GE HealthCare

Pre-Installation Manual

Revolution CT Family

5418654-1EN
Revision 26

Revolution CT Family

This manual covers the following products:

Product Name	Configuration
Revolution CT	• 160 mm detector (collimation) • Performix tube • Revolution CT Covers • -61 PDU
Revolution CT ES	• 80 mm detector (collimation) • Performix tube • Revolution CT Covers • -61 PDU
Revolution Apex	• 160 mm detector (collimation) • Quantix tube • Revolution Apex Covers • -91 PDU or -92 PDU
Revolution CT with Apex Edition	• 160 mm detector (collimation) • Quantix tube • -91 or -61 PDU or -92 PDU
Revolution CT ES with Apex Edition	• 80 mm detector (collimation) • Quantix tube • -91 or -61 PDU or -92 PDU
Revolution Apex Select	• 40 mm detector (collimation) • Quantix tube • Auto Patient Positioning Covers • -91 or -61 PDU or -92 PDU
Revolution Apex Plus	• 80 mm detector (collimation) • Quantix tube • Auto Patient Positioning Covers • -91 or -61 PDU or -92 PDU
Revolution Apex Elite	• 160 mm detector (collimation) • Quantix tube • Auto Patient Positioning Covers • -91 or -61 PDU or -92 PDU
Revolution CT Power	• 160 mm detector (collimation) • Quantix tube • Revolution CT Covers • -61 PDU or -92 PDU
Revolution Apex Expert	• 160 mm detector (collimation) • Quantix tube • Auto Patient Positioning Covers • -92 PDU

Product Name	Configuration
Revolution Apex Essential	• 160 mm detector (collimation) • Quantix tube • Auto Patient Positioning Covers • -92 PDU
Revolution Vibe	• 160 mm detector (collimation) • Quantix tube • Auto Patient Positioning Covers • -92 PDU

Important...X-Ray Protection

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

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

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

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

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

Contents

1 Introduction

1.1 Pre-Installation Manual Introduction

(Applies to all sections within this chapter.)

1.2 Document Purpose

This preinstallation manual provides the necessary information to prepare a site for system installation. Specifically, this manual provides information:

1. To define system requirements and interactions.
2. For the effective arrangement and interconnection of system components.
3. The customer is responsible for:
   - 3.1. Compliance with all local and national codes and regulations
   - 3.2. Siting requirements for customer-specific site procedures (medical, CT, safety, and so on)
   - 3.3. Any special architectural requirements (for example, seismic codes)

The implementation of all requirements and adherence to all specifications in this manual is the responsibility of the customer or its architect and engineers. Refer any questions to the GE HealthCare Project Manager of Installation (PMI).

1.3 Intended User

Roles and their responsibilities

Purchaser or Customer	The entity that has entered into contract with GE HealthCare to purchase the system. See Section on Customer Responsibility below.
Customers Architectual Planner	Oversees all aspects of the customers site for preparation of a successful installation. This includes but not limited to general contractor, structural, electrical, network and IT specialists, as well as HVAC.
General Contractor	Customer contracted to coordinate all aspects of the installation.
Structural Engineer	Customer contracted engineer consulting all aspects of the structural requirements for installation.

Electrical Engineer	Qualified (certified by a regulatory agency), in-house individual or entity contracted by the customer. Responsible for electrical connections between customer power source and up to and including the final connection to the GE HealthCare product.
HVAC Design Engineer	Customer contracted engineer consulting all aspects of the HVAC requirements for installation.
Zone Broadband Specialist	GE HealthCare personnel responsible for providing IT expertise and maintaining records of specific network IT connectivity parameters that are required to properly configure the products' connection to the broadband connection provided by the customer.
Network IT Personnel	Dedicated customer site personnel affiliated with or contracted by the customer. Responsible for providing IT expertise necessary to ensure successful network IT connectivity between the GE HealthCare product and the facility.

GE HealthCare roles and their responsibility

Project Manager of Installation (PMI)	GE HealthCare provided dedicated contact person working directly with the Project Site Coordinator. Responsibilities include the overall project coordination and site planning of GE HealthCare products; manages activities cross-functionally with sales, customer, customer contractors, and local field teams to ensure customer site is designed and prepared to accept and install product in the facility. GE HealthCare PMI must read and fully comprehend all chapters of the Pre-Installation Manual. Prior to any construction or installation, a PMI must approve the completeness of all preliminary concepts, site plans, and final working drawings.
GE HealthCare Field Engineer (FE)	GE HealthCare field personnel responsible for the actual assembly, installation, calibration of the product and verification of the proper operation and configuration of the GE HealthCare product. This may include the physical movement of the system and its subcomponents from the point of delivery to the scan suite.The FE will oversee coordinating any replacement of damage in-shipment items, and resolving missing in-shipment issues.

1.4 Who must consult this manual

The following personnel must be aware of the content listed in the following sections:

Section	Personnel							
								
	Customer	Architect	General Contractor	Structual Engineer	Electrical Engineer	HVAC Engineer	Zone Broadband Specialist	Network IT Personnel
1 Introduction on page 6	X	X	X	X	X	X	X	X
2.1 System Siting Requirements on page 12	X	X	X	X	X	X	X	X
2.2 Regulatory Requirements on page 14		X						
2.3 Delivery and Handling on page 15	X	X	X					
2.4 Shipping Dimensions and Weight on page 22	X	X						
3 Equipment Specifications and Requirements on page 25		X		X	X	X		
4.1 Ceiling Requirements for Monitor-in-Room on page 55		X		X	X			
4.2 Ceiling Requirement for Auto Patient Positioning Depth Camera on page 64		X		X	X			
4.3 Remote Control Panel with Video Monitoring Mounting Requirements on page 74		X		X	X			
5.1 Flooring Requirements and Specifications on page 81		X		X				
5.2 Floor Loading Data on page 83		X		X				
5.3 Functional Scan Suite Layout Configuration on page 85		X						
5.4 Work Space Requirements on page 88		X						
5.5 Anchoring on page 99		X		X				
5.6 Electromagnetic Compatibility		X			X			
5.7 Scatter Radiation Measurement on page 116	X	X						

Section	 Customer	 Achitectic	 General Contractor	 Structual Engineer	 Electrical Engineer	 HVAC Engineer	 Zone Broadband Specialist	 Network IT Personnel
5.8 Vibration Isolation on page 127	X	X						
5.9 Other Construction Considerations on page 130		X	X					
6 Environmental Requirements (HVAC) on page 131		X				X		
7.1 Power Requirements on page 135		X			X			
7.2 Grounding on page 142		X			X			
7.3 System Interconnection and Cabling on page 144		X			X			
7.4 Scan Room Warning Light and Door Interlock on page 155		X			X			
8 Network Requirements on page 157		X					X	X
9.1 Edison HealthLink (EHL) Pre-Connectivity Checklist on page 159		X					X	X
9.2 Imaging Protocol Manager (IPM) Import/Export Criteria Checklist on page 161		X					X	X
9.3 Remote Services Platform (RSvP) Connectivity on page 163		X					X	X
10.1 System Cabinet B7919AH on page 165		X		X	X			
10.2 Scanner Desktop Dimensions		X		X	X	X		
10.3 Install the Revolution CT Gantry on a Support Structure on page 169		X		X				

1.5 Customer Responsibility

Customer responsibility

It is essential to verify all aspects of the site configuration before construction has begun, as subsequent changes can be costly or impractical. Consideration should be taken for future expansion or upgrades during the design phase of the site.

Planning and Design Work The customer will select the location of the site. All architectural, mechanical, and electrical drawings associated with the design and planning of the site are the responsibility of the customer. Any alterations or modifications to the drawings or to products not specifically included in the sales contract are the customer's responsibility. The customer shall provide a clean and safe work environment including proper lighting. We recommend a minimum of 500 lux of illumination measured at the floor to ensure proper lighting to service the equipment. All floors, walls and ceiling should be in a finished state prior to installation, and all site construction and renovation is completed.

Regulatory Compliance The customer shall be solely responsible for all regulatory compliance. All work shall comply with national, state and local regulatory and building codes for the location in which the installation occurs. This includes but is not limited to: permits, inspections, radiation licensing, fire control devices, earthquake regulations, international building codes, service, structural, flooring, vibration, HVAC, electrical, IT network, radiation protection, operational clearance requirements, and all applicable codes.

Electrical Requirements The customer shall be solely responsible for providing all electrical material and service required as outlined and illustrated in this publication. This includes but is not limited to: installation of all properly-sized junction boxes, outlets with covers, line safety switches, and fittings installed at the locations specified in the site design. Supplying electrical power of the required voltage, all necessary power supply cables and grounds, all necessary power cables and grounds to the PDU, and an Emergency-Off switch in the scan room.

NOTE
GE HealthCare does not provide or install conduits, junction boxes, or ducting illustrated in this publication. GE HealthCare only supplies some of the cabling and wiring used in this publication..

Accessory Installation Accessories ordered for use on the Revolution CT system come with their own service manual and installation instructions provided by the OEM (non-GE HealthCare) supplier. For items not installed by GE HealthCare Service, the customer must ensure that the accessory is installed per OEM specifications. For ceiling, wall or floor mounted accessories, ensure the item is mounted properly and will not be a hazard to users. GE HealthCare is not responsible for the contents and accuracy of the non-GE HealthCare supplied OEM installation manual.

For items installed by GE HealthCare Service but for which the pre-installation is under customer responsibility, the customer must ensure that the pre-installation work is performed per OEM specifications. For any ceiling, wall or floor support structure part of the pre-installation requirement, the customer must ensure those structures have been validated by a structural engineer. GE HealthCare is not responsible for the contents and accuracy of the non-GE HealthCare supplied OEM installation manual.

1.6 Form requirements

Installation forms

It will be the responsibility of the PMI to ensure the following forms are filled out completely and correctly by the proper personal and submitted prior to the end of the installation of the system. All forms are available on the Customer Portal Site by part number for download.

Form	Part Number	Description
Floor Levelness Measurement Form	DOC1766027	Used by Program Manager to record the floor levelness measurement prior to the installation.
Pre-Installation Connectivity Requirements	DOC2272544	**This must be provided to the installation team** prior to install. Only used with systems using Remote Services Platform (RSvP).

2 General Requirements

2.1 System Siting Requirements

System site print

A system installation, relocation, or move requires a site print.

The system site print, provided by GE HealthCare, is the overall layout of system, room components and egresses. The customer will ensure all equipment, storage cabinets, counter tops, and sinks appear on the site print, in their proper location. It is not to be used as a blue print for actual construction. If any discrepancies between actual room size, clearances, or egress is found on the site print, notify GE HealthCare PIM.

Facility Minimum clearance for doorways and hallways

The scan room shall have at least one unobstructed clear doorway to move the scanner sub-systems in and out of the room. The customer is responsible for removing or protecting any doorway threshold (if one exists) in order to move the scanner sub-systems in and out of the room.

Table 2-1 Minimum doorway width requirements

Doorway Clear Opening	Hallway
Minimum Width	
1168.4 mm (46.0 in)	No hallway or need to turn subsystems to enter the room
Minimum Width Needed to Turn Subsystem.**	
1168.4 mm (46.0 in)	2438.4 mm (96.0 in)
1219.2 mm (48.0 in)	2119.3 mm (84.0 in)
1524.0 mm (60.0 in)	1802.4 mm (71.0 in)
**If there is enough room in the hallway to spin the system into the room, the minimum doorway width will be smaller. If the hallway is smaller in width, the doorway width must increase.	

Table 2-2 Minimum height requirements

Doorway Clear Opening	Hallway/Path to Room
1980.0 mm (78.0 in)	2438.5 mm (96.0 in)

Related hospital equipment clearances

Check/verify the room layout for the necessary clearances required by any related hospital equipment. Avoid compromising important system features by ensuring there is ample working space around the patient table for the hospital cart, emergency equipments, personnels, and so on.

Steps for Site Readiness

The PMI will work closely with the Customer and Architect in the advancement toward final site readiness. There will be sign offs at various steps towards final installation. These include but are not limited to:

- **Site Readiness Completion and Verification**
  Installation cannot proceed until all site-readiness requirements have been completed and verified. A site is ready when all renovations/modifications have been completed and the scan suite meets all regulatory, code, and system requirements, system delivery needs, and all requirements for any options.
- **Contractor's Final Confirmation**
  Final confirmation of installation site readiness shall be made by all contractors associated with the project; structural engineer/architect, HVAC contractor, electrical contractor, qualified radiological health physicist, cleaning service, and so on.
- **Schedule of Site-Ready Visit**
  To ensure timely system delivery and installation, the customer shall complete all necessary work listed in this Pre-Installation Manual and schedule a site-ready PMI visit prior to system delivery.

2.2 Regulatory Requirements

Building codes, regulations and permits

Building Codes and Regulations

The customer will ensure the scan suite meets all building codes and applicable local regulations.

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

Surface Penetration

Prior to drilling into the floor or other surface, an inspection is required to avoid drilling into any imbedded objects that may cause injury to the installer or cause damage to the site. For seismic active locations, there will be additional holes required in the floor to mount the other subsystems to the floor.

A GE HealthCare Surface Penetration Permit (DOC0741664) may be required to allow for GE HealthCare or GE HealthCare contracted personnel to drill into the concrete floor.

Clearance regulations

Federal and National Association Regulations

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

Federal and Foreign Regulations

Ensure all systems installed within the U.S. and its territories comply with all GE HealthCare, federal, state, and local regulations. Compliance to specifications shall be the responsibility of the customer. If any regulation is in conflict with a specification defined in this manual, the most restrictive of the two specifications shall be applied.

Codes, clearances, and service space regulation

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

2.3 Delivery and Handling

Contents of this section include:

GE HealthCare Project Manager Task List

NOTICE

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

NOTICE

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

Task	Description
Site dimensions	PMI shall measure and verify all site dimensions to ensure the facility can accommodate the delivery of the system (and any related components or equipment), from the delivery drop-off point to the scan suite.
Delivery type	PMI shall determine type of delivery: loading dock or ground level. Ground level delivery may require a fork truck.
Delivery equipment	PMI shall determine if delivery requires special dollies, lifting crates, or riggers. PMI shall order any additional delivery equipment and all necessary delivery personnel. **NOTE** The CT gantry or its sections cannot be lifted or transported by any means other than pallet or the dolly system which it was delivered. Otherwise, serious damage to the gantry could result.

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

Consult the 2.4 Shipping Dimensions and Weight on page 22 for details on each system component and carts.

Delivery types and system lifting and rigging restrictions

DANGER

PERSONAL INJURY OR DEATH, EQUIPMENT DAMAGE. TIP HAZARD.

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

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

- **Loading Dock Deliveries** (Preferred method): Facilities with a loading dock in the receiving areas can generally accommodate delivery of the system by semi-tractor trailer. This is the preferred method for system delivery. Dock-to-dock shipment minimizes the possibility of dropping the gantry or damaging other sub-systems during the transition from the trailer to the facility. This method also allows for the most efficient packing and unpacking of the system.
- **Ground (Non-Loading Dock) Deliveries**: Facilities without a loading dock require a lift-gate or forklift. Such deliveries require unloading the system components from the truck bed to ground level and then transported to the facility over a smooth surface such as a concrete sidewalk or driveway or paved area. These paved surfaces must be able to support the weight of the sub-systems. It may be necessary to protect these surfaces as well.
- **Lift-Gate Truck**: The delivery truck requires a lift-gate rated for at least a 2722.0 kg (3.0 tons) capacity. When the gantry or table is lowered to ground level, lower it at a steady rate using the slowest speed as possible to minimize G-loads until the lift-gate reaches the ground. Keep the gantry or table level when moving to avoid flipping. Failure to smoothly transition the table and gantry to ground level may cause serious damage to the table, gantry or their transport dollies. Delivery of the system by tilt-bed truck is no longer an approved delivery method due to EHS safety risks of tipping the system over. If a loading dock is not available, use an appropriately sized forklift truck.

Rigging

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

⚠ DANGER

POSSIBLE SEVERE PERSONAL INJURY OR DEATH.

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

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

NOTICE

If it is determined that the sub-systems must be lifted by crane or other lifting method the PMI or person responsible for local siting of the system shall NOT proceed with the installation without consulting with GE HealthCare Engineering. The GE HealthCare PMI is responsible for getting consultation.

Lifting the sub-systems by crane or other lifting method should always be avoided. All alternate methods of delivery should be evaluated including the removal of any obstructions, doorways, walls, and windows.
If lifting is still required, see 2.4 Shipping Dimensions and Weight on page 22:

1. The entire gantry assembly and both gantry transport side dollies must be placed on a lifting platform. GE HealthCare does not provide a lifting platform.
   The Stationary Assembly shall be lowered to its transport position with the gantry base in contact with the platform. The Rotating Assembly shall be lowered to its transport position resting on the dolly transport pads in contact with the platform.

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

2. The entire patient table must be on its dollies and lifted while sitting on a lifting platform.
   The patient table on its dolly shall be lowered to its transport position so the table base is in contact with the platform.

3. The platform must be designed such that no lifting straps or cables come in contact with any part of the gantry or table sub-systems or its side dollies.
4. The lifting platform shall bear the entire load. No part of the sub-system shall bear any load during the lift.

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

Shipping and receiving

Handling Restrictions

- *Shock Restrictions:* The system cannot tolerate shock or vibration. System components cannot be tipped, dropped, or hoisted. The PMI shall communicate these restrictions to everyone involved with handling the system components.
- *Rolling on Surfaces:* System components shall be rolled across smooth surfaces (sidewalks, parking lots, tile flooring, and so on.) only. If a smooth surface is not available (for examples, a sidewalk or driveway has cracks or uneven joints, or a tiled floor has deep or rough joint lines), then floor protection shall be used to move the system across the uneven surface.
- *Shipping Crate/Packaging Integrity:* Do not damage or puncture the shipping crate or packaging.

Floor Protection

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

Door Threshold Not Allowed The customer is responsible for removing any doorway threshold (if one exists), in order to move the scanner sub-systems in and out of the room.

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

- Evaluate the flooring along the path from where the system will be delivered and installed in the scan suite. For finished floors, adequate space must be present to lay down sheets of fiberboard (masonite) with a minimum thickness of 6.35 mm (1/4 in) in front of the subsystem dolly wheels as they are moved through the facility.
  DO NOT move any subsystem from the loading dock or unloading platform location unless the finished floor is protected. This is the responsibility of the delivery company. Use of protective sheets of fiber board (masonite) is required to roll and move subsystem components to the scan suite.

Dollies, Installation and Shipping Carts

- U.S. Installations — Shipments within the United States typically involve the use of dollies (pre-installed on the gantry sections and table) for moving the gantry sections and table to the suite, and the use of installation and shipping carts and pallets for other parts. After completing the installation, return all dollies, the gantry shipping cage, and installation and shipping carts to UMI using the shipping document found in box #1. http://www.umi-dollyshop.com. Pallets are not re-usable.
- Installations Outside U.S. — For shipments outside the United States, customers may purchase dollies at: http://www.umi-dollyshop.com. DO NOT return dollies, the gantry shipping cage, or installation and shipping carts to the U.S. Instead, forward dollies, cage, and installation and

shipping carts to the local GE HealthCare office or warehouse. The gantry sections and table subsystems are shipped with dollies attached placed on a pallet for transport. Pallets are not re-usable.

- Installations China Only — For system installations in China, dollies and shipping carts are returned to: GE HealthCare Renewable Resources (Tianjin) Co., Ltd.
  Address: No 266-1 Jingsan Road Airport Economic Zone Tianjin City

  IMPORTANT
  Returning toxic materials, chemicals of any type, paints or food waste items in the shipping carts is prohibited. With the exceptions noted below, table/gantry dollies and their associated shipping cages, as well as shipping carts, can eventually be returned to UMI Inc. DollyShop Division. Go to their website for instructions on where and how to return the dollies; http://www.umicompany.com/umimobility/

  Exceptions: For tables shipped with yellow transport dollies: If the table was delivered in a wooden crate with yellow transport dollies already attached, both the crate and yellow dollies are single-use and must be discarded or recycled. They are not returnable.

- The square footage required for the installation and shipping carts storage can be calculated based on the dimensions in GE HealthCare Project Manager Task List on page 15.

Delivery Temperature and Humidity Tolerance

When transporting the system, excluding any scanner desktop LCD display monitors, water-filled calibration/IQ phantoms and covers, the temperature shall be maintained within the range of -40 to +70° C (-40 to +158° F), inclusive.

When transporting the system, excluding water-filled calibration/IQ phantoms, all packing material shall remain intact and the relative humidity shall be maintained within the range of 5% to 95% (non-condensing), inclusive.

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

Table 2-3 Shipping temperature and humidity ranges for excluded items

Items	Temperature	Humidity **NOTE** Relative humidity (non-condensing)
LCD monitors	-20 to +60° C (-4 to +140° F)	5% to 95%
Covers	-40 to +50° C (-40 to +122° F)	5% to 95%
Water-filled calibration/IQ phantoms	+5 to +70° C (+41 to +158° F)	5% to 95%

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

Unpacking System

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

Do not remove the scanner desktop from the shipping skid until after the unit has been delivered to the scan suite location.

Storage

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

Table 2-4 Humidity and ambient temperatures for storage**

Ambient temperature shall be maintained within a range of:	+4 to +27° C (+40 to +80° F)
Maximum rate of change in the temperature shall be no greater than:	3° C per hour (+5.4° F)
Relative humidity (non-condensing) shall be maintained within a range of:	20 to 60% RH
Maximum rate of change in the relative humidity shall be no greater than:	5% RH per hour
**** Delivery van/truck storage shall meet these same requirements.	

The estimated floor footprint of all the packages shipped with a standard Revolution CT system takes up an area approximately 45.5 feet (1386.8 cm) long by 8.5 feet (259.1 cm) wide by 7.0 feet (213.4 cm) high.

Construction sites

The site for delivery and installation must be a dust-free, occupancy-ready state. If the site is under construction or adjacent construction, the system and all its components must be packaged for construction site. Determine if the system will be stored or installation at this site.

1. **Construction Site Storage**
   - Construction site packaging must be ordered and the system shipped packaged for storage.
   - Do not damage or puncture the shipping crate.
   - Do not remove packaging until the completion of all construction at the site and the removal of all dust created by the construction.
   - Maintain a storage temperature within the range outlined in the Pre-installation Manual.
   - Maintain a relative humidity as outlined in the Pre-Installation Manual.
2. **Construction Site Installations**
   A construction installation describes installations at sites without an occupancy permit, or ongoing construction. In general, construction sites fail to meet the required specifications for system delivery, and GE HealthCare does not recommend such installations, as they can result in delays, increased costs, and possible damage to the system. When construction-site delivery proves unavoidable, the installation falls into one of two categories:
   - **Full construction site with completed radiology area**
     This type of site consists of a finished, dust-free, occupancy-ready radiology suite at a site with ongoing construction in other areas, but with no remaining construction in or around the scan suite area. At the time of delivery such sites feature:
     2.1.1. Dust control measures deployed in the radiology suite area.
     2.1.2. Scan suite access limited to a single entrance.

2.1.3. Radiology suite sealed off from the remaining construction area.

2.1.4. Operational HVAC, with a positive air pressure within the radiology suite.

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

- **Full construction site with limited delivery access**
  This type of site allows delivery during ongoing construction of the radiology suite area. Construction site packaging must be ordered and the system is delivered packed for construction site storage. Packaging cannot be added during the delivery.

  At full construction sites, delivery occurs prior to site completion, but the product remains stored until the completion of a finished, dust-free, occupancy-ready radiology suite area. This system is delivered in sealed packages with dollies. Delivery to the storage area requires a lift truck or riggers. Installation work can begin only when the site reaches the completed, dust-free, occupancy-ready radiology suite requirement.

2.4 Shipping Dimensions and Weight

Gantry Shipping Dimensions and Weight

Gantry	Height mm (in.)	Length mm (in.)	Width/ Depth mm (in.)	Weight kg (lb)
Stationary assembly (with two (2) gantry transport side dollies and upper and lower cross bars) *Assume the lowest point of its bottom is 101 mm (4 in) above the floor. Adjust the vertical dimension with transporting dollies to desire height if necessary. **Width becomes 925 mm (36.4 in) if cross bars are removed.	*2049.0 (80.7)	2753.0 (108.4)	**1149.0 (45.2)	1738.8 (3830.0)
Rotating assembly (with gantry transport cage plus two (2) gantry transport side dollies) **NOTE** Assume the transport cage is raised so the lowest point of its bottom is 97.0 mm (3.8 in) above the floor.	1905.0 (75.0)	2878.0 (113.3)	1018.0 (40.1)	1681.6 (3704.0)
Gantry transport side dolly -- (Two (2) for stationary assembly and two (2) for rotating assembly) **NOTE** Does not include cross-bars.	1360.0 (53.5)	328.0 (12.9)	870.0 (34.3)	95.3 (210.0) [190.7 (420.0)]
Gantry cross-bars (4)	N/A	N/A	N/A	45.4 (100.0)
Gantry transport cage	1552.0 (61.1)	2377.0 (93.6)	925.0 (36.4)	564.8 (1244.0)
Gantry covers and cover brackets	N/A	N/A	N/A	331.4 (730.0)

Patient Table Shipping dimensions and weight

Patient Table	Height mm (in)	Length mm (in)	Width/ Depth mm (in)	Weight kg (lb)
NG-2000 table with shipping dolly **NOTE** Table is fully lowered (550.0 mm (21.7 in)) and in Home position for shipping *Estimated weight.	1244.6 (49.0)	3866.4 (155.2)	863.6 (34.0)	*1257.6 (2770.0)

Patient Table	Height mm (in)	Length mm (in)	Width/ Depth mm (in)	Weight kg (lb)
NG-2000 Table at mechanical shipping height with four (4) transporting dollies/extension brackets *Height can be adjusted by table elevation. **Estimated length, bulkhead included. ***Estimated weight	*1230.0 (48.4)	**3149.6 (124.0)	1120.0 (44.1)	***866.0 (1905.0)
NG-2000V Table with shipping dolly	1244.6 (49.0)	3866.4 (155.2)	863.6 (34.0)	1280.0 (2816.0)
NG-2000V Table at mechanical shipping height with four (4) transporting dollies and extensions	*1230.0 (48.4)	2972 (117.0)	1120.0 (44.1)	737.2 (1622.0)
NG-1700V Table with shipping dolly	1244.6 (49.0)	3866.4 (155.2)	863.6 (34.0)	1108.0 (2438.0)
NG-1700V Table at mechanical shipping height with four (4) transporting dollies and extensions	*1230.0 (48.4)	2672 (105.2)	1120.0 (44.1)	650 (1430.0)
NG-2000SV Table with shipping dolly	1340 (52.8)	2963.5 (116.7)	934 (36.8)	730.8 1611
NG-1700SV Table with shipping dolly	1340 (52.8)	2663.5 (104.9)	934 (36.8)	710.4 (1566)

Scanner Desktop Shipping dimensions and weight

Scanner Desktop	Height mm (in)	Length mm (in)	Width/ Depth mm (in)	Weight kg (lb)
Scanner Desktop IV-V	660.0 (26.0)	670.0 (26.4)	600.0 (23.6)	29.5 (65)
Scanner Desktop (I-III) computer (with shipping crate)	769.6 (30.3)	1219.2 (48.0)	1016.0 (40.0)	85.9 (189.2)
Operator workspace table (option) (with shipping crate)	N/A	1520.0 (59.8)	915.0 (36.0)	74.9 (165.0)

System Cabinet Shipping dimensions and weight

System Cabinet	Height mm (in)	Length mm (in)	Width/ Depth mm (in)	Weight kg (lb)
System Cabinet VII	1219.2 (48)	1346.2 (53)	863.6 (34)	256.2 (565)
System Cabinet VI	1536.7 (60.5)	1485.9 (58.5)	977.9 (38.5)	404.7 (892.2)
System Cabinet V (with shipping brackets and crate)	1536.7 (60.5)	1485.9 (58.5)	977.9 (38.5)	404.7 (892.2)
System Cabinet IV (with shipping brackets and crate)	1536.7 (60.5)	1485.9 (58.5)	977.9 (38.5)	478.54 (1055)
System Cabinet III (with shipping brackets and crate)	1536.7 (60.5)	1485.9 (58.5)	977.9 (38.5)	352.8 (777.0)

PDU Shipping dimensions and weights

Power Distribution Unit (PDU)	Height mm (in)	Length mm (in)	Width/ Depth mm (in)	Weight kg (lb)
NGPDU-61 (with shipping crate)	1214.2 (47.8)	1219.2 (48.0)	1219.2 (48.0)	374.6 (825.0)
NGPDU-91 (with shipping crate)	1222.0 (48.1)	975.0 (38.0)	635.0 (25.0)	480.8 (1060.0)
NGPDU-92 (with shipping crate)	1222.0 (48.1)	975.0 (38.0)	635.0 (25.0)	551.5 (1215.9)

Other components dimensions and weight

Miscellaneous Components	Height mm (in)	Length mm (in)	Width/ Depth mm (in)	Weight kg (lb)
Service storage cabinet (option) (with shipping crate)	1206.5 (47.5)	977.9 (38.5)	673.1 (26.5)	61.3 (135.0)
UPS (If equipped) (with shipping crate)	1358.9 (53.5)	1219.2 (48.0)	1016.0 (40.0)	297.4 (655.0)

Shipping Cart dimensions and weight

Shipping Carts	Height mm (in)	Length mm (in)	Width/ Depth mm (in)	Weight kg (lb)
Installation Cart #1	1403.4 (55.3)	1308.1 (51.5)	781.1 (30.8)	168.0 (370.0)
Installation Cart #2	1403.4 (55.3)	1308.1 (51.5)	781.1 (30.8)	174.8 (385.0)
Installation Cart #3 (frames and brackets)	1410.0 (55.5)	1315.0 (51.8)	790.0 (31.1)	220.0 (484.6)
Revolution Cover Cart #4 (front cover and rear bezel)	2095.0 (82.5)	2360.0 (92.9)	740.0 (29.1)	250.0 (550.7)
Revolution Cover Cart #5 (covers)	1670.0 (65.7)	2120.0 (83.5)	890.0 (35.0)	190.0 (418.5)

3 Equipment Specifications and Requirements

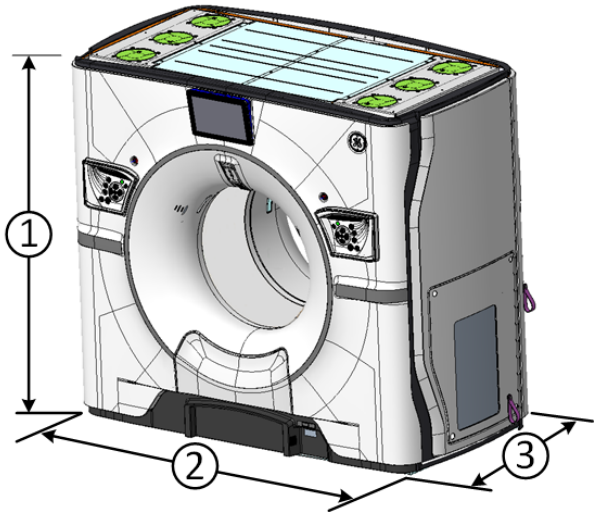
3.1 Intended Users

(Applies to all sections within this chapter.)

3.2 Gantry Dimensions

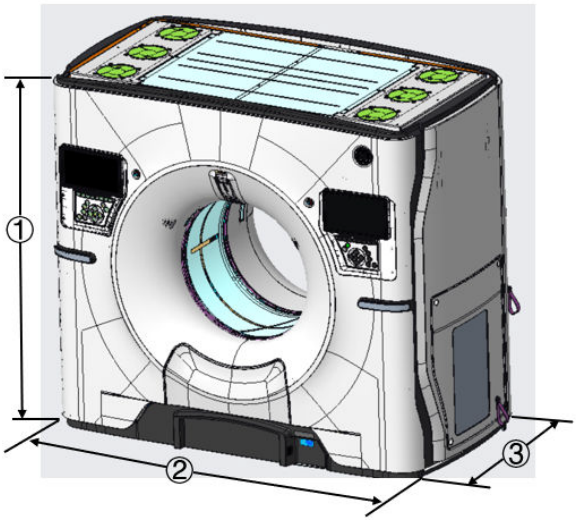
Gantry dimensions and weight

Figure 3-1 Gantry dimensions



Gantry	Height mm (in) [1]	Length mm (in) [2]	Width/Depth mm (in) [3]	Weight kg (lb)
Assembled gantry for all Revolution gantries (without covers or cover brackets)	1938.0 (76.3)	2059.0 (81.1)	1041.4 (41.0)	2544.7 (5605.0)
Assembled gantry for Revolution CT, Revolution CT ES and Revolution CT with Apex Edition (with covers installed)	2005.0 (78.9)	2365 (93.1)	1427.5 (56.2)	Revolution CT: 2874.5 (6335) Revolution CT ES: 2820.4 (6218)

Figure 3-2 Gantry dimensions for Revolution Apex Select



NOTE
Dimension of assembled gantry depth is measured when both front and back top LCD displays in open position.

Gantry	Height mm (in) [1]	Length mm (in) [2]	Width/Depth mm (in) [3]	Weight kg (lb)
Revolution Apex Elite, Plus, Select, Expert, Essential, Vibe gantry (with covers installed)	2036.5 (80.2)	2300.0 (90.6)	1331.4 (52.4)	2676.2 (5900)
Revolution Apex gantry (with covers installed)	2029.5 (79.9)	2293.6 (90.3)	1331 (52.4)	2798.7 (6170)

Gantry open cover dimensions

The figure below shows the maximum height of the front cover during installation and during service. Note: the exact dimensions in both figures are different, more hieght is required for installation. Anything from the ceiling must stay above these heights or there will be a collision with the top cover. Note, the change in placement of the maximum height location.

Figure 3-3 Maximum height at installation and during service

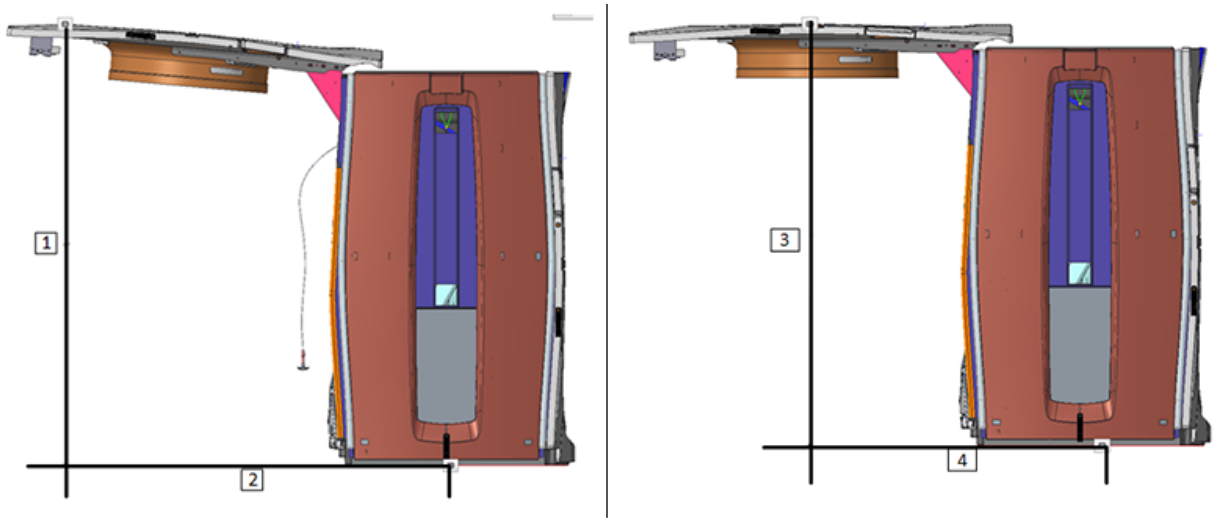
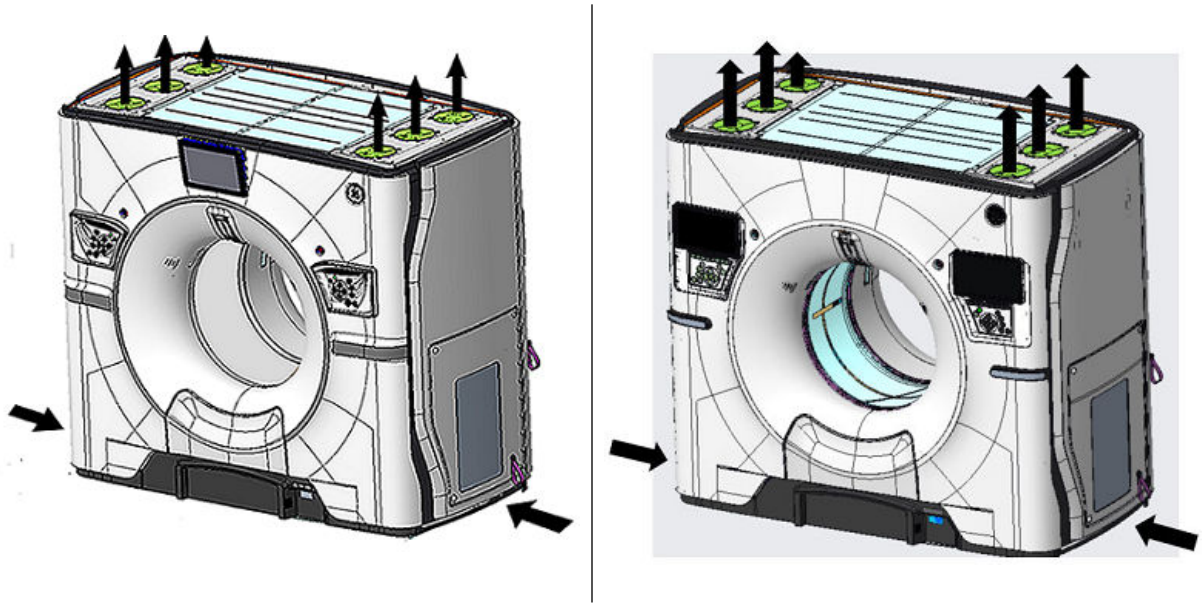


Figure	Height	Length (from ISO center)
Gantry front cover installation	(**1**) 2252 mm (88.6 in)	(**2**) 1760 mm (69.2 in)
Gantry front cover service	(**3**) 2126 mm (83.7 in)	(**4**) 1097 mm (43.2 in)

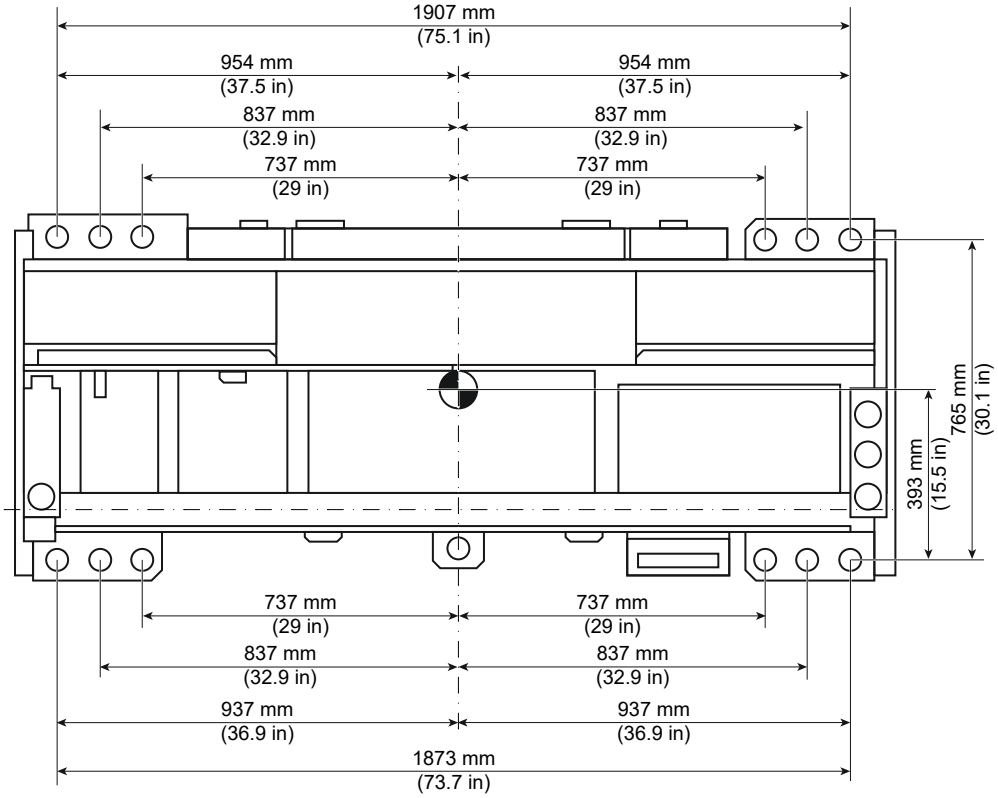
Air Flow: Intake air pulled through side covers. Exhaust air pushed through top covers.

Figure 3-4 Air flow for Revolution CT, Revolution ES and Revolution Apex



Gantry Center of Gravity

Figure 3-5 Gantry Center of Gravity (all gantry models)



NOTE

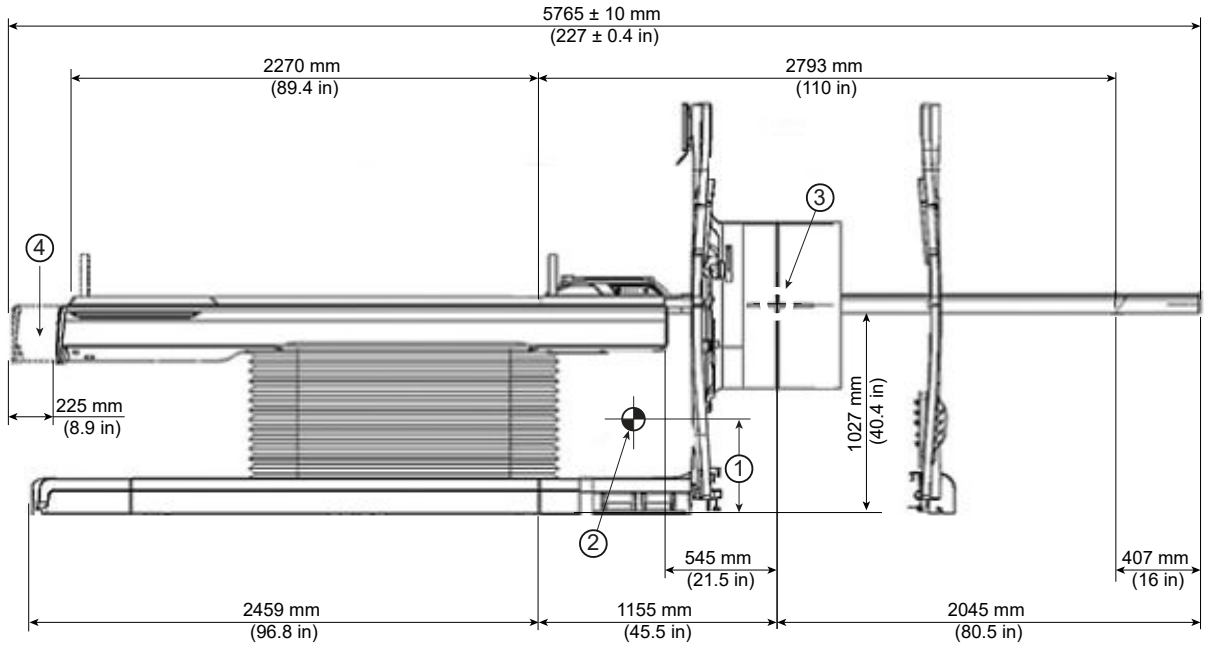
CG-Y from floor at nominal feet height is 963 mm (37.9 in.).

3.3 NG 2000 Patient Table Dimensions

Patient Table	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
NG-2000 table (only)	1230.0 (48.4)	2971.8 (117.0)	609.6 (24.0)	799.0 (1760.0)
NG-2000 table foot pedal unit	209.0 (8.2)	733.0 (28.9)	574 (22.6)	33.0 (72.7)

NOTE
The weight of the patient table does not include patient load.

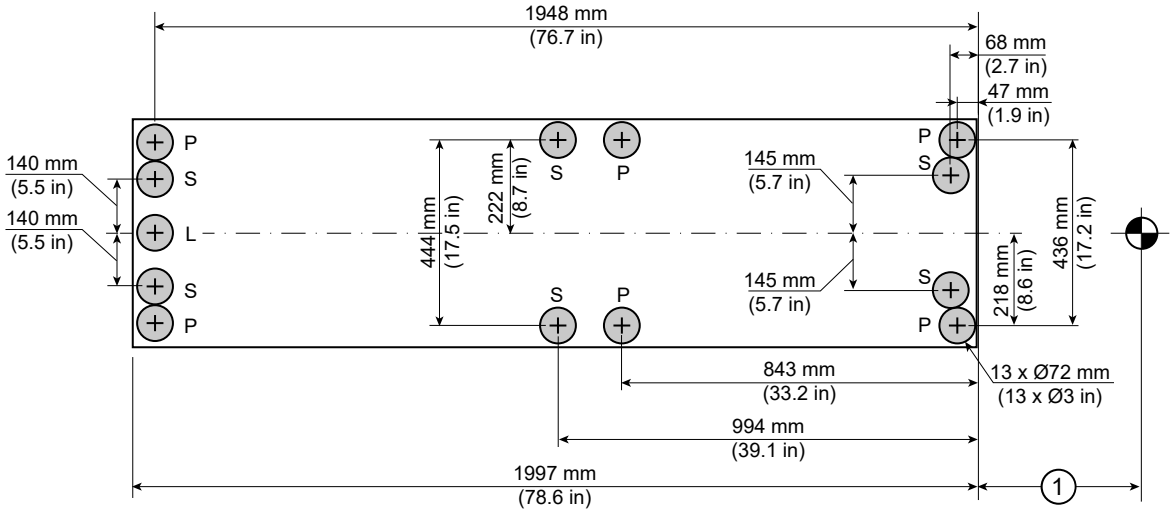
Figure 3-6 NG-2000 table component dimensions and Center of Gravity



Item	Description	Dimensions
1	Capacity table 227 kg (500 lb)	688 mm (27.1 in)
	Capacity table 306.7 kg (675 lb)	725 mm (28.5 in)
2	Center of gravity	
3	ISO center	
4	Transporter Travel	

NOTE
CG calculations include the maximum patient weight listed, on the end of the cradle when fully extended at maximum elevation.

Figure 3-7 NG-2000 patient table Center of Gravity



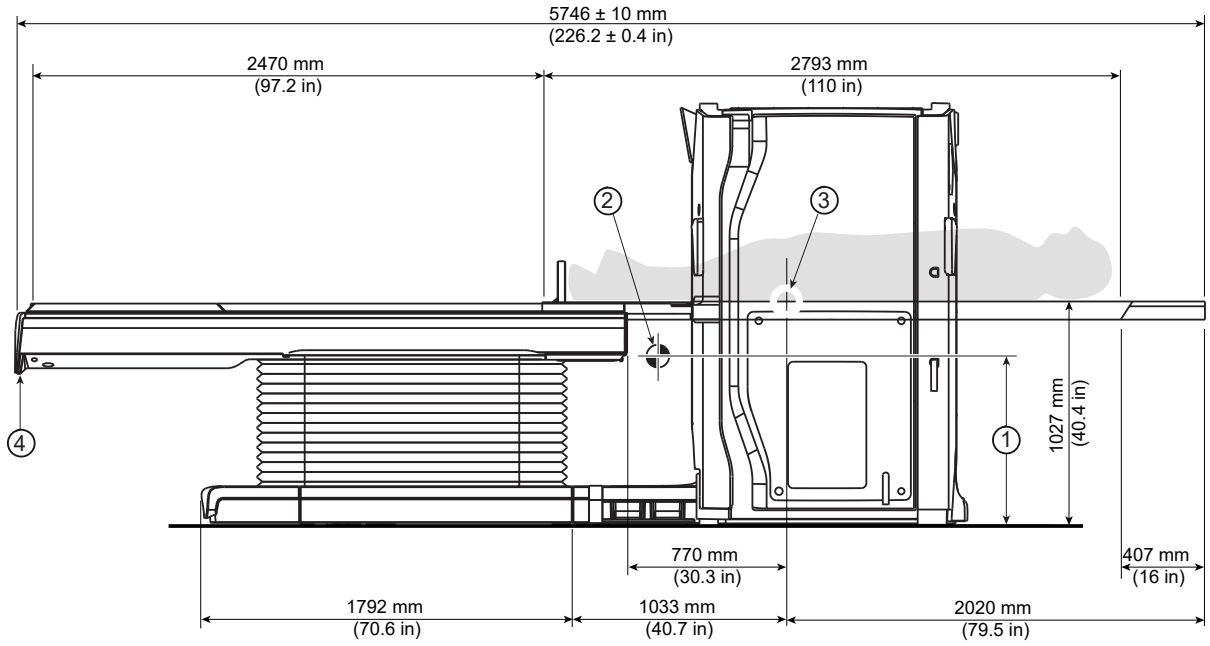
Item	Description	Dimensions
1	Capacity table 227 kg (500 lb)	171 mm (6.7 in)
	Capacity table 306.7 kg (675 lb)	341 mm (13.4 in)

3.4 NG2000V Patient Table Dimensions

Patient Table	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
NG2000V table (only)	1232 (48.5)	2960.4 (116.5)	600.2 (23.6)	670.0 (1474.0)
NG2000V table foot pedal unit	216 (8.5)	591 (23.3)	594 (23.4)	34 (74.8)

NOTE
The weight of the patient table does not include patient load.

Figure 3-8 NG2000V table component dimensions and Center of Gravity

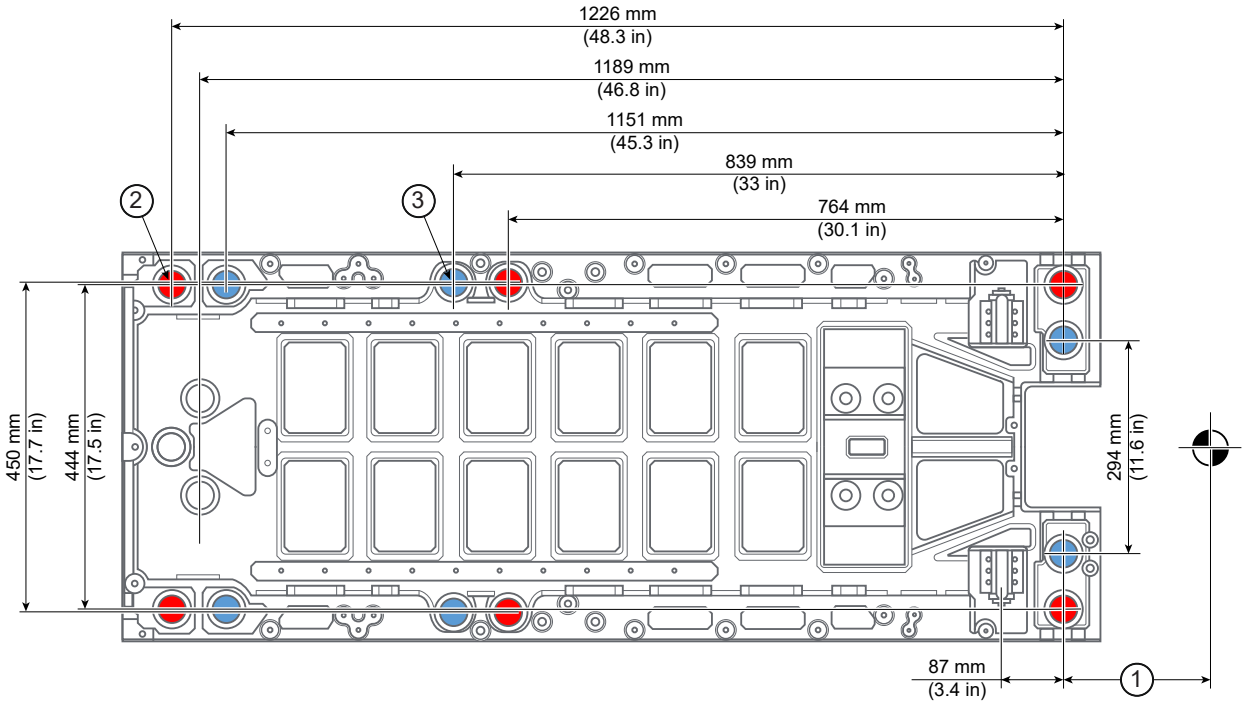


Item	Description	Dimensions
1	Capacity table 227 kg (500 lb)	795 mm (31.3 in)
	Capacity table 306.7 kg (675 lb)	796 mm (31.3 in)
2	Center of gravity	
3	ISO center	
4	Transporterless — no travel	

NOTE
CG calculations include the maximum patient weight listed, on the end of the cradle when fully extended at maximum elevation.

NOTE
NG1700V and NG2000V have identical COG data.

Figure 3-9 NG2000V patient table Center of Gravity



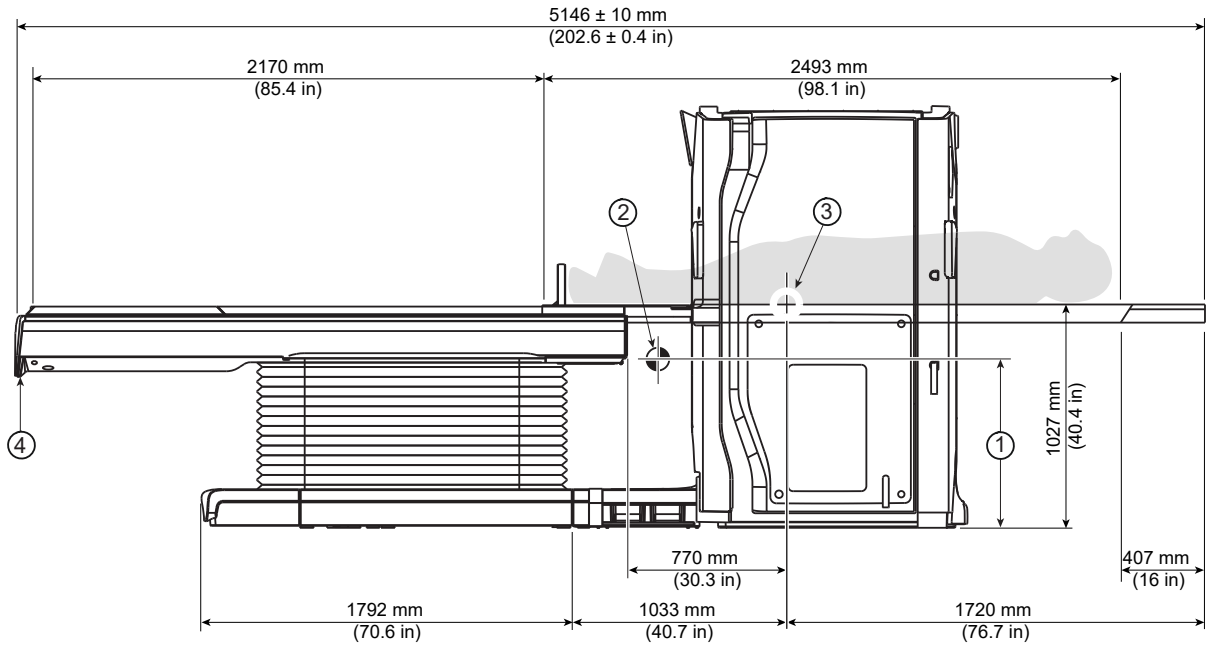
Item	Description	Dimensions
1	Capacity table 227 kg (500 lb)	197 mm (7.8 in)
	Capacity table 306.7 kg (675 lb)	362 mm (14.3 in)
2	Primary anchor locations	
3	Secondary anchor locations	

3.5 NG1700V Patient Table Dimensions

Patient Table	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
NG1700V table (only)	1233.0 (48.5)	2660.5 (104.7)	600.2 (23.6)	650.0 (1430.0)
NG1700V table foot pedal unit	216 (8.5)	591 (23.3)	594 (23.4)	34 (74.8)

NOTE
The weight of the patient table does not include patient load.

Figure 3-10 NG1700V table dimensions

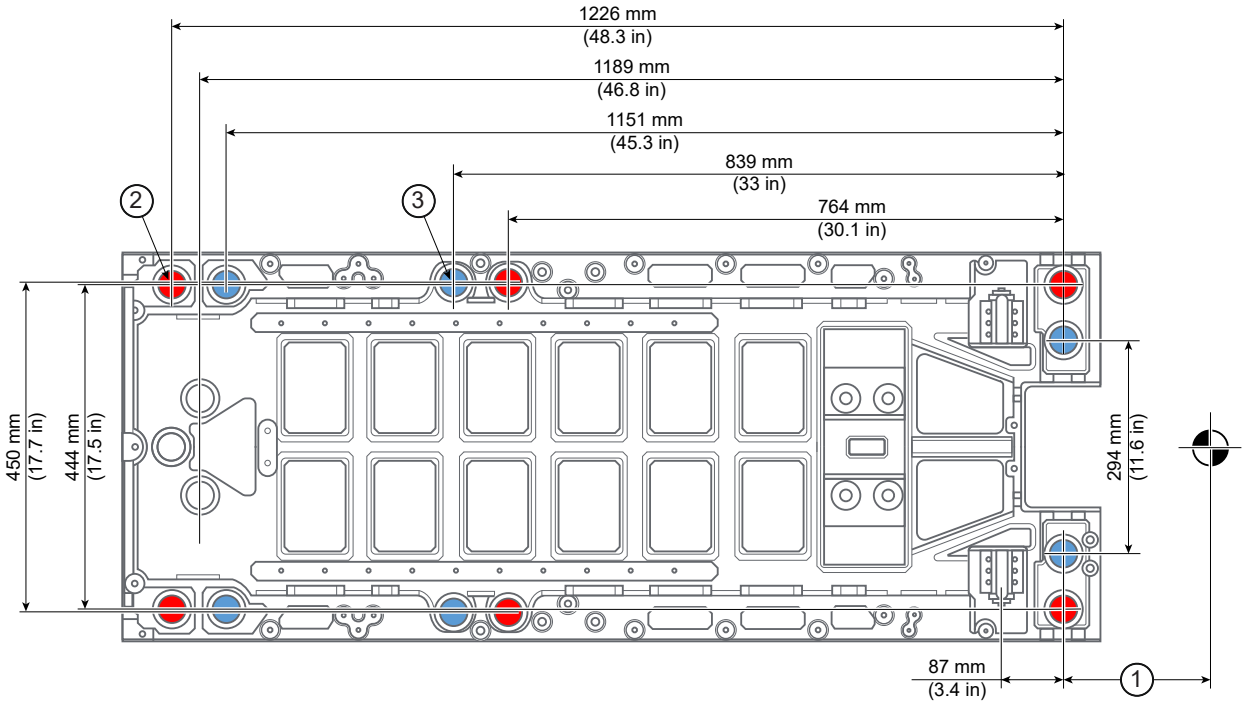


Item	Description	Dimensions
1	Capacity table 306.7 kg (675 lb)	794 mm (31.2 in)
2	Center of gravity	
3	ISO center	
4	Transporterless — no travel	

NOTE
CG calculations include the maximum patient weight listed, on the end of the cradle when fully extended at maximum elevation.

NOTE
NG1700V and NG2000V have identical COG data.

Figure 3-11 NG1700V patient table Center of Gravity



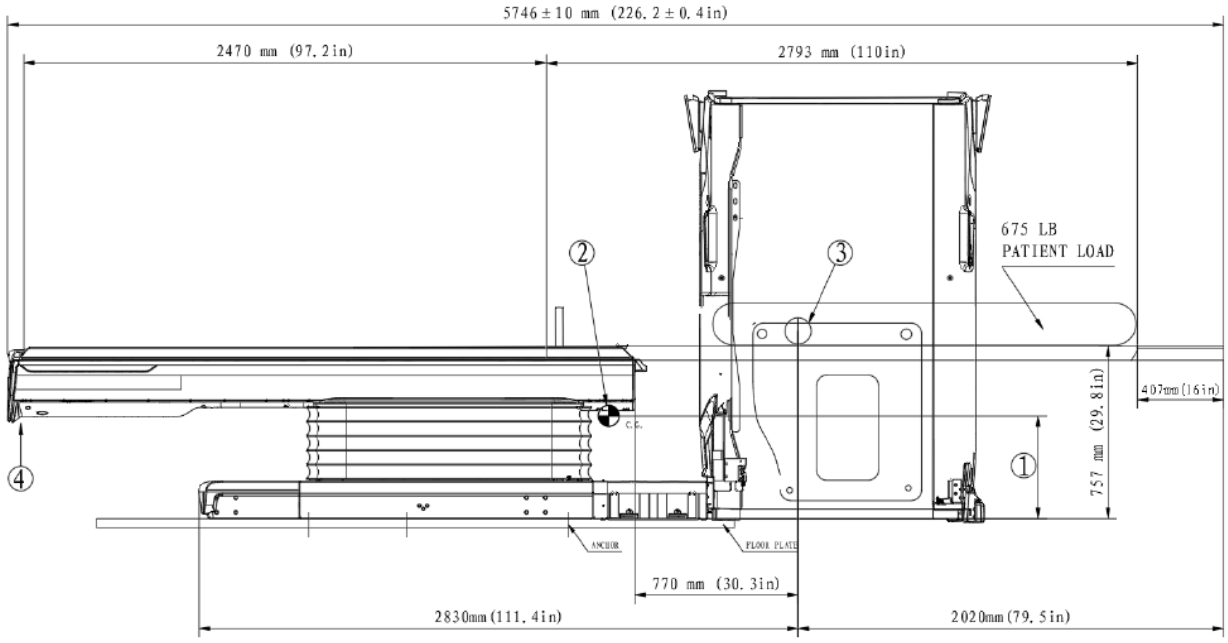
Item	Description	Dimensions
1	Capacity table 306.7 kg (675 lb)	362 mm (14.3 in)
2	Primary anchor locations	
3	Secondary anchor locations	

3.6 NG2000SV Patient Table Dimensions

Patient Table	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
NG2000SV table (only)	1271.6 (50)	2963.5 (116.7)	600.2 (23.7)	680.0 (1498.0)
NG2000SV table foot pedal unit	216 (8.5)	591 (23.3)	594 (23.4)	25.2 (55.6)

NOTE
The weight of the patient table does not include patient load.

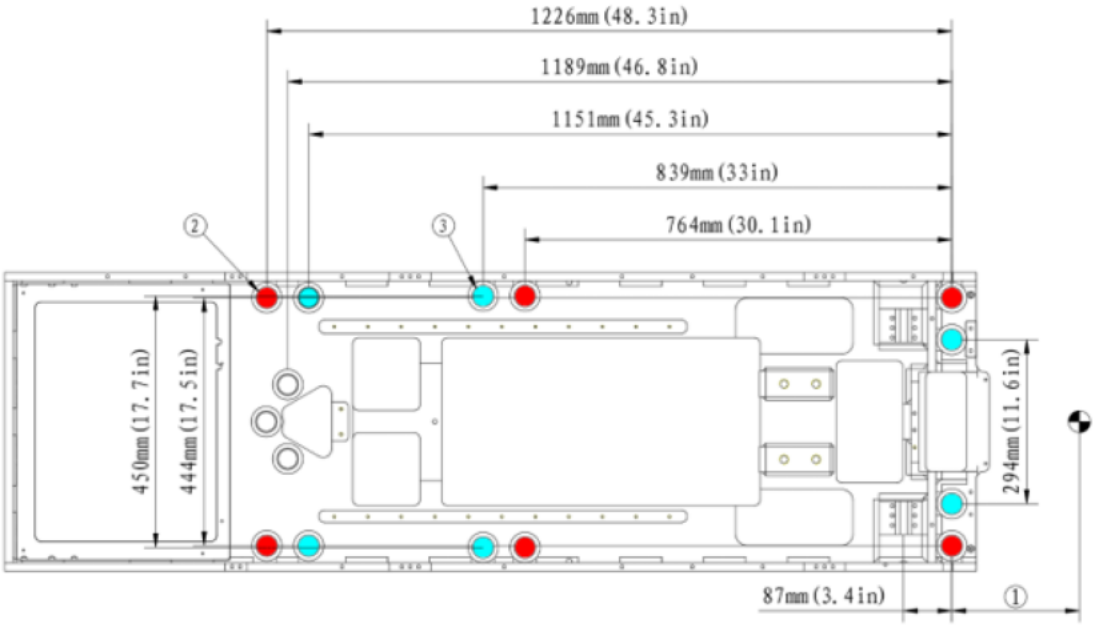
Figure 3-12 NG2000SV table component dimensions and Center of Gravity



Item	Description	Dimensions
1	Capacity table 306.7 kg (675 lb)	541.02 mm (21.3 in)
2	Center of gravity	
3	ISO center	
4	Transporterless - no travel	

NOTE
CG calculations include the maximum patient weight listed, on the end of the cradle when fully extended at scanning elevation.

Figure 3-13 NG2000SV patient table Center of Gravity



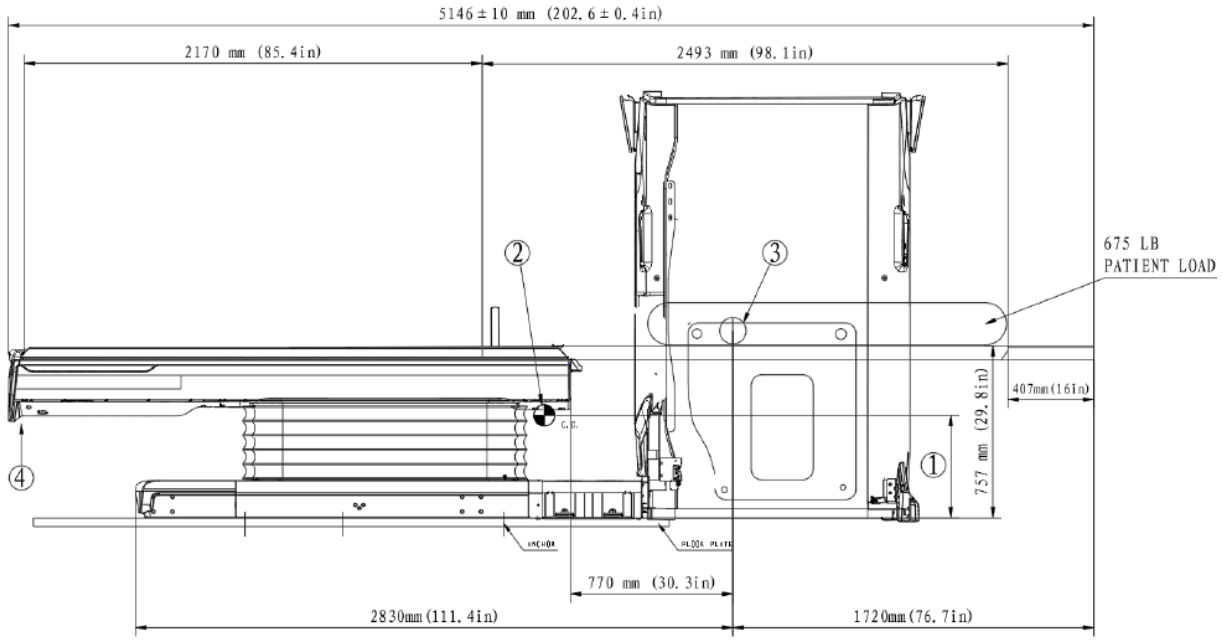
Item	Description	Dimensions
1	Capacity table 306.7 kg (675 lb)	165.1 mm (6.5 in)
2	Primary anchor locations	
3	Secondary anchor locations	

3.7 NG1700SV Patient Table Dimensions

Patient Table	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
NG1700SV table (only)	1271.6 (50)	2663.5 (104.9)	600.2 (23.7)	660.0 (1453.0)
NG1700SV table foot pedal unit	216 (8.5)	591 (23.3)	594 (23.4)	25.2 (55.6)

NOTE
The weight of the patient table does not include patient load.

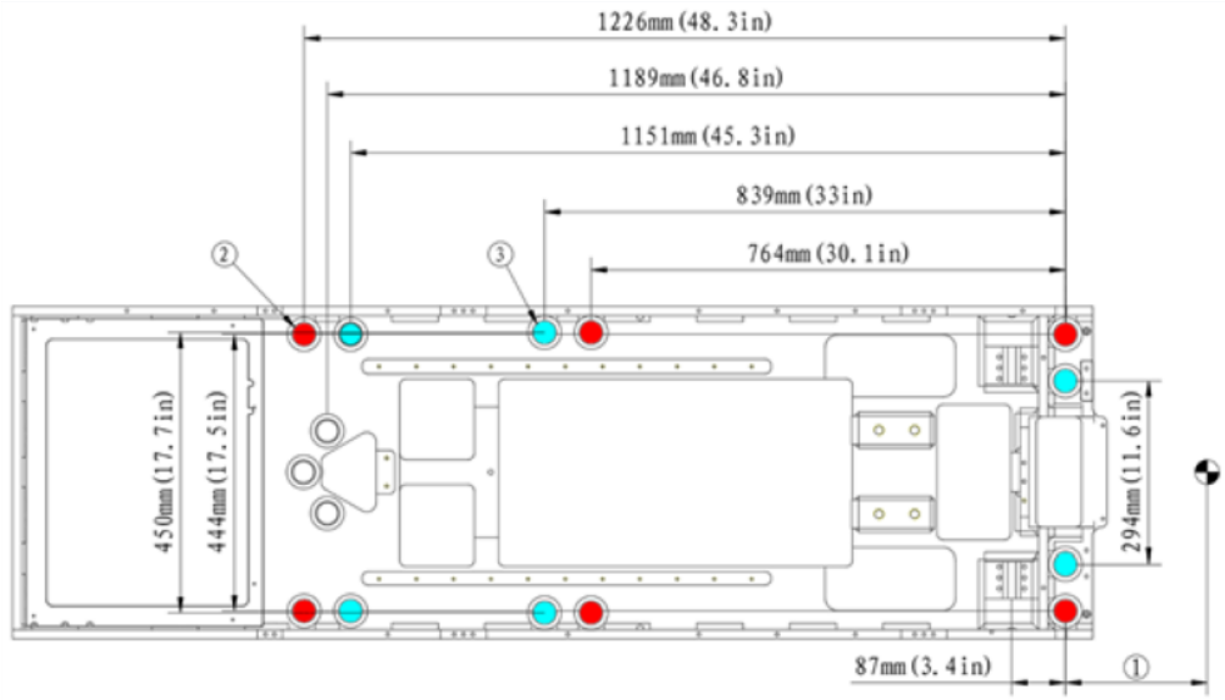
Figure 3-14 NG1700SV table component dimensions and Center of Gravity



Item	Description	Dimensions
1	Capacity table 306.7 kg (675 lb)	541.0 mm (21.3 in)
2	Center of gravity	
3	ISO center	
4	Transporterless - no travel	

NOTE
CG calculations include the maximum patient weight listed, on the end of the cradle when fully extended at scanning elevation.

Figure 3-15 NG1700SV patient table Center of Gravity

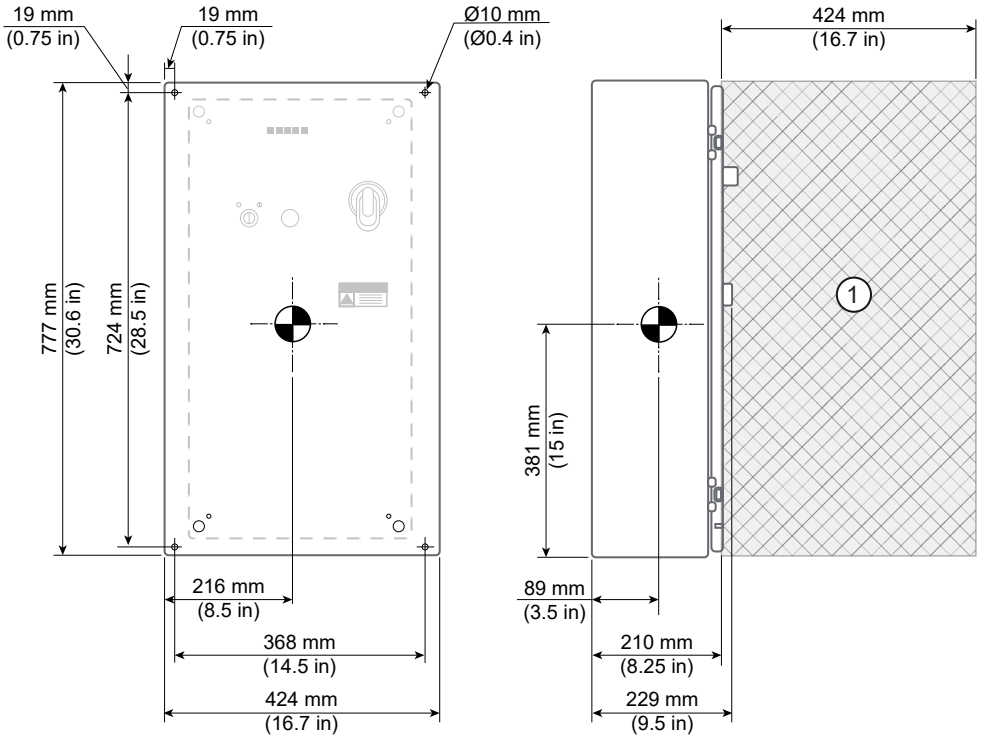


Item	Description	Dimensions
1	Capacity table 306.7 kg (675 lb)	109.2 mm (4.3 in)
2	Primary anchor locations	
3	Secondary anchor locations	

3.8 Main Disconnect Panel (MDP) Dimensions

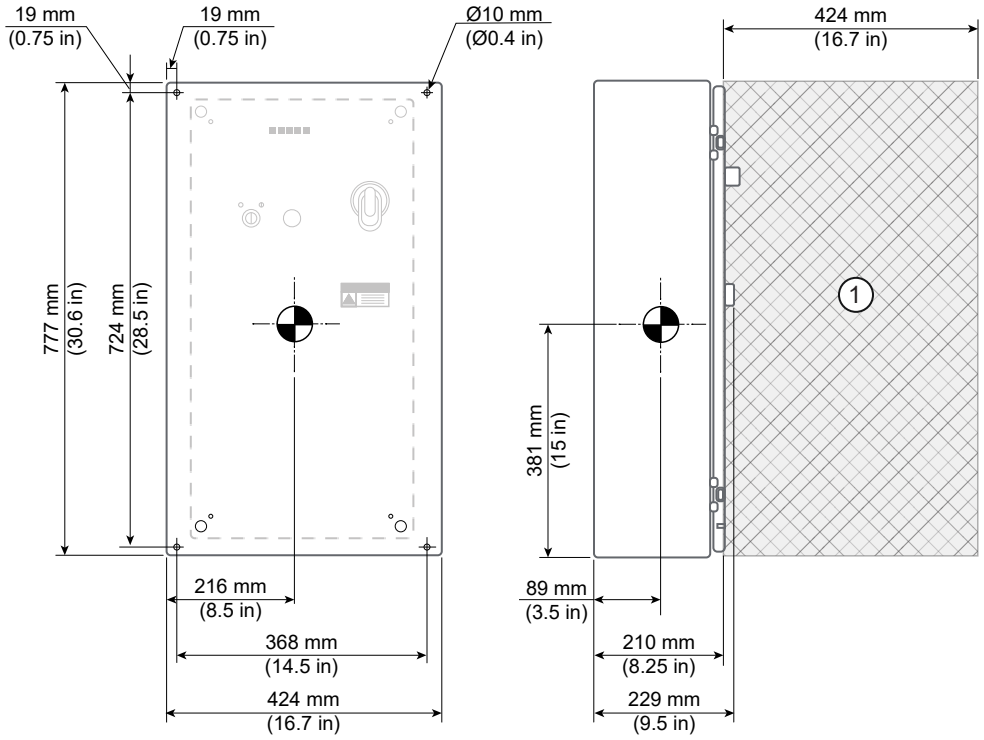
NOTE
MDP details in this section are intended for seismic calculations and does not fully represent all variations available.

MDP E4502BG (200 kVA)



Item	Description
1	Panel door swing area

MDP E4502BE (150 kVA)



Item	Description
1	Panel door swing area

3.9 Power Distribution Unit (NGPDU) Dimensions

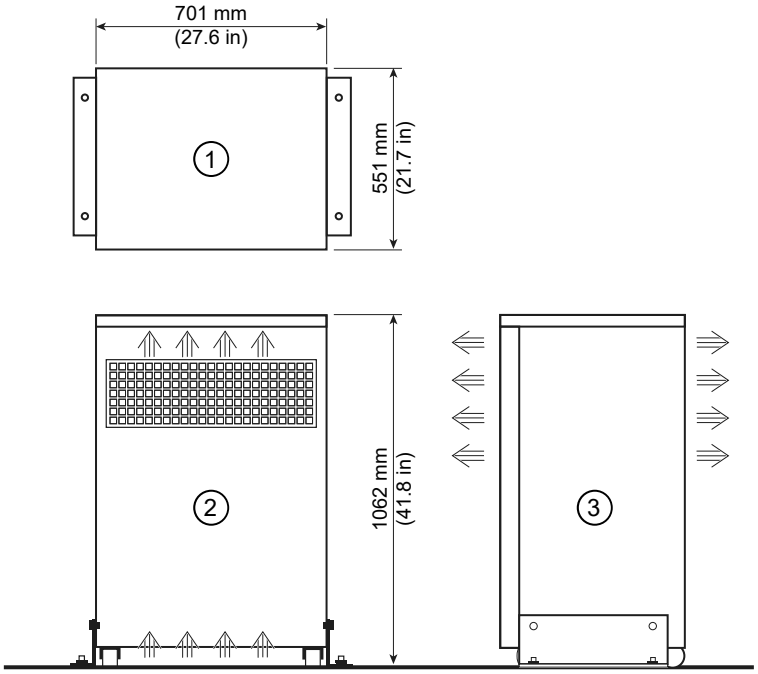
Table 3-1 NGPDU Dimensions

Power Distribution Unit (PDU)	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
NGPDU–61*	1062.0 (41.8)	701.0 (27.6)	551.0 (21.7)	*361.4 (796.0)
NGPDU–91*	1062.0 (41.8)	701.0 (27.6)	551.0 (21.7)	*423.2 (933.0)
NGPDU–92*	1062.0 (41.8)	701.0 (27.6)	551.0 (21.7)	*487 (1072)
*Does not include optional seismic brackets of 10.0 kg (22.0 lbs).				

NGPDU-61

Weight: 361 kg (796 lb.) - Does not include seismic brackets of 10.0 kg (22.0 lbs).

Figure 3-16 NGPDU-61 Power Distribution Unit (PDU) air flow

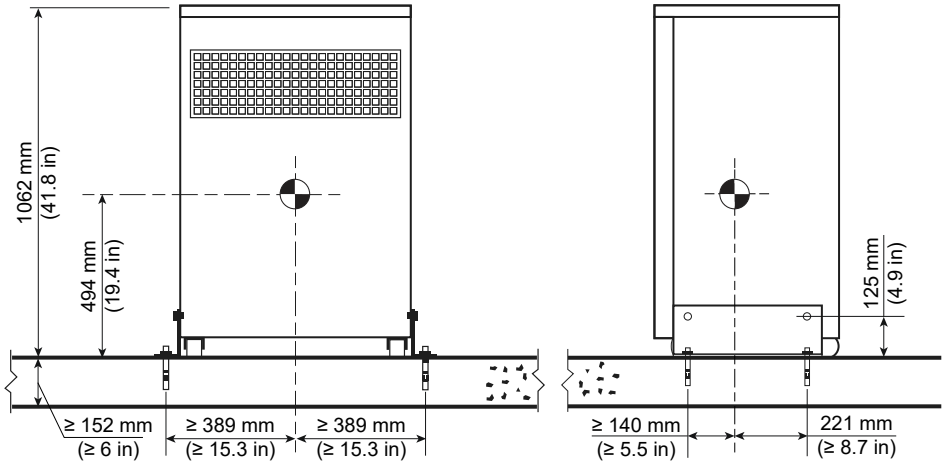


Item	Description	Item	Description
1	Top View	3	Side View
2	Front View	-	-

NOTE
NGPDU-61 and NGPDU-91/-92 have identical air flow. Air Flow does not use fans. Convection is done through bottom of cabinet, and then air exhausts through vents at top of front cover.

NOTE
The PDU shipping brackets are to be used as Seismic brackets.

Figure 3-17 NGPDU-61 Center of Gravity

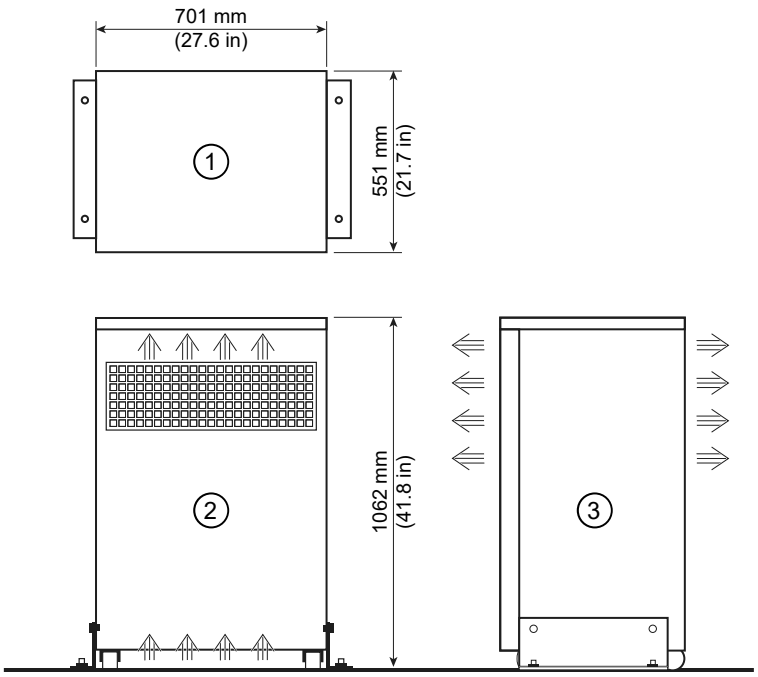


NGPDU-91/-92

NGPDU-91 Weight: 423kg (933 lb.) - Does not include seismic brackets of 10.0 kg (22.0 lbs).

NGPDU-92 Weight: 487 kg (1072 lb.) - Does not include seismic brackets of 10.0 kg (22.0 lbs).

Figure 3-18 NGPDU-91/-92 Power Distribution Unit (PDU) air flow



Item	Description	Item	Description
1	Top View	3	Side View
2	Front View	-	-

NOTE
NGPDU-61 and NGPDU-91/-92 have identical air flow. Air Flow does not use fans. Convection is done through bottom of cabinet, and then air exhausts through vents at top of front cover.

NOTE
The PDU shipping brackets are to be used as Seismic brackets.

Figure 3-19 NGPDU-91 Center of Gravity

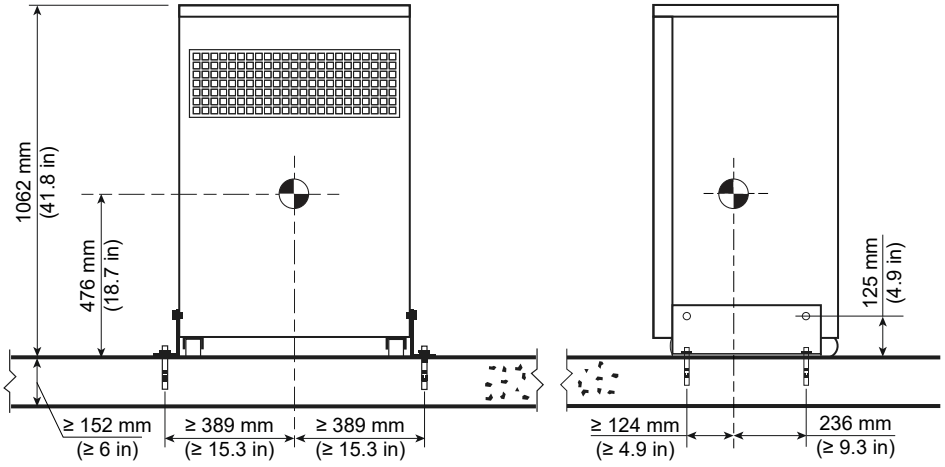
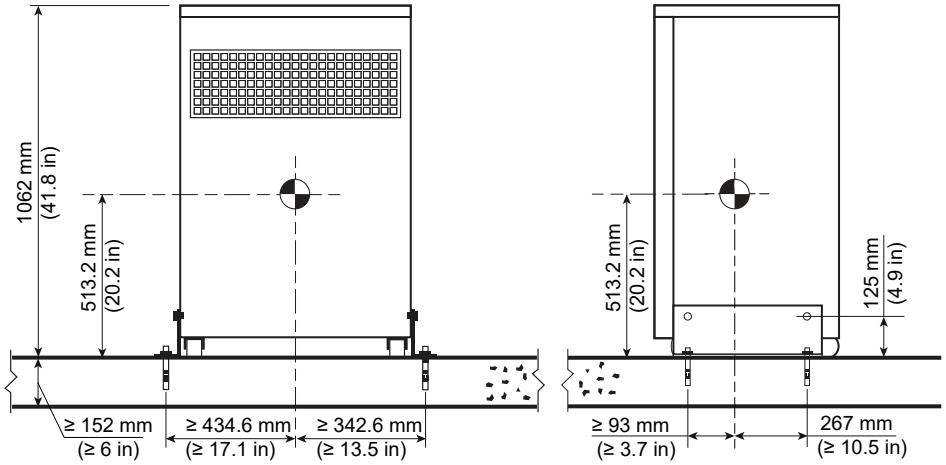


Figure 3-20 NGPDU-92 Center of Gravity



3.10 Uninterrupted Power Supply (UPS) Dimensions

Partial UPS is standard equipment on Revolution Apex, it is an available option on Revolution CT; Revolution ES.

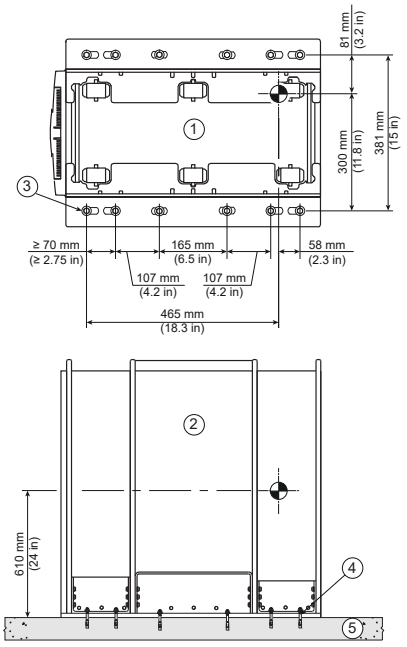
	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
Partial UPS	1244.6 (49.0)	812.8 (32.0)	304.8 (12.0)	281 (620) *
* Weight does not include seismic brackets 60 (136) kg(lb).				

Partial UPS Center-of-Gravity

For information refer to the Original Equipment Manufacturers (OEM) documentation.

Figure 3-21 Optional Eaton UPS (shown with Seismic brackets installed)

NOTE
This is the recommended anchoring method provided by the OEM, GE HealthCare doesn't design any seismic brackets for the UPS; however, GE HealthCare does distribute EATON's seismic kit as GE HealthCare Catalog E4502YA



Item	Description	Item	Description
1	Bottom view	3	Pre-manufactured mounting bracket with (12)-3/8 in Ø Hilti KB-TZ2 expansion anchors (min. embed. = 2 in) and 1-1/2ØO.D. x 7/16 in I.D.x1/8 in thick washers
2	Side view	4	Pre-manufactured mounting bracket with (12)-3/8 in. Ø Hilti KB-TZ2 expansion anchors or with (12)-Hilti HY 200 + has R316 3/8 in Ø (ASTM F593H) and 1-1/2 Ø O.D. x 7/16 in I.D.x1/8 in thick washer
-	-	5	Concrete floor

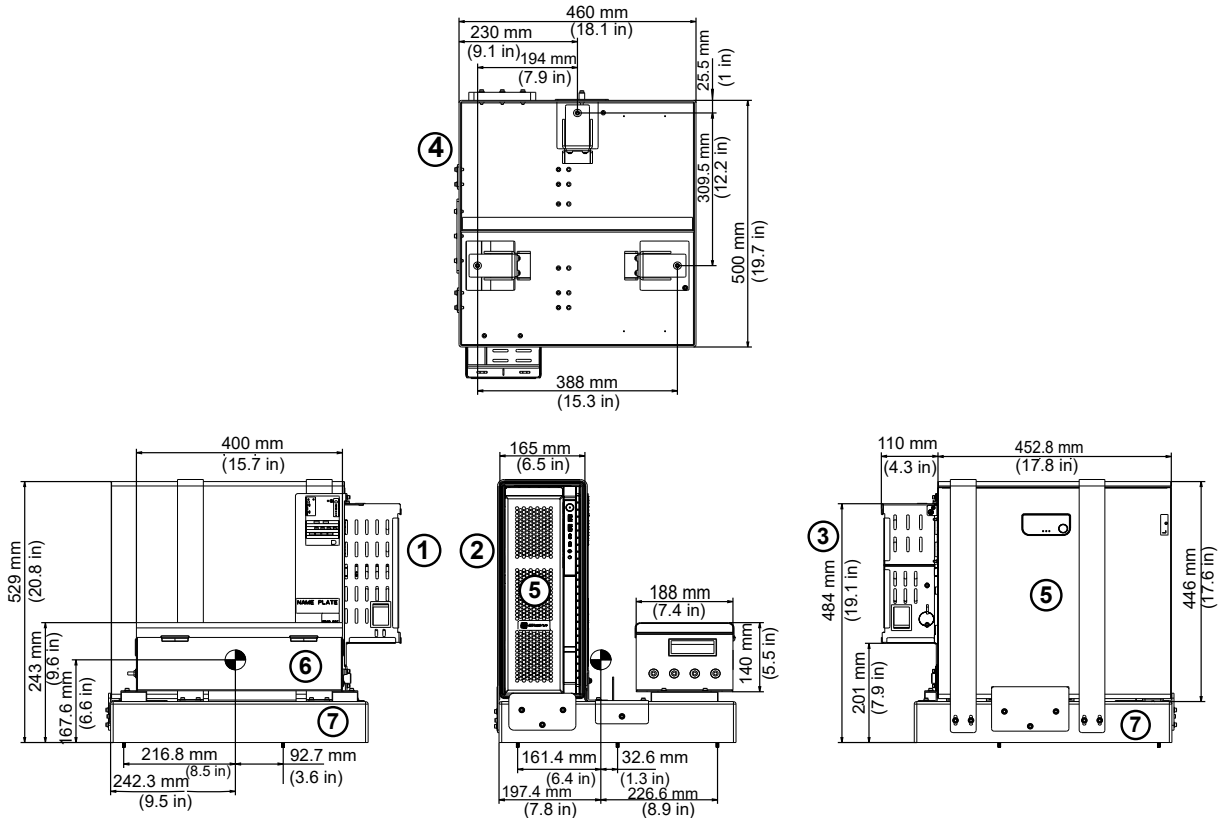
3.11 Scanner Desktop II-V Dimensions

Scanner Desktop V computer

Figure 3-22 Scanner Desktop V and Seismic Dimensions, and Center of Gravity

Scanner Desktop computer V Weight with Seismic Kit installed: 36.42 kg (80.3 lb.)

Component Weight: PC 13.92 kg (30.7 lb.) **Power Box** 7 kg (15.5 lb)



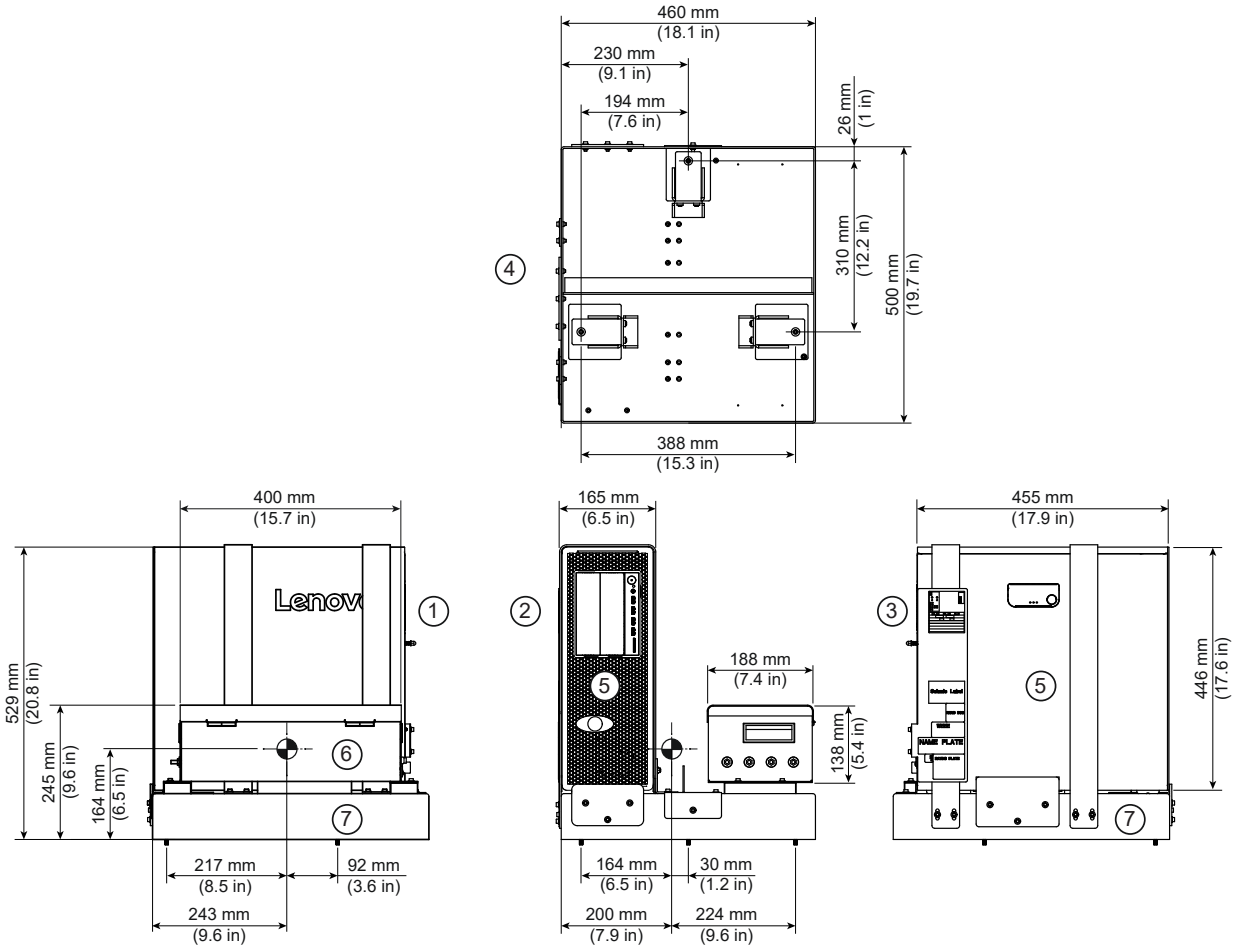
Item	Description	Item	Description
1	Side View Right	5	Scanner Desktop V
2	Front view	6	Power Box
3	Side View Left	7	Seismic Kit
4	Bottom View (Seismic Kit)	-	-

Scanner Desktop IV computer

Figure 3-23 Scanner Desktop IV and Seismic Dimensions, and Center of Gravity

Scanner Desktop computer IV Weight with Seismic Kit installed: 35.5 kg (78.3 lb.)

Component Weight: PC 13 kg (28.5 lb.) **Power Box** 7 kg (15.5 lb)



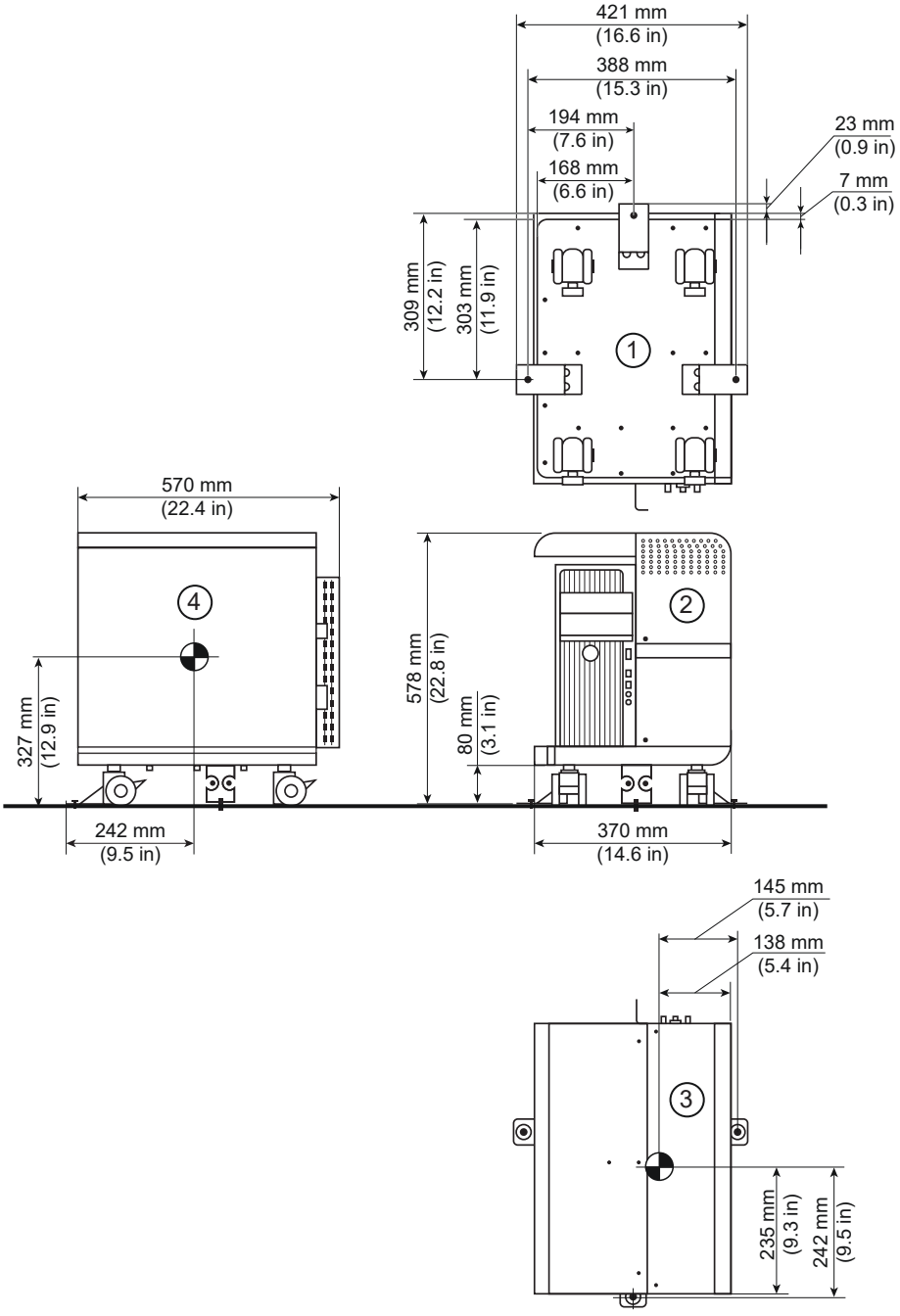
Item	Description	Item	Description
1	Side View Right	5	Scanner Desktop IV
2	Front view	6	Power Box
3	Side View Left	7	Seismic Kit (Sold separately #B7919VR)
4	Bottom View (Seismic Kit)	-	-

Scanner Desktop II and III computer (open console)

Figure 3-24 Dimensions and Center of Gravity

Scanner Desktop computer II (open console) Weight: 47.6 kg (105 lb.)

Scanner Desktop computer III (open console) Weight: 48.1 kg (106 lb.)



Item	Description	Item	Description
1	Bottom view	3	Top view
2	Front view	4	Side view

Scanner Desktop component dimensions

Scanner Desktop	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
24 in LCD monitor (2 monitors) (only)	528.0 (20.8)	566.8*2 (21.9*2)	227.6 (9.0)	10.8 (23.8) [21.6 (47.6)]
RSCB	N/A	460.0 (18.1)	270.0 (10.6)	N/A
Keyboard	N/A	460.0 (18.1)	160.0 (6.3)	N/A
Mouse	N/A	70.0 (2.8)	110.0 (4.3)	N/A
PMT tower	N/A	190.0 (7.5)	320.0 (12.6)	N/A
Operator workspace table (option)	700.0 (27.6) to 1150.0 (45.3)	1520.0 (60.0)	915.0 (36.0)	60.0 (132.2)

NOTE
Height can be manually adjusted. Not including any wall clearance requirements.

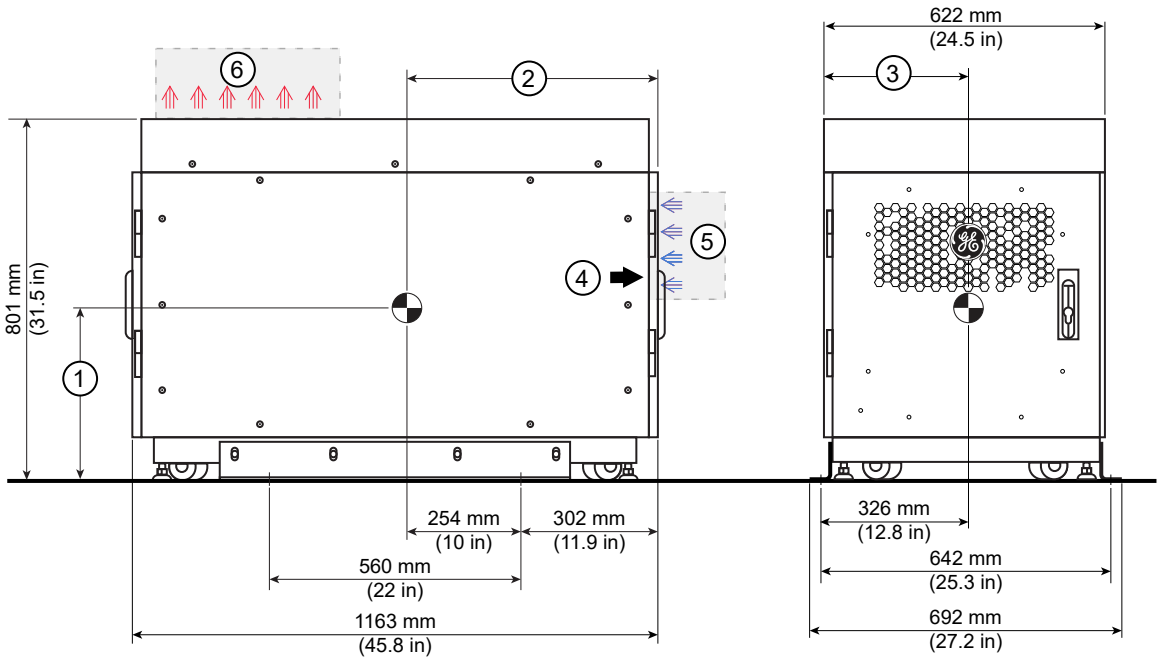
NOTE
The Seismic brackets are included with the console.

3.12 System Cabinet Dimensions

System cabinet VII Center of Gravity diagrams

System Cabinet VII Weight: 185.9 kg (410 lb.) - Does not include optional seismic brackets of 8.0 kg (18.0 lbs). Seismic brackets must be ordered separately (P/N B7919WP) .

Figure 3-25 System Cabinet VII Center of Gravity



Item	Description
1	383.5 mm (15.1 in.) - **CG-Y Height** for System Cabinet VII Center of Gravity
2	556.2 mm (21.9 in.) - **CG-X Length** for System Cabinet VII Center of Gravity
3	326 mm (12.8 in.) - **CG-Z Width/Depth** for System Cabinet VII Center of Gravity
4	Cabinet Front
5	Minimum space in the front
6	Do not block upwards exhaust flow.

NOTE
Air Flow: Intake air is pulled through the perforation at the top of the front door. Exhaust is pushed out upwards through the perforation at the top of the cabinet.

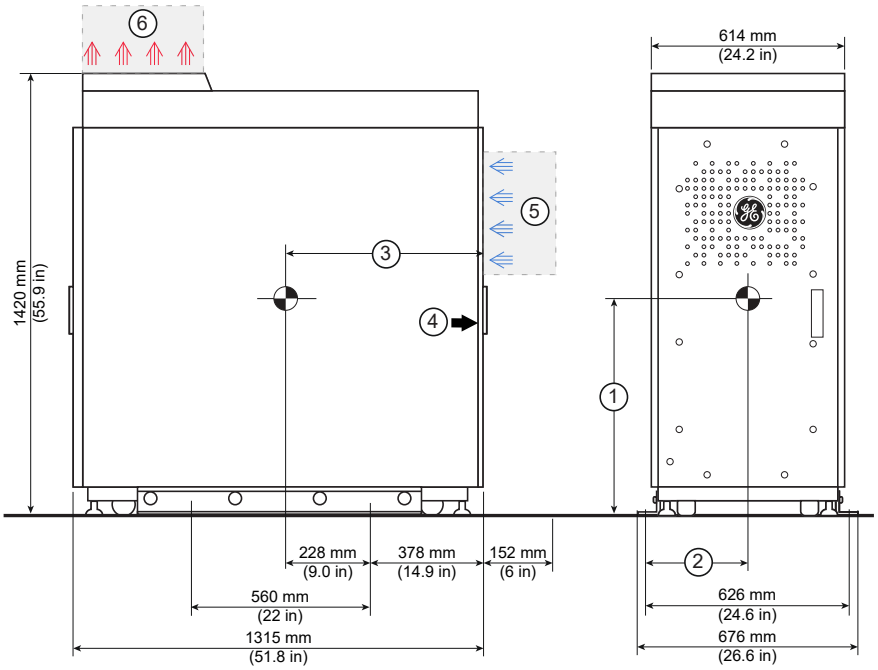
System cabinet IV, V and VI Center of Gravity diagrams

System Cabinet VI Weight: 251.7 kg (555 lb.) - Does not include optional seismic brackets of 10.0 kg (22.0 lbs). Shipping brackets are used as seismic brackets.

System Cabinet V Weight: 260 kg (573.2 lb.) - Does not include optional seismic brackets of 10.0 kg (22.0 lbs). Shipping brackets are used as seismic brackets.

System Cabinet IV Weight: 323.8 kg (714 lb.) - Does not include optional seismic brackets of 10.0 kg (22.0 lbs). Shipping brackets are used as seismic brackets.

Figure 3-26 System Cabinet IV, V and VI Center of Gravity



Item	Description
1	694 mm (27.3 in.) - **CG-Y Height** for System Cabinet VI Center of Gravity 694 mm (27.3 in.) - **CG-Y Height** for System Cabinet V Center of Gravity 645 mm (25.4 in.) - **CG-Y Height** for System Cabinet IV Center of Gravity
2	313 mm (12.3 in.) - **CG-X Length** for System Cabinet VI Center of Gravity 313 mm (12.3 in.) - **CG-X Length** for System Cabinet V Center of Gravity 313 mm (12.3 in.) - **CG-X Length** for System Cabinet IV Center of Gravity
3	602 mm (23.7 in.) - **CG-Z Width/Depth** for System Cabinet VI Center of Gravity 602 mm (23.7 in.) - **CG-Z Width/Depth** for System Cabinet V Center of Gravity 606 mm (23.9 in.) - **CG-Z Width/Depth** for System Cabinet IV Center of Gravity
4	Cabinet Front
5	Minimum space in the front
6	Do not block upwards exhaust flow.

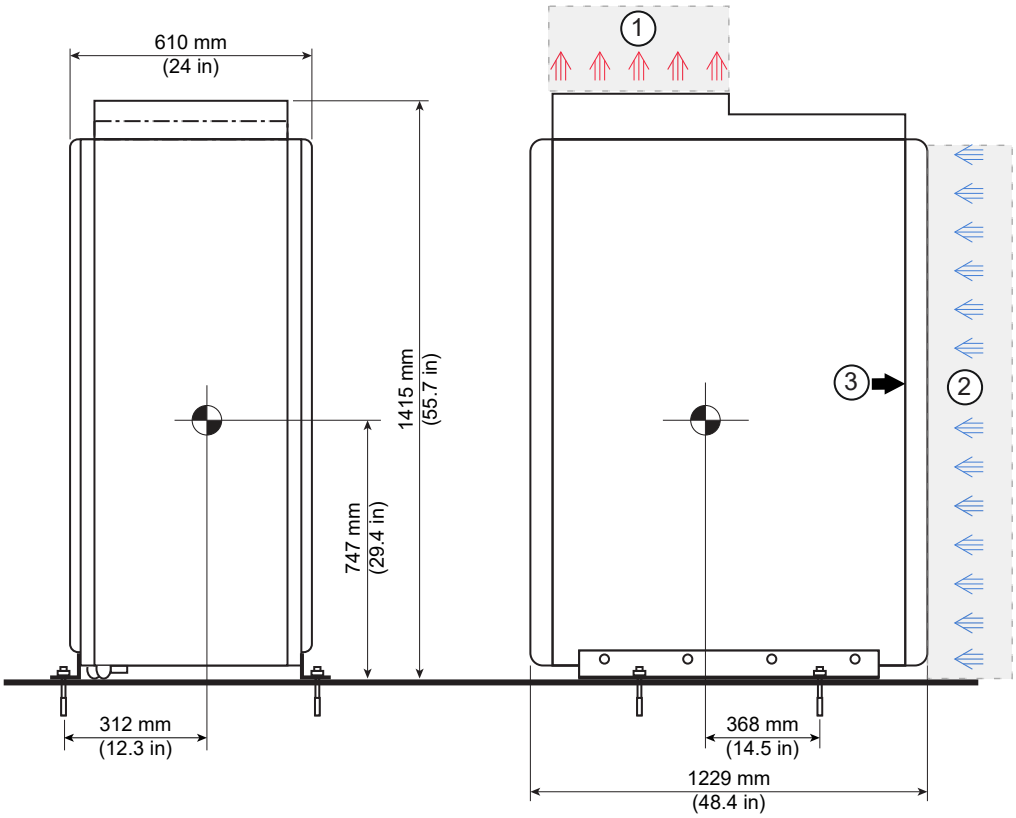
NOTE

Air Flow: Intake air is pulled through the perforation at the top of the front door. Exhaust is pushed out upwards through the perforation at the top of the cabinet.

System Cabinet II and III Center of Gravity

System Cabinet II and III Weight: 320.5 kg (706 lb.) - Does not include optional seismic brackets of 10.0 kg (22.0 lbs). Shipping brackets are used as seismic brackets.

Figure 3-27 System Cabinet II and III Center of Gravity

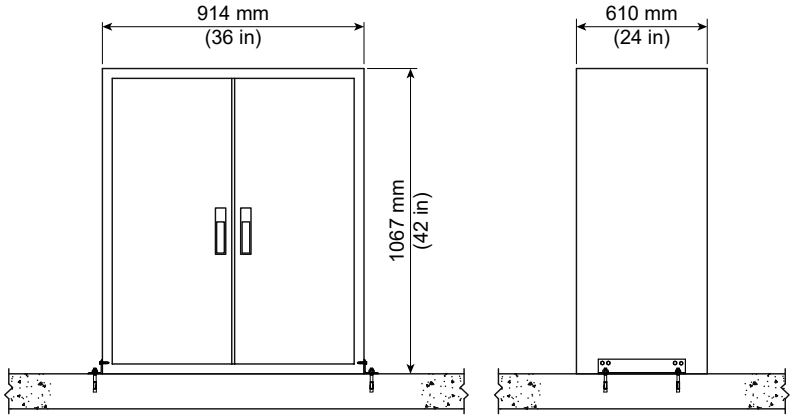


Item	Description
1	Do not block upwards exhaust flow.
2	Minimum space in the front
3	Cabinet Front

3.13 Service Storage Cabinet Dimensions

Empty Weight: 40.9 kg (90 lb.).

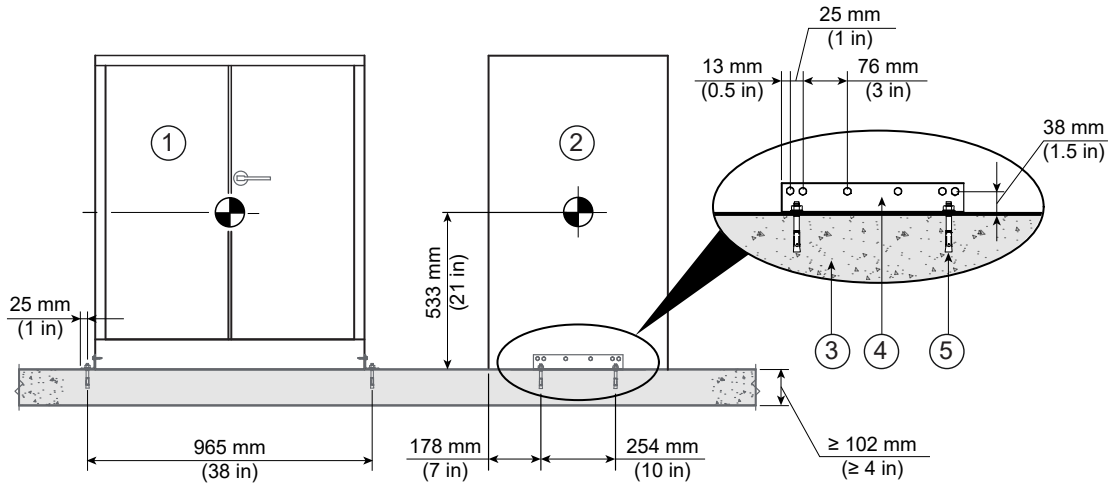
Figure 3-28 Service Storage Cabinet Dimensions



	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
	[1]	[2]	[3]	[4]
Service storage cabinet (option)	1066.8 (42.0)	914.4 (36.0)	610 (24.0)	40.9 (90.0)

Figure 3-29 Optional service cabinet

NOTE
This is the recommended anchoring method but GE HealthCare does not provide any brackets or hardware.



Item	Description	Item	Description
1	Front view	4	L 2in x 2-1/8in x 12in (A36) w/ (6)-1/4 in Ø A307 Bolts though steel cabinet wall to 2in x 1/8in x 12in plate washer (2 locations)
2	Side view	5	Expansion anchors
3	Concrete floor	-	-

4 Accessory Specifications and Requirements

4.1 Ceiling Requirements for Monitor-in-Room

Overview

The purchaser or their contractor shall complete the installation of all pedestals for ceiling-mounted components. The PMI will provide the necessary bolt hole information upon request. The ceiling mounting plate must be designed by a structural engineer and installed by a qualified contractor prior to the system installation.

NOTE
A finished ceiling is required for installation.

The specifications and weight requirements are provided. These plates must accommodate and be designed specifically to the details provided here. Failure to comply is a safety factor. The customer shall:

- design a structure with sufficient strength to hold the power module and storage hanger assembly.
- ensure the junction box mounting plate and the boom mounting plate **shall be no less than 4 times load**.
- be responsible to fabricate and mount the boom pedestal ceiling plate. An additional junction box mounting plate may be required depending on the kit type. (See the following sections for more information.)

NOTE
The final installation will require documented specifications to be submitted back to GE HealthCare to ensure all items meet essential to safety guidelines.

Essential to Safety	
Material:	Steel
Thickness:	Minimum 10 mm to maximum 15 mm

Site preparation

Minimum ceiling height

The minimum ceiling height above the table and gantry shall measure at least 2286 mm (90 in) or the minimum distance allowed by local laws and codes, whichever is greater, when measured from the floor to the finished ceiling or to the lowest point of any ceiling mast of any ceiling-mounted components.

Peak system height dimension is met when the top-hinged gantry cover is installed. Height is 2252 mm (88.6 in), while the length from ISO center is 1760 mm (69.2 in). Anything installed above the system from the ceiling should take this into consideration.

New ceiling mast installation mounting constraints

The validated configuration for the Revolution CT SmartStep, with provided suspension arm (boom) and monitor as shown in Figure 4-1 Arm size and Center of Gravity (CG) on page 57 below, is for only a single arm and monitor, using the electrical junction box described below. Adding a second suspension arm to the mast is prohibited for this option.

The electrical junction box included in the boom/monitor installation kit is required not only for regulatory purposes, but for protection of the electronics from damage and electromagnetic interference (EMI). A special EMI shield is designed into the junction box for this purpose. Alternative electronics installation methods are prohibited.

Existing ceiling mast and boom installation constraints

Use of existing ceiling mast installations are prohibited.

Use of existing boom arms are prohibited.

Cable for monitor and boom assembly

Determine whether the existing system cables run through conduit, wire though or under raised floor, and if a sufficient opening exists to run the monitor video cable from the operator console to the gantry base.

- Cable length: 23 m (75 ft) (operator console to ceiling junction box)
- Minimum 45 mm (1.75 in) hole to route cables between console and gantry

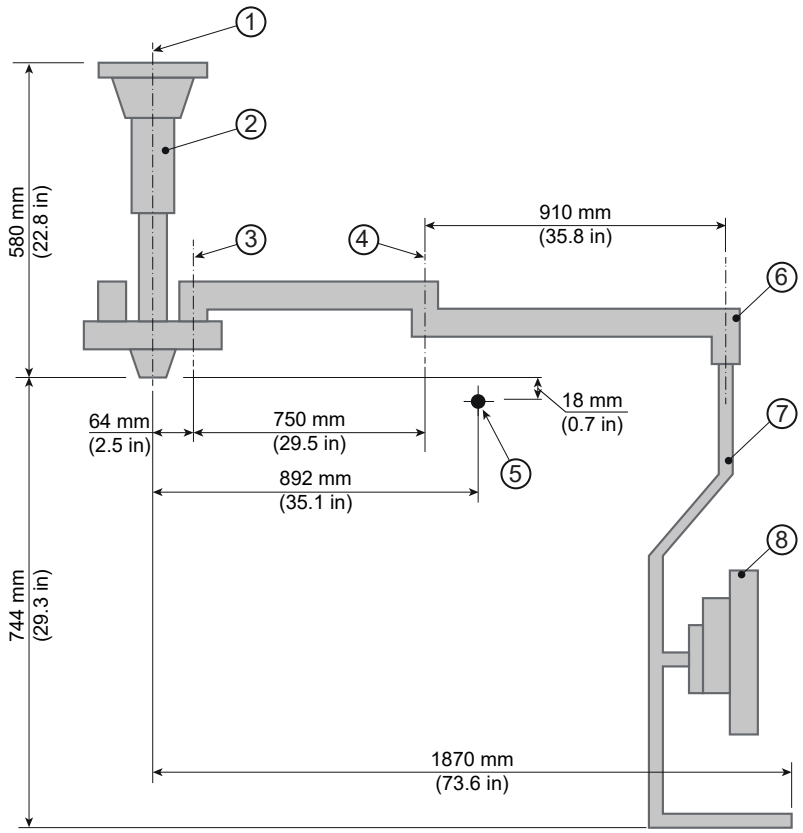
Component weight and dimensions

Dimensions listed for boom, suspension arm with LCD bracket and monitor are averages. The **Monitor in Room Boom Assembly** includes a ceiling mast, suspension arm (boom) with LCD bracket, and LCD monitor as shown in Figure 4-1 Arm size and Center of Gravity (CG) on page 57. Note the ceiling mast includes a second shoulder pin, but the use of a second suspension arm on this pin is prohibited.

Table 4-1 Component weight

Component	Weight
Suspension arm with LCD bracket	12.6 kg (27.8 lbs)
Ceiling mast with pedestal	10.5 kg (23.2 lbs)
LCD monitor	6.8 kg (15 lbs)

Figure 4-1 Arm size and Center of Gravity (CG)



Item	Description	Item	Description
1	Boom pedestal base with four (4) primary mounting holes 14 mm (0.551 in) diameter on 150 mm (5.90 in) bolt circle	5	CG location at design weight: 35.4 kg (78 lbs)
2	Ceiling mast (attached to pedestal mounting base)	6	Suspension arm (boom)
3	Axis "A"	7	LCD mast/handle with LCD mounting bracket
4	Axis "B"	8	LCD

The center to center separation distance between the two (2) ceiling plates for this option is 400 mm minimum to 500 mm maximum.

Mounting plate requirements

The Monitor in Room Boom Installation requires up to two (2) ceiling mounting plates to be fabricated and supplied by the customer, with sufficient strength to hold the boom ceiling mast/arm/monitor assembly. A ceiling mast mounting plate is common to all kit types and, depending on the kit collector, a second plate to mount the electrical junction box may be required.

The ceiling mounting plates must be designed by a structural engineer and installed by a qualified contractor prior to the system installation. The Project Manager of Installation (PMI) will provide all instructions and engineering drawings required to properly design and install all ceiling mounted options.

Material for the boom pedestal mounting plate shall be:

- Structural steel between 10 to 15 mm (0.4 to 0.6 in) thickness
- Tensile stress shall be 400 MPa or greater
- Yield stress shall be 235 MPa or greater

For kit collectors 5115174-33 or 5115174-83:

Fabrication of an electrical junction box mounting plate is not required. However, the customer must mount the electrical junction box (included in the kit) flush to the ceiling, since a finished cover plate, also included in the kit, mounts directly to the junction box. The electrical junction box is an industry standard, large capacity type (deep), dimensions of which are included in Junction box assembly for EIZO EV2430 display 5115174-33 and 5115174-83 collectors only on page 59 section.

NOTICE

The new junction box is for Scanner Desktop III with P520 console computer or later.

For kit collectors 5115174-30 or 5115174-82:

A second flush-mount ceiling plate must be fabricated by the customer for mounting the electrical junction box. The electrical junction box, included in the kit, mounts to this ceiling plate and a separate cover plate, also included in the kit, mounts to the flush ceiling plate. This second ceiling plate is used for the electrical junction box. See the Junction box assembly for 5115174-30 or 5115174-82 collectors only on page 55 section for dimensions and weights.

Material for the junction box mounting plate shall be:

- Structural steel between 8 to 15 mm (0.3 to 0.6 in) thickness
- Tensile stress shall be 400 MPa or greater
- Yield stress shall be 235 MPa or greater

Drawings for both ceiling plates are shown below. Document numbers are also provided for higher resolution plate drawings and are available from the PMI upon request.

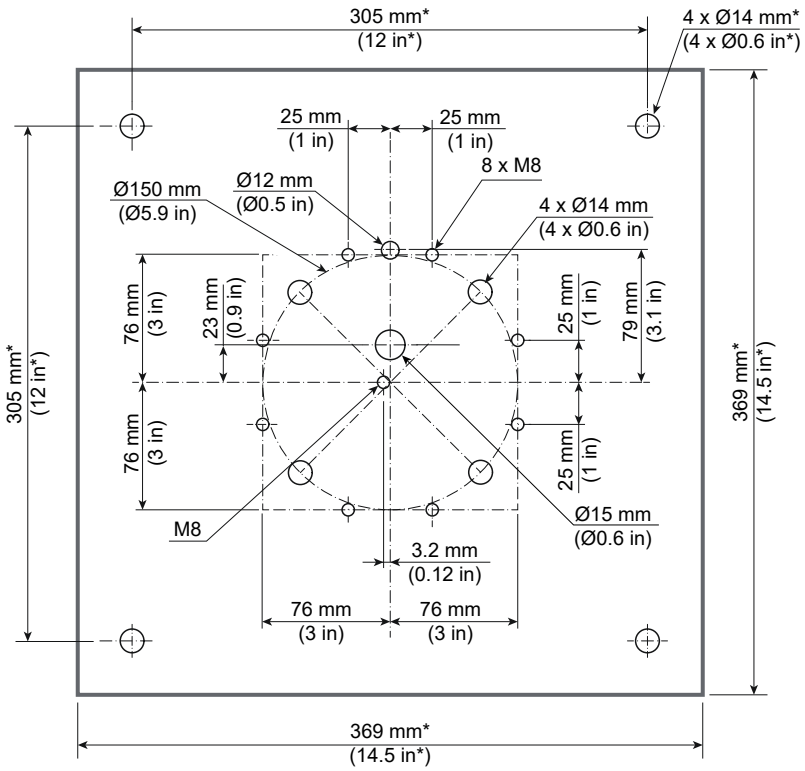
Regardless of kit type, minimum and maximum center-to-center separation distance requirements between the junction box and the pedestal mount specified herein still apply.

NOTE
The safety factor on the junction box mounting plate and the boom mounting plate shall be no less than 4 times load.

Table 4-2 GE HealthCare engineering drawings for customer ceiling plate

Description	Drawing No.
Boom pedestal mounting plate	DOC1951266
Junction box mounting plate (**only** for 5115174-30 or 5115174-82 collectors)	DOC1951270

Figure 4-2 Boom pedestal ceiling plate dimension



NOTE

Dimensions marked with an asterisk (*) above (and the available engineering drawing provided by the PMI) are for customer reference only. Since the customer supplies this plate, dimensions marked with (*) are minimum size recommendations and may vary, depending on customer ceiling layout.

NOTE

Threaded M8 holes for the center chain and eight (8) shoulder bolts require an M8 x 1.25 tap.

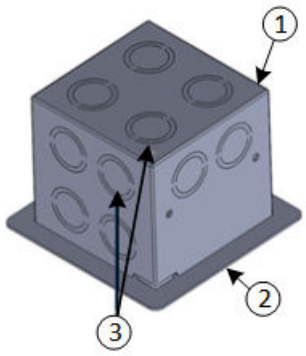
The customer can refer to the MAVIG home page (http://www.mavig.com) for joint element structural ceiling information for the boom mounting interface. A basic plate is available. MAVIG recommendation: TS1525/1520. This plate has 4 x M10 threads to mount the boom. **However, these threads shall be drilled out to 4 x ϕ14 holes to use 4 x M12 bolts and nuts for the four primary boom mounting locations.** The eight M8 tapped holes must also be machined for the failsafe shoulder bolts and brackets supplied with the boom mounting kit.

Junction box cover plate assembly, dimensions and weights

There are two (2) junction box types based on the model ordered. Only one will be installed based on the collector ordered. When installing the junction box the center to center separation distance between the two (2) ceiling plates is 400 mm minimum to 500 mm maximum is a requirement that is common to **all** collectors.

Junction box assembly for EIZO EV2430 display 5115174-33 and 5115174-83 collectors only

Figure 4-3 Junction box assembly for 5115174-33 or 5115174-83 collectors



Item	Component	Approximate Weight
1	GE HealthCare supplied junction box	1 kg (2 lbs)
2	GE HealthCare supplied junction box cover plate assembly	.5 kg (1 lb)
3	Knockouts	N/A

Figure 4-4 Junction box dimensions for 5115174-33 or 5115174-83 collectors

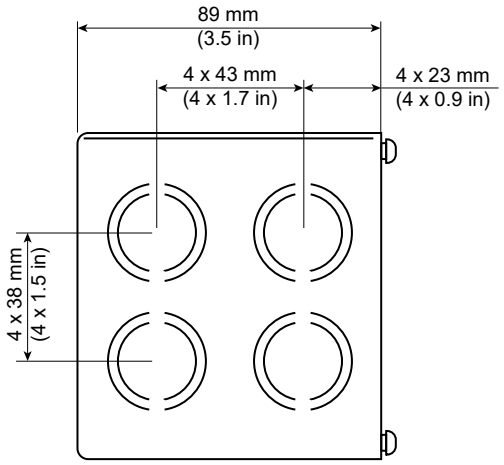


Figure 4-5 Deep junction box dimensions for 5115174-33 or 5115174-83 collectors

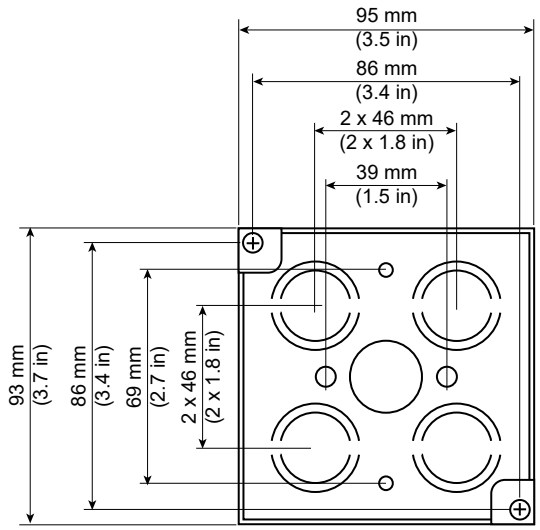


Figure 4-6 4x4 junction box dimensions for 5115174-33 or 5115174-83 collectors

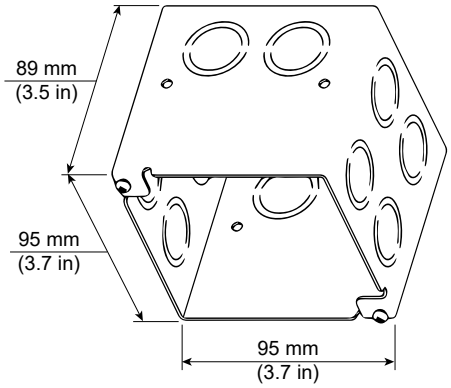
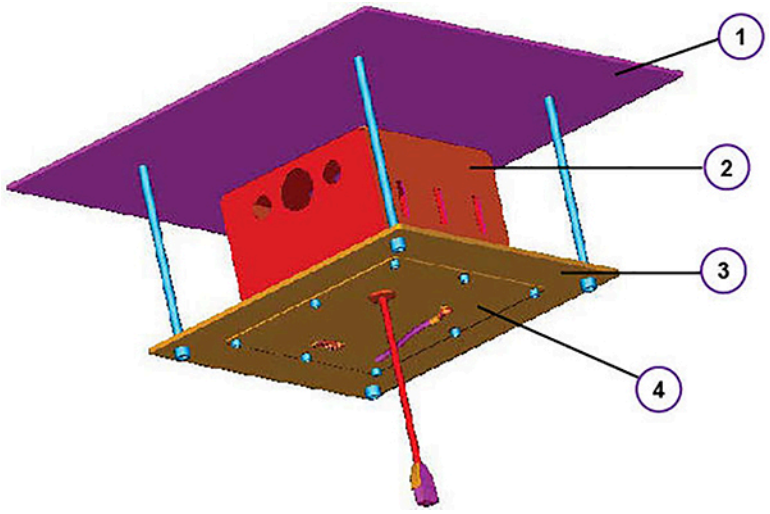


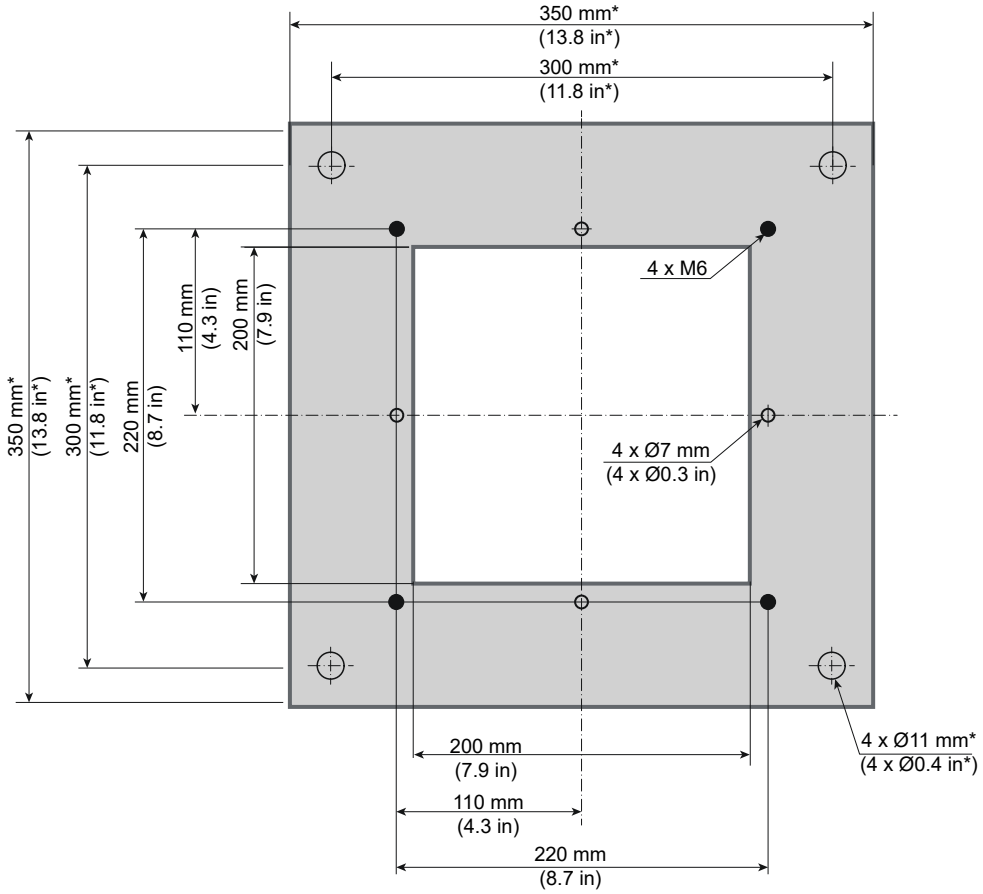
Figure 4-7 Junction box for 5115174-30 or 5115174-82 collectors



Item	Component	Approximate Weight
1	Ceiling	N/A
2	GE HealthCare supplied junction box	2 kg (2 lbs)
3	Customer supplied ceiling plate	unspecified
4	GE HealthCare supplied junction box cover plate assembly	1.1 kg (1 lb)

NOTE
For load consideration, only the weight of GE HealthCare-supplied parts is shown, the structural engineer needs to consider weight of additional customer-supplied parts.

Figure 4-8 Junction box mounting plate dimensions for 5115174-30 or 5115174-82 collectors



4.2 Ceiling Requirement for Auto Patient Positioning Depth Camera

Overview

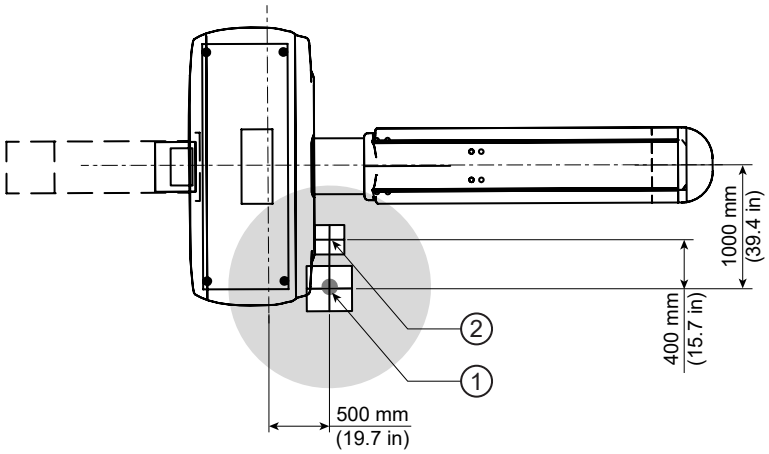
If customer has purchased Express Mode Depth Camera Option, please refer to **Auto Patient Positioning Depth Camera Installation Manual (5882508-1EN)** from SIMS Content Viewer for details.

NOTICE

NOTE TO SITE PLANNING AND CUSTOMERS:

Though the camera coverage is defined at 100mm above isocenter, Auto Patient Positioning works at different table heights, with variable patient sizes. The technique works even if part of the patient body being scanned is out of the camera view or the patient body occupies only a smaller portion of the view, but the best accuracy is achieved when the full patient body fits the view. Appropriately choosing the desired camera coverage before camera installation can optimize the Auto Patient Positioning performance.

Figure 4-9 Boom In Room Swinging Radius



Item	Description
1	Boom In Room monitor hung position
2	Cables fixed position (Junction Box)

⚠ CAUTION

When moving ceiling mounting devices (In-Room-Monitor, Injector, Anesthesia Machine etc), make sure to avoid damage to the depth camera resulted from collisions by the suspension arms.

NOTICE

NOTE FOR COLLISION AVOIDANCE WITH IN-ROOM-MONITOR:

When determining the camera installation position, it's also important to avoid possible collision with the Boom-in-Room. The "upper arm" of the boom can reach a range of 850mm radius.

The camera shall be installed:

- either outside of this 850mm-radius range (the camera cover size is 360 (W)x360 (L)x180 (H) mm^3).

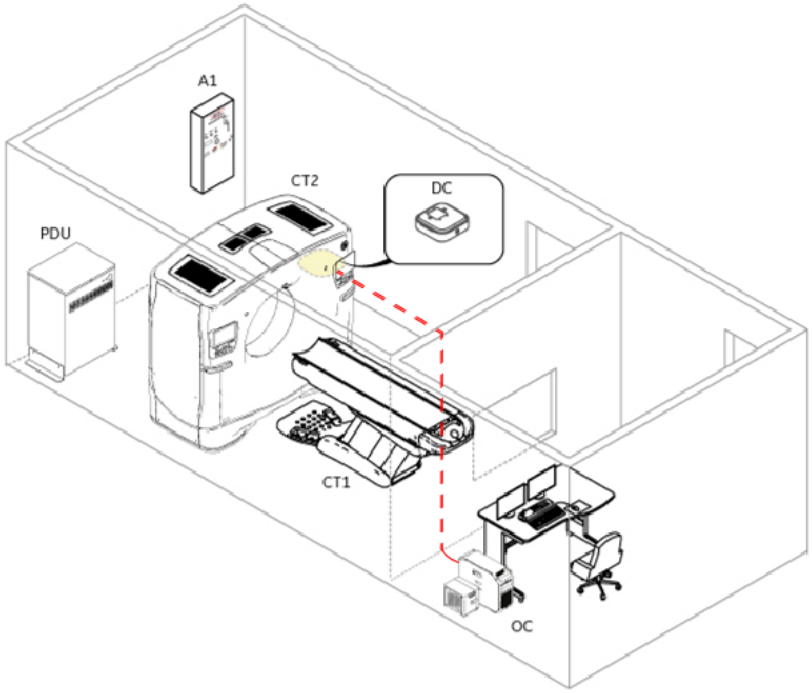
or

- inside the range but its bottom cover is higher than the Boom upper arm. Mavig recommends no less than 579mm from finished ceiling to the column bottom. This is equivalent to 380mm between finished ceiling and the upper arm.

If the camera is installed within the boom arm reach, the customer shall be suggested to install a protective bracket beside the camera or the boom arm to avoid damage of the camera.

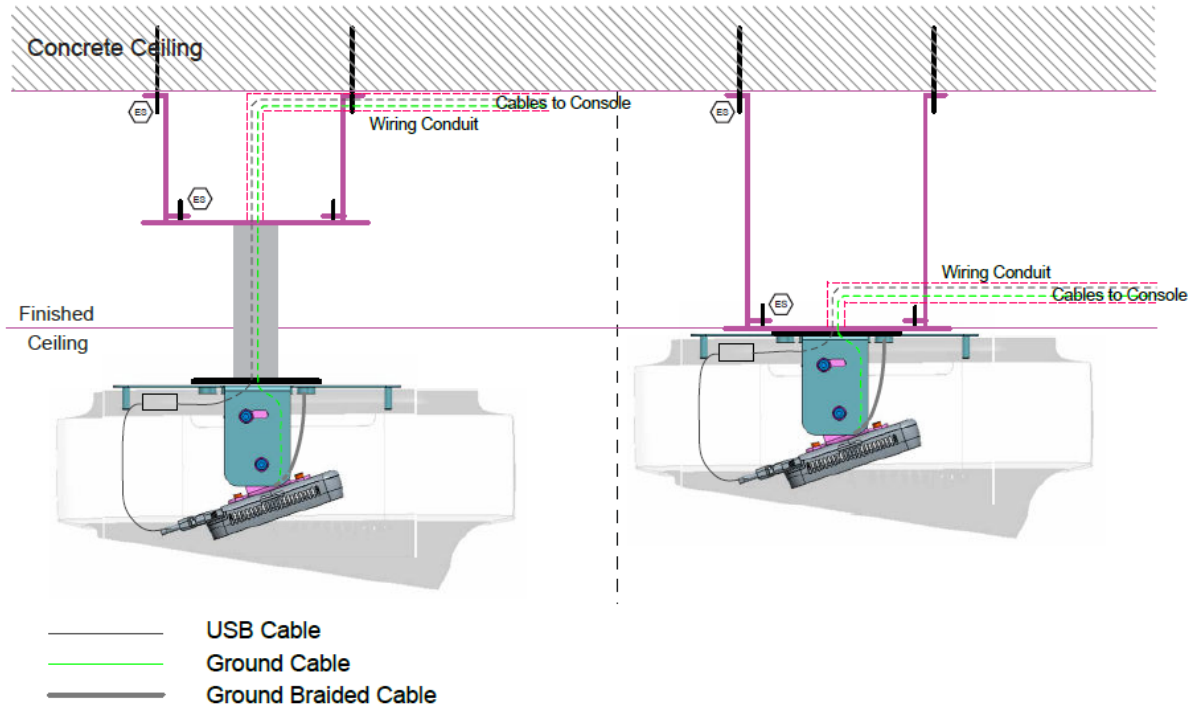
Depth Camera Installation Typical Layout

Figure 4-10 Room Layout



- - - - - - Depth Camera cable routing from Operator Room to Scan Room

Figure 4-11 Camera Cables Routing



⚠ WARNING

The ceiling-mounted components should NOT touch any electricity conductive structures which are connected with power or grounding other than CT system's power and grounding, to avoid unexpected short circuit/arcing hazard.

Junction Plate Requirement

GE HealthCare will provide a Junction Plate (5847942-2), shipped with the depth camera assy kit (5808502). If the Junction Plate supplied by GE HealthCare can not meet the requests of the customer or the building structure, the customer's architect can design and install the Junction Plate (refer to Prepared by Customer) with sufficient strength to hold the camera assembly.

NOTICE

No matter customer uses GE junction plate or makes junction plate by themselves, customer is responsible for installing it on the concrete ceiling and meeting regulatory and GE HealthCare's loading requirement.

- **Supplied by GE HealthCare**

⚠ WARNING

ES The system manufacturer will NOT inspect and test that the fixing methods between the Junction Plate and the building structure meet the loading capacity specified (recommend a >4x safety factor), which is the customer's responsibility.

Figure 4-12 Example for Fixing Junction Plate by using Anchor Bolts

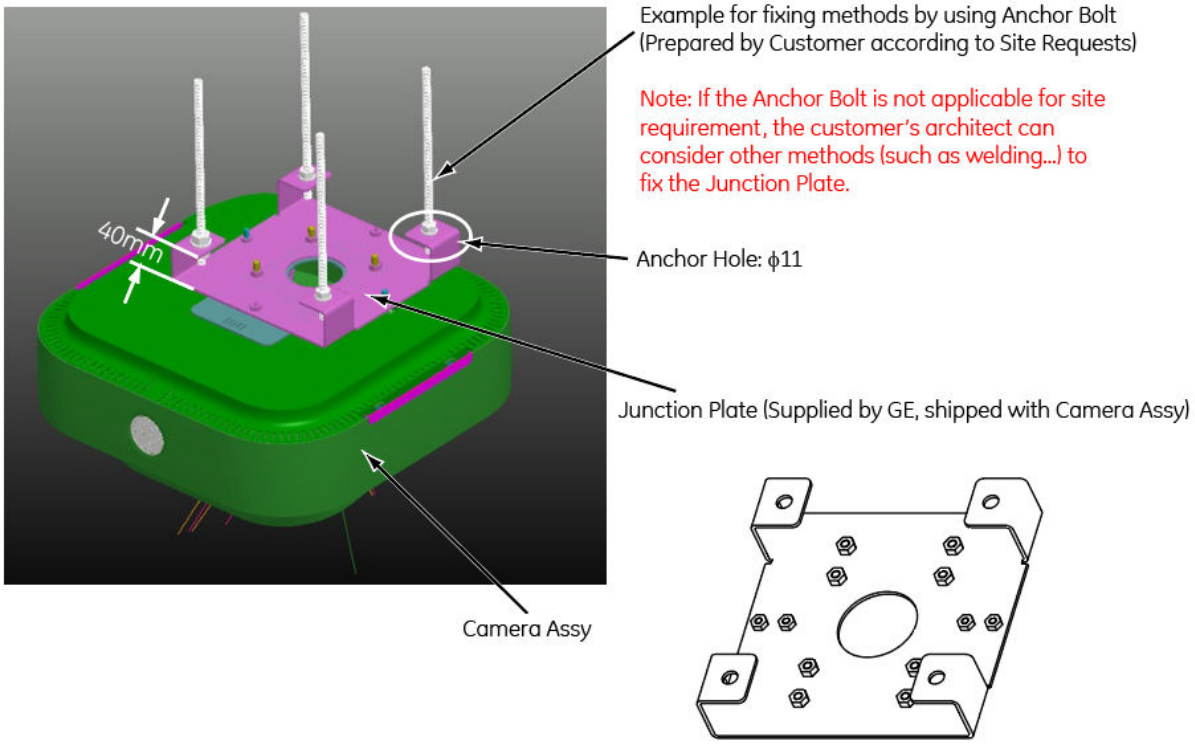
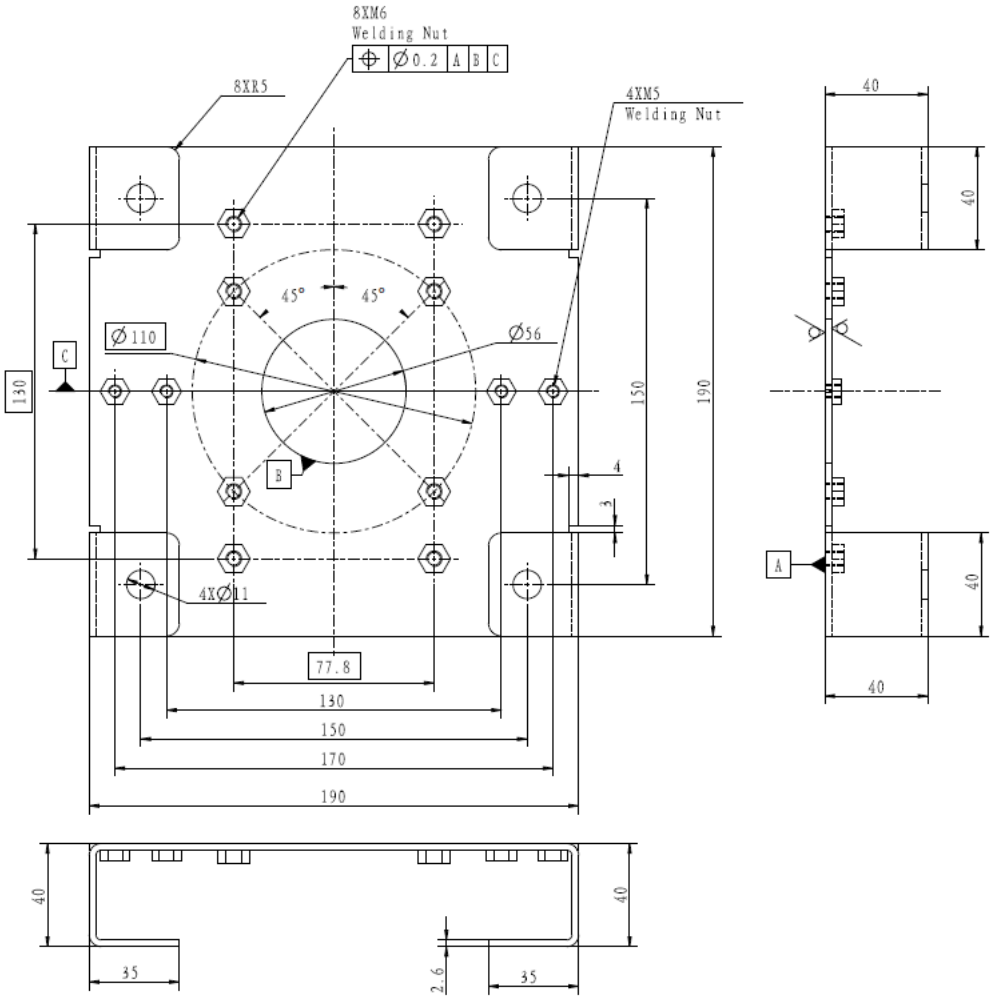


Figure 4-13 Junction Plate (Supplied by GE HealthCare)



- **Prepared by Customer**

⚠ WARNING

ES The customer's architect is responsible for designing and installing the Junction Plate with sufficient strength to hold the Camera Assembly. The weight of the camera assembly is approximately 3.75kg, suggest the safety load on the Junction Plate is no less than 20kg.

⚠ WARNING

The system manufacturer will NOT inspect and test that the Junction Plate meets the loading capacity specified (recommend a >4x safety factor), this is the customer's responsibility.

Figure 4-14 Junction Plate (Prepared by Customer)

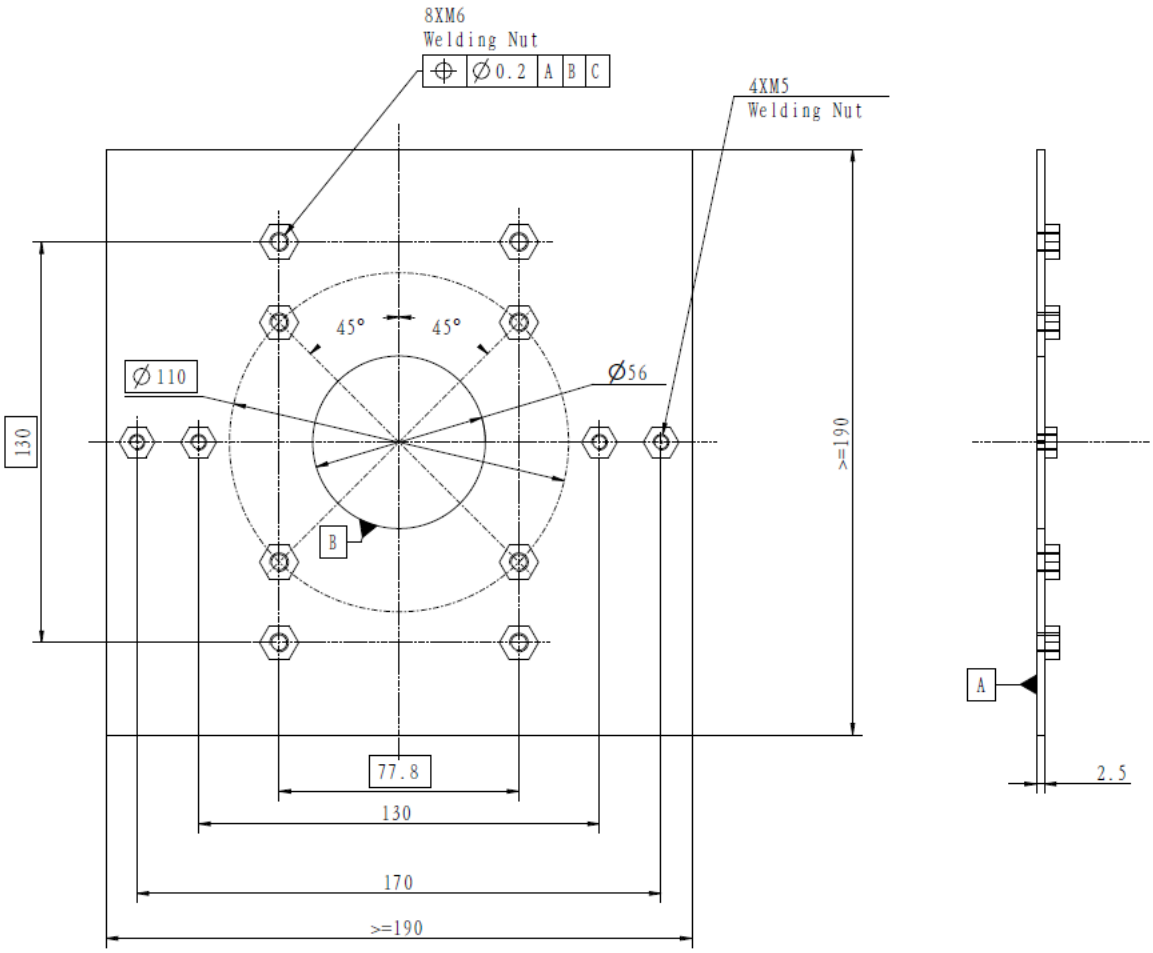


Table 4-3 Junction Plate (Prepared by Customer)

GB-T 13681-1992 Welding Nut		
	M5	M6
Thickness (mm)	3.7-4	4.7-5
Pledge Load (N)	11000	15500
Pledge Load (N) is to insure welding nut on junction plate is firmly enough. The junction plate already shipped together with express mode, if customer want to build junction plate by themselves, then they need to meet our 6x load requirement (>=20kg).		
Junction plate material: Steel material with a min tensile strength 375Mpa.		

- **Junction Plate Installation Direction**

NOTICE

The Junction Plate direction should be in line with the system layout, NOT be in line with the scan room. see below figure for example of the Junction Plate direction.

Figure 4-15 Junction Plate Installation Position

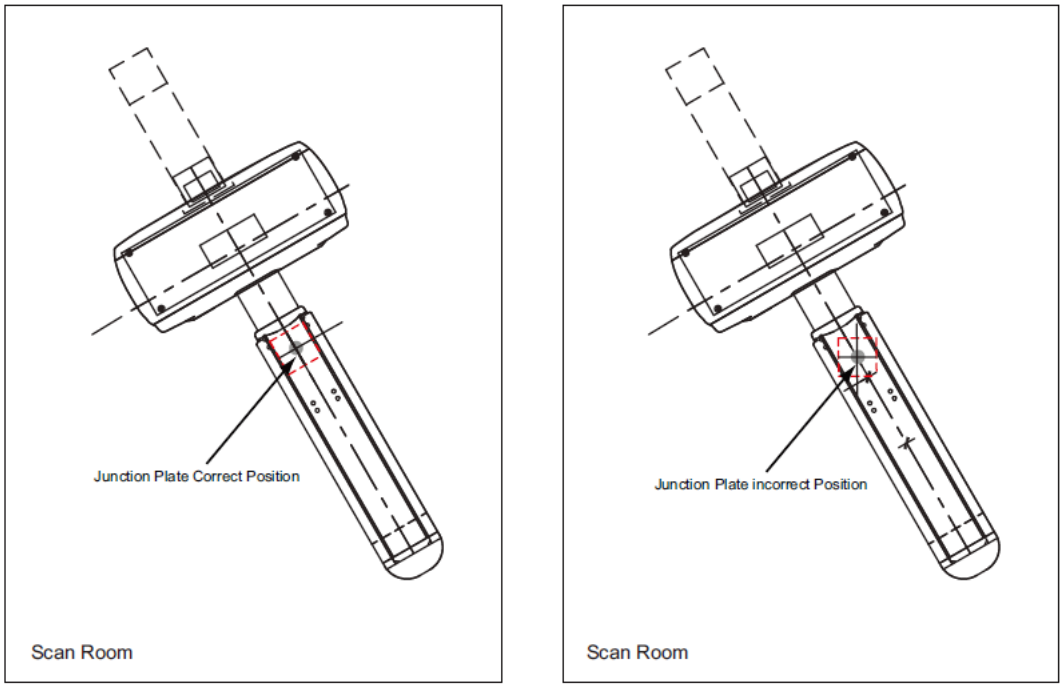
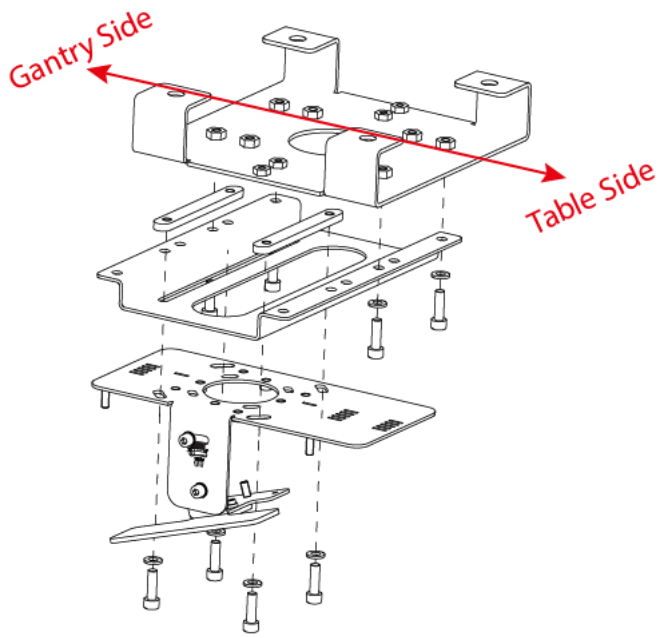
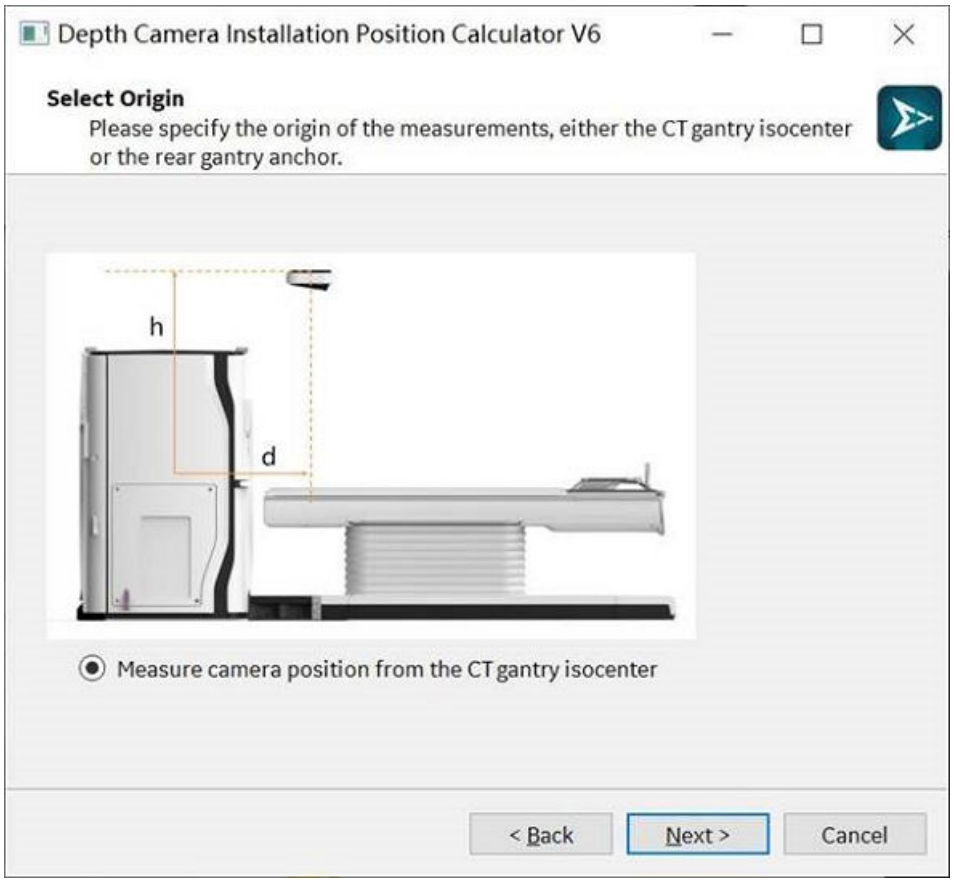


Figure 4-16 Junction Plate Installation Direction

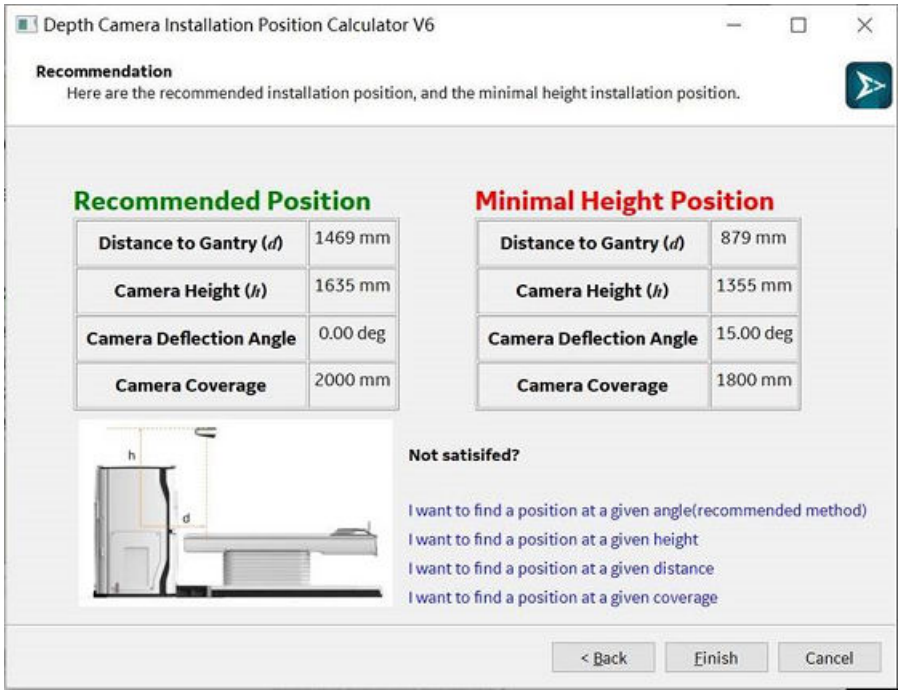


Junction plate position

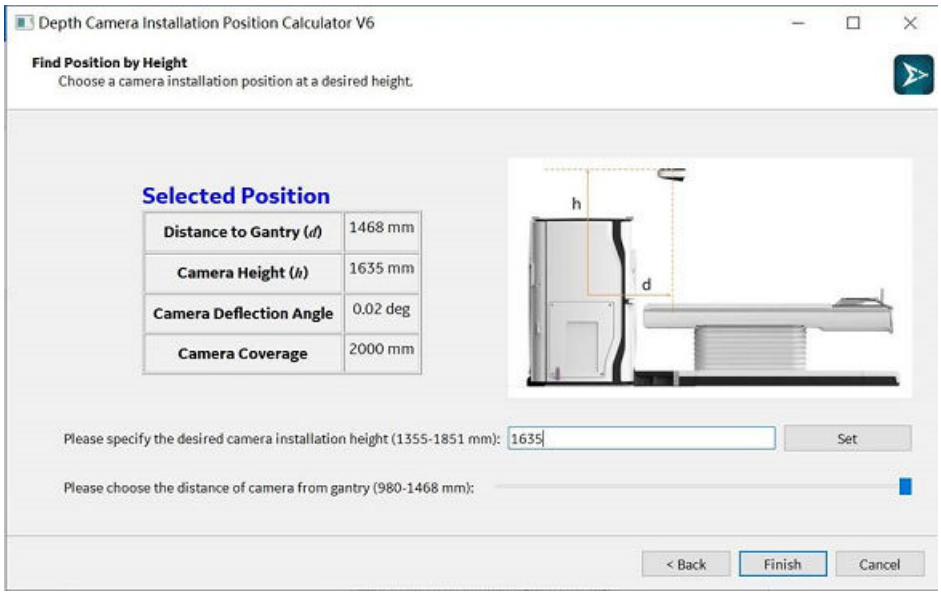
1. Measure the height from finished floor to finished ceiling.
2. Search for the software (SW) tool (DOC2254236) from SIMS Content Viewer Catalog to download it.
3. Select the correct type of gantry and table according to system configuration and click **Next**.
4. Select **Measure camera position from the CT gantry isocenter** and click **Next**



5. There are two positions (recommended and minimal) available to the site. If the height of the junction plate is not satisfied, select **I want to find a position at a given height** to modify height.



6. Input the actual height of the junction plate and click **Set**.



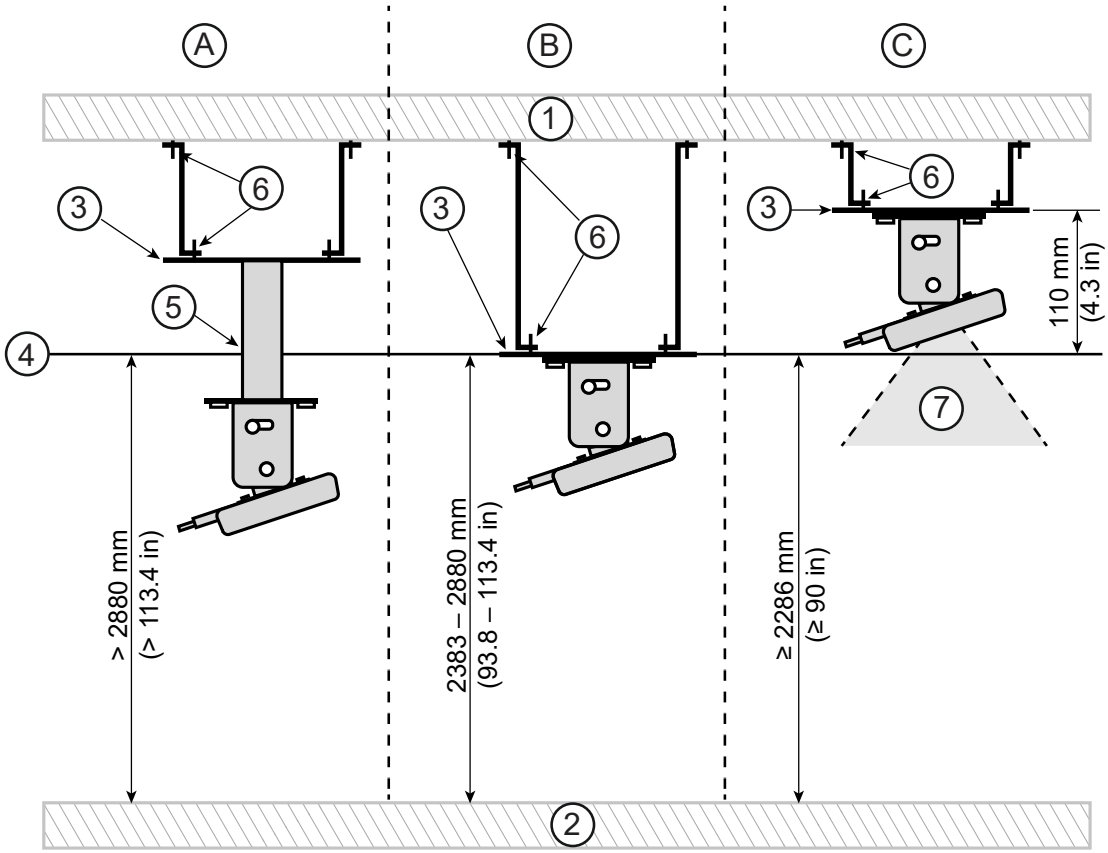
7. Get the value d.

Identify the position of the junction plate on the ceiling

When determining the camera installation position, special consideration shall be paid to the relation between the junction plate installation height and the finished ceiling height. See the cases below:

- **Case A: Camera below finished ceiling**
  Camera installation height is smaller than finished ceiling height, customer needs to order the extender kit (5821337) to install the junction plate 200 mm or 400 mm above the desired position.
- **Case B: Camera attached to finished ceiling**
  Camera installation height is equal to finished ceiling height.
- **Case C: Camera above finished ceiling**
  Camera installation height is equal to finished ceiling upper surface height plus 110 mm, a rectangle hole needs to be opened in the finished ceiling as requested.

Figure 4-17 Camera Installation Position



Item	Description	Item	Description
1	Concrete Ceiling	5	Extender plate
2	Finished Floor	6	Essential to safety connection joint
3	Junction plate	7	Field of view opening
4	Finished ceiling	-	-

4.3 Remote Control Panel with Video Monitoring Mounting Requirements

Introduction

RCK-AVIMOS is the abbreviation of Remote Control Kit with Assisted Video Monitoring System, includes the Remote Control Panel (RCP) Option software and the Assisted Video Monitoring system.

Remote control panel

The RCP extends the CT scanner in-room control panel function to the operator desktop. With this solution, hospital technologists can turn laser lights ON/OFF, plus achieve table up/down control, cradle in/out control, landmark setting, one button loading and one button loading of the patient without entering into the scan room.

Assisted video monitoring system (AVIMOS)

The AVIMOS is a monitoring system that includes one host computer to collect data through a user interface, one monitor for display, and three (3) cameras:

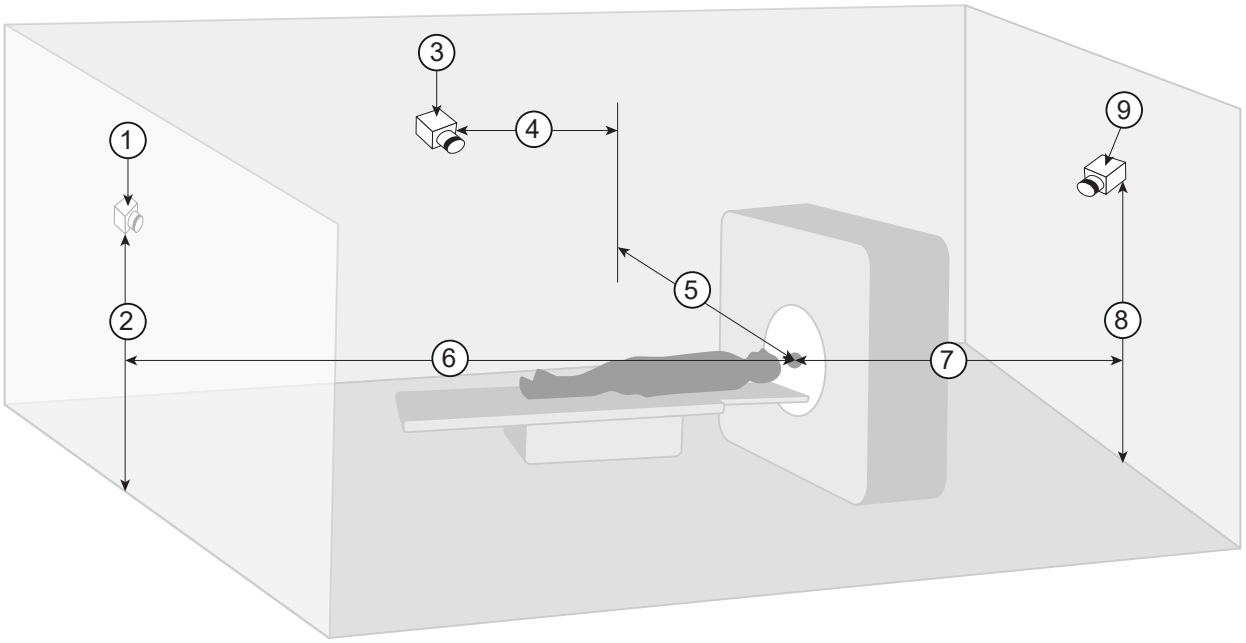
- One camera installed at side to monitor the laser line
- One camera installed at front to monitor the table/patient movement
- One camera installed at rear to monitor the table/patient movement

Scan room with AVIMOS layout

AVIMOS requires proper camera location and alignment to present quality video for doctor/technologist to view the patient. It is also used to monitor table movement and alignment of the gantry's internal/external laser lines. Each camera covers a particular area and the sharpness and clarity for each video image is required.

General positioning of the cameras can be located on the room layout drawings, which determines if the site will require wall brackets or ceiling pipe mounts. It will also allow for approximate placement of conduit and wiring runs to these camera locations. The Project Manager of Installation (PMI) should detail heights and obstructions in the area where the cameras are to be positioned for an accurate layout. The measurement process detailed in the *Remote Control Kit with Assisted Video Monitoring System Service Manual* must be executed after the system has been installed to determine the exact locations of the bracket plates. See below for approximate camera positioning locations.

Figure 4-18 Scan room layout



Item	Description
1	Front camera
2	Y-axis distance from ground to front camera bracket base center (2400 to 3000 mm)
3	Side camera, Y-axis distance from ISO center to side camera bracket base center (2400 to 3000 mm)
4	Z-axis distance from ISO center to side camera bracket base center
5	X-axis distance from ISO center to side camera bracket base center (will be calculated during install based system location within the room). (1400 to 4500 mm)
6	Z-axis distance from ISO center to front camera bracket base center (3100 to 5500 mm)
7	Z-axis distance from ISO center to rear camera bracket base center (2000 to 5500 mm)
8	Y-axis distance from ground to rear camera bracket base center (2000 to 3000 mm)
9	Rear camera

Mounting requirements for cameras

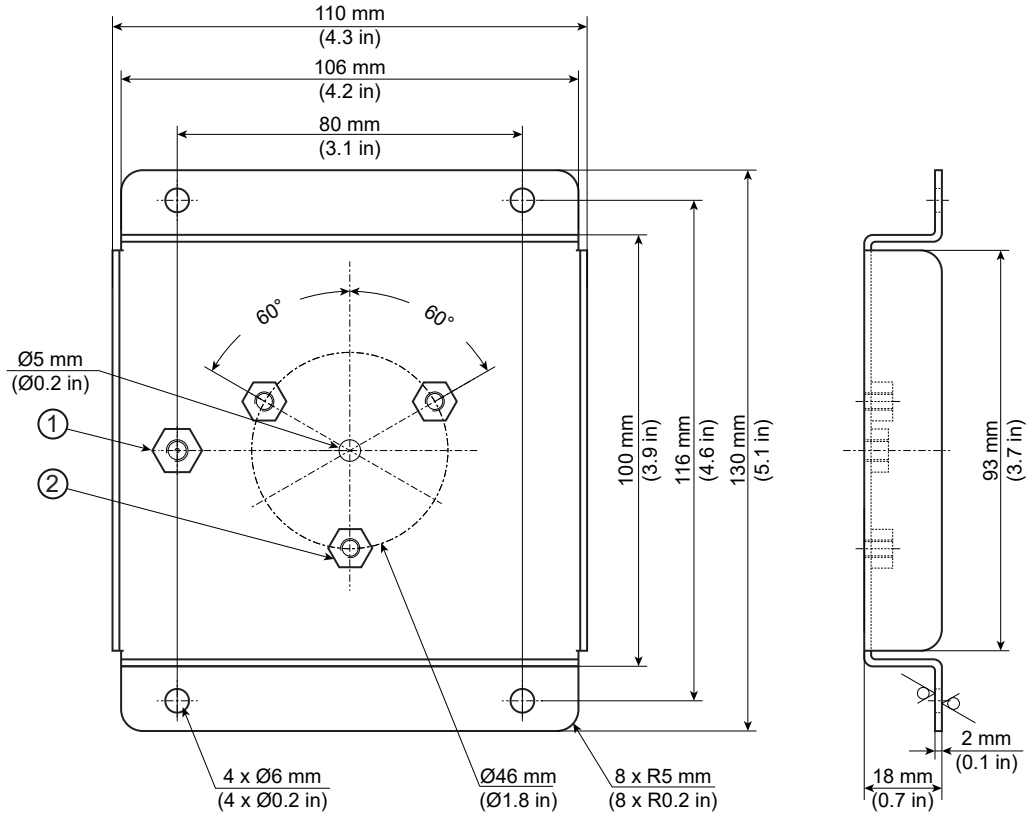
GE HealthCare will provide two (2) junction plate options depending on mounting configurations. If the junction plates supplied by GE HealthCare can not meet the requests of the building structure, the customer's architect can design equivalent junction plate with sufficient strength to hold the camera (recommend a 4x safety factor).

Standard junction plate

The minimum ceiling height above the table and gantry shall measure at least 2286 mm (90 in) or the minimum distance allowed by local laws and codes, whichever is greater, when measured from the floor to the finished ceiling or to the ceiling pedestal mounts of any ceiling-mounted components.

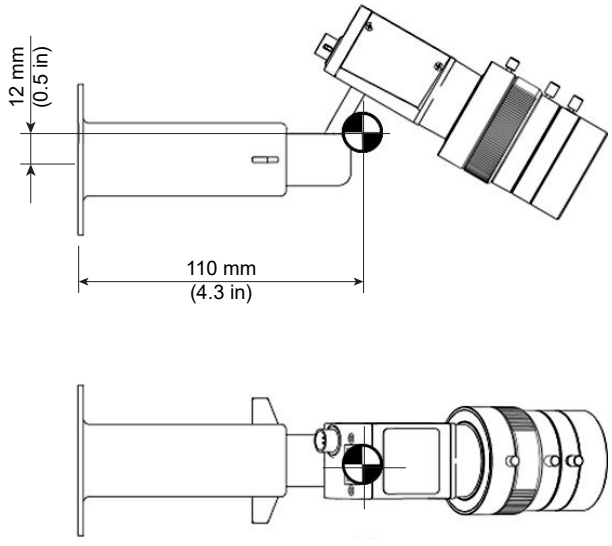
Figure 4-19 Standard bracket with safety chain

Figure 4-20 Standard junction plate (supplied by GE HealthCare)



Item	Description	Item	Description
1	M5 welding nut	2	3 x M4 welding nut

Figure 4-21 Center of gravity



If a structural contractor designed an equivalent plate, the thickness should be 15 mm or more, the (3) M4 mounting holes are required to anchor the standard bracket to the junction plate and one (1) M5

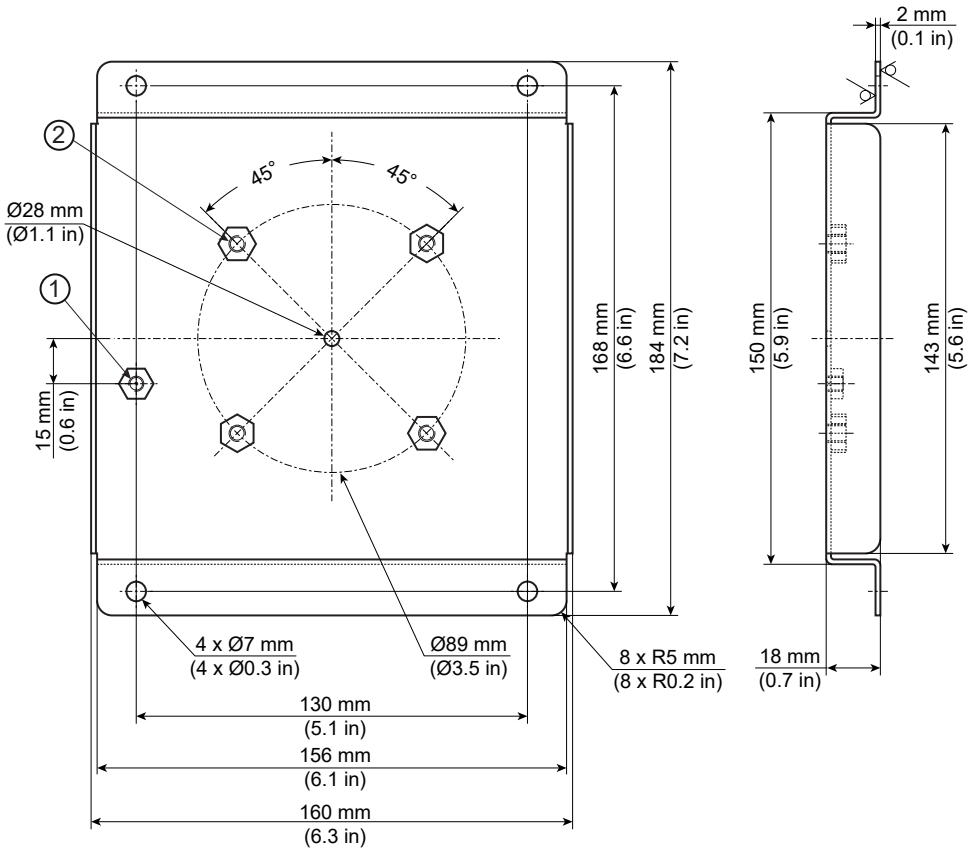
hole is used to anchor the safety chain. Please consider the loading capacity of the junction plate, the total weight of the camera and extendable pipe provided by GE HealthCare is 0.335 kg (0.74 lbs).

For the detailed instructions for the hole size, see Figure 4-20 Standard junction plate (supplied by GE HealthCare) on page 77 and Figure 4-21 Center of gravity on page 77 diagrams.

Junction plate for pipe

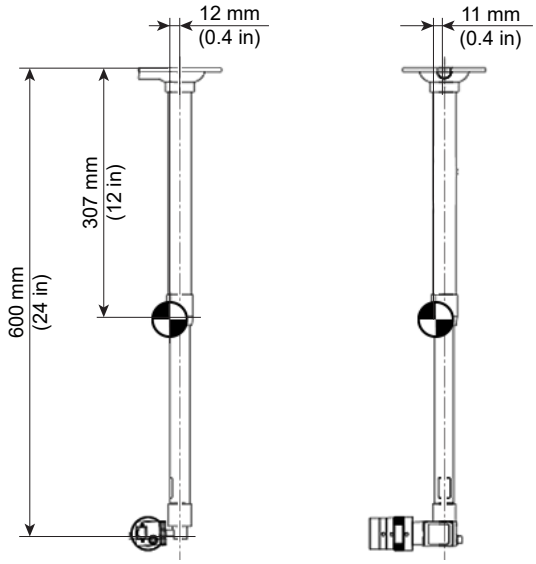
Figure 4-22 Pipe bracket with safety chain

Figure 4-23 Junction plate for pipe (supplied by GE HealthCare)



Item	Description	Item	Description
1	M5 welding nut	2	4 x M6 welding nut

Figure 4-24 Center of gravity for pipe



If a structural contractor designed an equivalent plate, the thickness should be 15 mm or more, four (4) M6 mounting holes are required to anchor the pipe bracket to the junction plate and one (1) M5 hole is used to anchor the safety chain. Please consider the loading capacity of the junction plate, the total weight of the camera and extendable pipe provided by GE HealthCare is 0.665 kg (1.47 lbs).

For the detailed instructions for the hole size, see Figure 4-23 Junction plate for pipe (supplied by GE HealthCare) on page 79 and Figure 4-24 Center of gravity for pipe on page 79 diagrams.

Cable requirements

LAN cable requirement

RCK-AVIMOS has three (3) LAN cables, which power the cameras and provide video feedback, these will need to be routed from the system control console desk room to the scan room. The customer is responsible to complete cable-conduit installation in advance.

Power cable requirement

AVIMOS power cord should meet global all countries/regions, there are 14 selectable power cord kits for different countries.

5 Room Requirements

5.1 Flooring Requirements and Specifications

Floor specifications

The customer is responsible for the following:

- The gantry and table must be installed on a concrete surface. In some sites it may be necessary to install the gantry on a raised platform. It is the customer's responsibility to contract a structural engineer to design the details based on the information in Requirements of Installing the Revolution CT Gantry on a Support Structure on page 169.
- The minimum concrete floor thickness beneath the gantry and patient table shall be 102.0 mm (4.0 in).
- Wood, asphalt and marble floors are prohibited in the foot pad load bearing areas under the gantry and the patient table.
- If the concrete floor has a floor covering installed over it (such resilient tile or carpeting), the foot pad load bearing areas under the gantry and the patient table must be removed by cutting into the flooring to ensure the table and gantry rest on a solid surface. (Openings cut during installation.)
- For older facilities, if the scan room flooring (for example, floor tile) is to be installed or replaced after the gantry and table are installed, the floor should be clean-finished with a dust-free concrete before system is installed.
- Refer to Weight and Floor Loading Data for the load of the system on the concrete floor directly beneath the table and gantry.
- The customer must have signed a GE HealthCare Penetration Permit to allow for GE HealthCare or GE HealthCare contracted personnel to drill into the concrete floor. Refer to Anchoring Requirements.

Floor levelness check

Verify the floor meets the levelness specification. The levelness directly impacts the adjustment range for table/gantry alignment and will adversely impact Image Quality (IQ) if the levelness is not met to specification. Follow the escalation procedure if the floor does not meet the levelness specification.

Due to tighter alignment specifications to meet system Image Quality (IQ), the GE HealthCare Revolution CT requires the floor to be within the spec. Even if an older CT machine is in the

room, regardless of CT model or manufacture, **DO NOT** assume the floor is automatically within specification.

- The floor shall have no greater than **6 mm (0.25 in) levelness over a 3 meter (10 ft)** range under the full system load. Levelness is defined as the distance between the highest and lowest points on the floor.

Use the instructions found in *Floor Levelness Measurement Form* **(DOC1766027)** to verify the floor is within specification.

Refer to table below to obtain the correct GE HealthCare Revolution CT floor template for the system table type. The Revolution CT Installation Kit is universal and can be used with all three table/gantry types for alignment. These items will be necessary to perform the procedure to determine if the floor directly beneath the table and gantry meets the floor levelness specification. Contact your PMI to order templates.

Table 5-1 Installation Kit and floor template part numbers

Item	Part Number	Description
1	5507435-1	Revolution CT Installation Kit (is universal for all NG table types)
2	5498509-2	Revolution CT floor template for systems with an NG-2000 table (transporter type)
3	5498509-3	Revolution CT floor template for systems with either an NG-2000V or NG-1700V, NG2000SV, NG1700SV table.
4	5881460	Revolution CT Auto Patient Positioning Camera Installation Toolkit

5.2 Floor Loading Data

Component weight and floor loading data (table and gantry)

System Component	Net Weight Kg (Lbs)	Maximum Uplift Load N (Lbf)[5]	Max compressive Load N (Lbf)[5]	Maximum Compressive Floor Pressure per pad MPa[5]		Number of Foot Pads [3,4]
				Nominal	Shimmed (Worst Case)[6]	
Gantry	2876.1 (6335.0)	0.0 (0.0)	7048.8 (1584.0)	10.9	13.3	4 (63.5 mm (2.5 in) in diameter)
NG-2000 Table with 226.8 Kg (500 Lb) patient	1026.0 (2260.0)	1679.0 (377.0)	4720 (1061.1)	9.8	12.0	6 (63.5 mm (2.5 in) in diameter)
NG-2000 Table with 306.5 Kg (675 Lb) patient	1105.5 (2435.0)	2368.0 (532.0)	5624 (1264.3)	10.1	12.3	6 (63.5 mm (2.5 in) in diameter)
NG-2000V Table with 226.8 Kg (500 Lb) patient	884.2 (1949.3)	1713.4 (385.2)	5265.1 (1183.6)	10.0	12.2	6 (63.5 mm (2.5in) in diameter)
NG-2000V Table with 306.5 Kg (675 Lb) patient	963.9 (2125)	2552.4 (573.8)	6575.4 (1478.2)	10.5	12.8	6 (63.5 mm (2.5in) in diameter)
NG-1700V Table with 306.5 Kg (675 Lb) patient	943.9 (2080.9)	2061.1 (463.4)	5940.9 (1335.6)	10.2	12.4	6 (63.5 mm (2.5in) in diameter)
NG-2000SV Table with 306.5 Kg (675 Lb) patient	986.5 (2174.9)	2452.3 (551.3)	6640.3 (1492.8)	10.5	12.8	6 (63.5 mm (2.5in) in diameter)

System Component	Net Weight Kg (Lbs)	Maximum Uplift Load N (Lbf)[5]	Max compressive Load N (Lbf)[5]	Maximum Compressive Floor Pressure per pad MPa[5]		Number of Foot Pads [3,4]
				Nominal	Shimmed (Worst Case)[6]	
NG-1700SV Table with 306.5 Kg (675 Lb) patient	966.5 (2130.8)	1989.2 (447.2)	6004.2 (1349.8)	10.3	12.5	6 (63.5 mm (2.5in) in diameter)

Note:

1. Foot pedal not included. Need to add additional 31.8 kg (70.0 lb) static weight to the floor loading if foot pedal needs to be included.
2. Maximum uplift load value and maximum compressive load value were determined with the cradle fully extended for worst-case condition.
3. Part number of foot pad of the anchor: 5396513. The area of the pad contacts the floor is 26.6 cm^2 (4.12 in^2).
4. Exact floor locations of the table and gantry footpads is documented in the site print provided to the customer.
5. Values in this table do not include safety factor. Refer to Anchor Safety Factor on page 99 for discussion on safety factor. The patient table values are based on 1 times patient load plus 1 times empty table load at the worst patient location.
6. GE HealthCare part number of the shim: 5726354. The maximum allowable height is 5.0 mm when used with the GE HealthCare supplied anchors. Refer to Floor Specifications for more shim related details.

Variable floor loading

A rotating CT gantry applies a static and variable (dynamic) load to the floor on which it is anchored. The static load is based on the weight and center of gravity of the system. The variable/dynamic load is based on other variables such as gantry static and dynamic balance of the rotor. The frequency of the variable/dynamic load is based on the rotating speed of the gantry.

Table 5-2 Static and dynamic floor loading

	Static Load	Amplitudes of Variable (Dynamic Load)		Support Surface (Single Foot Pad Area)
Rotating Speed	--	0.28 sec/rev (3.57 Hz)	0.2 sec/rev (5 Hz) (Future)	--
Highest loaded gantry foot pad (there are 4 pads on the gantry)	718.5 kg (1584 lb)*	+/- 29 kg (64 lb)	+/- 45.8 kg (101 lb)	26.6 cm^2 (4.12 in^2)

* Based only on the static weight of the gantry on the floor. Max compressive floor pressure per pad in on page 83 includes both the static weight of the gantry as well as the compressive preload of the anchor.

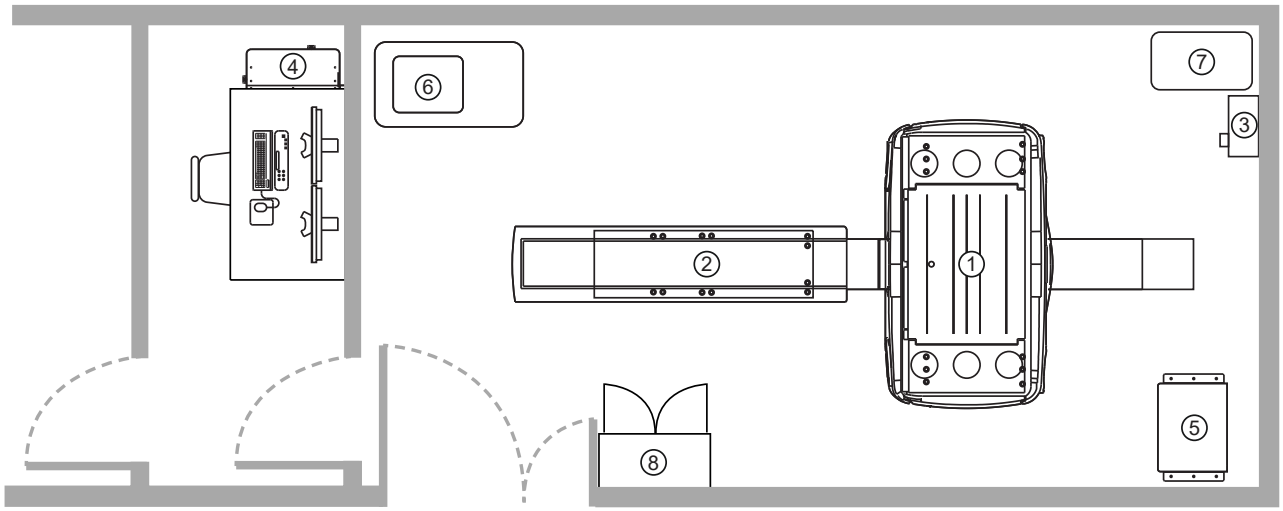
5.3 Functional Scan Suite Layout Configuration

A functional scan suite is comprised of a separate scan room and control room. The scan room contains the CT scanner, and the control room houses the scanner desktop for operation of the system. Both must be designed with enough space to accommodate:

- all individual components of the CT system
- service access to support the individual CT system components
- operational egress for safe exit from all areas of the rooms
- meet all regulatory codes based on the location of the system

The minimum control room and scan room sizes are based on the regulatory envelope which surrounds a CT scanner. This envelope of space includes the above considerations along with all regulatory requirements and applicable local building codes. An example of a functional system layout is detailed in the configurations below.

Figure 5-1 Functional scan suite layout configuration



Item	Description	Item	Description
1	Gantry	5	PDU
2	Patient Table	6	System Cabinet
3	MDP (A1) (Mains)	7	Partial UPS (See next table)
4	Scanner Desktop	8	Service (Storage) Cabinet

Partial UPS is equipped as follows:	
Revolution CT	Optional
Revolution CT ES	
Revolution Apex	Standard

Partial UPS is equipped as follows:	
Revolution with Apex Edition	Standard
Revolution CT ES with Apex Edition	Standard
Revolution Apex Select	Standard
Revolution Apex Plus	Standard
Revolution Apex Elite	Standard
Revolution CT Power	Standard
Revolution Apex Expert	Standard
Revolution Apex Essential	Standard
Revolution Vibe	Standard

Scan Room Requirements

The minimum size for the scan room may vary. Factors to consider are:

- Room workflow
- Patient care accessibility
- Critical care equipment requirements
- Safety egress and door swing egress
- Possible future system option upgrades or purchases
- Local regulatory codes
- Cabinets
- Sink
- Medical gas access/clearances

How items are configured in the scan room will also have an impact, refer to the next section on *Work Space Requirements*.

Control Room Requirements

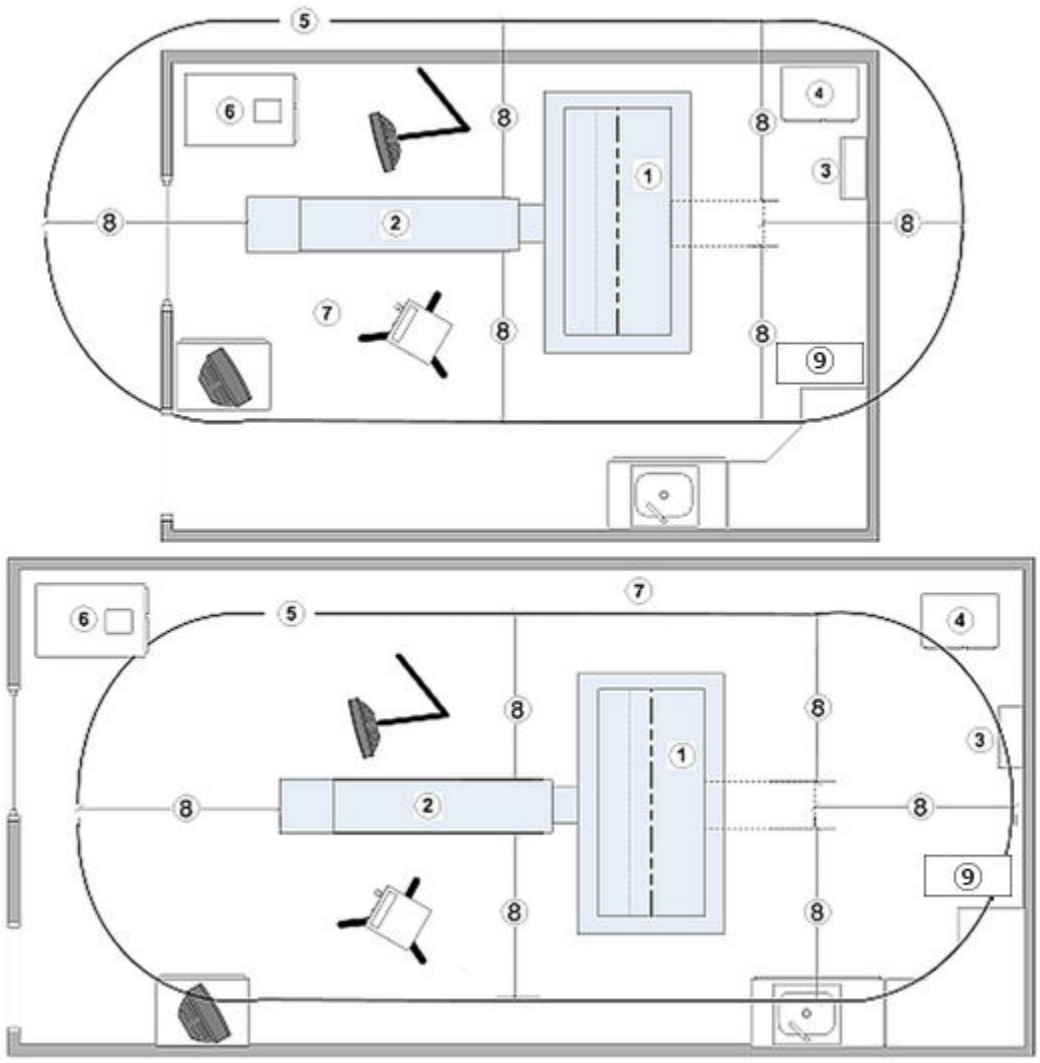
The minimum size of the control room may vary due to factors like room workflow, size of counter or furniture used to position the monitors, keyboard, and other scanner desktop equipment. A clear line of sight from the operator workstation (monitor/keyboard) to the patient on the table in the scan room allows the operator at the workstation to have a clear view to the patient in case of emergency.

Leakage Envelope of the Scan Room

The Enclosure (Patient Touch) Leakage Envelope tests ensures the patient undergoing a scan cannot touch or otherwise contact any conductive surface. As in Figure 5-2 Patient care vicinity envelope/ Enclosure (Patient Touch) Leakage Envelope on page 87, a zone is defined in the scan room only, where the enclosure leakage must be tested. Areas that fall outside of this envelope DO NOT need to be tested. The intent of this graphic is to provide the PMI with a view of potential electrical devices, plumbing fixtures, hospital gas outlets, and metal surfaces that may fall within this scan room envelope, which may require additional grounding prior to customer turnover. (The height of envelope from floor-to-ceiling; IEC-3 (International Electrical Code Section 3) = 2290.0 mm (90 in). UL60601-1 (2.12.20 DV Addition).)

NOTE
The Enclosure Leakage Envelope has nothing to do with regulatory work space clearance or safe egress requirements for Service Personnel (*NFPA 70*).

Figure 5-2 Patient care vicinity envelope/Enclosure (Patient Touch) Leakage Envelope



Item	Description
1	Gantry
2	Table
3	MDP (A1) (Mains)
4	PDU
5	Patient care vicinity envelope
6	System Cabinet
7	Scan room
8	Envelope dimensions: 1829.0 mm (6.0 ft)
9	UPS

5.4 Work Space Requirements

Prior to the delivery and install of the system, ensure there is enough room in the suite to receive and temporarily store all components and service equipment required for the installation. This would include all system, subsystems and all subsystem components. If there is not sufficient space, the PMI should work with the customer to arrange for temporary storage at a location as close to the suite as possible. This temporary location shall meet the same temperature and humidity specifications as defined in Shipping and Receiving on page 15.

System configuration and room requirements for work space

Definitions:

- **Working Space:** Work space for equipment operating at 600 Volts, nominal, or less, to ground, and likely to require examination, adjustment, servicing, or maintenance while energized.
- **Service Space:** Defined as Working Space by: *NFPA 70* (Table 110.26) *2011 Edition*. GE HealthCare also requires a minimum work space for the safe servicing of the product. This work space is defined: *Where the cover has been removed or open in the area where service is performed, and power is applied to the system.*
- **Grounded Surface/Wall:** Made of concrete, masonry, brick, ceramic tile, or a wall that contains surface mounted electrical boxes, conduits, medical gas or other exposed metal plumbing or ducting.
- **Ungrounded Surface/Wall:** Made of wood or other insulated construction material that will not create a path to ground when touched.
- **Obstructions:** Surface mounted floor ducts or other trip hazards, walls, pilasters, support columns, and equipment covers stored temporarily that would block direct access to an exit from the room.
- **Powered On Service – Work Space Egress - 712.0 mm (28.0 in) :** Any work space around the perimeter of the system or subsystem, shall have at least one unobstructed route to a direct exit of the room. The width of the exit route shall not be less than 712.0 mm (28.0 in.) along the entire length of the route. This emergency egress route must be free of obstructions and trip hazards, including equipment covers that may have been removed for service and surface floor ducts.
- **Small Room (Not recommended):** A condition of installation where the gantry may be placed a minimum of 356.0 mm (14.0 in) from a wall where access to electrical power or the wall is not required. The 356.0 mm (14.0 in) condition may be applied to both sides of the gantry providing that doing so does not create a trapped area or inhibits direct unobstructed safe egress from the scan room with a minimum width of the egress path of no less than 712.0 mm (28.0 in). The end of the patient table to the wall should be at least 152.4 mm (6.0 in).

Per *NFPA 70* (Table 110.26) *2011 Edition*, GE HealthCare requires the following minimum work space requirements for the safe servicing of the product.

Table 5-3 Minimum ceiling height requirements

Unobstructed hallway heights	2438.5 mm (96.0 in)
Doorway opening heights	1980.0 mm (78.0 in)
Above table and gantry from the floor*	minimum 2286.0 mm (90.0 in)
Head clearance in front of the gantry when overhead equipment is installed from the floor	minimum 2235.0 mm (88.0 in)
** The minimum ceiling height above the table and gantry is stated here or the minimum distance allowed by local laws and codes, whichever is greater, when measured from the floor to the finished ceiling or to the ceiling pedestal mounts of any ceiling mounted components.*	

Table 5-4 Work space conditions

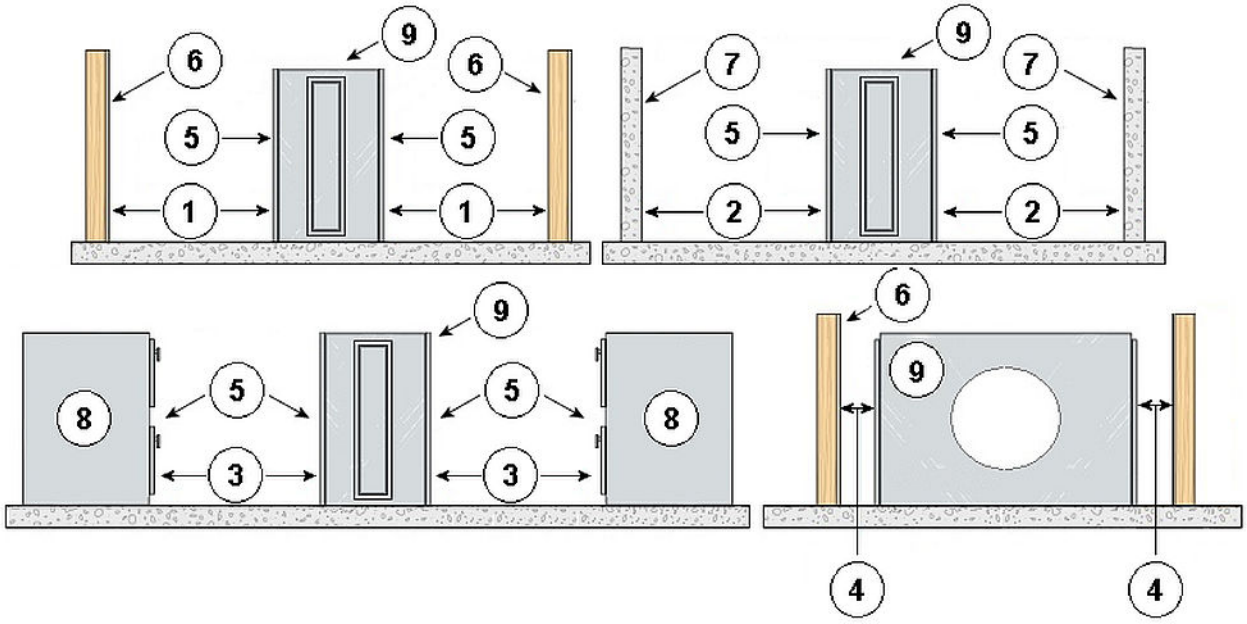
Dimension	Condition Number	Condition	Separation Distance mm (in)
Length/Depth	1	If the depth of the working space is directly facing an ungrounded surface or wall without live voltage panels (less than 600 V) and without surface mounted ducts or conduits.	914.0 (36.0)
	2	If the depth of the working space is directly facing a grounded surface or wall (less than 600 V).	1067.0 (42.0)
	3	If the depth of the working space is directly facing a surface or wall with live voltage panels (less than 600 V), grounded surface mounted ducts, or conduits.	1219.0 (48.0)
Width	4	Minimum width of the working space in front of the electrical equipment, unless the width of the exposed electrical equipment is larger. This is the minimum width required for FRU crate access. Refer to *FRU Crate Access Requirements*.	762.0 (30.0)
		If the exposed electrical equipment is wider than 762.0 mm (30.0 in) the width of the equipment shall become the width of working space.	Size of equipment
		The working space shall permit at least a 90 degree opening of equipment doors.	—
Height	5	Minimum height of the working space shall be clear and extend from the grade (floor), unless the height of the equipment is higher.	1981.0 mm (78.0)
		If the equipment is taller than 1981.0 mm (78.0 in), the required height of the working space shall become the height of the equipment.	Height of equipment

Table 5-5 Small room condition (not recommended)

Small Room Condition (Not Recommended)	Separation Distance mm (in)
Minimum distance required on either side of the gantry as you face the gantry front. Not recommended. Refer to *Small Room* below. **IMPORTANT** Minimum FRU crate access clearances and paths shall be provided to front-left, front-right, and rear of the gantry. Refer to *Scan Room Subsystem Clearance Requirements*.	356.0 (14.0)

The required work space has several conditions defined by the (U.S.) National Electrical Code (NEC) and adopted by GE HealthCare as minimum siting conditions for all CT scanner installations. These conditions are defined by the wall type and accessibility/exposure to: electrical power panels, electrical outlets, surface mounted conduits, plumbing, hospital gases, or surface ground points directly opposite exposed CT equipment.

Figure 5-3 Work space conditions (unit: mm (in.))



1	Condition 1: 914.0 mm (36.0 in)
2	Condition 2: 1067.0 mm (42.0 in)
3	Condition 3: 1219.0 mm (48.0 in)
4	Condition 4: Small room gantry side clearance 356.0 mm (14.0 in) (not recommended) **IMPORTANT** Minimum FRU crate access clearances and paths shall be provided to front-left, front-right, and rear of the gantry. Refer to *Scan Room Subsystem Clearance Requirements*.
5	Exposed live parts
6	Effectively insulated wall/ surface
7	Grounded parts, concrete wall/surface, and so on
8	MDP (A1) or other electrical equipment or power panels
9	Scanner or other subsystem component

Work space clearances apply to equipment operating at 600 V or less, where examination, adjustment, servicing, and maintenance is likely to occur with live parts exposed. System servicing requires a space for one service engineer to accomplish all system component replacement and service tasks.

There shall be sufficient working space in the scan room to allow adequate egress during service operations. If the customer and PMI have any concern that the site will not provide adequate work space for egress under these conditions, the necessary provisions should be made to accommodate this event. Refer to Figure 5-4 Minimum regulatory and service envelope on page 92.

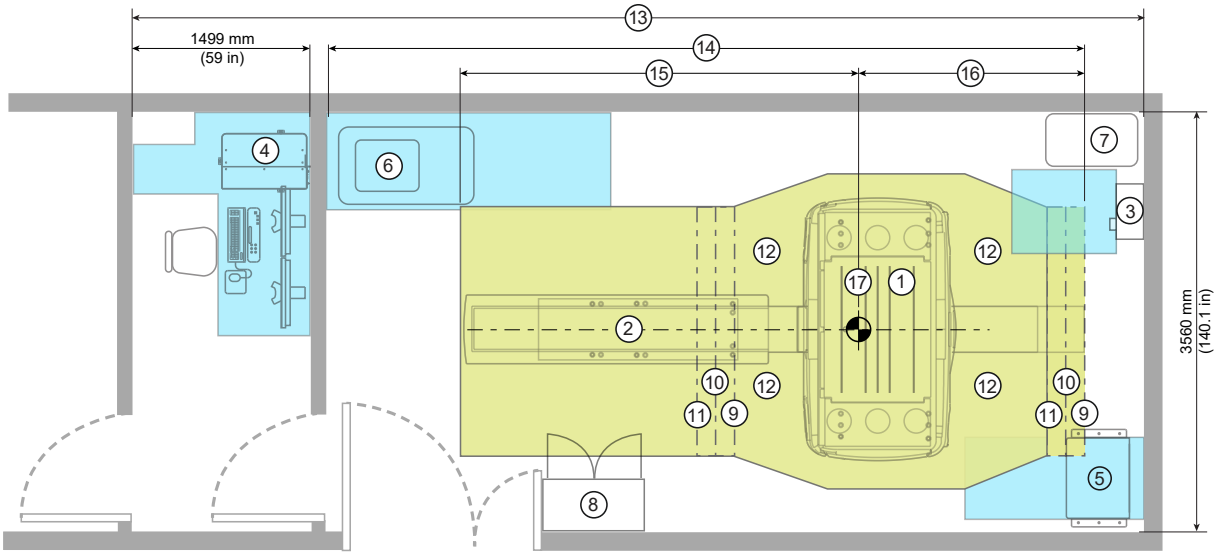
The customer shall maintain the required regulatory clearance distances and not use these areas for storage. This applies during normal system operation and during service inspection and routine maintenance.

It is important to review operational clearances to verify daily use items will properly fit (beds, carts, wheelchairs, and so on.). In addition, it is also necessary to consider clearances for emergency medical equipment.

Minimum Regulatory and Service Envelope Figures

- Minimum regulatory and service envelope figure below is not scaled to reflect actual dimensions.
- The dimensions in the figure below have been defined for the purpose of determining the smallest room size possible. Specific scan suite dimensional requirements as well as local regulations must also be considered when determining the minimum room size.
- Distances within the figure below are defined by service requirements and do not take into consideration the need for adequate space around the scanner for medical equipment used during the normal operation of the scanner. The customer is responsible for making sure that adequate room exists to perform required tasks while tending to the needs of patients within the patient care vicinity.
- The figure below shows multiple doorways or exit points from the scan suite. Not all of these doorways are required. These doorways are part of the drawing in order to define possible exit points that are required based on egress pathways for the safe service of the system.

Figure 5-4 Minimum regulatory and service envelope



Item	Description	Item	Description
1	Gantry	10	Condition 2: Refer to Figure 5-3 Work space conditions (unit: mm (in.)) on page 90
2	Patient Table	11	Condition 3: Refer to Figure 5-3 Work space conditions (unit: mm (in.)) on page 90
3	MDP (A1) (Mains)	12	Minimum safe service clearance: 914.4 mm (36.0 in)
4	Scanner Desktop	13	Minimum regulatory scan suite length: For NG2000: 8335.0 mm (27 Ft. 4.1 in) For NG2000V/NG2000SV: 8316.0 mm (27 Ft 3.4 in) For NG1700V/NG1700SV: 7716.0 mm (25 Ft 3.8 in)
5	PDU	14	Minimum regulatory scan room length: For NG2000: 6710.0 mm (22.0 Ft) For NG2000V/NG2000SV: 6691.0 mm (21 Ft 11.25 in) For NG1700V/NG1700SV: 6091.0 mm (19 Ft 11.8 in)
6	System Cabinet	15	Scan plane to cradle max length: For NG2000: 3720.0 mm (12.0 Ft 2.5 in) For NG2000V/NG2000SV: 3726 mm (12.0 Ft 2.8 in) For NG1700V/NG1700SV: 3426 mm (11.0 Ft 2.9 in)

Item	Description	Item	Description
7	Partial UPS (if equipped)	16	Scan plane to cradle max travel with extender: For NG2000: 2045.0 mm (6.0 Ft 8.5 in) For NG2000V/NG2000SV: 2020.0 mm (6.0 Ft 7.5 in) For NG1700V/NG1700SV: 1720.0 mm (5.0 Ft 7.7 in)
8	Service (storage) Cabinet. Refer to tables listed in 2.3 Delivery and Handling on page 15 for space requirements.	17	ISO scan plane (marked for the purpose of providing guidance for X-ray shielding needs)
9	Condition 1: Refer to Figure 5-3 Work space conditions (unit: mm (in.)) on page 90	-	-

Scan room sub-system clearance requirements

Some of the subsystems require removal of the covers for service. Make sure there is sufficient space to remove all necessary covers from the subsystems. Normal servicing of the gantry does not require removal of the front covers.

Gantry Cover Clearance

The front cover is hinged at the top and flip up, refer to Table 5-3 Minimum ceiling height requirements on page 89 for head clearance details. The rear cover also has clearances when removed. See Figure 5-7 Gantry rear cover with dollies on page 95 for details.

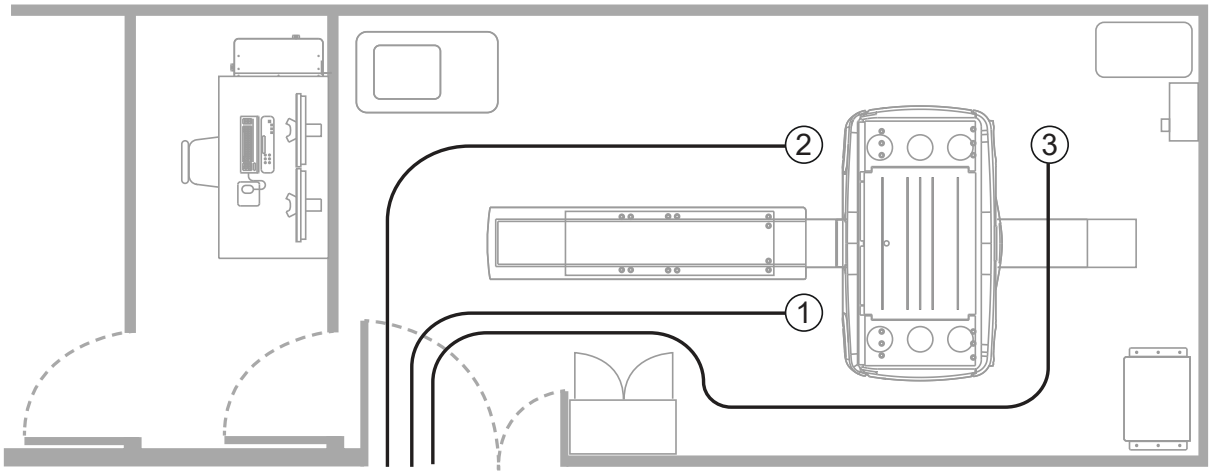
Field Replaceable Unit (FRU) Crate Access Requirements

It is important to follow FRU crate access requirements when placing a Revolution CT system in the scanner room layout/design process. Minimum work space clearances defined in Table 5-4 Work space conditions on page 89 shall be followed for FRU crate access to the gantry front-left, front-right, and back side. For personnel and equipment safety, the FRU crates designed and used with gantry subsystem components identified in Figure 5-5 Gantry FRU crate access regions with example FRU access paths on page 94 and on page 94 below are integral to the replacement process and shall be used accordingly. **A clear path to all three regions shall be provided.** Moving FRUs under the foot-end of the system table is not a clear path and is prohibited. Hand-carrying FRUs into position, or the use of commercial-off-the-shelf and/or custom dolly platforms or "skates" to maneuver the FRU are prohibited.

NOTE
The X-Ray tube includes a dolly ("skate") within the FRU crate, but this dolly is used *only* to maneuver the FRU crate into position in front of the gantry, **not** the tube itself.

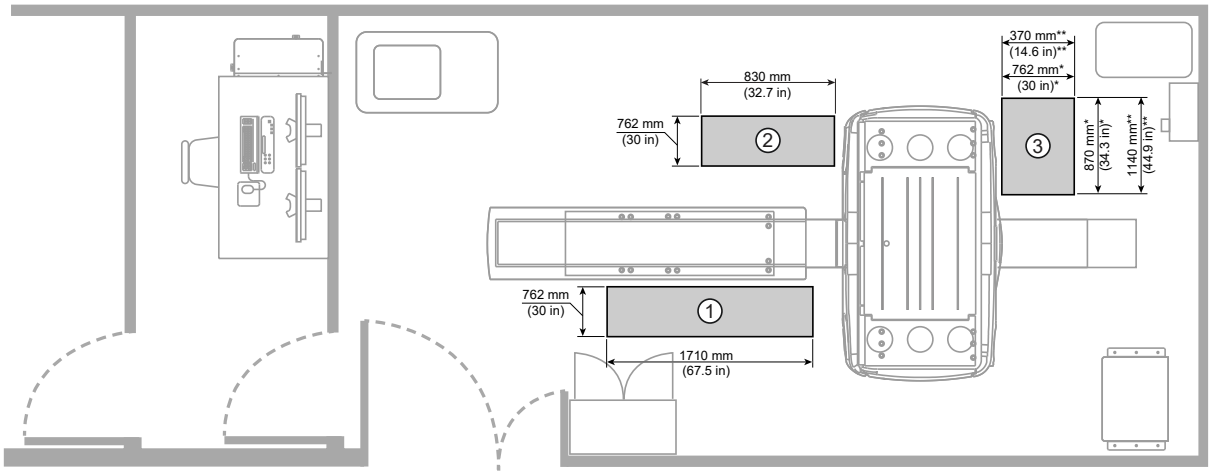
The following figure provides dimensions for the largest FRU crate by region. It is also important to consider the rear gantry cover with dollies attached. Figure 5-7 Gantry rear cover with dollies on page 95 provides dimensions for the rear cover with cover dollies attached.

Figure 5-5 Gantry FRU crate access regions with example FRU access paths



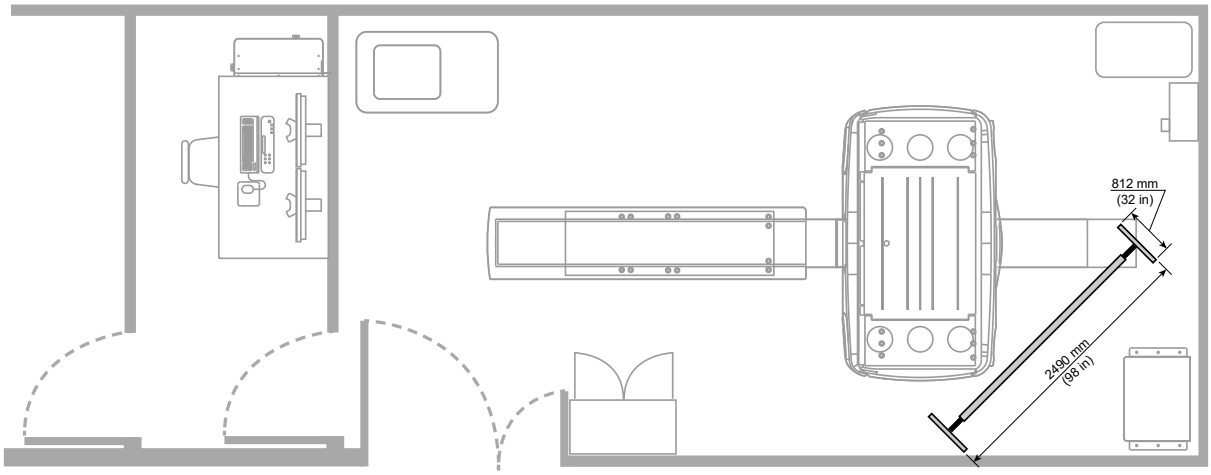
Region	FRUs with Integral Crates
1	Detector, X-Ray tube, detector thermal subsystem
2	HV tank, tube heat exchanger, rotating auxiliary power
3	Rear gantry cover with dollies, stationary inverter, collimator, power pan

Figure 5-6 Largest FRU crate by region



Item	Description	Item	Description
1	Detector	3	Stationary inverter (*) Power pan (**) Choose worst case between these two, depending on room layout and access path. Verify both can be delivered to region, given the access path. Also see dimensions for rear gantry cover and dollies in the figure below.
2	Heat exchanger	-	-

Figure 5-7 Gantry rear cover with dollies

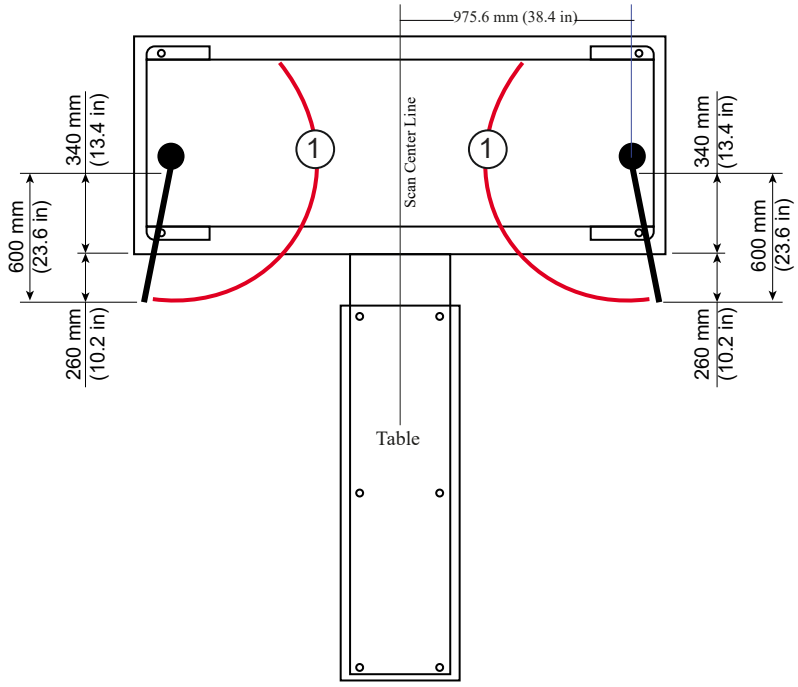


For the example in Figure 5-5 Gantry FRU crate access regions with example FRU access paths on page 94 above, assuming the minimum 762 mm (30 in) clearance width is met at the foot of the table and on the right side of the gantry (when facing the bore from the foot of the table), the gantry FRU crate access to Regions 2, and 3 would be around the foot-end of the table to Region 2, and around the right-side of the gantry to Region 3. This acceptable, even if FRU access in not possible on the left side, as shown in this example for a small room layout. Other room layouts will be different, but when placing the system on the room drawing, be certain to consider door entry ways and obstructions that may limit a clear path for the minimum FRU crate width and height for access to all three regions. Before submitting a *Concession Request*, check to see if the system may be rotated and/or translated within the room layout to achieve a clear path to all three regions.

Crane Clearance Requirements

Some parts replacements require the temporary installation of a crane. For examples, tube replacement (right side in the front of gantry) and tank replacement (left side in the front of gantry). The crane does not exceed the gantry height. There shall be no obstructions in the cranes operational radius below the gantry height that would inhibit the swing of the crane. See Figure 5-8 Crane clearance radius on page 96.

Figure 5-8 Crane clearance radius



Item	Description
1	Crane operational radius

PDU Configuration Requirements

When positioning a PDU, consider regulatory compliance. Also, refer to the room layout figure in Figure 5-4 Minimum regulatory and service envelope on page 92.

PDU is on wheels and can be moved around for service.

Consider the possibility of a future replacement of a PDU when placing them into the scan room. Make sure there is adequate space to move for replacement purposes.

System Cabinet Configuration Requirements

Related information can be found in System Cabinet Air Flow and HVAC Map For System Cabinet on page 132.

- Do not block upwards exhaust flow.
- The system cabinet is on wheels and can be pulled away from the wall for service. Upon completion of service, the system cabinet shall be placed no closer than 152.4 mm (6.0 in) on any side near a wall.
- On both ends of the system cabinet, a clearance of 600 mm (23.6 in) is required to open the doors for service. If replacing components inside the cabinet, the system cabinet can be pulled away into an area that has 960 mm (37.7 in) of clearance space.
- Thermostats shall not be within range of the System Cabinet exhaust.

Service (Storage) Cabinet Space Requirements

The minimum dimensions for a storage space or storage cabinet is nominally: 610.0 mm (24 in) deep by 914.0 (36.0 in) Wide by 1067.0 mm (42.0 in) high. A storage cabinet or defined storage space is

required, at the customer expense, to store service equipment purchased with the system. The storage space solution does not have to be located in the scan room. GE HealthCare recommends that the storage of the service equipment be located as close as possible to the scan suite if not located inside the scan suite.

NOTE
The service equipment is the property of the customer and shall NOT be removed from the site and/or stored off-site by GE HealthCare personnel.

Table 5-6 Sample of service storage cabinet contents

Item	Description
1	3 piece component replacement hoist assembly
2	QA phantom; water phantom
3	Phantom holder
4	Installation support kit
5	Service documentation/software/software options
6	Inverter hoist assembly

UPS Space Requirements

The UPS can be placed in the scan room or placed in another room providing the cables are long enough and the environmental and HVAC requirements of the room is equal to or exceeds the environmental and HVAC requirements of the scan room.

Control room Scanner Desktop requirements

The site shall maintain a service working clearance in front of the scanner desktop components, with a minimum depth of 914.4 mm (36.0 in).

A clear line of sight from the operator workstation (monitor/keyboard location) to the patient on the table in the scan room is necessary. The operator must be able to see the patient during the scanning process while at the operator workstation in case of patient distress.

The operators desktop area will require enough space for the scanner desktop components:

- Two (2) 610.0 mm (24.0 in) LCD monitors
- Computer mouse
- Scanner Control Box (RSCB)
- Keyboard
- Peripheral Media Tower (PMT)
- Bar code reader (option)

The back and sides of the scanner desktop computer must maintain 152 mm (6 in) of clear, unobstructed space to allow for hot air venting.

Refer to System Dimensions and Weight on page 15 for specific dimensions of these components.

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

No other electrical devices may be connected to the scanner desktop computer. All other devices shall be connected to their own electrical outlet or power source. The only exceptions are EKG monitor and the system injector, which gets power from scanner desktop computer AC BOX outlets.

Operator Workspace Table (Option)

If the optional scanner desktop table is used, the table must be located directly in front of the window between the control and scan room to provide the operator with a clear view of the patient laying on the table in scan position.

5.5 Anchoring

General Requirements

It is the responsibility of the customer of the system to have a licensed structural engineer work in conjunction with a qualified contractor to mount the gantry and patient table to the floor. The customer shall consult a licensed architect, licensed structural engineer, qualified contractor and/or PMI to resolve all anchoring issues. The customer or customer's structural engineer is responsible for making sure that the floor material and design meets the forces and weight requirements for the installation and anchoring of the subsystems to the floor.

- The anchoring method defined in this manual applies to both the gantry and the patient table. Modification of this anchoring method or improvising with the sequence defined in the Revolution CT Installation procedure is prohibited.
  GE HealthCare has provided an anchoring method, which is designed to a safety factor of 4 against the loading condition described in Weight and Floor Loading Data. The safety factor of 4 has been chosen is to ensure that the patient table does not tip over, which could result in death or serious injury. The choice of a safety factor of 4 is also based on medical device safety standard. For example, for 500 lb table, 4 times of the maximum uplift load is 4*377= 1508 Lbf.
- Concrete floor strength must have a minimum strength of f` c=2000psi (1.4 x 10^7 Pa) for mounting floor anchors. It is the responsibility of each customer to have appropriate test performed to determine and measure concrete strength.
- GE HealthCare and workers contracted by GE HealthCare, are not responsible for any failure of an anchoring system not authorized by GE HealthCare.
- This procedure, at times, requires a minimum of two persons. Only trained personnel shall install this product.
- If there is not enough room to assemble the gantry in the scan room, the gantry can be assembled in another location and then transported to the scan room as an assembled unit, providing the delivery route and doorway openings can accommodate the assembled gantry with its two (2) gantry side dollies attached.

Surface Preparation and Requirements

Prior to GE HealthCare personnel drilling holes in the floor, conduit, or any customer surface; a penetration permit for customer approval of the penetrations is required. Refer to the GE HealthCare Surface Penetration Permit for details.

Examples of hidden objects could be floor beams, rebar, and concrete wire mesh.

NOTE
If there are floor obstructions, such as conduits or old anchors, be sure to cut them flush to the floor to prevent the gantry from resting on them.

For new construction, refer to the site print and avoid embedding rebar, electric conduits or any object that will interfere with the installation of the anchors in the concrete directly beneath the table and gantry footprint.

Anchoring Specifications	
Anchors installed clear of structural objects or hidden within floor. Clearance from edge of concrete slab or any expansion joint:	127 mm (5.0 in)
Anchor supplied by GE HealthCare (non-seismic)	12.7 mm (0.5 in) *HILTI Anchor Stud KWIK-BOLT (KB1) with an extended thread*
Minimum concrete floor thickness	102.0 mm (4.0 in)
Minimum Anchor clearance from any existing old cut off anchor or metal conduit.	127.0 mm (5.0 in)

Pre-Drilling is not allowed

Due to tight table/gantry alignment requirements, pre-drilling and pre-anchoring the gantry or table is prohibited. For example, the table shall be anchored **after** the table/gantry fine-alignment is complete. Pre-drilling or pre-anchoring can severely restrict the fine alignment process, causing adverse impacts to image quality.

Anchor Hammer Drill Bit

The anchor provided requires a 1/2 in masonry drill bit to drill a minimum of 14 holes in the concrete floor. This drill bit is not provided and should be acquired prior to the first day of install. The recommended drill bit for SDS and SDS Plus type hammer drill chucks is: Bosch mfg # HCFC2084, Grainger part number: 36H212 (Hammer drill bit, SDS Plus, 1/2 inch x 12 inch) or equivalent. This specific drill bit has a full cutter head and is designed to drill through rebar. The overall length of the drill including shank is 12 inches. The shank size is 25/64. The use of drill bits with less than a full cutter head may result in incorrect hole size. it may also cause a delay in the installation due to excessive drill tip wear if rebar is hit during the drilling process.

NOTE
If rebar is hit when drilling a hole, immediately stop drilling and use the alternate anchor point for that anchor. If rebar is hit in the alternate anchor point, contact GE HealthCare PMI. The local inspector must be contacted before drill through rebar in the floor.

For sites that will not be using tools from Joboxes defined by Service Operations, a concrete drill bit must be special ordered separately.

1. **Non-Seismic Installation**
   The non-seismic 1/2 inch anchors provided require a 1/2 inch masonry drill bit to drill a minimum of 14 holes in the concrete floor.
2. **Seismic Installation**
   The 5/8 inch seismic anchors, nuts and 5/8 inch drill bit required for seismic installations are not provided by GE HealthCare. The type and length of the anchors, nuts, and drill bit must be defined in the alternative seismic anchoring plan and purchased separately by the customer.

Anchor Points

Only the gantry and patient table are required to be securely anchored to the floor in a non-seismic environment. Gantry installations shall use a minimum of four (4) floor anchors — one at each corner of the gantry. Alternate anchoring locations for the gantry are provided, maximum use of one or two of any of these alternate anchoring points on the gantry is permitted. The patient table shall use a minimum of six (6) anchors — three (3) anchors on each side. The GE HealthCare floor template can be used to locate the table and gantry anchor holes. Refer to Flooring Requirements and Specifications for GE HealthCare Installation Kits.

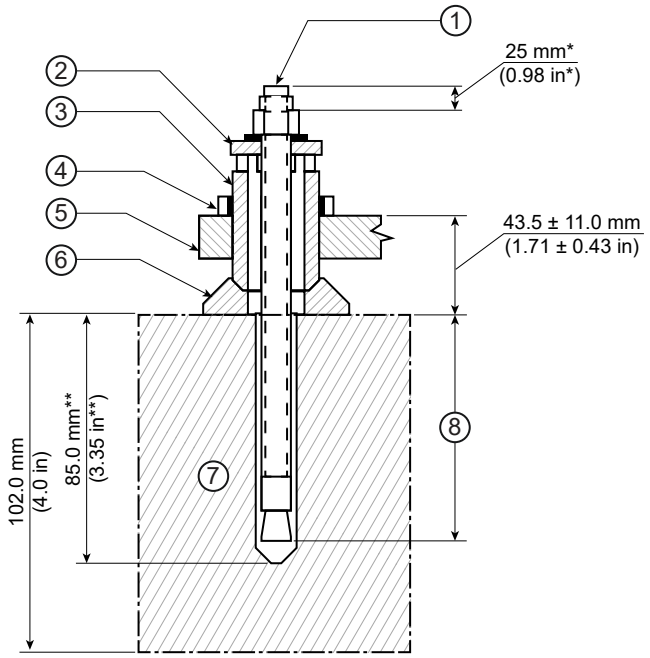
Shims are not recommended to level the gantry or patient table.

NOTE

In some cases, it is found during the non-seismic system installation (once system weight is applied to the floor) that the table or gantry needs a shim in order to meet the required alignment specs. GE HealthCare provides a Revolution CT shim kit in anchor collector 5488900-2 for non-seismic installation. It shall only be used if absolutely needed for the non-seismic installation. Restrictions and instructions in the installation manual regarding the shim kit shall be followed if the shim kit is used. Refer to Weight and Floor Loading Data for floor loading data with shims.

The scanner desktop, power distribution unit, and system cabinet do not require anchoring to the floor in a non-seismic installation. See next section for *Seismic Anchoring Methods*.

Figure 5-9 GE HealthCare-supplied floor anchor cross-section



Item	Description	Item	Description
1	Anchor bolt	6	Leveling pad
2	Anchor washer	7	Minimum concrete thickness
3	Leveling screw	8	75.0 mm (2.95 in) (nominal embedment before anchor is torqued) 1. Minimum 63.0 mm (maximum of 25.0 mm exposed anchor above nut) when no shim used 2. Minimum 57.0 mm (maximum of 25.0 mm exposed anchor above nut) when three (3) shims (5.0 mm maximum height) used
4	Adjuster lock ring	8	Maximum depth after proper torque (*) **NOTE** The starting insertion depth is 13.0 mm (0.51 in), which is the set amount of threads exposed when the anchor is installed in the hole. The anchor is hammered into the hole with the nut and washer installed until the washer bottoms out on anchor washer (item 5 below).
5	Gantry stationary base		Drill depth (**)

Alternative Anchoring Methods

- If an alternate method of anchoring is utilized, it is the customer's responsibility to confirm that the anchors can meet the loading described within the Weight and Floor Loading Data. GE HealthCare requires designing this alternate anchoring solution to at least a safety factor of 4. Check local governing building codes to see if additional safety factor is required. The customer shall confirm the load capability of the anchoring solution after installation to the loading provided in Weight and Floor Loading Data. Examples of confirmation methods are a pull-up test (with load transducer) or torque test.
- If a customer does not use the anchor method defined in the install manual, the customer is responsible for having a *Alternative Anchoring Plan* developed by a Structural Engineering firm at the cost of the customer. This plan must be retained by the customer, since it must be reviewed by service personnel at time of de-installation.
- Execution of the alternative anchoring method(s) defined by the *Alternative Anchoring Plan* shall follow the specified sequence in the Revolution CT Installation procedure workflow. Failure to follow the specified anchoring sequence can result in table/gantry alignment issues with adverse impact to image quality.

Seismic Anchoring Methods

For a seismic installation, the customer shall refer to all applicable state/local laws and building codes. Customer shall consult with structural engineer, site contractor, or architect for seismic installation requirements pertaining to all scanner components/sub-systems.

Seismic anchoring is considered to be an alternate anchoring method. An alternative installation plan that meets all required seismic codes for the region the product is located in, should be developed for sites requiring seismic installations. Development of this plan is the responsibility of the customer. Generally, this requires the customer to contract the services of a Structural Engineering firm to develop the seismic anchoring plan prior to install. The alternative seismic installation plan should be executed at time of installation in place of the existing anchoring method defined in the product install manual This plan must be retained by the customer, since it must be reviewed by service personnel at time of de-installation.

Use of seismic anchoring kit (B7919BS, which can be ordered) designed by GE HealthCare is required for a seismic-compliant installation. GE HealthCare seismic kit is designed and tested with 5/8 in (15.9 mm) anchors (eight (8) for gantry and six (6) for table). However, GE HealthCare does not supply anchors with the seismic kit. It is the responsibility of the customers to have qualified structural engineers to determine and supply the correct seismic anchors and anchor torques. The type and length of the anchor must be defined in the alternative seismic anchoring plan and purchased separately by the customer.

The existing 1/2 in anchors provided by GE HealthCare shall be discarded and **NOT** used for seismic installations.

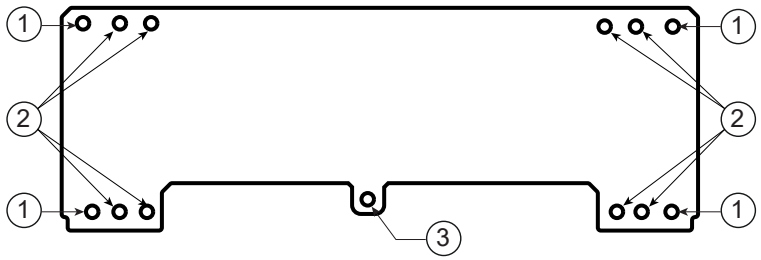
The customer’s contractor will often supply the installation instructions for a seismic region in a certified print or equivalent.

Gantry and Table

Gantry Anchoring

Primary gantry anchor locations shown below must be used for seismic installation. Refer to the GE HealthCare Floor templates provided for primary table anchor locations for seismic installation. Those are the only GE HealthCare tested configurations for seismic sites.

Figure 5-10 Gantry anchor locations



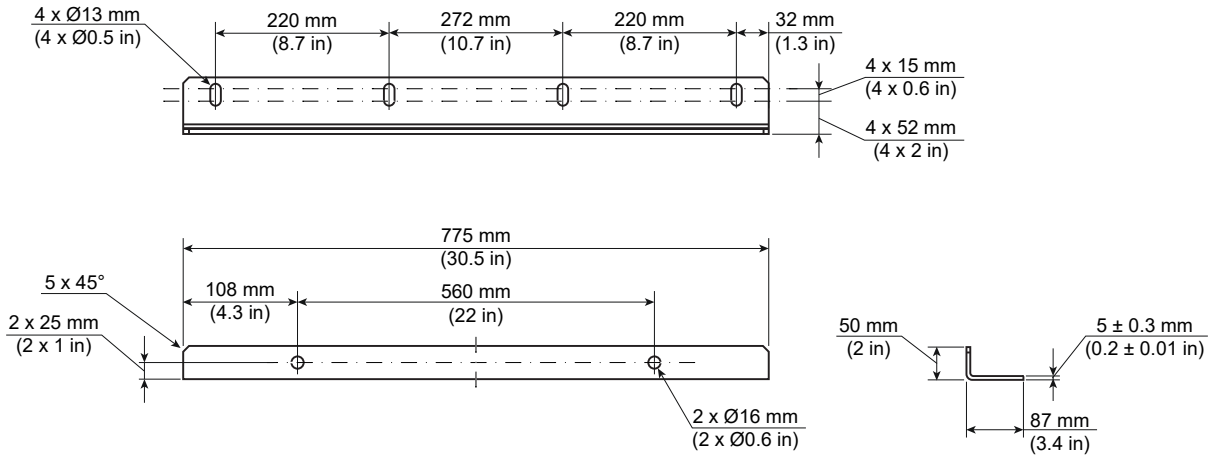
Item	Description
1	Primary anchor locations
2	Secondary anchor locations
3	Front leveling screw location (for gantry leveling)

System Cabinet Anchoring

System Cabinet VII

NOTE
Seismic brackets for System Cabinet VII must be ordered, they are not provided. Order Part B7919WP.

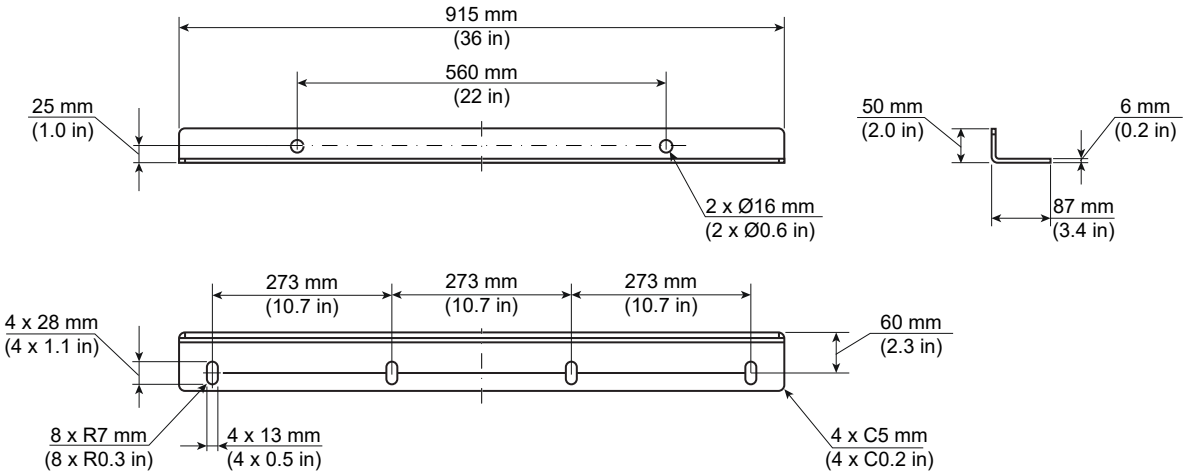
Figure 5-11 System Cabinet VII anchors mounting locations



NOTE
Material Details: Steel minimum tensile strength: 379 MPa / Anchor holes are 16 mm diameter.

System Cabinet (III, IV, V, VI)

Figure 5-12 System Cabinet anchors mounting locations



NOTE

Material Details: Steel minimum tensile strength: 270 MPa / Anchor holes are 16 mm diameter.

System Cabinets III, IV, V, VI	
Seismic brackets	Use brackets used for shipping. Use hardware used for shipping to attach bracket to system cabinet.
Seismic hardware (bracket to cabinet)	
Seismic hardware (bracket to floor)	Not provided*
* It is the responsibility of the customers to have qualified structural engineers to determine and supply the correct seismic anchors.	

Scanner Desktop Anchoring

Scanner Desktop Computer (Open Console)

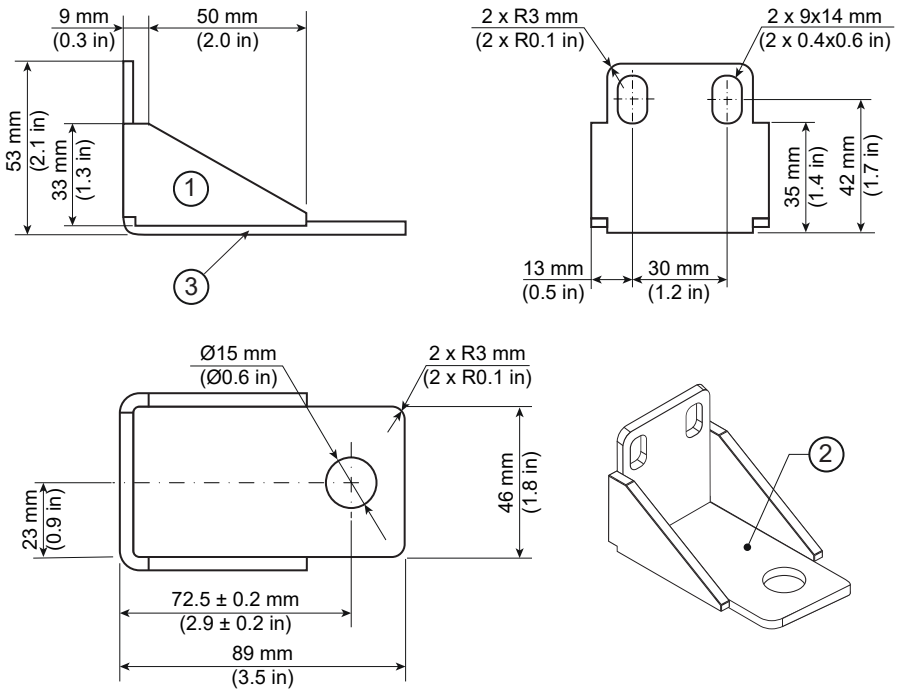
NOTE

If you use the front anchor holes as alternative anchor location, use the drop-in type anchor.

NOTE

Seismic brackets are included with the console.

Figure 5-13 Scanner Desktop computer (open console), bottom view



Item	Description	Item	Description
1	Side View	3	Weld two (2) pieces
2	Label location	-	-

NOTE
For the Scanner Desktop IV/V console, the seismic brackets are in a separate kit (PN B7919VR).

NOTE
Material Details: Steel / 4.0 mm thickness 15 mm diameter anchor holes

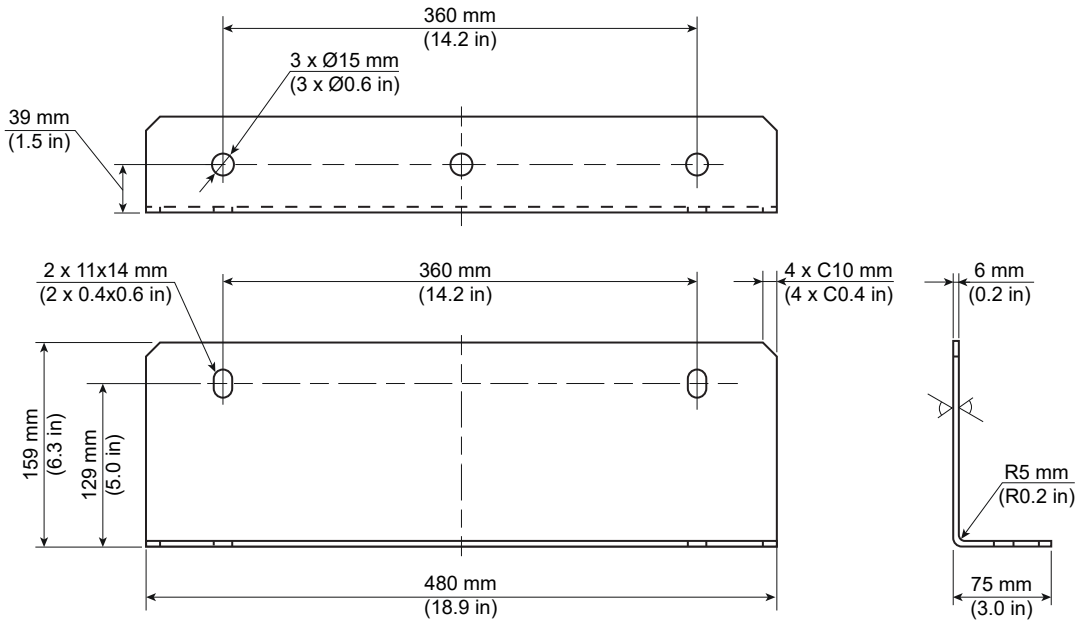
PDU and UPS Anchoring

PDU

Refer to Figure 5-14 NGPDU-61 and NGPDU-91 and NGPDU-92 seismic mounting brackets on page 107 for an example of an NGPDU with seismic mounting brackets.

NOTE
Siesmic brackets are included with the PDU.

Figure 5-14 NGPDU-61 and NGPDU-91 and NGPDU-92 seismic mounting brackets



NOTE

Material Details: Steel is zinc plated / Anchor holes are 15 mm diameter.

Partial UPS

For seismic kit and further information refer to the Original Equipment Manufacturers (OEM) documentation.

NOTE

This is the recommended anchoring method provided by the OEM. For details, refer to **Optional Eaton UPS (shown with Seismic brackets installed)** located under ***Equipment Specifications and Requirements*** in this manual. GE HealthCare does distribute EATON's seismic kit (P/N E4502YA)

5.6 Electromagnetic Compatibility

Introduction

NOTE
Revolution CT products are listed in Revolution CT Family on page 2, which will be referred to as Equipment or System for short to simplify the description.

This equipment complies with IEC 60601-1-2:2007 (Ed3.0), YY9706.102:2021 (Ed3.0 IDT. for China), IEC 60601-1-2:2014 (Ed4.0) and A1:2020 (Ed4.1) EMC standard for medical electrical equipment. This equipment generates, uses, and can radiate radio frequency energy. The equipment may cause radio frequency interference to other medical and non-medical devices and radio communications.

Detailed requirements and recommendations about the power supply distribution and installation are listed in the Site Preparation Manual.

However, there is no guarantee that interference will not occur. If this equipment is found to cause interference (which may be determined by turning the equipment ON and OFF), then you can attempt to correct the problem by one or more of the following:

- Reorient or relocate the affected device(s).
- Increase the distance between the equipment and the affected device.
- Power the equipment from a separate source from that of the affected device.
- Consult your service representative.

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

Devices which intentionally transmit RF signals (cellular phones, transceivers, or radio controlled products) in the vicinity of this equipment may cause performance outside the published specifications.

The medical staff in charge of this equipment is required to instruct technicians, patients, and other people who may be around this equipment to comply fully with the above equipment. In order to achieve the electromagnetic compatibility for a typical installation, further detailed data and requirements are described in the *Site Preparation Manual*.

General Scope

The system is suitable to be used in the electromagnetic environment, as per the limits and recommendations described in the following tables:

- Emission Compliance level and limits (Table 5-7 Guidance and manufacturer’s declaration – electromagnetic emissions on page 109)
- Immunity Compliance level and recommendations to maintain equipment clinical utility (Table 5-8 Guidance and manufacture’s declaration – electromagnetic immunity on page 110, Table 5-9 Guidance and manufacturer's declaration – electromagnetic immunity on page 111Table 5-10 Recommended separation distances between portable and mobile RF communications equipment and the Equipment on page 112 and Table 5-11 Immunity and recommended separation between RF wireless communication equipment on page 114).

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

Electromagnetic Emission

Table 5-7 Guidance and manufacturer's declaration – electromagnetic emissions

Guidance and manufacturer's declaration – electromagnetic emissions		
The equipment is intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should assure that it is used in such an environment.		
Emissions Test	**Compliance**	**Electromagnetic Environment Guidance**
RF emissions CISPR 11 GB 4824	Group 1	The equipment uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11 GB 4824	Class A	The equipment 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 GB 17625.1	Not applicable	
Voltage fluctuations/flicker emissions IEC 61000-3-3 GB 17625.2	Not applicable	

NOTE
GB4824, GB17625.X and GB17626.X standard apply to China only.

NOTE
The EMISSIONS characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 / GB 4824 class A). If it is used in a residential environment (for which CISPR 11 / GB 4824 class B is normally required), this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

Electromagnetic Immunity

Table 5-8 Guidance and manufacture's declaration – electromagnetic immunity

Guidance and manufacturer's declaration – electromagnetic immunity			
The equipment is intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should ensure that it is used in such an environment.			
Immunity Test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2 GB/T 17626.2	±6 kV contact ±8 kV air ±8 kV contact ±15 kV air	[Edition 2 and 3] ±6 kV contact ±8 kV air [Edition 4] ±8 kV contact ±15 kV air	Floors should be wood, concrete, or ceramic tile If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4 GB/T 17626.4	±2 kV for power supply lines 5kHz and 100kHz rate ±1 kV for input/output lines 5kHz and 100kHz rate	[Edition 2 and 3] ±2 kV for power supply lines, 5kHz rate ±1 kV for input/output lines, 5kHz rate [Edition 4] ±2 kV for power supply lines, 100kHz rate ±1 kV for input/output lines, 100kHz rate	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5 GB/T 17626.5	±1 kV line-line ±2 kV line-earth	[Edition 2,3, and 4] ±1 kV line-line ±2 kV line-earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11 GB/T 17626.11	<5 % U_T for 0.5 cycle (>95 % dip in U_T) 40 % U_T for 5 cycles (60 % dip in U_T) 70 % U_T for 25 cycles (30 % dip in U_T)	Not applicable	Mains power quality should be that of a typical commercial or hospital environment. If the user of the equipment requires continued operation during power mains interruptions, it is recommended that the equipment be powered from an uninterruptible power supply or a battery.
	<5 % U_T for 5s (>95 % dip in U_T) 0%U_T, 5s	[Edition 2 and 3] <5 % U_T (>95 % dip in U_T) for 5 s [Edition 4] 0% U_T, 5 s	
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8 GB/T 17626.8	3 A/m 30 A/m	[Edition 2 and 3] 3 A/m [Edition 4] 30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Proximity Magnetic Fields	8A/m 30 kHz	Not applicable	

Table 5-8 Guidance and manufacture's declaration – electromagnetic immunity (Table continued)

Guidance and manufacturer's declaration – electromagnetic immunity			
The equipment is intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should ensure that it is used in such an environment.			
Immunity Test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
IEC61000-4-39	65A/m 134.2 kHz 7.5A/m 13.56 MHz	[Edition 4.1] 65A/m 134.2 kHz 7.5A/m 13.56 MHz	
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

Table 5-9 Guidance and manufacturer's declaration – electromagnetic immunity

Guidance and manufacturer's declaration – electromagnetic immunity			
The equipment is Intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should ensure that it is used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment - Guidance**
Conducted RF IEC 61000-4-6 GB/T 17626.6	3Vrms 150 kHz ~ 80 MHz 6Vrms ISM bands between 150 kHz and 80 MHz 80%AM at 1kHz	[Edition 2, 3, 4] 3Vrms 6Vrms ISM bands between 150 kHz and 80 MHz	Portable and mobile RF communications equipment should be used no closer to any part of the equipment, including cables, than the recommended separation distance calculated from the equation appropriate to the frequency of the transmitter **Recommended Separation Distance** $d = 1.2\sqrt{p}$
Radiated RF Fields IEC 61000-4-3 GB/T 17626.3	3V/m 80 MHz ~ 2.7GHz 80% AM 1kHz	[Edition 2, 3] 3V/m 80 MHz ~ 2.5 GHz 80% AM 1 kHz [Edition 4] 3 V/m 80 MHz ~ 2.7 GHz 80% AM 1 kHz	$d = 1.2\sqrt{p}$ 80 MHz ~ 800 MHz $d = 2.3\sqrt{p}$ 800 MHz ~ 2.7 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).

Table 5-9 Guidance and manufacturer's declaration – electromagnetic immunity (Table continued)

Guidance and manufacturer's declaration – electromagnetic immunity			
The equipment is Intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should ensure that it is used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment - Guidance**
Proximity fields from RF Wireless communications equipment IEC 61000-4-3	refer to Table 5-11 Immunity and recommended separation between RF wireless communication equipment on page 114	[Edition 4] refer to Table 5-11 Immunity and recommended separation between RF wireless communication equipment on page 114	Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE
At 80 MHz and 800 MHz, the higher frequency range (6. 765 MHz~6. 795 MHz, 13.553 MHz~ 13.567 MHz, 26. 957 MHz~27.283 MHz, 40.66 MHz~40.70 MHz) applies.

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

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

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

Table 5-10 Recommended separation distances between portable and mobile RF communications equipment and the Equipment

Recommended separation distances between portable and mobile RF communications equipment and the Equipment			
The equipment is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Equipment can help prevent electromagnetic Interference by maintaining a minimum distance between portable and mobile RF communIcations equipment (transmitters) and the Equipment as recommended below, according to the maximum output power of the communications equipment			
Rated maximum output power (P) of transmitter (W)	**Separation distance according to frequency of transmitter**		
	150 kHz ~ 80 MHz $d = 1.2\sqrt{p}$	**80 MHz ~ 800 MHz** $d = 1.2\sqrt{p}$	**800 MHz ~ 2.7 GHz** $d = 2.3\sqrt{p}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.74
1	1.2	1.2	2.3

Table 5-10 Recommended separation distances between portable and mobile RF communications equipment and the Equipment (Table continued)

Recommended separation distances between portable and mobile RF communications equipment and the Equipment			
The equipment is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Equipment can help prevent electromagnetic Interference by maintaining a minimum distance between portable and mobile RF communIcations equipment (transmitters) and the Equipment as recommended below, according to the maximum output power of the communications equipment			
Rated maximum output power (P) of transmitter (W)	**Separation distance according to frequency of transmitter**		
	150 kHz ~ 80 MHz $d = 1.2\sqrt{p}$	**80 MHz ~ 800 MHz** $d = 1.2\sqrt{p}$	**800 MHz ~ 2.7 GHz** $d = 2.3\sqrt{p}$
10	3.8	3.8	7.3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the separation distance can be estimated using the equation in the corresponding column, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. **NOTE** At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. **NOTE** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.			

⚠ WARNING

Portable RF communications equipment (including peripherals such as antenna cables and external antennas) at frequencies noted below should be used no closer than 30cm (12 inches) to any part of the Revolution CT system, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

Table 5-11 Immunity and recommended separation between RF wireless communication equipment

Immunity and recommended separation between RF wireless communication equipment for IEC60601-1-2 Edition 4				
Portable RF communications equipment (including peripherals such as antenna cables and external antennas) at frequencies noted below should be used no closer than 30cm (12 inches) to any part of the system, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result. **Minimum separation distances for higher IMMUNITY TEST LEVELS shall be calculated using the following equation:** $d = \left[\frac{6}{E}\right]\sqrt{P}$ **Where *P* is the maximum power in W, *d* is the minimum separation distance in m, and *E* is the IMMUNITY TEST LEVEL in V/m.**				
Test frequency (MHz)	**Band (MHz)**	**Service**	**Maximum Power (W)**	**IMMUNITY TEST LEVEL (V/m)**
385	380-390	TETRA 400	1.8	27
450	430-470	GMRS 460 FRS 460	2	28
710	704-787	LTE Band 13, 17	0.2	9
745				
780				
810	800-960	GSM 800/900 TETRA 800 IDEN 820 CDMA 850 LTE Band 5	2	28
870				
930				
1720	1700-1990	GSM 1800 CDMA 1900 GSM 1900 DECT LTE Band 1, 3, 4, 25 UMTS	2	28
1845				
1970				
2450	2400-2570	Bluetooth WLAN 802.11 b/g/n RFID 2450 LTE Band 7	2	28
5240	5100-5800	WLAN 802.11 a/n	0.2	9
5500				
5785				

Environment of Intended Use

This medical device is evaluated to the IEC60601-1-2 safety standard electromagnetic emissions and immunity levels in the Professional Healthcare Facility environment category. See sections in this manual for the electromagnetic disturbance compliance levels this product meets including a list of wireless communications services evaluated.

Examples of Environment of Intended Use

The CT System is exposed to EM sources generally from LAN and WLAN, mobile phones, paging systems, computers, printers, monitors, and other medical devices.

Environment Exclusions

This medical device is not suitable for use in certain hospital environments. Electrical devices that are brought into the CT System room that generate intense EM disturbances *have not* been considered per the safety standard. Also, the CT System compliance levels don't guarantee that other equipment in the room that is EM sensitive is not impacted. The IEC60601-1-2 safety standard requires additional testing and/or risk assessment for compliance and patient/operator safety of the CT system.

Examples of Excluded Environment

CT System is exposed to EM from High Frequency surgical equipment or short-wave therapy equipment.

Installation Requirements and Environmental Control

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.

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

⚠ WARNING

Use of accessories, transducers, and cables other than those specified may result in increased emissions or decreased immunity performance of the system and result in improper operation

⚠ WARNING

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

The Pre-installation Manual (PIM) contains recommended separation distances and information regarding compatibility with other equipment.

5.7 Scatter Radiation Measurements

[Reference IEC 60601-2-44]

A cylindrical PMMA phantom with a diameter of 32 cm and a length of 30 cm (for the 160 mm collimation measurements) or 25 cm (for the 80 mm collimation measurements) or 20 cm (for the 40 mm collimation measurements) is centered in the scan plane and scanned. Scatter radiation measurements are made for both the vertical and the horizontal planes which include the axis of rotation. The horizontal plane is 1.03 m above the floor.

The air kerma per 100 mAs (µGy / 100 mAs) is provided at 0.5 m intervals within each plane as follows:

The CT scan technique that results in the maximum scatter radiation per unit mAs is used for all measurements as follows:

- Tube voltage = 140 kV
- SFOV = Medium body

NOTE
Preference has been made towards the point plots grids provided below due to the accuracy they provide. Due to this fact, we will no longer supply contour radiation plots, which are inherently inaccurate and are manually created.

Figure 5-15 Typical scatter radiation in µGy per 100 mAs – horizontal plane 160 mm collimation

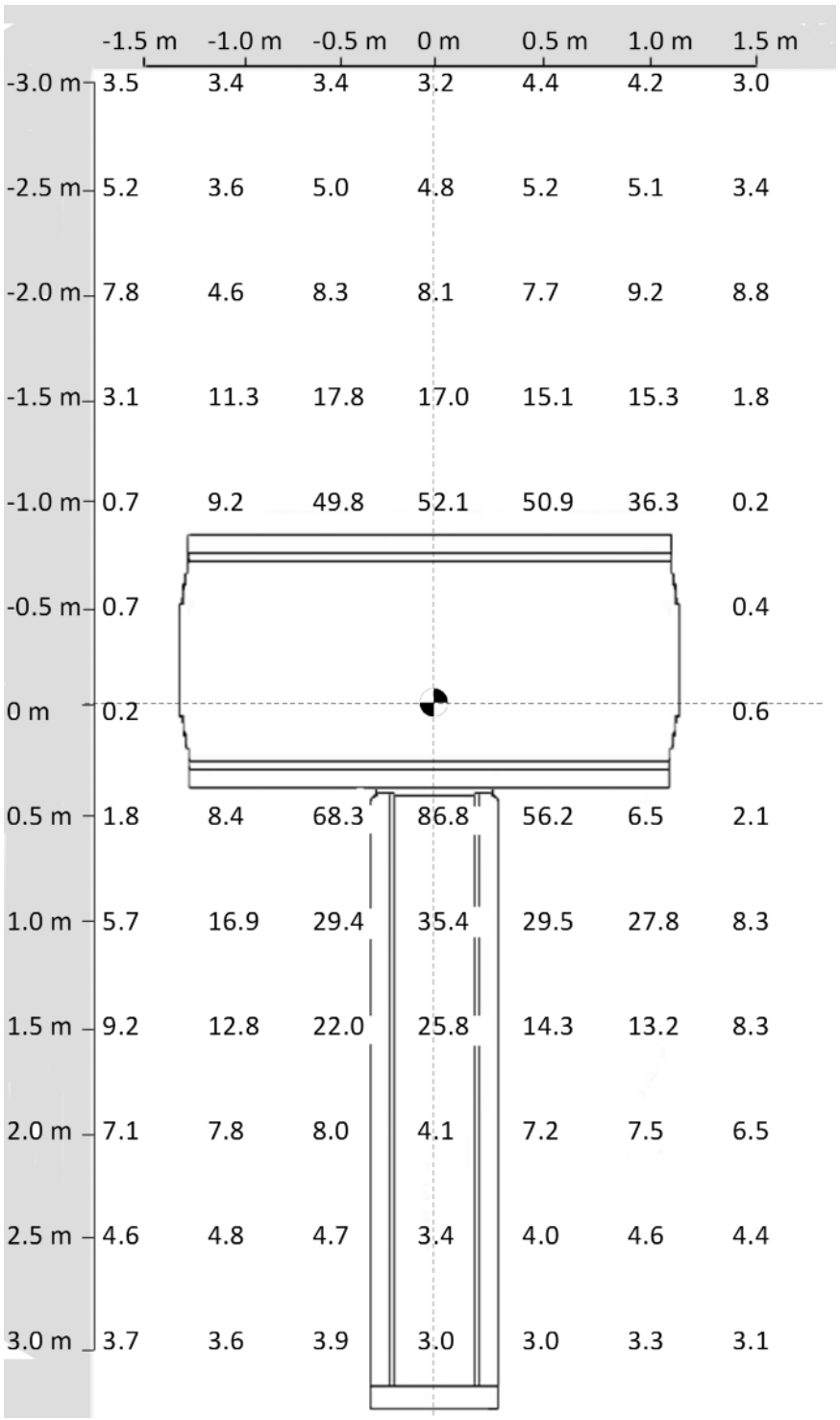


Figure 5-16 Typical scatter radiation in µGy per 100 mAs – vertical plane 160 mm collimation

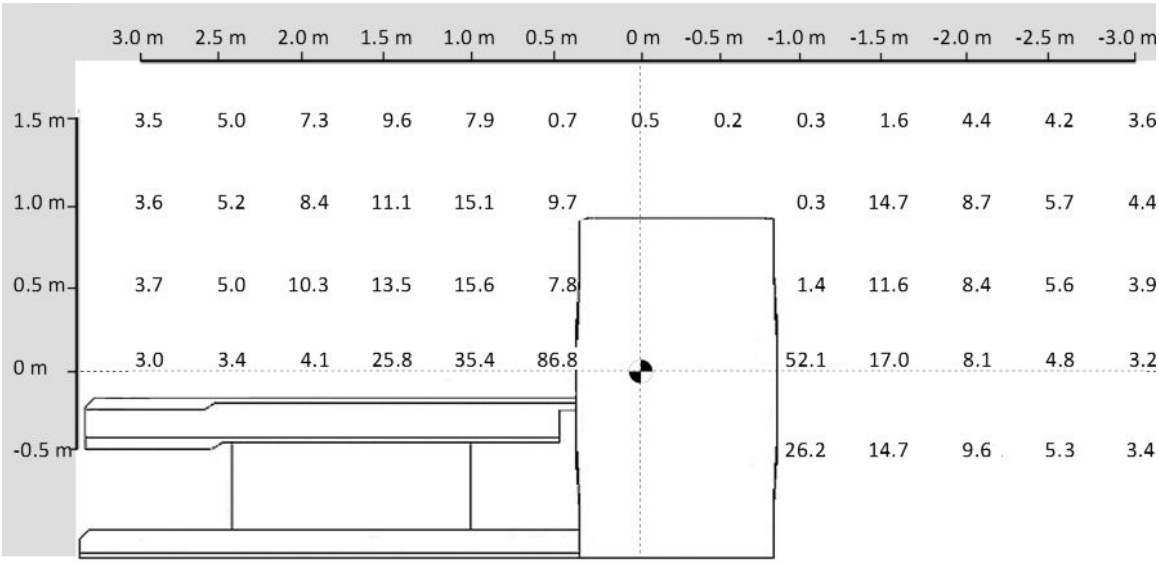


Figure 5-17 Typical scatter radiation in µGy per 100 mAs – horizontal plane 80 mm collimation

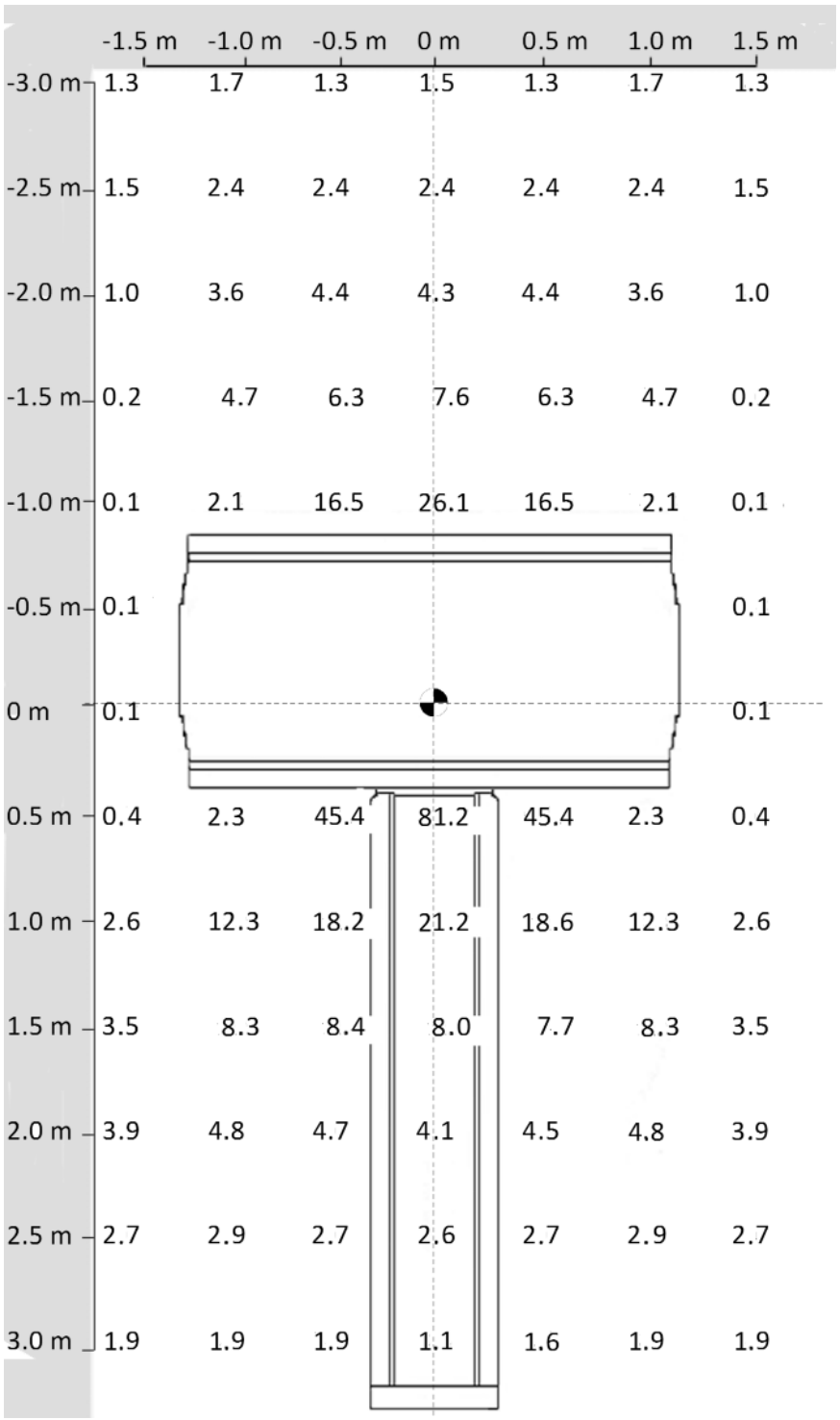


Figure 5-18 Typical scatter radiation in µGy per 100 mAs – vertical plane 80 mm collimation

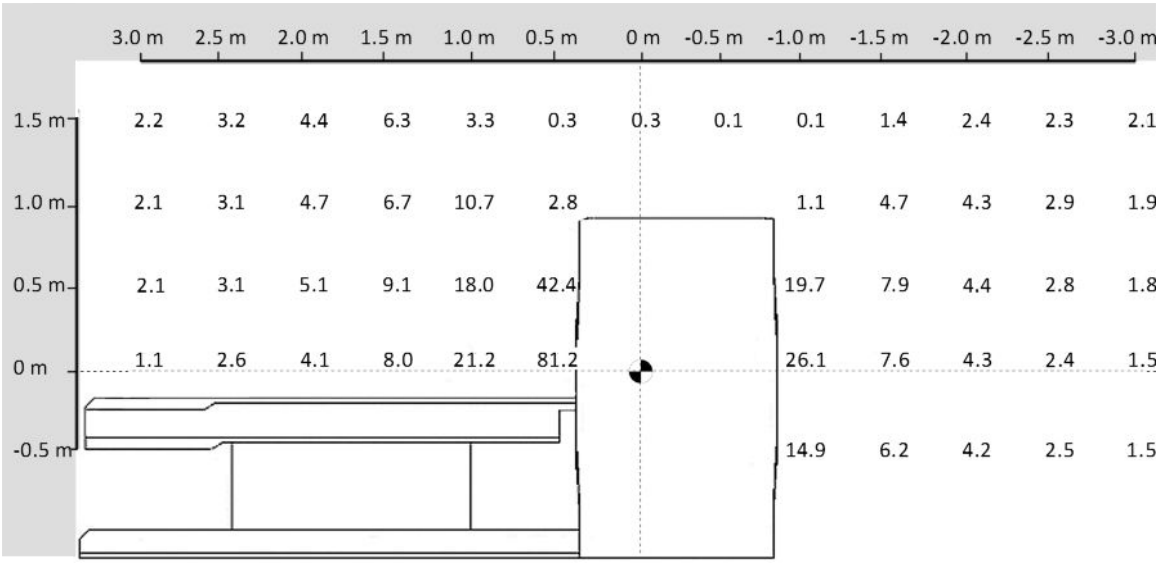


Figure 5-19 Typical scatter radiation in µGy per 100 mAs – horizontal plane 160 mm collimation with Apex or Apex Edition systems

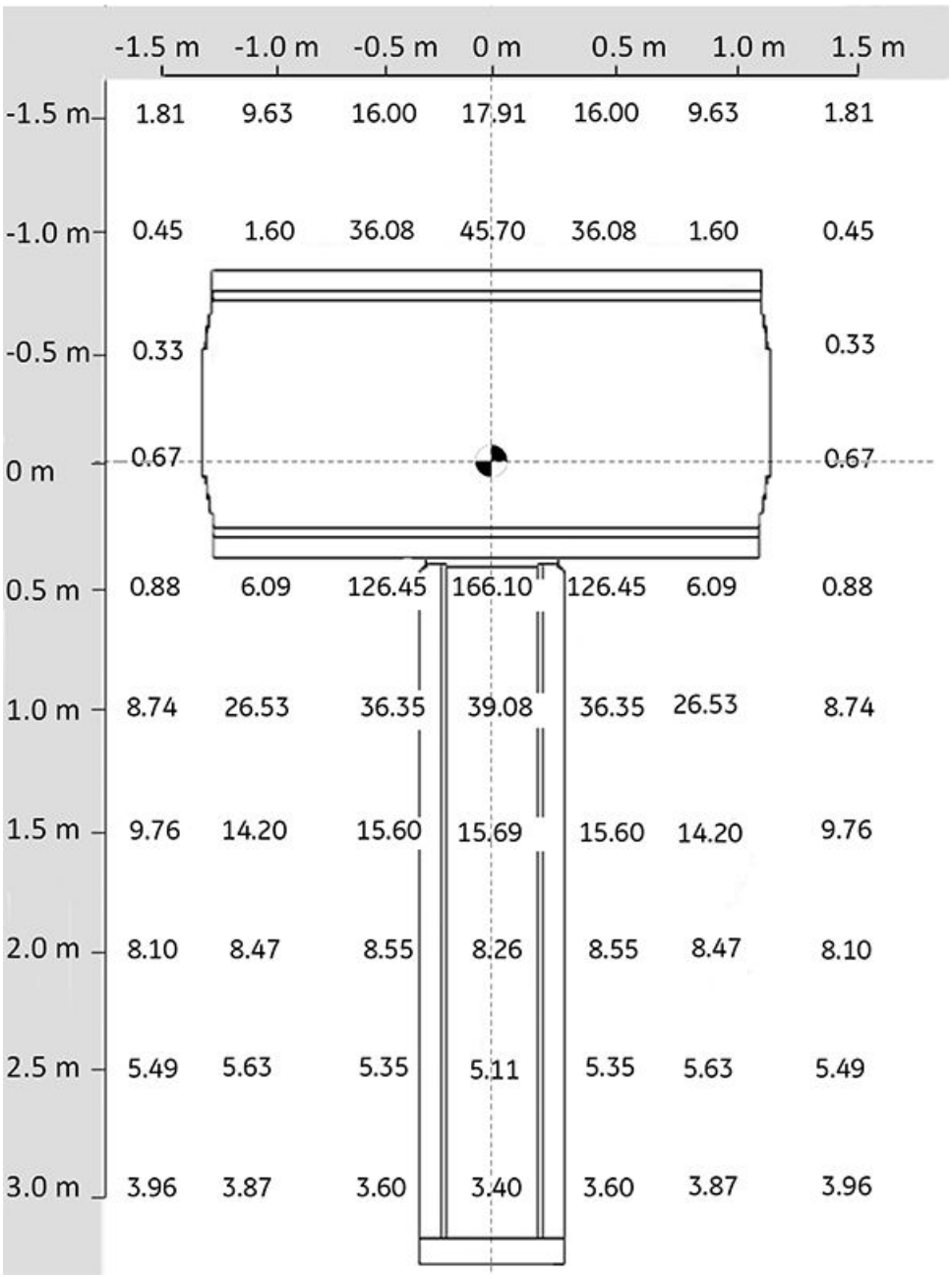


Figure 5-20 Typical scatter radiation in µGy per 100 mAs – vertical plane 160 mm collimation with Apex or Apex Edition systems

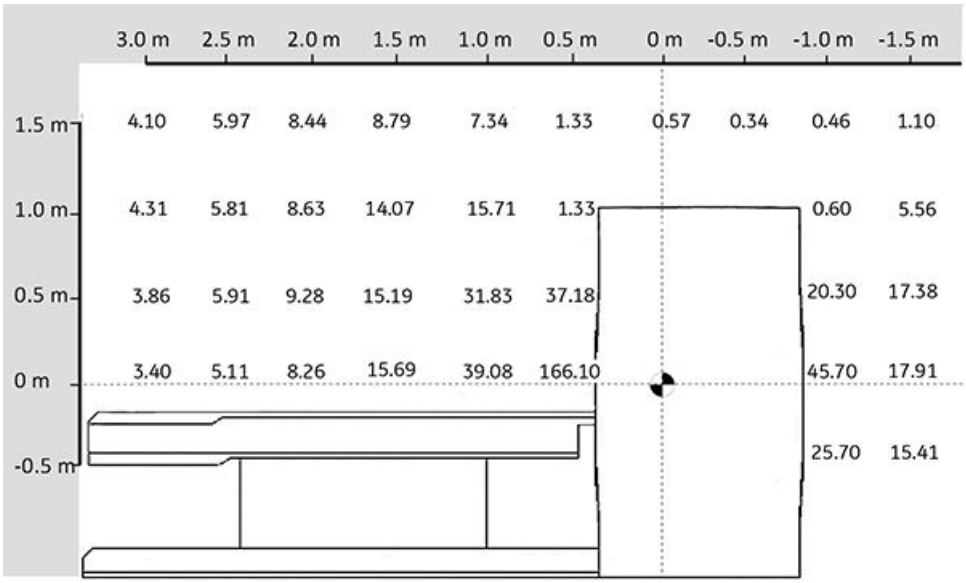


Figure 5-21 Typical scatter radiation in µGy per 100 mAs – vertical plane 80 mm collimation with Apex or Apex Edition systems

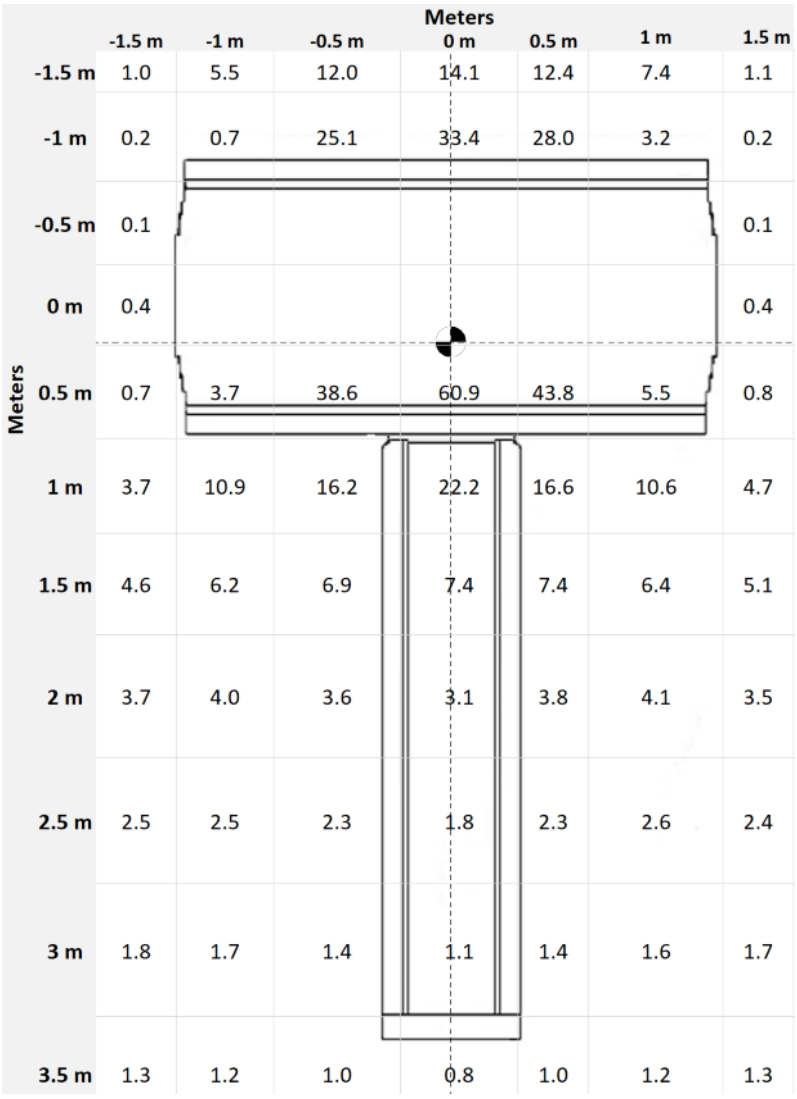
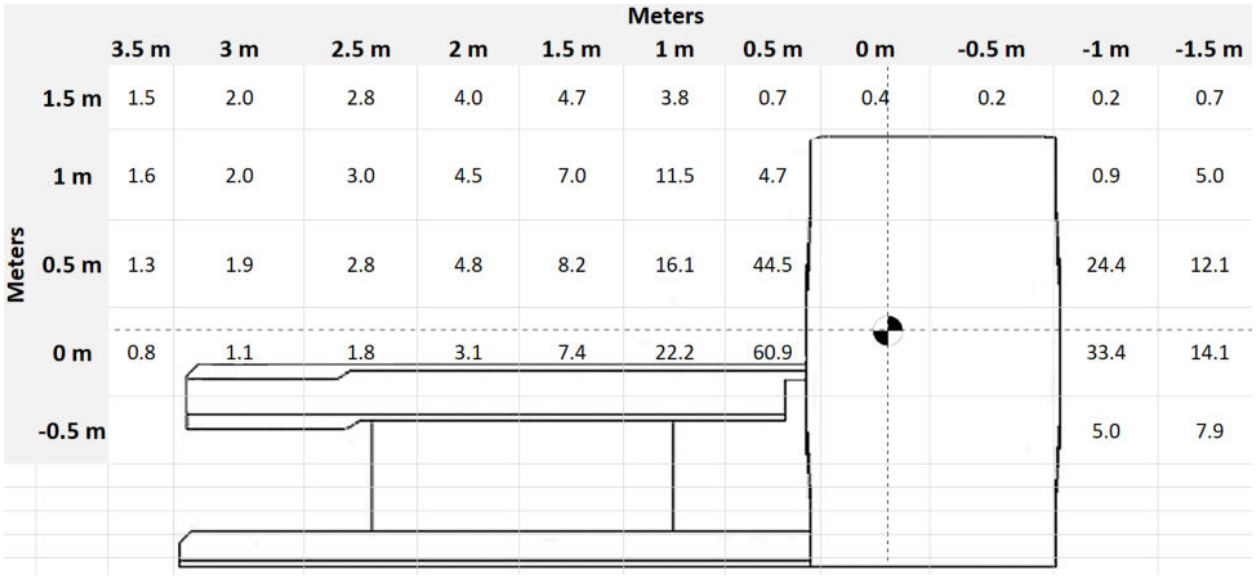
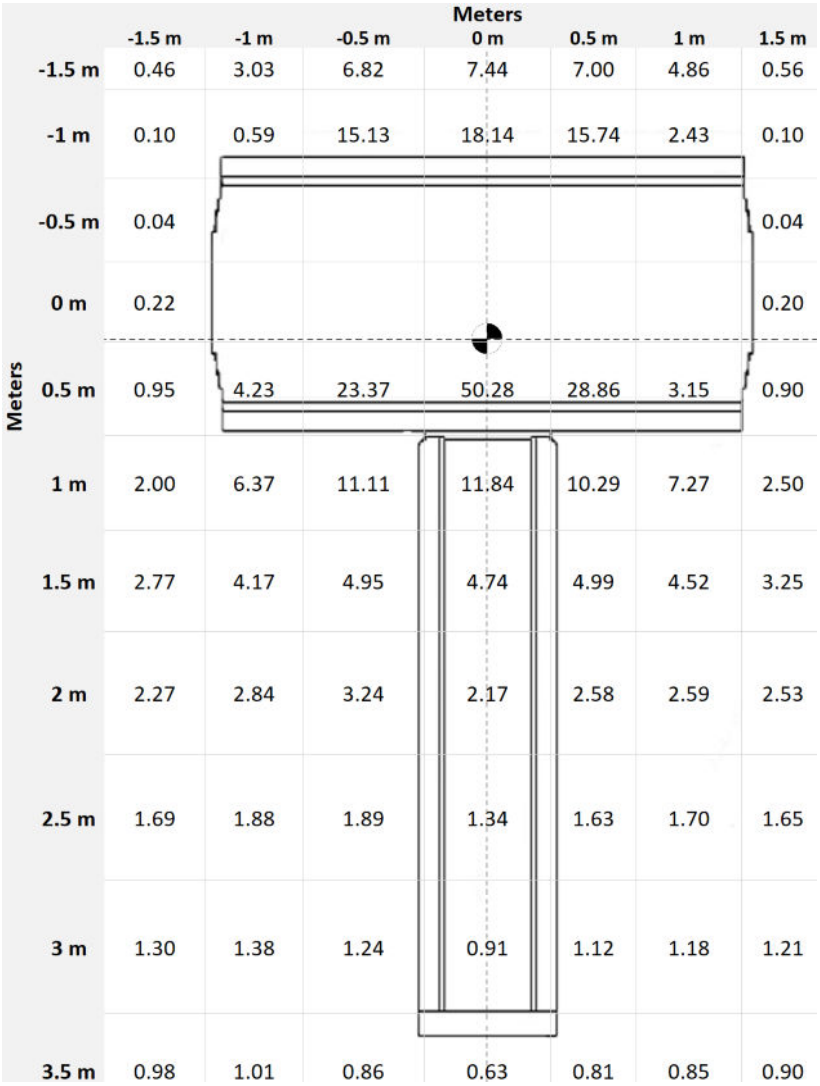


Figure 5-22 Typical scatter radiation in µGy per 100 mAs - horizontal plane 80 mm collimation with Apex or Apex Edition



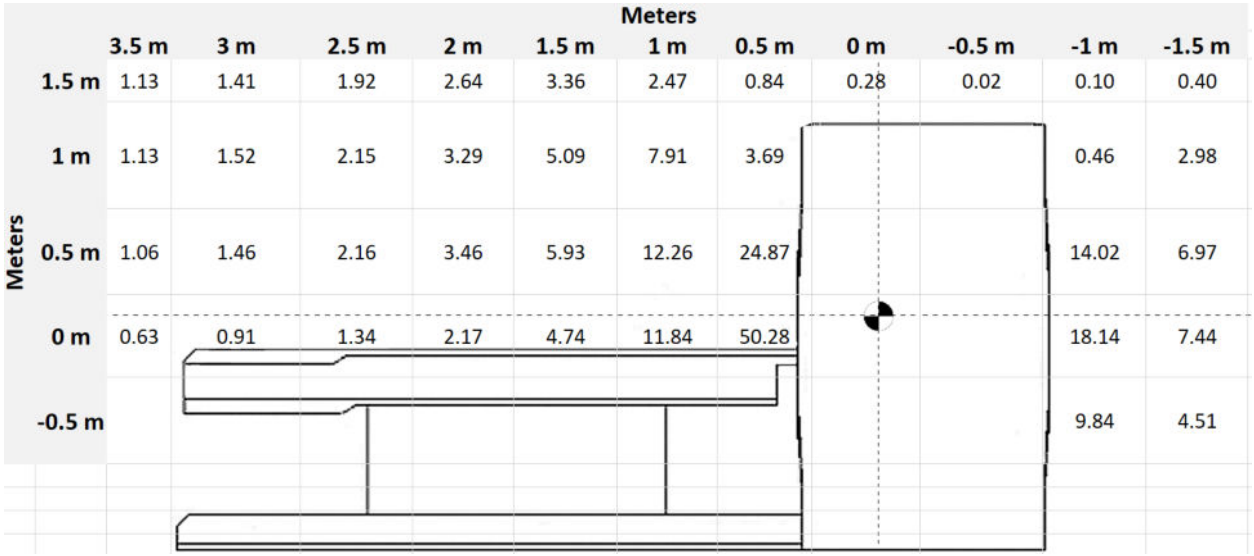
Horizontal Plane

Figure 5-23 Typical Stray Radiation in µGy per 100 mAs – Horizontal Plane 40 mm Collimation - Revolution Apex



Vertical Plane

Figure 5-24 Typical Stray Radiation in µGy per 100 mAs – Vertical Plane 40 mm Collimation - Revolution Apex

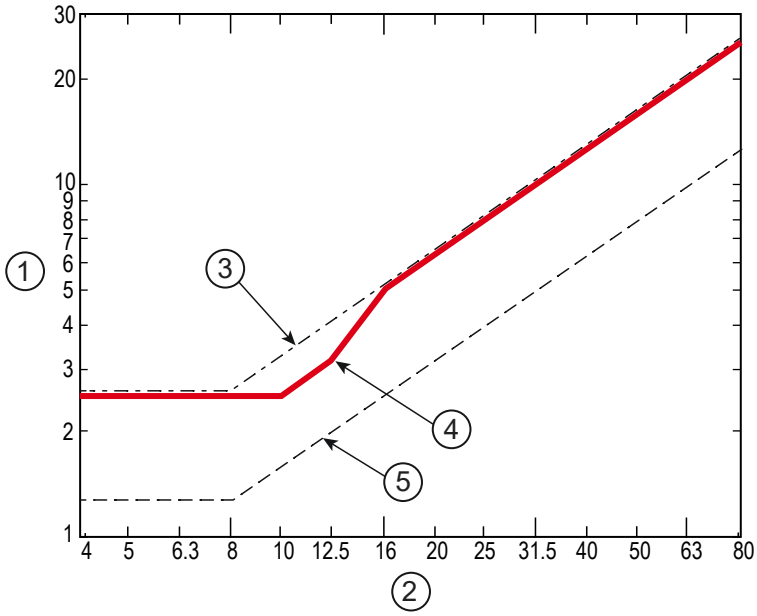


5.8 Vibration Isolation

Scanning Facility Vibration Isolation

The scanning facility shall be isolated from vibration such as hallway foot traffic, nearby rooms with exercise equipment or where exercise occurs, hospital power plants, pumps, motors, air handling equipment, air conditioning units, elevators, parking lots, roads, subways, trains, and heliports. Vibration will affect the image quality of the scanner. The degree of isolation shall be such that floor vibration given in Figure 5-25 Allowable floor vibration in acceleration units compared to ISO class A and B limits on page 128 and Figure 5-26 Allowable floor vibration in velocity units compared to ISO class A and B limits on page 129 is not exceeded.

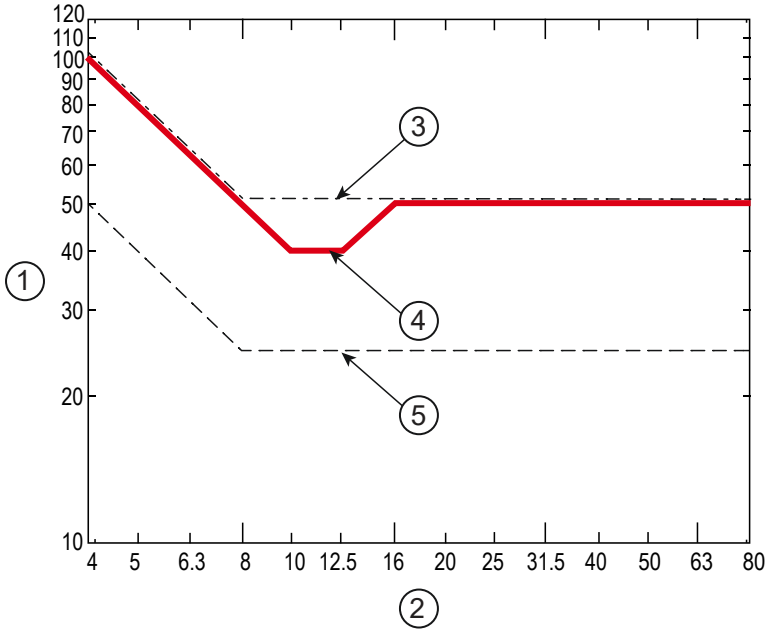
Figure 5-25 Allowable floor vibration in acceleration units compared to ISO class A and B limits



Item	Description	Item	Description
1	Acceleration [mm/s^2, rms]	4	CT Scanner/Table
2	One-Third-Octave Band Center Frequency [Hz]	5	VC-B (25 µm/s)
3	VC-A (50 µm/s)	-	-

Frequency [Hz]	Acceleration [mm/s^2, rms]
4	2.5
10	2.5
12.5	3.1
16	5
80	25

Figure 5-26 Allowable floor vibration in velocity units compared to ISO class A and B limits



Item	Description	Item	Description
1	Velocity [µm/s, rms]	4	CT Scanner/Table
2	One-Third-Octave Band Center Frequency [Hz]	5	VC-B (25 µm/s)
3	VC-A (50 µm/s)	-	-

Frequency [Hz]	Velocity [µm/s, rms]
4	100
10	40
12.5	40
16	50
80	50

5.9 Other Construction Considerations

- **Patient Viewing Window Dimensions** — The recommended patient viewing window is a minimum of 1219 mm wide x 1067 mm high (48 in x 42 in). Vertical placement of the window should allow the technician to have clear visibility of the patient while the scanner is in use.
- **Support Structure Installation**— Approved steelwork or equivalent support structure for mounting equipment to walls, ceilings, and floors shall be installed prior to the system installation.
- **Finished Walls**— The scan and control room walls shall be painted prior to the system installation. **Exception:** A primer coat of paint is acceptable for system installation. After the system is installed, any final coats of paint will require the system to be completely powered down and completely covered until the painted surfaces are dry. **Spray painting is not permitted**, as it can seriously damage CT system components.

System Options Construction Requirements

Confirm all options have been reviewed and final locations determined. Customer shall be responsible for installation of all power source connections and all control cables for all options prior to system delivery. Options purchased and installed during initial installation and options installed after installation may require power or data connections. Refer to Electrical Requirements on page 10.

System Noise Level

The maximum noise level produced by the system in the scan room is less than 70 dBA at one meter from any surface of the system.

All **Non GE HealthCare Installed Options** should be reviewed and final locations determined prior to system delivery. The customer shall be responsible for pre-installing all ceiling mounting plates/ pedestals before system installation begins.

6 Environmental Requirements (HVAC)

6.1 HVAC Requirements

Air quality

See IEC 60654-4 for air quality guidelines.

Construction Dust Concerns

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

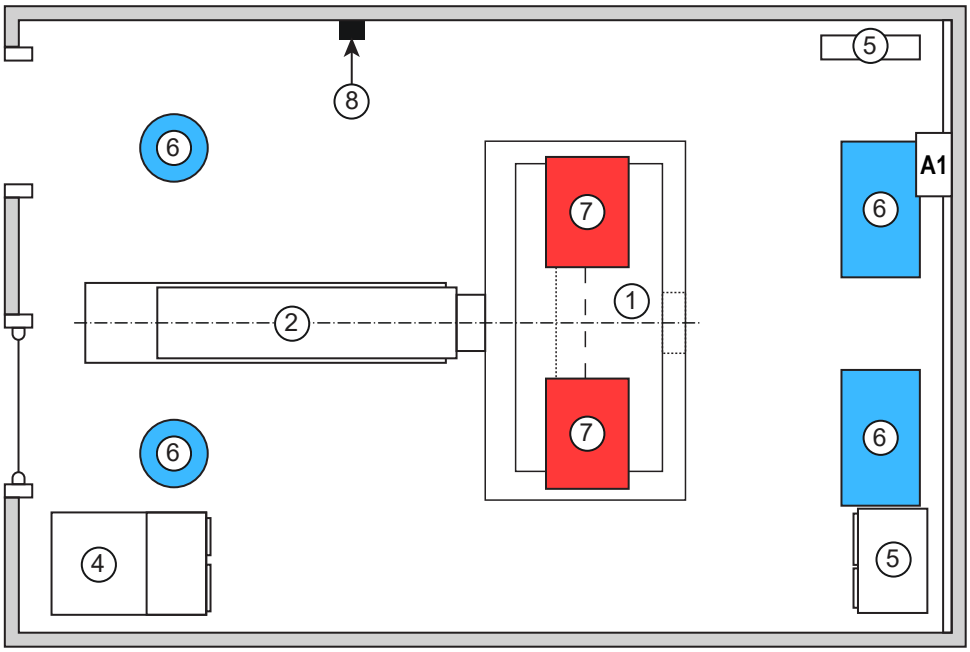
- Concrete dust
- Drywall dust
- Ceiling tile dust
- Sawdust or wood shavings
- Dust tracked into CT suite from adjoining rooms

Air-Handling System Initial Startup Considerations

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

- **Thermostats:** Refer to Figure 6-1 HVAC map for System Cabinet on page 132 for HVAC map.
  - The control room and scan room shall have separate HVAC thermostats.
  - Thermostats shall be within 2 m (6 ft) of gantry.
  - Thermostats shall be on opposite side of doors or wall openings.
  - Thermostats shall not be in the System Cabinet exhaust.
- **System Cabinet:** Intake air is pulled through the perforation at the top of the front door. Exhaust is pushed out upwards through the perforation at the top of the rear end of the cabinet 3.12 System Cabinet Dimensions on page 50. Refer to final working drawings approved by GE HealthCare Headquarters Architectural Planning for final system cabinet location.
  - Do not block upwards exhaust flow. System Cabinet cannot be placed under any wall mounted casework/furniture due to the airflow from the top of the System Cabinet.
  - Minimum 152.4 mm (6.0 in) spacing in the front.

Figure 6-1 HVAC map for System Cabinet



Item	Description	Item	Description
A1	Main disconnect panel (MDP)	5	Partial UPS (if equipped)
1	Gantry	6	Cold air in
2	Patient Table	7	Warm air out
3	PDU	8	Thermostat
4	System Cabinet	-	-

Chemical Contamination Concerns

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

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

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

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

Altitude operating range along with climate limits

Temperature and Humidity

Ensure the site provides an HVAC system capable of maintaining the temperature and humidity requirements as specified here. The environmental conditions at the site shall be maintained at all times (including overnight, weekends, and holidays). Environmental conditions apply to the table,

gantry, power distribution unit, system cabinet and scanner desktop. Consider patient comfort needs when designing or modifying/designing the HVAC system for the scan suite. Avoid placing any ducts that are blowing air into the exam room that would make the patient uncomfortable.

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

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

Table 6-1 System temperature and humidity limits by acceptable altitude range

Altitude Range (relative sea level)	Ambient Temperature Range of Scan Room (expressed as minimum and maximum system temperature limits.)
-150 m to 1600 m (-492 ft to 5249 ft)	18-26°C (64-79°F)*
1600 m to 3000 m (5249 ft to 9843 ft)**	18-25°C (64-77°F)*
* Minimum and maximum limits must account for any cooling equipment cycle-control range, ensuring that the room temperatures are not exceeded during room thermal cycling. For example, if the HVAC is capable of ± 2°C control, then the limits would be 20°C to 24°C/23°C (depending on altitude) to maintain absolute limits.	
** The system may be installed at an altitude up, but not exceeding 3000 m (9843 ft) above sea level. System performance, image quality, reliability and safety cannot be guaranteed at altitudes above 3000 m. Maximum room temperature must not exceed 25°C (77°F) due to the altitude effects on system cooling.	
Recommended ambient room temperature for all altitudes.	22°C (72°F)
Minimum room temperature for all altitudes	18°C (64°F)
Humidity levels apply to both scan room and control room	
Minimum allowable non-condensing relative humidity:	30%
Maximum allowable non-condensing relative humidity:	70%

System Cooling Requirements

Table 6-2 System heat load* on page 133 details the heat load produced by the CT system and its various components. Use the BTU/Wattage ratings listed to determine the requirements of the HVAC system. See Chapter 3 for air flow details for components.

Table 6-2 System heat load*

* Does not include heat load from room lighting, non-CT equipment, personnel, and so on.

System Components	Maximum	Maximum
Gantry and patient table	27,150 BTU/Hr	7.95 kW
PDU	1,200 BTU/Hr	0.352 kW
Scanner Desktop (includes two monitors)	5,100 BTU/Hr	1.5 kW
System Cabinet	10,578 BTU/Hr	3.1 kW
UPS (B7864PZ) (UPS is standard equipment on Apex systems only.	5,100 BTU/Hr	1.5 kW

Table 6-2 System heat load* (Table continued)

System Components	Maximum	Maximum
The heat load of the equipment ***placed in the scan room*** will not exceed	46,070 BTU/Hr	13.5 kW
The heat load of the equipment ***placed in the control room*** will not exceed	5,100 BTU/Hr	1.5 kW
Average overall system demand in standby is approximately 11kW.		

7 Electrical Requirements

7.1 Power Requirements

Certified Electrical Contractor Statement

All electrical installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. In addition, electrical feeds into the Power Distribution Unit (PDU) shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE HealthCare personnel or by a person or persons trained by GE HealthCare for the purpose of installing, de-installing, moving, servicing, and maintaining the CT scanner.

In performing all electrical work on the system, GE HealthCare will use specially trained field engineers. All of GE HealthCare's electrical work on the system will comply with the requirements of the applicable electrical codes. The purchaser of GE HealthCare equipment shall only utilize qualified personnel (that is, GE HealthCare field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

Regulations

All electrical work shall comply with *NFPA 70*: Standard for Electrical Safety in the workplace or local codes, whichever is more restrictive.

Disconnects

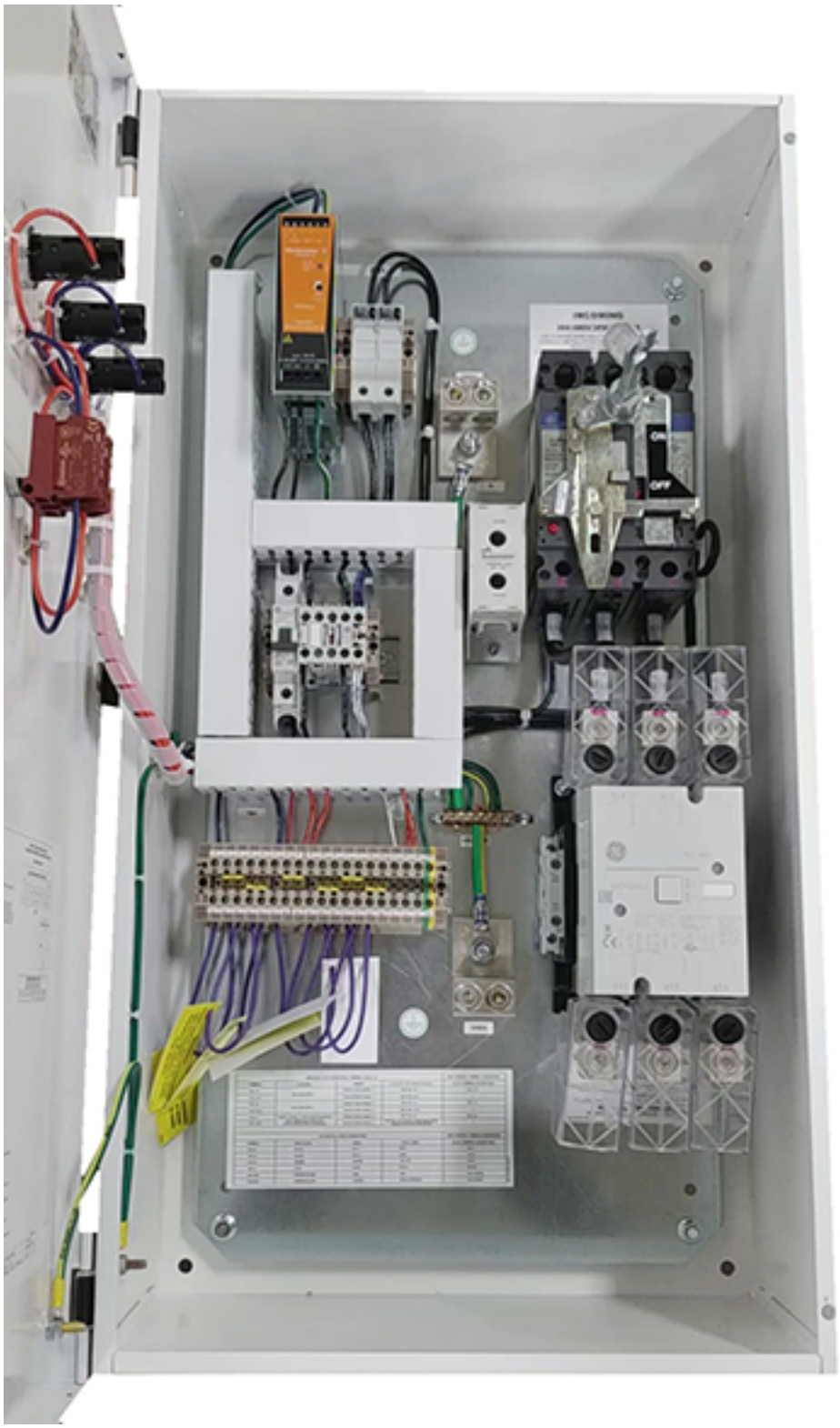
The customer shall provide a MDP (A1) mains disconnect that is capable of the meeting the following requirements to be able to isolate the CT system from facility mains for service.

- **Emergency Off Switch:** The MDP (A1) mains disconnect shall provide over-current protection for the entire system and shall have at least one Emergency OFF switch located in the path between the operator's location and the patient *(NEC 517.72b)*.

  NOTE
  When a system has the Partial UPS option, the MDP (A1) must provide a dedicated Emergency OFF circuit for the UPS control cable for approved connection.

- **Local Disconnects:** The MDP (A1) mains disconnect with lock-out and tag-out (LOTO) capability shall be installed within the scan suite *(IEC60601-1 3.1, OSHA Title 29 CFR, and The National Electrical Code NFPA 70)*.

Figure 7-1 Typical MDP (A1) panel



- **Neutral Wire (Neutral Wire Not Necessary):** If present, the neutral wire may be terminated at the MDP (A1) disconnect.

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

MDP	Max input MDP Cable size (from Switch-gear)	Max output MDP Cable size (to the PDU)
E4502BG (UL)	3/0 AWG	4/0 AWG
E45021BG (CE)	150 mm^2	95 mm^2 (limited by PDU terminal block ABB ZS-95)

- **Protective Disconnect Device:** The protective disconnect shall be located within 10 m (32 ft) of the PDU and be visible to personnel servicing the PDU.
- **Internal Disconnect:** PDU contain a circuit breaker to provide an internal disconnect to isolate all three (3) phases of the MDP (A1) Mains supply.

Electrical and Junction Boxes

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

Power Feed and Overcurrent Requirements

- **Power Feed:** The system shall operate on a three-phase electrical power supply input provided by the customer, in a 4-wire, grounded-wye configuration (three phase wires plus ground). Qualified personnel shall verify the power transformer and feeder lines (at the point of take-off) leading to the CT scanner, meet all requirements stated in this document.
- **Capacity:**
  - The recommended electrical power supply is 200 kVA momentary (peak power) for peak duration of 0.28 sec and <= 20 kVA average power.
  - This is the system power demand, a UPS will need to support for full system coverage if UPS is equipped. With limitation on future upgrade, the system may operate on a minimum electrical power supply of 150 kVA momentary (peak power) for peak duration of 0.28 sec and <= 20 kVA average power (consult with PMI for this exception).
  - The average power for battery hold-up time calculations is 20 kVA (this is worst-case short-term condition and not long-term average. For long term average, the maximum thermal load is specified in Electromagnetic Immunity).
  -

Power Supplied Capacity by System	
150 kVA is the maximum power supplied, will have a Power-Pro/PowerCore option and Partial UPS.	Revolution CT Revolution CT ES Revolution CT with Apex Edition Revolution CT ES with Apex Edition Revolution Apex Revolution Apex Elite Revolution CT Power Revolution Apex Plus Revolution Apex Select Revolution Apex Expert Revolution Vibe

Power Supplied Capacity by System	
200 kVA is REQUIRED to supply Power Xtream and Partial UPS	Revolution CT with Apex Edition Revolution CT ES with Apex Edition Revolution Apex Revolution Apex Elite Revolution Apex Plus Revolution Apex Select Revolution Apex Expert Revolution Apex Essential Revolution Vibe

- **Frequency** Range: 50 Hz or 60 Hz, +/- 3 Hz
- **Average power demand at maximum duty cycle:** Equals: 11 kVA.
- **Maximum power demand:** 200kVA at 0.85 Power factor (PF) is recommended. With limitation on future upgrade ability, the system may run at 150 kVA at 0.85 Power factor (PF) at a selected technique of 140 kV and 635 mA. (Please consult with Project Manager of Installation (PMI) for this exception.)
- **Under voltage release control:** The preferred disconnect, will utilize under voltage release control, rather than shunt trip devices.
- **Over-current protection:** to prevent power loss to other loads during an unexpected system fault, the power feeder shall have over-current protection such that the downstream over-current protection devices clear the fault before an upstream over-current protection device opens.
- **Voltage regulation effects:** to minimize, keep power wiring between the facility main distribution panel and the PDU as short as possible.
- **Load regulation:** measured at PDU input terminals, shall not exceed 6%.

Total source voltage tolerance

- **Voltage:** Voltage range: 380 to 480 VAC

When combining the daily voltage variation and source regulation under full load, the maximum allowable input voltage is +10% –13% of nominal at the PDU input.

Phase imbalance

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

Sags, surges, and transients

Sags and surges of the power line shall not exceed the absolute range limits show here.

Table 7-1 Nominal line voltage and current ranges

Nominal line voltage MUST fall within ONE of these ranges.							
Nominal Line Voltage (VAC RMS)	200 kVA (recommended)*	380	400	420	440	460	480
	150 kVA	380	400	420	440	460	480
Hi-Line Limit, +10% over 24 hours period (VAC RMS)	200 kVA (recommended)*	418	440	462	484	506	528
	150 kVA	418	440	462	484	506	528
Lo-Line Limit, -10% over 24 hours period (VAC RMS)	200 kVA (recommended)*	342	360	378	396	414	432

Table 7-1 Nominal line voltage and current ranges (Table continued)

Nominal line voltage MUST fall within ONE of these ranges.							
	150 kVA	342	360	378	396	414	432
Continuous Line Current (A)	200 kVA (recommended)*	38	36	34	33	31	30
	150 kVA	38	36	34	33	31	30
Momentary Line Current (A)**	200 kVA (recommended)*	304	289	275	262	251	241
	150 kVA	228	217	206	197	188	180
Maximum Line Current (A)	200 kVA (recommended)*	334	318	302	289	276	265
	150 kVA	253	241	229	219	209	200
Minimum Recommended Circuit Protection Rating (Amps RMS)	200 kVA (recommended)*	200	200	200	175	175	175
	150 kVA	150	150	150	125	125	125
**200 kVA is REQUIRED for all Revolution Apex, Revolution with Apex edition or Apex Select for full capacity.*							
**Momentary Rating is a rating based on an operating interval that does not exceed 5 seconds. *(NEC 660.2)*							

Transient Voltage maximum is 1500 V peak.

Dedicated distribution transformer

NOTICE

Dedicated Distribution Transformer recommended below is **NOT APPLICABLE** to 200kVA systems.

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

The minimum recommended size for a dedicated distribution transformer is: 225 kVA, rated 2.4% regulation at unity power factor. Resultant maximum allowable feeder regulation is 3.6%.

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

System power requirements

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

System		**150 kVA**	**200 kVA**
Revolution CT Revolution CT ES Revolution with Apex Edition Revolution Apex Revolution Apex Select Revolution Apex Expert Revolution Vibe	Average Power	20 kVA	20 kVA
	rms Power	30 kVA	40 kVA
	Peak Power	150 kVA	200 kVA
	Maximum Power Demand @ 0.85 PF	At a selected technique of 140 kV, 720 mA	At a selected technique of 80 kV, 1300 mA
Revolution Apex Essential	Average Power	n/a	20 kVA
	rms Power	n/a	40 kVA

System		150 kVA	200 kVA
	Peak Power	n/a	200 kVA
	Maximum Power Demand @ 0.85 PF	n/a	At a selected technique of 80 kV, 1300 mA
Revolution CT Power Revolution Apex Elite Revolution Apex Plus	Average Power	20 kVA	n/a
	rms Power	30 kVA	n/a
	Peak Power	150 kVA	n/a
	Maximum Power Demand @ 0.85 PF	At a selected technique of 140 kV, 720 mA	n/a

System	System Power	
		150kVA
Revolution CT Revolution CT ES	Average Power	20 kVA
with Power Pro option 150kVA		
Revolution CT with Apex Edition Revolution CT ES with Apex Edition Revolution Apex Revolution Apex Elite Revolution CT Power Revolution Apex Plus Revolution Apex Select Revolution Apex Expert Revolution Vibe	rms Power	30 kVA
	Peak Power	150 kVA
	Maximum Power Demand @ 0.85 PF	At a selected technique of 140 kV, 720 mA
with Power Core option 150kVA		
Revolution CT with Apex Edition Revolution CT ES with Apex Edition Revolution Apex Revolution Apex Elite Revolution CT Power Revolution Apex Plus Revolution Apex Select Revolution Vibe	rms Power	38.63 kVA
	Peak Power	150 kVA
	Maximum Power Demand @ 0.85 PF	At a selected technique of 140 kV, 720 mA
with Power Xtream option 200kVA		
Revolution CT with Apex Edition Revolution CT ES with Apex Edition Revolution Apex Revolution Apex Elite Revolution CT Power Revolution Apex Plus	Average Power	20 kVA
	rms Power	40 kVA
	Peak Power	200 kVA

Revolution Apex Select Revolution Apex Expert Revolution Apex Essential Revolution Vibe	Maximum Power Demand @ 0.85 PF	At a selected technique of 80 kV, 1300 mA

- Maximum allowable total source regulation is 6%.

NOTE
In all cases the recommended ground wire is a 1/0 (50 mm^2) ground wire.

Table 7-2 Minimum sub-feeder wire size

Sub-feeder Length (MDP (A1) to PDU)	Minimum sub-feeder wire, AWG or MCM (sq. mm)					
	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
15 M (50 ft)	3/0 (95)	3/0 (95)	3/0 (95)	2/0 (70)	2/0 (70)	2/0 (70)

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

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

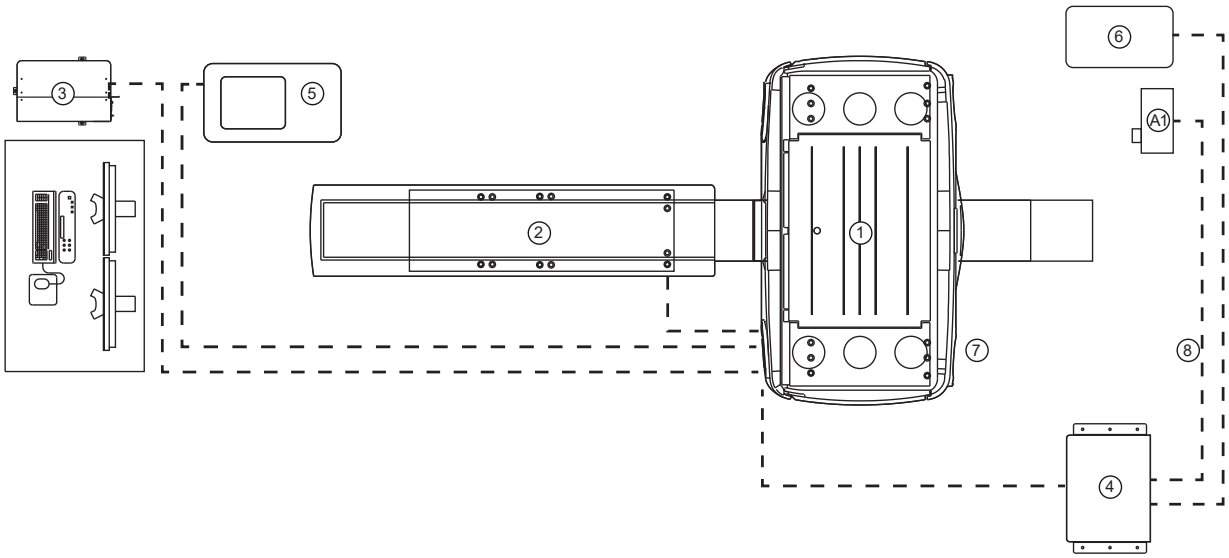
7.2 Grounding

The design of the scanner uses an equal potential grounding system. All components within the system are provided power on a common ground, so all the components are suitable for use in the patient environment. Three primary grounding points exist, they include:

- A system power ground point located in PDU.
- A reference ground point located between the gantry and the table base.
- A protective earth ground points located at the rear of the gantry for accessory use.

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

Figure 7-2 System Ground Map Revolution CT



Item	Description	Item	Description
A1	Main disconnect panel (MDP)	5	System Cabinet
1	Gantry	6	Partial UPS (if equipped)
2	Patient Table	7	Accessories/Options
3	Scanner Desktop/Computer	8	GND provided by customers
4	PDU	-	

Table 7-3 Ground Points

Ground Points	Description
Dedicated Ground	A dedicated 1/0 (50 mm^2), or larger, insulated copper ground wire shall be installed between the main distribution panel and PDU, in accordance with the NEC.
Grounding Power, MDP (A1), and PDU	All three-phase wires with ground running between the power source, the MDP (A1) Disconnect, and the PDU shall be installed in accordance to the NEC.
Maximum resistance between PDU and Facility Ground	The resistance between the PDU ground and the facility Earth ground shall not exceed 0.5 ohm.
Maximum resistance between PDU and Earth	The resistance between the PDU ground and Earth ground shall not exceed 2.0 ohms, or follow local grounding requirements whichever is more restrictive.

7.3 System Interconnection

Component interconnections

The customer and electrical contractor shall refer to the following system, network, and power interconnection requirements. Interconnect cables are not rated for underground/wet locations.

Table 7-4 Component designators

Designator	Applies to:	Source
MDP (A1)	Primary power disconnect	Contractor-supplied
CT1	Patient table	System
CT2	Gantry	System
DS	Door Interlock Switch	Contractor-supplied
OC1	Operator console (Scanner Desktop)/computer	System
PDU	Power Distribution Unit	System
SEO	System emergency off	Contractor-supplied
SDT	Scanner Desktop	System
WL / AD	X-ray ON warning light / Audible Device	Contractor-supplied

7.4 System Cabling

Cable specifications

Refer to **Pull Size** column in the table below for the conduit cable runs.

Table 7-5 Revolution Short-Length Cable

(B7919AE, 6259500-4) and (B7919VD, 6259520-6 Console IV only) — Supplied by GE HealthCare

Run #	Actual Length m (ft)	Useable Length m (ft)	Part Number	Description	UL Cable Information								Pull Size mm (in)
					UL Style	Flame Rating	Voltage Rating	Actual Voltage	Temp. Rating (C)	Dia. mm (in)	# of Cond.	Wire Size (AWG)	
050	9 (29.5)	8.5 (27.9)	6259506-2	HVDC, PDU to Gantry	2587	FT-4	600	± 350V DC	90	22 (0.866)	3	(2) 4 [(1) 8]	22 (0.87) Dia.
051	13 (42.7)	12.8 (42.0)	6259509-2	LVAC PDU to Sys Cab	2587	FT-4	600	120V/2 P	90	14 (0.542)	5	10	56 (2.22) Dia.
052	9 (29.5)	8.5 (27.9)	6259507–2	LVAC PDU to Gantry	2587	FT-4	600	120V/3 P	90	19 (0.751)	5	8	56 (2.22) Dia.
053	23 (75.5)	22.8 (74.8)	6259508–2	LVAC PDU to Console (Except Console IV)	2587	FT-4	600	120V	90	12 (0.483)	4	10	56 (2.22) Dia.
053	23 (75.5)	22.8 (74.8)	5855119-2	LVAC PDU to Console (Console IV only)	2517	VW-1	300	120V	105	9 (0.354)	3	12	30 (1.18) Dia.
054	13 (42.7)	11.5 (37.7)	6259510-6	Sys Cab to Ground Bar	1283	FT-1	600	0	105	12 (0.483)	1	2	12 (0.48) Dia.
055	9 (29.5)	7.5 (24.6)	6259510–2	PDU to Ground Bar	1284	FT-1	600	0	105	16 (0.608)	1	0 (1/0)	16 (0.62) Dia.

Table 7-5 Revolution Short-Length Cable (Table continued)

056	25 (82.0)	23.8 (78.1)	6259510-4	Console to Ground Bar	1283	FT-1	600	0	105	12 (0.467)	1	2	12 (0.48) Dia.
100	9 (29.5)	7.5 (24.6)	6259503–2	Gantry to PDU Control	CL2	FT-4	300	<30V DC	80	11 (0.440)	25	22	19 x 58 (0.75 x 2.30)
101	25 (82.0)	24 (78.7)	6259504–2	Gantry to Scan Control	N/A	FT-4	300	<30V DC	80	10 (0.394)	10 (8 Cu/2 FO)	24+28	35 x 35 (1.38 x 1.38)
102	25 (82.0)	24 (78.7)	6259501–2	Gantry to Console LAN	444	UL1581 /CM	300	<30V DC	75	6 (0.234)	8	24	15 (0.59) Dia.
103	23 (75.5)	21 (68.9)	6259501-4	Console to Sys Cab LAN	444	UL1581 /CM	300	<30V DC	75	6 (0.234)	8	24	15 (0.59) Dia.
104	13 (42.7)	12 (39.4)	6259505–2	Gantry to Sys Cab Quad Fiber	N/A	OFNR	N/A	N/A	80	5 (0.197)	12	N/A	15 (0.59) Dia.
105	23 (75.5)	22.5 (73.8)	6259511–2	Console to Sys Cab SDA Fiber	N/A	OFNR	N/A	N/A	80	5 (0.197)	2	N/A	15 (0.59) Dia.
106	23 (75.5)	22.5 (73.8)	6259511-4	Console to Sys Cab WCRS Fiber	N/A	OFNR	N/A	N/A	80	5 (0.197)	2	N/A	15 (0.59) Dia.

Table 7-6 Revolution Long-Length Cable, Optional

(B7919AF, 6259500-3) or (B7919VC, 6259520-5 Console IV only) — Supplied by GE HealthCare

Run #	Actual Length m (ft)	Useable Length m (ft)	Part Number	Description	UL Cable Information								Pull Size mm (in)
					UL Style	Flame Rating	Voltage Rating	Actual Voltage	Temp. Rating (C)	Dia. mm (in)	# of Cond.	Wire Size (AWG)	
050	20 (65.6)	19.5 (64)	6259506	HVDC PDU to Gantry	2587	FT-4	600	± 350V	90	22 (0.866)	3	4+8	22 (0.87) Dia.

Table 7-6 Revolution Long-Length Cable, Optional (Table continued)

Run #	Actual Length m (ft)	Useable Length m (ft)	Part Number	Description	UL Cable Information								Pull Size mm (in)
					UL Style	Flame Rating	Voltage Rating	Actual Voltage	Temp. Rating (C)	Dia. mm (in)	# of Cond.	Wire Size (AWG)	
051	26 (85.3)	25.8 (84.6)	6259509	LVAC PDU to Sys Cab	2587	FT-4	600	120V/2P	90	14 (0.542)	5	10	56 (2.22) Dia.
052	20 (65.6)	19.5 (64)	6259507	LVAC PDU to Gantry	2587	FT-4	600	120V/3P	90	19 (0.751)	5	8	56 (2.22) Dia.
053	27 (88.6)	26.8 (87.9)	6259508	LVAC PDU to Console (Except Console IV)	2587	FT-4	600	120V	90	12 (0.483)	4	10	56 (2.22) Dia.
053	27 (88.6)	26.8 (87.9)	5855119	LVAC PDU to Console (Console IV only)	2517	VW-1	300	120V	105	9 (0.354)	3	12	30 (1.18) Dia.
054	26 (85.3)	24.5 (80.4)	6259510-5	Sys Cab to Ground Bar	1283	FT-1	600	0	105	12 (0.483)	1	2	12 (0.48) Dia.
055	20 (65.6)	18.5 (60.7)	6259510	PDU to Ground Bar	1284	FT-1	600	0	105	16 (0.608)	1	0 (1/0)	16 (0.62) Dia.
056	28 (91.9)	26.8 (87.9)	6259510-3	Console to Ground Bar	1283	FT-1	600	0	105	12 (0.467)	1	2	12 (0.48) Dia.
100	20 (65.6)	18.5 (60.7)	6259503	Gantry to PDU Control	CL2	FT-4	300	<30V DC	80	11 (0.440)	25	22	19 x 58 (0.75 x 2.30)
101	28 (91.9)	27 (88.6)	6259504	Gantry to Scan Control	N/A	FT-4	300	<30V DC	80	10 (0.394)	10 (8 Cu/ 2 FO)	24+28	35 x 35 (1.38 x 1.38)

Table 7-6 Revolution Long-Length Cable, Optional (Table continued)

Run #	Actual Length m (ft)	Useable Length m (ft)	Part Number	Description	UL Cable Information								Pull Size mm (in)
					UL Style	Flame Rating	Voltage Rating	Actual Voltage	Temp. Rating (C)	Dia. mm (in)	# of Cond.	Wire Size (AWG)	
102	28 (91.9)	26 (85.3)	6259501	Gantry to Console LAN	444	UL1581/CM	300	<30V DC	75	6 (0.234)	8	24	15 (0.59) Dia.
103	27 (88.6)	25 (82)	6259501-3	Console to Sys Cab LAN	444	UL1581/CM	300	<30V DC	75	6 (0.234)	8	24	15 (0.59) Dia.
104	26 (85.3)	25 (82)	6259505	Gantry to Sys Cab Quad Fiber	N/A	OFNR	N/A	N/A	80	5 (0.197)	12	N/A	15 (0.59) Dia.
105	27 (88.6)	26.5 (86.9)	6259511	Console to Sys Cab SDA Fiber	N/A	OFNR	N/A	N/A	80	5 (0.197)	2	N/A	15 (0.59) Dia.
106	27 (88.6)	26.5 (86.9)	6259511-3	Console to Sys Cab WCRS Fiber	N/A	OFNR	N/A	N/A	80	5 (0.197)	2	N/A	15 (0.59) Dia.

Table 7-7 Revolution Injector Cable, Optional — Supplied by GE HealthCare

Actual Length m (ft)	Useable Length m (ft)	Part Number	Description	UL Cable Information								Pull Size mm (in)
				UL Style	Flame Rating	Voltage Rating	Actual Voltage	Temp. Rating (C)	Dia. mm (in)	# of Cond.	Wire Size (AWG)	
30.5 (100.1)	29 (95.1)	5169456	Injector to Gantry	2464	FT-4	300	< 30V	80°	7.0 (0.276)	4	22	19x44 (0.75x1.73)

Table 7-8 Revolution UPS Cables* — Supplied by GE HealthCare

Actual Length m (ft)	Useable Length m (ft)	Part Number	Description	UL Cable Information								Pull Size mm (in)
				UL Style	Flame Rating	Voltage Rating	Actual Voltage	Temp. Rating (C)	Dia. mm (in)	# of Cond.	Wire Size (AWG)	
6 (19.7)	5.2 (17)	5125079	LVAC PDU to UPS	2587	FT-4	600	120V/3P	90°	19 (0.751)	5	8	19 (0.75) Dia.
6 (19.7)	5.2 (17)	5125079–2	LVAC UPS to PDU	2587	FT-4	600	120V/3P	90°	19 (0.751)	5	8	19 (0.75) Dia.
14 (45.9)	13.2 (43.3)	5169224	UPS to MDP (A1) Control	2587	FT-1	600	< 30V	90°	11 (0.433)	6	18	11 (0.43) Dia.
35 (114.8)	33 (108.3)	6259501–5	Console to UPS LAN	21047	FT-4	600	< 30V	90°	7.0 (0.276)	8	24	19 (0.75) Dia.

Table 7-8 Revolution UPS Cables* — Supplied by GE HealthCare (Table continued)

Actual Length m (ft)	Useable Length m (ft)	Part Number	Description	UL Cable Information								Pull Size mm (in)
				UL Style	Flame Rating	Voltage Rating	Actual Voltage	Temp. Rating (C)	Dia. mm (in)	# of Cond.	Wire Size (AWG)	
*Standard on Revolution Apex and Revolution CT with Apex edition, optional on other configurations.												

NOTE

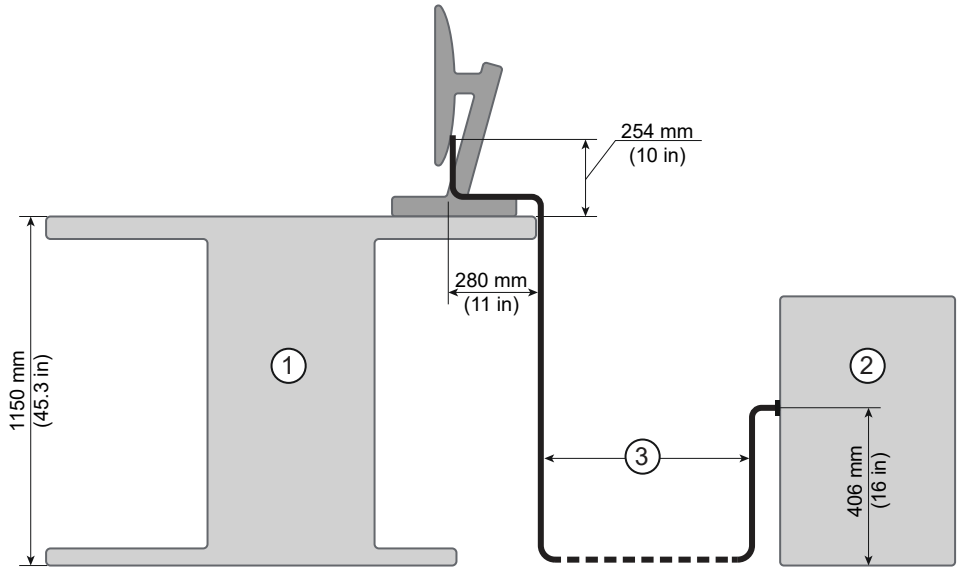
In order to avoid any violation of each National Regulation (NEC in USA, CCC in China, etc.), use of the compliant cable/wire is recommended. For China market, China end-user shall purchase the power supply cable that has the CCC mark.

Scanner desktop computer placement: Console cable usable length

The scanner desktop computer can be located some distance away from the operator station desktop - including the scanner room - subject to limitations of usable length by the scanner desktop peripheral cables, as well as usable cable lengths specified in *Revolution Short-Length Cable Table or Revolution Long Length Cable, Optional* tables for the system cabinet, PDU, etc. The scanner desktop monitor cables are normally the limiting factor since the keyboard and mouse cables are slightly longer. The Standard (short) peripheral cable set is limited in *total* length to 3 meters. An optional Long peripheral cable set is limited in *total* length to 5 meters. For performance reasons, the use of cable extensions beyond 5 meters is prohibited.

For the scanner desktop, a reference design example and table of usable length is provided in *Console CAble Usable Length Reference Design*. Usable cable length depends on many factors and can be adjusted from the reference design, although is generally limited by the monitor AC power and video cables. The keyboard and mouse cables are slightly longer than 3 or 5 meters, depending on the cable set option used.

Figure 7-3 Console Cable Usable Length Reference Design



Item	Description	Item	Description
1	Operator Console Desktop	3	Usable Length (3 m Cable Set) - 0.91 m (35.8 in) Usable Length (5 m Cable Set) - 2.91 m (114 in)
2	Scanner Desktop Computer	-	-

NOTE
The reference design shown above assumes cables are routed along the floor, with the monitors and adjustable desktop set to their maximum height (using the optional adjustable table).

Using the reference design provided above, during room layout the following factors should be considered when adjusting usable length:

- **Floor duct depth (if used):** Subtract 2X Depth from the usable length provided.
- **Conduit height off the floor (if used):** The reference design assumes the cables are run along the floor. If routed through a conduit in the wall instead, add either 1x or 2x the conduit height from the floor to the usable cable length, depending on cable run plan. If the conduit is below the floor, subtract in a similar manner for floor ducts.
- **Table height:** Adjust usable length based on chosen table type (always use maximum height if optional GE HealthCare-supplied adjustable table is chosen).
- **Wall clearances:** The reference design assumes zero wall clearance for both the table and computer. Subtract from usable length accordingly for all required clearances.
- **Scanner desktop computer orientation:** The reference design assumes a straight-in cable run. Subtract from usable length accordingly for side runs. Refer to **System Dimensions and Weight**.
- Monitor placement shown is assumed to be back as far as possible but can be moved forward along the table top, depending on user preference. Any movement of the monitors closer to the operator should be accounted for and subtracted from the usable length.

Customer supplied cable specifications

Table 7-9 Miscellaneous Electrical Cables — Supplied by Customer/Contractor

Customer Installed Wiring		Description	Cables Supplied			Plug Pulling Dimensions		Wire and Cable Pigtails ft (M)	
Qty	Size AWG (mm^2)		Part No	Length ft (M)	Dia. in (mm)	From	To	From	To
FROM PRIMARY POWER SOURCE TO FACILITY DISCONNECT (POWER SOURCE - MDP (A1))									
3		POWER	*					3 (1)	3 (1)
1	1/0 (50)	GROUND						3 (1)	3 (1)
FROM FACILITY DISCONNECT TO POWER DISTRIBUTION UNIT (MDP (A1) - PDU)									
3		POWER	*					3 (1)	3 (1)
1	1/0 (50)	GROUND						3 (1)	3 (1)
-	-	NEUTRAL - Not Required						3 (1)	3 (1)
FROM FACILITY DISCONNECT TO SYSTEM EMERGENCY OFF (MDP (A1) - SEO)									
2	14 (2)	Partial UPS EPO Circuit	*					6 (2)	6 (2)
2	14 (2)	Facility Disconnect EPO Circuit						6 (2)	6 (2)
1	14 (2)	GROUND						6 (2)	6 (2)
POWER DISTRIBUTION UNIT TO WARNING LIGHT / AUDIBLE DEVICE CONTROL (PDU - WL/AD)									
2	14 (2)	WARNING LIGHT / AUDIBLE DEVICE 24 VOLT	*						
		CONTROL TS6 1, 2, 3, 4, 5, 6, 7, 8							

Table 7-9 Miscellaneous Electrical Cables — Supplied by Customer/Contractor (Table continued)

Customer Installed Wiring		Description	Cables Supplied	Plug Pulling Dimensions	Wire and Cable Pigtails ft (M)
POWER DISTRIBUTION UNIT TO SCAN ROOM DOOR INTERLOCK (PDU - DOOR SWITCH)					
2	14 (2)	SCAN ROOM DOOR INTER LOCK TS6 9, 10	*		
* These are dependent on customer room size, position of components, conduit path.					

Cable routing requirements

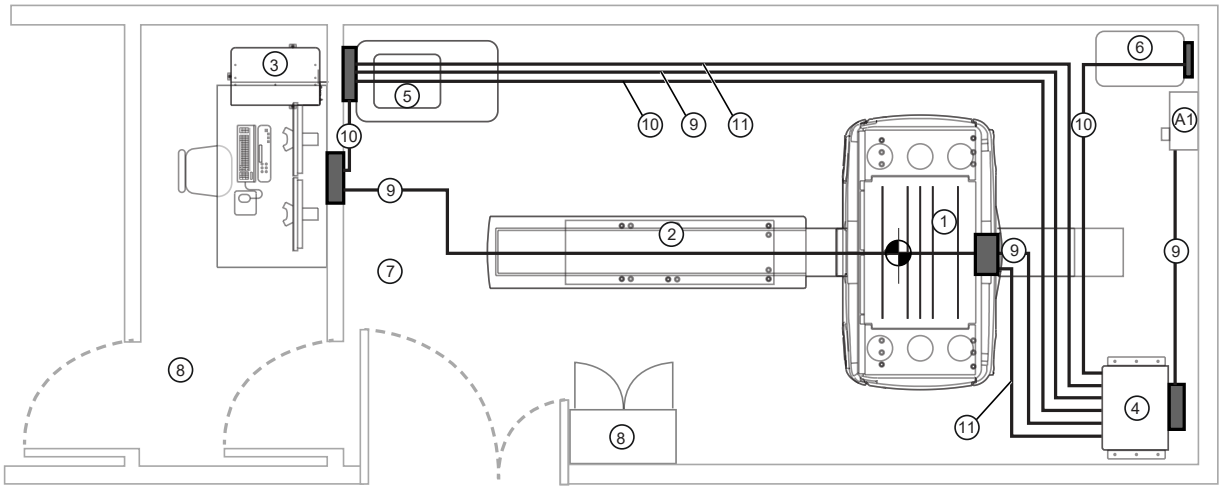
Install appropriate and properly sized conduits, duct work, and floor troughs for all system cables. Also refer to *Revolution Short-Length Cable Table or Revolution Long Length Cable, Optional* through Table 7-9 Miscellaneous Electrical Cables — Supplied by Customer/Contractor on page 152.

- When routing the power wiring, all three-phase wires and ground must run in the same conduit or raceway or duct.
- Route power wires separate from the system control and signal cables, using a separate conduit or trough in a raceway or duct.
- Use of metallic conduit, floor duct, or surface raceway for running cables, may be used depending upon local codes and practices.
- Ensure cable passageways are large enough to install additional cables with all other cables already installed. Do not use non-metallic conduit.
- Minimize additional junction boxes, use either a cable raceway or in floor ducting for routing all system cabling. The system uses prefabricated cables with large plugs.

Ducting requirements

Refer to Figure 7-4 Ducting Requirements on page 154 for the ducting requirements to run all the electrical cabling between the CT system components.

Figure 7-4 Ducting Requirements



Item	Description	Item	Description
A1	Main disconnect panel (MDP)	6	Partial UPS (if equipped)
1	Gantry	7	Scan Room
2	Patient Table	8	Control Room
3	Scanner Desktop/Computer	9	89.0 mm (3-½ in) Inside Diameter
4	PDU	10	64.0 mm (2-½ in) Inside Diameter
5	System Cabinet	11	Accommodate Up to 4 Gigabit Data Cables

Future Expansion: Ensure all cable passageways have additional capacity for future cable installations. Recommended to run pull lines with all runs.

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

Power and System Control Wire Separation: Power supply wires and system control lines shall be located in separate conduit or ductwork.

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

System Cabinet Cable Access: Incoming cables are routed through the notch at the rear bottom (same side as the top exhaust perforation, see System Cabinet Air Flow) of the cabinet first then come through the cable clamp port inside the System Cabinet. Recommend to plan the ductwork and conduit properly for these cables.

7.5 Scan Room Warning Light and Door Switch

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

X-Ray warning light

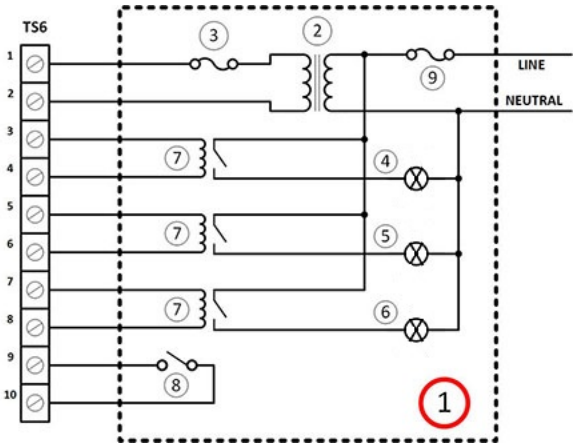
The terminal block 6 located in PDU is for x-ray warning light connection. See table below for details.

Table 7-10 PDU Terminal Strip 6 X-Ray Warning Light

Connection or Wall Box	Connection From	Connection to PDU 1
Warning Light/Audible Device	TLV Source -1	TS6 1
	LV Source -2	TS6 2
	X-Ray ON Light -1	TS6 3
	X-Ray ON Light -2	TS6 4
	Sys-ON Light -1	TS6 5
	Sys-ON Light -2	TS6 6
	Ready Light -1	TS6 7
	Ready Light -2	TS6 8

NOTE
All of the above TS6 terminal blocks are maximum wire gage: 10 mm2 (8 ga). Allowable power source is 24VAC with maximum current 6A.

Figure 7-5 Example: Externally powered warning light connection circuit



Item	Description	Item	Description
1	Customer provided	**6**	Ready Light
2	24v power supply	**7**	Isolation relays, 24v
3	Fuse (Max 6 Amp)	**8**	Door Interlock switch, 24VDC@10mA
4	X-Ray ON Light	**9**	Line Fuse, Customer sized
5	System ON Light		

Scan room door switch connections

The terminal block 6 located in PDU is also for scanner room door switch connection. See table below for details.

NOTE
The x-ray door interlock switch (supplied by the customer) working parameter is: 24VDC@10mA

Table 7-11 PDU Terminal Strip 6 Scan Room Door Switch

CONNECTION OR WALL BOX	CONNECTION FROM	CONNECTION TO PDU
Scan Room Door Switch	Door SW-1 Door SW-2	TS6 9 TS6 10

8 Communications Requirements

8.1 Network Requirements

1. The customer shall provide an active RJ45 network wall outlet within a minimum of 3.0 m (10.0 ft) of the scanner desktop computer.
2. Broadband interface type: 100 Mb to 1 Gb Ethernet connection.
3. The customer shall ensure a network broadband line is installed and active.
4. The customer shall provide a patch cable, not to exceed 3.0 m (10.0 ft), to connect the scanner desktop to a wall outlet. This includes a minimum of 305.0 mm (12.0 in) of slack to allow for movement of the cabinet.
5. The customer shall complete any cable duct work or conduit installation required for routing network cables to workstation, camera, and scanner desktop.
6. The customer shall ensure the communication run from the hospital/facility network switch to the RJ45 wall outlet does not exceed 88 m (290 ft).

Broadband Connectivity Information

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

The CT scanner is typically installed in a medical facility. The facility may or may not have dedicated in-house network IT support personnel for the facility. If there is a dedicated in-house network IT personnel, the customer and PMI should work with the GE HealthCare zone broadband specialists (if one exists) or the GE HealthCare field engineers to acquire the required broadband information to support the installation. Refer to Customer Pre-Installation Checklist on page 13 for details.

For smaller facilities and clinics, there may not have a dedicated in-house network IT personnel, the PMI should work with zone broadband specialist (if one exists) in advance to obtain the required broadband information and ensure that the needs for the broadband connection and connectivity have been met prior to the installation. Refer to the Customer Pre-Installation Checklist on page 13 for details.

- Customer shall contact PMI to obtain the name of a zone broadband specialist.
- **IT Infrastructure Changes**- Zone broadband specialist and PMI will work with customer to complete identified infrastructure changes.

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

9 System Connectivity Requirements

9.1 Edison HealthLink (EHL) Pre-Connectivity Checklist

Table 9-1 Checklist

Action Item	Action Item Completed?		Comments
	Yes	No	
Networking information required from site • Five (5) contiguous public IP addresses • Gateway server IP • Subnet (CIDR) to be used **NOTE** EHL has a default IP address 172.16.0.120. Adjustments may be needed if this causes conflict with customer network settings.			
Server must be placed in the same room with the CT console to allow a direct physical network connection.			
Server must be placed within six (6) feet of an open power outlet, and within ten (10) feet of an open network jack.			
Server must be installed on a flat, level surface, such as a shelf, table, or a wall-mount. **NOTE** The site is responsible for supplying this surface.			

Table 9-2 Specification of server requirements

Power	Two (2) wall standard power outlets within 1.8m (6 ft) of the server. Voltage 100 to 240 VAC, 50 to 60 Hz (115 V/220 V manual or auto-ranging). At least a 1500W circuit is recommended.
Cooling	2 x 800W: 6134 BTU/hr (at 120 VAC), 5196 (at 240 VAC) heat dissipation - front to rear air-flow
Humidity (non-condensing)	Storage: 5 to 95% RH
	Use: 8 to 90% RH
Temperature (at 20% RH)	Storage: -30 to 60° C (-22 to 140° F)
	Use: 10 to 35 C (50 to 95° F)
Altitude (AMSL)	Storage: 0 to 9,144 m (0 to 30,000 ft)

Table 9-2 Specification of server requirements (Table continued)

	Use: 0 to 3050 m (0 to 10,000 ft)
Dimensions	648 x 174 x 462.5 mm (25.51 x 6.85 x 18.21 inches) D x W x H
Weight	20.87 kg (46 lbs)
Rack	4U

Table 9-3 Specification of switch requirements

Power	One (1) wall standard power outlet within 1.8m (6 ft) of the switch. Voltage 100 to 240 VAC, 50 to 60 Hz (115 V/220 V manual or auto-ranging)
Cooling	15W: 51 BTU/hr
Humidity (non-condensing)	Storage: 5 to 95% RH
	Use: 8 to 90% RH
Temperature (at 20% RH)	Storage: -40 to 70° C (-40 to 158° F)
	Use: 0 to 40° C (32 to 104° F)
Altitude (AMSL)	Storage: 0 to 9,144 m (0 to 30,000 ft)
	Use: 0 to 5,000 m (0 to 16,404 ft)
Dimensions	173 x 439.9 x 43.9 mm (6.81 x 17.32 x 1.73 inches) D x W x H
Weight	2.2 kg (4.85 lb)
Rack	1U

9.2 Imaging Protocol Manager (IPM) Import/Export Criteria Checklist

Action Item	Action Item Completed?		Comments
	Yes	No	
Protocol must be created on the same product and system of CT scanner.			
Protocol must be created with the same version of software or earlier. Minor revision upgrades (Service Packs) may not affect compatibility.			
The scanner receiving the protocol must support the options used in the protocol.			
The CT scanner must be InSite with RSVP checked out and connected.			
The CT scanner must have sweeps enabled.			
The CT scanner must have a version of software that is IPM supported.			
Current Version Supported — must be affiliated with an organization. If not, an organization must be created.			
Current Version Supported — the protocols should be saved to a System State media.			
The organization where the CT Scanner is affiliated must have at least one Administrative User.			
The organization where the CT Scanner is affiliated must have at least one GE HealthCare Service User (optional).			

9.3 McAfee ePO-Managed Antivirus

For the McAfee ePO-Managed Antivirus option, setup is required at the Scanner Desktop during installation or if the ePO server information changes. IT Administration is responsible for providing the following information for ePO setup to connect the Scanner Desktop to the ePO server:

Action Item	Action Completed		Comments
ePO server IP address	Yes	No	
ePO Port no. (number)	Yes	No	
ePO Username	Yes	No	
ePO Password	Yes	No	

9.4 Remote Services Platform (RSvP) Connectivity

1. **Connectivity Information for RSvP Insite**
   For RSVP Insite, we ask customers to use Transport Layer Security (TLS) over TCP port 443. This is commonly known as an HTTPS (HTTP-Secure) connection. The data required from the customer will depend on their preferred connectivity. Either method is acceptable:

   - a Domain Name System (DNS) server IP addresses (preferred)
   - or, a Proxy server IP or Domain Name and Port

   Complete the *form DOC2272544* located in SIMS. The Field Engineer will use this information to configure the system. Below are the sections of this form designation on audience required to complete each section.

   - System Delivery Information *(Completed by GE HealthCare)*
   - Customer Contact Information *(Completed with Customer)*
   - Local Connectivity Data Sheet *(Completed with Customer)*
   - Remote Connectivity Data Sheet *(Completed with Customer)*

2. **Understanding the Customers Network**
   Perform the following to aid in working with the customer's IT/Network Administrator. These can be run from an existing system or have the administrator run them on their network:

   2.1. To check if a Domain Name System (DNS) server IP address is already setup on the existing system.

   2.1.1. Open a shell window

   2.1.2. Type `curl –v –k https://insite.gehealthcare.com` **[Return]**

   2.1.3. Successful connectivity is confirmed if the last line of the system response equals the following:

   ```
   <HTML><HEAD><TITLE>GE HealthCare Web Server</TITLE></
   HEAD><BODY><P><AHREF="http://gehealthcare.com/">GE HealthCare</
   A>Web Server</P></BODY></HTML>
   ```

   2.1.4. This result means that the system used a DNS Server and was able to connect to *insite.gehealthcare.com url*. Speak to the customer Network Administrator and confirm the DNS IP Address that should be used. **NO** more command line checks need to be run.

   2.2. To check if a Proxy server is available for connectivity.

   2.2.1. Open a shell window

   2.2.2. Type `curl –v –k https://198.169.189.25` **[Return]**

2.2.3. Successful connectivity is confirmed if the last line of the system response equals the following:

```
<HTML><HEAD><TITLE>GE HealthCare Web Server</TITLE></
HEAD><BODY><P><AHREF=”http://gehealthcare.com/”>GE HealthCare</
A>Web Server</P></BODY></HTML>
```

2.2.4. This result means that the system used a Proxy Server to connect to 198.169.189.25. A DNS server connection is still preferred, therefore first ask the customer Network Administrator for DNS information. If the customer prefers to use a Proxy Server use the Proxy information for connectivity.

2.3. Testing did not confirm connectivity to the internet using either command. Speak to the customer Network Administrator to complete the network information gathering checklists in the tables above.

10 Appendicies

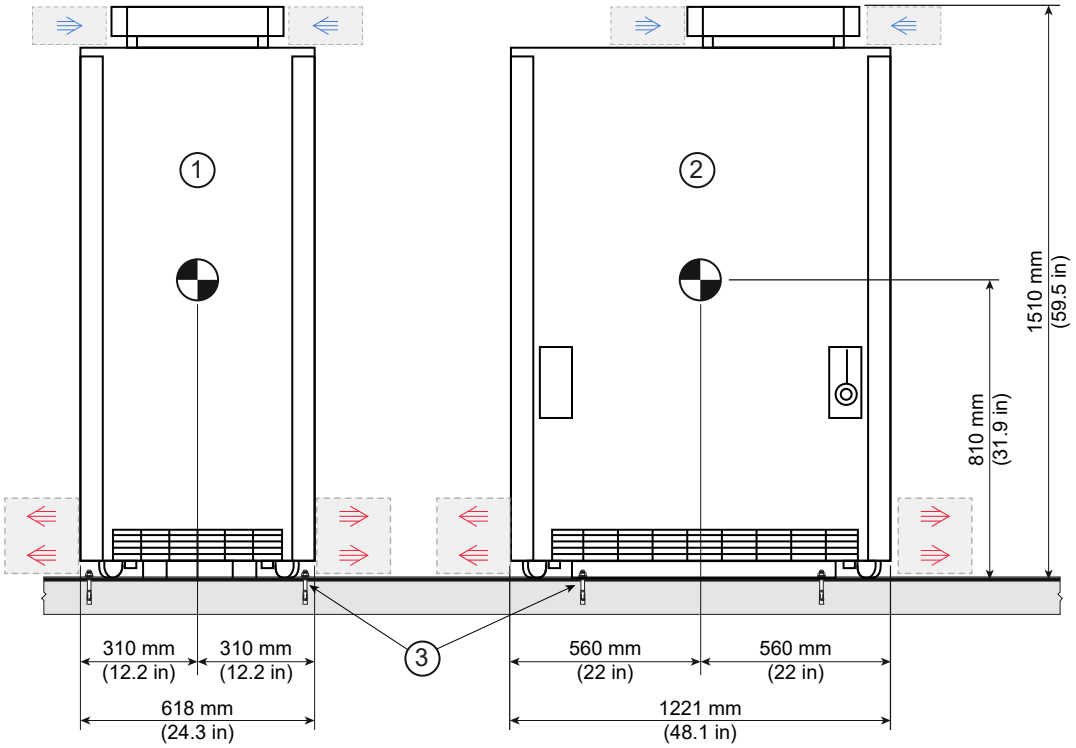
10.1 System Cabinet B7919AH

System Cabinet B7919AH was replaced by System Cabinet B7919DH in 2015. The information regarding System Cabinet B7919AH is included here.

System dimensions and weight

Figure 10-1 System Cabinet B7919AH Dimensions and Anchors Mounting Locations

System Cabinet B7919AH Weight: 318.3 kg (701 lb.) - Does not include optional seismic brackets of 4.5 kg (10.0 lbs).



Item	Description	Item	Description
1	Front View	3	Seismic Anchor Location
2	Side View	-	-

NOTE

Air Flow: Intake air pulled through chimney cover at the top of cabinet. Exhaust air pushed through side covers located at the bottom of cabinet.

The System Cabinet must be placed in the room at a location as far as possible away from the gantry. This cabinet exhausts hot air at its base. If the cabinet is too close to the gantry, the hot air will be sucked into the gantry inlets affecting the ability of the gantry to maintain its required operating temperature impacting image quality.

NOTE

If site specifications require seismic mounting, use the seismic brackets that shipped in the purchase option gantry and table seismic kit (B7919BS). GE HealthCare does not supply anchors with the seismic kit. It is the responsibility of the customers to have qualified structural engineers to determine and supply the correct seismic anchors.

System shipping dimensions and weight

Table 10-2 Shipping dimensions and weight

System Cabinet	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
System Cabinet (B7919AH) with shipping crate	1701.8 (67.0)	1219.2 (48.0)	1016.0 (40.0)	352.2 (775.8)

System Cabinet B7919AH configuration requirements

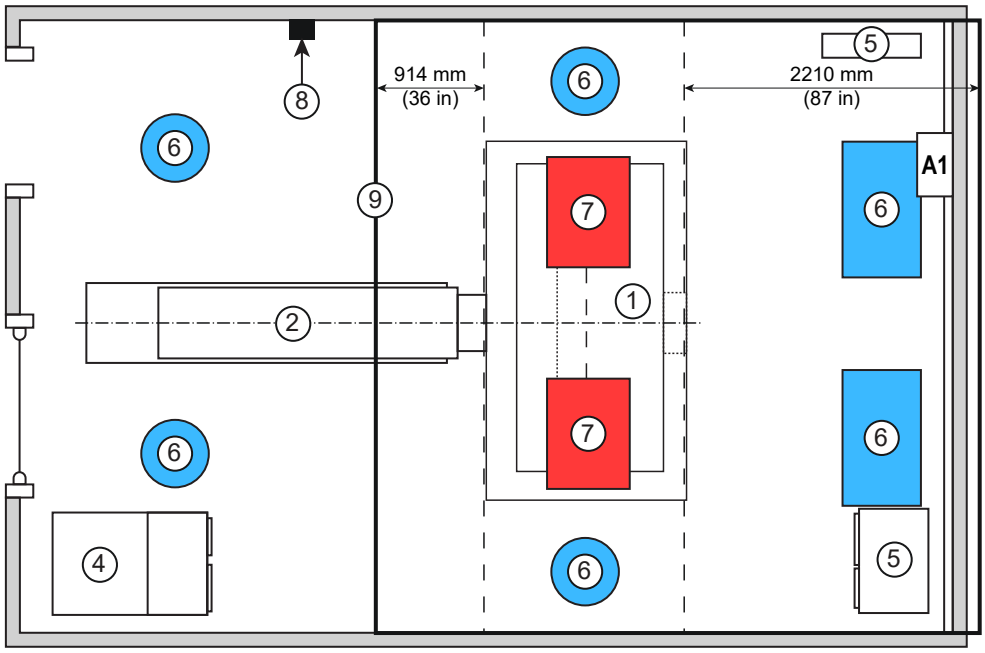
The system cabinet has to be at least 915.0 mm (36.0 in) in the front of the gantry on the table side or 2210.0 mm (87.0 in) behind the gantry, measured surface to surface as shown in figure below. This is due to the interaction of the system cabinet heat exhaust and the gantry cool air intake in combination with room air flow.

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

HVAC requirements

The system cabinet must not be located in the **No System Cabinet Zone** shown in the figure below. Refer to final working drawings approved by *GE HealthCare Headquarters Architectural Planning* for final system cabinet location.

Figure 10-2 HVAC Map For System Cabinet B7919AH



Item	Description	Item	Description
A1	Main disconnect panel (MDP)	5	Partial UPS (if equipped)
1	Gantry	6	Cold air in
2	Patient Table	7	Warm air out
3	PDU	8	Thermostat
4	System Cabinet	9	No System Cabinet Zone

System cooling requirements

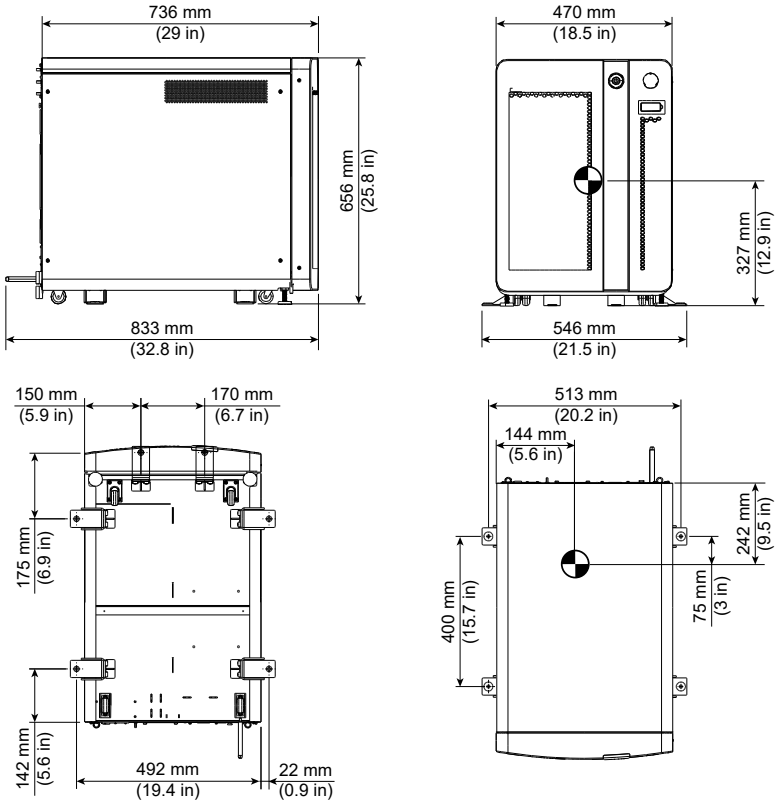
Table 10-3 System Heat Load

System Components	Maximum BTU/HR	Maximum Kilowatts
System Cabinet B7919AH	9,890	2.9 kW

10.2 Scanner Desktop Dimensions

Scanner Desktop I

Figure 10-3 Dimensions



Scanner Desktop I component dimensions

Scanner Desktop	Height mm (in)	Length mm (in)	Width/Depth mm (in)	Weight kg (lb)
24 in LCD monitor (2 monitors) (only)	528.0 (20.8)	566.8*2 (21.9*2)	227.6 (9.0)	10.8 (23.8) [21.6 (47.6)]
RSCB	N/A	460.0 (18.1)	270.0 (10.6)	N/A
Keyboard	N/A	460.0 (18.1)	160.0 (6.3)	N/A
Mouse	N/A	70.0 (2.8)	110.0 (4.3)	N/A
PMT tower	N/A	190.0 (7.5)	320.0 (12.6)	N/A
Operator workspace table (option)	700.0 (27.6) to 1150.0 (45.3)	1520.0 (60.0)	915.0 (36.0)	60.0 (132.2)

NOTE
Height can be manually adjusted. Not including any wall clearance requirements.

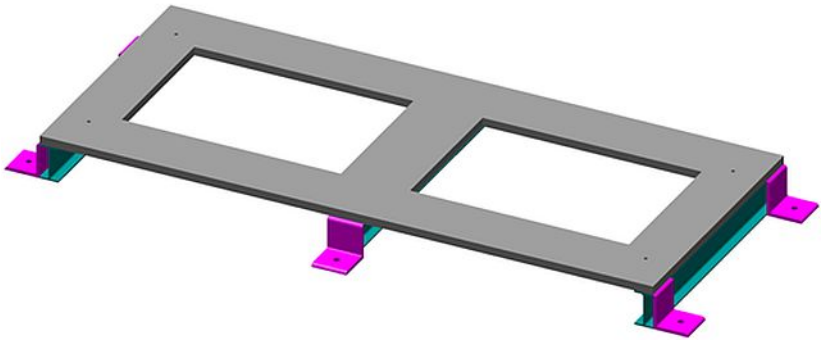
10.3 Install the Revolution CT Gantry on a Support Structure

The requirements of installing the Revolution CT gantry on a support structure is discussed in this section.

Overview

It is recommended to install the Revolution CT gantry on a concrete surface. In some sites it may be necessary to install the gantry on a raised platform. An example of a raised platform comprised of a 30.0 mm thick top plate and three 120.0 mm **I** beams as shown in Figure 10-4 Example of a Raised Platform on page 169. When using a raised platform (support structure), the platform must meet the below requirements. This will ensure the stiffness of the platform is high enough so that gantry vibration does not impact the image quality of the scanner.

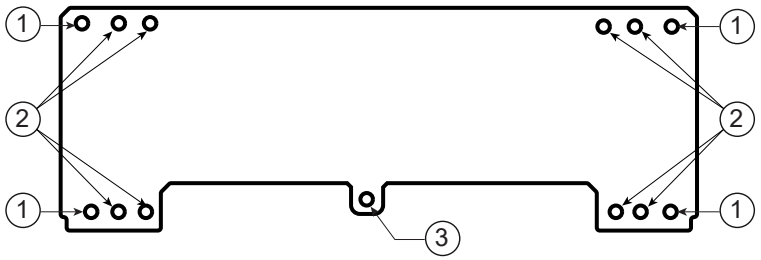
Figure 10-4 Example of a Raised Platform



Requirements for support structure (Platform)

1. Vertical deflection (Y direction) of the support platform at each of the 4 gantry anchors points, under a load of 1584 lbs, shall be ≤ 0.0065 inch (0.165 mm). Confirmation of this shall be checked via analysis as it cannot be practically measured.
2. When the Revolution CT gantry is mounted to a support structure, it must be anchored using the outer 4 anchors (additional inner anchors may be used if required by local building code). Refer to Figure 10-5 Gantry Anchor Definitions on page 170 for definition of **Outer** anchors.

Figure 10-5 Gantry Anchor Definitions



Item	Description
1	Primary Anchor Locations
2	Secondary Anchor Locations
3	Front Leveling Screw Location (for Gantry Leveling)

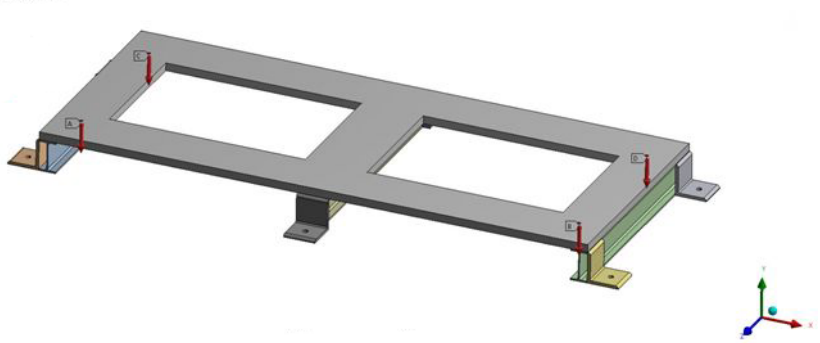
3. The platform structure shall provide capability of installing and leveling the gantry using the Front-Center foot pad (refer to Figure 10-5 Gantry Anchor Definitions on page 170). This floor pad does not require final anchoring, but the structure will need to support 50% of the gantry total weight on this front-center foot pad.
4. Legacy platform structures used under existing CT gantries need to be analyzed to show that they can meet the vertical defection requirement above for the Revolution CT gantry. Modifications shall be made to the structure if needed to increase the stiffness.
5. The support structure shall meet all the other gantry requirements in this document including flatness.
6. Support structures shall not be used for seismic installations.

Example support structure analysis

The example in Figure 10-6 Structure with gantry loads applies at outer anchors in Y direction on page 170 and Figure 10-7 Bottom View of structure showing how it is restrained to the floor in the model on page 171 shows a linear static finite element analysis for the general support structure which was shown in Figure 10-4 Example of a Raised Platform on page 169. In this analysis all material was steel. Total weight of this support structure, without gantry, is 682.0 lbs.

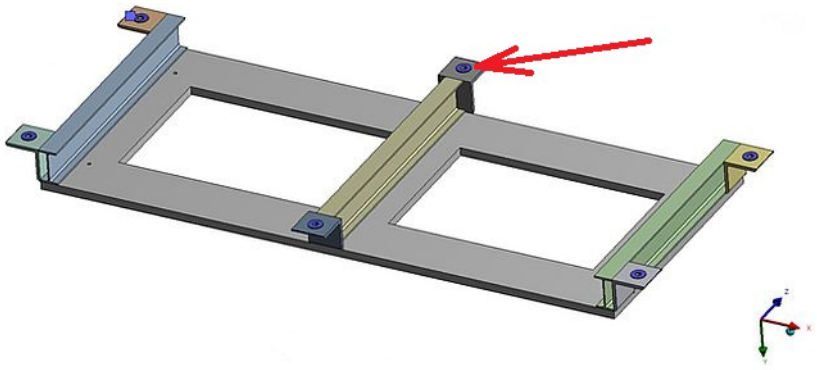
- 1584.0 lb (Y Direction) load is applied at each of the 4 outer gantry anchor locations (pointed by red arrows in Figure 10-6 Structure with gantry loads applies at outer anchors in Y direction on page 170). Total load in model is 4 x 1584.0 = 6336.0 lb

Figure 10-6 Structure with gantry loads applies at outer anchors in Y direction



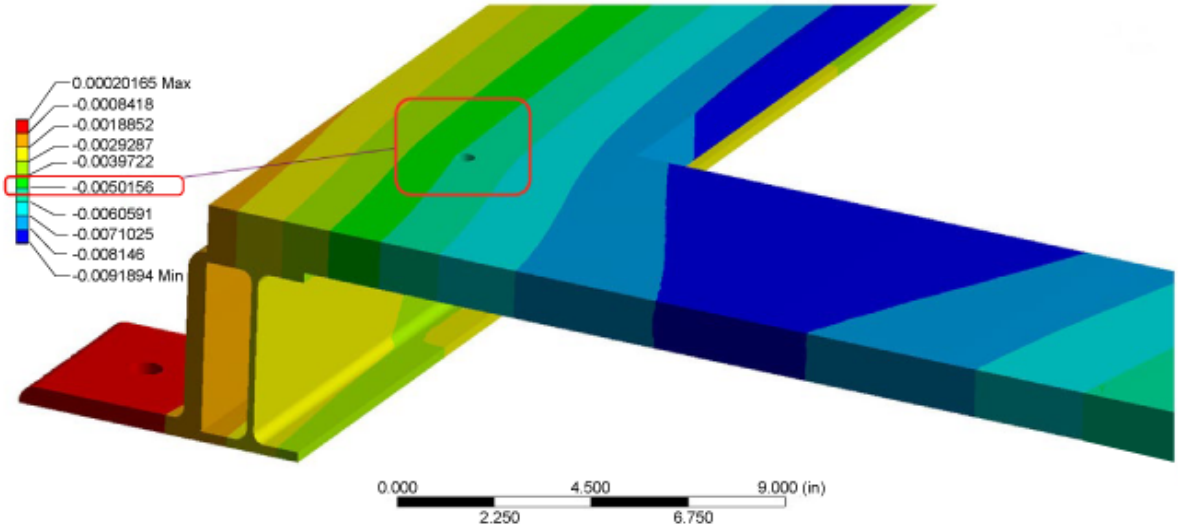
- In Figure 10-7 Bottom View of structure showing how it is restrained to the floor in the model on page 171, only surfaces to touch the floor in the model are 6 x 50.0 mm diameter pads – representing shims/bolt load path. It is unrealistic to fully constrain the complete bottom surfaces of the six (6) pads to ground.

Figure 10-7 Bottom View of structure showing how it is restrained to the floor in the model



- The results in Figure 10-8 Deformation Results in Y Axis on page 171 are plotted for deflection in the Y (vertical) axis. The results show that the deflection at the gantry outer (primary) anchor is 0.005156 inch which is less than the required the required deflection of 0.0065 inch.

Figure 10-8 Deformation Results in Y Axis



This simple analysis has shown that the structure can meet the required stiffness for the Revolution CT gantry. If the deflection had been larger than 0.0065 inch, then additional analyses could have been performed to look at other options such as a thicker top plate, adding ribs/gussets, or adding more floor mounting locations. What this analysis shows is that it is possible to design a relatively simple structure that can meet the required deflection/stiffness.

IMPORTANT

Note that the analyzed structure has large weight reduction holes in the top plate. The two (2) holes reduced the weight of the structure by nearly 40%, to a total of 682 lbs (9% the gantry weight), yet the structure still can meet the required deflection.

Revision History

Revision History

Revision	Date	Detail of Change
26	14-Feb-2025	**Revolution CT Family** Update Revolution CT Family list for Revolution CT Power. **Chapter 5 Room Requirements** **Section 5.3 Functional Scan Suite Layout Configuration** Update Revolution CT Power in the sencond table. **Chapter 7 Electrical Requirements** **Section 7.1 Power Requirements** Update Revolution Vibe power information
25	5-Nov-2024	**Revolution CT Family** Add Revolution Vibe product name **Chapter 2 General Requirements** Add Scanner Desktop V information in Table of Scanner Desktop Shipping dimensions and weight on **Section 2.4 Scanner Desktop Shipping dimensions and weight**. **Chapter 3 Equipment Specifications and Requirements** Update Figure 3-12 below table value from "485.2 mm (19.1 in)" to "541.02 mm (21.3 in)" on **Section 3.6 NG2000SV Patient Table Dimensions** Update Figure 3-13 below table value from "191 mm (7.5 in)" to "165.1 mm (6.5 in)" on **Section 3.6 NG2000SV Patient Table Dimensions** Update Figure 3-14 below table value from "479.9 mm (18.9 in)" to "541.0 mm (21.3 in)" on **Section 3.7 NG1700SV Patient Table Dimensions** Update Figure 3-15 below table value from "129 mm (5.1 in)" to "109.2 mm (4.3 in)"on **Section 3.7 NG1700SV Patient Table Dimensions** Add Scanner Desktop V computer information on **Section 3.11 Scanner Desktop II-V Dimensions**
24	23-July-2024	**Revolution CT Family** Update Revolution CT Family list for Revolution Apex Expert and Revolution Apex Essential **Chapter 3 Equipment Specifications and Requirements** Update Figure 3-12 on **Section 3.6 NG2000SV Patient Table Dimensions** Update Figure 3-14 on **Section 3.7 NG1700SV Patient Table Dimensions**

Revision	Date	Detail of Change
23	07-Mar-2024	**Below update information for Apex 3.0** **Revolution CT Family** Delete Revolution Apex Pro product name from the Table **Chapter 2 General Requirements** **Section 2.4 Shipping Dimensions and Weight** "Add NG1700SV and NG2000SV information" **Chapter 3 Equipment Specifications and Requirements** Add **Section 3.6 NG2000SV Patient Table Dimensions** Add **Section 3.7 NG1700SV Patient Table Dimensions** **Chapter 4 Accessory Specification and Requirements** **Section 4.2 Ceiling Requirement for Auto Patient Positioning Depth Camera** "Correct Depth Camera Installation Manual P/N" **Chapter 5 Room Requirements** **Section 5.1 Flooring Requirements and Specifications** "Add NG SV Table information in Table of Installation Kit and floor template part numbers" **Section 5.2 Floor Loading Data** "Add NG1700SV and NG2000SV Table information" **Section 5.4 Work Space Requirements** "Add NG1700SV and NG2000SV Table information" **Section 5.6 Electromagnetic Compatibility** "Update EMC 4.1 information"
		Below update information for 160C **Revolution CT Family** Add Revolution Apex Expert and Revolution Apex Essential product name in the Table **Chapter 3 Equipment Specifications and Requirements** **Section 3.2 Gantry Dimensions** Add Revolution Apex Expert and Revolution Apex Essential product name in the Table **Chapter 5 Room Requirements** **Section 5.3 Functional Scan Suite Layout Configuration** "Add Revolution Apex Expert and Revolution Apex Essential product name" **Chapter 7 Electrical Requirements** **Section 7.1 Power Requirements** Add Revolution Apex Expert and Revolution Apex Essential power information
22	28-Aug-2023	**Revolution CT Family** "Add NGPDU-92 information" for all APEX products. **Chapter 2 General Requirements** **Section 2.4 Shipping Dimensions and Weight** "Add NGPDU-92 information" **Chapter 3 Equipment Specifications and Requirements** **Section 3.7 Power Distribution Unit (NGPDU) Dimensions**"Add NGPDU-92 information" **Chapter 5 Room Requirements** **Section 5.5 Anchoring** Add NGPDU-92 in seismic mounting brackets. **Chapter 7 Electrical Requirements** **Section 7.1 Power Requirements** "Add the description of power core option for Power Supplied Capacity of 150kVA." "Add a row of power core option for System power requirements."

Revision	Date	Detail of Change
21	21-Mar-2023	Updated all branding referennces of GE to GE Healthcare. Chapter 1 "Who must consult this manual" updated the titles to correctly match sections titles. Chapter 2 "Shipping Dimensions and Weight" Added system cabinet VI and VII. Chapter 3 "Gantry Dimensions" Rewrite of reference to front cover ceiling height. "Uninterrupted Power Supply (UPS) Dimensions" Added note to Weight includes Seismic. "System Cabinet" Added system cabinet VI and VII. "Service Storage Cabinet Dimensions" fixed typo 12 in. Chapter 5 "Flooring requirements and specfications" Removed excess redundant sentence. "Work Space Requirements" Added collimator to list of items in Crate. Chapter 6 "HVAC Requirements" Updated the UPS HVAC Maximum Heat Load. Chapter 7 "Power Requirements" Fix typo Revelation to Revolution. "Scan Room Warning Light and Door Switch" Added warning light schematic updated table. Chapter 9 "Edison HeatlhLink(EHL) Pre-Connectivity Checklist" Added default IP address. New Procedure "McAfee ePO-Managed Antivirus"
20	18-May-2022	General re-write of the entire manual. Concentration on system graphics clean up, editorial fixes, and general update of word usage. Removed procedural information that was duplicated from referenced material. Development of new chapters, and provided intended user icons for quick review by users. This revision closes the following SPRs HCSDM00657040, HCSDM00656612,
19	20-Nov-2021	**Chapter 1 General Requirements** **Section 1.1 Introduction** US732246 Apex 40 Addition Product Name. Changed PM to PMI. **Section 1.2 System Siting Requirements** US732246 Apex 40 Addition Express Mode Installation Kit. US732246. Added placeholder info to Installation Kit and Floor Template Part Number table for Revo Apex Select installation kit and changed 4.0 inches to 5.0 inches (127 mm) in System Site Print section. US732246. Updated Floor Point Locations table - added last row with "Point 9 and 10 are the same spot, but 9 is measured from location A and 10 is measured from location B". Removed Floor levelness measurement table - (duplicate info: this info is in Floor point locations table) **Section 1.4 Delivery and Handling** US717892 - HCSDM00669713 Humidity Value US732246 Apex 40 Addition Gantry Dimensions. Bolded 1st sentence in Rigging subsection.

Revision	Date	Detail of Change
		Chapter 2 Equipment Requirements **Section 2.1 System Components**US732246 Apex 40 Addition Gantry Component Air Flow. US732246. Updated Customer Ceiling Requirements for Monitor in Room section with updated NG-2000V and NG-1700V Patient Table Center of Gravity image and added new image: MDP E4502BG before PDU section. US732246. Added new images to Partial UPS Center of Gravity section. - Updated Warning. US732246. Corrected metric value in Weight and floor loading data table - Note 3 to 26.6 cm^2 (4.12 in ^2). Updated 2 airflow images and title of 1st image. **Functional Scan Suite Layout Configuration** US732246. Added Apex Select to 2nd sentence of the 1st Note **Section 2.4 Anchoring** US732246. minor edit to floor template part number description. NEW **Section 2.6 Ceiling Requirement for Auto Patient Positioning Depth Camera**. Add new procedure.
		Chapter 3 Special Construction Requirements NEW **Section 3.1 Electromagnetic Compatibility** US732246. Replaces the EMI section.
		Chapter 5 Electrical Requirements **Section 5.1 Power Requirements** US732246. Added Apex Select to Note in Power Feed and Overcurrent Requirements, Capacity subsection. Added Apex Select to 1st footnote in Nominal line voltage and current ranges table.
18	26-Mar-2021	**Chapter 1 General Requirements** US520109. **Section 1.1 Introduction** - Updated the forms table. US520109. **Section 1.2 System Siting Requirements** - Fixed decimal spacing. Removed template discussion notes. US520109. **Section 1.4 Delivery and Handling** - Removed side hinged cover information and the word cabinet as a suffix to system desktop. **Chapter 2 Equipment Requirements** US520109. **Section 2.4 Anchoring** - Updated Warning. US598409. Included **Section 2.5 Customer Ceiling Requirement for Monitor-in-Room** topic (now shared between Monitor-in-Room and PIM). US598409. Added new **Section 2.6 Remote Control Panel with Video Monitoring Mounting Requirements**. **Chapter 3 Special Construction Requirements** US520109. **Section 3.1 Electromagnetic Interference (EMI) Consideration** - removed limitations management. US520109. **Section 3.2 Scatter Radiation Measurements** - corrected typo from stray to scatter to keep wording consistent with other PIMs. US601220. **Section 3.4 Other Construction Considerations** - added sentence about window placement height dimensions. **Chapter 5 Electrical Requirements** HCSDM00642299 - US597188 **Section 5.1 Power Requirements** - Added note regarding single connect for emergency power off. **Chapter 7 System Connectivity Requirements** US520109. **Section 7.3 Remote Services Platform (RSvP) Pre-Connectivity Checklist** - Referenced form and removed table for RSvP. **Chapter 8 Appendices** US520109. **Section 8.1 System Cabinet B7919AH** - Updated measurements.

Revision	Date	Detail of Change
17	11-Jul-2020	**Chapter 1 General Requirements** **Section 1.1 Introduction** - updated formatting. **Section 1.2 System Siting Requirements** - updated graphics for translation compliance, and readability. **Section 1.4 Delivery and Handling** - updated graphics and weight values for -91 PDU, Added dimensions, size, weight CG, mass and seismic for Scanner Desktop III and System Cabinet VP80, SPR:HCSDM00589276 , SPR:HCSDM00593271, Add the rigging platform size needed for the Rev CT table, stationary gantry, rotating gantry. **Chapter 2 Equipment Requirements** **Section 2.1 System Components** - updated graphics and weight values for -91 PDU, - added dimensions, size, weight CG, mass and seismic for Scanner Desktop III and System Cabinet VP80, - updated graphics for translation compliance, and readability. **Section 2.2 Functional Scan Suite Layout Configuration** - updated graphics for translation compliance, and readability. **Section 2.3 Work Space Requirements** - updated graphics for translation compliance, and readability. **Section 2.4 Anchoring** - updated graphics for translation compliance, and readability. **Section 2.5 Ceiling Requirements** - updated graphics for translation compliance, and readability. **Chapter 3 Special Construction Requirements** **Section 3.1 Electromagnetic Interference (EMI) Consideration** - updated graphics for translation compliance, and readability. **Chapter 4 Environmental Requirements (HVAC)** **Section 4.1 Electromagnetic Interference (EMI) Consideration** - updated graphics for translation compliance, and readability. Also added the -91PDU. **Chapter 5 Electrical Requirements** **Section 5.1 Power-Requirements** - updated graphics and weight values for -91 PDU - updated with using the Apex w/ 150kva (the -61 pdu) For Full UPS Sizing on Revolution CT Apex updated the Peak power demand and duration. **Section 5.2 Grounding**- updated graphics for translation compliance, and readability. **Section 5.3 System Interconnection and Cabling**- updated graphics for translation compliance, and readability. **Section 5.4 Scan Room Warning Light and Door Interlock**added note for x-ray warning light **Appendices** **Install Revolution CT Gantry on a Support Structure** - updated graphics for translation compliance, and readability.

Revision	Date	Pre-Installation Changes

16	22–Oct-2019	**Chapter 1 General Requirements** **System Siting Requirements** Pre-Installation Checklist added Apex system identification. Also added Electrical connection check. **Delivery and Handling** Section 4.3 *System Dimensions and Weight* Table updated Assembled Gantry with identified systems. Updated Scanner Desktop (Open Console) weight. System Cabinet III removed reference to old System Cabinet. System Cabinet IV updated all dimensions and weight. **Chapter 2 Equipment Requirements** **System Components** Section 1.4 System Center-of-Gravity illustration 2–13 updated. Illustration 2–14 NG2000 Patient Table Center-Of-Gravity updated. Illustration 2–15 NG2000V & NG1700V Patient Table Center-Of-Gravity updated. Illustration 2–16 PDU Center-of-Gravity updated. Illustration 2–17 System Cabinet Center-of-Gravity updated. Illustration 2–18 Scanner Desktop (Open Console) Center-of-Gravity updated. **Work Space Requirements** Removed note under *"System Cabinet Configuration Requirements"* regarding old cabinet reference. **Anchoring** Updated Seismic Kit part number under *"Seismic Anchoring Methods"*. System Cabinet and Console and PDU Seismic illustrations updated. **Chapter 4 Environmental (HVAC) Requirements** **HVAC Requirements** Section 1.2 *Altitude Operating Range* updated with new ambient temperatures. Table 4–1 *System Temperature Limits* updated. Table 4–3 *System Heat Load* removed reference to old System Cabinet. **Chapter 5 Electrical Requirements** **Power Requirements** Under "Certified Electrical Contractor Statement added note regarding secure connections. **System Interconnection and Cabling**Added Section 3.1.2 *"Scanner Desktop Computer Placement: Console Cable Usable Length.*" **Chapter 7 System Connectivity** Added Edison HealthLink (EHL) Pre-Connectivity Checklist

15	20–Jun-2019	**Cover page** Added Revolution CT, Revolution CT ES, Revolution CT Apex, Revolution CT with Apex Edition. **Chapter 1 General Requirements** **Delivery and Handling** Section 4.3 System Dimensions and Weight Table 1–8: Updated Width/Depth column of Assembled Gantry (with covers installed) row, added Revolution Apex Gantry row, added row in Scanner Desktop for Open Console row; updated Weight column of System Cabinet IV (System Cabinet) row, updated NG-2000V Table (Only) row, updated NG-1700V (Only) row. **Chapter 2 Equipment Requirements** **System Components** Added Illustration 2–9; Added Scanner Desktop Computer (Open Console) Dimensions. Added Illustration 2–20; Scanner Desktop Computer (Open Console) Center of Gravity. **Anchoring** System Cabinet; Removed paragraph and added table below Illustration 2–31. Added new section, Scanner Desktop Computer (Open Console), which includes Illustration 2–33 and table. PDU; Updated Illustration 2–34 to show NGPDU with seismic mounting bracket. **Chapter 3 Special Construction Requirements** **Stray Radiation Measurements** Added paragraphs for Apex and Apex Edition Systems and added Illustrations 3-6 and 3-7.

14	17–May-2019	**Chapter 1 General Requirements** **System Siting Requirements** Updated for Apex/Apex edition with removal of wording "optional" on UPS specifications. **Delivery and Handling** Corrected shipping weight of NG2000V table Sec 4.3 Clarified UPS as standard or optional per system installed. **Chapter 2 Equipment Requirements** **System Components** UPS Center of Gravity reference to OEM documentation; Gantry dimensions annotations updated. **Functional Scan Suite Layout Configuration** UPS edited into room layout graphics. **Work Space Requirements** UPS edited into room layout graphics; Updated minimum regulatory envelope dimensions for NG2000V/NG1700V tables. **Anchoring** UPS Seismic kit reference to OEM documentation. **Chapter 4 Enviromental Requirements (HVAC)** **HVAC Requirements** Restated UPS as standard on all Apex systems under System Heat Load; UPS edited into room layout graphics. **Chapter 5 Electrical Requirements** **Power Requirements** UPS references as "optional" removed added if equipped/equipped. **System Interconnection and Cabling** Added cables provided by GE for the UPS. UPS edited into room layout graphics for Ducting Requirements. **Chapter 7 System Connectivity Requirements** Added new chapter and three new procedures for EES, IPM and RSvP. **Appendix** Updated HVAC Map for Sys Cab with UPS location.
13	9–Jan-2019	**Chapter 5 Electrical Requirements** **Power Requirements** Updated artwork of the A1 Panel.

12	7–Dec-2018	Updates to the following: **Chapter 1 General Requirements** **Introduction Section** Added system effectivity list. Section 1.2 Edited references to PDU to include the NGPDU–91. **Delivery and Handling Section** Section 4.3 Added NGPDU—91 weight and dimensions. Section 4.4 Added Crated NGPDU-91 weight and dimensions. **Chapter 2 Equipment Requirements** **System Components** Section 1.4 added NGPDU-91 Center of Gravity dimensions. Removed Illustration 2–19 DPB Center of Gravity and weight. **Functional Scan Suite Layout Configuration** Updated Illustration 2–21. **Work Space Requirements** Edited references to PDU to include the NGPDU–91. **Chapter 5 Electrical Requirements** **Power Requirements** Section 1 Updated Illustration 5–1. Edited references to PDU to include the NGPDU–91. Added new content on Total Source Voltage Tolerance. Updated Power Feed and Overcurrent Requirements for Revolution Apex system. **Grounding** Edited references to PDU to include the NGPDU–91. **System Interconnect and Cabling** Edited references to PDU to include the NGPDU–91. **Scan Room Warning Light and Door Switch** Edited references to PDU to include the NGPDU–91. **Appendix** Edited references to PDU to include the NGPDU–91.
11	1–Aug-2018	Updated the following: **Chapter 1 General Requirements** Updates were made to the following sections: System Siting Requirements Delivery and Handling **Chapter 2 Equipment Requirements** Updates were made to the following sections: Work Space Requirements **Chapter 5 Electrical Requirements** Updates were made to the following sections: Power Requirements

10	25–Jun–2018	Updated the following: **Chapter 1 General Requirements** Updates were made to the following sections: System Siting Requirements Delivery and Handling **Chapter 2 Equipment Requirements** Updates were made to the following sections: System Components Work Space Requirements Anchoring Ceiling Requirements **Chapter 3 Special Construction Requirements** Updates were made to the following sections: Electromagnetic Interference (EMI) Consideration **Chapter 4 Environmental Requirements (HVAC)** Updates were made to the following sections: HVAC Requirements
9	Nov 27, 2017	Updated the following: **Chapter 1 General Requirements** Introduction Updates to PDU. Regulatory requirements Update to NFPA 70. Delivery and Handling Updates to PDU. **Chapter 2 Equipment Requirements** Functional Scan Suite Layout Configuration New system layout features. Work Space Requirements Update to NFPA 70. Ceiling Requirements New layout features. **Chapter 3 Special Construction Requirements** Electromagnetic Interference (EMI) Consideration Updates to PDU. **Chapter 4 Environmental Requirements (HVAC)** HVAC Requirements Updates to PDU. **Chapter 5 Electrical Requirements** Power Requirements Updated Grounding Updated System Interconnects and Cabling Updated Scan Room Warning Light and Door Interlock Updated **Chapter 7 Appendicies** System Cabinet B7919AH Updated

8	Feb 16, 2017	Updated the following: **Chapter 1** **Introduction** Add Installation forms list. **System Siting Requirements** Updated floor requirements list. **Delivery and Handling** Added Pre-delivery installation information. Updated Table dimensions. **Chapter 2** **System Components** Updated top hinged cover dimensions when open. **Ceiling Requirements** New section for ceiling mounted installation for accessory options.
7	Nov 16, 2015	Updated the following: **Introduction** Add “Accessory Installation” requirement **System Siting Requirements** Update floor requirements (It is recommended to install the Revolution CT Gantry on a concrete surface); and floor levelness meets specifications (under the full system load). **Delivery and Handling** Add lean carts information for top hinged gantry cover. **System Components** Update Maximum Compressive Floor Pressure per pad MPa updated for nominal and shimmed. Update system cabinet dimension and CG. **Appendix** Updated and added requirements for “Install the Revolution CT Gantry on a Support Structure”.
6	July 28, 2015	Updated the following: Update information for the new system cabinet B7919DH/B7919CH. The information of the old system cabinet B7919AH is moved to Appendices. HCSDM00358308:Update table shipping dimension. Added additional information for long and standard cable kits
5	March 2015	Updated the following: **System Siting Requirements** Updated check list. **Delivery and Handling** regarding patient load references. **System Components** added new table and floor loading data. **Anchoring** adding notice on drill bits, alternate and seismic. **Stray Radiation Measurements** Updated with new information.
4	18 Sep 2014	Updated the following: **Delivery and Handling** Updated phantom shipping specs humidity range 5% to 95%, Added reduced clearance dolly information. Added estimated floorprint of all packages shipped. Updated Table 4 Lean Carts weights **System Component** Added a note for gantry dimension depth definition and updated the call out. **Work Space Requirements** Sections Modified Table 2 **Anchor** Section Added BCAT number to seismic kit
3	9 May 2014	Update system name to read “Revolution CT”. Installation specifications updated, and with detailed anchoring specifications. Reformatted and edited for optimization.

2	16 Jan 2014	Updated and renamed the following 2 sections: “Functional Scan Suite Layout Configuration” and “Minimum Regulatory Scan Suite Layout Configuration” Modified existing disclaimers for marketing purposes. Updated several graphics to replace texts with callouts and tables.
1	11 Nov 2013	Initial Release. Content is subject to change without notice. This release includes advance siting information.

Language Policy

DOC0371395 - Global Language Procedure

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ATENÇÃO (PT-BR)	Este manual está disponível somente em chinês (ZH-CN), inglês, francês, alemão, italiano, japonês, coreano, polonês, português (PT-BR), russo, espanhol e vietnamita. Se o prestador de serviços de um cliente necessitar de um idioma diferente dos mencionados, o fornecimento dos serviços de tradução é de responsabilidade do cliente.
ATENÇÃO (PT-PT)	Este manual está disponível apenas em alemão, chinês (ZH-CN), coreano, espanhol, francês, inglês, italiano, japonês, polaco, português (PT-BR), russo e vietnamita. Se o fornecedor de serviços de um cliente necessitar de um idioma diferente dos listados aqui, é da responsabilidade do cliente assegurar os serviços de tradução.

ATENŢIE (RO)	Acest manual este disponibil numai în limbile chineză (ZH-CN), engleză, franceză, germană, italiană, japoneză, coreeană, poloneză, portugheză (PT-BR), rusă, spaniolă şi vietnameză. Dacă furnizorul de servicii al unui client solicită o limbă diferită faţă de aceste limbi, este responsabilitatea clientului să furnizeze servicii de traducere.
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