), are less than the compliance level in each frequency range(2). Interference may occur in the vicinity of equipment marked with the following symbol: 
Radiated Radio Frequency IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz See statement below for Large Permanently Installed Medical Equipment.	E_1 = 3 V/m See statement below for Large Permanently Installed Medical Equipment.	

NOTE: (1): Field strengths from fixed transmitters, such as base stations for cellular telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be theoretically estimated accurately. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be performed. If the measured field strength exceeds the RF compliance level above, observe the Innova system to verify normal operation in each use location. If abnormal performance is observed, additional measures may be necessary, such as re–orienting or relocating the Innova system.

(2): Over the frequency range 150 kHz to 80 MHz, field strengths are less than 3 V/m.

⚠WARNING

THE INNOVA IGS SYSTEM IS A LARGE, PERMANENTLY-INSTALLED MEDICAL EQUIPMENT FOR WHICH THE SIMULATED OPERATION IN AN ANECHOIC CHAMBER IS NOT FEASIBLE AND CONSEQUENTLY IS EXEMPT FROM THE TESTING REQUIREMENT SPECIFIED BY IEC 61000-4-3.

The Innova IGS system has not been tested for radiated RF IMMUNITY over the entire frequency range 80 MHz to 2.5 GHz.

The Innova IGS system has been tested in situ for radiated RF IMMUNITY only at selected frequencies in the range 80 MHz to 2.5 GHz.

ISM Frequency (MHz)	Field Level	Modulation
433.920 (ISM)(1)	3 V/m	80 % AM at 1 kHz rate
915 (ISM)(1)		
1440		
1750		
1920		
2450 (ISM)(1)		

NOTE: (1): Industrial, Scientific and Medical (ISM) radio bands.

Equipment used for tests:

- RF signal generator,
- RF power amplifier,
- Transmitting antenna,
- Field sensor,
- Field meter.

The Recommended Separation Distances are listed in Table 3-4.

These are guidelines. Actual conditions may vary.

2.3.2 Recommended Separation Distances for Portable and Mobile RF Communications Equipment IEC 60601-1-2

Table 3-4:

Frequency of Transmitter	150 KHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
Equation	$d = [3.5 / V_1]\sqrt{P}$	$d = [3.5 / E_1]\sqrt{P}$	$d = [7 / E_1]\sqrt{P}$
Rated Power of Transmitter (watts)	Distance (meters)	Distance (meters)	Distance (meters)
0.01	0.11	0.11	0.22
0.1	0.37	0.37	0.74
1	1.1	1.1	2.3 (*)
10	3.7	3.7	7.4
100	12	12	23

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

NOTE: These are guidelines. Actual conditions may vary.

2.4 Limitations Management

Adhering to the distance separation recommended in Table 3-4, between 150 KHz and 2.5 GHz, will reduce disturbances recorded at the image level, but may not eliminate all

disturbances. However, when installed and operated as specified herein, the system will maintain its essential performance by continuing to acquire, display, and store diagnostic quality images safely.

For example, a 1 W mobile phone (800 MHz to 2.5 GHz carrier frequency) shall be put 2.3 meters (see (*) Table 3-4) apart from the Innova system (in order to avoid images interferences risks).

2.5 Use Limitation

⚠WARNING

THE USE OF ACCESSORIES, TRANSDUCERS, AND CABLES OTHER THAN THOSE SPECIFIED MAY RESULT IN DEGRADED ELECTROMAGNETIC COMPATIBILITY OF THE INNOVA SYSTEM.

In case of an Innova system, the Gantry (digital detector) shall be apart 1 meter from the generator cabinet, and 1 meter apart from the analog (CRT) monitors. These distances specifications shall minimize the low frequency magnetic field interference risk.

Other electrical equipment may disturb and interfere with these Innova components. The control of the clearing distances from the noise sources is recommended from the HF electrosurgery generator, power supplies converters from nearby monitors or from other close electrical equipment). Refer to respective device manufacturers instructions & recommendations in such cases.

2.6 Installations Requirements & Environment Control

NOTICE

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

- Cables shielding & grounding:

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

- Separated Power supply distribution panel & separated power line:
  - This product complies with the radiated emission limits as per the CISPR11 Group1 Class A standard.
  - The Innova system is predominantly intended for use (e.g. in hospitals) with a dedicated supply system, and with an X–Ray shielded room.
  - In case of using in a domestic environment (e.g. doctors' offices), in order to avoid interferences, it is recommended to use a separated AC power distribution panel & separated power line, and an X–Ray shielded room.

- Subsystems, options & accessories Power supply distribution:

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

  NOTE: In order to avoid interferences, the same AC power distribution panel should supply all Innova system components, accessories, subsystems and options as the Advantage Workstation, and the UPS. That same AC power distribution panel should be supplied by a separated AC power line (coming from a separated transformer line and winding).

- Stacked components & equipment:

  The Innova system should not be used adjacent to or stacked with other equipment; if adjacent or stacked use is necessary, the Innova system should be observed to verify normal operation in the configuration in which it will be used.

- Low frequency magnetic field:

  In case of an Innova system, the Gantry (digital detector) shall be apart 1 meter from the X-Ray generator cabinet, 1 meter from the PDB cabinet, 3 meters from the UPS cabinet, and 1 meter apart from monitors. These distances specifications shall minimize the low frequency magnetic field interference risk.

- Static Magnetic Field Limits: The Innova system is compatible with the Earth magnetic Field. Earth magnetic Field is lower than 1 Gauss.

- Electrostatic discharges environment & recommendations:

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

Chapter 4 Environmental Requirements

1 Relative Humidity and Temperature

NOTICE

Avoid extremes in temperatures

Innova system room climate requirements – relative humidity and temperature. Individual products or components are classed by their installation area for **in use** see Table 4-1,

Individual products or components are classed separately for **Storage**, see Chapter 1, Product Storage and Handling Requirements.

NOTE: Due to the differential in temperature / humidity between the clinical room and the room below, the floor creates condensation within the gantry / patient table resulting in part failure or rusting inside the gantry / patient table.

For systems that are planned to be installed on higher level (second floor or above), the temperature and humidity of the rooms that are directly below the gantry room should be maintained same as the exam room requirement. Failure to do so will void the equipment warranty. Avoid above grade installations where the temperature is high in the area below the gantry / table cables exit if at all possible.

Table 4-1: In use - Humidity and Temperature

INSTALLATION ROOM OF PRODUCT OR COMPONENT	RELATIVE HUMIDITY (NON- CONDENSING)		TEMPERATURE			
	IN-USE		IN-USE (See Note (2a))		RECOMMENDED (See Note (2b))	
	MIN	MAX	MIN	MAX	MIN	MAX
Examination room	30%	70%	+15°C +59°F	+32°C +90°F	Design for Patient/ Operator Comfort	
Technical room (See Note (1))	30%	75%	+10°C +50°F	+32°C +90°F	+13°C +55°F	+25°C +77°F
Technical room with Fluoro UPS optional	30%	75%	+20°C +68 °F	+25°C +77°F	+20°C +68 °F	+25°C +77°F
Control room	30%	75%	+15°C +59°F	+35°C +95°F	+20°C +68°F	+25°C +77°F

NOTE: (1): The target temperature (best recommended) is 18°C (64°F).

The target humidity (best recommended) is 50% RH.

NOTE: (2a): **In use temperature limits** specify the range where the system shall work. Operating outside these limits could occur severe performance and reliability issues.

(2b): **Recommended temperature limits** specify the range where it is recommended to adjust air conditioning control in order to warranty current operations inside the in use range.

Relative Humidity and Temperature: Refer to Table 4-1. To obtain relative humidity and temperature requirements for components not specified in Table 4-1, refer to the appropriate component Pre–Installation Manual listed in Chapter 2, System Compatibility.

NOTICE

In some cases condensation occurs and water drops from outlets and pipes of the air conditioner in the technical room.

Therefore, it is critical to install the cabinets where there is no risk of flood from the air conditioner.

2 Altitude and Atmospheric Pressure

Refer to Table 4-2. To obtain altitude and atmospheric pressure requirements for components not specified in Table 4-2, refer to the appropriate component Pre–Installation Manual listed in Chapter 2, System Compatibility.

For storage and transport, individual products or components are classed separately, refer to Chapter 1, Product Storage and Handling Requirements.

Table 4-2: Altitude and Atmospheric Pressure

INSTALLATION ROOM OF PRODUCT OR COMPONENT	ALTITUDE (meters)		ATMOSPHERIC PRESSURE (kPa)	
	IN-USE		IN-USE	
	MIN	MAX	MIN	MAX
Examination room	0	2000	79,4	106
Technical room	0	2000	79,4	106
Control room	0	2000	79,4	106

3 Heat Output

3.1 Equipment Heat Output Tables

Refer to Table 4-3. To obtain heat output information for components not specified in Table 4-3, refer to the appropriate component Pre–Installation Manual listed in Chapter 2, System Compatibility.

Table 4-3:

		HEAT OUTPUT							
		Stand by		Moderate Use (8 cases / a 10 hour day)		Typical Use (13 cases / a 10 hour day)		Maximum Use (maximum peak power during exam)	
Room	**Core System**	**kW**	**BTU/hr**	**kW**	**BTU/hr**	**kW**	**BTU/hr**	**kW**	**BTU/hr**
Exam Room	Innova Frontal/Lateral positioner and table	0.61	2076	0.75	2540	1.21	4128	1.62	5517
Ctrl Room	DL user area with 1 TFT monitor	0.16	546	0.16	546	0.16	546	0.16	546
	3 B&W flat monitors	0.25	859	0.25	859	0.25	859	0.25	859
	Ctrl Room Total	**0.41**	**1405**	**0.41**	**1405**	**0.41**	**1405**	**0.41**	**1405**
Tech Room	C1 Frontal Cabinet	0.71	2421	0.99	3389	1.29	4412	1.59	5435
	C1 Lateral Cabinet	0.31	1057	0.56	1923	0.86	2946	1.16	3969
	C2 Cabinet	0.29	989	0.83	2813	1.34	4571	1.81	6171
	Coolix 4100 chiller Frontal & Lateral @ 50Hz (1) (2)	1.55	5288.6	2.1	7165	2.72	9280.64	5.5	18766
	Coolix 4100 chiller Frontal & Lateral @ 60Hz (1) (2)	2.32	7915.84	2.8	9553	3.44	11737.28	6.3	21495.6
	Chiller autotransformer @ 50Hz	0.04	136.48	0.048	164	0.045	153.54	0.065	221.78
	Chiller autotransformer @ 60Hz	0.06	204.72	0.064	218	0.07	238.84	0.09	307.08
	Detector conditioner Frontal	0.21	709	0.21	709	0.21	709	0.21	709
	Detector conditioner Lateral	0.21	709	0.21	709	0.21	709	0.21	709
	Main disconnect panel PDB	0.60	2216	0.65	2216	0.65	2216	0.65	2216
	3kVA Cabinet UPS - model 9130 (4)	0.37	1257	0.37	1257	0.37	1257	0.37	1257
	Tech Room Total	**7.54**	**25885**	**12.29**	**41888**	**15**	**51153**	**19.65**	**67003**
Total for core system		**8.56**	**29366**	**13.44**	**45832**	**16.63**	**56685**	**21.68**	**73925**
Room	Options (3)	Stand by		Moderate Use		Typical Use		Maximum Use	
Exam Room	7 in room B&W TFT monitors	0.59	2005	Same values as Stand by		Same values as Stand by		Same values as Stand by	

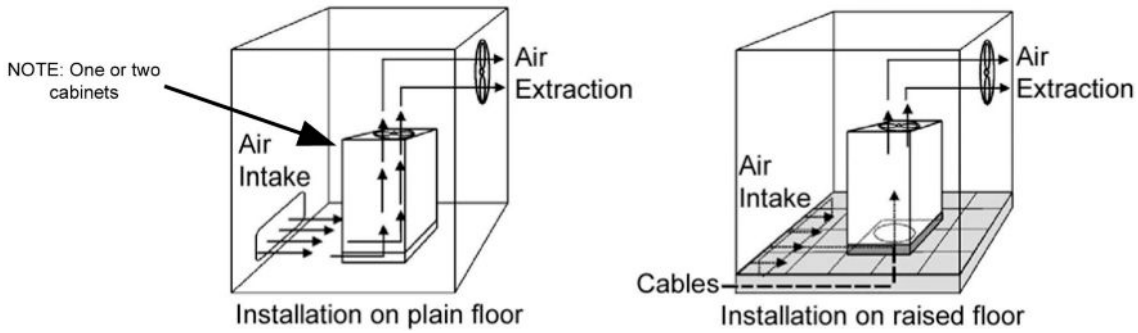
		HEAT OUTPUT							
		Stand by		Moderate Use (8 cases / a 10 hour day)		Typical Use (13 cases / a 10 hour day)		Maximum Use (maximum peak power during exam)	
Room	**Core System**	**kW**	**BTU/hr**	**kW**	**BTU/hr**	**kW**	**BTU/hr**	**kW**	**BTU/hr**
	In room AW TFT monitor	0.12	409						
	Typical injector	0.09	320						
	LD Monitor	0.5	1706						
	Exam room total	**1.3**	**4440**						
Ctrl Room	AW work station	0.35	1201						
	2 AW TFT monitors	0.24	818						
	Printer	0.31	1054						
	LD Monitor (5)	0.5	1706						
	Ctrl room total	**1.4**	**4779**						
Tech Room	LD Cabinet	1.0	3412						
	3kVA Cabinet UPS - model 9130 (4)	0.37	1257						
	Tech Room Total	**1.37**	**4669**						
Typical configuration without fluoro UPS		**10.27**	**35173**	**15.15**	**51640**	**18.33**	**62493**	**23.39**	**79732**
Note (1): Air flow requirements 1200 m^3/h (706 CFM)									
Note (2): For more details, consult appropriate pre–installation manual									
Note (3): For UPS 20 kVA option refer to Section 3.2									
Note (4): On batteries heat output = 0.52 kW / 1755 BTU									
Note (5): The 2nd optional LD monitor is not necessarily in the control room. It may be installed in the exam room (outside patient vicinity).									

⚠CAUTION

Make sure there is a ventilation air flow, preferably ensured by natural air flow, otherwise by enforced ventilation, so that hydrogen concentration is below 1% (according to Standard IEC 62040-1-2).

3.2 Fluoro UPS Option

Illustration 4-1:



The heat produced by the UPS is transferred to the environment by its ventilation. Cooling air enters the cabinets through the air inlet (grids) located at the bottom and exhausted through the outlet on the roof. A suitable ventilation or cooling system must be installed to extract the heat from the UPS room.

NOTICE

Do not put anything on the top of the cabinet.

If the UPS is placed on a raised floor, the airflow for UPS cooling should enter from underneath the UPS, through the appropriate aperture on the raised floor.

If the UPS runs in a dusty environment, we recommend strongly to install filters on the air inlet of the UPS room. In this case it should be considered that these filters can cause reduced speed at the air inlet.

The size of the air inlet has therefore to be dimensioned accordingly.

Contact your Local Distributor or one of the Service Centre, which will help you to find valuable solutions.

Table 4-4 indicates the typical heat dissipation at nominal load and specify cooling air flow in two situations:

- 1000 m (3280 ft) altitude, cooling air between 25°C (77°F) and 30°C(86°F)
- 250 m (820 ft) altitude, cooling air below 18°C (64°F)

Table 4-4:

Fluoro UPS	Typical heat output	On–line cooling air flow at 30°C / 86°F	Typical on-line cooling air flow at 18°C / 64°F
CE version	1.50 kW (5101 BTU/hr)	625 m^3/h (368 CFM)	227 m^3/h (134 CFM)
UL version	4720 BTU/hr (1.38 kW)	301 CFM (511 m^3/h)	119 CFM (203 m^3/h)

3.3 Large Display Subsystem Option

NOTICE

The Large Display Cabinet requires a cooling system to keep ambient temperature below 35 ºC (95 ºF).

The heat produced by the Large Display Cabinet is transferred to the environment by its ventilation. Cooling air enters the Large Display cabinet through the air inlet (grids) located at the front and exhausted through the outlet on the rear & from underneath the Large Display Cabinet. A suitable ventilation or cooling system must be installed to extract the heat from the Large Display Cabinet room

Ventilation holes must not be covered or closed; otherwise the heat generated in the device cannot be dissipated sufficiently.

Avoid dusty environments:

The Large Display Monitor has been designed for use in the clean environment of medical diagnostics. The Large Display Monitor dissipates heat through the openings at the rear. Dust from dirty environments can penetrate into the display through these openings. In the extreme case, deposits are possible which become evident as dark spots in a white picture and which can result in deterioration of the luminance. Protect the display from dust, e.g. during building measures at the installation location, and use the original packaging for transport.

NOTICE

Do not put anything on the top of the Large Display cabinet.

If the Large Display Cabinet runs in a dusty environment, we recommend strongly installing filters on the air inlet of the Large Display Cabinet room. In this case it should be considered that these filters can cause reduced speed at the air inlet. The size of the air inlet has therefore to be dimensioned accordingly.

NOTICE

If installed in the technical room, the Large Display Cabinet may impact its layout. It may also be installed in a separate technical room. This depends on hospital constraints, local regulations or EHS rules. Clearance, weight of Large Display Cabinet, airflow and cooling system should be adapted for the Large Display Cabinet.

Make sure that local regulations have been applied for the installation of the Large Display Cabinet (dedicated room/fire detection etc.)

NOTE: Refer to the Large Display Subsystem vendor Service manual for more details

NOTICE

Ventilation instructions:

- **The Large Display Cabinet must be placed in a sufficiently ventilated area; the ambient temperature should not exceed 95°F (35°C).**
- **Clearance around the front of the unit should be sufficient to enable free passage of personnel with the doors fully open, and to allow sufficient airflow to the door vents – Min. 100cm / 40”**
- **It is important that air can move freely around and through the LD Cabinet. Do not block the air vents.**
- **Avoid locations in direct sunlight or near heat sources.**

4 Acoustic Specifications

Audible noise:

- Less than 50 dB (A) at 1 meter for an Innova Frontal Positioner.
- Less than 50 dB (A) at 1 meter for an Innova Lateral Positioner.
- Limited to 50 dB (A) at 1 meter for Omega V table.
- Limited to 55 dB (A) at 1 meter for C2 Cabinet (Frontal/Lateral).
- Limited to 60 dB (A) at 1 meter for the Coolix 4100 chiller.
- Limited to 65 dB (A) at 1 meter for C1 Frontal Cabinet.
- Limited to 65 dB (A) at 1 meter for C1 Lateral Cabinet.
- Limited to 52 dB (A) (background of 35 dB (A)) at 1 meter for Digital Detector Conditioner Thermo–Con.
- Less than 50 dB (A) at 1 meter for a DL LCD monitor.
- Less than 50 dB (A) at 1 meter for the Fluoro UPS.

The values contained inTable 4-5 are the results of the measurement performed on the first system with 31 cm Revolution Digital detector installed on a clinical site.

Table 4-5: Gantry Noise measurements

Measurements	Gantry (FRT, LAT, both)	Gantry positions	Peak (db)	Mean (db)
Ambient (System off)		1	N/A	55.7
System ON (no motion, no X-Ray)		2	N/A	58.2
Motions	FRT (Detector lift)	1	86.2	66.3
	LAT (C-Arc)	2	86.3	63.7
	FRT and LAT	2	85.1	66.9
First scopie (anode acceleration)	FRT	1	80.2	60.3
	LAT	2	80.3	59.6
Fluoro	FRT	1	79.7	59.2
	LAT	2	79.5	59.1
	FRT and LAT	2	79.8	60.2

NOTE: Noise generated by system cabinets all together is 70dB. If cabinets are installed too close to the exam room (e.g. behind sliding doors) appropriate measures have to be implemented during the pre-installation to effectively reduce noise in the exam room.

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Chapter 5 Electrical Requirements

1 Power Requirements

1.1 Electrical Requirements

Innova System requires a specific power line, with three phase (see Illustration in Power Distribution).

Table 5-1: Core system

Nominal voltage	Frequency	Power consumption		Type of power input	
		Nominal (at 125 kV, 100 ms, 640 mA)	Peak	Without Fluoro UPS	With Fluoro UPS
380 V ± 10 %	50 Hz or 60 Hz (± 3 Hz)	60 kVA	150 kVA	3~	3N~
400 V ± 10 %					
415 V ± 10 %					
480 V ± 10 %	60 Hz (± 3 Hz)				

The Hospital circuit breaker should fit the current protection of the Innova system:

- 150A/ 480V, 3 Phases for UL
- 80A/ 380V/400V/415V, 3 Phases for CE

Table 5-2: Options

Option	Nominal voltage	Frequency	Nominal Power consumption	Type of power input
LDM	100-120 V / 220-240 V	50 Hz or 60 Hz (± 3 Hz)	3 kVA	Single phase
AW	100-127 V / 200-240 V	50 Hz or 60 Hz	11 A / 5.5 A	Single phase
S5I GE	100-120 V / 230 V	50 Hz or 60 Hz	400 VA	Single phase

NOTE: PDB maximum rating is equal to 211 kVA.

Large Display Option requires an additional power line for Large Display Cabinet (see illustration in Power Distribution).

This power line should fit the current protection requirement of Large Display Cabinet:

- 30A /120V / AWG10 (UL option)
- 30A /120V / AWG10 (CE option)

NOTICE

Line impedance should be compliant with IEC 601.2.7 Refer to the table *Max Line Impedance for feeder line between Generator cabinet and Hospital* in Power and Grounding Recommendations.

⚠WARNING

PRIOR TO EACH INSTALLATION, ENSURE THAT THE ECG POWER CABLE IS CONNECTED TO A LINE THAT IS PROTECTED AGAINST SHORT CIRCUIT HAZARDS, ACCORDING TO LOCAL REGULATIONS AND THAT THE ECG MONITOR IS POWERED ACCORDING TO IEC60601-1 REQUIREMENTS (LEAKAGE CURRENT AND GROUNDING).

NOTICE

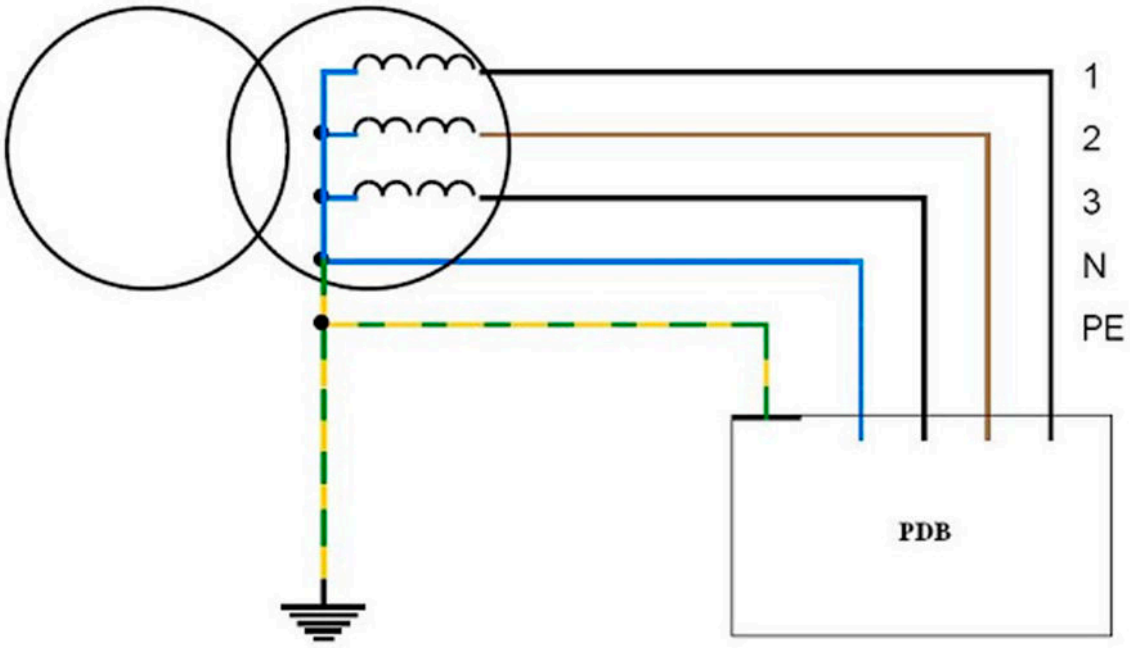
When a Fluoro UPS is or will be installed, a Neutral line is mandatory. If IT scheme as earthing system is used, an isolation transformer is required with Delta-Wye or Delta-Star connection.

Optional Isolation transformer specifications:

It shall be :

- Secondary star 3Ph+N
- 150 kVA minimum for input voltage of 380V and 400V. 100 kVA minimum for input voltage of 415V and 480V
- Power distribution shall be of TNS type with Neutral grounded
- The transformer impedance shall be 4.5% or less (this parameter is also called %Z or short circuit voltage)

Illustration 5-1: TNS scheme

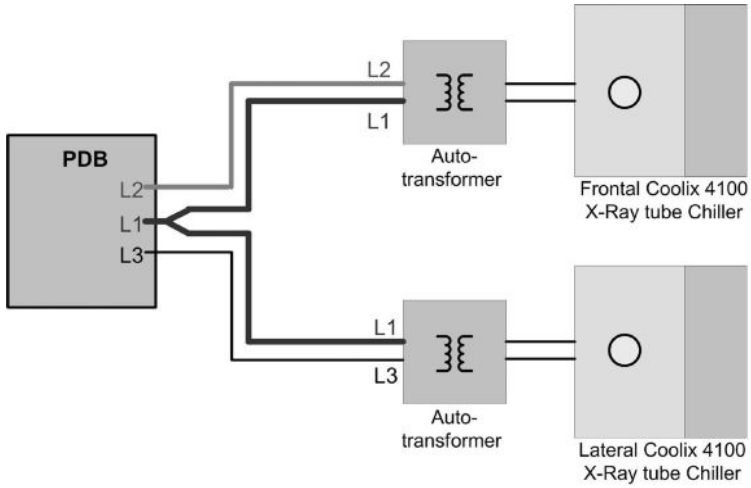


1.1.1 Power configuration for Coolix 4100 Chillers

Both frontal and lateral Coolix 4100 chillers are powered from 2 phase supply :

- 1st Chiller by phases L1 and L2
- 2nd Chiller by phases L1 and L3

Illustration 5-2: Power configuration for Coolix 4100 Chillers



A non-continuity measurement must be made between phase L2 of the frontal autotransformer and phase L3 of the lateral autotransformer.

A continuity measurement must be made between phase L1 of the frontal autotransformer and phase L1 of the Lateral autotransformer.

⚠WARNING

MEASUREMENTS SHOULD BE PERFORMED ON A SYSTEM OFF.

1.1.2 Large Display Monitor System special instructions:

⚠WARNING

THERE IS A DANGER TO LIFE IF WARNINGS ARE NOT OBEYED. SEVERE PERSONAL INJURY OR DAMAGE TO EQUIPMENT MAY OCCUR.

DO NOT INSERT ANY OBJECTS INTO THE HOUSING
OBJECTS INSERTED INTO THE HOUSING MAY RESULT IN DAMAGE TO THE UNIT OR PERSONAL INJURY.
DO NOT PLACE ANY OBJECTS ON TOP OF THE LARGE DISPLAY CABINET.
LIQUID ENTERING THE UNIT MAY RESULT IN FIRE OR ELECTRIC SHOCK.

Backup power instructions:

The Large Display subsystem is powered by the Hospital mains single phase electrical power. It is not supplied by the Fluoro UPS in case of power outage, but by its own 3kVA UPS.

1.1.3 Customer Requirements:

- Large Display Option:

  - The customer shall provide the power supply cables between the transformer and the UPS of the LD cabinet (for LD system option).
  - The LDM optional system must be powered through a wall circuit breaker or equivalent device with LOTO capability. This circuit breaker must have a 30 amps current rating. Procurement, delivery and installation of this device is customer responsibility.
- The customer shall provide Power supply cables between the main transformer and the system:
  - Main supply: 3 phases + 1 ground (+ 1 neutral if Fluoro UPS option present)
  - Cables from PDB to Jedi (LAT and FRT)
  - Cables from PDB to Tube Chillers (LAT and FRT)
  - Cable from PDB to modular PDU inside C2 cabinet
  - Cable from PDB to the fluoro UPS
- Injectors: If Injector is not powered by the PDB, it is the customer responsibility to ensure the compliance of installation by referring to injector's documentation.

1.2 Power Distribution

NOTE: All short AC power cable less than 3 meters, between peripherals and respective power strip, are not shown. All have a single phase line, a neutral line and a ground wire.

NOTE: Large Display Cabinet can provide power to an optional secondary large monitor outside of the patient vicinity.

Illustration 5-3: Power distribution - CE

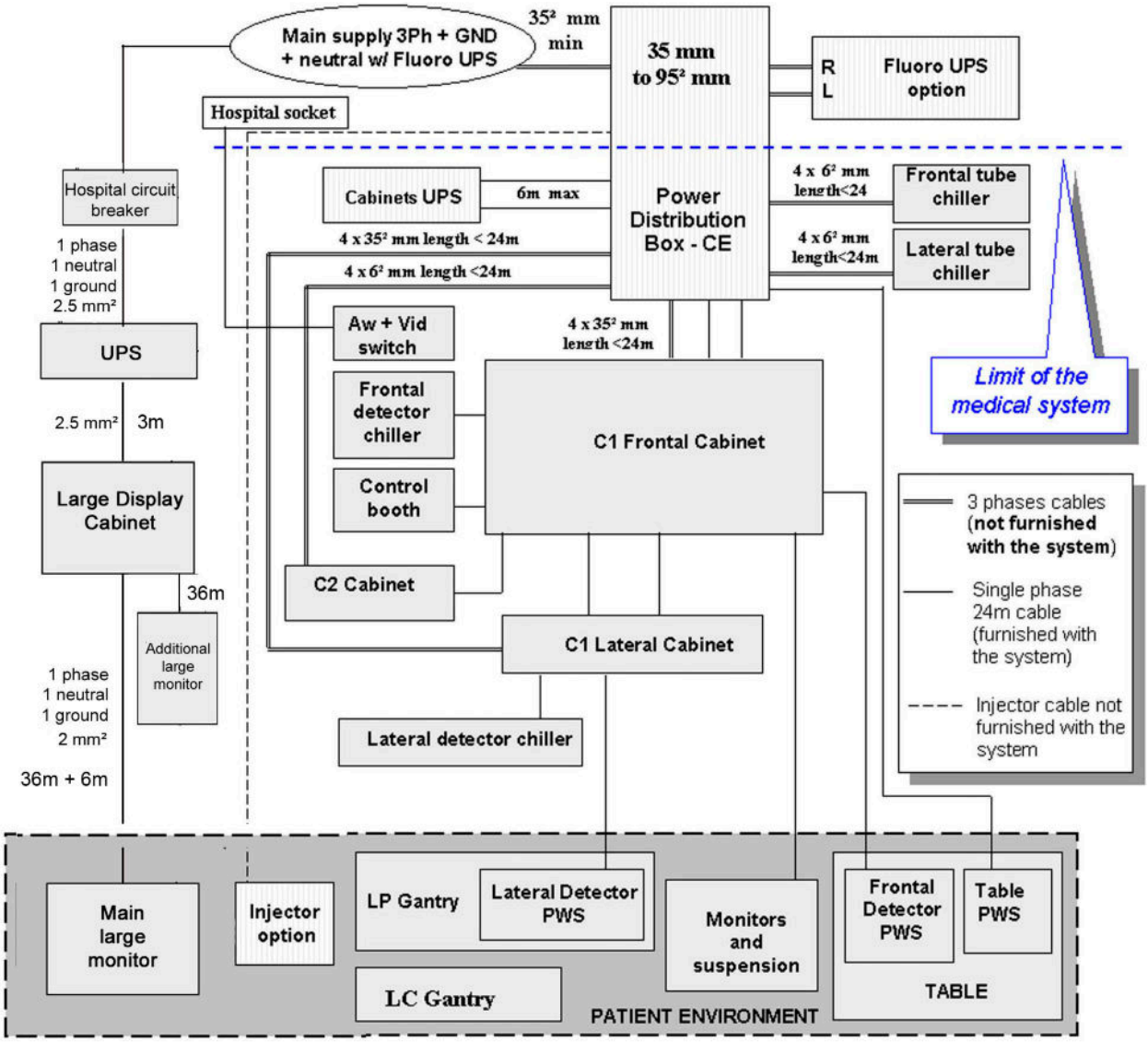
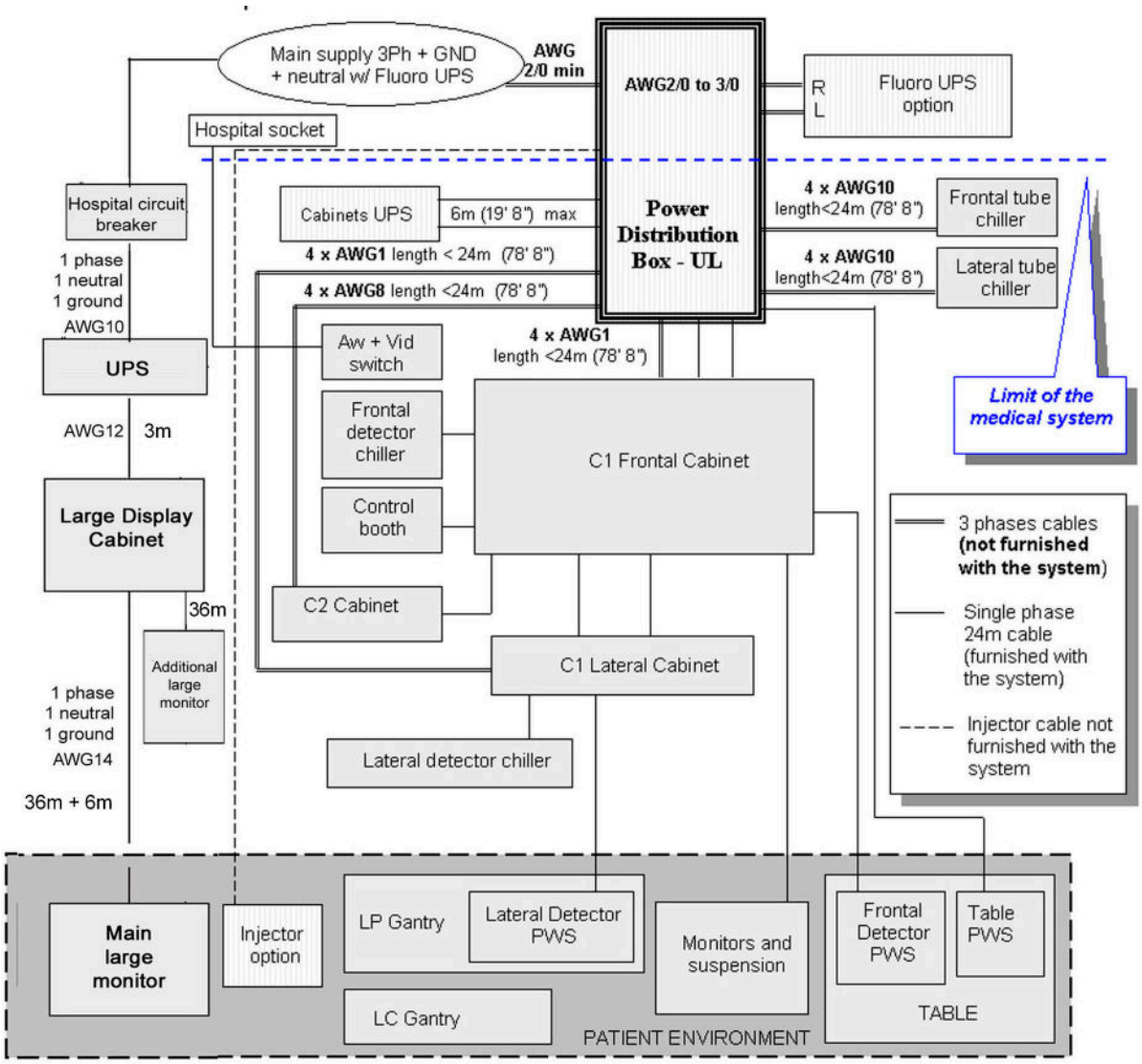


Illustration 5-4: Power distribution - UL



Cable	CE UPS configuration		UL UPS configuration			Max length
	Recommended (1)	Type	Max gauge	Recommended (1)	Type	
R rectifier	5 x 10 mm²	3ph+N+PE	AWG3	AWG6	3ph+N+PE	24 m (78ft 8in)
L out /load	5 x 10 mm²	3ph+N+PE	AWG3	AWG6	3ph+N+PE	24 m (78ft 8in)

(1) Size and type may be adapted locally per local regulation.

NOTE: Electrical contractor is responsible for providing the power cables from Hospital mains to Large Display UPS and the ground cable from Hospital mains to Large Display Cabinet as per local regulations.

1.3 Emergency Failure

During an examination, any operator can encounter two main cases of failures.

1.3.1 Main power supply cut

In this case, refer to Physical Runs.

1.3.1.1 Partial UPS Fluoro (option)

A Fluoro UPS (20 kVA) has been designed for systems with 21 & 31 cm detector. This partial UPS lets the customer complete an exam in fluoro mode in case of a power failure. The autonomy provided by this UPS is 5 minutes of fluoro every 24 hours.

⚠WARNING

DO NOT CONNECT THE UPS BATTERIES PRIOR THE COMMISSIONING OF THE UPS (INITIAL POWER UP).

NOTICE

General safety instructions

- **Move the UPS in an upright position in its original package to the final destination room.**

  To lift the cabinets, use a forklift or lifting belts with spreader bars.
- **Check for sufficient floor and elevator loading capacity.**
- **Check the integrity of the UPS equipment carefully.**
- **If you notice visible damage, do not install or start the UPS. Contact the nearest Service Center immediately.**

  WARNING! RISK OF ELECTRICAL SHOCK: Do not remove covers; there are no user serviceable parts inside.
- **All installation, maintenance and service work should be performed by qualified service personnel.**

  The UPS contains its own energy source (battery).
- **The field–wiring terminals may be electrically live, even when the UPS is disconnected from the utility.**
- **Dangerous voltages may be present during battery operation. The battery must be disconnected during maintenance or service work.**
- **This UPS contains potentially hazardous voltages.**
- **Be aware that the inverter can restart automatically after the utility voltage is restored.**

NOTICE

Installation safety instructions:

- Contractor responsibility:
  - Electrical contractor is responsible for providing and connecting the cables and configuring the PDB in by-pass mode.
  - GEHC is responsible for powering on the system with the UPS in by-pass mode.
  - GEDE is responsible for UPS comissioning.
- After removing the sidewalls of the UPS, make sure that all earth connections when reassembling, are correctly reattached.
- This UPS is intended for use in a controlled indoor environment free of conductive contaminants and protected against animals intrusion.
- HIGH GROUND LEAKAGE CURRENT: Ground connection is essential before connecting to AC input!

  For Europe only, if a differential breaker is placed on the hospital main supply, upstream the PDB, the differential shall be set to 300 mA.
- Switching OFF the unit does not isolate the UPS from the utility.
- Do not install the UPS in an excessively humid environment or near water.
- Avoid spilling liquids on or dropping any foreign object into the UPS.
- The unit must be placed in a sufficiently ventilated area; the ambient temperature should not exceed 104°F (40°C).
- Optimal battery life time is obtained if the ambient temperature does not exceed 77°F (25°C).
- It is important that air can move freely around and through the unit. Do not block the air vents.
- Avoid locations in direct sunlight or near heat sources.
- Check local regulations for UPS installation.

NOTICE

Storage safety instructions:

- Store the UPS in a dry location; storage temperature must be within –13°F (–25°C) to 131°F (55°C).
- If the unit is stored for a period exceeding 3 months, the battery must be recharged periodically (time depending on storage temperature).

NOTICE

Battery safety instructions:

- **The battery–voltage is dangerous for person's safety.**
- **Never dispose of battery in a fire: They may explode.**
- **Do not open or mutilate battery: Their contents (electrolyte) may be extremely toxic.**

  If exposed to electrolyte, wash immediately with plenty of water.
- **Avoid charging in a sealed container.**

1.3.1.2 Full UPS Record (compatability)

An UPS sized for a minimum of 160 kVA is required to supply the system in record mode. Such an UPS would provide to the customer about 10 minutes of autonomy.

The UPS output shall follow the same output specifications as shown in *Optional Isolation transformer specifications* in Electrical Requirements.

Contact your local GE Healthcare representative for more information and/or public power distribution analysis.

1.3.2 System failure

In the event of a system failure with a patient on table during an examination, the operator can utilize a Surgical Imaging mobile unit to finish the examination.

In this case a wall outlet single phase + ground is required to feed the mobile. It is also requires a free space around the patient table to proceed with the mobile instead of Frontal Positioner. The table has to rotate to 90º. The minimum room width of 4400 mm (14.5 in) may not be sufficient for this scenario.

1.4 Power Distribution System

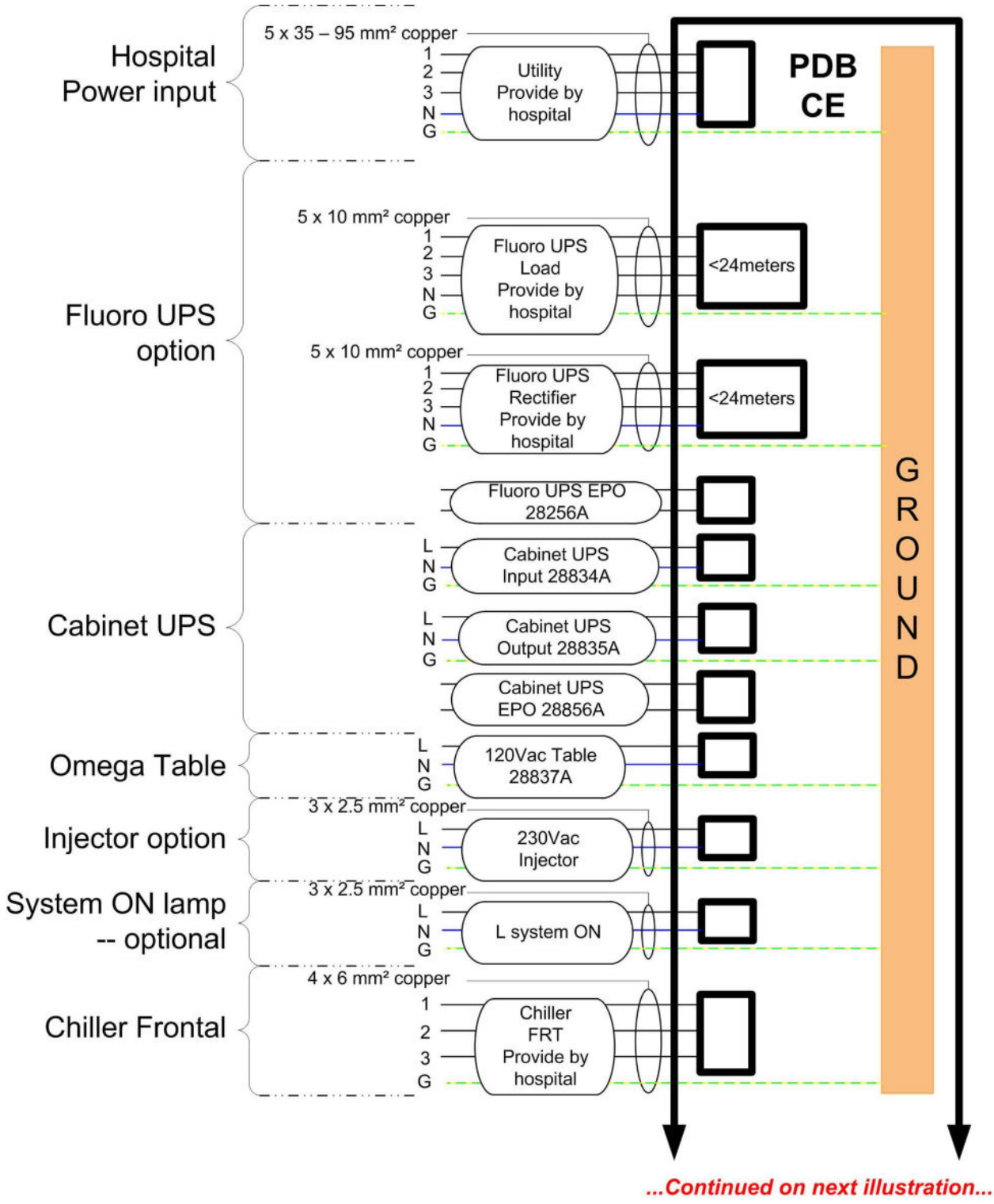
NOTICE

It is recommended to separate power supply cables from the other cables.

1.4.1 Power Distribution Box - CE

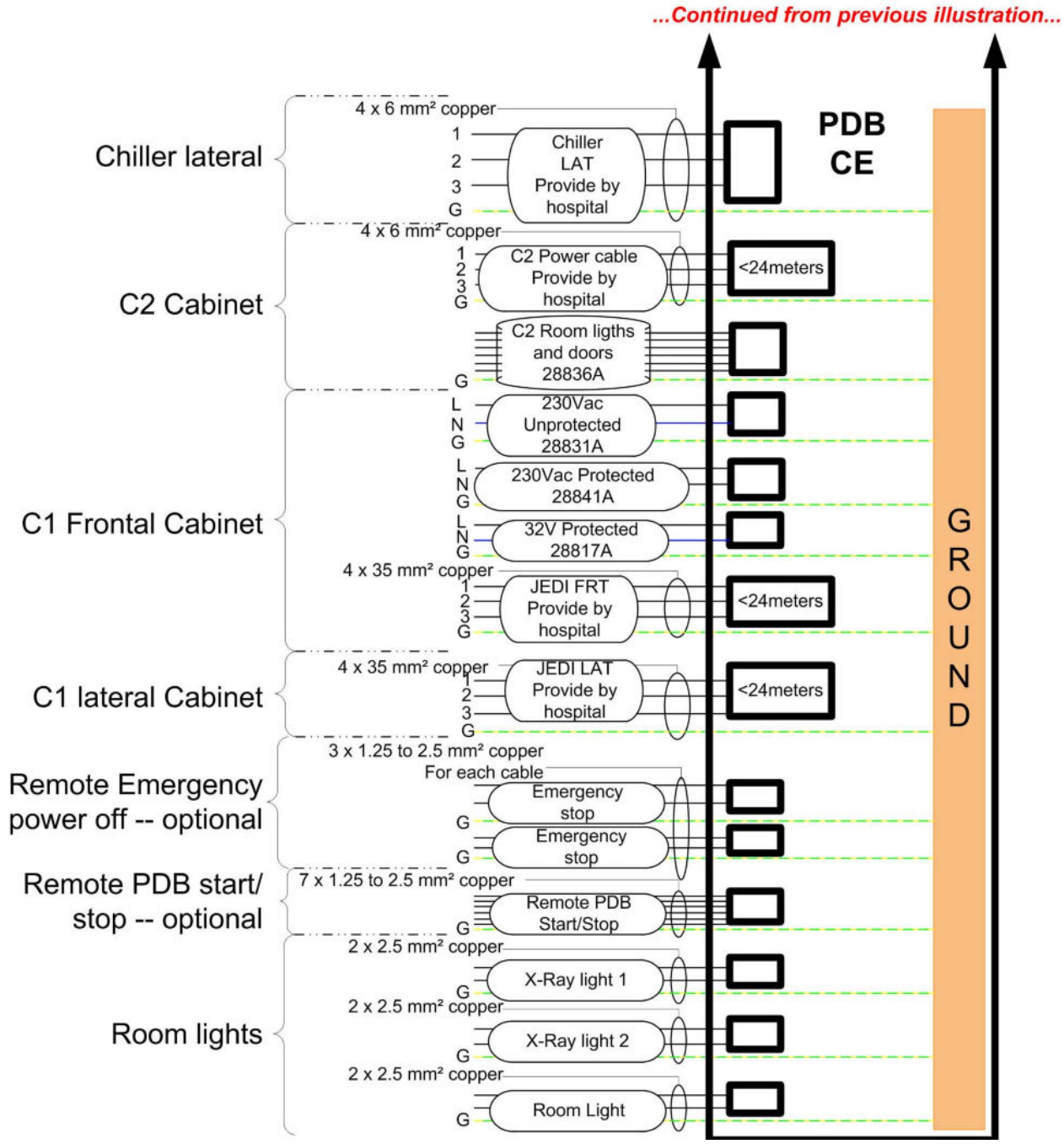
Illustration 5-5: PDB CE - 50 Hz

Illustration 5-6: PDB Schematic CE - 1/2



...Continued on next illustration...

Illustration 5-7: PDB Schematic CE - 2/2



1.4.2 Power Distribution Box - UL

Illustration 5-8: PDB UL - 60 Hz (US only)

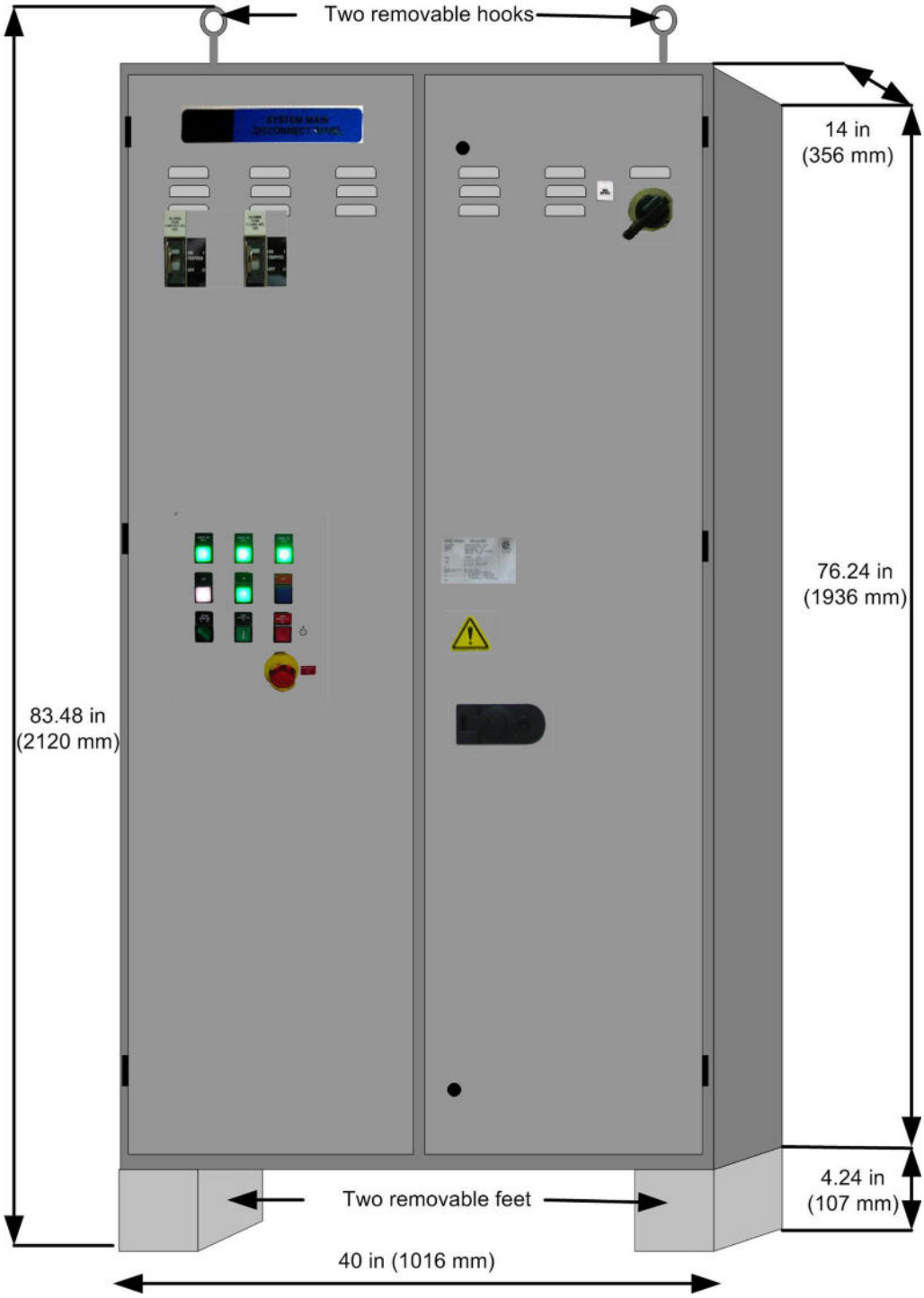


Illustration 5-9: PDB Schematic UL - 1/2

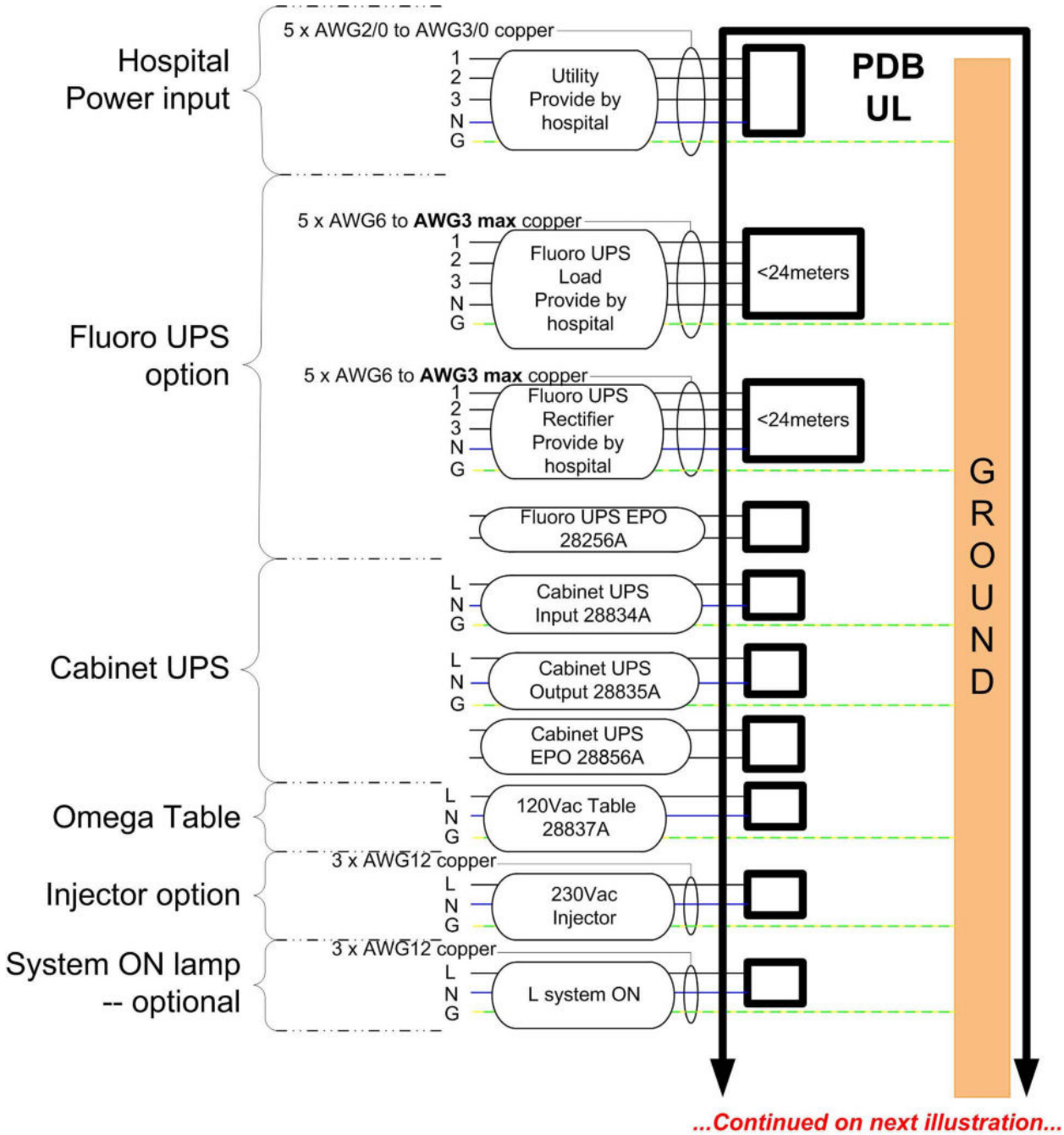
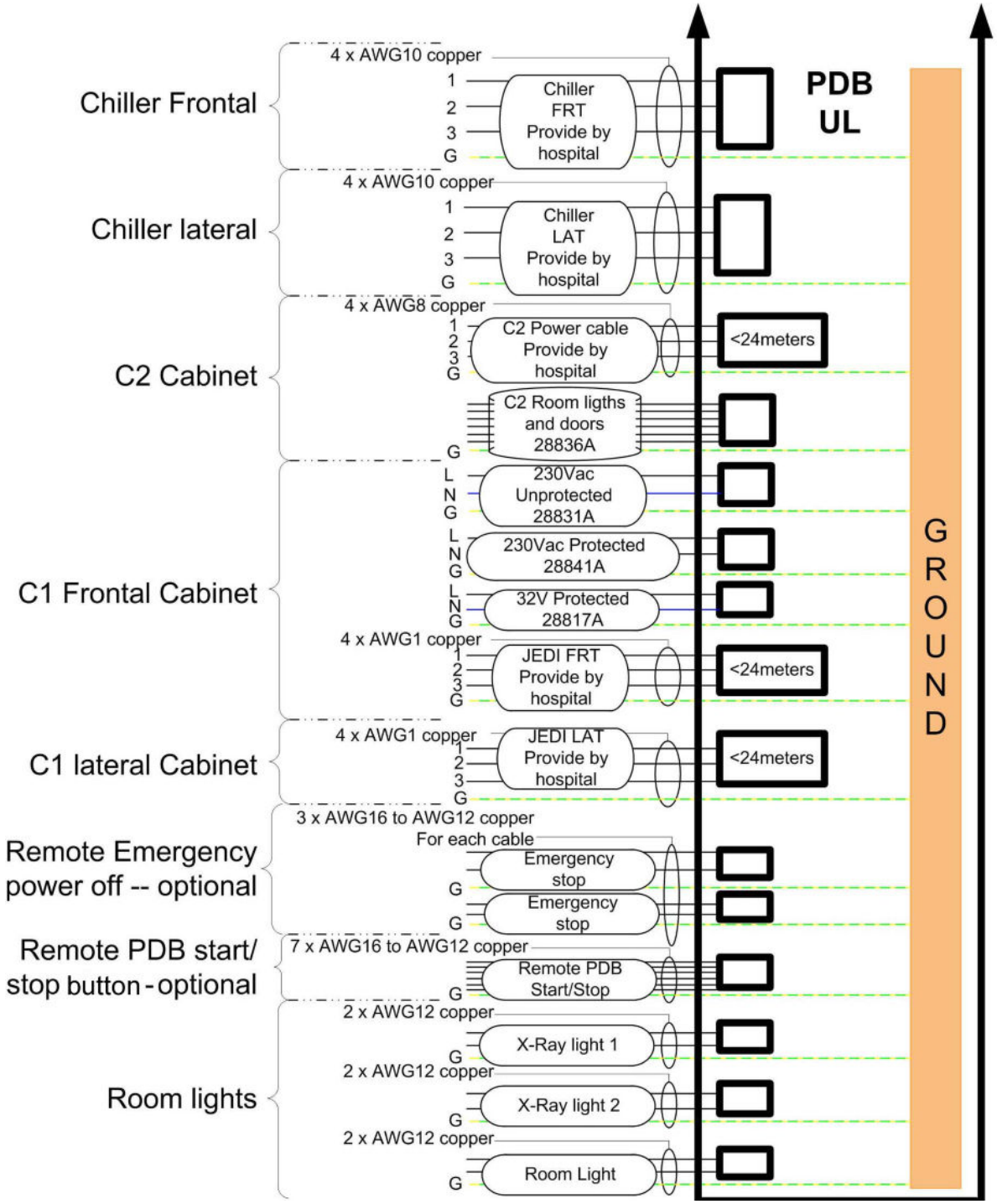


Illustration 5-10: PDB Schematic UL - 2/2

...Continued from previous illustration...



2 Grounding

2.1 Grounding

A vascular lab is a critical care area and requires a special grounding system for patient safety. An equipotential grounding system is recommended for meeting patient safety requirements.

Reference: For general system grounding requirements and information on establishing an equipotential grounding system, refer to:

- Grounding Continuity – Job card in the Installation manual

NOTICE

All shielded cables shall have a connection to ground at each extremity without regard to the grounding to the scheme below.

NOTICE

Metallic covers on cable connectors shall be tested to ground.

Illustration 5-11: Grounding distribution

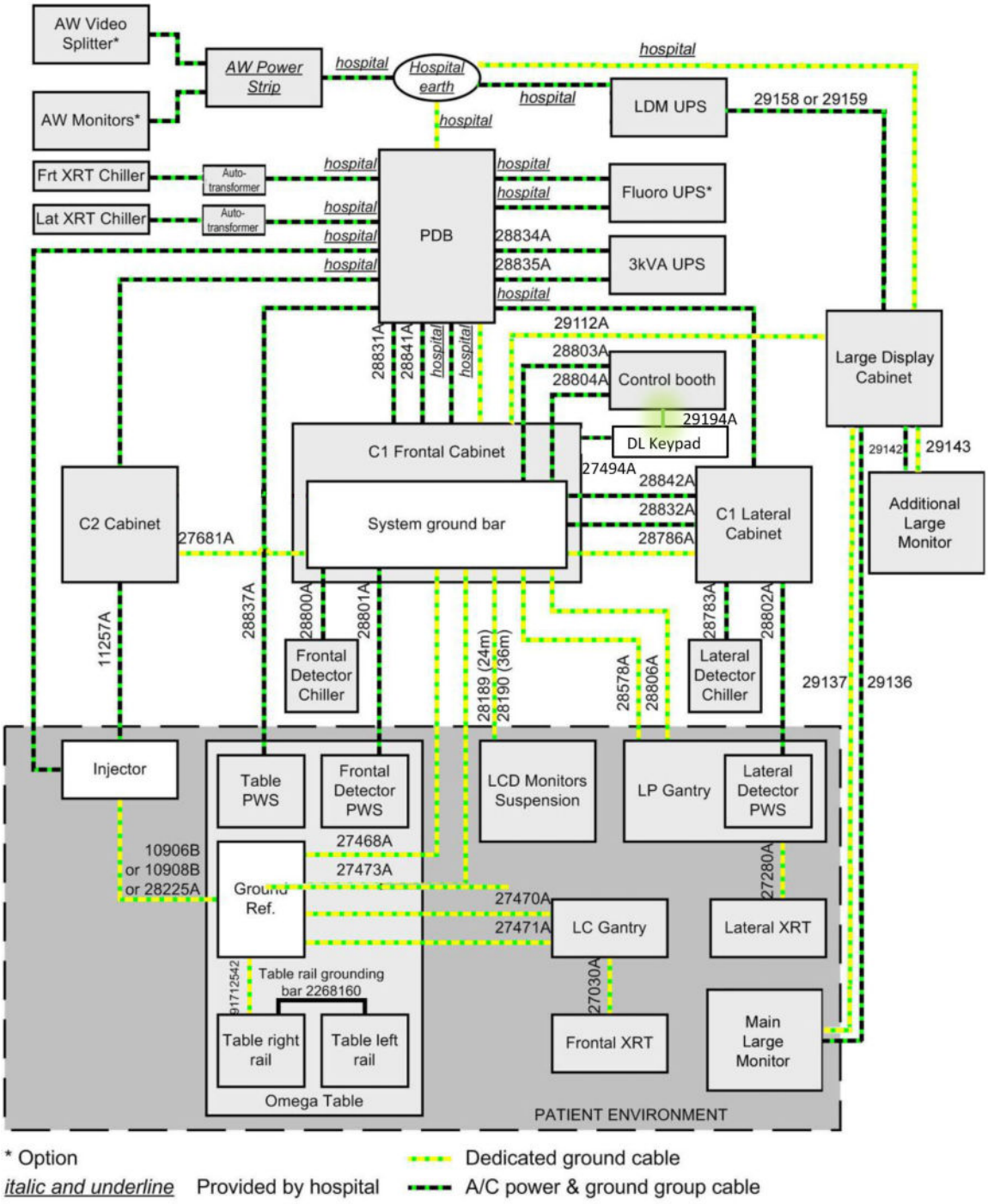


Table 5-3:

CABLE	FROM	TO	WIRE GAUGE
28189	C1 Frontal Cabinet	LCD Monitor Suspension	AWG6
28190	C1 Frontal Cabinet	LCD Monitor Suspension	AWG6

CABLE	FROM	TO	WIRE GAUGE
2308096	C1 Frontal Cabinet	Jedi	AWG6
2308096	C1 Lateral Cabinet	Jedi	AWG6
10906B	Injector	Omega Table	AWG10
10908B	Injector	Omega Table	AWG10
11257A	C2 Cabinet	Injector	AWG22
27030A	Frontal Gantry	Frontal XRT	AWG16
27280A	Lateral Gantry	Lateral XRT	AWG16
27468A	C1 Frontal Cabinet	Omega Table	AWG6
27470A	Omega Table	Frontal Gantry	AWG6
27471A	Omega Table	Frontal Gantry	AWG6
27473A	C1 Frontal Cabinet	Omega Table	AWG6
27494A	C1 Frontal Cabinet	DL Keypad	AWG22
27508A	Omega Table	TSUI Remote Box	AWG6
27681A	C1 Frontal Cabinet	C2 Cabinet	AWG6
28225A	Injector	Omega Table	AWG10
28578A	C1 Frontal Cabinet	Lateral Gantry	AWG6
28783A	C1 Lateral Cabinet	Frontal Detector Chiller	AWG16
28786A	C1 Frontal Cabinet	C1 Lateral Cabinet	AWG6
28800A	C1 Frontal Cabinet	Frontal Detector Chiller	AWG16
28801A	C1 Frontal Cabinet	Frontal Detector PWS	AWG16
28802A	C1 Lateral Cabinet	Frontal Detector PWS	AWG16
28803A	C1 Frontal Cabinet	Control Booth Power Strip 1	AWG16
28804A	C1 Frontal Cabinet	Control Booth Power Strip 2	AWG16
28806A	C1 Frontal Cabinet	Lateral Gantry	AWG6
28831A	PDB	C1 Frontal Cabinet	AWG14
28832A	C1 Frontal Cabinet	C1 Lateral Cabinet	AWG14
28834A	PDB	3kVA UPS	AWG14
28835A	PDB	3kVA UPS	AWG14
28837A	PDB	Omega Table	AWG14
28839A	C1 Frontal Cabinet	Frontal Live Monitor	AWG6
28840A	C1 Frontal Cabinet	Frontal Roadmap Monitor	AWG6
28841A	PDB	C1 Frontal Cabinet	AWG14
28842A	C1 Frontal Cabinet	C1 Lateral Cabinet	AWG14
29194A	Control Booth Power Strip	DL Keypad	AWG14
29229A	C1 Frontal Cabinet	Lateral Live Monitor	AWG6
29230A	C1 Frontal Cabinet	Lateral Roadmap Monitor	AWG6
91712542	Omega Table	Table right rail	AWG18
hospital	AW Power Strip	Ground	-

CABLE	FROM	TO	WIRE GAUGE	
hospital	PDB	C1 Frontal Cabinet	35 mm²	AWG1
hospital	PDB	C1 Frontal Cabinet	35 mm²	AWG2
hospital	PDB	C1 Lateral Cabinet	35 mm²	AWG1
hospital	PDB	C2 Cabinet	6 mm²	AWG8
hospital	PDB	Fluoro UPS	10 mm²	AWG6
hospital	PDB	Fluoro UPS	10 mm²	AWG6
hospital	PDB	Frontal XRT Chiller	6 mm²	AWG10
hospital	PDB	Ground	35 mm² mini	AWG2/0 mini
hospital	PDB	Injector	AWG10	
hospital	PDB	Lateral XRT Chiller	6 mm²	AWG10
Table rail grounding bar 2268160	Table right rail	Table left rail	N/A	
hospital	Hospital mains	LDM UPS	AWG12	
hospital	Hospital mains	LDM cabinet	AWG12	
29158A or 29159A	LDM UPS (3 meter)	LDM cabinet	AWG12	
29137A	LDM cabinet	Main large monitor (dedicated)	AWG10	
29136A	LDM cabinet	Main large monitor (group cable)	AWG16	
29143A	LDM cabinet	Additional large monitor (dedicated)	AWG10	
29142A	LDM cabinet	Additional large monitor (group cable)	AWG16	
29112A	LDM cabinet	C1 frontal (system ground bar)	AWG6	

2.2 Power and Grounding Requirements

- A breaker with cut-out capability shall be installed by the customer (or his contractor) next to the PDB. It is needed for the LOTO procedure in front of the PDB.
- The main facility ground conductor to the PDB shall be copper wire and the minimum size as required by the local coding regulations, such as the NEC. For countries, which are not covered by local requirement (like NEC), the ground wire to earth should be at minimum of AWG 2/0 (150 A breaker) UL or 35mm^2 (80 A breaker) CE, or same size (100%) as feeder wires, whichever is larger.
- Power cables must not be used to supply other systems
- Cables shall be in conformity with local regulation (UL, CSA, IEC, CCC).

Table 5-4:

Max Line Impedance for feeder line between Generator cabinet and Hospital						
V	380	400	415	440	460	480
Ohms	0.09	0.096	0.101	0.108	0.114	0.12

NOTE: These 3 phases cables are not furnished by GE Healthcare. Provided by installer.

- These cables must be kept separated as much as possible from room system cables.
- The shield of any shielded cable coming from the distribution cannot replace the ground wire.

Reference: For specific Vascular system grounding maps and connection details, refer to the MisMap and mis chart listed in MIS (Master Interconnect System).

Large Display option requirements:

The Large Display option must be powered through a wall circuit breaker or equivalent device with LOTO capability. This circuit breaker must have a 30 amps current rating. Procurement, delivery and installation of this device is customer’s responsibility. The customer shall provide the power supply cables from this circuit breaker to the LDM UPS, and the ground cable from the main power to the LDM cabinet.

Table 5-5: System FEEDER from hospital

UL	Power supply voltage 480 V			
	Panel (PDB) to C1 run in m (ft)			
	8 (26)	*16 (52)*	*24 (79)*	
Feeder run length: 10 m (30 ft)	2/0	2/0	2/0	 **WARNING** **RECOMMENDED FEEDER CABLE GAUGE : FOR PHASES, NEUTRAL & GROUND PDB INPUT TERMINALS ACCEPT 2/0 AND 3/0 AWG. BIGGER CABLES NEEDS A SIZE REDUCTION BEFORE PDB ENTRY.**
20 m (70 ft)	2/0	2/0	2/0	
30 m (100 ft)	2/0	2/0	3/0	
40 m (130 ft)	2/0	2/0	250	
50 m (160 ft)	2/0	3/0	300	
60 m (200 ft)	3/0	4/0	400	
80 m (260 ft)	4/0	350	600	
100 m (330 ft)	300	500	see Note	
120 m (390 ft)	400	600	see Note	

CE	Power supply voltage								
	380 V			400 V			415 V		
	Panel (PDB) to C1 cabinet run								
	8 m	*16 m*	*24 m*	*8 m*	*16 m*	*24 m*	*8 m*	*16 m*	*24 m*
Feeder run length: 10 m	35	35	35	35	35	35	35	35	35
20 m	35	35	70	35	35	50	35	35	50
30 m	50	70	95	35	50	70	35	50	70
40 m	50	70	120	50	70	95	50	70	95
50 m	70	95	185	70	95	120	70	95	120
60 m	95	120	240	70	95	185	70	95	150
80 m	120	185	300	95	150	300	95	120	240
100 m	185	240	see note	150	240	see note	120	185	see note
120 m	240	300	see note	185	300	see note	185	240	see note

NOTICE

Recommended feeder cable section in mm² : for PHASES, NEUTRAL & GROUND PDB input terminals accept 35² to 95². Bigger cables needs a size reduction before PDB entry.

NOTE: Increasing transformer power will decrease its voltage loss and feeder cables section. To be calculated site by site.

3 Interconnections

3.1 MIS (Master Interconnect System)

Innova system interconnect cables are described in MIS (Master Interconnect System) documents. These documents specify all interconnections between components within the system.

Reference: For specific Vascular system interconnect maps and connection details, refer to the following:

- *Innova™ IGS 620, Innova™ IGS 630 Mismaps*
- *Innova™ IGS 620, Innova™ IGS 630 Mis Charts*.

General Guidelines

Innova System introduces a new system interconnect with a star distribution for all cables from the technical area. Cable group 1 for Exam room and cable group 2 for Control room. The cable group shall be put in place during the same action. The cables are routed in the same duct.

The HV cables could be pulled separately.

3.2 Cable Channeling

3.2.1 General

High voltage and power cables must be separated from other cables. Use a separate trough in the duct system, or use a separate conduit. Minimize cable length between the line disconnect and the System Cabinet power unit to reduce voltage regulation problems and wiring costs.

For information about the cables supplied with your system, please refer to Physical Runs.

Raceways or cables trays containing electric conductors shall not contain any pipe, tube or equal for steam, water, air, gas, drainage or any service other than electrical

3.2.2 Conduit

Separate conduits must be used for power and signal wires. These wires must be kept separated from each other.

Using conduit imposes some important considerations when used with this system. Of primary concern, the majority of cables used are pre–terminated. Pre–termination greatly simplifies interconnection but makes cable–pulling difficult because of the added dimensions of the connectors.

Conduit must be large enough to pass the cable and connector through with all other cables already in the conduit. Also, the size of conduit chosen must allow for future growth. There is the possibility of additional cables being added later as the system is developed and options are added.

The use of conduit is recommended for cables running overhead between rooms, especially when a diagonal run provides the shortest cable path

3.2.3 Electrical Ducts

It's important that electrical ducts have separate compartments for power and signal wires. These wires must be kept separated from each other for proper system operation.

Electrical ducts have advantages, when used with a single room or two adjacent rooms. Electrical ducts combine cabling in a neat and functional appearance, with accessibility and room for expansion.

NOTE: Medrad AVANTA and Mac-lab cables exit behind the table in the patient room.

For Fast Link cable (C1 cabinet - AW station), the static operation bending radius must be at least 4 times the outer cable diameter.

It is the responsibility of the site planner to provide the appropriate solution to the table exit (e.g gas box, Clab II, Tram module, connection interface box)

NOTE: Specific Recommendations for installation with GE ECG Device such as MacLab, CardioLab or ComboLab:

- TRAM RAC in Exam Room with cable 2016134-106 routed back to Control Room where the other modules & PC are installed.
- If no GE Maclab cable 2016134-106 installed between the TRAM (Exam Room) and the Control Room, need to route it so that installation/connection of Physio module can be made in Control Room.

NOTE: **MEDRAD Avanta Table mount**: A 76.2 mm (3 in) and max 25 m (984 in) length conduit between technical room and patient room shall be prepared below the floor for the three injector cables. It is recommended to use the MEDRAD Avanta floor mounting bracket to cover the duct hole in the patient room if there is no gases box.

Floor mount installation can be accomplished one of two ways:

- Connectors mounted in trough under mounting bracket (Figure 1)
- Connectors mounted above mounting bracket (Figure 2)

Illustration 5-12: MEDRAD Avanta floor mounting methods

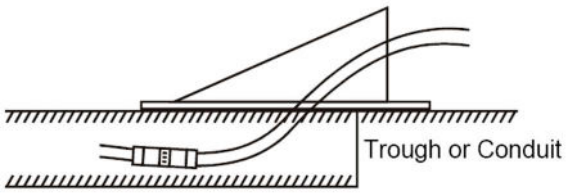


Figure 1

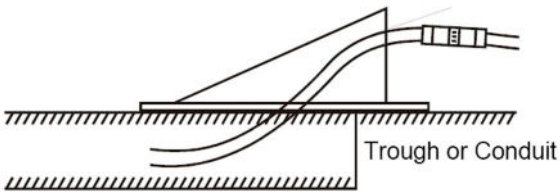
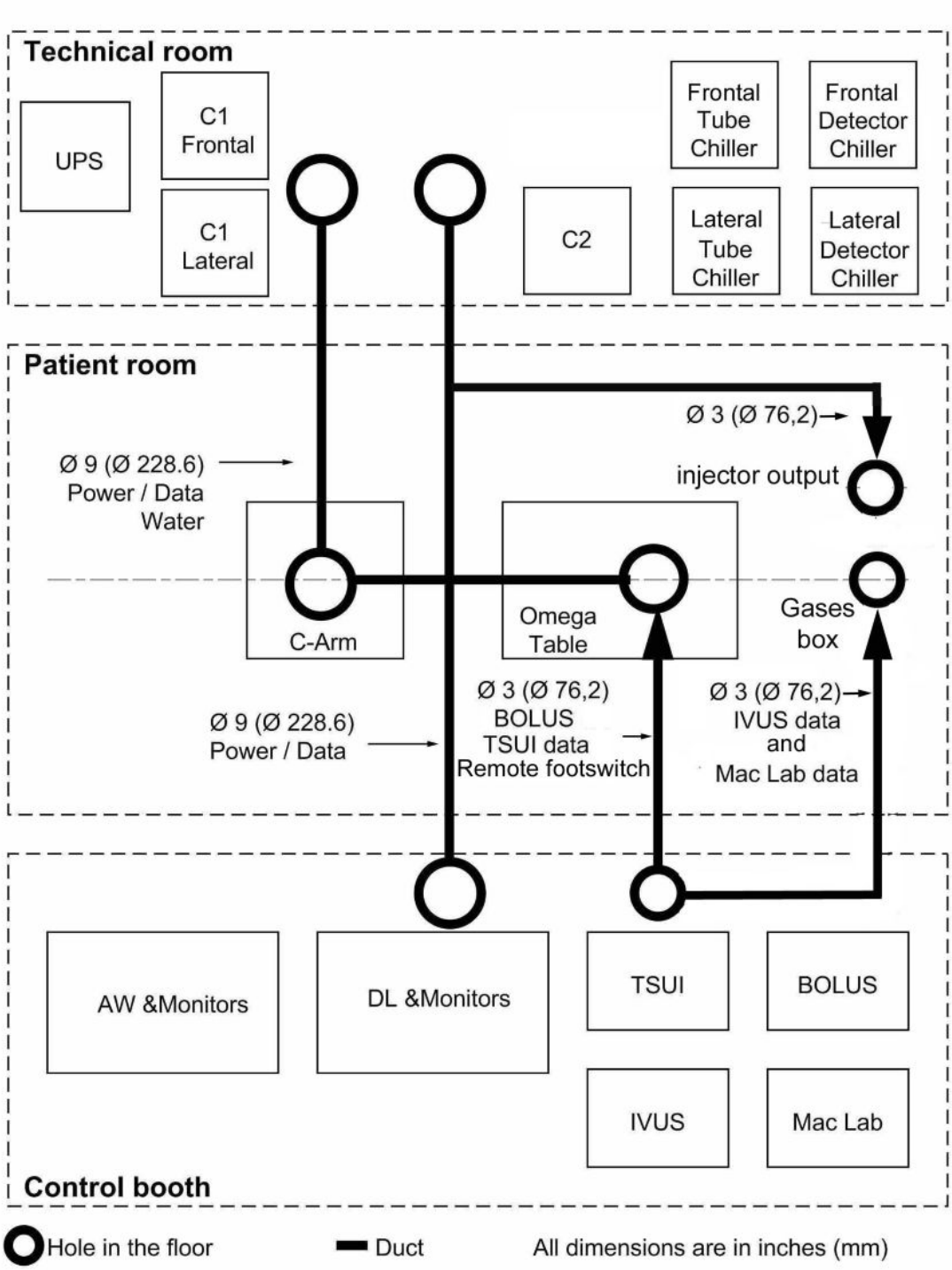


Figure 2

For further MEDRAD Avanta floor mounting, see the Installation guide *MEDRAD Avanta Floor Mounting Bracket.*

Illustration 5-13: Floor ducts and outlets



NOTE: 18 meters (59 ft) is the only cable length available for the Remote TSUI box data cable connecting remote TSUIs in the control booth and the patient table.

4 System Cable Information

4.1 Physical Runs

NOTICE

All lengths of cable are:

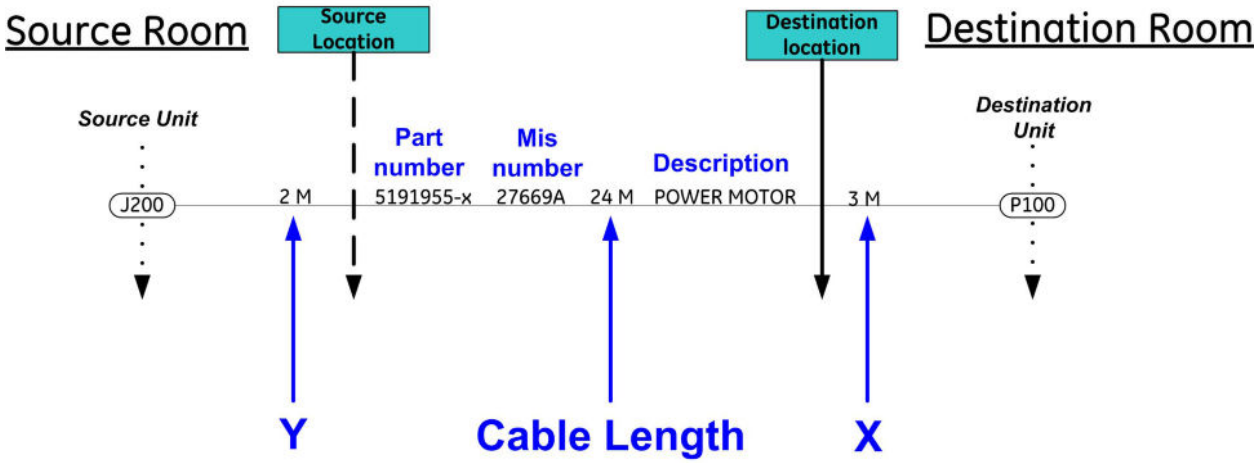
- **in useable meter when you look at group level, or**
- **in meters (connector to connector) when you look at the cable level.**

Suspension are always pre–cabled with 36 meter cables of connector to connector Monitor options includes their 24 meters length for cabling

In case 24 m required, they have to be added in the order and replaced on site.

For a description of how to use the following 5 cable group schematics, see below:

Illustration 5-14: Description of cable group diagrams



Cable length data is as follows:

- **Cable Length** = the total cable length, connector to connector (example above is 24 meters).
- X + Y = used length for connection within system (example above is 5 meters).
- **Cable Length** - (X + Y) = available length for conduit run (example above is 19 meters).

Illustration 5-15: CABLE GROUP 1 – FROM TECHNICAL AREA TO EXAM AREA

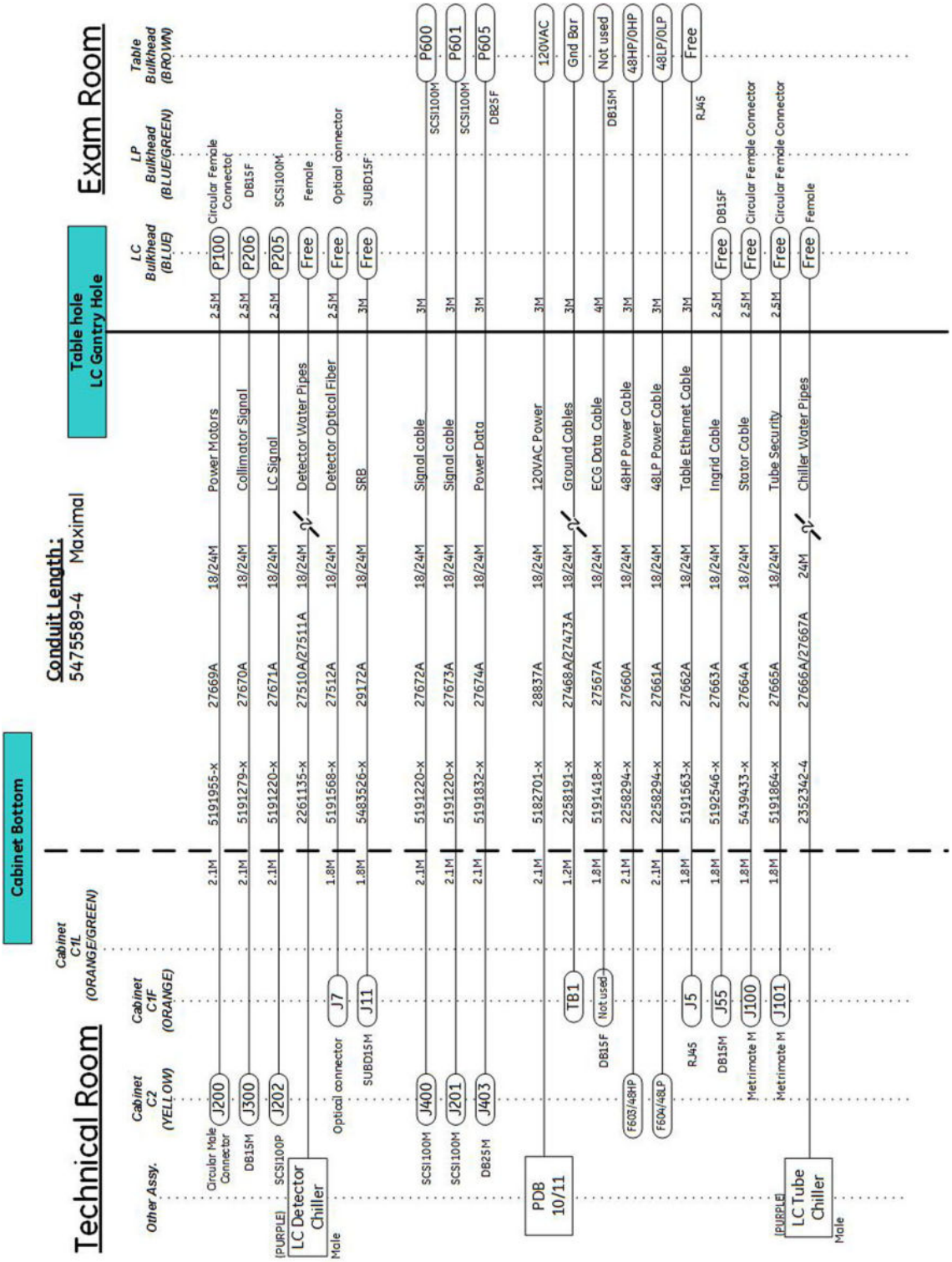


Illustration 5-16: CABLE GROUP 2– FROM TECHNICAL AREA TO CONTROL AREA

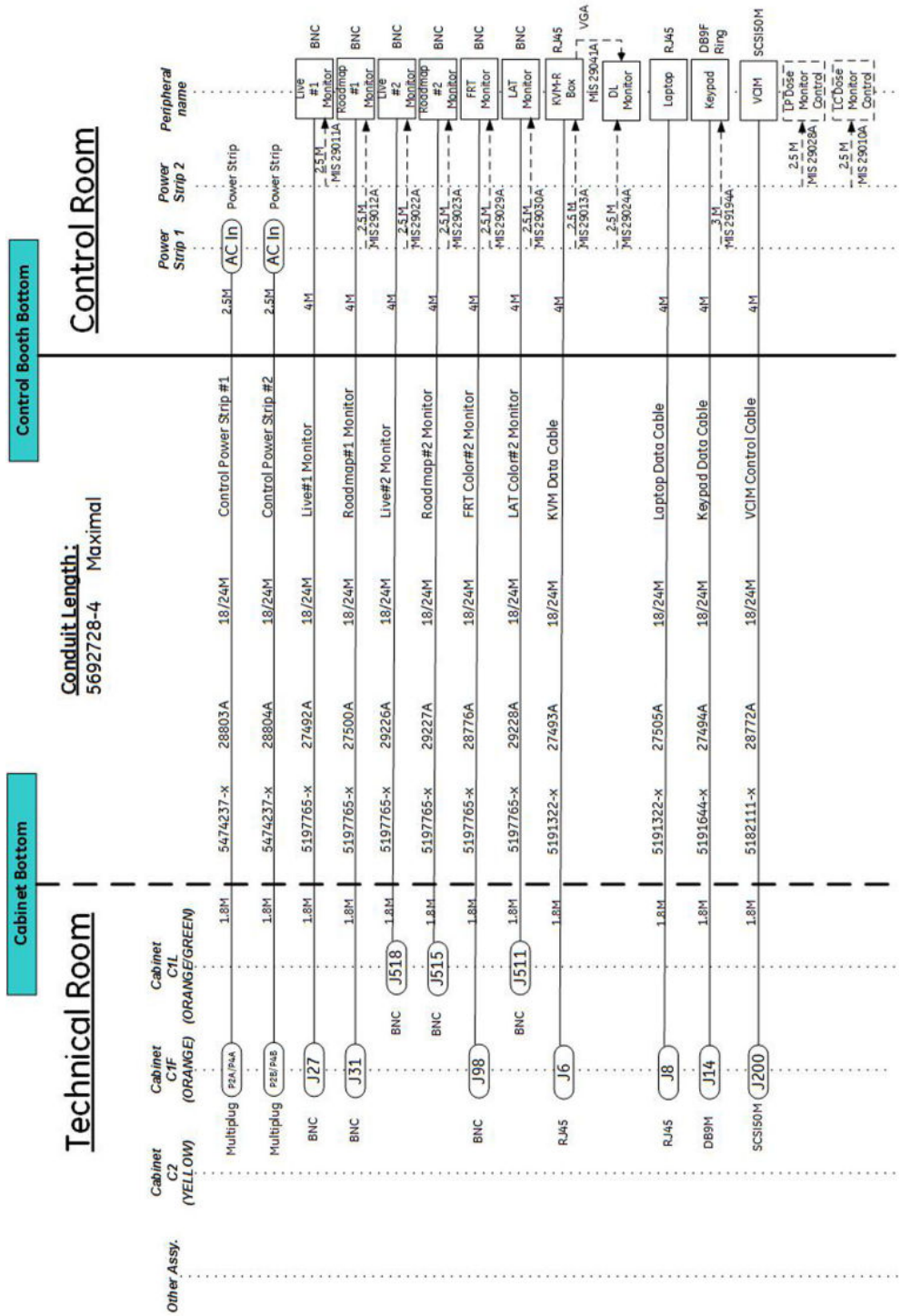


Illustration 5-17: Cable Group - Fast Link Option

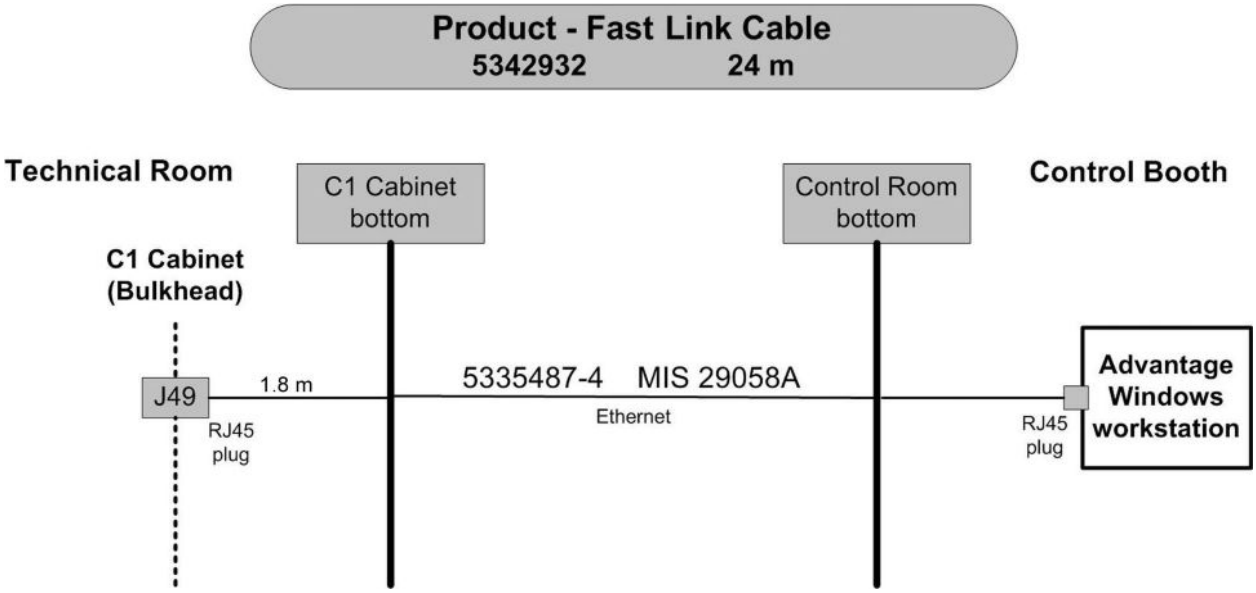


Illustration 5-18: CABLE GROUP 3 - FROM TECHNICAL AREA TO TECHNICAL AREA

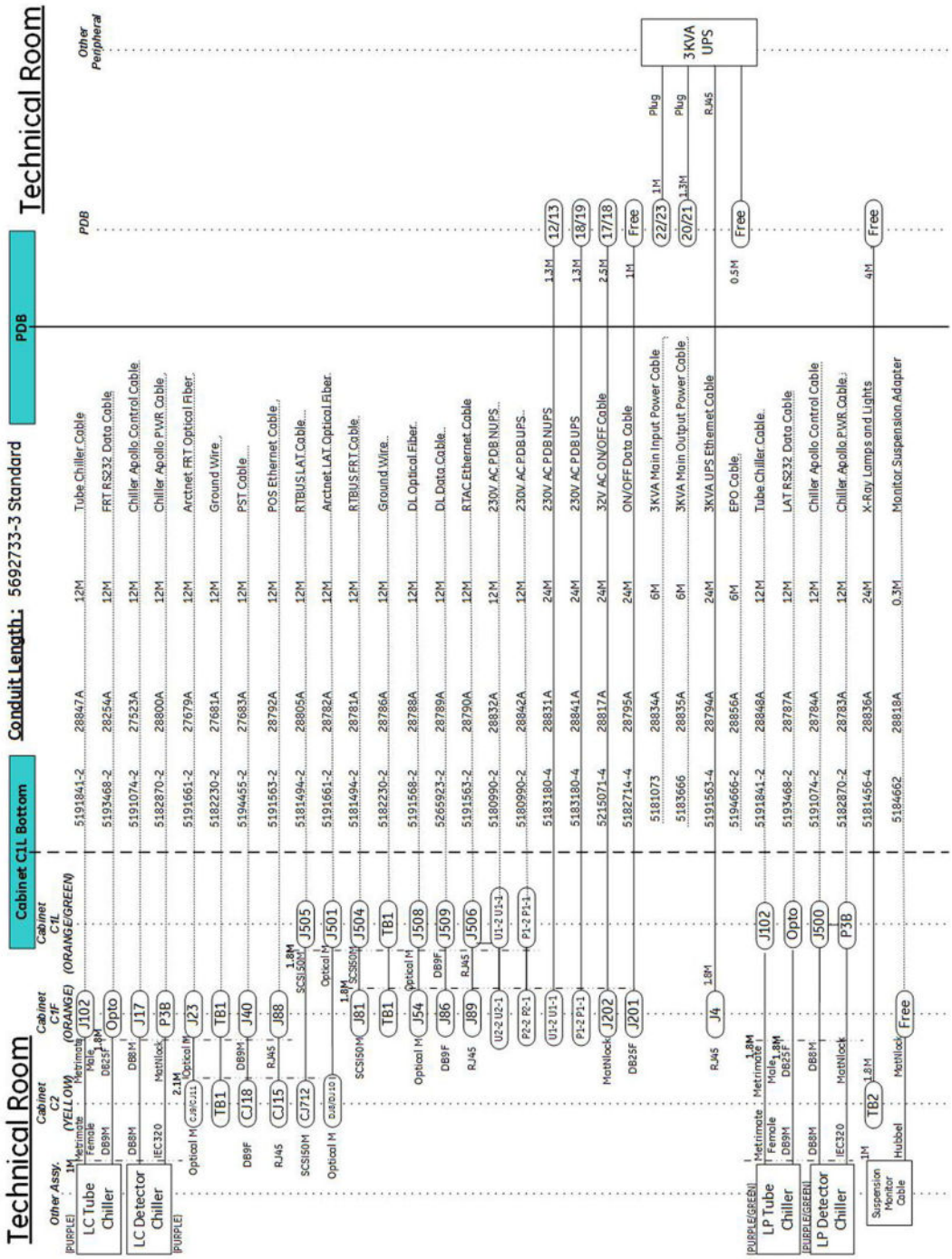


Illustration 5-19: CABLE GROUP 4 - FROM TECHNICAL AREA TO EXAM AREA

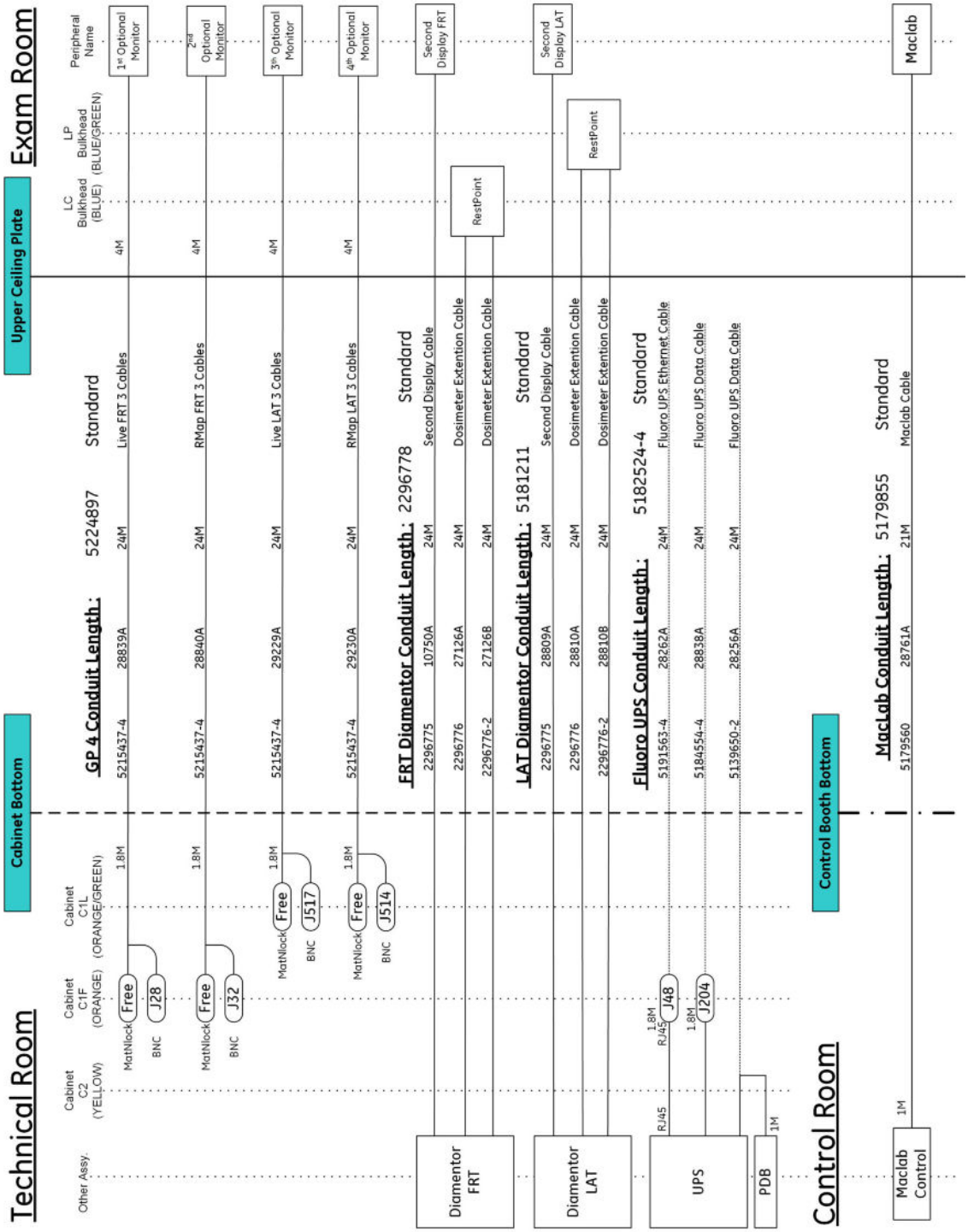
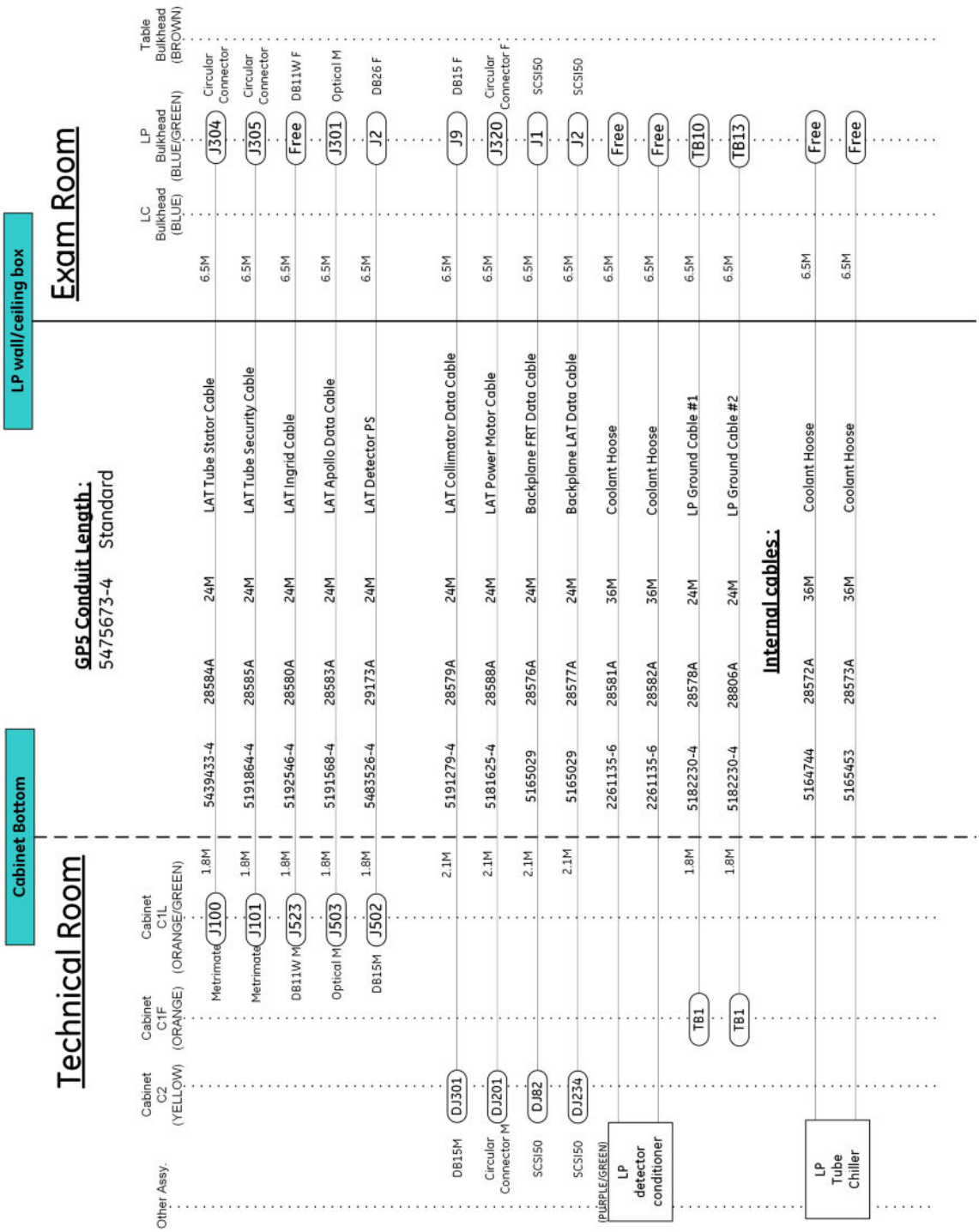


Illustration 5-20: CABLE GROUP 5 - FROM TECHNICAL AREA TO EXAM AREA



5 X-Ray ON Lamp Distribution

The fitter shall install an X-Ray On lamp in the Exam room, and in the control room if necessary, outside the patient area, so that they are connected to the equipment through connection terminals.

NOTE: Innova systems with 21 & 31 cm detector provides 24 VAC for driving X-Ray ON line.

Hospital or contractor to provide 1.5 mm^2 (AWG 14) wires to connect to the system.

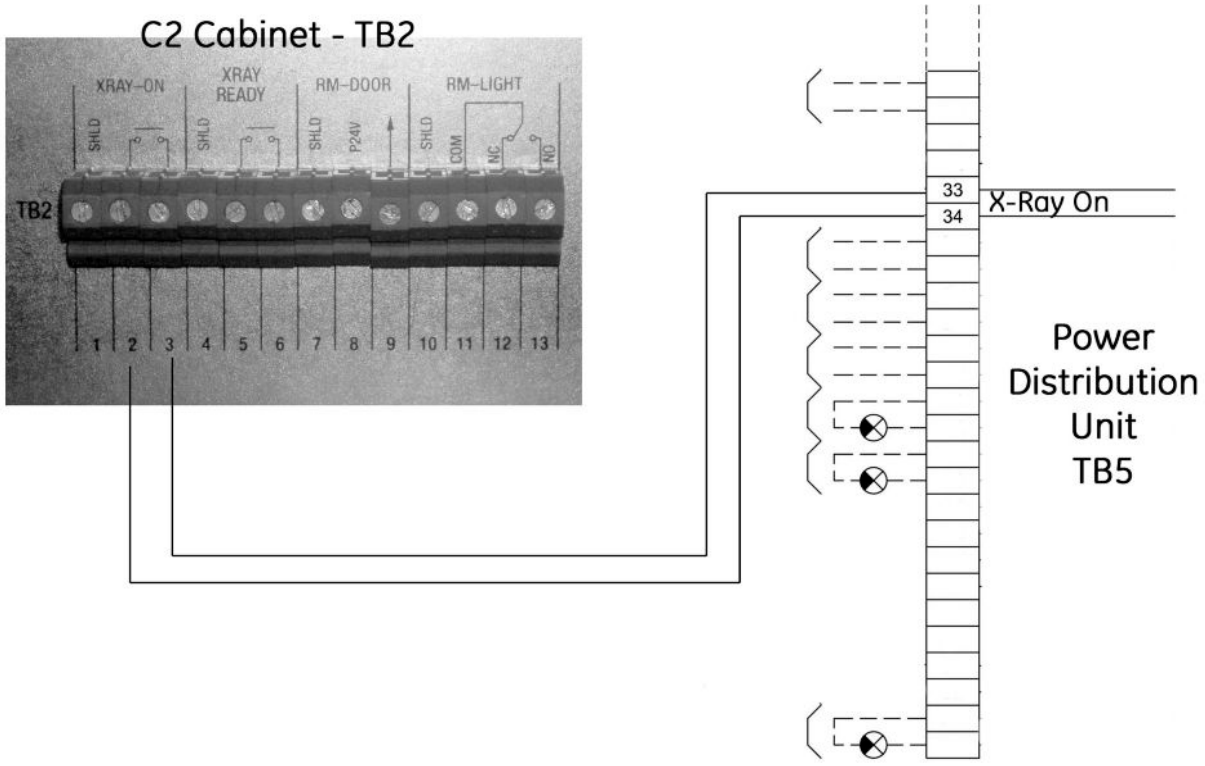
X-Ray ON lamp is active during X-Ray exposures.

⚠WARNING

THE X-RAY ON LAMP MUST BE INSTALLED IN THE EXAM ROOM TO CONFORM TO INTERVENTIONAL STANDARD IEC/EN 60601-2-43. SIGNAL INDICATING THE X-RAY ON SHALL BE PERCEPTIBLE BY THE OPERATOR IN ALL THE LOCATIONS DEFINED FOR THE PERSONNEL WHO MAY RECEIVE SCATTERED RADIATION.

In the control room, an additional X-Ray on light must be installed if the console (VCIM) indicator cannot be perceived by all the persons in the control room.

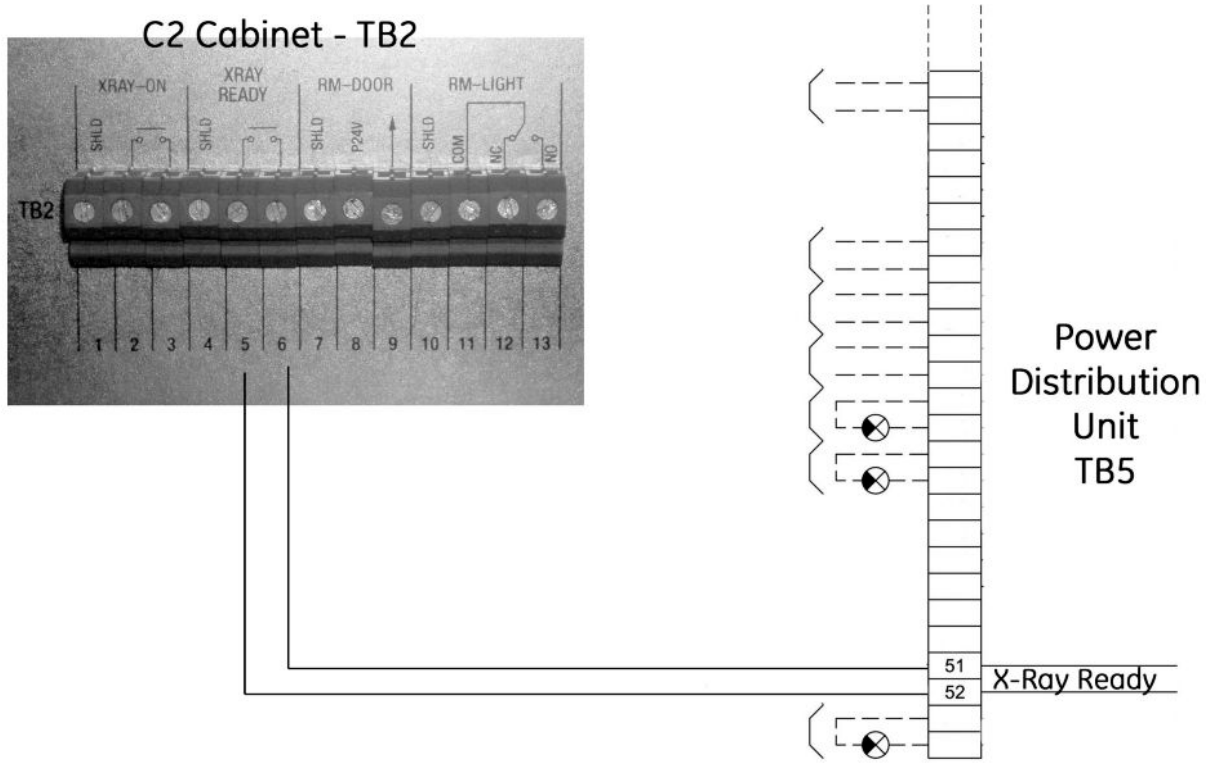
Illustration 5-21: X-Ray ON cabling between C2 cabinet and PDB



6 Ready For X-Ray Lamp

Innova systems with 21 & 31 cm detector provides contacts for driving a **Ready for X-Ray** lamp. These contacts are terminals **5** and **6** of TB2 bulkhead connector of the C2 cabinet.

Illustration 5-22: X-Ray READY cabling between C2 cabinet and PDB



NOTE: Check local regulations if this indication is required.

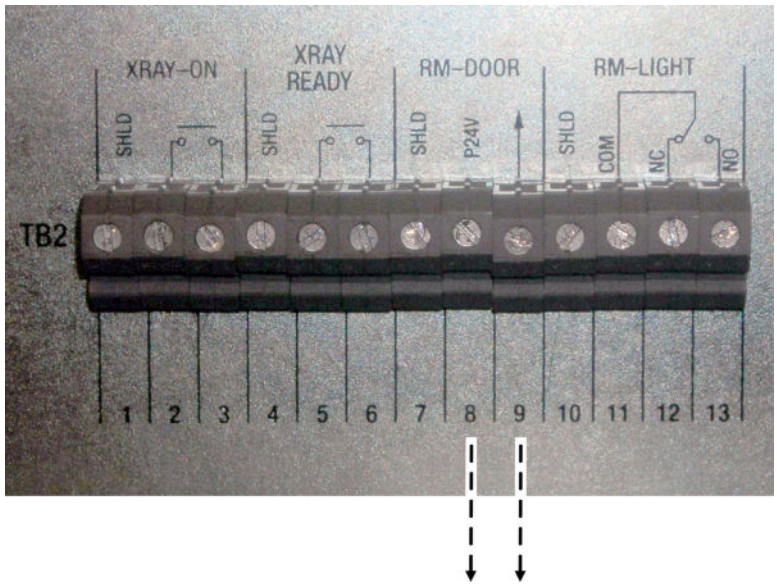
If needed, the lamp needs to be provided by the hospital or their contractor.

7 Door Interlocks

⚠CAUTION

IEC 60601–2–43 requires not to install door interlocks. It is the responsibility of the field service to check that this requirement is not in contradiction with local regulation. In case of conflict, follow local regulation. No other measures employed for radiation protection should cause the interruption of irradiation and any other disturbance of a procedure in progress.

Illustration 5-23: C2 cabinet bulkhead RM DOOR connecting

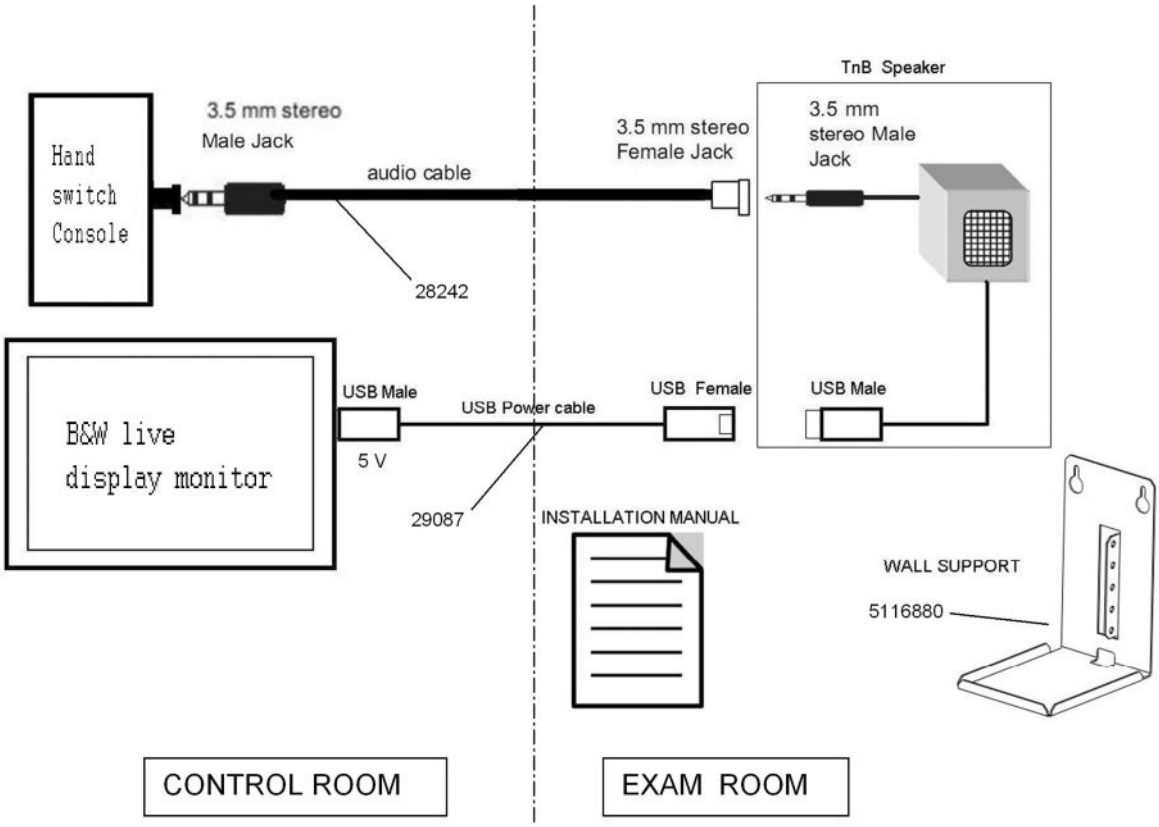


8 Room Speaker

The remote speaker provides the operator in the exam room, the indication of record exposure sequence (same level information as provided by the control room control panel).

The speaker must be installed in the exam room out of the patient vicinity to give easy access to the FE for maintenance operations and to medical staff to adjust the tone signal level and to be able to see the power LED indicator.

Illustration 5-24:



⚠WARNING

THE REMOTE SPEAKER KIT SHALL NOT BE INSTALLED IN THE PATIENT VICINITY.

Patient Vicinity Definition : see *Patient Environment Equipment* in Chapter 2, Room Layout Considerations

9 MAC-LAB System EX

For location of MAC–LAB Acquisition Unit Floor mount kit 408431–001, refer to *Electrical Ducts* in Cable Channeling.

For MAC–LAB System EX, refer to:

- Marquette document P/N 2000465–001 Preinstallation Guide

10 Advantage Windows

A power cord is supplied with Advantage Windows. It is connected to outlet fed by the main disconnect room device.

Verify that the ground between AW, AW spliter and monitors ground are equipotential (0.1 ohm equipotentiallity between room ground point (busbar) and wall outlets).

NOTICE

To power the AW splitter, use the appropiate cable out of lot P/N 2385173.

11 Injectors

The injector is provided with an additional ground cable (P/N #2135737) to meet equipotentiality requirement at patient vicinity.

Injector emergency power off:

- if no emergency power off is required for the injector, the injector can be powered from a wall outlet socket.
- if emergency power off circuit must include the injector, ensure the power for the injector is via the PDB.

11.1 Remote Injector (rack mount)

A power cord is supplied with the injector.

110 VAC or 230 VAC are supplied from the main disconnect room device. The injector must be connected to this supply.

11.2 Pedestal Injector

A power cord is supplied with the injector.

In all cases (110 VAC or 230 VAC), it will be connected to a wall outlet near the operator location, fed by the main disconnect room device.

12 Lighting Specifications

12.1 Room Light Distribution

12.1.1 Requirements for lighting

Requirement for lighting concern the following, general, light–technique characteristics:

- Illuminator level.
- Lighting distribution.
- Preventing the operator from being dazzled by the light (by direct light sources or by reflection on bright objects).

The Illumination level must be compliant with established lighting technical rules and be as constant as possible.

Technical room, operating room and control room shall be provided with appropriate lighting in the maintenance area (maintenance area to be considered are service workplaces). It corresponds to service areas as defined for any of the product components.

The minimum required average luminance Em shall be of 500Lx and minimum color rendering factor Ra of 80 as per IEC/EN 12464-1 (Light and lighting. Lighting of work places. Indoor work places: Illumination requirements for indoor workplaces corresponding to assembly of medium size electrical components, e.g. control panel) for the electrical industry).

12.1.2 Lighting Relay

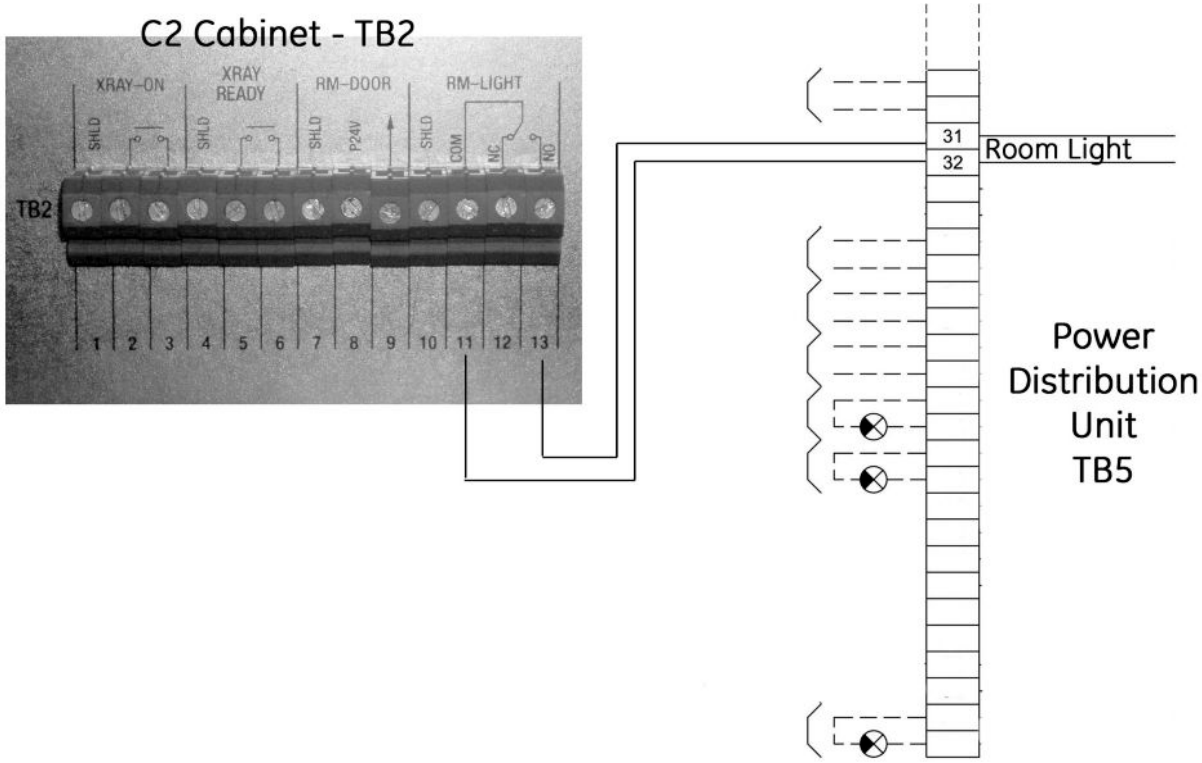
Innova systems with 21 & 31 cm detector has the ability to control an external relay that applies power to the room light (dry contacts).

The relay is to be provided by the hospital or contractor.

The wire size to connect to the C2 cabinet is 1.5 mm^2 (AWG 14).

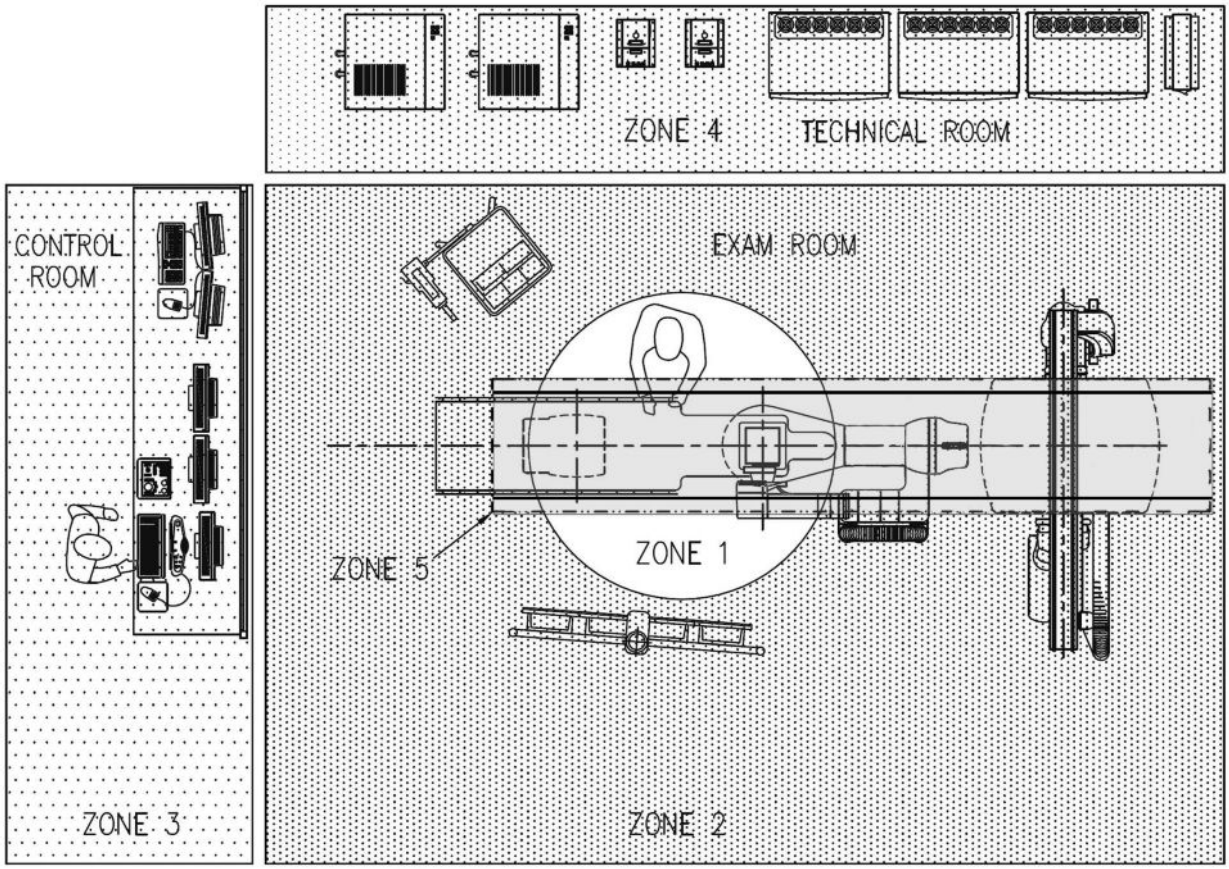
Relay rating is max 600 VAC

Illustration 5-25: ROOM LIGHT cabling between C2 cabinet and PDB



12.1.3 Room Lighting for System

Illustration 5-26:



Zone 1: Intensive lighting needed by operator. Manually cut not located at false ceiling level.

Zone 2: Variable lighting without specular reflection on display and monitor screens. Indirect lighting but preferable from ceiling. Automatically cut by the Innova system.

Zone 3: Variable lighting without artifact on display and monitor screens. manually cut.

Zone 4: Normal lighting manually cut. (For maintenance).

NOTICE

Zone 5: Nothing is permitted in this zone, that means:

- no mounting hardware can protrude below the finished ceiling height (top surface of gantry stationary rails), such as Unistrut mounting bolts, support brackets, sprinklers, air vents, etc.

12.1.4 Windows and curtains

When the examination room has a window with an aperture outside of the controlled light area (day light, other...) a curtain has to maintain the light intensity under a limit fixed to 150 lux.

Chapter 6 Communication Requirements

1 Network Requirements

1.1 Insite/Network Connection

The preferred Insite connection uses a broadband modem. This connection requires a dedicated Ethernet Jack (RJ45) that must be located less than 1 meter (3 feet) from the C1 frontal cabinet

For complete descriptions of the GEHC connectivity solutions, please refer to the Broadband Solutions catalogue available through your local GEHC sales and service representative.

Connectivity Process and pre-installations checklists are available in the Broadband Connectivity PIM available through your local GEHC sales and service representative.

InSite requires an Internet Address connecting it to the Innova System. This address must be available before installing the system. A request form has been defined. For more information, please refer to IP Addressing Process or contact your GE Healthcare OLC representative.

NOTICE

The C1 frontal cabinet comes equipped with a Firewall unit. The hospital network must be capable of connecting to this firewall. In the case that it cannot be, please contact GE Healthcare to discuss alternatives.

1.2 IP Addressing Process

To obtain an IP address, contact the following for your pole:

- GEMSAM:

  Contact: OnLine Center–Americas, Network Products and Services (NP&S)

  Telephone: 1–800–321–7937

  NOTE: Press [1] for the Online Center. Follow the phone tree instructions to select X–Ray modality. When prompted, select the option for obtaining an IP address.

- GEMSE:

  Use the new mail form called *INSFORM.xls* or *INSFORM.txt* for obtaining an IP Address.

  If you have questions or need clarification regarding the use of this form, do not hesitate to ask the Operation support OnLine.

  Contact: OnLine Center–Europe

  Telephone: +33 (0)1 30 83 13 00

  FAX: +33 (0)1 30 70 99 70

  NOTE: The INSITE FORM is on the formatted sheet (.xls) or text sheet (.txt) that can be found on the Sevice CD–Rom.

- GEMSA:

  Contact: OnLine Center–Asia

  Network Products and Services (NP&S)

  Telephone: (81) 426 56 0033

  FAX: (81) 426 56 0053

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