GE HealthCare

Pre-Installation Manual

Revolution Ascend Family

5987663-1EN
Revision 6

Revolution Ascend Family

This manual covers the following products:

Product Name	Configuration
Revolution Ascend	• 40mm-collimation • Performix 40 Plus X-ray Tube • VT1700V/VT2000/VT2000x Table • Revolution Ascend Black Covers
Revolution Ascend Elite	• 40mm-collimation • Performix 40 Plus X-ray Tube • NG1700 Elite Standard Table / NG2000 Elite Heavy Table • Revolution Ascend Purple Covers • True Enhance DL Option
Revolution Ascend Plus	• 40mm-collimation • Performix 40 Plus X-ray Tube • NG1700 Elite Standard Table / NG2000 Elite Heavy Table • VT1700V/VT2000/VT2000x Table • Revolution Ascend Purple Covers
Revolution Ascend Select	• 20mm-collimation • Performix Plus X-ray Tube • NG1700 Elite Standard Table / NG2000 Elite Heavy Table • Revolution Ascend Purple Covers

Language Policy

DOC0371395 - Global Language Procedure

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Damage in Transportion

All packages should be closely examined at time of delivery. If damage is apparent, have notation "damage in shipment" written on all copies of the freight or express bill before delivery is accepted or "signed for" by a GE HealthCare representative or a hospital receiving agent. Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

To file a report:

- Call 1-800-548-3366 and use option 6.
- Fill out the GIQ workflow for any items missing, damaged, OBF/FOI for in process installs: https://buildsmart.capgemini.com
- Contact your local service coordinator for more information on this process.

Rev. Nov. 10, 2017

Certified Electrical Contractor Statement

All electrical Installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. In addition, electrical feeds into the Power Distribution Unit shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE HealthCare personnel. The products involved (and the accompanying electrical installations) are highly sophisticated, and special engineering competence is required. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE's electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE's field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

IMPORTANT ... X-Ray Protection

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

Lithium Battery Cautionary Statements

⚠ CAUTION

RISK OF EXPLOSION.

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

WARNING

DANGER D'EXPLOSION

Il y a danger d'explosion s'il y a replacement incorrect de la batterie.

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

Omissions & Errors

Customers, please contact your GE Sales or Service representatives.

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

Revision History

Revision	Date	Reason for change
6	Nov 21, 2025	Chapter 3, Section 3.1.3.3: Update floor levelness 3000mm (118.0) to 3048mm (120.0 in) based on Feedback9685. Chapter 5, Section 5.1.3: Update value of "Table extension head end with extender to obstruction" from 150mm to 152mm. Chapter 6, Section 6.1: Update Minimum Service Clearances for VT1700V,VT2000/VT2000x and NG Elite Table. Chapter 12, Section 12.3.3: Update Nominal Line Voltage [V] 380/400 --Minimum Recommended Circuit Breaker [A] Value from 125 to 110 based on Feedback17332. Chapter 13, Section 13.3.3: Add Ground wire 5821716 information for Auto Position Express Mode. Chapter14, Section 14.1: Update Danger information. Appendix B, B.3: Update Cover Removal Clearances for NG Elite Table, VT2000/VT2000x and VT1700.
5	Oct 25, 2024	Chapter 1, Section 1.2: Update Pre-Installation Checklist. Chapter 5, Section 5.2.1: Add rear cover door dimension Chapter 5, Section 5.2.5: Add Z8G5 information Chapter 7, Section 7.2.1: Update Figure 7-1 and following explanation Chapter 8, Section 8.2.2.2: Update Figure 8-3 according to site feedback Chapter 8, Section 8.4: Add Z8G5 information and add new lightweight dolly information in the Table 8-6 Chapter 12, Section 12.3.3: Update Feeder Wire Size per global team Chapter 13, Section 13.3.6: Update power cable size from 14 (2) to 14 (2.5) per global team Chapter 13, Section 13.3.3: Update Cardiac cable information on Table 13-4 Chapter 13, Section 13.6: Update A1 information, refer to DOC2058932 Chapter 14, Section 14.4.3: Update dolly weight in Table 14-2 Chapter 15, Section 15.2.4: Tilting not approved for Flat-bed Truck. feedback

Revision	Date	Reason for change
4	Feb 05, 2024	Add Revolution Ascend Family configuration Table on Page 2 Chapter 1, Section 1.2: Update Pre-Installation Checklist per DOC1809666_r8 Chapter 5, Section 5.1.3: Add NG Elite Table information in Table 5-1 Chapter 6, Section 6.2.1: Add Figure 6-4 Tube Change Box Delivery Chapter 7, Section 7.1: Add NG Elite table room size information on Table 7-1 Chapter 8, Section 8.2.2.1: Add Figure 8-2 Boom-In-Room Routing without Junction Box. Chapter 8, Section 8.2.2.4: Update Junction Mounting Plate Chapter 8, Section 8.4: Add NG Elite Table information in Table 8-6 Chapter 8, Section 8.5.1 and 8.5.2: Update Anchor information Chapter 8, Section 8.6.2: Add VT2000x information in Figure 8-41 to fix IB issue. Chapter 9, Section 9.5.1: Add EMC 4.1 information Chapter 10, Add Section 10.2 Stray Radiation information Chapter 12, Section 12.3.1: Update power requirement per SPRHCSDM00727629 Chapter 13, Add Section 13.6 Typical Customer Supplied Wiring Chapter 14, Section 14.2.1: Update lifting description per SPRHCSDM00720264 Chapter 14, Section 14.4: Add new gantry dolly information Chapter 14, Section 14.5: Update Table Delivery Considerations Appendix B: Add NG Elite Table cover removal information
3	April 18, 2022	Update contents according to HII Log (DOC2715511) Chapter 6: Update Figure 6-1 and 6-2 according to SPR HCSDM00671907 Chapter 14: Update tilt-bed truck to forklift
2	August 12, 2021	Chapter 10: Update Table 10-2 and 10-3 Update first NOTE of Figure 10-1 and 10-2
1	July 19, 2021	Initial Release

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Contents

Chapter 1 Introduction

This document contains the physical and electrical data necessary for planning and preparing a site for system installation. The responsibility of arranging and paying for this work rests solely with the purchaser.

1.1 Introduction

The information in this manual applies to the following GE Healthcare CT Scanners:

- Revolution Ascend
- Revolution Ascend Elite
- Revolution Ascend Plus
- Revolution Ascend Select

The information in this manual does NOT apply to non-fixed (mobile) installations.

1.1.1 Using the Pre-Installation Manual

This manual is the official source of prerequisites to installing a General Electric (GE) Computed Tomography (CT) system. Topics covered are site planning, site preparation, and the system requirements. This manual is divided into requirements for the customer, the system, the environment and on-site construction. It also includes the importance of addressing the local and national regulatory requirements, which may be specific to your location.

A GE Project Manager (PM) will be available for specific questions or concerns. The PM's primary responsibility is to assist the buyer with the siting requirements. This manual is a guide toward the actual installation of your GE CT system. Prior to any construction or installation, GE Headquarters Architectural Planning must approve the completeness of all preliminary concepts, site plans, and final working drawings.

Pre-installation includes the procurement and installation of ALL requirements, materials, and services necessary for the installation and startup of a CT system.

1.1.2 Assigning a Site Project Coordinator

It is the customers (purchaser) responsibility to assign a site project coordinator. The site project coordinator is the primary contact and liaison between with the construction planners, architects, contractors, and any other site administrative personnel for all site related functions; reporting to the purchaser.

The primary responsibility of the site project coordinator, working closely with GE , is to ensure the purchaser upholds all requirements outlined in this manual. To ensure a successful installation, it is recommended that the site project coordinator manage the entire project from pre-install to final startup, be familiar with all phases of pre-installation and installation of similar medical device construction projects. The site project coordinator should read and understand the contents of this manual and be familiar with the installation procedures.

1.1.3 Customer Responsibility

It is the responsibility of the customer to prepare the site in accordance with all the specifications provided in this manual and in conjunction with site-specific drawings and applicable regulations. Consideration should be taken for future expansion during the design phase of the site. It is essential to verify all aspects of the site configuration before construction has begun, as subsequent changes can be costly or impractical.

Pre-Install Checklist A detailed pre-installation checklist is provided in this manual, see Customer Pre-Installation Checklist. It is the responsibility of the customer to ensure all requirements on the checklist are fulfilled and that the site conforms to all specifications and requirements detailed in this manual.

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 customers responsibility. The customer shall provide the site project coordinator, a clean and safe work environment including proper lighting, and a level suitably supported structured floor. All floors, walls and ceiling should be in a finished state prior to installation, and all site-construction renovation 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.

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 does not provide or install the wires, conduits, junction boxes, or ducting illustrated in this publication .

1.1.4 Roles and Responsibilities

- **Customer :** Also known as Buyer or Purchaser or End User. This is the entity that has enteredinto contract with GE to buy the product.
- **GE Salesperson :** Responsible for completing the customer order process. They coordinate the completion of customer order as desired by the customer, for the customer. They are responsible for correcting incorrect orders. Changing orders, coordinating any replacement of damage in shipment items and for resolving missing in shipment issues.
- **GE Project Manager (PM) :** Responsibilities include the overall project coordination and site planning of GE 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 Field Engineer :** GE field personnel responsible for the actual assembly, installation, calibration of the product and verification of the proper operation and configuration of the GE

product. This may include the physical movement of the system and its subcomponents from the point of delivery to the scan suite.

- **Zone Broadband Specialist :** GE 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 on site personnel affiliated with or contracted by the customer. Responsible for providing IT expertise necessary to ensure successful network IT connectivity between the GE product and the facility.
- **Qualified Electrician :** Also known as Electrical Contractor. 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 product.
- **Architectural Engineer :** Dedicated on site personnel affiliated with the customer or contracted by the customer to manage the details of the construction parameters defined by regulatory agencies and as defined by parameters in the GE Pre-installation manual for the proper installation of the GE product.
- **Structural Engineer :** Dedicated on site personnel affiliated with the customer or contracted by the customer to manage the details of the structural parameters defined by regulatory agencies and as defined by the structural parameters provided in the GE Pre-installation manual for the proper installation of the GE product.
- **HVAC Design Engineer :** Dedicated on site personnel affiliated with the customer or contracted by the customer to manage the details of the air conditioning and air handling parameters defined by regulatory agencies and as defined by parameters in the GE Pre-installation manual for the proper installation of the GE product.
- **Independent Contractor :** Person or entity who contracts to do work for another person according to his or her own processes and methods; the contractor is not subject to another's control except for what is specified in a mutually binding agreement for a specific job. Can be contracted by GE personnel or by the customer for a unique or special task as part of the GE product installation process.
- **Customer provided Project Coordinator :** Dedicated contact person that works with GE Project Manager (PM). Acts as the single point of contact for the customer. Coordinates with all persons or entities contracted by the customer for the successful installation of a GE product.
- **Rigger :** Person, persons or entity hired as an Independent Contractor to perform a specific task related to the movement of GE product from the point of delivery to the scan suit where it will be installed.

1.2 Pre-Installation Checklist

To ensure the latest revision is used, locate DOC2949059 on SIMS Content Viewer.

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Chapter 2 Installation Types

2.1 How to Determine the Best Installation Type for Your Site

Discuss installation options with your PMI to determine which of the installation types listed below best fits your site and schedule.

2.2 Typical Installations

Typical installations occur at established sites with finished, dust-free, occupancy-ready scan suites. The rooms range from suggested to minimum room sizes, and have NO ongoing construction on-site. A typical installation allows customers flexibility for room upgrades and site improvements. Upgrades and improvements may require additional planning prior to system delivery, especially when involving:

- Seismic approval
- Floor structural improvements
- HVAC improvements
- Electrical improvements
- Review of scan room shielding requirements by a qualified radiological health physicist.

As with any installation, the final site design for a typical installation must meet all service and regulatory requirements detailed in this manual.

2.3 Construction Site Installations

A *construction installation* describes installation at sites without an occupancy permit, often with ongoing construction. In general, construction sites fail to meet the recommended specifications for delivery of the system. GE does not recommend construction 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.
- Full constructions site with limited delivery access.

Review the following categories to determine which most closely matches the condition of the planned installation site.

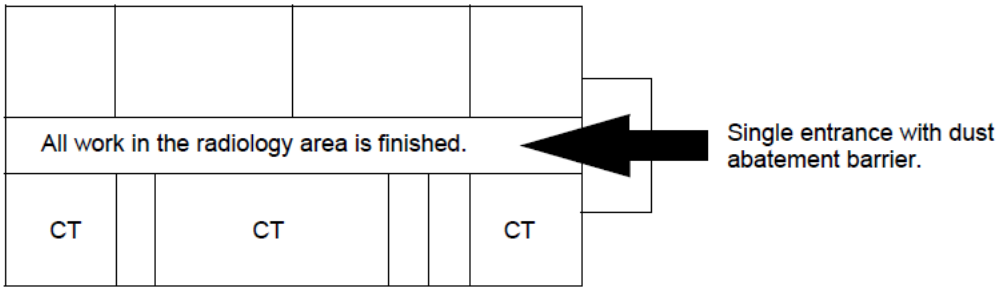
2.3.1 Full Construction Site with Completed Radiology Area

This type of site consists of a finished, dust-free, occupancy-ready radiology suite. While there is no remaining construction in or around the scan suite area, there may be ongoing construction in other areas. At the time of delivery such sites feature:

- Dust control measures deployed in the radiology suite area.
- Scan suite access limited to a single entrance (see Figure 2-1 Full construction site with completed radiology area on page 22).
- Radiology suite sealed off from the remaining construction area.
- 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.

Figure 2-1 Full construction site with completed radiology area



2.3.2 Full Construction Site with Limited Delivery Access

This type of site allows delivery during ongoing construction of the radiology suite area. At such sites, delivery occurs prior to site completion, but the product remains stored until a finished, dustfree, occupancy-ready radiology suite area is ready. This type of site requires the system scanner to be delivered in a sealed package with dollies. Delivery to the storage area may require a lift truck or riggers. Installation work begins only when the site reaches the completed, dust-free, occupancy-ready radiology suite requirement.

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

2.4 Relocatable Building Installations

A re-locatable building is made in a factory and delivered to the site of its permanent location. Relocatable buildings qualify as fixed sites and must satisfy all of the requirements of a fixed site. The gantry and table must be mounted on a solid concrete floor. Any other floor type installations must designed by the customer's structural engineer and meet all GE Healthcare's specifications listed in this manual.

Refer to the Chapter 8 Structural and Mounting Requirements on page 63 of this manual for further information.

2.5 Upgrade Installations

Upgrade installations occur after the installation of another system. A change in the customer's needs requires the installation of additional equipment at the same site. For example, adding a PET system to an existing CT system.

To proceed with an upgrade installation, the customer's room size must be large enough to accommodate the new product without violating the regulatory and service requirements of the new product. When planning for an upgrade installation, siting requirements of the new equipment may exceed those of your existing system. Requirements needing additional consideration include:

- Floor thickness
- Room shielding
- Additional electrical capacity
- Increased cooling capacity
- Scan room shielding requirements

The final site design must include a room layout showing the equipment room with the recommended room size dimensions. All upgrade installations must meet all service and regulatory requirements detailed in the manual.

2.6 Quick Installations

Quick Installations involve sites requiring minimum room improvements. These installations typically consist of a weekend de-installation and room preparation completion, with a next business day delivery and installation.

Requirements

A site must meet a number of requirements to qualify for a Quick Installation, including:

electrical, structural, and HVAC requirements outlined in this manual. Also, the suite must meet all regulatory and minimum size requirements, as well as, the scan room shielding requirements. The facility must accommodate delivery and meet all delivery requirements. Consult this manual for details of the requirements and your PMI for information about any additional requirements your installation must meet.

Consult your Project Manager of Installation (PMI) for information about any additional requirements.

Restrictions

The following restrictions govern Quick Installations: check with your PMI regarding floor anchor re-use.

- Quick Installations require a new room print that accurately reflects the rooms targeted for upgrade.
- You ***CANNOT*** re-use existing floor anchors for a new CT system.
- New floor anchors must be a minimum of 102 mm (4 in) from any existing floor penetrations.
- Rooms not meeting the minimum requirements for the final product must undergo an upgrade/enlargement prior to the installation.

2.7 Two-Step (Temporary) Installations

The two-step installation is a temporary installation of one system in a site, with the intention of upgrading the site to another system in a near future date. All two-step installations must comply with ALL siting requirements necessary for the upgraded or final system. This includes the recommended room size and all electrical, structural, and HVAC requirements. All System Siting Requirements apply to these types of installations. The customer is responsible for verifying compliance with all requirements. Rooms not meeting minimum requirements for the final product must undergo sufficient upgrading/enlargement.

NOTE

Temporary installations include all systems installed at a site for a period ranging from two weeks to six months.

Chapter 3 System Siting Requirements

3.1 System Siting Requirements

The requirements listed in this manual apply to all fixed-site customer installations, including installation within re-locatable buildings. The following requirements represent the **MINIMUM** that a site must meet before beginning **ANY** new or replacement system installation. All parties should review these requirements to ensure that the site meets all of the following:

- Service requirements
- Regulatory requirements
- Minimum structural, flooring, and vibration requirements
- Minimum HVAC requirements
- Minimum Electrical requirements
- All network requirements
- All radiation protection requirements
- All operational clearances
- All finished doors, floors, windows, ceilings, walls, and all plumbing and cabinets are installed.
- Does not have ANY continuing construction in the scan room OR neighboring suite areas.
- Conforms to the final GE Healthcare site print, which must be kept ON-SITE and must show all items intended for the finished room.

> **NOTE**
> Each site should receive a CT scanner quick start kit from the PMI. Use the Pre-Installation Checklist in this manual to confirm that the site meets all of the requirements listed above. GE Healthcare recommends completing all work to meet these requirements PRIOR to starting installation.

GE HEALTHCARE RESPONSIBILITY: The Project Manager (herein referred to as PM or PMI) assists the purchaser in meeting all system siting requirements.

The PMI also performs the following pre-installation delivery tasks:

- Determines the delivery type: ground, dock.
- Determines if the delivery requires tilt dollies or riggers; orders dollies and lifting crates, as needed.
- Determines if the delivery requires the use of floor protection.
- Determines if the ground delivery requires the use of a forklift, and informs GE Transportation of the need for a forklift.

Site Review with Customer: A site-ready visit should occur prior to the delivery date. This visit verifies that the site meets all system siting requirements and confirms that installation can proceed. During the site-ready visit, a GE representative confirms that the site meets all of the required site-ready conditions including floor levelness, and delivery route readiness. Lifting options and construction site packaging must be ordered prior to delivery and cannot be added on-site.

CUSTOMER RESPONSIBILITY: Listed below is the breakdown of the customer tasks crucial for ensuring proper site preparation, regardless of whether planning for a replacement system at an existing site, or designing a new scan room for a first time.

Installation cannot proceed until verification of site-readiness occurs. A site is ready ONLY when it meets ALL delivery, regulatory, system, network, radiation protection, and operational requirements, as well as, requirements for any options. The purchaser is responsible for completing all work necessary to install the system, and includes:

- Completion of all structural items (recommended before installation begins.)
- PMI verification that ALL items on the Pre-Installation Checklist are completed.
- Review and preparation of all site-ready items.

To ensure timely delivery and installation, GE Healthcare recommends that the customer complete all necessary work and schedule a site-ready visit prior to the delivery date. To confirm that the site meets all requirements, you may need to employ these and other contractors: Structural Engineer and/or Architect, HVAC Contractor, Electrical Contractor, Qualified Radiological Health Physicist, Cleaning Services.

NOTICE

An improperly prepared site—one that is in a state of construction—can result in a delayed installation date and/or damage to the system.

3.1.1 Regulatory Requirements

Verify that the site conforms to all of the following:

- The room must meet all regulatory clearance requirements.
- The room must meet all minimum size requirements.
- The site print is on-site, reflects actual room size and layout, and has received final approval.
- No grounded walls are found in regulatory clearance areas.
- The room meets all local codes.

3.1.2 Electrical

- Install the correct size junction boxes with covers at locations shown in the installation plan.
- Install appropriate conduits and duct work for system cables. If the suite houses additional components, determine the necessary considerations and complete the connections.
- Install a power supply of correct voltage output and adequate kVA rating.
- Install local disconnects, including proper over-current protection. This includes the A1/MDP main disconnect with Lock-out and Tag-out (LOTO) installation.

3.1.3 Structural

- Install “steelwork” or other suitable support work for mounting equipment from walls or ceilings.
- Review structural requirements including:
  - floor vibration

- floor levelness
- floor thickness
- any seismic considerations, if applicable.

- Complete all suite and room renovations and modifications prior to delivery.

3.1.3.1 Dust and Air Quality

Ensure that the scan suite area is free of all dust, and not subject to ANY ongoing construction, including the installation of cabinets, hanging doors, and ceiling tiles.

⚠ CAUTION

POTENTIAL EARLY SYSTEM FAILURE.

Fine dust can deposit on the internal electronic components in Gantry, DAS, Tube, Table, PDU, and Operator Console.

It results in potential damage to the electronic components and lead to an early system failure.

Before installing scanner systems, ensure that the scan suite area is free of all dust and not subject to any ongoing construction.

TYPES OF DUST TO AVOID Ensure that NO construction occurs in or immediately around the scan suite area that results in:

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

Failure to take appropriate precautions to protect the system against these types of dust may result in DAMAGE to the system and early SYSTEM FAILURE.

3.1.3.2 Environmental Influences

CT systems are designed with commercial components that are sensitive to air contaminants like sulfide, chloride and nitrates. It is the responsibility of the purchaser to ensure that the levels of these contaminates are low (Class1). See IEC60654-4 for air quality guidelines.

3.1.3.3 Finished Floor Requirements

Installation requires a finish floor in the scan and control rooms. The floor surface in the scan room directly under the gantry and table must be level. The floor flatness tolerance of the floor surface that the gantry and table will rest on is 6 mm (1/4 in) over a 3048 mm (120.0 in) distance. Shims should not be used to compensate for a floor that does not meet this requirement. Eight or more floor covering openings that are 101.6 mm (4 in) in diameter are made to ensure the table and gantry rest on a solid surface. These floor penetrations can be sealed if required. These requirements apply to all installation types.

Finished Floor Exception 1 For sites replacing their scan room floor covering after the table and gantry are installed, the floor can be clean-finished with dust free concrete. The finish floor in the scan room requires no dust-producing operations when applying final floor covering.

Finished Floor Exception 2 Facilities under new construction that have a finished radiology area with a single controlled-access and dust abatement barrier, can have a finished concrete floor in the scan room. The finished concrete floor in the scan room requires no dust-producing operations when applying final floor covering.

3.1.3.4 Finished Walls Requirements

Finished walls inside the scan and control rooms must be painted at the time of installation. This requirement applies to all installation types. A finished walls exception is made for new construction and upgraded facilities. A primer coat of paint is acceptable for equipment installation. However, the final coat of paint must be applied using a brush of some type (roller, or bristle). The final coat of paint cannot be applied using a spray method.

3.1.4 Radiation Protection

A qualified radiological health physicist should verify that the scan room's radiation shielding provides adequate radiation protection for the planned system. Refer Shielding Requirements for more details.

3.1.5 Environmental

Review HVAC requirements, including system environmental controls and patient comfort needs. Make sure the site provides an HVAC system capable of maintaining the recommended temperature and humidity specifications at the time of installation.

3.1.6 Options

- Confirm that all customer installation options are reviewed and final locations determined.
- All GE supplied installation options are reviewed and final locations determined.
- The laser camera should be on site at the time of system installation.

3.1.7 Clearances

- Review operational clearances to verify whether daily use items fit (e.g. beds, carts).
- Consider clearances for emergency medical equipment.
- Ensure that all storage cabinets and sinks appear on the site print in their proper locations.
- Confirm that adequate space exists in the scan suite for delivery and installation of all replacement parts following installation of the system.

3.1.8 Network

Ensure that network communication is in place and active.

3.1.9 Chemical Contamination

Never install wet film processors in the same room as the scanner, as this may result in possible contamination of scanner components. Chemicals utilized by such processors can contribute to increased equipment failures and downtime, and decreased reliability.

When siting this equipment, consider the effects that contact with these chemicals and the resulting fumes might have on human subjects in proximity to them. In addition, film processor equipment installation must meet all manufacturer requirements (e.g. ventilation specifications) as well as all applicable local, state, and national codes.

3.1.10 Delivery

- Determine room dimensions and verify that doorways adequately accommodate the system.
- Verify the existence of an accessible dust-free non-construction zone route to the scan suite that accommodates delivery.
- Identify elevators, doorways and hallways that can accommodate delivery.
- Provide floor protection, if needed.
- Request rigging, if needed.

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Chapter 4 Regulatory Requirements

4.1 Regulatory Terms and Definitions

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

DIMENSIONS: The length, width, depth and height of equipment.

EGRESS: An egress is the single path of exit from within any room. It is the customer's responsibility to provide a means of egress.

GROUNDED WALL: A grounded wall is any wall with electrical conductivity to earth. Conductive materials generally found inwalls include masonry, concrete, and tile. Treat as grounded additional elements commonly found inwalls, including but limited to:

- Medical gas ports and plates
- Metal doors and window frames
- Water sources and metallic sink structures
- Metallic wall mounted cabinets
- A1/MDP main disconnect panel
- Equipment Emergency Off panels
- Industrial equipment (such as air conditioners and vents)
- Expansion joints
- Surface raceway
- Exposed wall conduits
- Floor outlet boxes
- Floor HVAC boxes
- Floor medical gas

Common wall components **NOT** constituting grounded elements include:

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

HEAD CLEARANCE: Head clearance represents the height dimension of the workspace, measured from the floo at the frontedge of the equipment to the ceiling or any overhead obstructions. It requires a minimum of 1981 mm(78 in) of the height of the equipment, whichever is greater.

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

SERVICE ACCESS WIDTH: Service access width refers to the width of the working space in front of the equipment, and requires aminimum of 762 mm (30 in) or the width of the equipment, whichever is greater.

WORK-SPACE: The workspace represents a three dimensional box of space required for safe inspection or service ofenergized equipment. It consists of depth, width, and height, with the depth dimension measuredperpendicular to the direction of access. US regulation requires a minimum depth of 914 mm (36 in). Reference local workspace requirements if outside US. Additional conditions can increase the minimum requirement. For example, FCT define workspace asthe envelope of the component superstructure, measured for the PDU with the front panel removed,and measured for the gantry and table with the extended covers removed.

4.2 Regulatory Clearances for United State

Refer to *Appendix: Regulatory Clearances for US* for United States (US) installations.

Chapter 5 System Component Dimensions

5.1 Minimum Operating Clearances

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

5.1.1 Ceiling Pedestal Mount Installation

The distance from the floor to the lowest point of the ceiling pedestal mount for the Injector or Monitor CANNOT measure LESS than 2134 mm (84 in.). Refer to the installation guides of those components for the length of the mounting post.

NOTE
The down post or ceiling mounted pedestal used to mount injectors, remote monitors or other devices shall not be installed within the tube crane area. See 6.1.1 Gantry Service Clearance on page 53.

NOTICE

Failure to maintain a distance of at least 2134 mm (84 in.) from the floor to the lowest point of the Injector or Monitor ceiling pedestal mount may pose a safety hazard. For installations with a finished ceiling height that is less than suggested, consideration should be given to utilizing floor mounted components, or attaching the mounting plate in the overhead (for example, above dropped ceiling tiles).

5.1.2 Injector Control Installation

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

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

NOTE
The console requires IEC power plugs to power GE approved options. All Options used with the system must be powered using the console or gantry power plugs.

For systems using any NEC power plugs, Options (such as Video splitter) must be plugged inside the console power strip.

5.1.3 System Operational Clearances

The clearances listed in Table 5-1 Minimum Dimensions and Operational Clearances on page 34 govern system operation; be sure that the site maintains each of these clearances.

Table 5-1 Minimum Dimensions and Operational Clearances

System Operation	mm	inches
Ceiling Pedestal mount (optional) Lowest point to floor injector or monitor	2134 mm	84 in.
Finished ceiling to floor (suggested)	2743 mm	108 in.
Finished ceiling to floor (minimum)	2286 mm	90 in.
Table to maximum extension head end with extender from Center Line	2070 mm (NG Elite 2000 Heavy Table) 1719 mm (NG Elite 1700 STD Table)	82 in. 68 in.
	2016 mm (VT2000, VT2000x) 1712 mm (VT1700V)	79 in. 67 in.
Table extension head end with extender to obstruction	152 mm	6 in.
Table in lowest position. with cradle at home position to surface of Gantry front cover.	3273 mm (NG Elite 2000 Heavy Table) 2848 mm (NG Elite 1700 STD Table)	129 in. 112 in.
	3327 mm (VT2000, VT2000x) 2744 mm (VT1700V)	131 in. 108 in.
Back of Console to wall	96 mm	4 in.
Back of PDU to wall	152 mm	6 in.

5.2 Component Dimensions

5.2.1 Gantry Dimensions

Figure 5-1 Gantry Dimensions with Covers

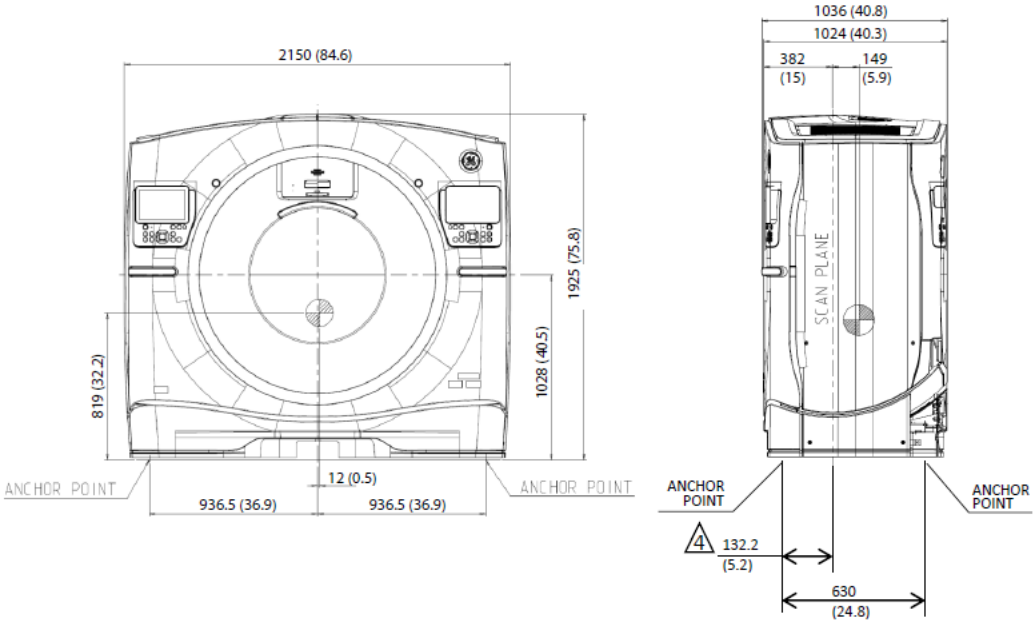


Figure 5-2 Rear Cover Door Dimensions

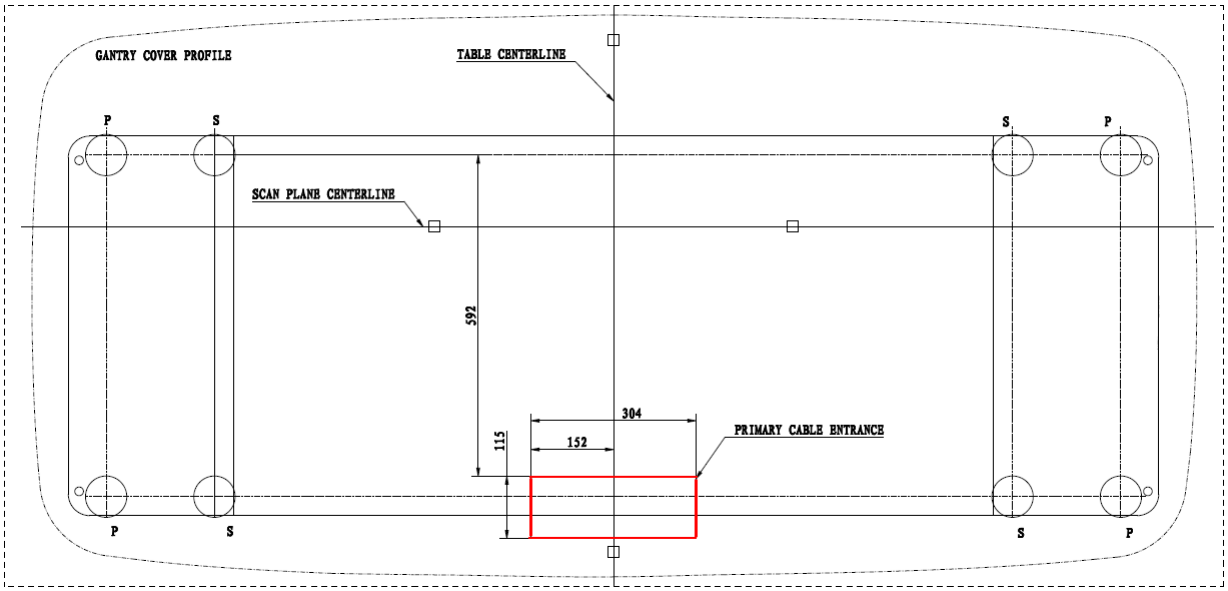
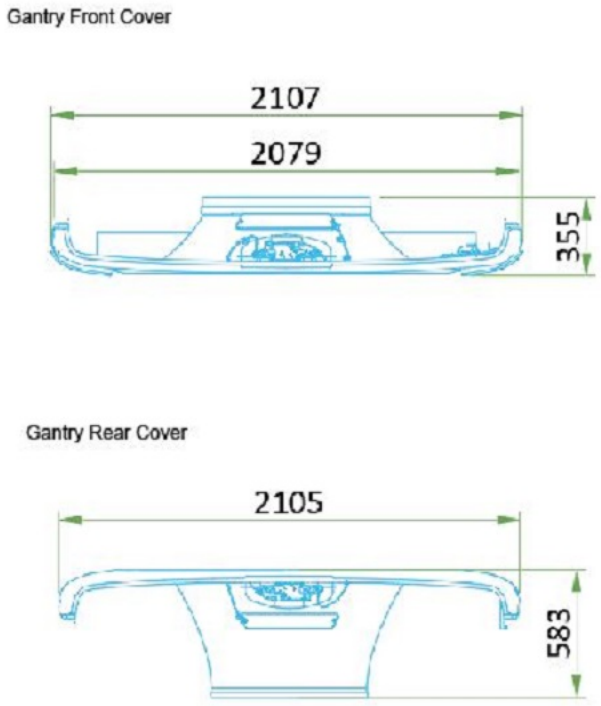


Figure 5-3 Gantry Cover Dimensions



NOTE
1036 is Gantry cover with LCD belt width, 1024 is the Gantry cover width without LCD belt.

5.2.2 Table and Gantry Dimensions (with NG Elite 1700 Table / VT1700V)

Figure 5-4 NG Elite 1700 Table and Gantry (Side View)

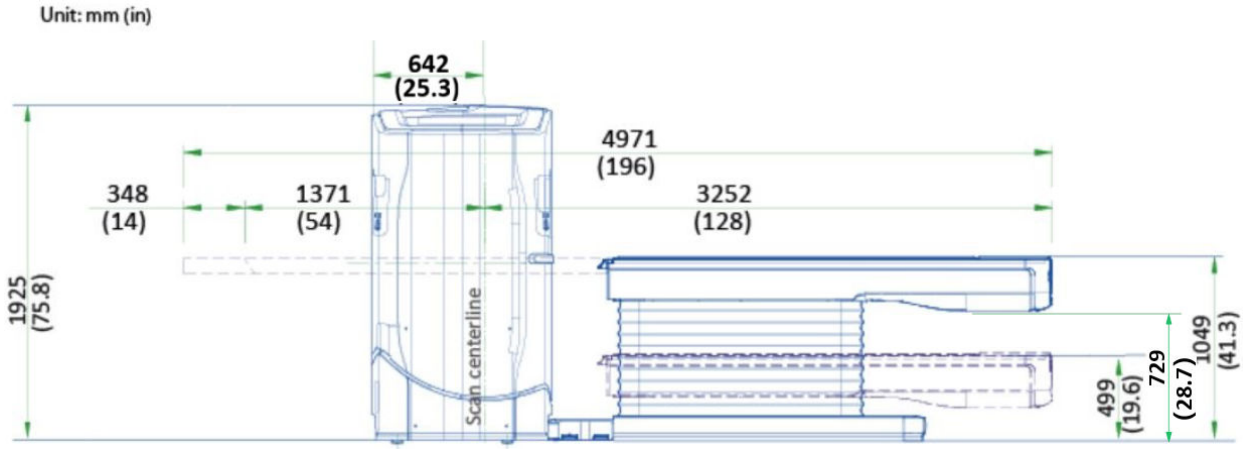


Figure 5-5 VT1700V Table and Gantry (Side View)

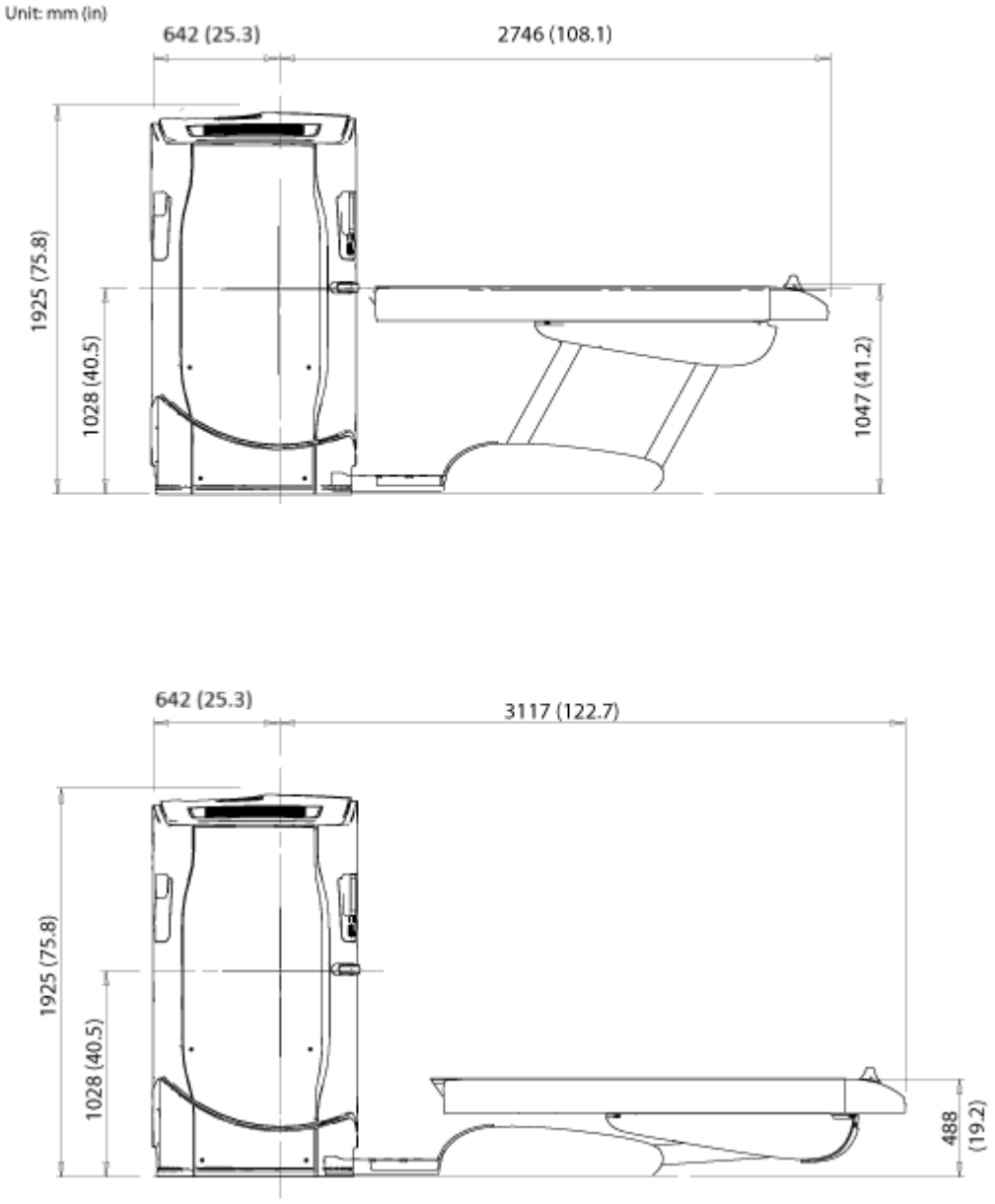


Figure 5-6 Gantry Tilted +30° (top) and -30° (bottom) - NG Elite 1700 Table Options

Unit: mm (in)

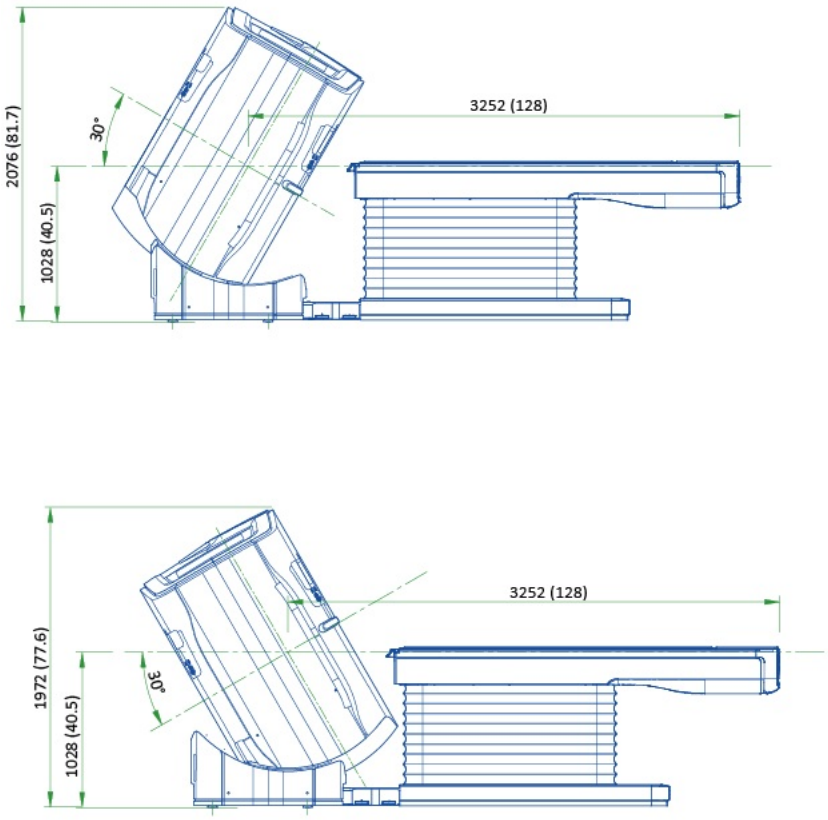
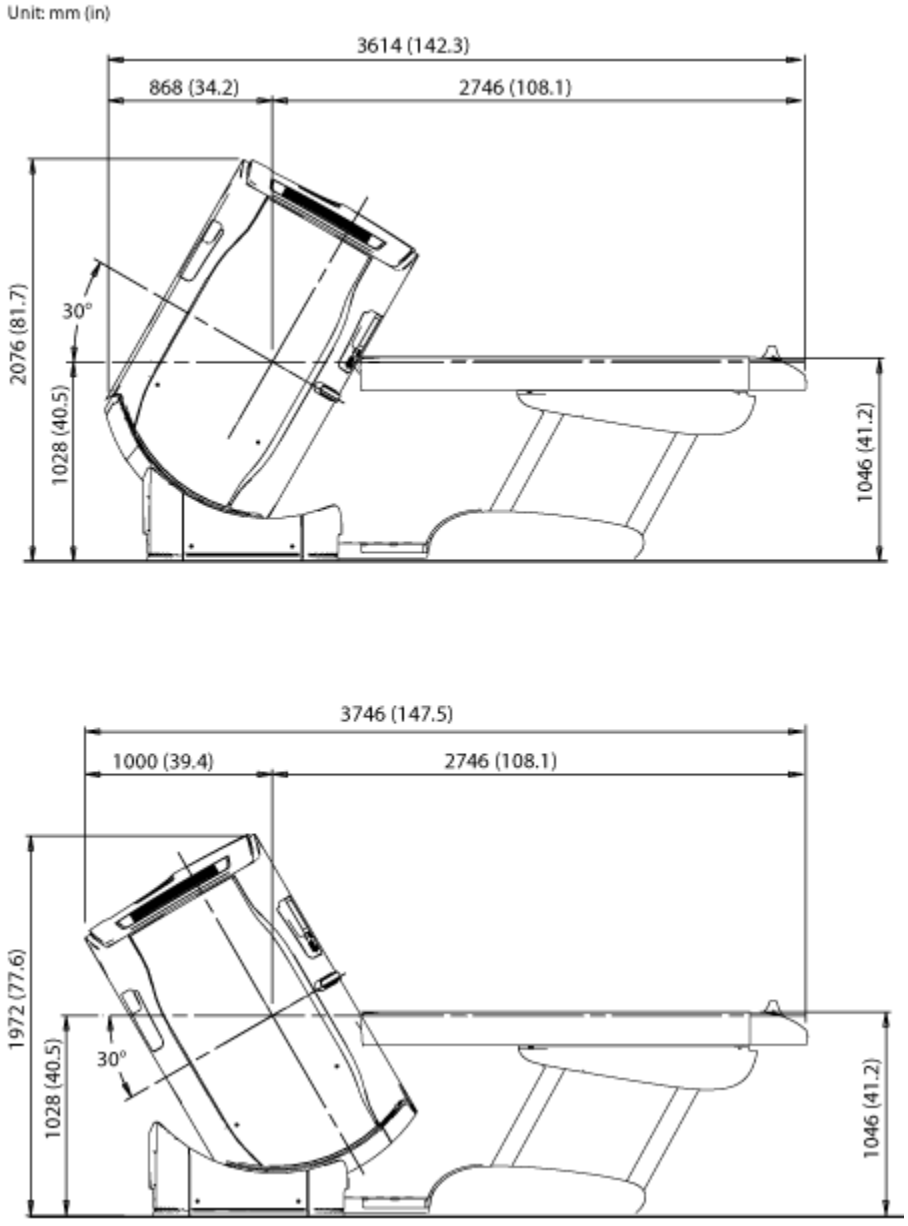


Figure 5-7 Gantry Tilted +30° (top) and -30° (bottom) - VT1700V Table Options



5.2.3 Table and Gantry Dimensions (with NG Elite 2000 Table / VT2000 Table / VT2000x)

Figure 5-8 NG Elite 2000 Table and Gantry (Side View)

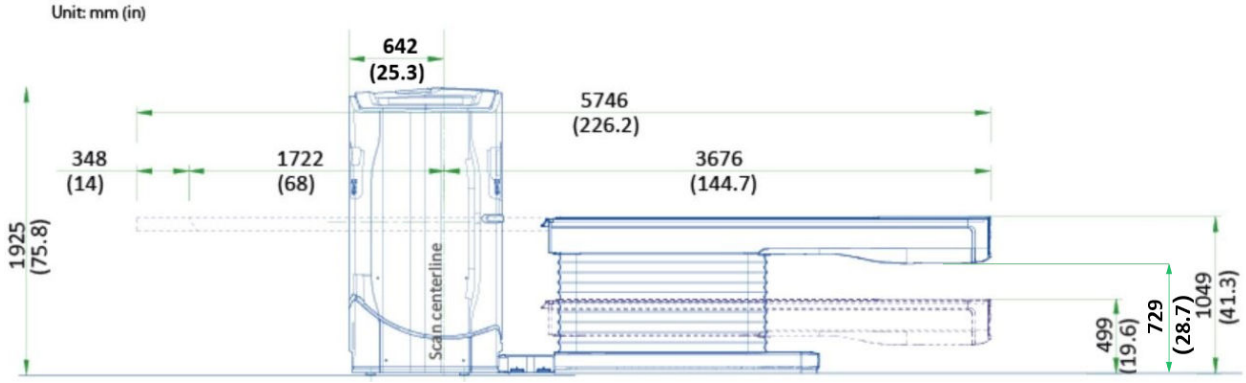


Figure 5-9 VT2000 / VT2000x Table and Gantry (Side View)

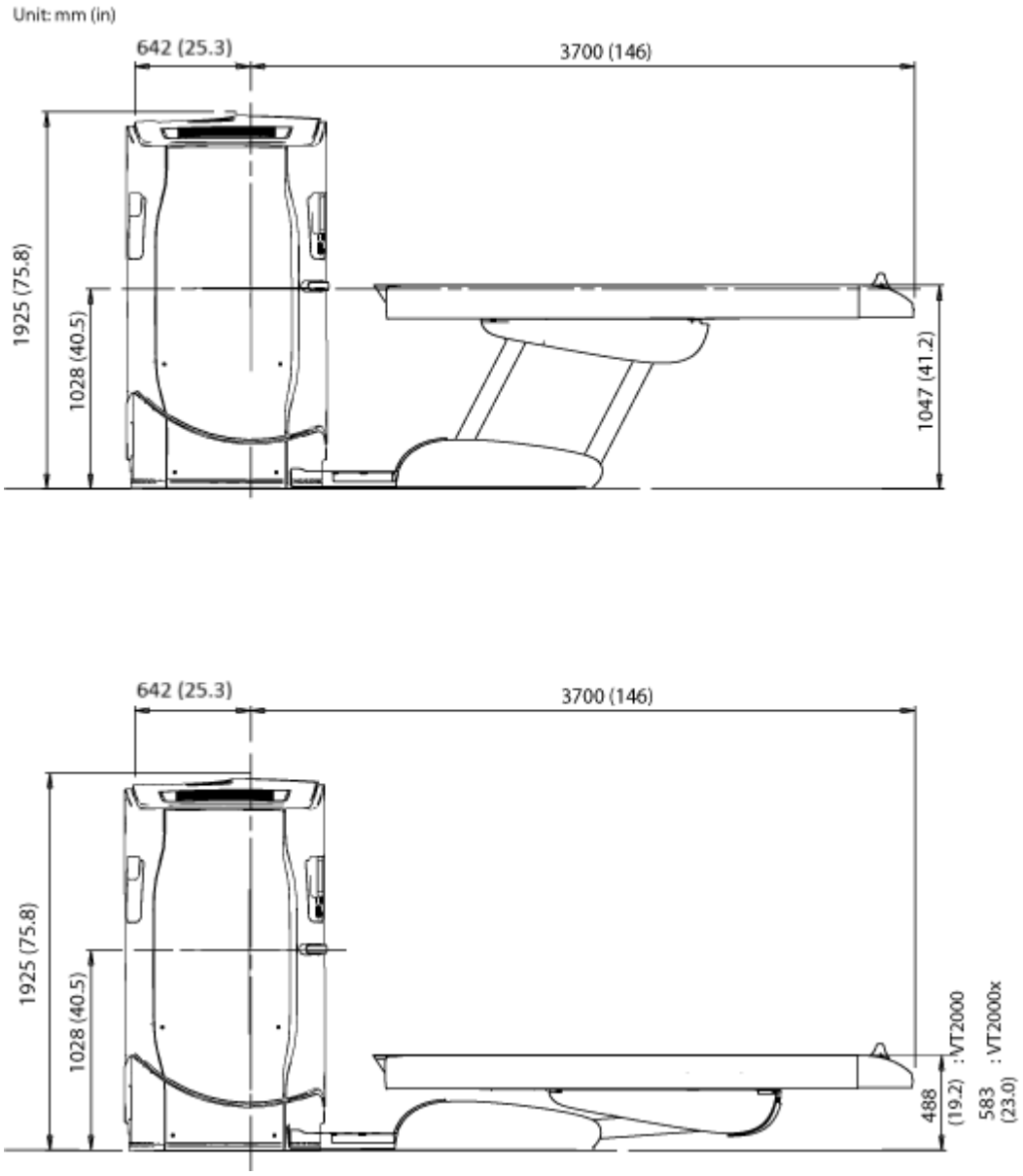


Figure 5-10 Gantry Tilted +30° (top) and -30° (bottom) - NG Elite 2000 Table Options

Unit: mm (in)

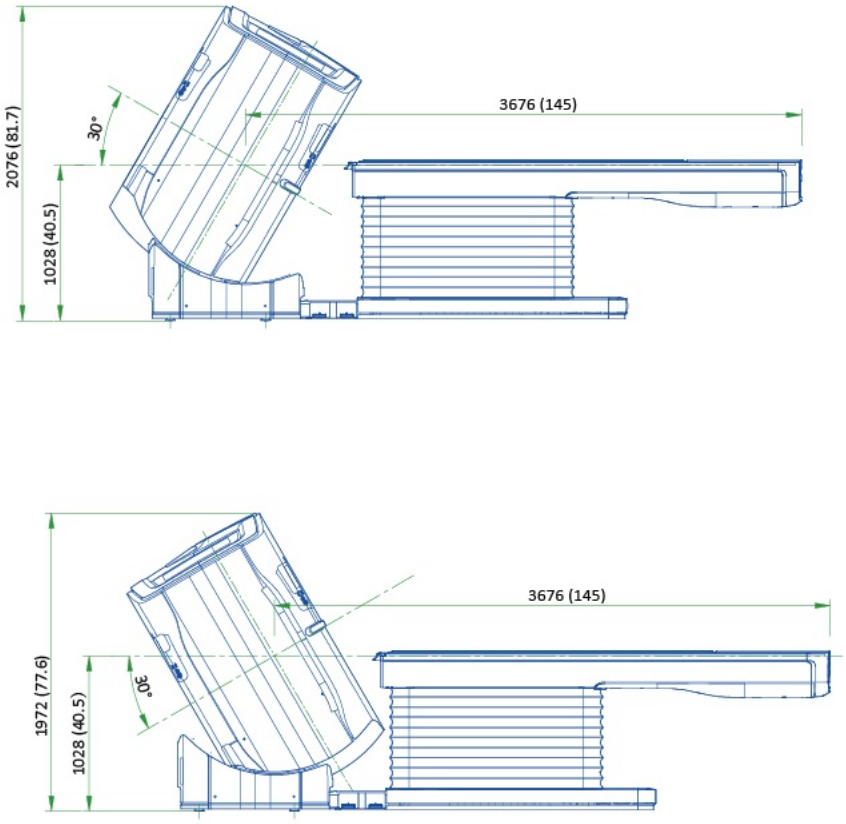
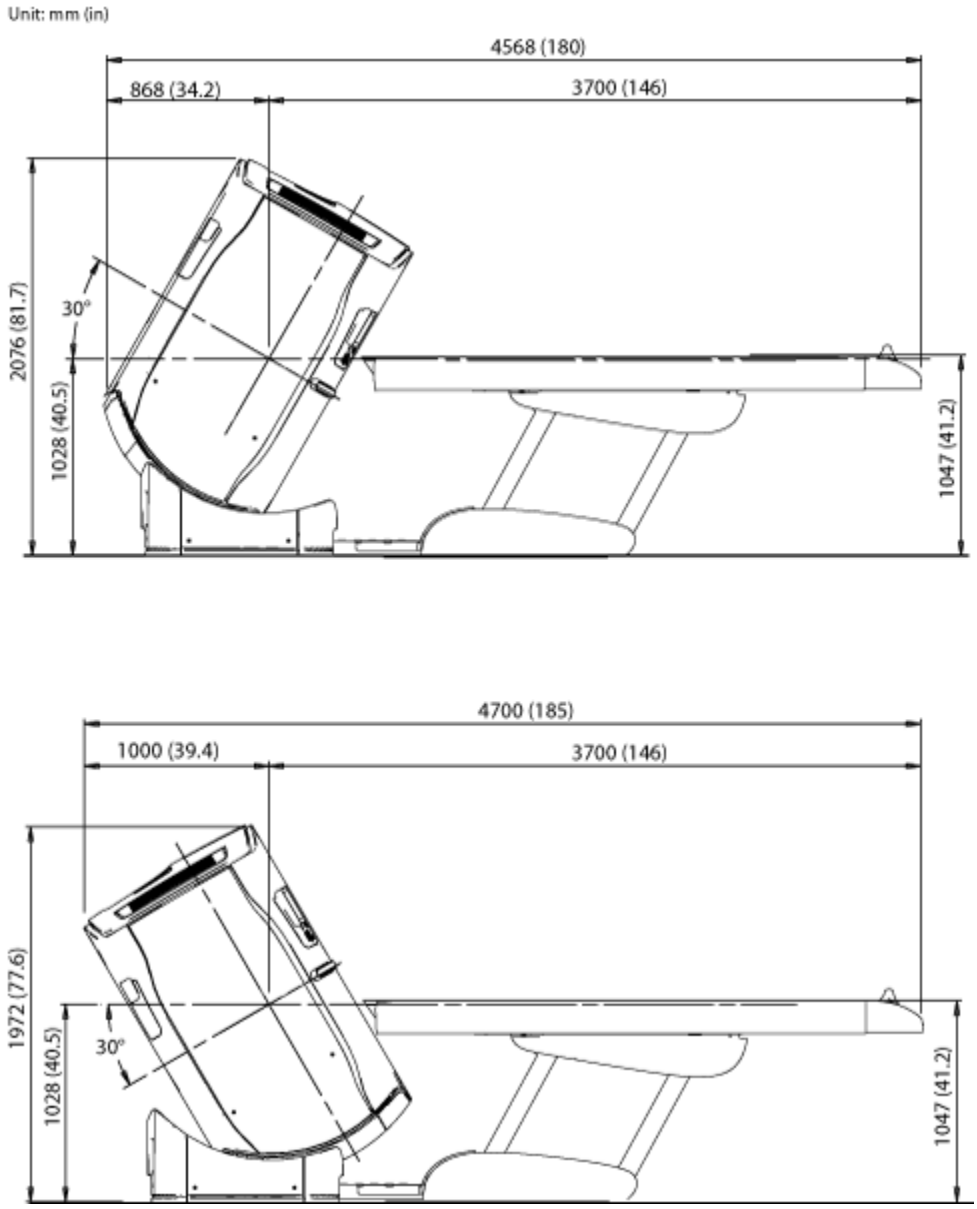


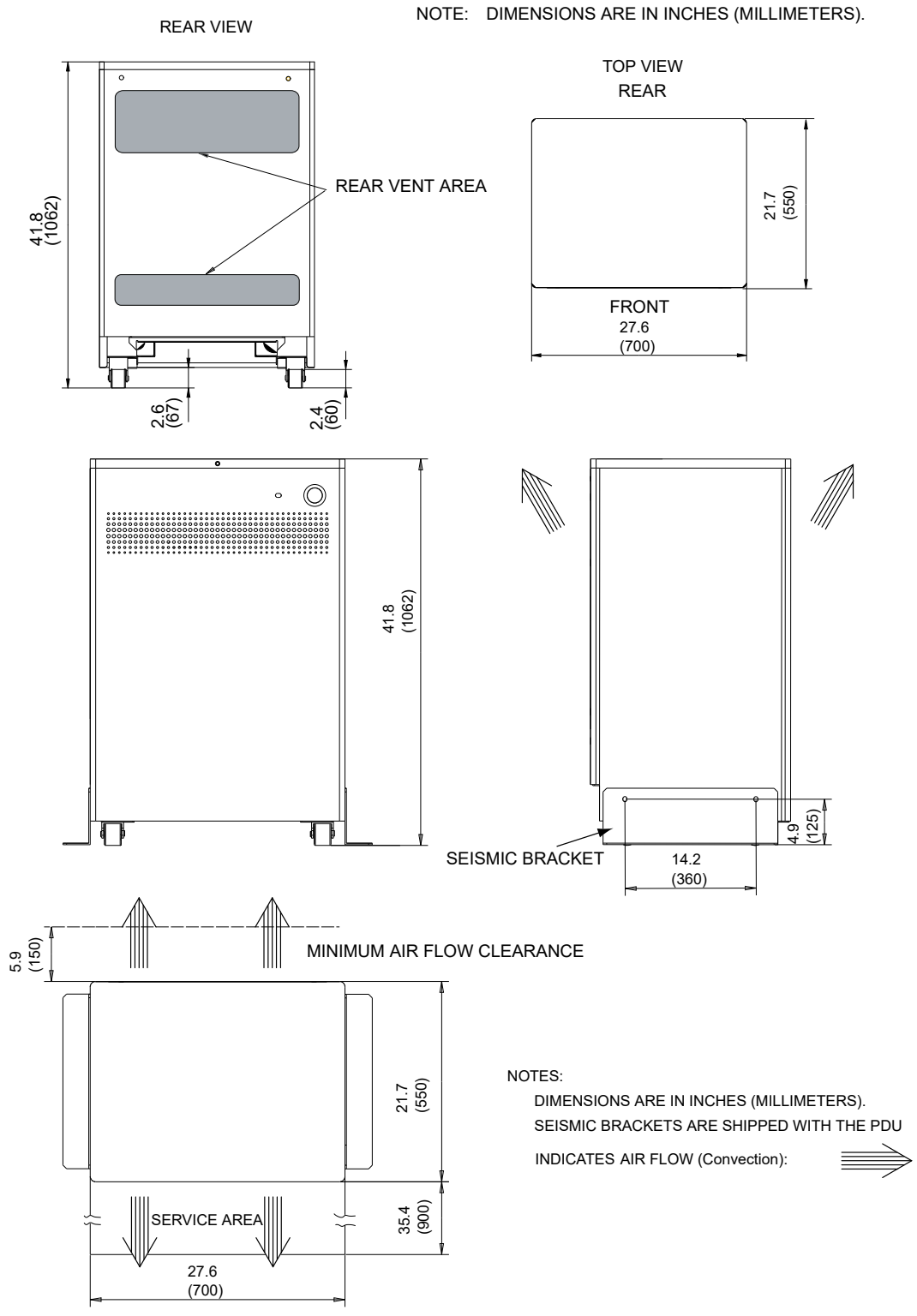
Figure 5-11 Gantry Tilted +30° (top) and -30° (bottom) - VT2000 and VT2000x Table Options



5.2.4 Power Distribution Unit Dimensions

PDU dimensions, air intake/exhaust, seismic bracket locations, and service areas appear below.

Figure 5-12 Power Distribution Unit



5.2.5 Console Dimensions

StandAlone Console

Figure 5-13 Z8G4 StandAlone Console

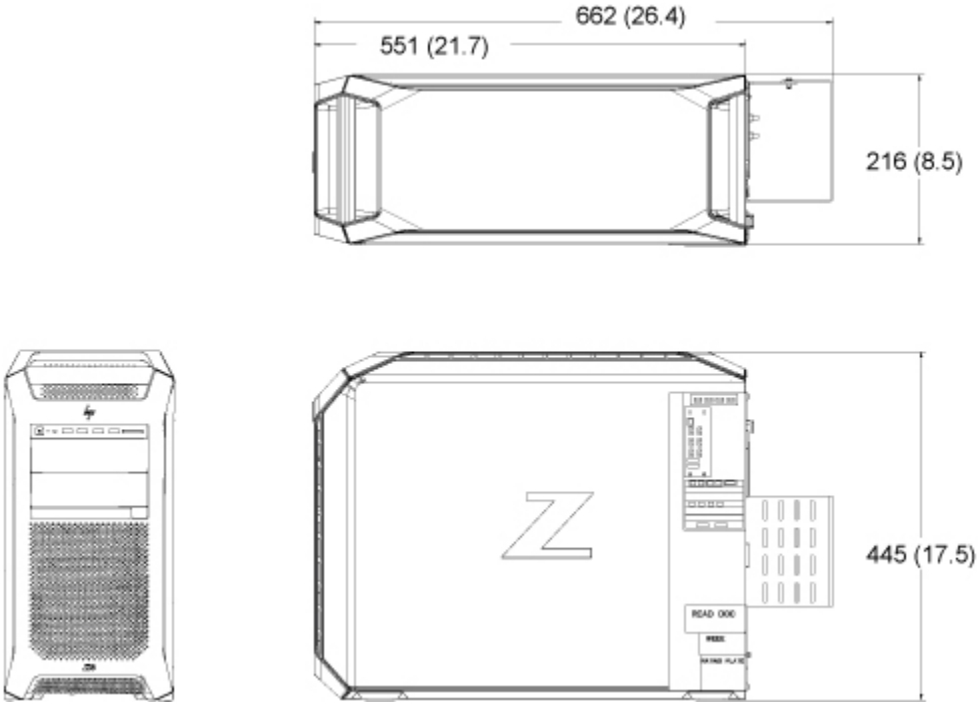


Figure 5-14 Z8G5 StandAlone Console

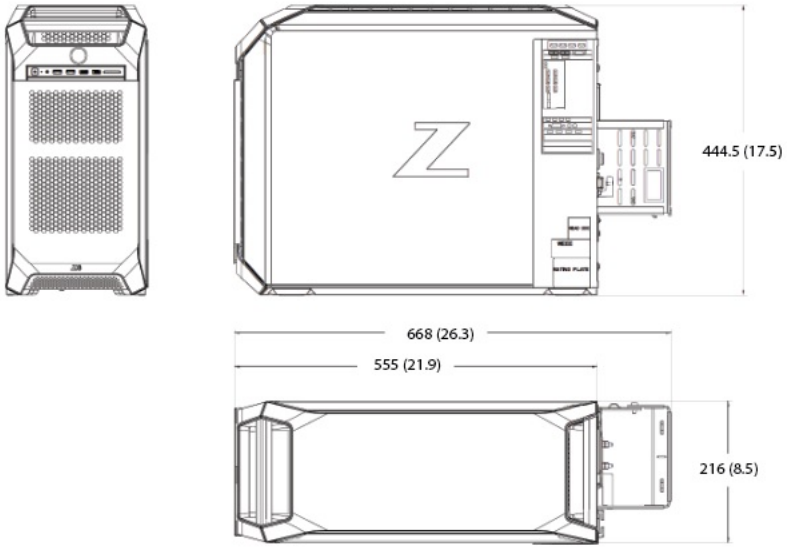


Table 5-2 Dimensions of StandAlone Console

Description	Width	Depth	Height	Weight
Z8G4 Host Computer	216 mm (8.5 in)	551 mm (21.7 in)	445 mm (17.5 in)	26 kg (57 lb) (without package)

Table 5-2 Dimensions of StandAlone Console (Table continued)

Description	Width	Depth	Height	Weight
Z8G5 Host Computer	216 mm (8.5 in)	555 mm (21.8 in)	445 mm (17.5 in)	23.1 kg (51 lb) (without package)

Figure 5-15 Power Box

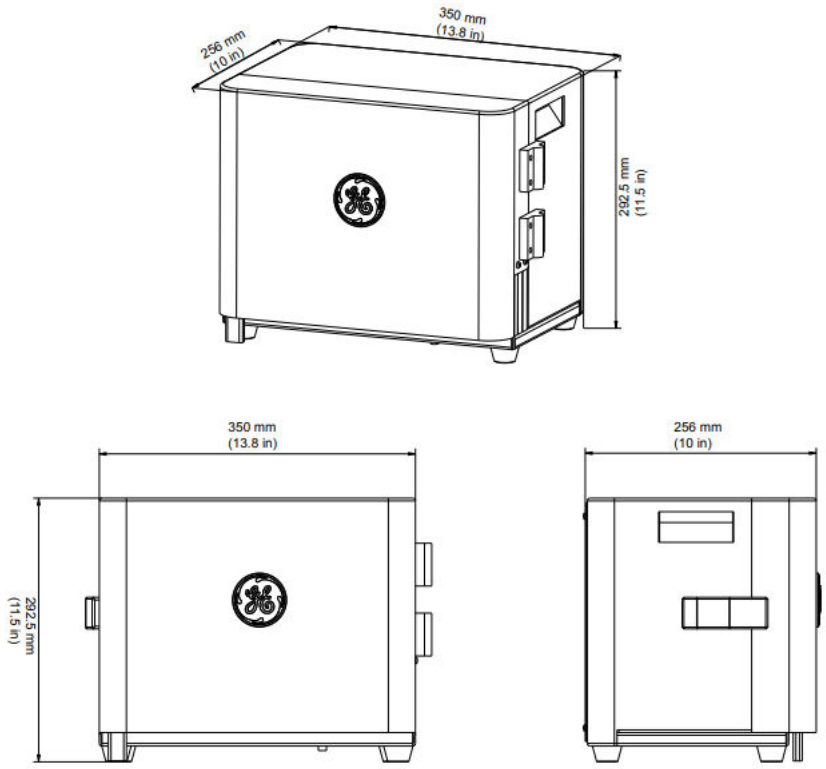


Table 5-3 Dimensions of Power Box

Description	Width	Depth	Height	Weight
Power Box	350 mm (13.8 in)	256 mm (10 in)	293 mm (11.5 in)	10.5 kg (23.1 lb) (without package)

StandAlone Console and Power Box with Seismit Kit (For Seismic Area Only)

Figure 5-16 StandAlone Console and Power Box with Seismit Kit

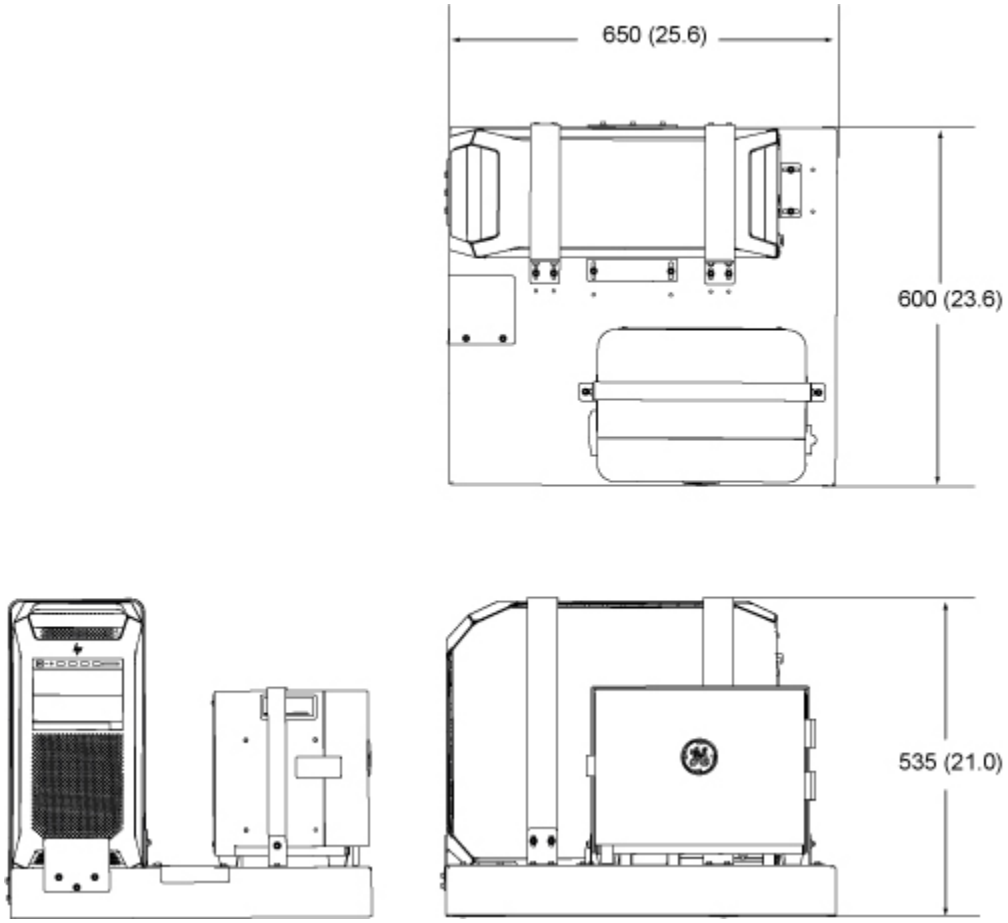


Table 5-4 Dimensions of StandAlone Console and Power Box with Seismit Kit

Description	Width	Depth	Height	Weight
Power Box	600 mm (23.6 in)	650 mm (25.6 in)	535 mm (21.0 in)	58.7 kg (129.4lb) (without package)

Figure 5-17 Console Desk (P/N 5449758-2)

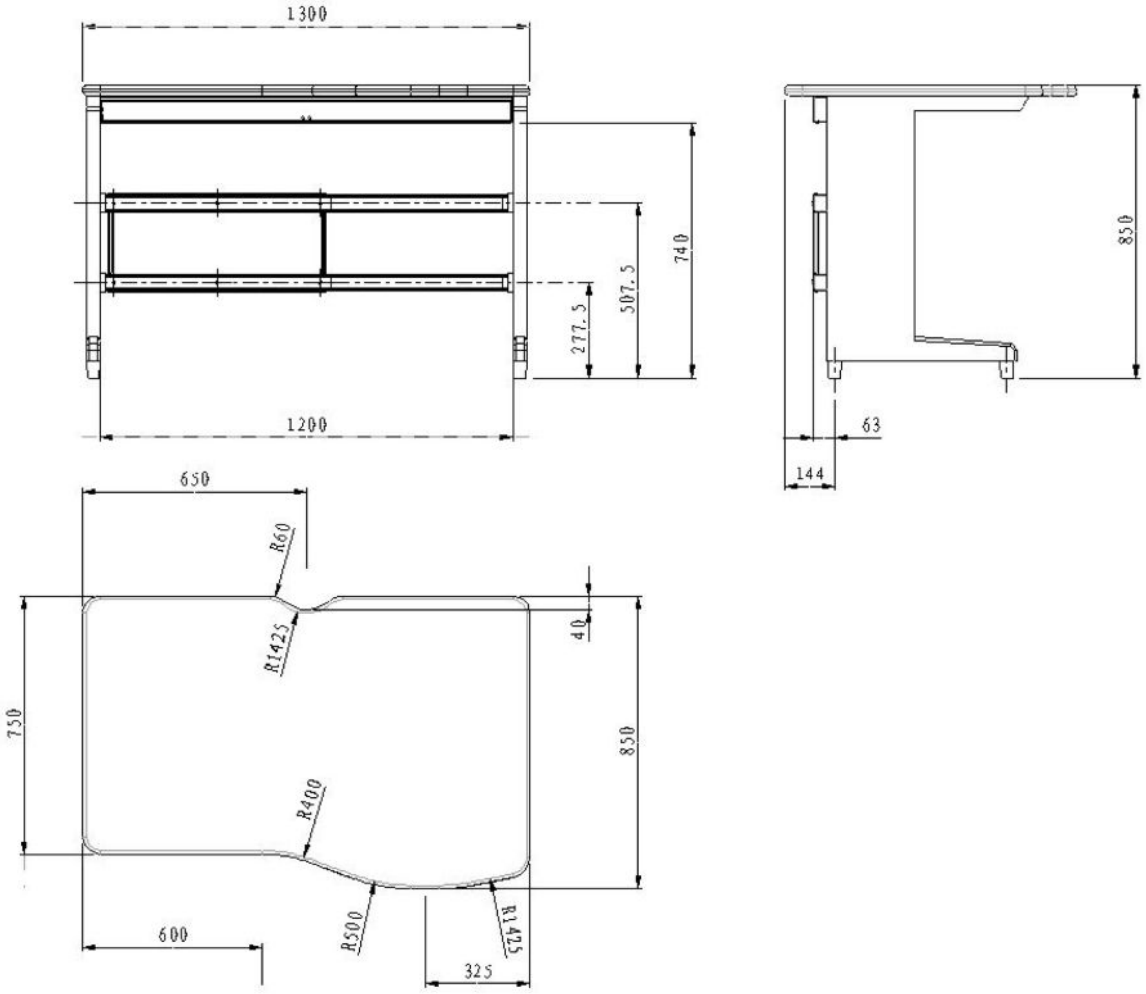


Table 5-5 Dimensions of Console Desk

Description	Width	Depth	Height	Weight
Console Desk	1300 mm (51 in)	850 mm (33 in)	850 mm (33 in)	40 kg (88 lb)

Chapter 6 Service Clearance Requirements

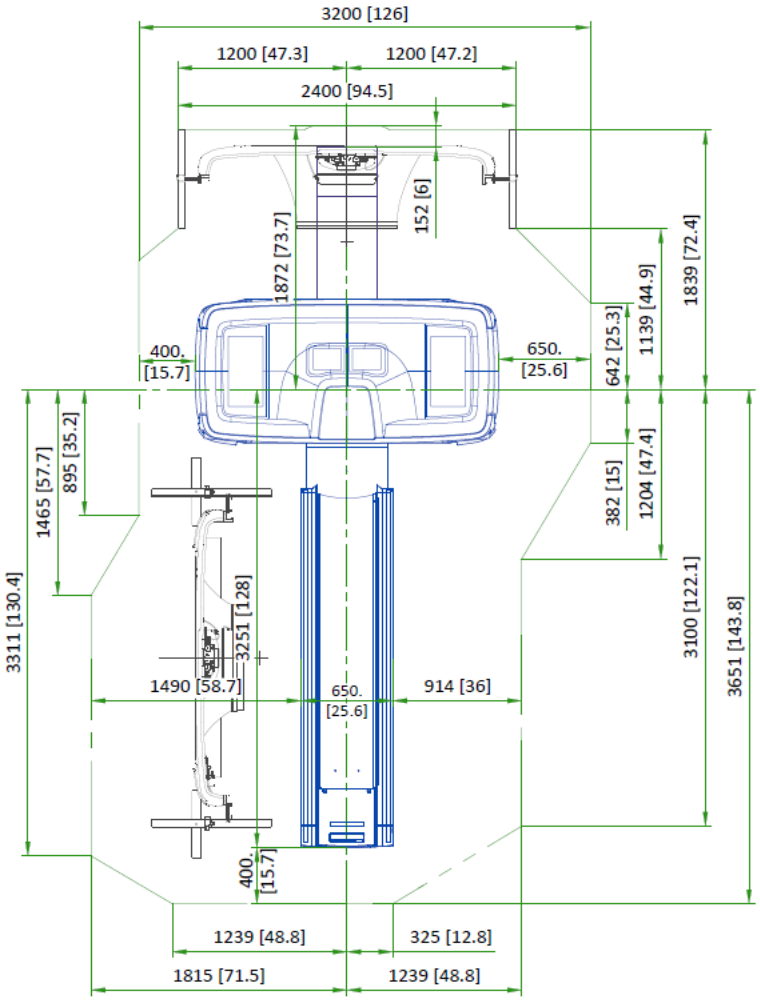
6.1 Service Clearance Requirements

- Sufficient space to remove the covers.
  (For NG Elite Table) See Figure 6-1 Minimum Service Clearances with NG Elite 1700 Table on page 50 and Figure 6-3 Minimum Service Clearances with NG Elite 2000 Table on page 52

  (For VT Table) See Figure 6-2 Minimum Service Clearances with VT1700V on page 51 and Figure 6-4 Minimum Service Clearances with VT2000, VT2000x on page 53

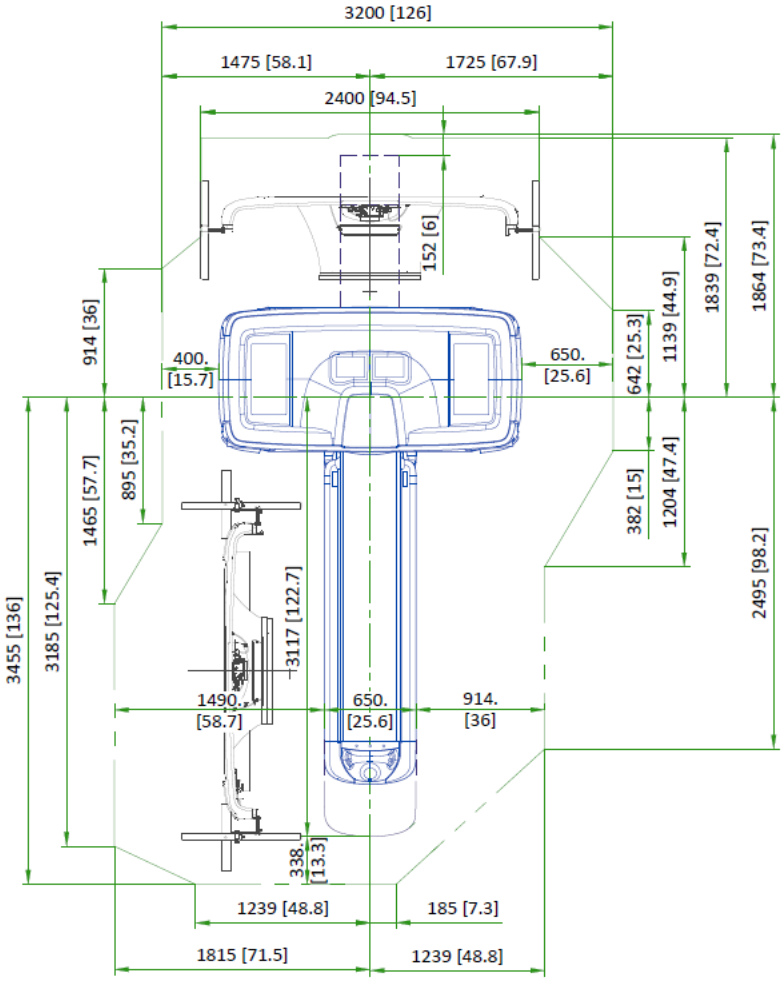
  NOTE
  Referring to Appendix B Alternate Cover Removal Options on page 175 for alternative cover removal options.
- One service engineer shall be able to accomplish all service component replacement tasks without needing special tools or equipment.
- ALL room layouts to provide service space and access around the table to the gantry right side. This is needed for replacement procedures that require components that ship in large boxes, such as the tube, detector, and HV tank.

Figure 6-1 Minimum Service Clearances with NG Elite 1700 Table



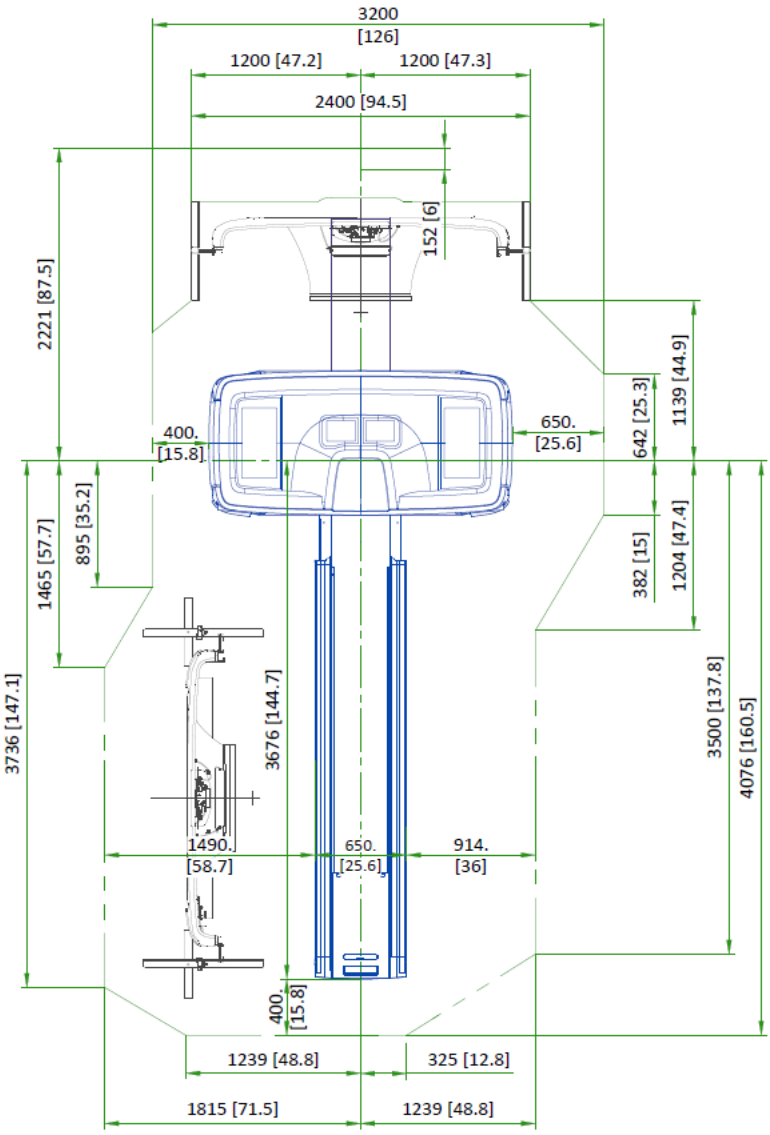
NOTE
Unit: mm (in)

Figure 6-2 Minimum Service Clearances with VT1700V



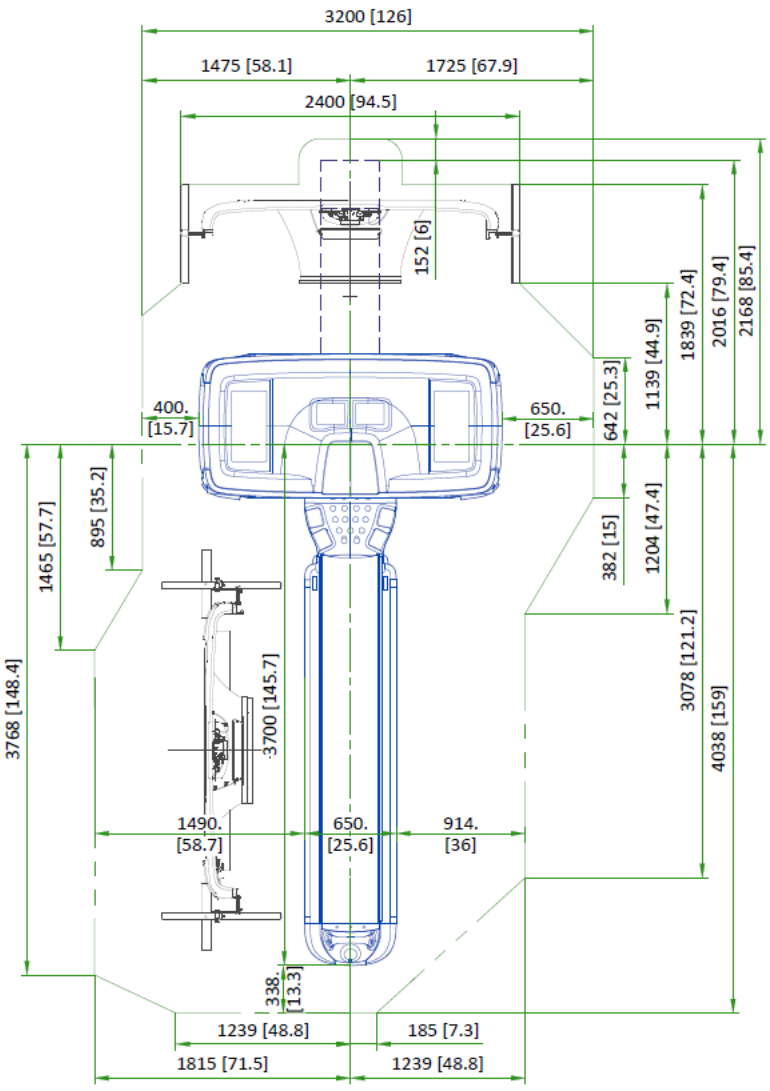
NOTE
Unit: mm (in)

Figure 6-3 Minimum Service Clearances with NG Elite 2000 Table



NOTE
Unit: mm (in)

Figure 6-4 Minimum Service Clearances with VT2000, VT2000x

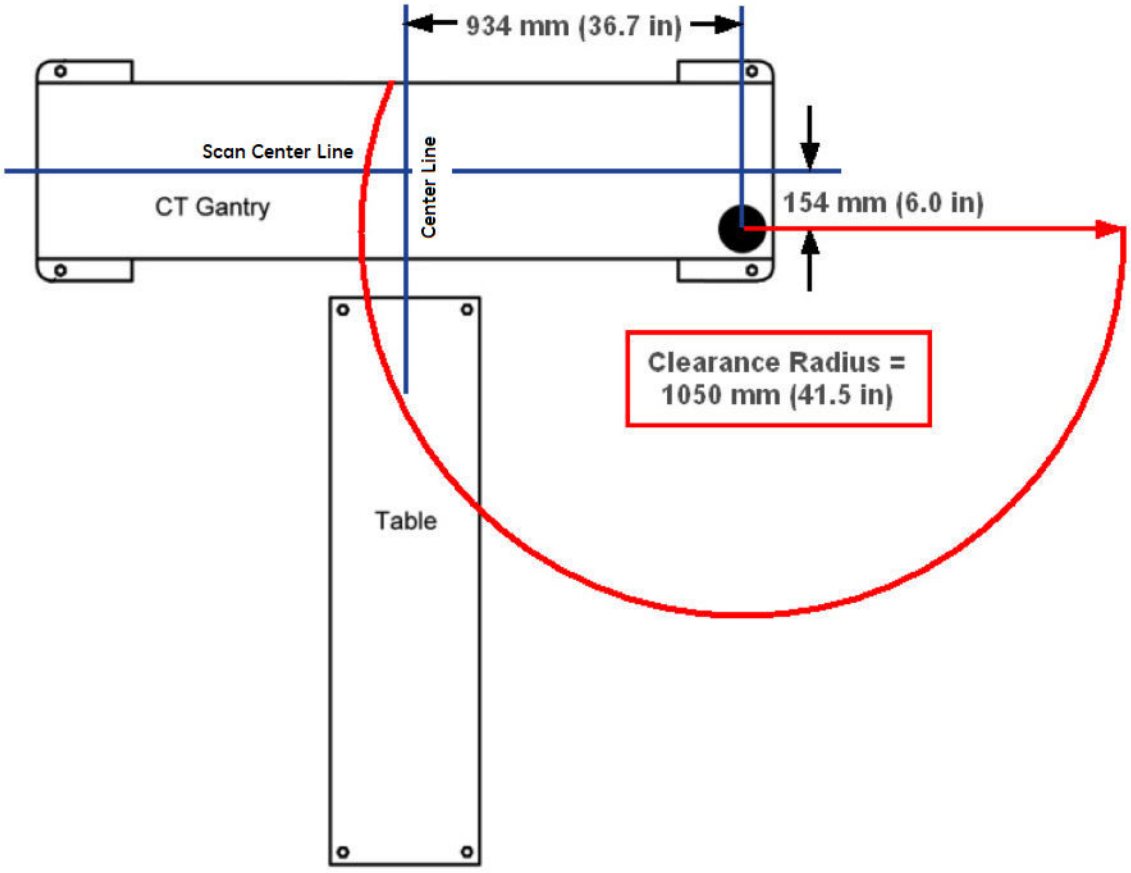


NOTE
Unit: mm (in)

6.1.1 Gantry Service Clearance

Specifications for Boom Assembly clearance arc are defined in Figure 6-5 Boom Assembly Clearance on page 54. The boom assembly is used during tube and detector replacement. The minimum ceiling height within the clearance radius is 2286 mm (90 in).

Figure 6-5 Boom Assembly Clearance



6.2 Service Clearances for Single Service Engineer

NOTE
When calculating service clearances, refer to 6.1 Service Clearance Requirements on page 49 for all service clearance needs.

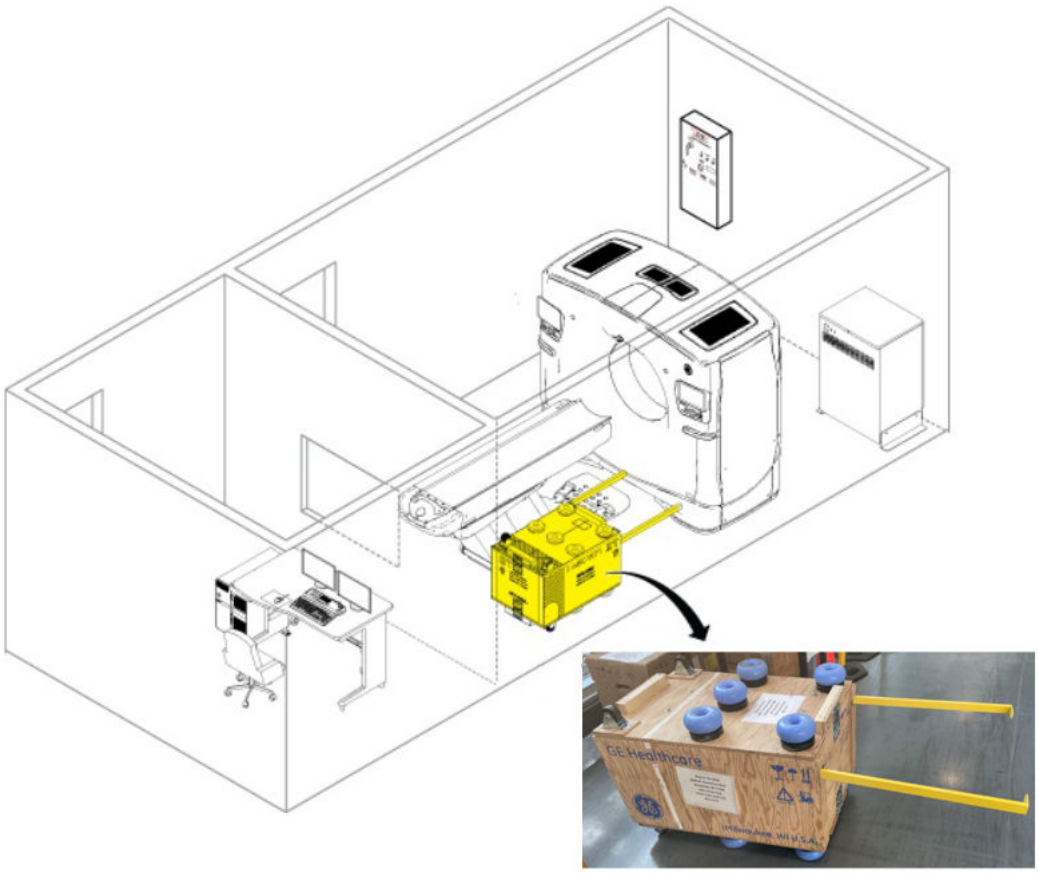
6.2.1 Cover Removal

- Gantry front cover removal requires the use of the Tilting Cover Dollies and a minimum clearance space of 2930 mm (115 in.) to maneuver the cover, as illustrated in Figure 6-2 Minimum Service Clearances with VT1700V on page 51 and Figure 6-4 Minimum Service Clearances with VT2000, VT2000x on page 53. The dollies allow the service engineer to separate the cover from the gantry, tilt it 90 degrees, roll it to the foot end of the table, and then tilt it an additional 90 degrees, so that it is upside-down relative to its normal system-mounted condition. After removal, the service engineer must then move the gantry front cover to a position that satisfies the minimum regulatory clearances.
- The gantry rear cover, with service dollies installed, requires a clearance width of 2400 mm (94 in.) and a depth of 1839 mm (72 in.) for removal, as shown in Figure 6-2 Minimum Service Clearances with VT1700V on page 51 and Figure 6-4 Minimum Service Clearances with VT2000, VT2000x on page 53. Sufficient space to allow the service engineer to move the cover either straight back or to one side of the table to satisfy the minimum service clearances shown in Figure 6-2 Minimum Service Clearances with VT1700V on page 51 and Figure 6-4 Minimum Service

Clearances with VT2000, VT2000x on page 53 must be maintained. The rear cover with dollies cannot extend past the allowable clearance space within the room (see Figure 6-2 Minimum Service Clearances with VT1700V on page 51 and Figure 6-4 Minimum Service Clearances with VT2000, VT2000x on page 53). If the system is not sited straight (it is positioned diagonally), full service space is still required. The PMI and customer should discuss this consideration and make the necessary provisions.

- The scan room must offer sufficient space to allow adequate egress during service operations that require both front and rear cover removal. If the customer and PMI have any concern that site will not provide adequate space for egress under these conditions, they should discuss these requirements and make the necessary provisions to accommodate this event.
- A single service engineer can safely perform servicing of the table. Ensure sufficient clear space to maintain egress clearances with the table covers or cradle removed.
- A single service engineer can safely perform servicing of the system. Ensure sufficient clear space to maintain egress clearances with covers or cradle removed.
- A tube change box is 1813 mm (L) x 711 mm (W) x 737 mm (H) (71 in. x 28 in. x 29 in.), with the handles extended, and 1016 mm (L) x 711 mm (W) x 737 mm (H) (40 in. x 28 in. x 29 in.) with handles not extended.. The box rolls like a wheelbarrow and must have access to the right side of the gantry. It is the PMI's responsibility to demonstrate that the tube change box can be positioned in the tube change area next to the gantry and that the front and rear covers can be removed.

Figure 6-6 Tube Change Box Delivery



6.2.2 Power Distribution Unit (PDU)

When positioning the Power Distribution Unit (PDU), consider regulatory compliance.

Minimum Safe Service Clearance (Front of PDU): 914.4 mm (36.0 in.)

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.

6.2.3 Console

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

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

See Figure 1 for a typical control room layout.

6.2.4 Storage Cabinet

GE Healthcare provides a storage cabinet (see Note below) for storing all supplied service equipment (see). Situate this storage cabinet within the scan room suite area to allow easy service access. The dimensions of the cabinet measure 610 mm D x 914 mm W x 1067 mm H (24 in. D x 36 in. W x 42 in. H), complete unit not to exceed 68kg (150 lbs) (empty).

NOTE
A storage cabinet is provided as option (B77292CA).

Table 6-1 Equipment Stored in Storage Cabinet

Item	Size	Weight (total)	
QA Phantom (water filled)	20 cm x 15 cm (7.9 in. x 5.9 in.)	5.5 kg	12 lb
Phantom Holder	25 cm x 25 cm (9.8 in. x 9.8 in.)	3.6 kg	8 lb
FE Box (Purple)	30 cm x 38 cm x 30 cm (11.8 in. x 15 in. x 11.8 in.)	6.8 kg	15 lb
Rear cover dollies	158 cm x 82 cm (62.2 in. x 32.3 in.)	11.4 kg	25 lb
Front cover dollies	116 cm x 85 cm (45.7 in. x 33.5 in.)	14.5 kg	32 lb
Install Support Kit (box)	30 cm x 30 cm x 38 cm (11.8 in. x 11.8 in. x 15 in.)	9.1 kg	20 lb
Tube Hoist Assembly	77 cm x 8 cm and 38 cm x 15 cm (30.3 in. x 3.1 in. and 15 in. x 5.9 in.)	9.1 kg	20 lb
Balance Weight Kit		33 kg	73 lb

Chapter 7 Room Sizes

7.1 Room Dimensions

Table 7-1 Minimum Scan Room Size Dimensions

System Configuration	OSHA compliant	OSHA non-compliant
Revolution ASCEND with NG Elite 1700 STD Table	3220 mm x 5490 mm (127 in. x 216 in.)	3160 mm x 5440 mm (125 in. x 214 in.)
Revolution ASCEND with NG Elite 2000 Heavy Table	3220 mm x 6270 mm (127 in. x 247 in.)	3160 mm x 6210 mm (125 in. x 244 in.)
Revolution ASCEND with VT 1700V Table	3220 mm x 5340 mm (127 in. x 210 in.)	3160 mm x 5280 mm (125 in. x 208 in.)
Revolution ASCEND with VT2000/ VT2000x Table	3220 mm x 6220 mm (127 in. x 245 in.)	3160 mm x 6170 mm (125 in. x 243 in.)
All service/regulatory requirements apply, with the addition of no energized left-side service.		

7.1.1 Minimum Room Size

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

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

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

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

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

7.2 Short Footprint Considerations

If the site room length cannot satisfy the requirements for standard mode. Short Footprint mode can be considered.

The Short Footprint mode limits the distance of the cradle travel so that cradle does not collide with the wall behind Gantry. The scannable range is limited accordingly.

The Short Footprint features are as follows:

- Cradle Movement limitation can be set at any position.
- Table height limitation cannot be set.
- Scannable range depends on the Gantry Rear space (distance to the wall), but need to consider the Service Clearance and country's local regulation for Gantry Rear space.

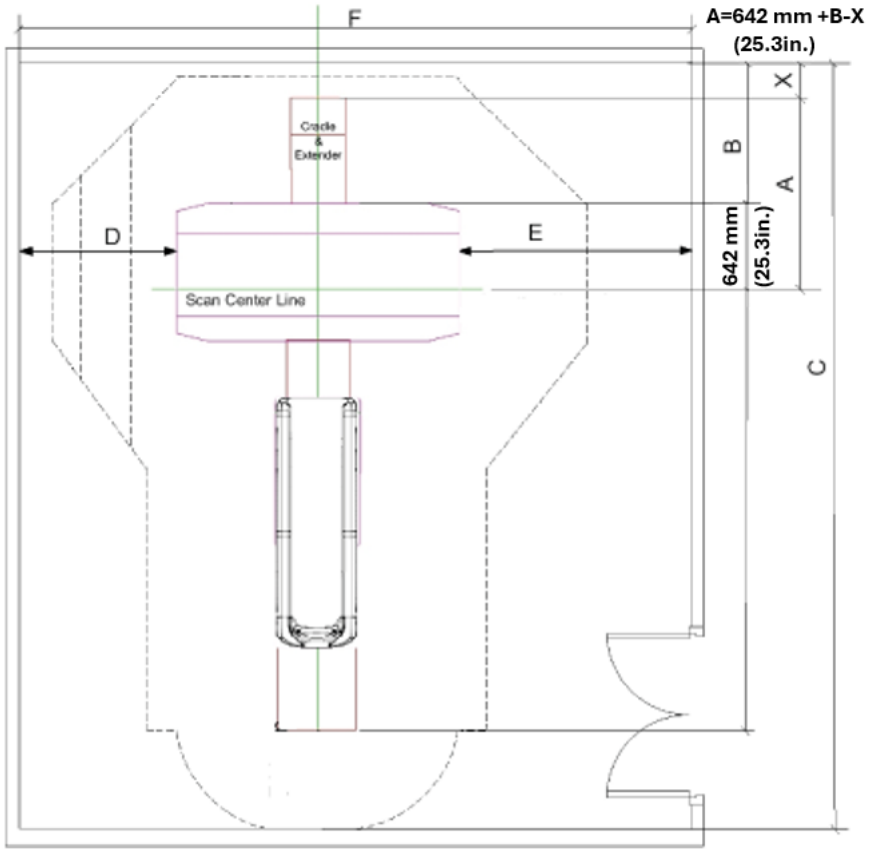
7.2.1 Instruction of using Short Footprint function

NOTICE

Cradle limitation must comply with country or local regulatory clearance requirements.Cradle movement limitation set by short footprint mode must be approved by customer during pre-installation.

1. Refer to Figure 7-1 Short Footprint Calculation diagram on page 58 and calculate the cradle scannable limitation (A).
2. Make GE siting print to meet regulatory and service clearance requirements.
3. Record the distance from cradle limitation to wall (X) and cradle scannable limitation (A) for installation.

Figure 7-1 Short Footprint Calculation diagram



A: Cradle Scannable Limitation, the value to be set using Short Footprint functionA(Scannable Range(approx.)) = 642mm (25.3in.) (Scan Center Line to Gantry Rear Cover)+ B(Gantry Rear Cover to Wall) - X(Safety Clearance to prevent hitting cradle to wall).

B: Gantry rear cover to wall.

C: Room Length

D: Gantry left side to wall.

E: Gantry right side to wall.

F: Room Width

X: Distance from cradle limitation to wall.

NOTICE

It is suggested that safety clearance from cradle IN-limit to wall should be no less than 152 mm (6 in.).

7.3 Control Room Considerations

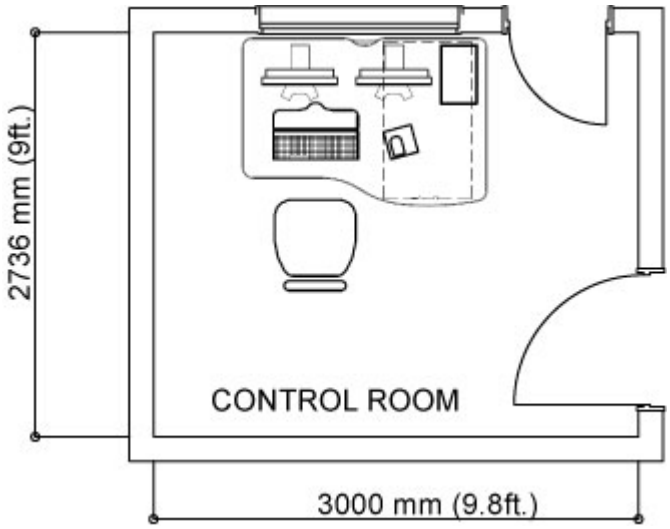
- The control room must provide an operating environment suitable for the console electronics and the operator's working comfort. See Chapter 9 Environmental Requirements on page 109.
- As the console requires adequate venting, maintain 96 mm (4 in.) of clear, unobstructed space on all sides of the console to allow the four fans located on the rear of the console to exhaust air to both the left and right.
- Provide a suitable work area within reach of the console for the placement of the injector control. Injector controls differ in dimensions depending on the brand selected.
- A PACS, workstation, image printer, or filming device may appear in the console control room area. These devices or other components, though having a direct link to the console via network or ethernet cable, shall NOT receive power from the console (if outlets exists on the console). If you are using additional devices or components, consider additional room power and network connections when reviewing the console workspace.

7.3.1 Typical Control Room Layout

7.3.1.1 Console Considerations

- The console must remain in the same configuration as shipped. Do not dismantle the console, or remove or rearrange its components.
- Cable lengths must remain as shipped (cables cannot be cut or extended to mount the monitor on the customer's counter).

Figure 7-2 Typical Control Room Layout without PDU



7.3.1.2 Console Long Cable Option

Console cabinet can be placed approximately 3 meters away from LCD monitor, GSCB and keyboard by using Long Cable Option.

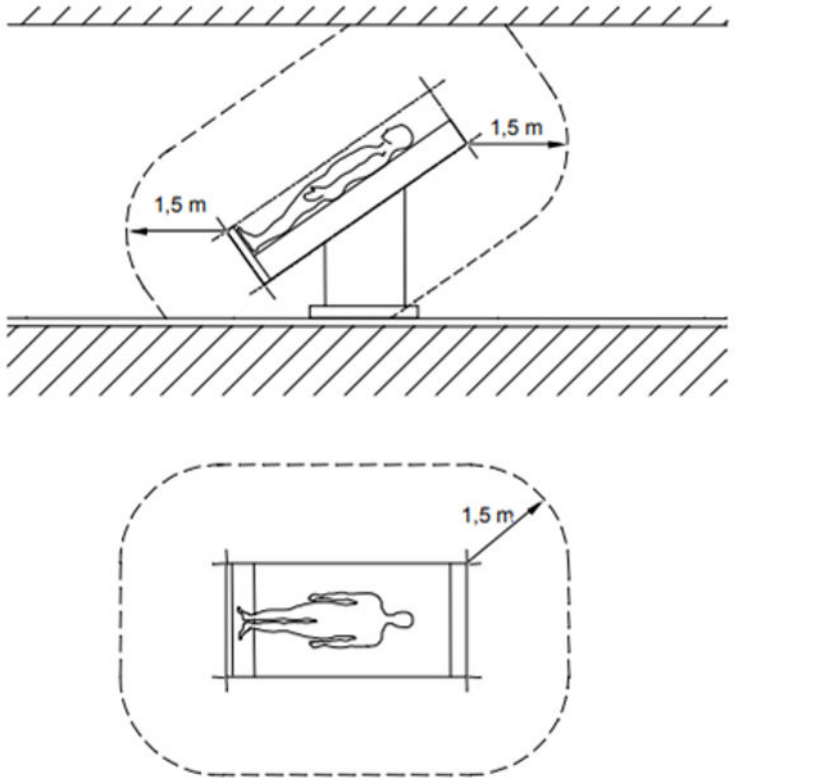
Refer to Console Long Cable Option Installation Manual (Direction 5456816-1EN) for the details.

NOTICE

When install the console cabinet in the scan room, do not place it within the patient environment. Refer to 7.4 Patient Environment on page 60 for the details.

7.4 Patient Environment

The patient environment is defined as the following picture.



Only Scanning Gantry, Patient Table components and the following options can be placed in this area.

- Advantage 4D
- In room monitor
- SmartStep
- Extream Injector
- Express Mode Camera
- AVIMOS Camera

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Chapter 8 Structural and Mounting Requirements

8.1 Importance of Meeting Structural Requirements

System performance specifications require close consideration of the customer's floor properties. The information in this chapter provides critical information and guidelines that the customer or PMI should communicate to the architect, structural engineer, and contractor prior to construction or renovation. Failure to properly evaluate the customer's floor and ceiling properties may result in limited performance and possible safety hazards.

8.1.1 Levelness, Vibration, and Floor Loading

All floors, whether configured to use the recommended GE-supplied anchoring system or an equivalent anchoring method, must meet the requirements for LEVELNESS, VIBRATION, and FLOOR LOADING listed in Minimum Floor Requirements.

8.1.2 Seismic Loading

Local laws and building codes in some areas may require the customer's contractor and structural engineer to consider seismic loads. Seismic Mounting provides the information necessary for the customer's contractor and structural engineer to complete the proper seismic calculations.

8.1.3 Anchoring

8.5 GE-Supplied Anchoring on page 94 lists the information necessary for the customer's contractor or structural engineer to properly implement the GE-supplied anchoring system, if appropriate for the site. Please note that local laws, building codes, seismic considerations, and building or structural limitations may require the use of anchoring methods other than the GE-supplied anchoring system. In such cases, responsibility for providing an equivalent anchoring method rests solely with the customer's contractor or structural engineer.

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

NOTICE

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

8.2 Ceiling Requirements

8.2.1 Regulatory Requirements

For systems with Suspension Options (Boom-in-Room or Depth Camera etc...), the overhead suspension shall be installed by strictly following the GEMS installation instruction. The system manufacturer specifically disclaims any and all liability arising out of or relating to the use or performance of the suspension (including cables), including, without limitation, any liability or claims relating to patient injury, death, or the reliability of such suspension.

Where a Junction Plate is supplied and installed by the Purchaser of the system, the installation plate should comply with the applicable Regulation enforced in the country.

⚠ WARNING

The customer's architect is responsible for designing and installing the Junction Plate. The system manufacturer will NOT inspect and test that the Junction plate meets the loading capacity specified (recommend a 6x safety factor).

8.2.2 Ceiling Requirement for Boom-in-Room

If customer has purchased Boom-In-Room kit, please refer to the correct option manual for details.

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. 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 support structure for a ceiling-mounted option using a Mavig pedestal, requires a flush ceiling mounting plate. This flush 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.

8.2.2.1 Ceiling Mounted Devices

If a ceiling mounted injector, remote monitor or other device is installed, it should be mounted in a position that allows for adequate patient and site personnel access to the table and gantry. If should not obstruct access to the gantry operator controls or interfere with patient loading. Refer to the table entitled Minimum Dimensions and Operational Clearances in *System Component Dimensions* chapter for minimum clearance requirements between the lowest points of the fixed ceiling mounted device and finished floor. The installation of any ceiling mounted device not specifically installed by GE Healthcare personnel shall be completed by the purchaser of their contractor. The GE Healthcare Project Manager will provide the necessary bolt hole information upon request.

NOTE
If a ceiling mounted boom-in-room monitor, it should NOT be mounted another arm with equipment (like injector etc..) on the same pedestal ceiling.

Figure 8-1 Boom-In-Room Cables Routing with Junction Box

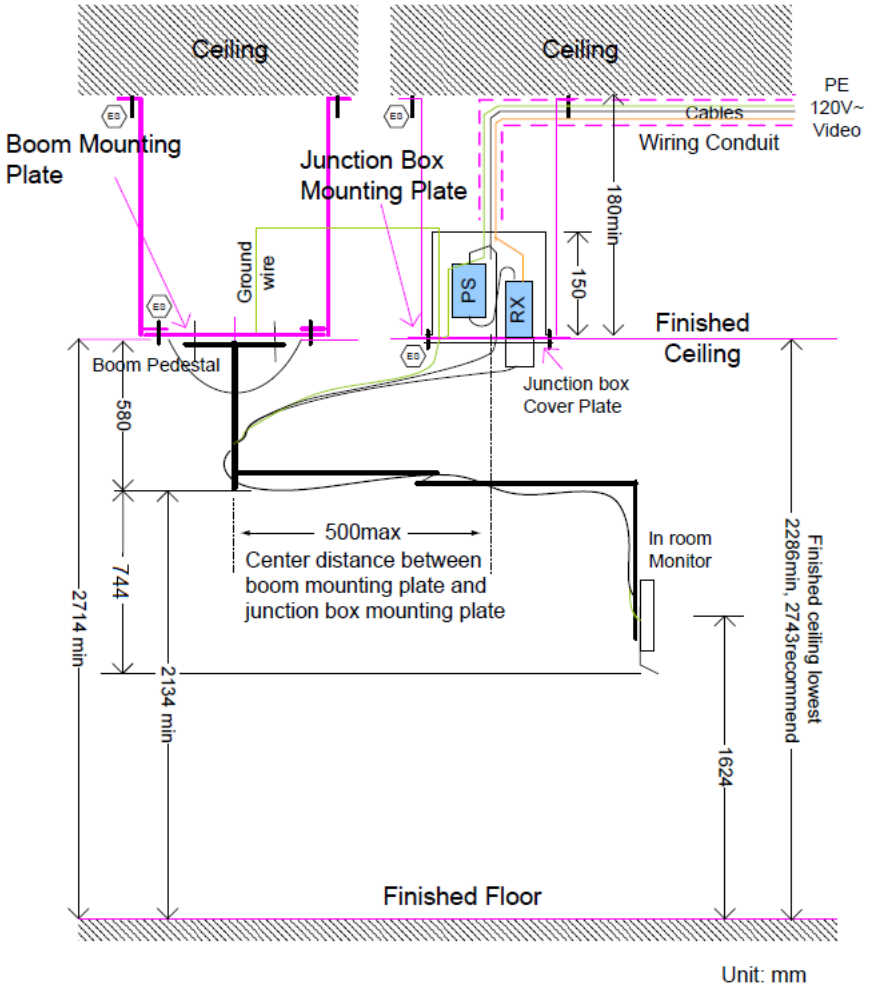
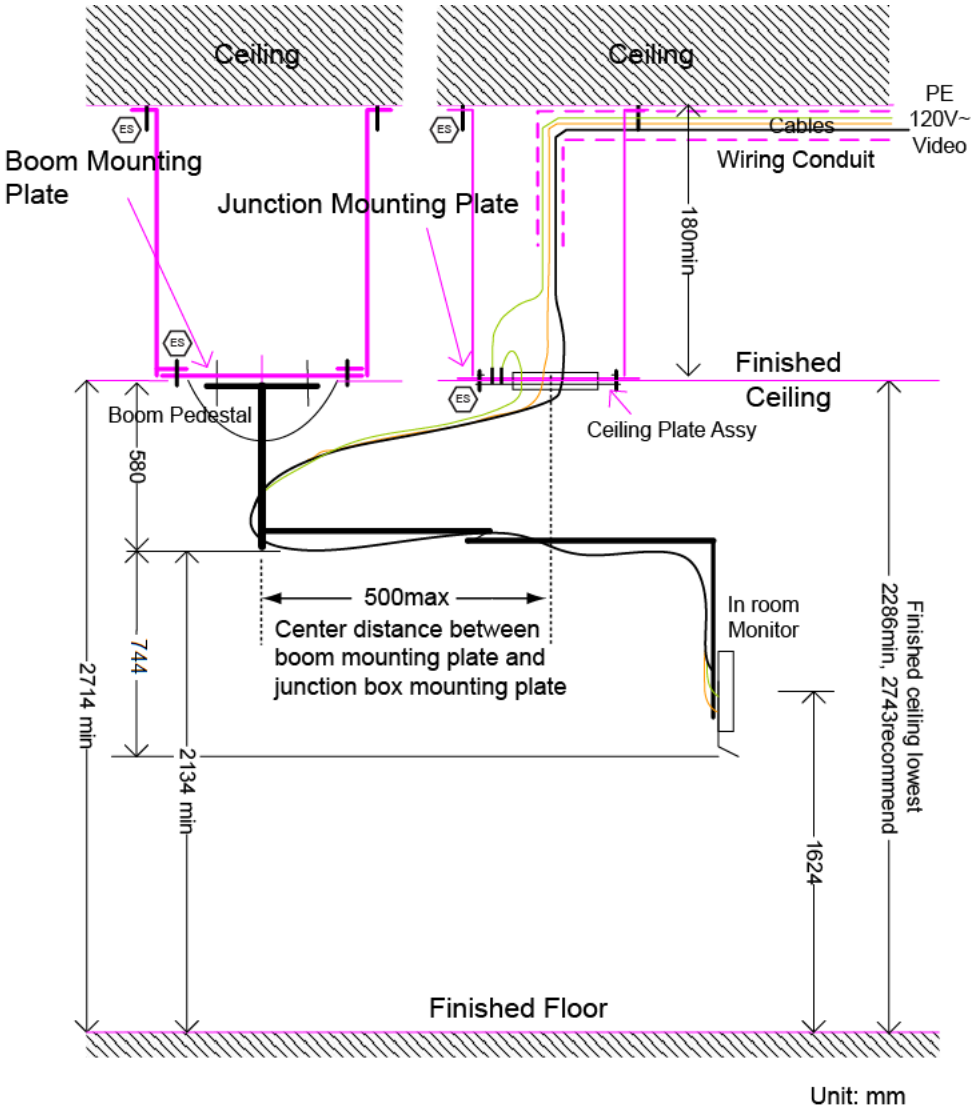


Figure 8-2 Boom-In-Room Cables Routing without Junction Box



⚠ WARNING

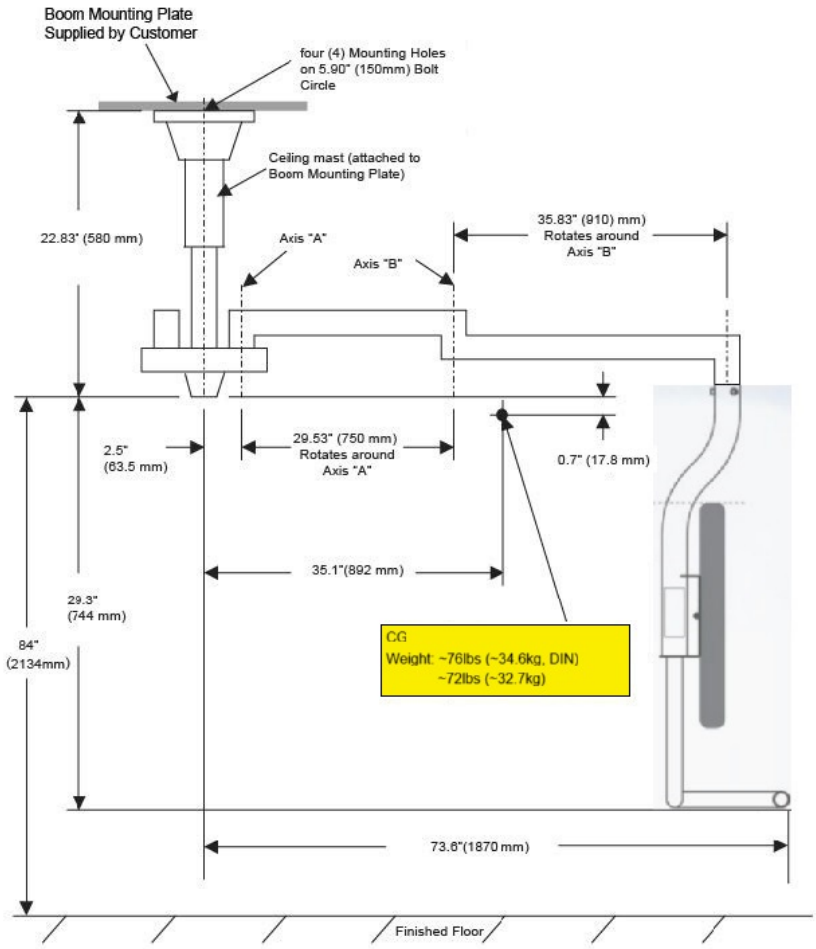
The ceiling-mounted components should NOT touch any electricity conductive structures which are connected with power or grounding other than CT system's power and grounding, to avoid unexpected short circuit/arcing hazard.

8.2.2.2 Pedestal Mounting Plate (Supplied by Customer)

The pedestal ceiling mount requires a flush ceiling mounting plate that is structurally supported to handle the weight of the load as shown in Figure 8-3 Arm size and center-of-gravity (CG) on page 67 .

Some options may required different option plates than those listed below. Refer to the options install manual to determine which plate is required.

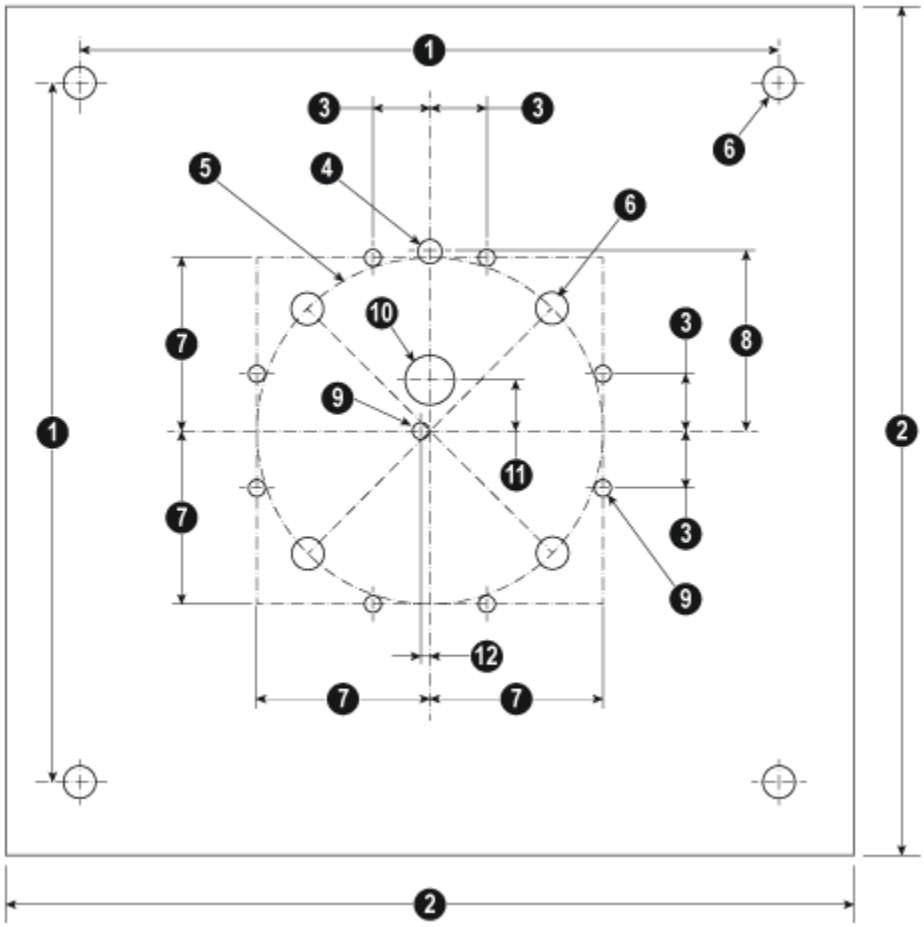
Figure 8-3 Arm size and center-of-gravity (CG)



If a structural contractor designed an equivalent plate, four (4) M12 (0.47 in.) mounting holes are required to anchor the boom pedestal (with flat washer, lock washer and hex nut) to the boom mounting plate and one M8 (0.32 in.) hole is used to anchor the safety chain bracket assembly. One M12 (0.47 in.) hole is used for the ground cable connection.

Detailed instruction for hole size and a template is available from Mavig or in their Portegra Installation Manual. Refer to Figure 8-4 Mounting hole pattern for Mavig ceiling pedestal base on page 68.

Figure 8-4 Mounting hole pattern for Mavig ceiling pedestal base



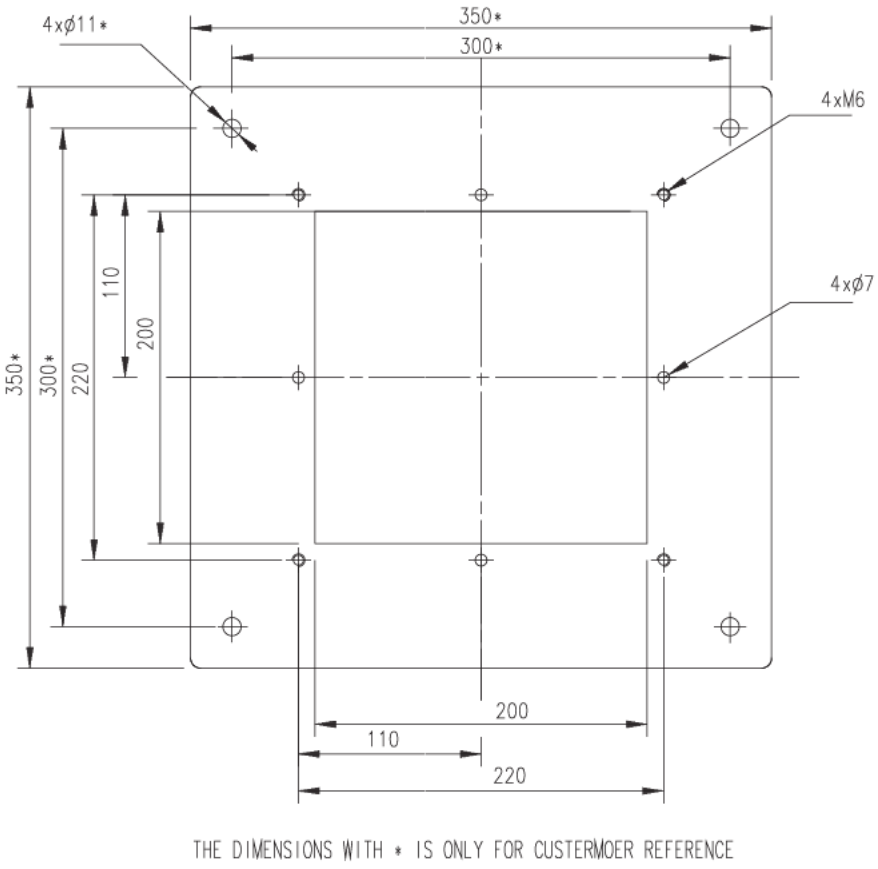
Location	Dimension mm (in)
1	305 (12.0)
2	369 (14.5)
3	25 (1.0)
4	12 (.5) Diameter
5	150 (5.9) Diameter
6	Qty 8 - 14 (0.6) Diameter
7	76 (3.0)
8	79 (3.1)
9	Qty 9 - M8 thru
10	15 (0.6) Diameter
11	23 (0.9)
12	3.175 (0.123)

8.2.2.3 Pedestal Height Requirement

The pedestal ceiling mount assembly must be installed at least 2134 mm (84 in) from the lowest point to the finished floor.

8.2.2.4 Junction (Box) Mounting Plate

Figure 8-5 Junction Mounting Plate Dimension



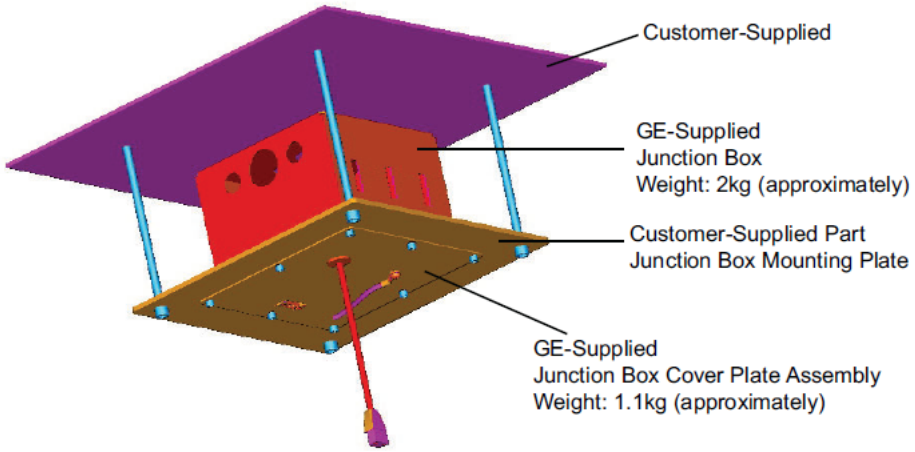
NOTE

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.

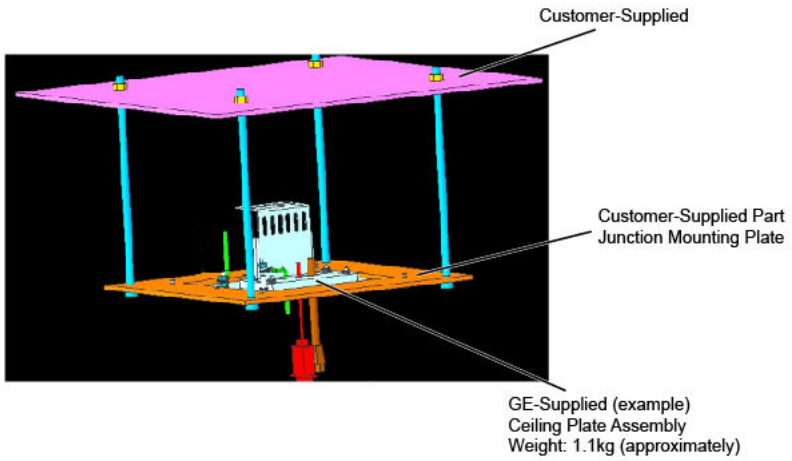
- With Junction Box

Figure 8-6 Junction Box Mounting/Ceiling Plate



- Without Junction Box

Figure 8-7 Junction Mounting Plate/Ceiling Plate Assy



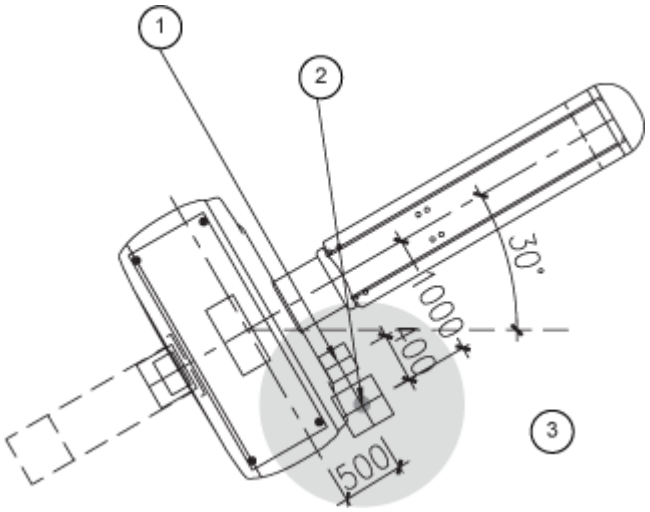
8.2.3 Ceiling Requirement for Auto Patient Positioning Depth Camera

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 8-8 Boom-In-Room Moving Radius



1	Cables fixed position (Junction Box)
2	Boom-In-Room monitor hung position
3	Scan Room

⚠ 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.

⚠ WARNING

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)⊠360 (L)⊠180 (H) mm3), or

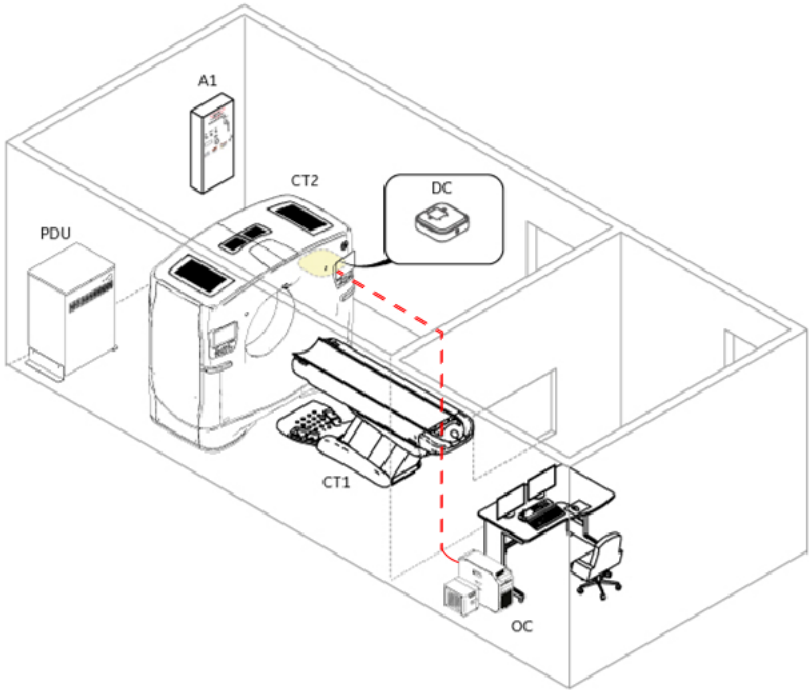
inside the range but its bottom cover is higher than the Boom upper arm. Mavig recommends no less than 579mm from finished ceiling to the column bottom. This is equivalent to 380mm between finished ceiling and the upper arm.

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.

8.2.3.1 Depth Camera Installation Typical Layout

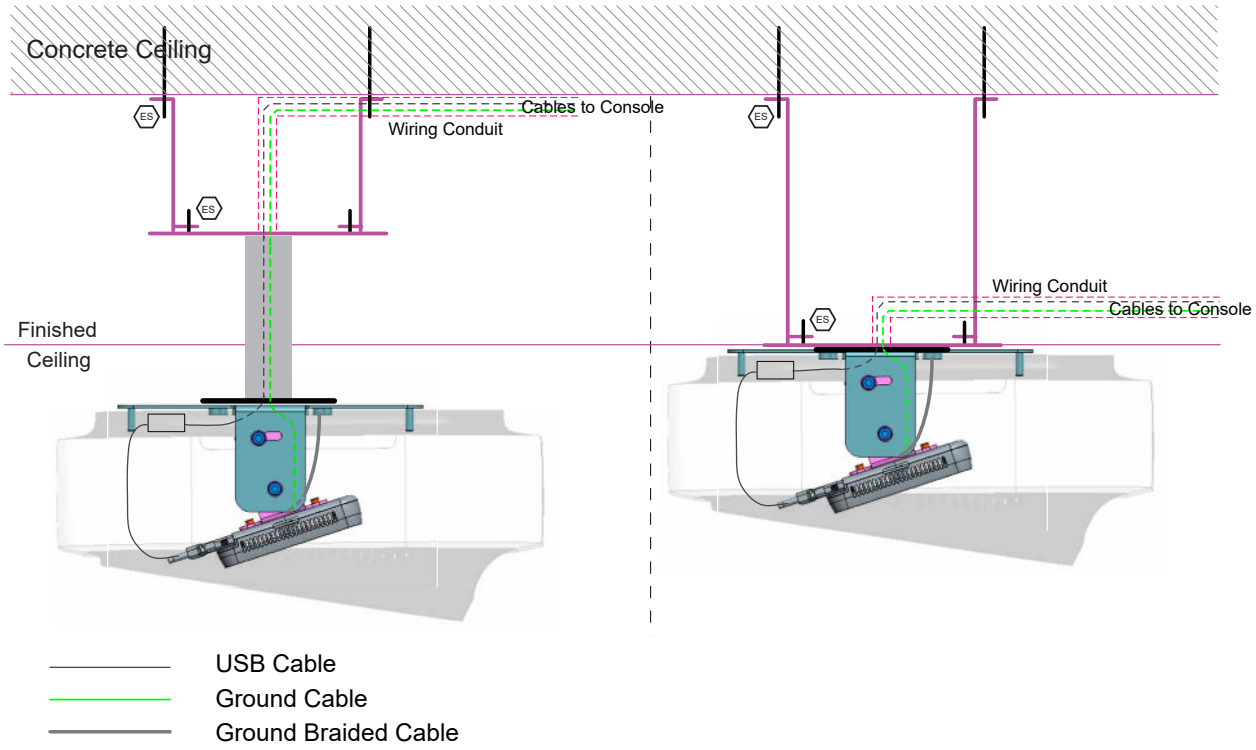
NOTE
The USB cable (5809034-3) is plenum rated, no conduit is required. However if customer chooses to run conduit, it should be 20mm in size.

Figure 8-9 Room Layout (example)



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

Figure 8-10 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.

8.2.3.2 Junction Plate Requirement

GE will provide a Junction Plate (5847942-2), shipped with the depth camera assy kit (5808502). If the Junction Plate supplied by GE 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 8.2.3.2.2 Prepared by Customer on page 76) with sufficient strength to hold the camera assembly.

NOTICE

If the customer uses the GE junction plate or makes junction plate by themselves, customer is responsible for installing it on the concrete ceiling and meeting regulatory and GE's loading requirement.

8.2.3.2.1 Supplied by GE

⚠ 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 8-11 Example for Fixing Junction Plate by using Anchor Bolts

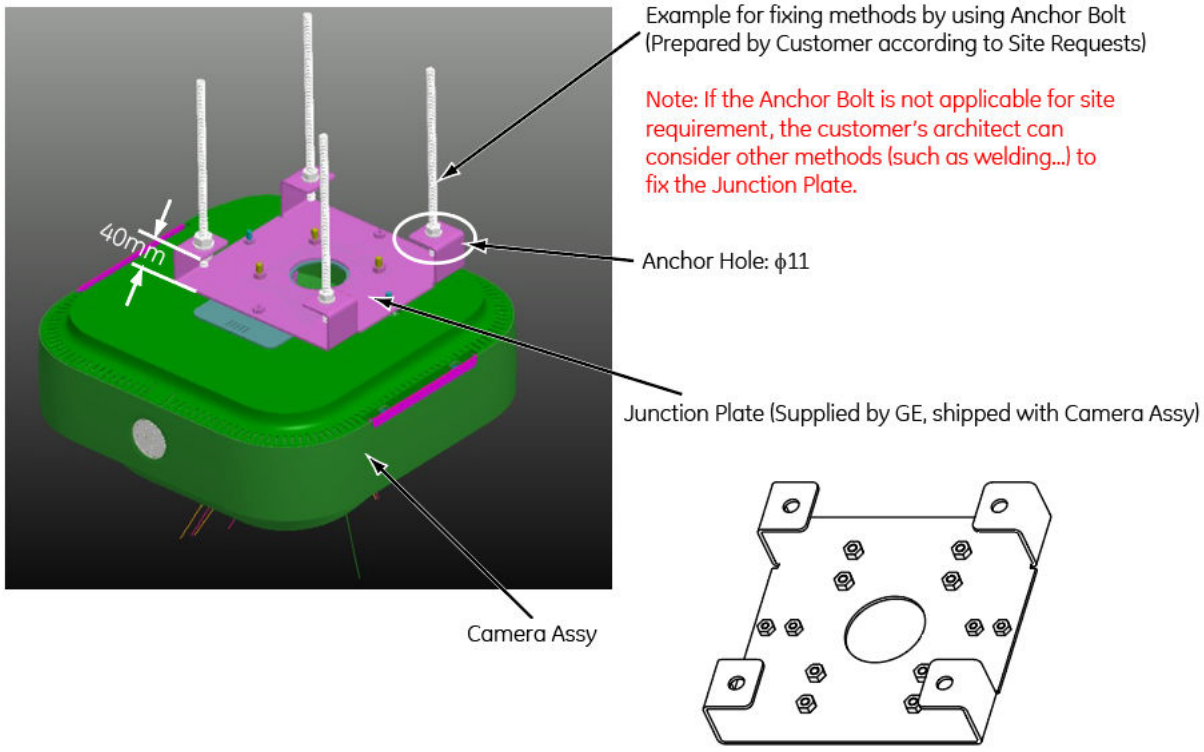
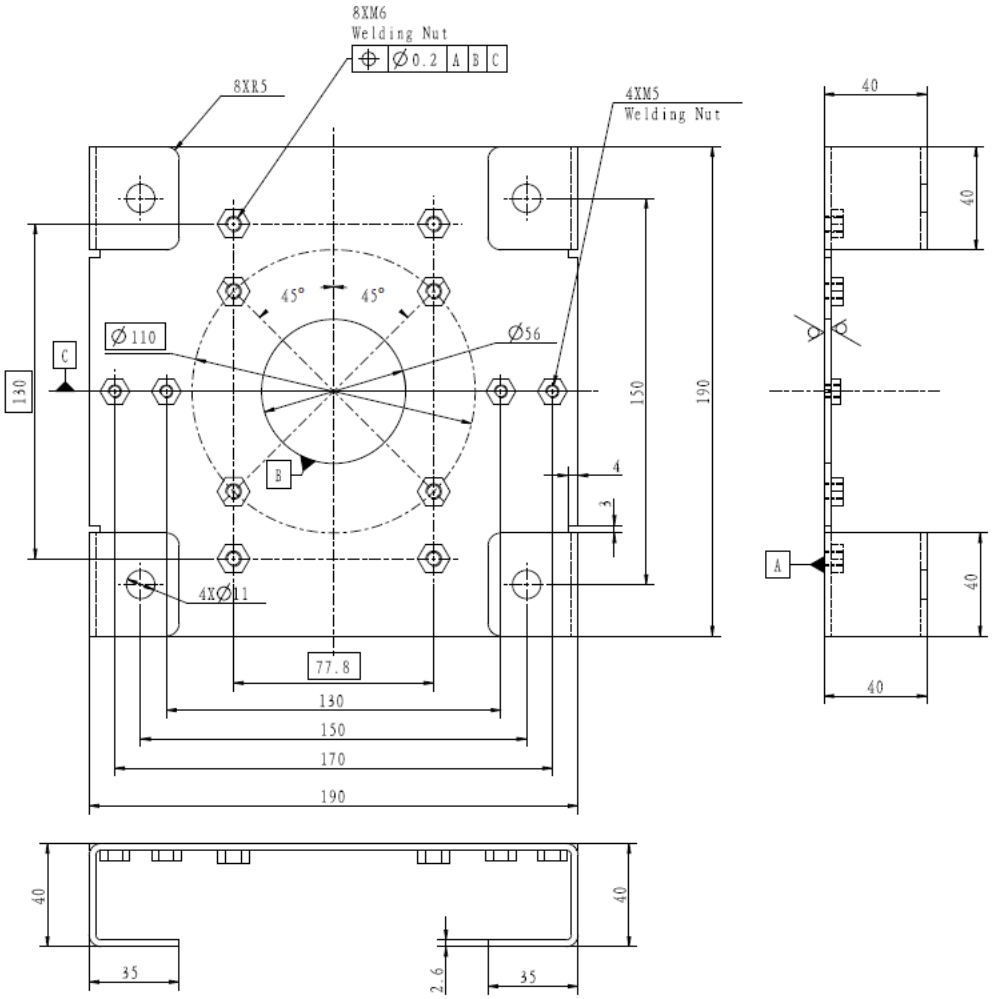


Figure 8-12 Junction Plate (Supplied by GE)



8.2.3.2.2 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 8-13 Junction Plate (Prepared by Customer)

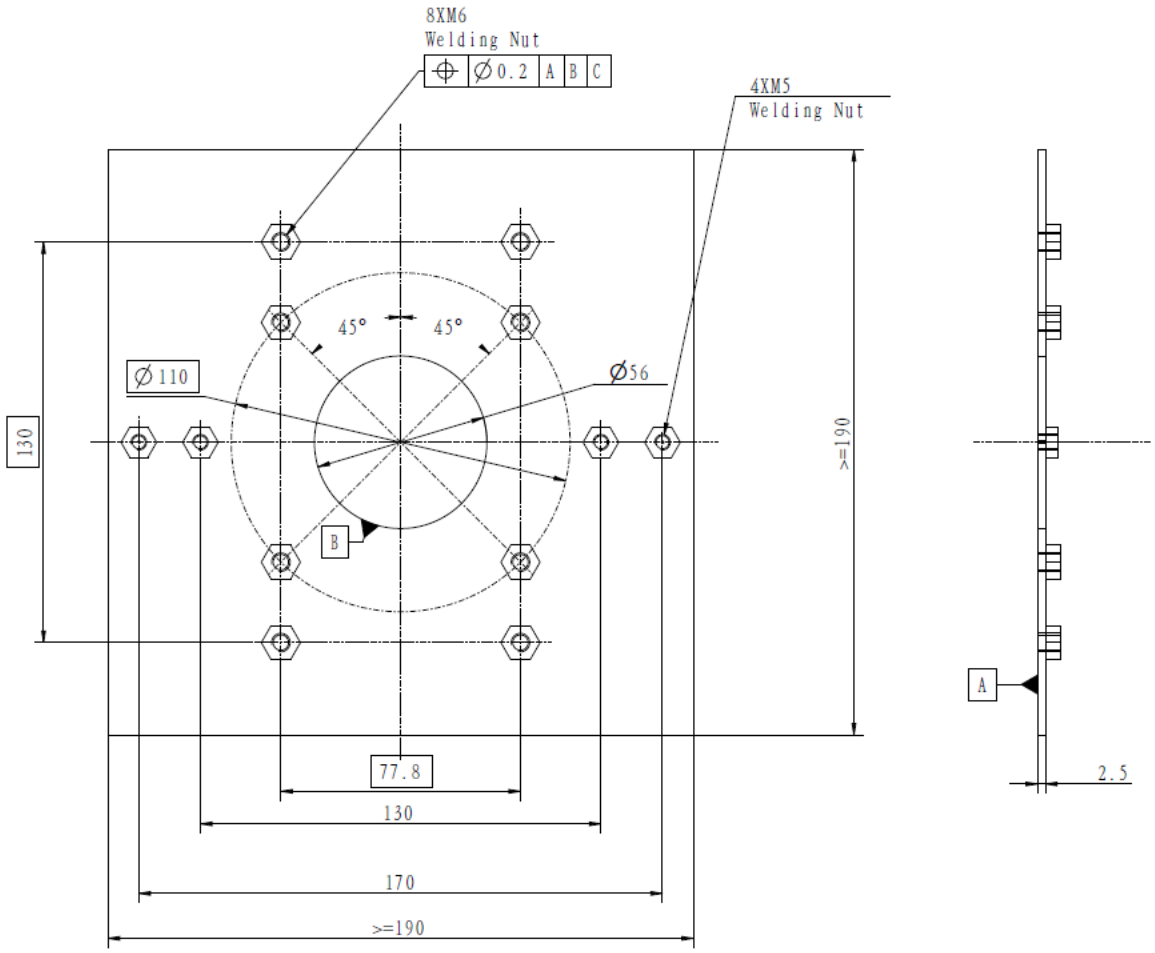


Table 8-1 Junction Plate (Prepared by Customer)

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 4x load requirement (>=20kg).		
Junction plate material: Steel material with a min tensile strength 375Mpa.		

8.2.3.2.3 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 8-14 Junction Plate Installation Position

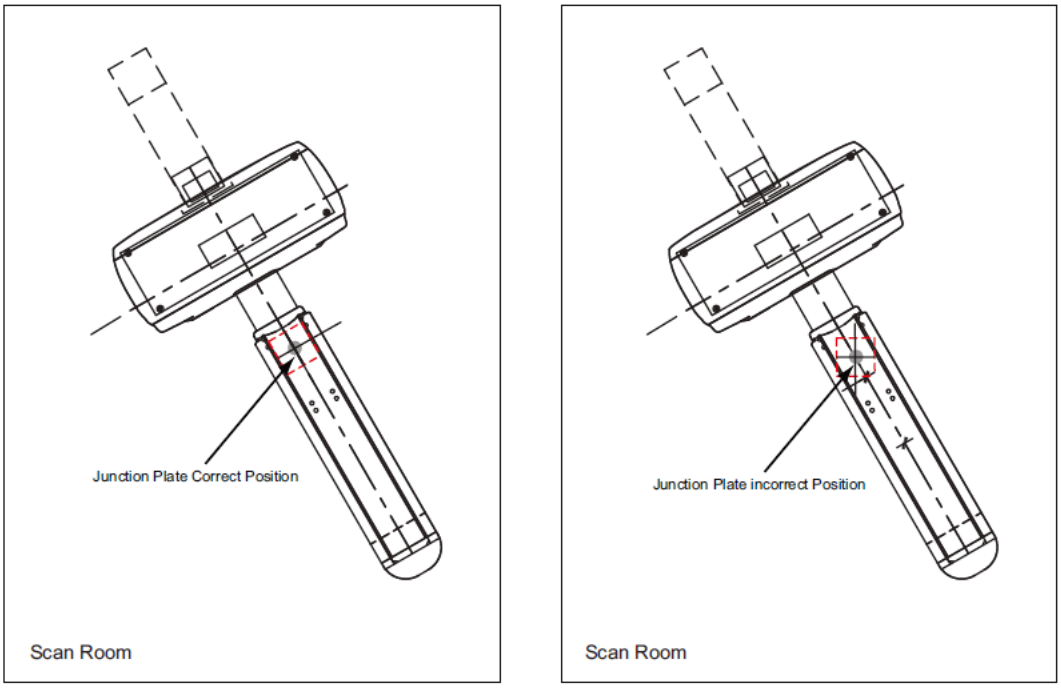
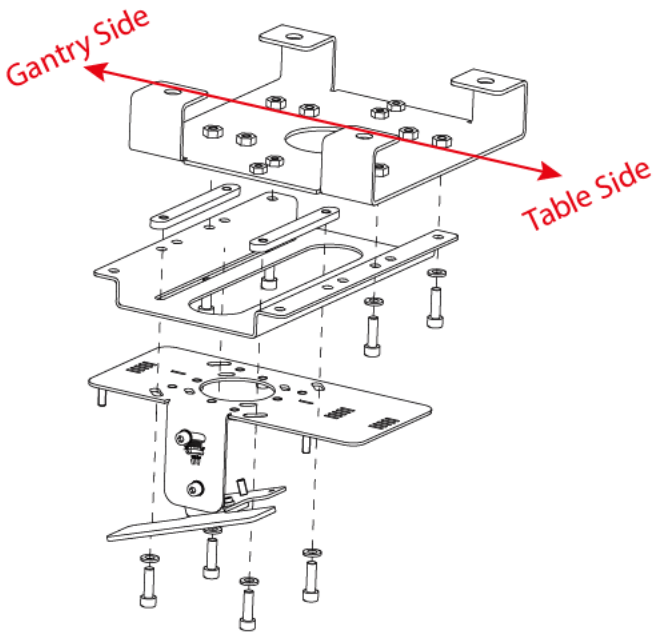


Figure 8-15 Junction Plate Installation Direction



8.2.3.3 Junction Plate Position

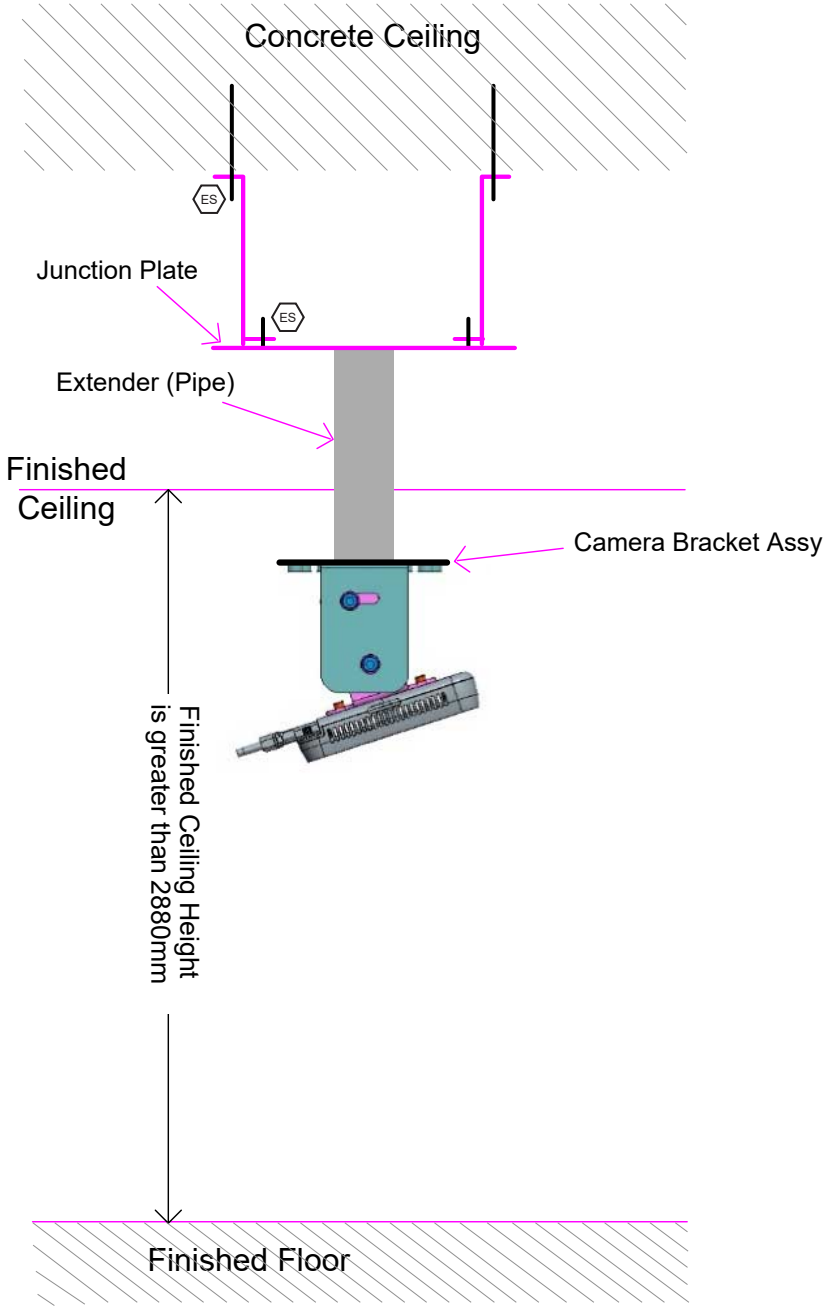
When determining the camera installation position, special consideration shall be paid to the relation between the junction plate installation height and the finished ceiling height.

For the detailed procedure, please refer to **Auto Patient Positioning Depth Camera Installation Manual (5809939-1EN)**.

There are three cases for the Junction Plate installation as shown below:

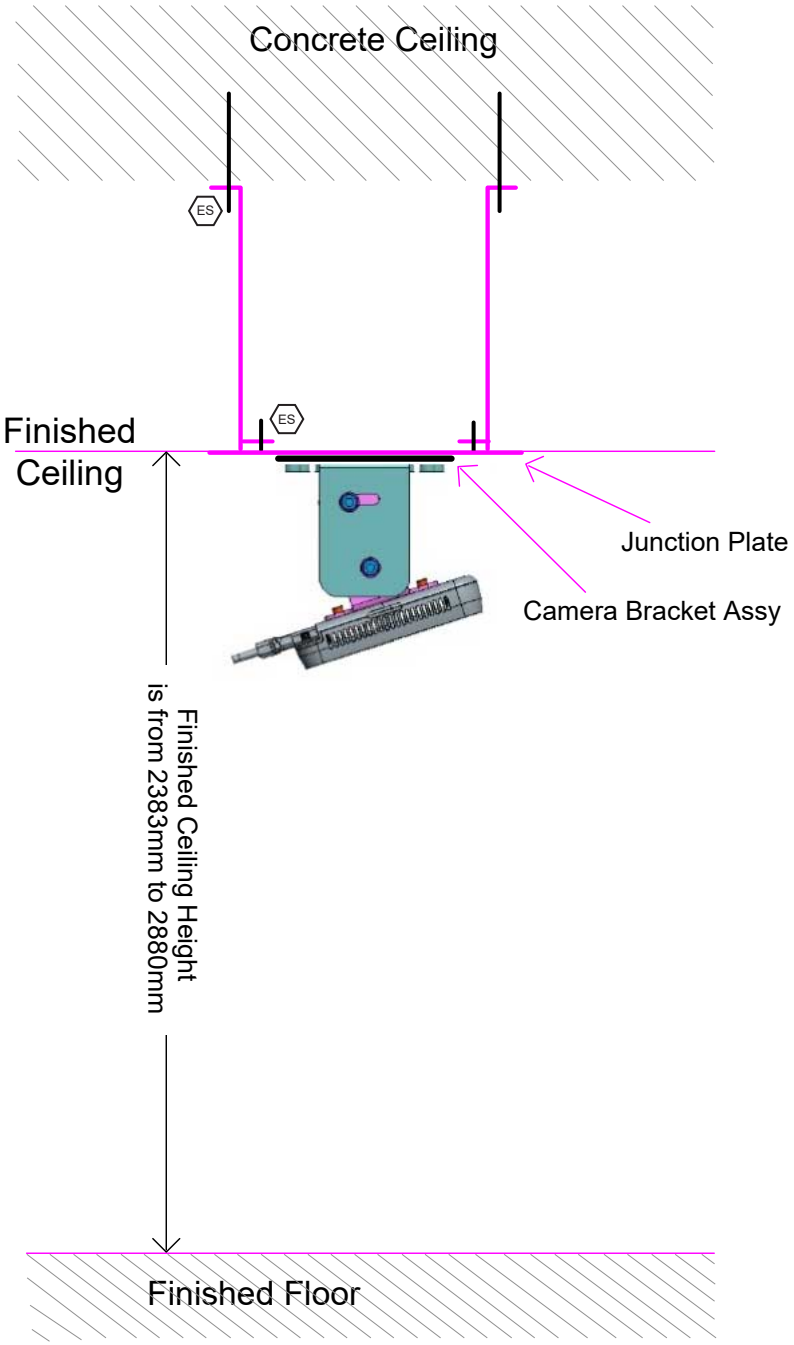
- **Case A: Camera below finished ceiling**
  Camera installation height is less than the finished ceiling height, customer needs order the extender kit (5821337) to install the Junction Plate 200mm or 400mm above the desired position.

Figure 8-16 Camera Installation Position_A



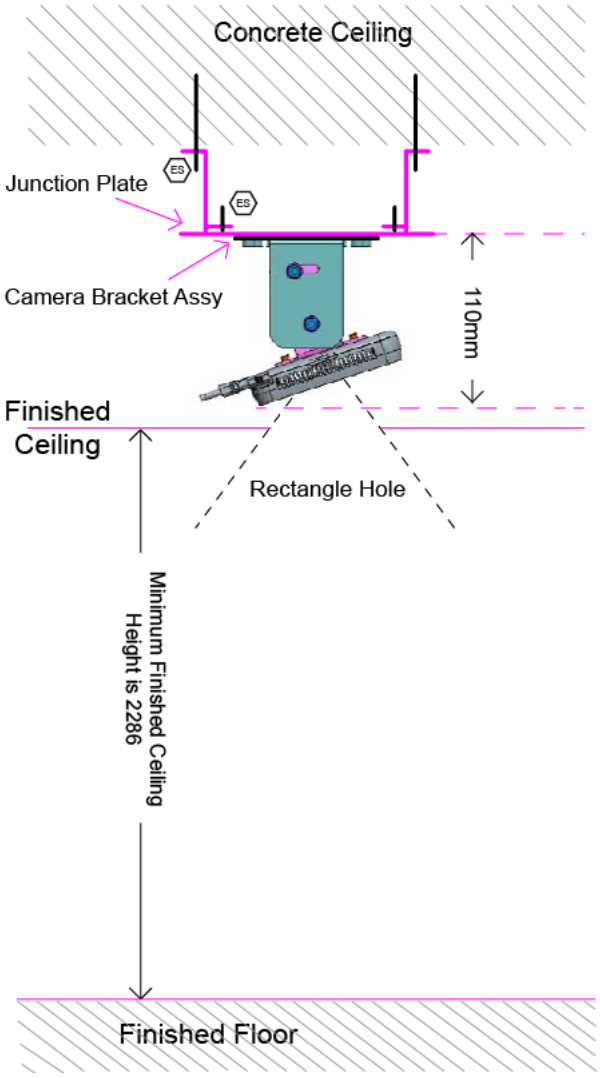
- **Case B: Camera attached to finished ceiling**
  Camera installation height is equal to the finished ceiling height.

Figure 8-17 Camera Installation Position_B



- **Case C: Camera Above finished ceiling**
  Camera installation height is higher than the finished ceiling upper surface height, a rectangular hole needs to be opened in the finished ceiling as requested.

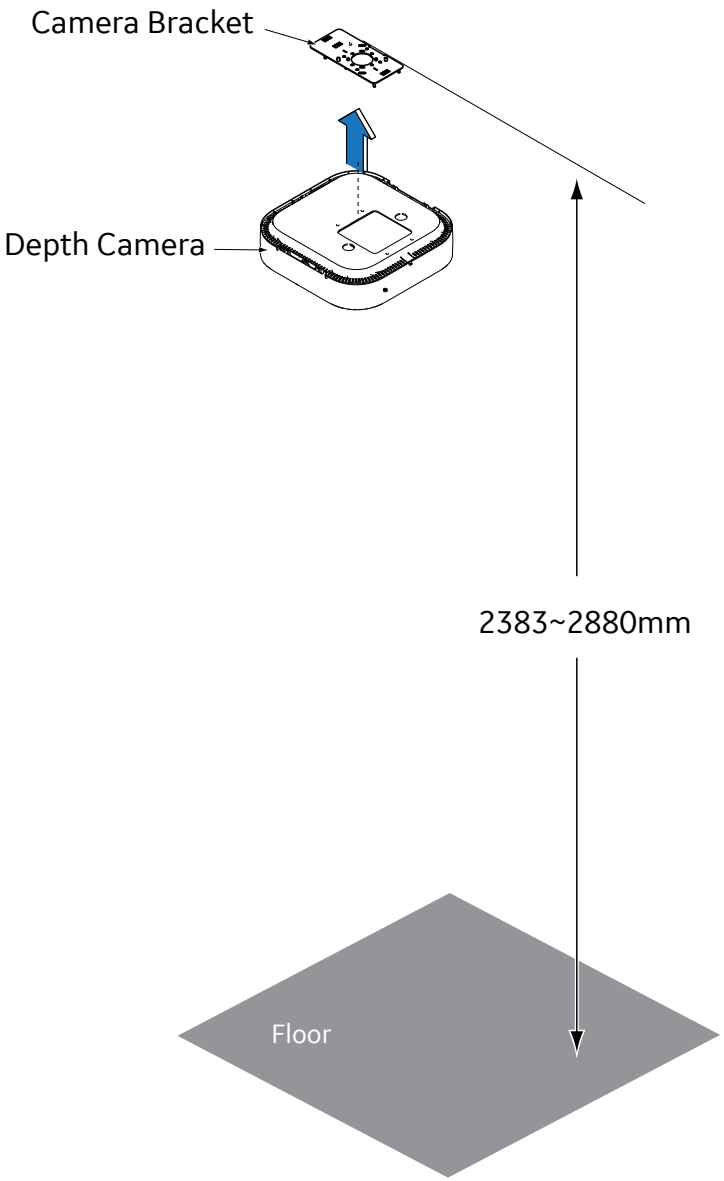
Figure 8-18 Camera Installation Position_C



NOTE

Installation height of the Camera Bracket should be within 2383 ~ 2880mm regardless of finished ceiling height or junction plate height.

Figure 8-19 Camera Bracket Height



8.2.4 Ceiling Requirement for AVIMOS Camera

AVIMOS needs the cameras to get the proper video for doctor/technologist to view the gantry internal / external laser lines, table movement and monitor patient. Then particular area/sharpness for each video is required. Where to locate the camera and how to adjust direction is important.

If customer has purchased RCK with AVIMOS kit, please refer to **Remote Control Kit with Assisted Video Monitoring System Manual (5863844-1EN)** from SIMS Content Viewer for details.

8.2.4.1 AVIMOS Camera Installation Typical Layout

Figure 8-20 RCK-AVIMOS Schematics Diagram

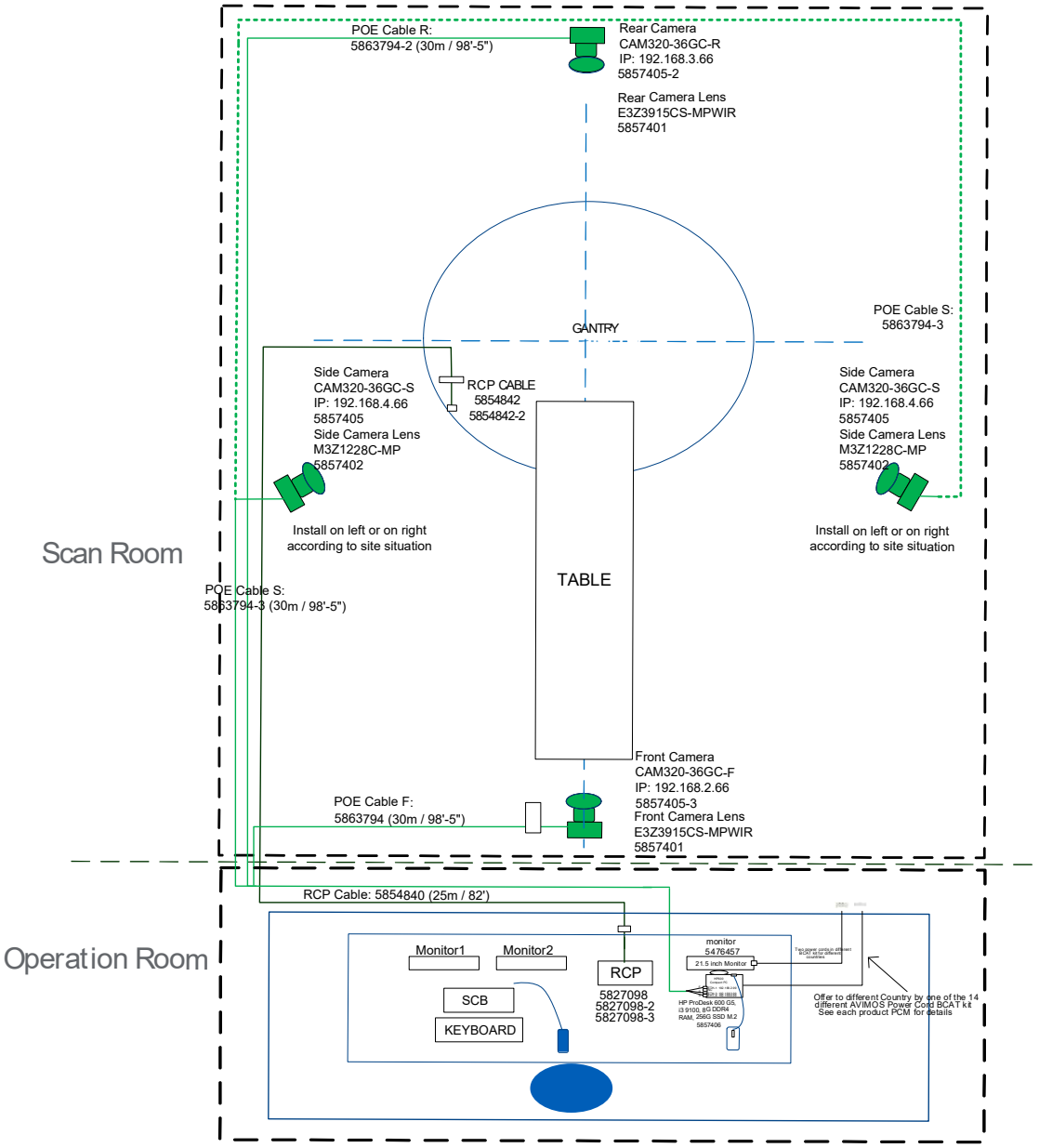
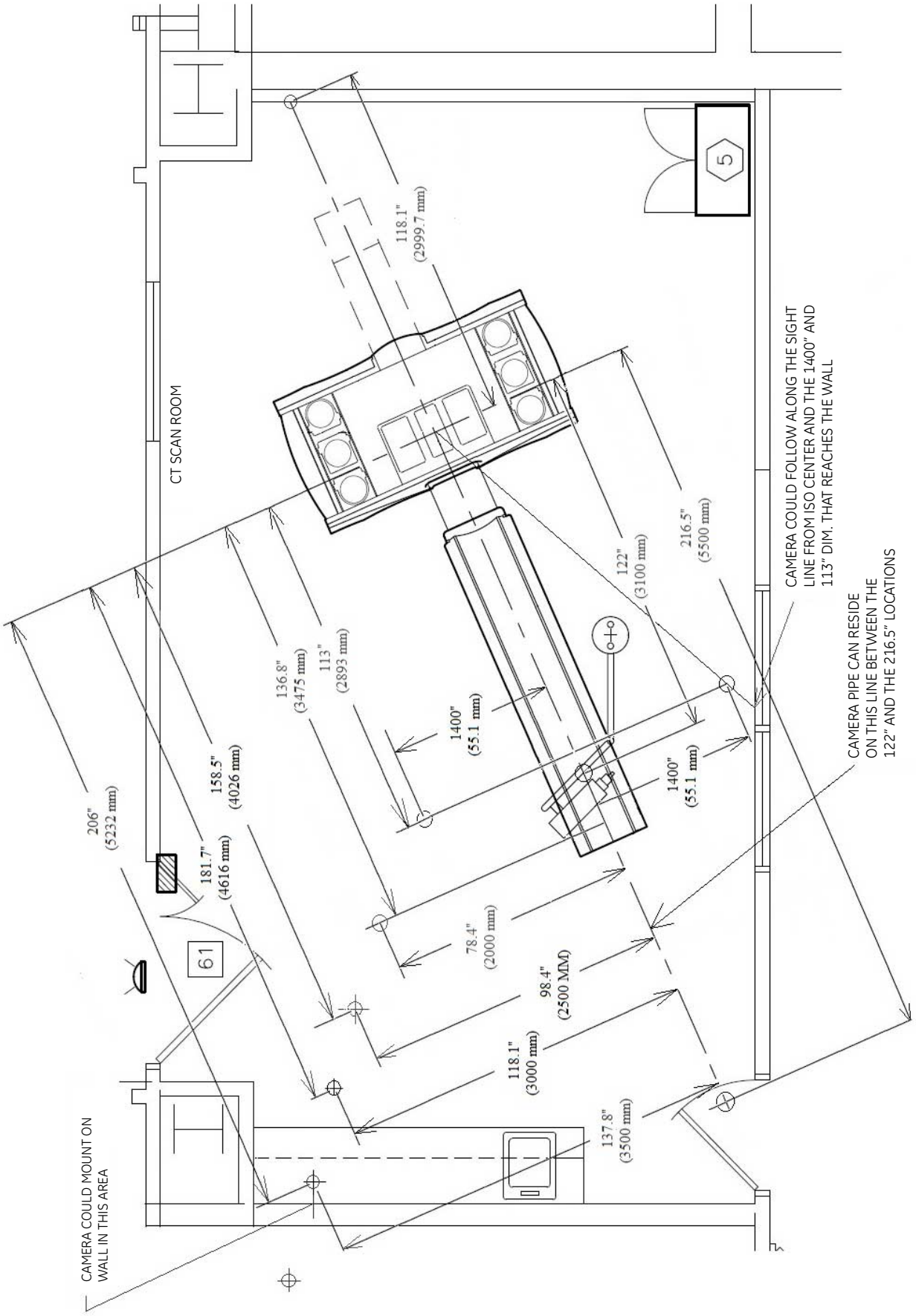


Figure 8-21 Example for Camera Position



8.2.4.2 Junction Plate Requirement

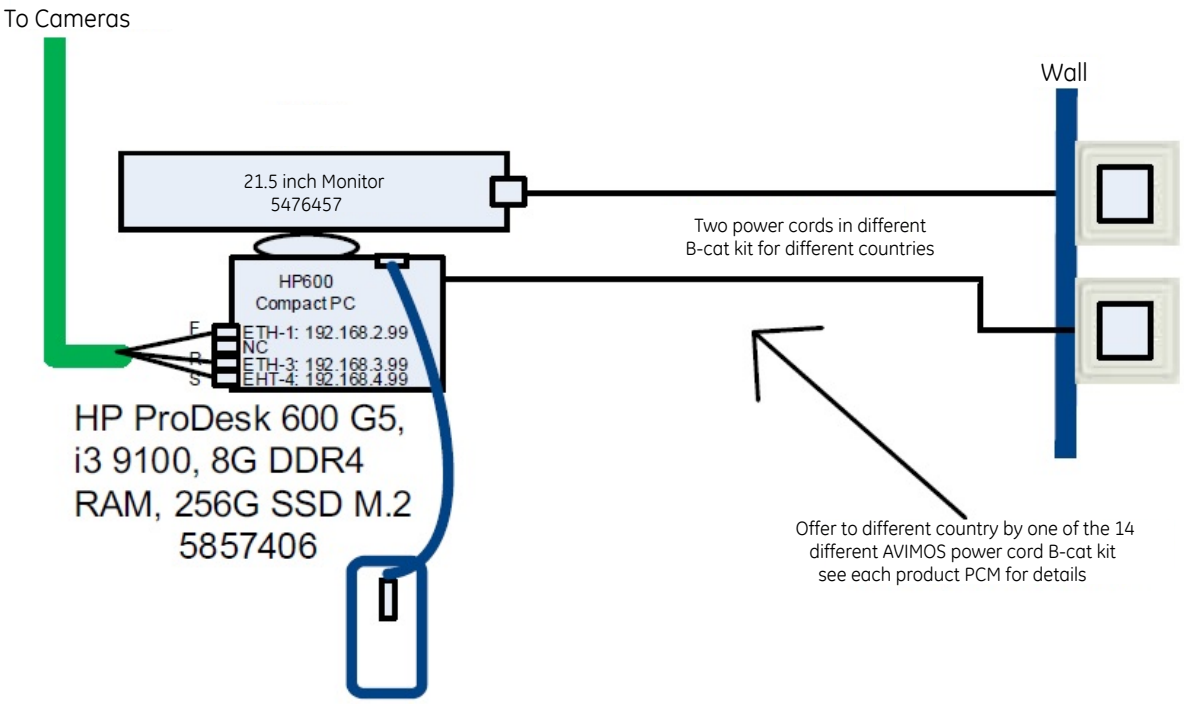
GE will provide two junction plates (Standard - 5863746 and Pipe - 5863748). If the junction plates supplied by GE can not meet the requests of the building structure, the customer's architect can design and install the equivalent junction plate with sufficient strength to hold the camera.

⚠ WARNING

ES The customer's architect is responsible for installing of junction plate. 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).

8.2.4.3 Cable Requirement

Figure 8-22 Cable Connection



8.2.4.3.1 LAN Cable Requirement

RCK-AVIMOS has three LAN cables, which need to be routed from the operating room to the scan room, so the customer should complete cable-conduit installation on ceiling in advance. (Refer to Figure 8-20 RCK-AVIMOS Schematics Diagram on page 83)

8.2.4.3.2 Power Cable Requirement

AVIMOS power cord should meet global all countries/regions, there are 14 selectable Power Cord Kits for different countries. (See Figure 8-22 Cable Connection on page 85)

NOTE
The computer and monitor of AVIMOS needs to be placed in scan room because of cameras adjustment, please ensure that the wall output voltage in the scan room meets the requirements of the computer and LCD monitor.

Table 8-2 Computer and Monitor Voltage Requirement

Component	Element	Range
HP600 Computer	Mains input Volts / Amperes / Frequency	100-240VAC, ~/2.3A, 50-60Hz
LCD Monitor	Mains input Volts / Amperes / Frequency	100-240VAC, 0.75-0.40A (1.3A for Mexico), 50/60Hz

8.3 Minimum Floor Requirements

8.3.1 Floor Levelness Specification

8.3.1.1 Critical Specifications

Accurate patient positioning during scanning depends on proper alignment of the gantry and the table. The floor levelness specifications in Table 8-3 CRITICAL SPECIFICATIONS for Floor Levelness on page 86 ensure that the table and gantry height adjusters have enough range to allow proper leveling of the system.

Table 8-3 CRITICAL SPECIFICATIONS for Floor Levelness

Specification	Metric (minimum)	English (minimum)
Levelness	6 mm maximum variance over 3048 mm	1/4 in. maximum variance over 10 ft

8.3.1.2 Floor Levelness Guidelines

Consider the following factors when determining floor levelness:

- Factors that can disturb the levelness of a weak floor, including:
  - Moving weights such as gurneys or heavy personal equipment.
  - Changes in the system's center-of-gravity when the table moves, as the table can carry a load capacity of up to 180 kg (396 lbs).
- Resilient tile, carpeting, or equivalent that may yield or compress over time. At sites with such floor coverings, be sure to cut away the tile or carpeting where the table and gantry adjusters touch the floor to expose the stable base material upon which to seat the adjusters.
- Floor shims are NOT PERMITTED.
- Refer to the steps listed in Measuring Floor Levelness to check whether the floor of the scan suite meets the floor levelness specifications for the system.

8.3.1.3 Measuring Floor Levelness

1. Identify the position of the gantry and table in the room per the GE print. If everything matches the GE print, continue. If not, please redo two points identification.
   a. GE Print for System with NG Elite 1700/2000 Table.

Figure 8-23 GE print

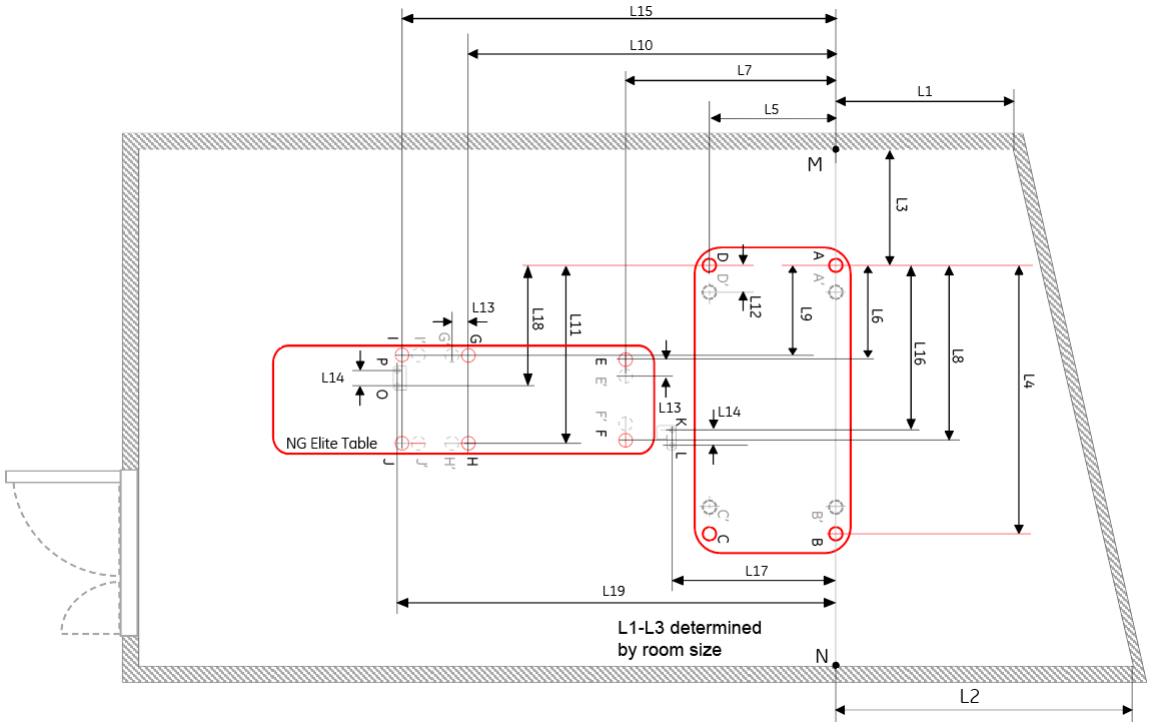


Table 8-4 Size of GE Print

Configu-ration	L1-L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18
System with NG Elite 1700/2000 Table	deter-mined by room size	1873	630	726.5	1382.2	1146.5	711.7	2168.8	1161.3	200	75	48	2556.1	1109	1273.3	800.2

NOTE
All demensions are in mm.

NOTE
L12~L13 are the dimensions of alternative anchor locations.

Alternative anchor locations will be used if there is structural interference such as reinforcement bars in the concrete.

b. GE Print for System with VT Table.

Figure 8-24 GE Print

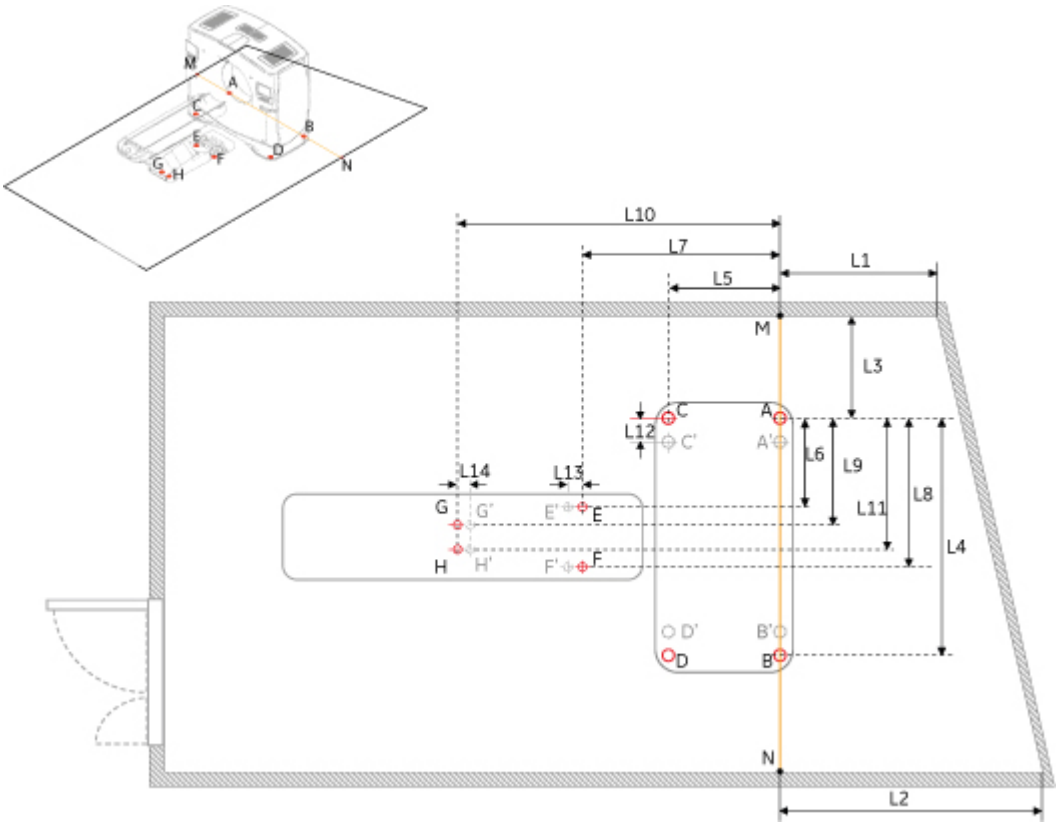


Table 8-5 Size of GE Print

Configuration	L1-L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14
System with VT1700V / VT2000 and VT2000x Table	determined by room size	1873	630	726.5	1382	1146.5	820.5	2236	1052.5	200	90	80

NOTE
All demensions are in mm.

NOTE
L12~L14 are the dimensions of alternative anchor locations.

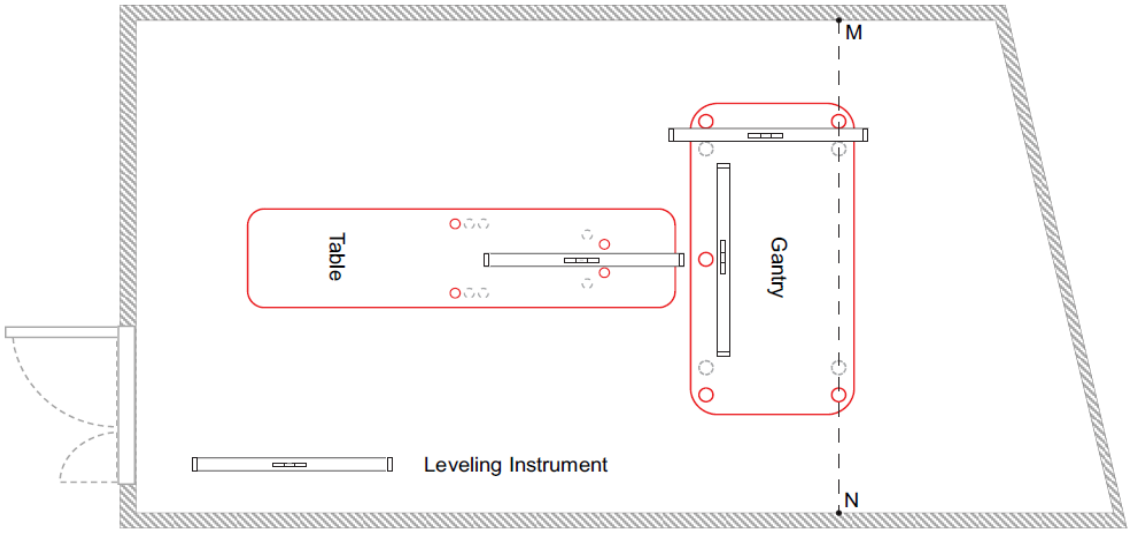
Alternative anchor locations will be used if there is structural interference such as reinforcement bars in the concrete.

2. Make sure there are no potential clearance issues. 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. Also, be sure there is at least 102 mm (4 in.) of clearance between any existing floor penetration and the new gantry position.
3. Drill anchor holes of gantry and table.
4. Move the gantry into position.

5. Level gantry.
6. Move the table into position.
7. Use the gantry/table alignment tool (5824714) to level the table position.
   Alignment tool Not included with system, and also available from your PMI/FE from GE tool warehouse. Use this to determine equipment layout and anchoring locations.

NOTE
If the floor is not level, your system cannot be properly aligned

Figure 8-25 Check Floor Levelness (example)



8.3.2 Scan Window

The recommended patient viewing window dimensions are 1219 mm wide x 1067 mm high (48 in. x 42 in.). The location of the window is dependent on the position of the operator workspace position. Consult Radiation Protection Requirements and a qualified radiological health physicist for radiation protection requirements of the window glass (lead content and thickness).

NOTE
The operator at the operator workspace must be able to view the patient during a scan.

8.3.3 Floor Vibration Specification

8.3.3.1 Requirements

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

- Patient Table: 2 - 10 Hz
- Gantry: 8 - 14 Hz
  Floor vibration from any intermittent or continuous source, such as walking, running, exercising, mechanical equipment, and traffic, must not exceed the levels shown in Figure 8-26 Allowable

floor vibration in velocity units compared to ISO class A & B limits on page 90 or Figure 8-27 Allowable floor vibration in acceleration units compared to ISO class A & B limits on page 91, as represented by the solid line labeled CT system/Table. These figures compare this limit to the limits of what the AISC (American Institute of Steel Construction) and the ISO (International Organization for Standardization) call Class A (VC-A) and Class B (VC-B).

NOTE

In Figure 8-26 Allowable floor vibration in velocity units compared to ISO class A & B limits on page 90 and Figure 8-27 Allowable floor vibration in acceleration units compared to ISO class A & B limits on page 91 the symbol µ represents 10^{-6}.

The preferred format for measuring vibration is velocity versus frequency, as shown in Figure 8-26 Allowable floor vibration in velocity units compared to ISO class A & B limits on page 90. However, should it prove necessary to measure acceleration and there is no means to convert the measured data to velocity, then use the equivalent acceleration limit shown in Figure 8-27 Allowable floor vibration in acceleration units compared to ISO class A & B limits on page 91, derived from the velocity spectrum.

Figure 8-26 Allowable floor vibration in velocity units compared to ISO class A & B limits

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

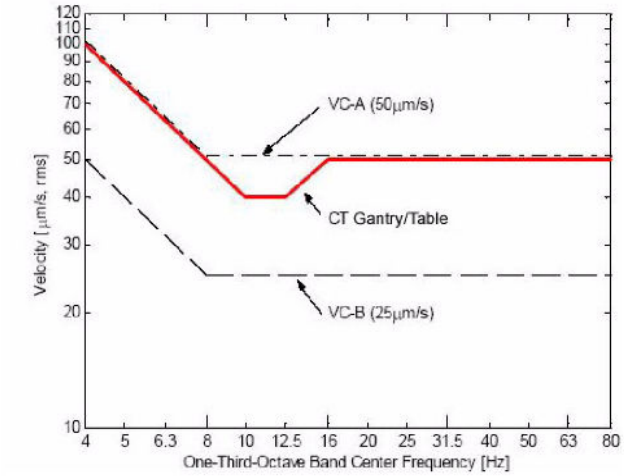
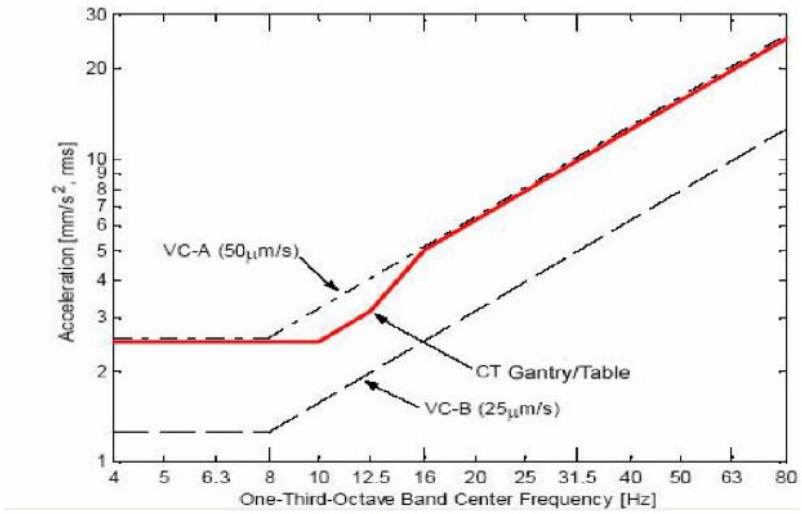


Figure 8-27 Allowable floor vibration in acceleration units compared to ISO class A & B limits

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



8.3.3.2 Sources of Floor Vibration

Consider that vibrations strong enough to affect the floor may emanate from the following sources in and around the scanning facility, requiring possible isolation of the floor or structure from them:

- Hospital power plants housing pumps, motors, air handling equipment, or air conditioning units
- Hallway foot traffic
- Elevators
- Parking lots
- Roadways
- Subways
- Trains
- Heliports

8.3.4 Floor Strength

Concrete floors must have a minimum strength of f'c = 2500 psi (1.7×10^7 pa) at 28 days for (curing time) mounting floor anchors. It is the responsibility of each customer to have appropriate tests performed to determine and measure concrete strength.

8.4 Floor Loading and Component Weights

The customer's contractor and structural engineer should use the information in Table 8-6 Component Weight and Floor Loading Data on page 92 to help determine if the floor structure in the scan suite possesses sufficient strength to support the weight of the system.

Table 8-6 Component Weight and Floor Loading Data

System Component	NET Weight kg (lb)	Overall Width x Depth mm (in.)	*1 Max Uplift Load N (lb)*1	Max Compressive load N (lb)	Supports mm (in.)
Gantry	1805 (3979)	2150 x 1036 (84.6 x 40.8)	0	4588 (1031)	Four round 64 mm (2.5 inch) pads in rectangular pattern.
Dollies (each)	128.4 (283)	864 x 510 (34 x 20)	-	-	Four casters
Lightweight Dolly (each)	86 (190)	864 x 510 (34 x 20)	-	-	Four casters
NG Elite 1700 STD Table *with 227 kg (500 lb) Load capacity*	757 (1669)	650 x 2547 (25.6 x 100.3)	728 (164)	3789 (850)	Six round 64 mm (2.5 inch) pads in rectangular pattern.
NG Elite 2000 Heavy Table *with 308 kg (680 lb) Load capacity*	886 (1953)	650 x 2972 (25.6 x 117)	1337 (300)	5009 (1126)	Six round 64 mm (2.5 inch) pads in rectangular pattern.
Footswitch Assembly (NG Table)	18 (40)				
VT1700V Table *with 227 kg (500 lb) Load capacity*	672 (1481)	650 x 2370 (25.6 x 93.3)	1455 (327)	4745 (1067)[1]	Four round 64 mm (2.5 inch) pads in rectangular pattern.
VT2000 Table *with 227 kg (500 lb) Load capacity*	732 (1613)	650 x 2910 (25.6 x 114.5)	1455 (327)	*2 5210 (1170)*21	Four round 64 mm (2.5 inch) pads in rectangular pattern.
VT2000x Table *with 306 kg (675 lb) Load capacity*	815 (1797)	650 x 2910 (25.6 x 114.5)	2630 (591)	5210 (1170)[1]	Four round 64 mm (2.5 inch) pads
Footswitch Assembly (VT)	15 (33)				
Power Distribution Unit	370 (816)	700 x 550 (27.6 x 21.7)	0	1070 (240)	Four casters
StandAlone (Z8G4)	26 (57)	216 x 551 (8.5 x 21.7)		318 (71)	Four casters
StandAlone (Z8G5)	23.1 (51)	216 x 555 (8.5 x 21.8)		318 (71)	Four casters
Console Power Box	10 (22)	350 x 256 (13.8 x 10.0)			

Table 8-6 Component Weight and Floor Loading Data (Table continued)

System Component	NET Weight kg (lb)	Overall Width x Depth mm (in.)	*1 Max Up-lift Load N (lb)*1	Max Compressive load N (lb)	Supports mm (in.)
24in. LCD Monitor - LCD (each)	10.8 (21.8)	567 x 228 (21.9 x 9.0)			
Console Desk	40 (88)	1300 x 850 (51 x 33)			
*1 Note: Indicates maximum load for one anchor bolt.					
*2 Note: Loads provided for table support with patient in worst-case-scenario positioning.					

8.4.1 Floor Loading and Anchoring Guidelines

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

- The table and gantry require secure anchoring to the scan room floor. The power distribution unit and the console sit on the floor with casters; anchoring of these components to the floor is optional, unless required because of seismic considerations.
- For total floor load of a Revolution ASCEND with a VT1700V/VT2000/VT2000x/NG Elite 1700/NG Elite 2000 table and no UPS refer to Table 8-6 Component Weight and Floor Loading Data on page 92.
- When carrying the heaviest possible patient, the table-gantry-footswitch assembly represents a concentrated load within the scan room. Refer to Table 8-6 Component Weight and Floor Loading Data on page 92 for total weight.
- Anchors mount through the table and gantry supports. Use the Alignment tool or system layout dimensions to locate the table and gantry support positions within the scan room, making sure that any anchors that pass through the supports clear all structural beams and interferences in the floor.
- If a loading analysis determines that the gantry and table position should change relative to their position on the GE site print, be sure to take into account the clearance requirements in Regulatory Requirements and Service Clearance Requirements when determining an appropriate location for the system.
- Hospitals and scanning facilities throughout the world may utilize a variety of floor types, and the disposition of different floor types may necessitate additional planning to adequately accommodate the system:
  - Wood floors often require substantial reinforcement. GE does not recommend using wood floors.
  - Temperature variation in blacktop or marble floors may allow anchor movement and pullout. GE does not recommend using these floors.
  - GE recommends using concrete floors with a minimum thickness of 102 mm (4 in.) for Gantry, Table, when using GE-supplied anchoring or any other equivalent anchoring method.

NOTICE

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

8.4.2 Anchor Edge Distance Definition

The edge distance of Table and Gantry floor anchor must meet following requirements:

- **Gantry and Table:**
  Using Hilti KWIK 0.5inch DIA*7 inch long anchor (P/N: 5874830-2)

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

NOTICE

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

8.5 GE-Supplied Anchoring

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

⚠ WARNING

POTENTIAL FOR PATIENT INJURY!

AN IMPROPERLY SECURED SYSTEM WILL CAUSE DAMAGE OR PERSONAL INJURY.

SYSTEM CAN MOVE OR TIP DURING OPERATION IF NOT PROPERLY SECURED.

PATIENT SAFETY DURING SYSTEM OPERATION REQUIRES PROPER ANCHORING OF THE SYSTEM.

8.5.1 Specifications of GE-supplied Anchors

Table 8-7 GE-Supplied Anchor Specifications on page 95 lists the specifications of GE-supplied anchors for the system. There are two types of anchors used in this product. For a detailed view, including dimensions and additional specifications, see Table 8-8 Table and Gantry Anchoring Requirements on page 95 of this section.

Table 8-7 GE-Supplied Anchor Specifications

GE-Supplied Anchors	Gantry and NG Elite Table / VT Table	NG Elite Table Shark fin anchor
Part Number	**5874830-2**	**5874830**
Description	Hilti Kwik Bolt 1	Hilti Kwik Bolt 1
Diameter	12.7 mm (0.5 in.)	12.7 mm (0.5 in.)
Length	178 mm (7 in.)	114 mm (4.5 in.)
Note: NG Elite Table Shark Fin Anchor (5874830) does not carry any patient loading and is for anchoring the table calibration brackets to the floor. These anchors take shear and uplift loading during table adjustment.		

8.5.2 Requirements for Using GE-supplied Anchors

Use of GE-supplied anchors (Table 8-7 GE-Supplied Anchor Specifications on page 95) shall adhere to the following requirements:

- Use the GE-supplied anchors ONLY when mounting components on concrete floors.
- Adhere to all anchoring requirements listed in Table 8-8 Table and Gantry Anchoring Requirements on page 95.
- Any anchors showing more than specified length of thread above the torqued nut requires theinstallation of a second anchor in the closest adjacent mounting location. The second anchor shallmeet the same requirements in Table 8-8 Table and Gantry Anchoring Requirements on page 95.
- Non-seismic installations must use as following anchor information:
  System with NG Elite Table: Gantry have four (4) anchors, Table have six (6) anchors, shark fin have four (4) anchors.

  System with VT Table: Gantry have four (4) anchors, Table have four (4) anchors.
- Fully engage the Adjuster Lock Rings (P/N 2106207) with at least one full thread showing below the notched portion on the Adjuster Screw.

NOTE
The table does not have the Adjuster Lock Rings shown in Figure 8-29 NG Elite Table Shark Fin Anchoring with 5874830 Anchor Bolt on page 97 and Figure 8-28 Gantry and NG Elite Table / VT Table Anchoring with 5874830-2 (7 in.) Anchor Bolt on page 96 of this section.

Table 8-8 Table and Gantry Anchoring Requirements

Mounting Requirements	Gantry and NG Elite Table / VT Table Anchor P/N 5874830-2	NG Elite Table Shark Fin Anchor P/N 5874830
Minimum Floor Thickness	102 mm (4 in.)	102 mm (4 in.)
Recommended Drilling Depth	85 mm (3.35 in.)	85 mm (3.35 in.)
Average Anchor Embedment	75 mm (2.95 in.)	68 mm (2.67 in.)
Minimum Anchor Embedment	63 mm (2.48 in.)	63 mm (2.48 in.)
Available Alternate Anchor Locations	Yes	Yes
Shipped Anchor Size	178 mm (7 in.)	114 mm (4.5 in.)
Alternate Anchoring Methods	Yes (see note, above)	Yes (see note, above)

Table 8-8 Table and Gantry Anchoring Requirements (Table continued)

Mounting Requirements	Gantry and NG Elite Table / VT Table Anchor P/N 5874830-2	NG Elite Table Shark Fin Anchor P/N 5874830
Floor Levelness Requirement	6 mm (1/4 in.) over 3 m (9.8 ft)	6 mm (1/4 in.) over 3 m (9.8 ft)

Figure 8-28 Gantry and NG Elite Table / VT Table Anchoring with 5874830-2 (7 in.) Anchor Bolt

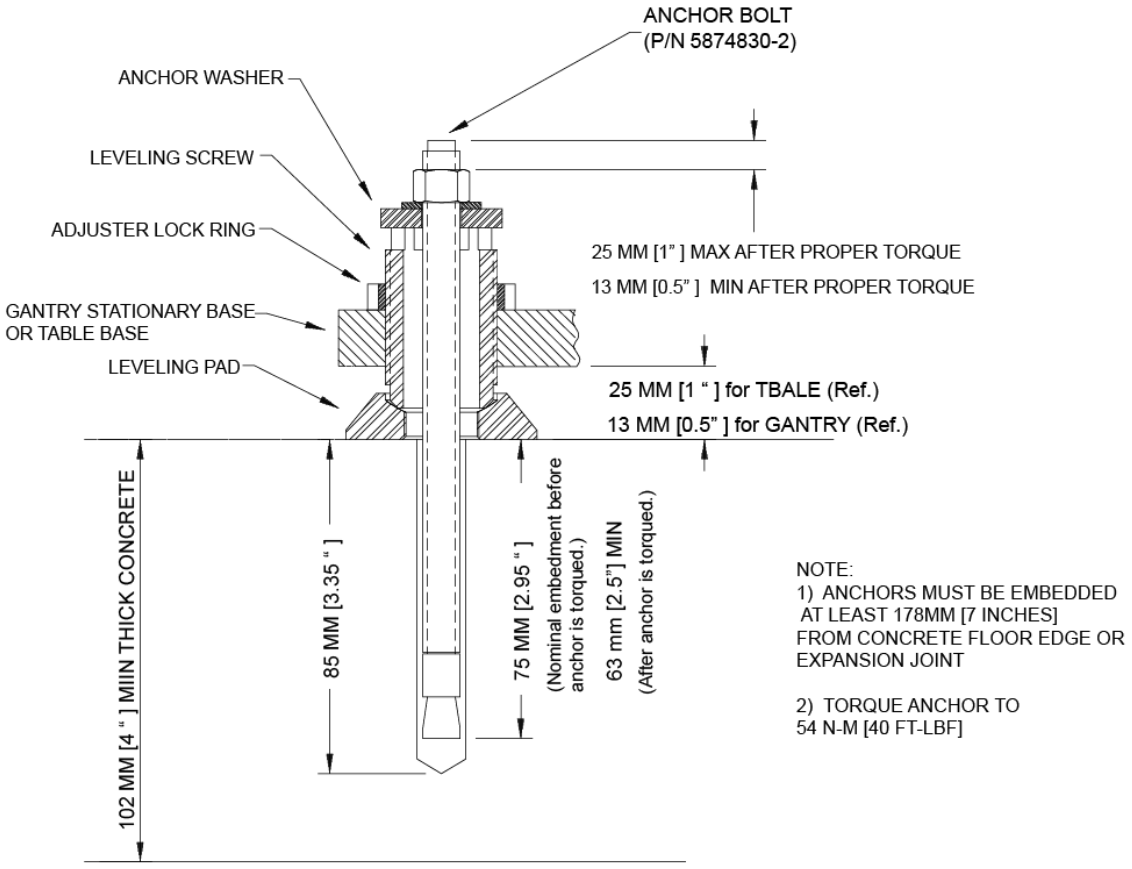
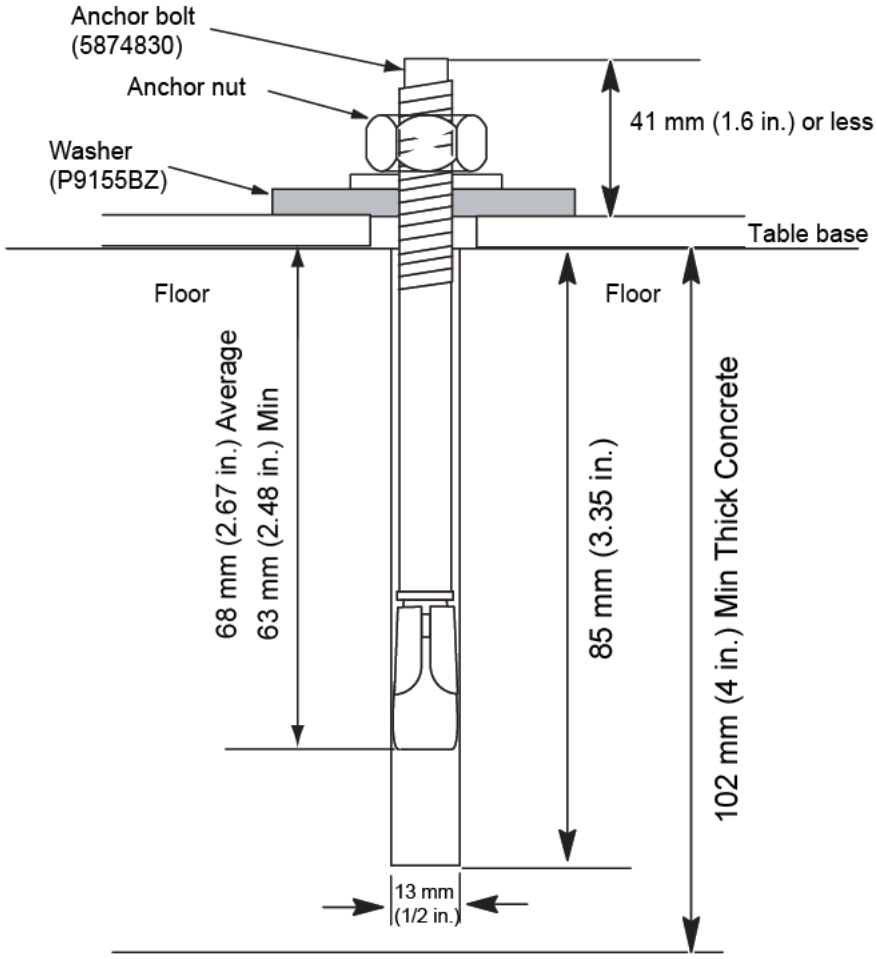


Figure 8-29 NG Elite Table Shark Fin Anchoring with 5874830 Anchor Bolt



8.6 Seismic Mounting

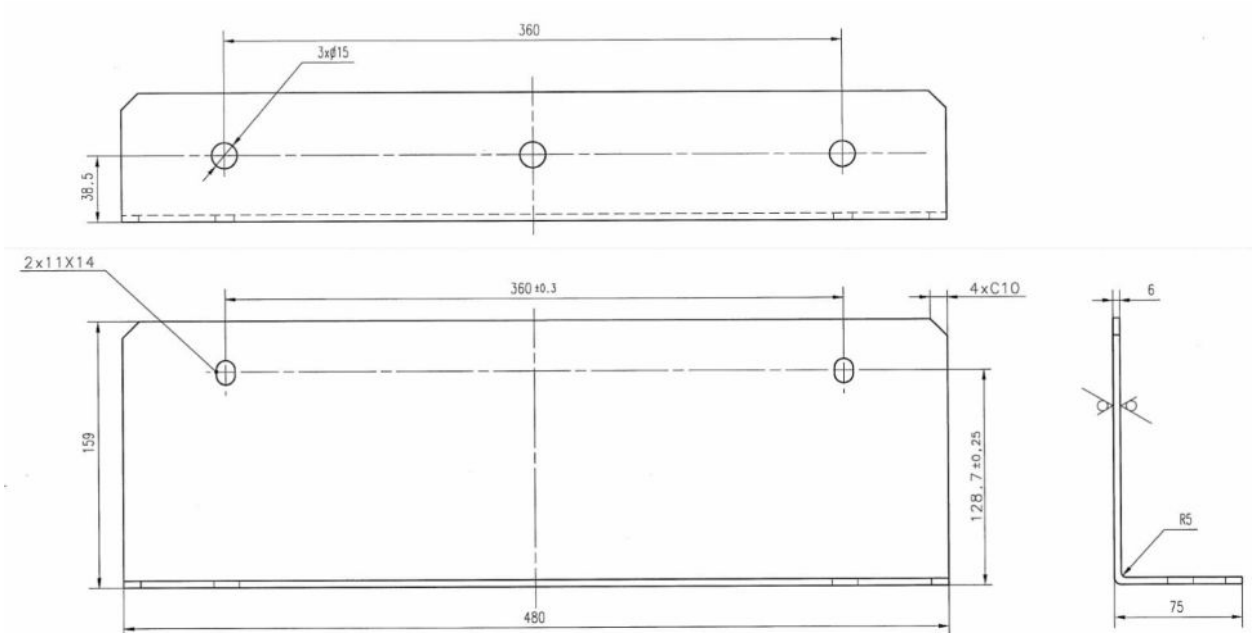
8.6.1 Overview

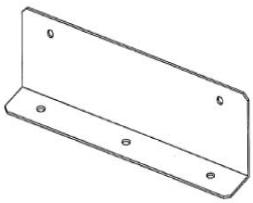
Refer to the guidelines in this section when mounting the system in seismic zones:

- Responsibility for proper seismic mounting rests with the customer. Refer to all applicable laws and codes for your locality.
- GE-supplied anchors may not meet local seismic laws and codes. Use them only if a qualified structural engineer approves them for use in local seismic applications.
- The customer's contractor often supplies a state-certified print or equivalent, showing seismic installation instructions.
- Consider seismic requirements for ceiling-mounted fixtures and refer to the appropriate installation instructions for ceiling-mounted fixtures.

(For NGPDU seismic:) PDU seismic brackets (2354563-2) and the PDU shipping kit (5453382-2) are shipped with the PDU. Detail bracket Installation procedure refer to Installation Manual.

Figure 8-30 PDU Anti Seismic Bracket (2354563-2)





Seismic bracket
shipped with PDU

(For StandAlone Console Seismic:) Console Anti seismic brackets and screws are includes in Console Seismic Kit (5873550) that are shipped with Console.

Figure 8-31 StandAlone Console Seismic Kit

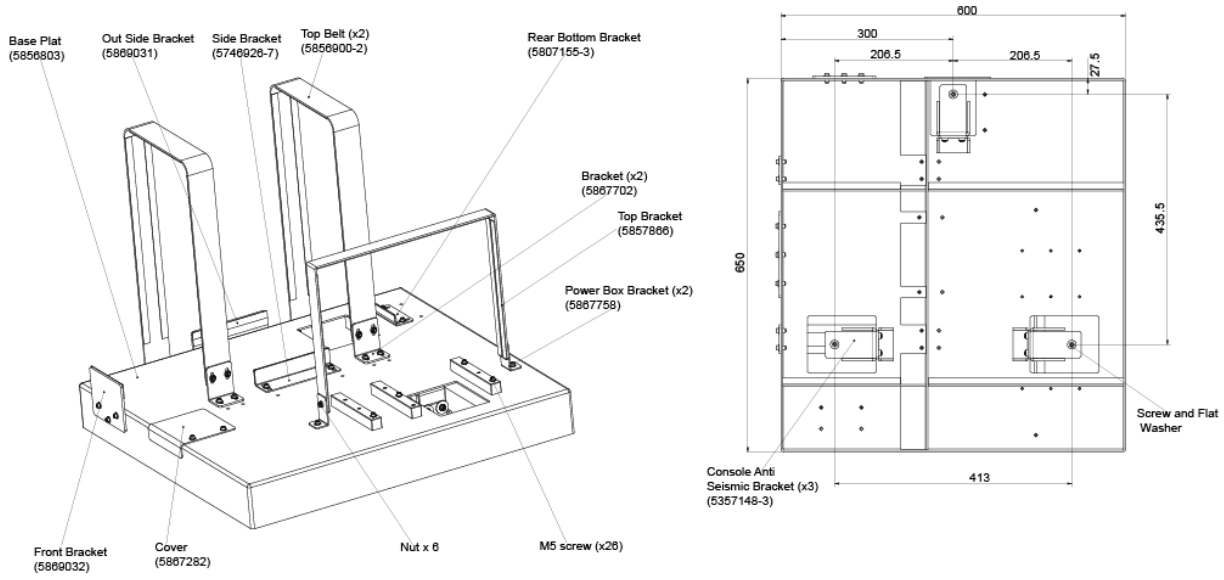
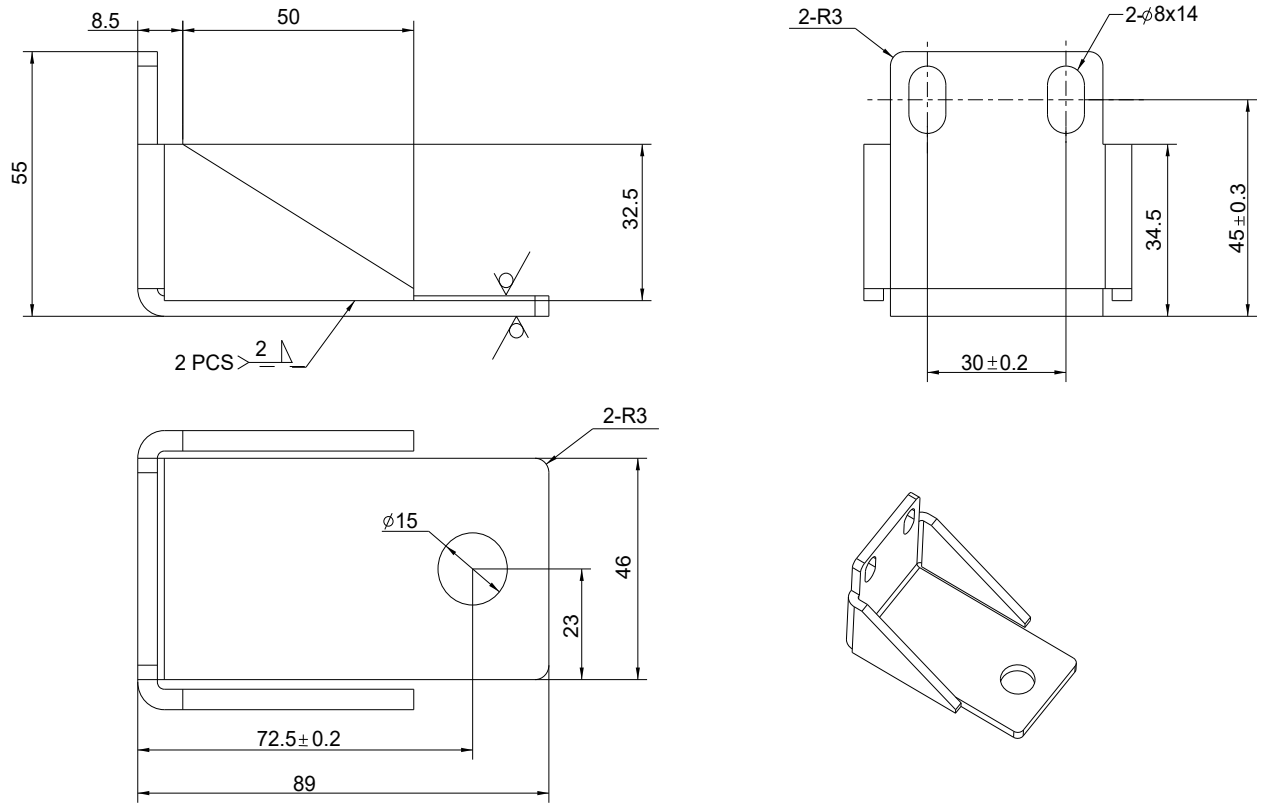


Figure 8-32 Console Anti Seismic Bracket (5357148-3)

Material: STEEL Q/BQB 403 DCO1 FB
Thickness 4.0mm



8.6.2 Center-of-Gravity Information

The information in the following figures provides the customer's contractor and/or structural engineer with center-of gravity information to assist in seismic calculations for the system:

- Gantry: Figure 8-35 Gantry Center-of-Gravity on page 102
- **(For NG Elite Table)** See Figure 8-36 NG Elite 1700 with 227kg (500lb) Center-of-Gravity on page 102, Figure 8-37 NG Elite 1700 without patient Center-of-Gravity on page 103, Figure 8-39 NG Elite 2000 with 308kg (680lb) Center-of-Gravity on page 105, Figure 8-40 NG Elite 2000 without patient Center-of-Gravity on page 106
- **(For VT Table)** See Figure 8-38 VT1700V Center-of-Gravity on page 104, Figure 8-41 VT2000 and VT2000x Center-of-Gravity on page 107
- Power Distribution Unit: Figure 8-42 PDU Center-of-Gravity on page 108 (PDU Seismic Mounting Bracket)
- Console: Figure 8-33 Standalone Console Center-of-Gravity on page 100

Figure 8-33 Standalone Console Center-of-Gravity

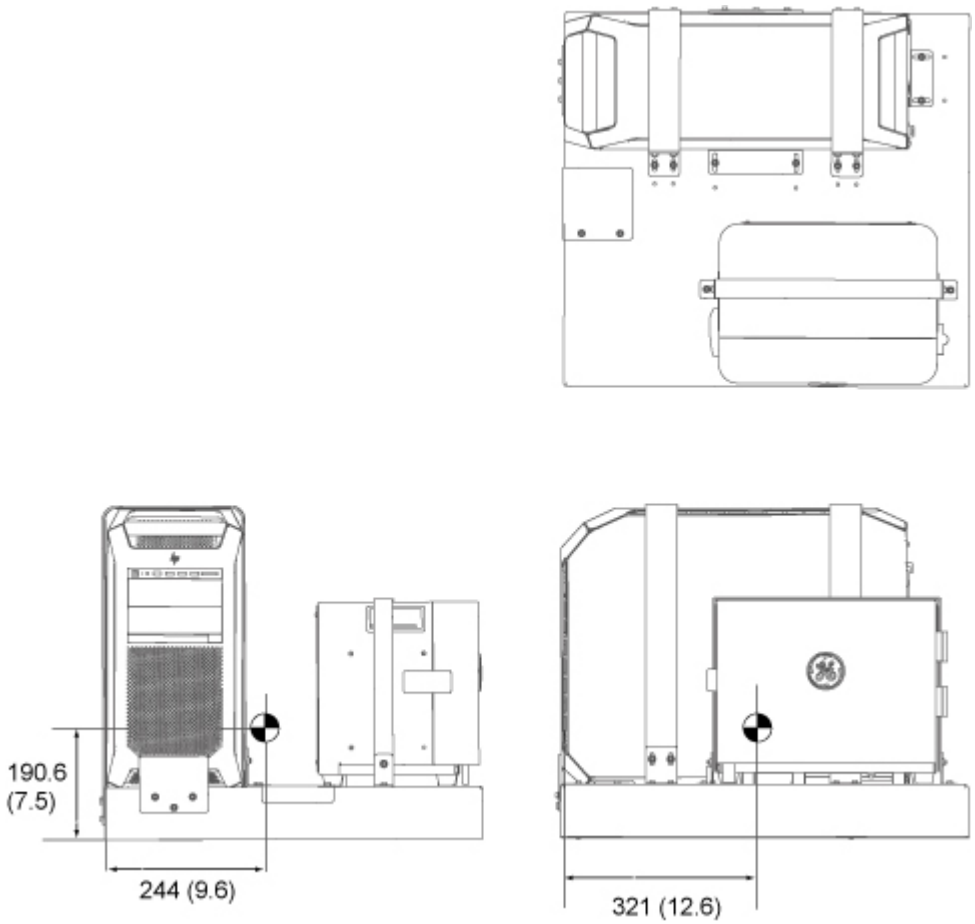


Figure 8-34 Standalone Console Anchor locations

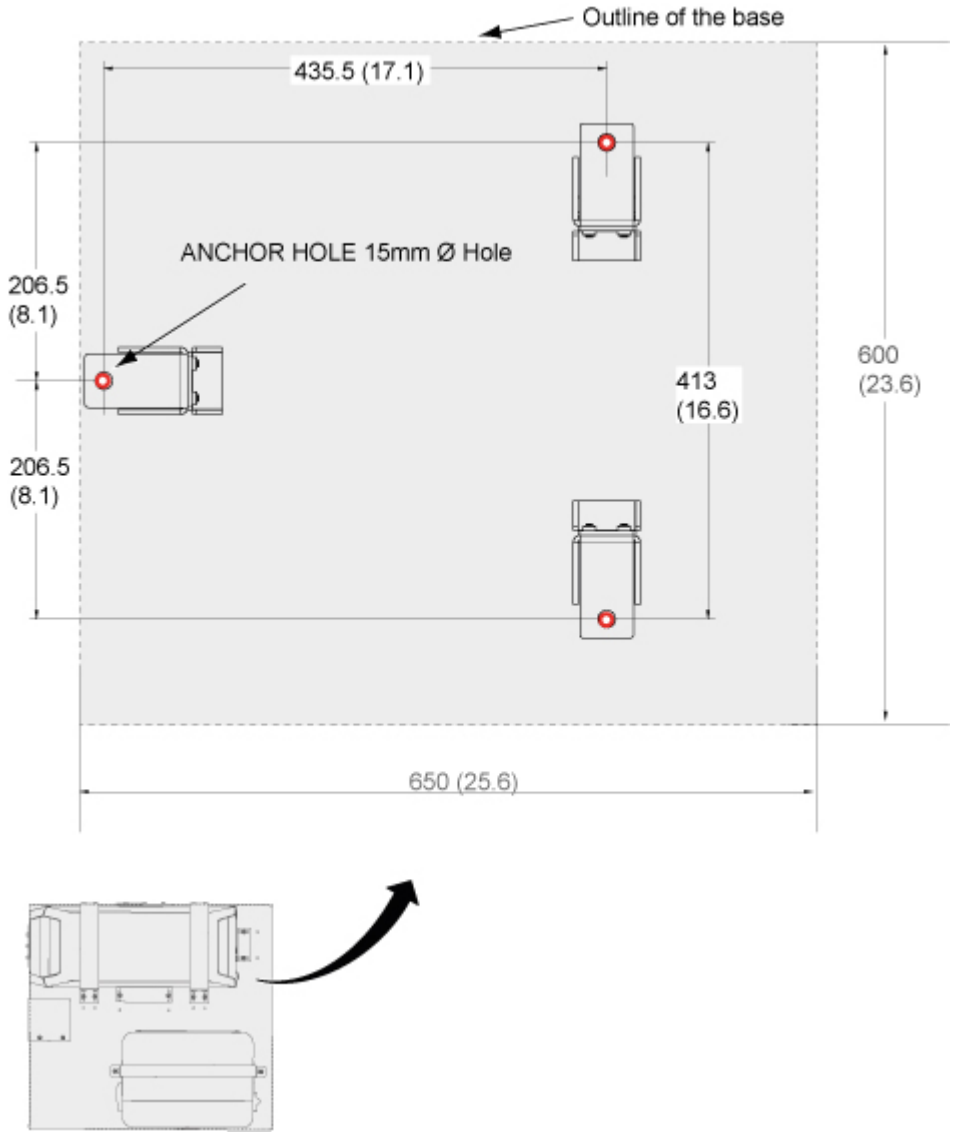


Figure 8-35 Gantry Center-of-Gravity

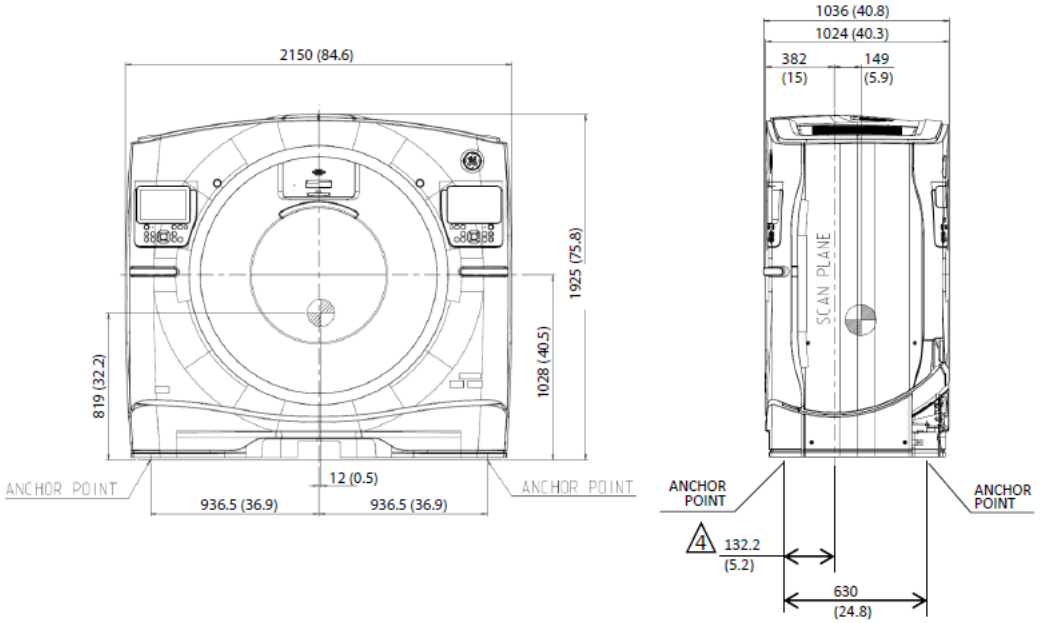
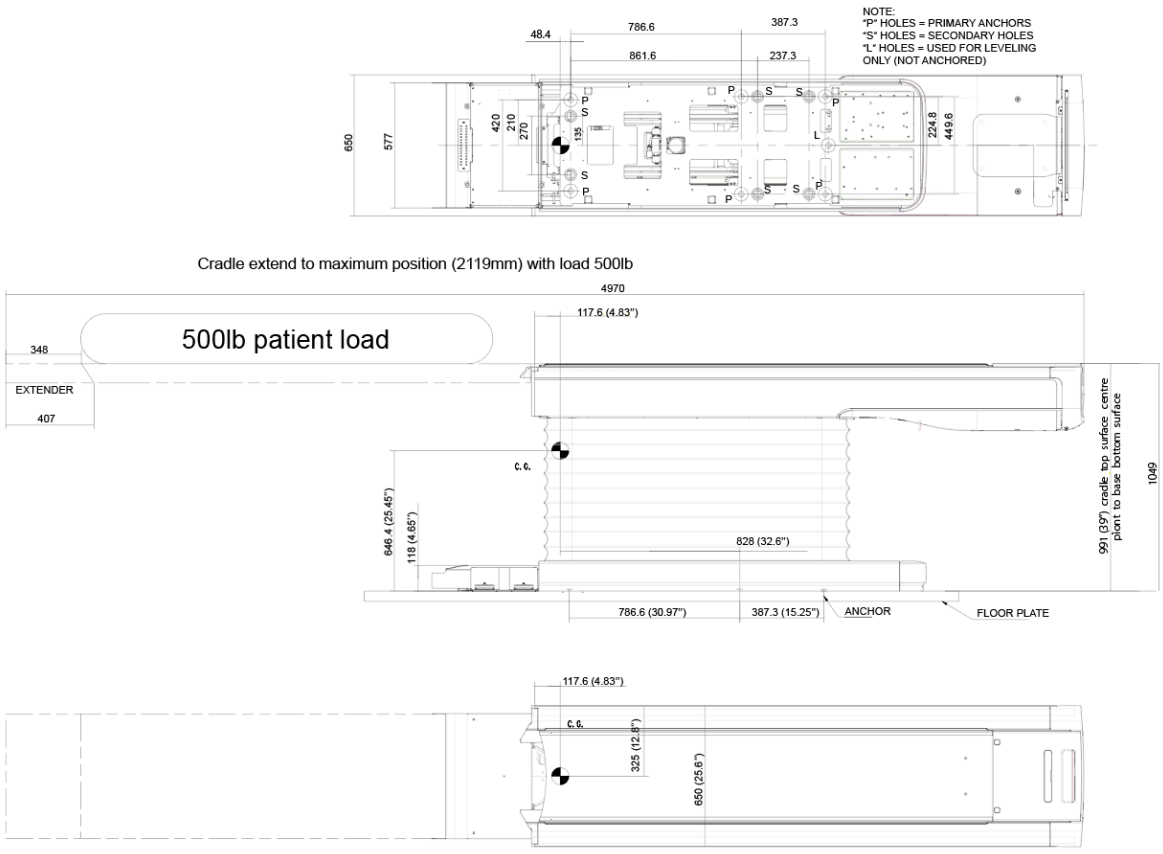


Figure 8-36 NG Elite 1700 with 227kg (500lb) Center-of-Gravity



NOTE

Center of Gravity location marked above includes the mass of a maximum 227kg (500lb) load capacity on the table with a fully extended cradle.

Figure 8-37 NG Elite 1700 without patient Center-of-Gravity

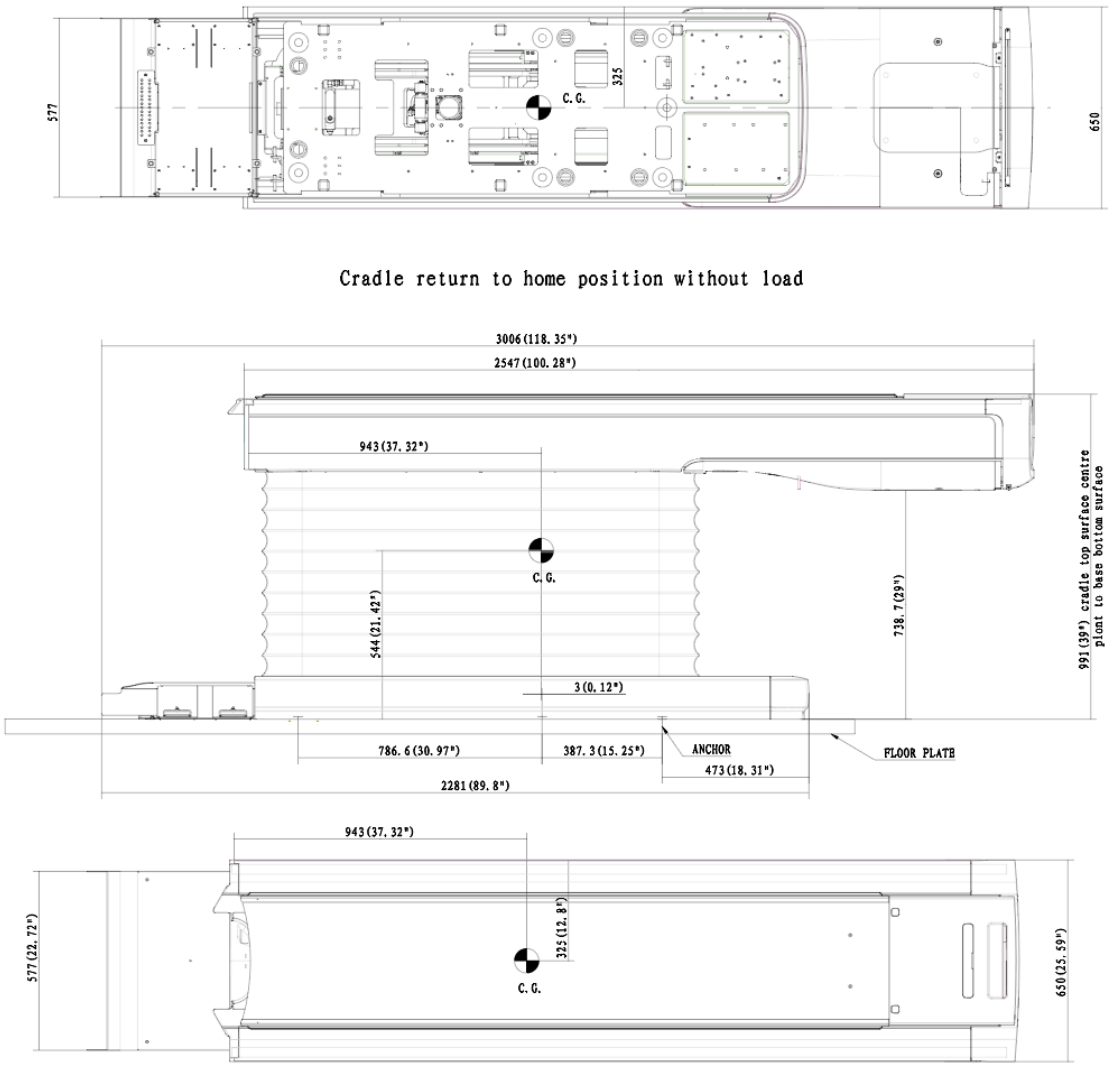
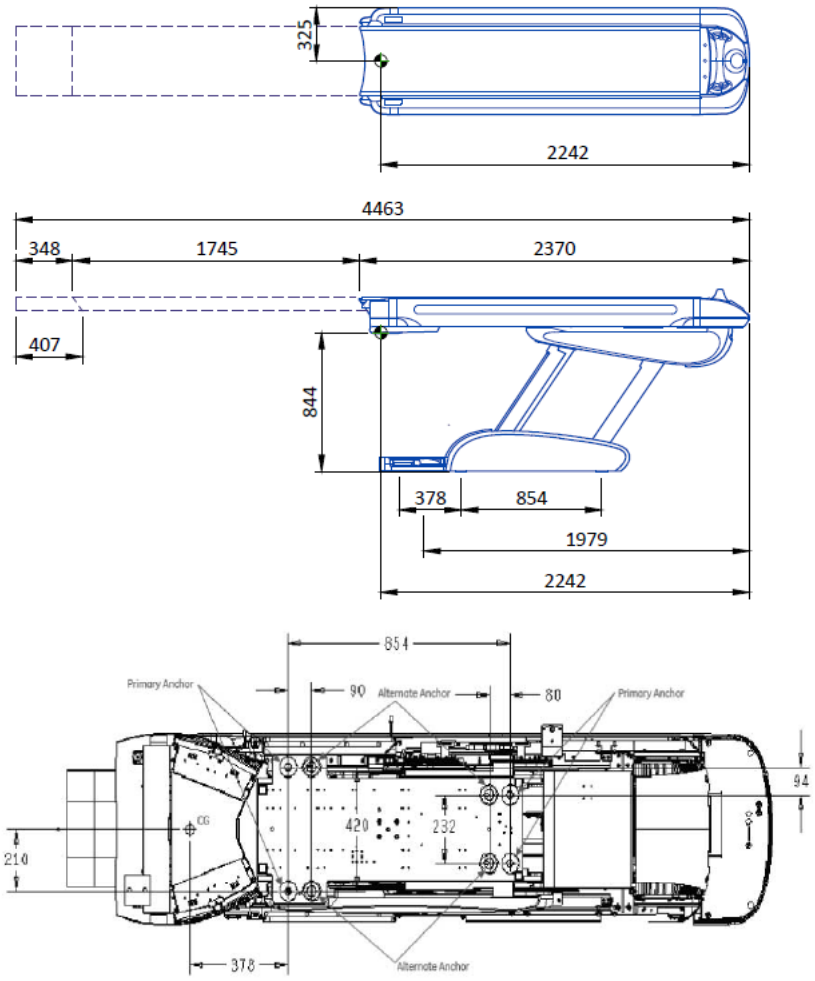


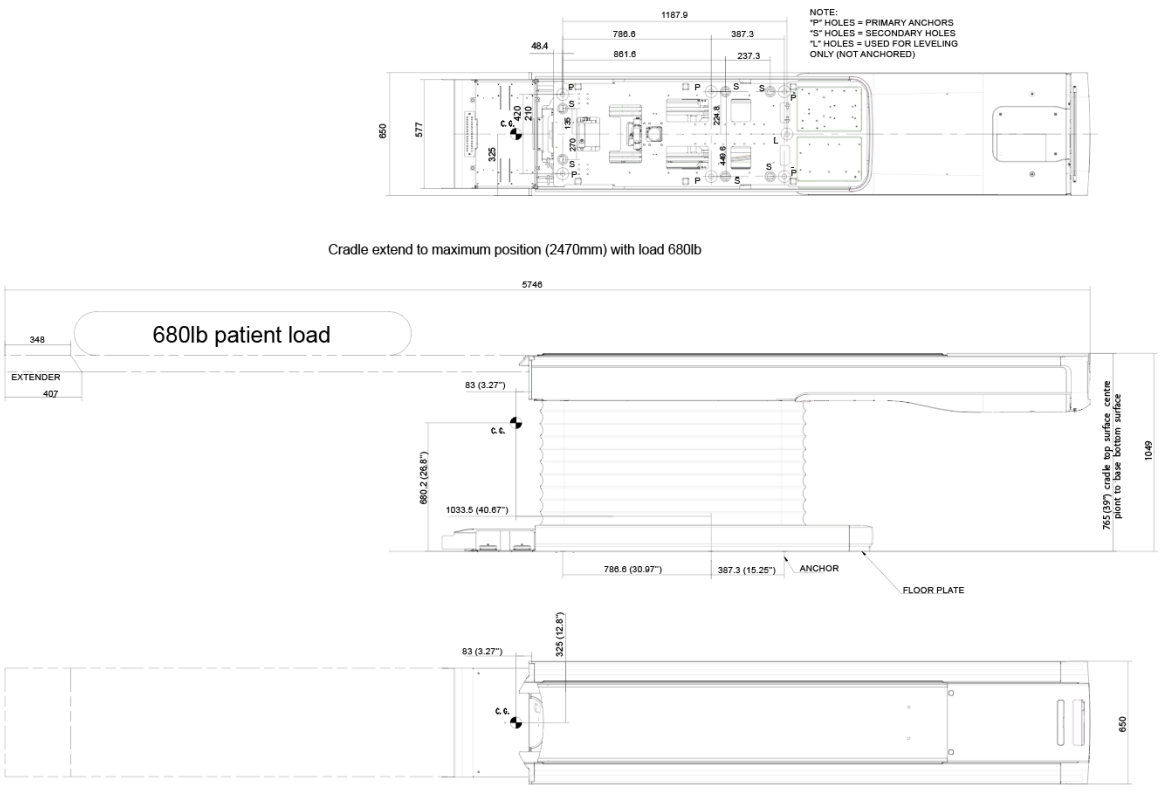
Figure 8-38 VT1700V Center-of-Gravity



NOTE

Center of Gravity location marked above includes the mass of a maximum 227kg (500lb) load capacity on the table with a fully extended cradle.

Figure 8-39 NG Elite 2000 with 308kg (680lb) Center-of-Gravity



NOTE

Center of Gravity location marked above includes the mass of a maximum 308kg (680lb) load capacity on the table with a fully extended cradle.

Figure 8-40 NG Elite 2000 without patient Center-of-Gravity

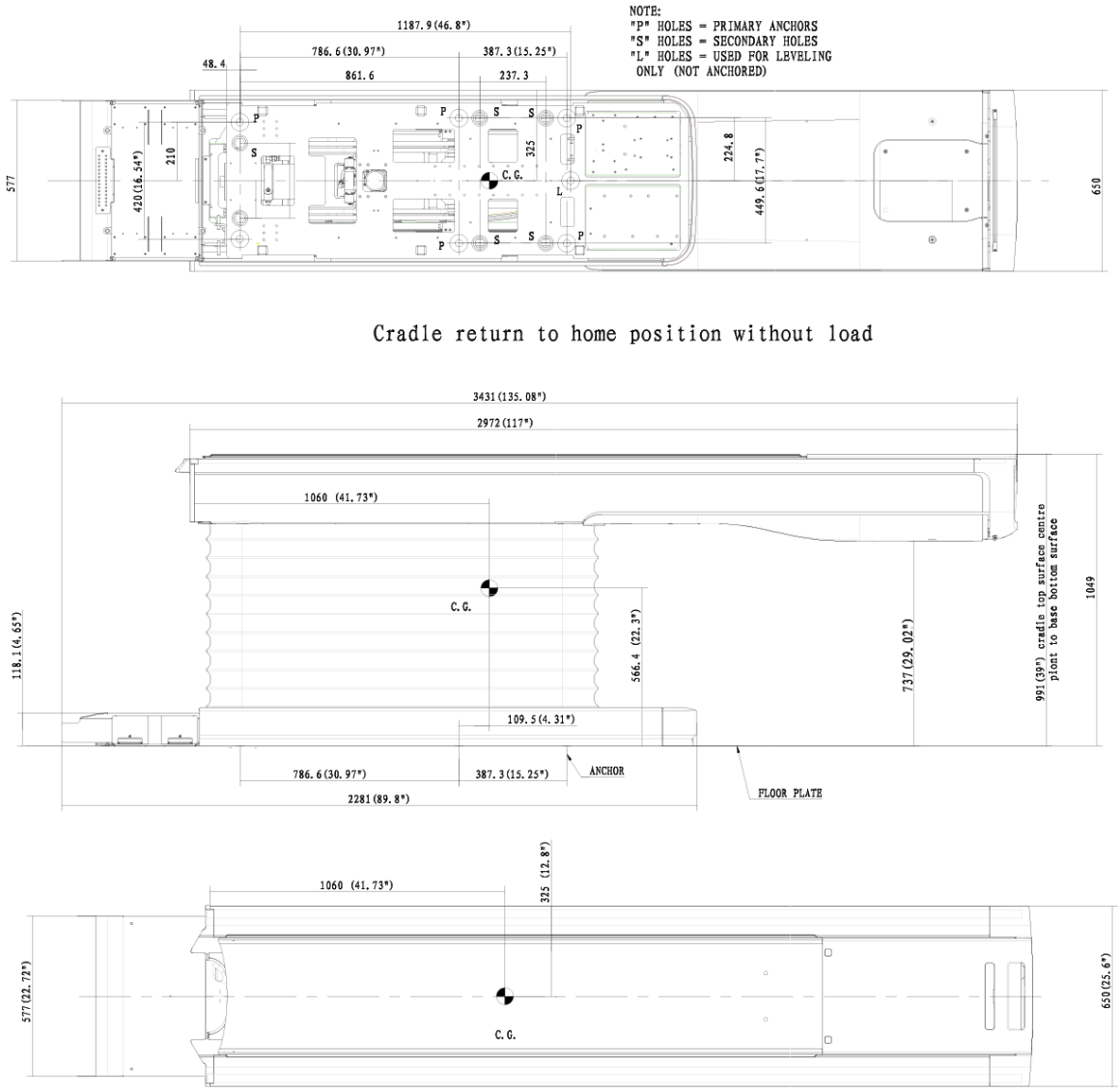
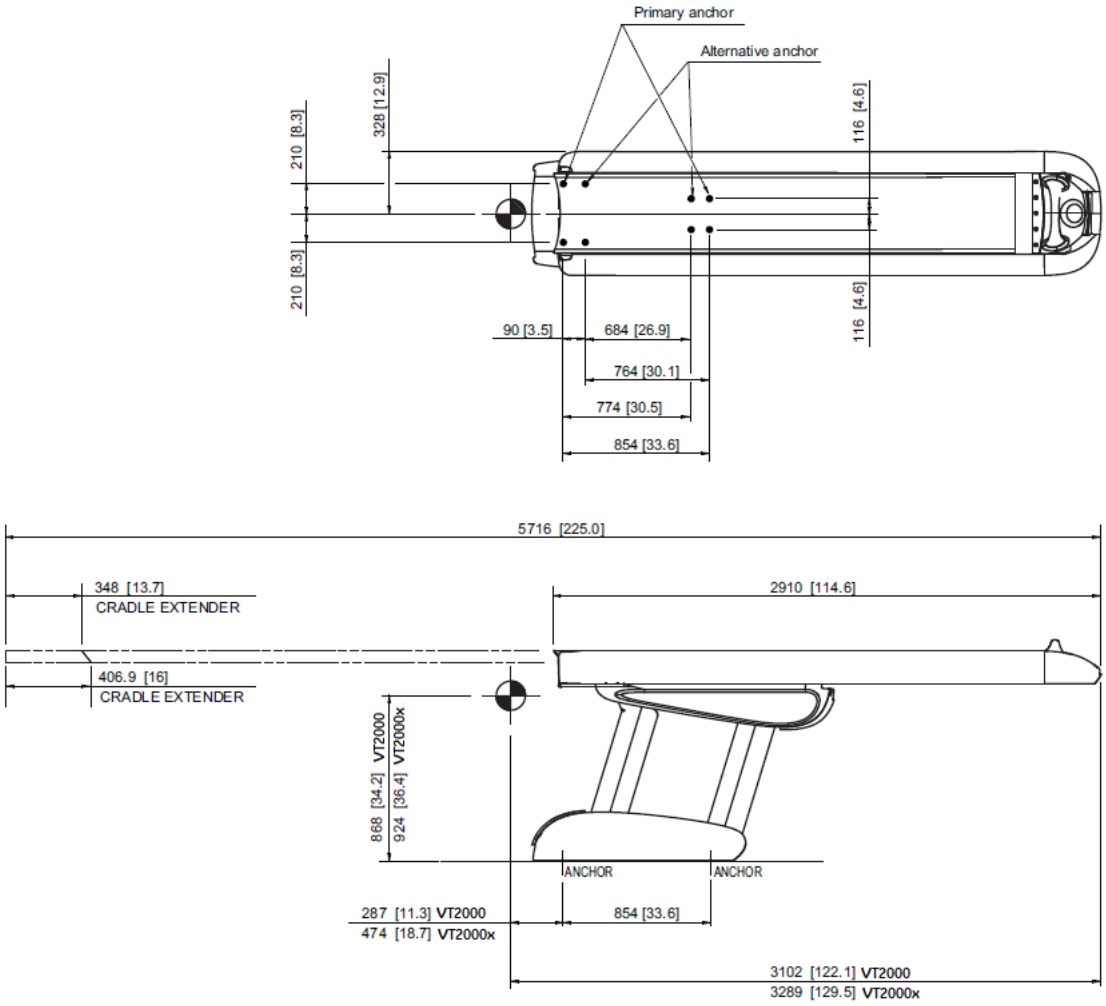


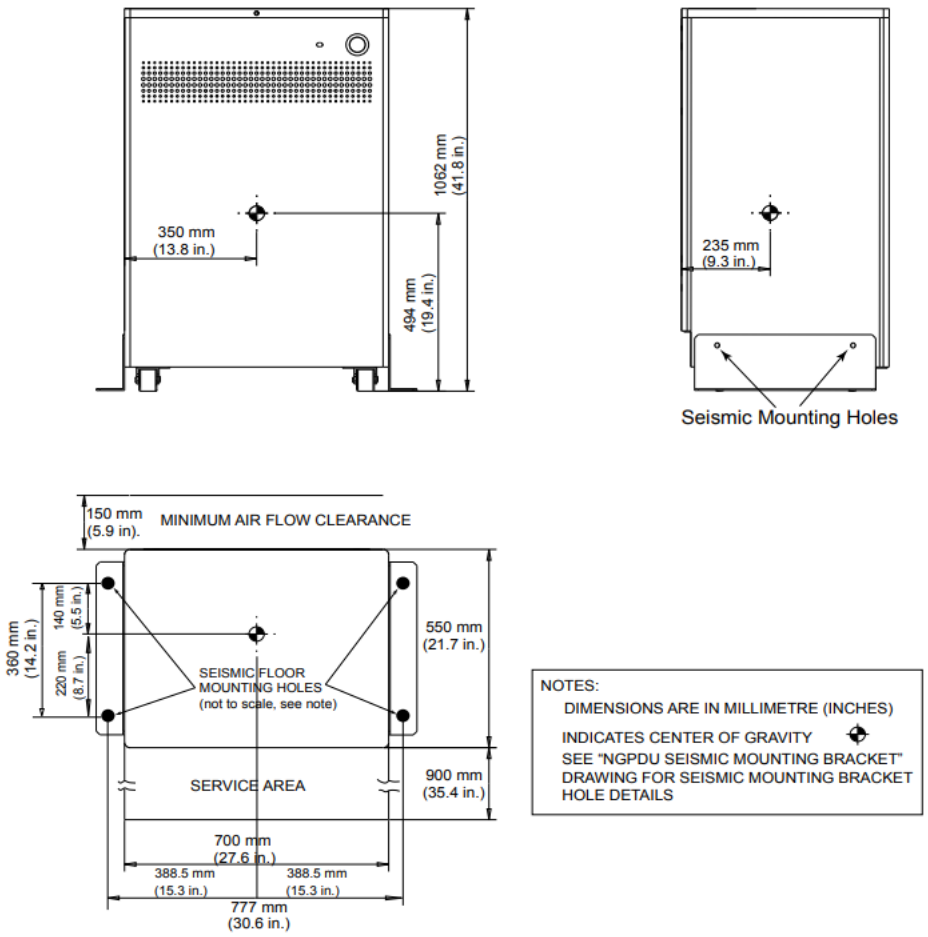
Figure 8-41 VT2000 and VT2000x Center-of-Gravity



NOTE

Center of Gravity location marked above includes the mass of a maximum 227kg (500lb) load capacity for VT2000 and 306kg (675lb) load capacity for VT2000x on the table with a fully extended cradle.

Figure 8-42 PDU Center-of-Gravity



Chapter 9 Environmental Requirements

Ensure the operational readiness and proper system calibration of HVAC prior to installation. Maintain the environmental conditions listed below at ALL times, including over nights, weekends, and holidays. Shut down the CT system if air conditioning is not working. When shutting down the system for major repair, you may also shut down the air conditioning.

9.1 Temperature and Humidity Specifications

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

NOTICE

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

9.1.1 Temperature (Scan and Control Rooms)

Table 9-1 System Temperature Limits

Maximum allowable ambient room temperature:	26°C (79° F)
Recommended ambient room temperature:	22°C (72°F)
Minimum allowable ambient room temperature:	18°C (64°F)

NOTE
Be certain to account for ANY cooling equipment cycle control range, ensuring that the maximum and minimum ambient room temperatures do not exceed those shown in Table 9-1 System Temperature Limits on page 109 during room thermal cycling. For example, if the HVAC is capable of ± 2°C control, then the limits would be 20°C - 24°C to maintain absolute limits.

9.1.2 Humidity (Scan Room & Control Room)

Table 9-2 System Humidity Limits

Maximum allowable non-condensing relative humidity:	60%
Minimum allowable non-condensing relative humidity:	30%

9.1.3 Other Guidelines

- Accurate determination of hospital room environmental conditions may require the temporary installation of a temperature and humidity recorder near the location designated for system installation. Record temperature and humidity readings before and after installation to verify the site's true environmental conditions.
- Consider heating, ventilating, air conditioning (HVAC) needs, and redundancy (back-up). An air conditioner with two compressor units rather than one, may prevent system downtime. A

redundant (back-up) air conditioner permits CT system operation during an extended repair of the primary air conditioner.

9.2 Cooling Requirements

Use Table 9-3 System Heat Output on page 110 to assist in cooling requirements planning. Gantry operation requires over half of the cooling utilized by your system. Contact an HVAC specialist to determine optimal placement of the thermostat and all HVAC vents, bearing in mind that:

- Gantry air INTAKE occurs across the BOTTOM of the gantry.
- Gantry air EXHAUST occurs across the TOP of the gantry.

Table 9-3 System Heat Output

System Component	Max BTU/HR	Max Watt
Gantry maximum (See Note 1)	18,700	5,480
Table	1030	300
Power Distribution Unit	3400	1000
Scan Room Subtotal	23,130	6,780
Console	2860	840
LCD Monitor (Total amount of 2 monitors)	340	100
Control Room Subtotal	3200	940
System Total	26,330	7,720
Average overall system demand in standby is approximately 4.5KW.		

NOTE
Maximum heat output reached at tube change (Detailed Calibration).

NOTE
Heat output does not include heat from room lighting, personnel, or non-CT equipment.

Figure 9-1 HVAC Air Vent Placement in Scan Room on page 111 and Figure 9-2 HVAC Air Vent Placement in Control Room on page 111 show the recommended placements of the thermostat and HVAC vents (intake and output) for the scan and control rooms.

Figure 9-1 HVAC Air Vent Placement in Scan Room

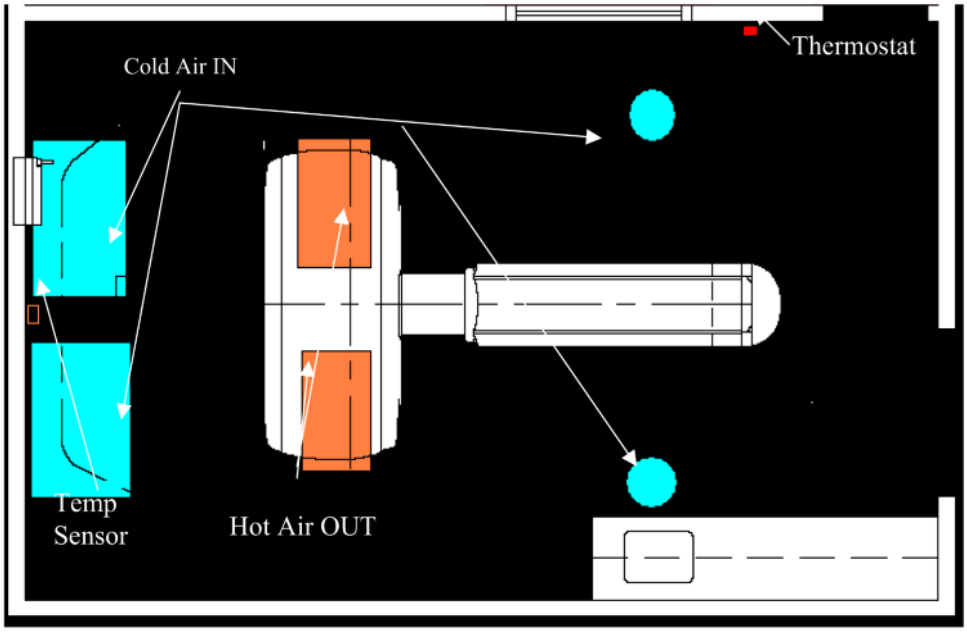
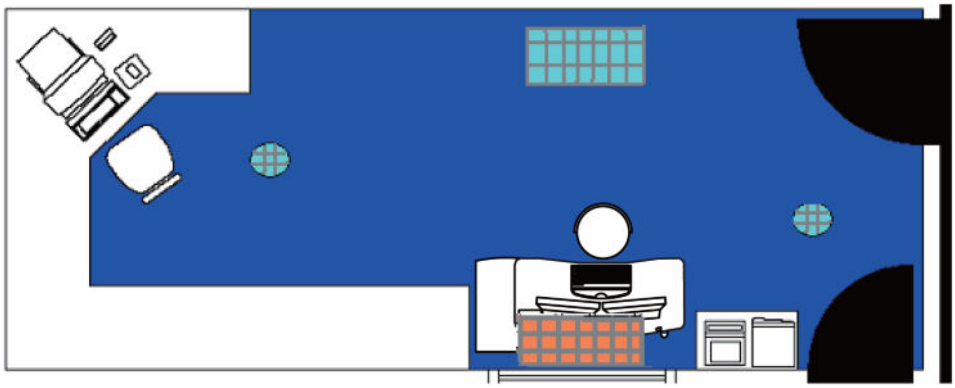


Figure 9-2 HVAC Air Vent Placement in Control Room



9.3 Altitude

The system shall meet all functional and performance specifications when placed in a room that is at an elevation of -150 m to 2,400 m (-492 ft to 7,875 ft) above sea level.

NOTE

(USA and Canada): For sites with an altitude of 2,400 m to 3,000 m (7,875 ft. to 9843 ft.), the maximum room temperature must not exceed the following temperature due to the altitude effects on system cooling.

- 2,400m to 3,000m (7875 ft. to 9843 ft.): 25 degrees C (77 degree F)

(Other Countries): For sites with an altitude of 2,400 m to 4,000 m (7,875 ft. to 13,124 ft.), the maximum room temperature must not exceed the following temperature due to the altitude effects on system cooling.

- 2,400m to 3,000m (7875 ft. to 9843 ft.): 25 degrees C (77 degree F)
- 3,000m to 4,000m (9843 ft. to 13,124 ft.): 23 degrees C (73 degree F)

NOTE
(Other Countries): For sites with an altitude of 3000 m to 4,000 m (9,843 ft. to 13,124 ft.) , additional X-ray tube cooling time is required during Detailed Calibration. Refer to Detailed Calibration procedure in Service Methods.

9.4 Electro-Magnetic Interference (EMI)

9.4.1 Gantry

Locate the gantry in ambient static magnetic fields of less than 0.1 mTesla (1 Gauss) to guarantee the specified imaging performance. Ambient AC magnetic fields must measure below 1 µTesla (10 mGauss) peak.

9.4.2 Console / Computer Equipment

Locate computer equipment in ambient static magnetic fields of less than 1 mTesla (10 Gauss) to guarantee data integrity (see Figure 9-3 Sample Room Layout on page 113).

9.4.3 PDU

The PDU produces an electromagnetic field that radiates outward from its cabinet in all directions. Do not place other sensitive electronics around or above the PDU.

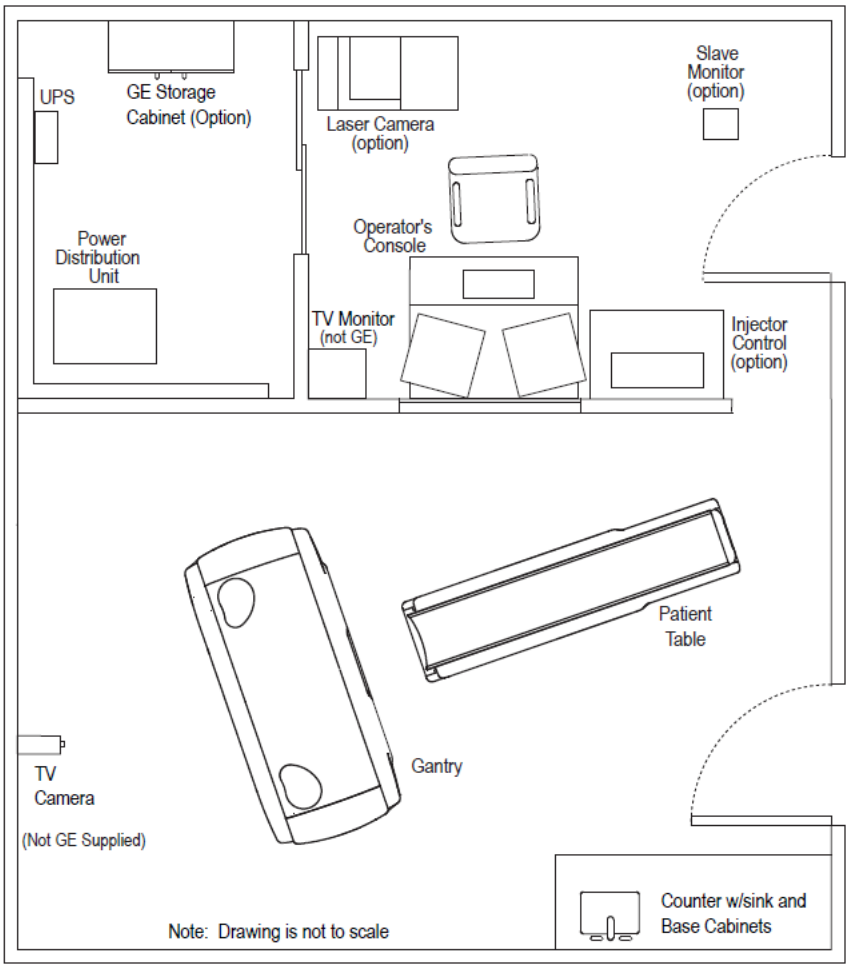
9.4.4 EMI Reduction

If you suspect the presence of fields of excessive EMI, consult GE Sales & Service for recommendations. Consider the following when attempting to reduce EMI:

- External field strength decreases rapidly with distance from source of the magnetic field.
- External leakage magnetic field of a three-phase transformer measures much less than that of a bank of three single-phase transformers of an equivalent power rating.
- Large electric motors constitute a source of substantial EMI.
- High-powered radio signals constitute a source of EMI.
- Maintain good screening of cables and cabinets.
- Consider and measure EMI fields of sites with main facility power running UNDER the floor or WITHIN the walls or ceilings of the scan room.
- Pay special attention to power substations and high-voltage power lines in proximity to the scan facility.
- If any concerns remain regarding excessive EMI fields, be sure to measure to confirm that your site meets all required specifications.

9.4.5 Equipment EMI "Envelopes"

Figure 9-3 Sample Room Layout



9.5 Electro-Magnetic Compatibility (EMC)

9.5.1 Electromagnetic Interference (EMI) Consideration

Revolution Ascend complies with IEC60601-1-2 Edition 3.0 (2007) / 4.0 (2014) / 4.1(2020) EMC standard for medical devices. This equipment generates, uses, and can radiate radio frequency energy. The equipment may cause radio frequency interference to other medical and nonmedical devices and radio communications. 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), the 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

Table 9-4 Environment of Intended Use

Environment of Intended Use	
This medical device is evaluated to the IEC60601-1-2 safety standard electromagnetic emissions and immunity levels in the environment category shown below.	
ENVIRONMENT CATEGORY	EXAMPLES
Professional Healthcare Facility	EM sources generally are from LAN and WLAN, mobile phones, paging systems, IT equipment, medical devices. Physician Offices / Clinics / Limited Care Facilities / Freestanding Surgical Centers / Multiple Treatment Facilities / Hospitals
Environment Exclusions	
This medical device may not be suitable for use in the IEC60601-1-2 safety standard environment categories listed below. The types of electromagnetic disturbances emitted from electrical devices found in these environments and their effect on the performance of this medical device have not been considered per the safety standard. The safety standard requires additional testing and/or risk assessment for compliance and patient/operator safety of the CT system.	
ENVIRONMENT CATEGORY	EXAMPLES
Home Healthcare Environment	Locations that have diverse electromagnetic disturbances. Category includes transportation. Residences / Homes / Nursing Homes / Vehicles (Cars, Trains, Planes) / Mobile Emergency Medical Services / Airports / Outdoors
Special Environment – Medical	EM sensitive locations or sources of intense emissions. Rooms with HF surgical equipment / Rooms with short-wave therapy equipment / Inside RF shielded room of an MRI system.
Special Environment - Military	Unique locations that have not been EM characterized. Near Radar Installations / Near Weapons Control Systems
Special Environment – Industrial	Unique locations that have not been EM characterized. Power Plants / Manufacturing Facilities / Mining / Refineries / Mills

The manufacturer is not responsible for any interference caused by using other than 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. Refer to the tables below.

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.

The system is suitable to be used in the electromagnetic environment, as per the limits and recommendations described in the following tables. The customer/owner shall ensure the system is used in such an environment.

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.

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

re-orienting the equipment. The emissions characteristics are provided in Table 9-5 Guidance and manufacturer's declaration - electromagnetic emissions on page 115.

Table 9-5 Guidance and manufacturer's declaration - electromagnetic emissions

Guidance and manufacturer's declaration - electromagnetic emissions		
The Revolution Ascend is intended for use in the electromagnetic environment specified below. The customer or the user of the Revolution Ascend 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 Revolution Ascend 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 Revolution Ascend 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.

Table 9-6 Guidance and manufacture's declaration - electromagnetic immunity

Guidance and manufacture's declaration - electromagnetic immunity			
The Revolution Ascend is intended for use in the electromagnetic environment specified below. The customer or the user of the Revolution Ascend should assure that it is used in such an environment.			
Immunity Test	**EC 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 [a)] ±15 kV air [a)]	±6 kV contact ±8 kV air ±8 kV contact [a)] ±15 kV air [a)]	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 ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.

Table 9-6 Guidance and manufacture's declaration - electromagnetic immunity (Table continued)

Guidance and manufacture's declaration - electromagnetic immunity			
The Revolution Ascend is intended for use in the electromagnetic environment specified below. The customer or the user of the Revolution Ascend should assure that it is used in such an environment.			
Immunity Test	**EC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment - Guidance**
Surge IEC 61000-4-5 GB/T 17626.5	±1 kV line-line ±2 kV line-earth	±1 kV line-line ±2 kV line-earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11 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 Revolution Ascend requires continued operation during power mains interruptions, it is recommended that the Revolution Ascend be powered from an uninterruptible power supply or a battery.
	<5 % U_T for 5s (>95 % dip in U_T) 0%U_T, 5s[a)]	<5 % U_T for 5s (>95 % dip in U_T) 0%U_T, 5s[a)]	
Power frequency (50/60Hz) magnetic fields IEC 61000-4-8 GB/T 17626.8	3 A/m 30 A/m [a)]	3 A/m 30 A/m [a)]	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Proximity Magnetic Fields [a)] IEC 61000-4-39	8 A/m 30 kHz	Not applicable	
	65 A/m 134.2 kHz 7.5 A/m 13.56 MHz	65 A/m 134.2 kHz 7.5 A/m 13.56 MHz	

NOTE
U_T is the a.c. mains voltage prior to application of the test level.

NOTE
[a)] For IEC 60601-1-2:2014 Ed4.0 and A1:2020 Ed4.1, Proximity Magnetic Fields apply to IEC 60601-1-2 Ed4.1 only.

Table 9-7 Guidance and manufacturer's declaration – electromagnetic immunity

Guidance and manufacturer's declaration - electromagnetic immunity			
The Revolution Ascend is intended for use in the electromagnetic environment specified below. The customer or the user of the Revolution Ascend should assure 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 [a)] ISM bands between 150 kHz and 80 MHz 80%AM at 1kHz	3Vrms 6Vrms [a)] ISM bands between 150 kHz and 80 MHz	Portable and mobile RF communications equipment should be used no closer to any part of the Revolution Ascend, 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 ~ 2.5/2.7[a)] GHz 80% AM at 1kHz	3V/m	$d = 1.2\sqrt{p}$ 80 MHz ~ 800 MHz $d = 2.3\sqrt{p}$ 800 MHz ~ 2.5/2.7[a)] 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).
Proximity fields from RF Wireless communications equipment [a)] IEC 61000-4-3	refer to Table 9-8 Immunity and recommended separation between RF wireless communication equipment on page 118	refer to Table 9-8 Immunity and recommended separation between RF wireless communication equipment on page 118	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.

NOTE
[a)] For IEC 60601-1-2:2014 Ed4.0 and A1:2020 Ed4.1.

Table 9-7 Guidance and manufacturer's declaration – electromagnetic immunity (Table continued)

Guidance and manufacturer's declaration - electromagnetic immunity			
The Revolution Ascend is intended for use in the electromagnetic environment specified below. The customer or the user of the Revolution Ascend should assure that it is used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment - Guidance**
[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 Revolution Ascend is used exceeds the applicable RF compliance level above, the Revolution Ascend should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Revolution Ascend. [b] Over the frequency range 150 kHz to 80 MHz. field strengths should be less than 3V/m.			

Table 9-8 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	2	28
1845				

Table 9-8 Immunity and recommended separation between RF wireless communication equipment
(Table continued)

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)**
1970		LTE Band 1, 3, 4, 25 UMTS		
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				

Electromagnetic Separation Distance

Maintain the electromagnetic separation (between 150K to 2.7GHz) distance as described below:

Table 9-9 Recommended Separation Distances

Recommended separation distances between portable and mobile RF communications equipment and the Revolution Ascend			
The Revolution Ascend is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Revolution Ascend can help prevent electromagnetic Interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Revolution Ascend as recommended below, according to the maximum output power of the communications equipment			
Rated Maximum Output Power (P) of Transmitter Watts (W)	**Separation Distance according to Frequency of Transmitter**		
	150 kHz ~ 80 MHz $d = 1.2\sqrt{p}$	**80 MHz ~ 800 MHz** $d = 1.2\sqrt{p}$	**800 MHz ~ 2.5/2.7[a)] 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
10	3.8	3.8	7.3

Table 9-9 Recommended Separation Distances (Table continued)

Recommended separation distances between portable and mobile RF communications equipment and the Revolution Ascend			
The Revolution Ascend is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Revolution Ascend can help prevent electromagnetic Interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Revolution Ascend as recommended below, according to the maximum output power of the communications equipment			
Rated Maximum Output Power (P) of Transmitter Watts (W)	**Separation Distance according to Frequency of Transmitter**		
	150 kHz ~ 80 MHz $d = 1.2\sqrt{p}$	**80 MHz ~ 800 MHz** $d = 1.2\sqrt{p}$	**800 MHz ~ 2.5/2.7[a] GHz** $d = 2.3\sqrt{p}$
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.

NOTE
[a] For IEC 60601-1-2:2014 Ed4.0 and A1:2020 Ed4.1.

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

Limitations Management:

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

Cable Shielding and Grounding

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

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

Unauthorized changes or modifications could void the users' authority to operate the equipment and affect image quality by producing image artifacts.

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

9.6 System Component Noise Levels

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

Maximum Console Audible Noise Level The Maximum audible noise level is less than 54dBA when measured at a distance of one meter from the nearest console surface, in any direction.

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Chapter 10 Radiation Protection Requirements

10.1 Shielding Requirements

NOTICE

Engage a QUALIFIED RADIOLOGICAL HEALTH PHYSICIST to review your scan room shielding requirements, taking into consideration:

- **Scatter radiation levels within the scanning room (see** Figure 10-1 Typical Scatter Survey (Large Filter (Body) - Phantom 32cm CTDI) on page 125 **and** Figure 10-2 Typical Scatter Survey (Small Filter (Head) - Phantom 16cm CTDI) on page 127**).**
- **Equipment placement.**
- **Weekly projected work-loads (number of patients/day technique (kvp*ma))**
- **Materials used for construction of walls, floors, ceiling, doors, and windows.**
- **Activities in surrounding scan room areas.**
- **Equipment in surrounding scan room areas (e.g., film developer, film storage)**
- **Room size and equipment placement within the room relative to room size.**

The illustrations in this Chapter depict measured radiation levels within the scanning room, while scanning a 32 cm or 16 cm CTDI phantom with the technique shown. Use the mAs, kV and aperture scaling factors shown in Table 1 to adjust exposure levels to the scan technique used at the site. The exposure level for a 120 kV, 800 mA, 1 sec. scan at 1270 mm (50 in.) away from the scan plane is: 10.4 µGy × 0.71 × 800/100 = 59.2 µGy.

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

Table 10-1 Shielding Requirements Scaling

Changed Parameter	Multiplication Factor
mAs	new mAs/100
80 kV	0.24
100 kV	0.45
120 kV	0.71
140 kV	1.00
1mm aperture	0.20
3 mm aperture	0.22
5 mm aperture	0.27

Table 10-1 Shielding Requirements Scaling (Table continued)

Changed Parameter	Multiplication Factor
10 mm aperture	0.38
15 mm aperture	0.48
20 mm aperture	0.59
30 mm aperture	0.79
40 mm aperture	1.00

NOTICE

This publication uses µGy (micrograys) to measure radiation levels. The conversion factor from mR to µGy (micrograys) is: 1 mR = 8.76 µGy.

Figure 10-1 Typical Scatter Survey (Large Filter (Body) - Phantom 32cm CTDI)

NOTE
ISO- Contour 0.7, 1.3, 2.2, 5.2, and 14.5 µGray/scan Technique 140 kV, 100 mA, 1 second (s), 40 mm

NOTE
The 32 cm CTDI Phantom should be placed on the patient table.

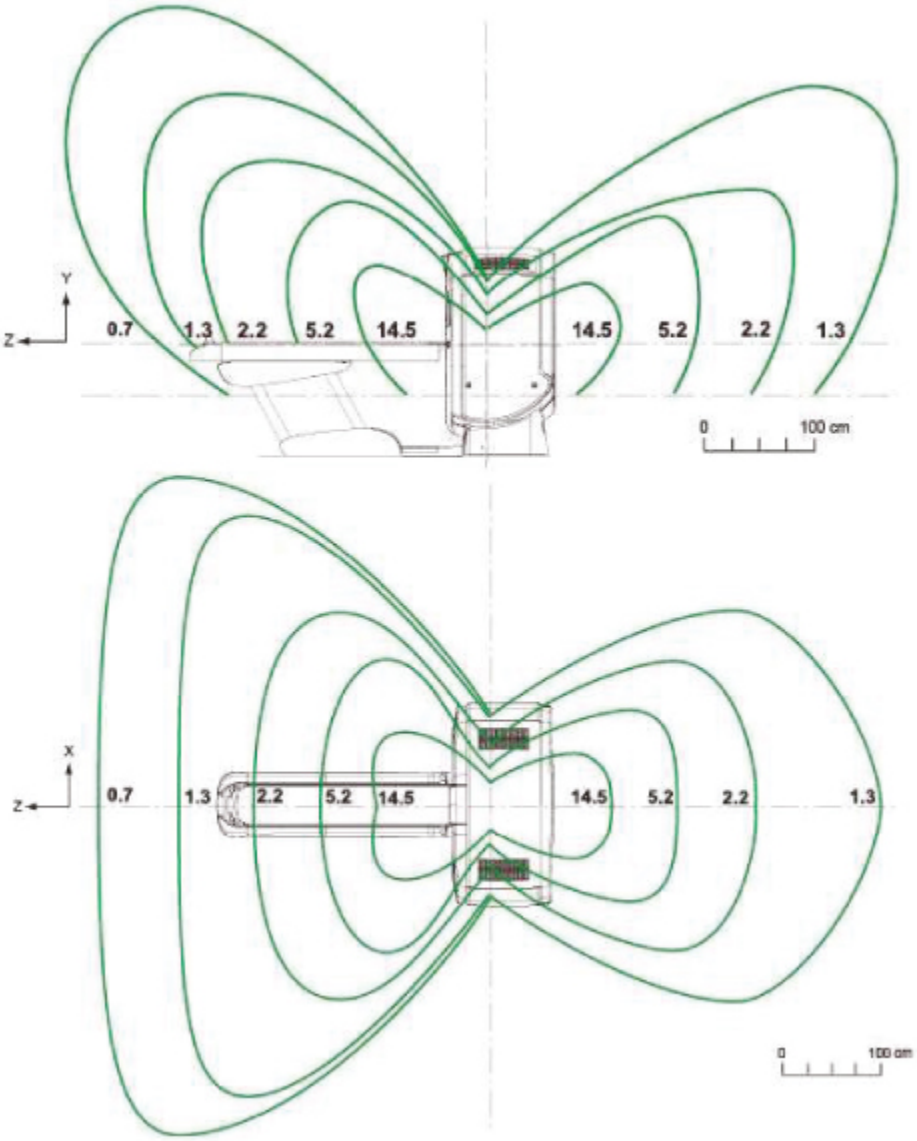

Table 10-2 Typical Scatter Survey (Large Filter (Body) - Phantom 32cm CTDI)

µGray/scan (Vertical) Z-Axis (m)														
Y-Axis (m)	**F3.0**	**F2.5**	**F2.0**	**F1.5**	**F1.0**	**F0.5**	**0.0**	**R0.5**	**R1.0**	**R1.5**	**R2.0**	**R2.5**	**R3.0**	
	1.6	2.2	3.1	4.3	3.5	0.9	-	0.3	0.3	1.8	2.8	2.2	1.6	**U1.5**
	1.8	2.6	3.7	5.4	7.7	5.1	-	0.2	3.7	5.8	3.7	2.5	1.8	**U1.0**

Table 10-2 Typical Scatter Survey (Large Filter (Body) - Phantom 32cm CTDI) (Table continued)

µGray/scan (Vertical) Z-Axis (m)														
	1.8	2.7	4.3	7.6	14.5	30.1	-	-	13.8	7.1	4.0	2.6	1.8	**U0.5**
	1.7	2.5	3.9	7.7	17.7	92.5	ISO	46.4	17.0	7.3	4.1	2.5	1.8	**0.0**
	0.0	-	-	-	2.3	34.0	-	-	12.1	6.1	3.7	2.4	1.7	**L0.5**

µGray/scan (Horizontal) X-Axis (m)														
Z-Axis (m)	**-3.0**	**-2.5**	**-2.0**	**-1.5**	**-1.0**	**-0.5**	**0.0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	
	0.9	1.1	1.3	1.4	1.6	1.7	1.7	1.7	1.6	1.4	1.3	1.1	0.9	**F3.0**
	1.1	1.3	1.6	1.9	2.2	2.3	2.5	2.3	2.2	1.9	1.6	1.3	1.1	**F2.5**
	0.9	1.5	2.1	3.0	3.3	3.6	3.9	3.6	3.3	3.0	2.1	1.5	0.9	**F2.0**
	0.6	1.1	2.4	3.8	5.4	6.7	7.7	6.7	5.4	3.8	2.4	1.1	0.6	**F1.5**
	0.2	0.4	0.9	3.6	9.6	13.8	17.7	13.8	9.6	3.6	0.9	0.4	0.2	**F1.0**
	0.1	0.2	0.3	0.5	3.3	32.7	92.5	32.7	3.3	0.5	0.3	0.2	0.1	**F0.5**
	0.1	0.1	0.1	0.2	-	-	ISO	-	-	0.2	0.1	0.1	0.1	**0.0**
	0.1	0.1	0.1	0.1	-	-	46.4	-	-	0.1	0.1	0.1	0.1	**R0.5**
	0.1	0.1	0.1	0.2	1.8	14.3	17.0	14.3	1.8	0.2	0.1	0.1	0.1	**R1.0**
	0.1	0.1	0.2	1.0	5.3	6.8	7.3	6.8	5.3	1.0	0.2	0.1	0.1	**R1.5**
	0.1	0.2	0.6	2.0	3.3	3.9	4.1	3.9	3.3	2.0	0.6	0.2	0.1	**R2.0**
	0.2	0.5	1.1	2.0	2.3	2.5	2.5	2.5	2.3	2.0	1.1	0.5	0.2	**R2.5**
	0.4	0.7	1.3	1.6	1.7	1.8	1.8	1.8	1.7	1.6	1.3	0.7	0.4	**R3.0**

Figure 10-2 Typical Scatter Survey (Small Filter (Head) - Phantom 16cm CTDI)

NOTE
ISO- Contour 0.7, 1.3, 2.6, 5.2 and 10.4 µGray/scan Technique 140 kV, 100 mA, 1 second (s), 40 mm

NOTE
The 16 cm CTDI Phantom should be placed on the patient table.

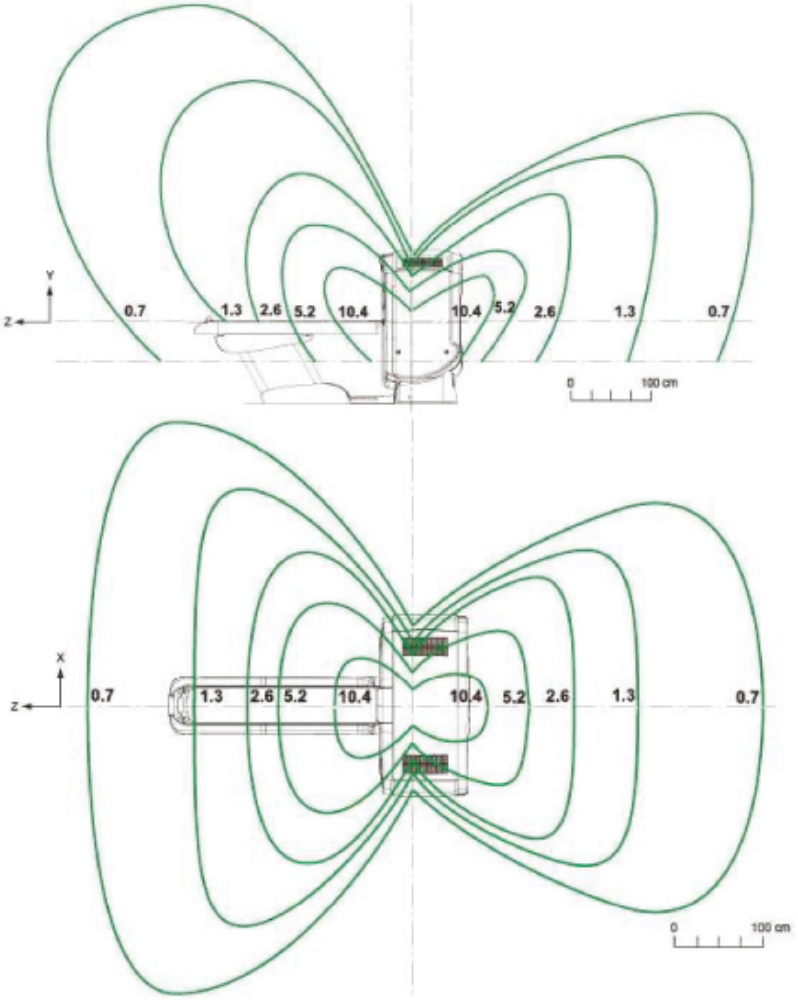

Table 10-3 Typical Scatter Survey (Small Filter (Head) - 16cm CTDI)

µGray/scan (Vertical) Z-Axis (m)														
Y-Axis (m)	**F3.0**	**F2.5**	**F2.0**	**F1.5**	**F1.0**	**F0.5**	**0**	**R0.5**	**R1.0**	**R1.5**	**R2.0**	**R2.5**	**R3.0**	
	1.2	1.7	2.1	3.1	4.3	1.3	-	0.3	0.3	1.6	2.1	1.6	1.1	**U1.5**
	1.1	1.6	2.4	3.9	6.9	4.2	-	0.2	2.7	3.8	2.4	1.6	1.1	**U1.0**
	1.0	1.5	2.4	4.3	9.3	26.3	-	-	9.6	4.6	2.6	1.6	1.1	**U0.5**
	0.7	1.0	2.0	3.7	10.1	49.9	ISO	38.7	10.7	4.1	2.4	1.6	1.1	**0**
	0.0	-	-	-	4.6	25.9	-	-	6.7	3.3	2.0	1.3	1.0	**L0.5**

µGray/scan (Horizontal) X-Axis (m)														
Z-Axis (m)	**-3.0**	**-2.5**	**-2.0**	**-1.5**	**-1.0**	**-0.5**	**0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	
	0.6	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.7	0.6	**F3.0**
	0.8	0.9	1.1	1.2	1.2	1.1	1.0	1.1	1.2	1.2	1.1	0.9	0.8	**F2.5**
	0.8	1.2	1.4	1.7	1.8	1.8	2.0	1.8	1.8	1.7	1.4	1.2	0.8	**F2.0**
	0.4	0.9	1.9	2.6	3.3	3.5	3.7	3.5	3.3	2.6	1.9	0.9	0.4	**F1.5**
	0.2	0.3	0.7	3.3	6.0	8.0	10.1	8.0	6.0	3.3	0.7	0.3	0.2	**F1.0**
	0.1	0.1	0.3	0.4	3.2	24.4	49.9	24.4	3.2	0.4	0.3	0.1	0.1	**F0.5**
	0.1	0.1	0.1	0.1	-	-	ISO	-	-	0.1	0.1	0.1	0.1	**0**
	0.1	0.1	0.1	0.1	-	-	38.7	-	-	0.1	0.1	0.1	0.1	**R0.5**
	0.1	0.1	0.1	0.1	0.7	8.7	10.7	8.7	0.7	0.1	0.1	0.1	0.1	**R1.0**
	0.1	0.1	0.0	0.6	3.2	4.1	4.8	4.1	3.2	0.6	0.0	0.1	0.1	**R1.5**
	0.1	0.2	0.4	1.6	2.1	2.2	2.4	2.2	2.1	1.6	0.4	0.2	0.1	**R2.0**
	0.1	0.3	0.9	1.2	1.4	1.4	1.6	1.4	1.4	1.2	0.9	0.3	0.1	**R2.5**
	0.2	0.4	0.8	0.9	1.0	1.0	1.1	1.0	1.0	0.9	0.8	0.4	0.2	**R3.0**

10.2 Stray Radiation (Scatter Radiation) (Reference: IEC60601-2-44:2009 Clause203.11, Clause203.13.2)

A cylindrical CTDI phantom is placed on the patient table, centered in the scan plane, and scanned. Stray radiation measurements are made for both the vertical and the horizontal planes which include the axis of rotation.

Figure 10-3 Typical Stray Radiation in µGy per 100 mAs – Body, Vertical Plane 40 mm Collimation on page 129 through Figure 10-6 Typical Stray Radiation in µGy per 100 mAs – Head, Horizontal Plane 40 mm Collimation on page 130show stray radiation for 40 mm collimation.

Figure 10-7 Typical Stray Radiation in µGy per 100 mAs – Body, Vertical Plane 20 mm Collimation on page 131 through Figure 10-10 Typical Stray Radiation in µGy per 100 mAs – Head, Horizontal Plane 20 mm Collimation on page 132 show stray radiation for 20 mm collimation. The air kerma per 100mAs (µGy / 100 mAs) is provided at 0.5 m intervals within each plane as follows.

Table 10-4 Typical Stray Radiation Scan Conditions

Type	Body	Head
Phantom	32cm CTDI	16cm CTDI
Tube voltage	140kVp	
SFOV	Large Body	Head
mA	200	
Rotational speed	1sec	

Figure 10-3 Typical Stray Radiation in µGy per 100 mAs – Body, Vertical Plane 40 mm Collimation

	3.5m	3.0m	2.5m	2.0m	1.5m	1.0m	0.5m	0.0m	0.5m	1.0m	1.5m
+1.5m	1.7	2.2	3.0	4.1	5.6	5.3	1.4	-	0.5	0.5	1.8
+1.0m	1.7	2.4	3.3	4.7	7.2	11.0	4.9	-	0.5	2.9	8.2
+0.5m	1.7	2.3	3.4	5.2	9.2	16.5	44.3	-	-	21.7	11.4
0.0m	1.3	1.8	2.7	4.5	8.3	19.7	82.5	ISO	72.6	19.3	8.1
-0.5m	0.2	0.1	-	-	-	-	38.8	-	-	15.6	9.2

Figure 10-4 Typical Stray Radiation in µGy per 100 mAs – Body, Horizontal Plane 40 mm Collimation

	1.5m	1m	0.5m	0.0m	0.5m	1.0m	1.5m
1.5m	1.5	5.9	7.7	8.1	7.5	5.9	1.3
1.0m	0.3	2.4	14.8	19.3	15.4	2.0	0.3
0.5m	0.2	-	-	72.6	-	-	0.3
0.0m	0.3	-	-	ISO	-	-	0.3
0.5m	0.6	4.0	39.5	82.5	37.5	3.0	0.6
1.0m	4.1	10.2	15.4	19.7	15.2	9.7	4.3
1.5m	4.4	6.1	6.8	8.3	7.2	5.8	4.5
2.0m	3.1	3.8	4.1	4.5	4.1	3.1	3.2
2.5m	2.3	2.5	2.6	2.7	2.6	2.4	2.3
3.0m	1.7	1.7	1.8	1.8	1.8	1.7	1.6
3.5m	1.3	1.3	1.3	1.3	1.3	1.3	1.3

Figure 10-5 Typical Stray Radiation in µGy per 100 mAs – Head, Vertical Plane 40 mm Collimation

	3.5m	3.0m	2.5m	2.0m	1.5m	1.0m	0.5m	0.0m	0.5m	1.0m	1.5m
+1.5m	1.1	1.1	2.1	2.9	4.4	4.7	2.0	-	0.4	0.4	1.4
+1.0m	1.1	1.5	2.2	2.8	4.8	8.6	4.6	-	0.4	2.7	5.4
+0.5m	1.0	1.1	2.1	3.3	5.7	12.8	32.8	-	-	13.0	6.2
0.0m	0.7	0.9	1.3	2.5	4.7	11.8	53.2	ISO	48.5	14.2	6.3
-0.5m	0.1	0.1	0.1	-	-	-	30.9	-	-	7.9	5.7

Figure 10-6 Typical Stray Radiation in µGy per 100 mAs – Head, Horizontal Plane 40 mm Collimation

	1.5m	1m	0.5m	0.0m	0.5m	1.0m	1.5m
1.5m	1.0	4.5	5.8	6.3	5.8	4.4	0.8
1.0m	0.3	2.0	12.2	14.2	12.7	1.8	0.3
0.5m	0.2	-	-	48.5	-	-	0.2
0.0m	0.3	-	-	ISO	-	-	0.3
0.5m	0.7	3.2	30.8	53.2	33.1	3.0	0.7
1.0m	4.7	7.9	10.0	11.8	10.1	8.1	5.0
1.5m	3.5	4.2	4.3	4.7	4.3	4.4	3.6
2.0m	2.4	2.5	2.5	2.5	2.4	2.6	2.4
2.5m	1.6	1.6	1.5	1.3	1.5	1.6	1.6
3.0m	1.2	1.1	1.0	0.9	1.0	1.1	1.1
3.5m	0.8	0.8	0.8	0.7	0.7	0.8	0.8

Figure 10-7 Typical Stray Radiation in µGy per 100 mAs – Body, Vertical Plane 20 mm Collimation

	3.5m	3.0m	2.5m	2.0m	1.5m	1.0m	0.5m	0.0m	0.5m	1.0m	1.5m
+1.5m	0.7	1.0	1.3	1.8	2.5	2.3	0.6	-	0.2	0.2	0.8
+1.0m	0.8	1.0	1.5	2.1	3.2	4.9	2.2	-	0.2	1.3	3.7
+0.5m	0.8	1.0	1.5	2.3	4.1	7.3	20.1	-	-	10.2	5.2
0.0m	0.7	1.0	1.4	2.4	4.5	10.7	46.0	ISO	40.6	10.6	4.4
-0.5m	0.1	0.1	0.1	-	-	-	17.6	-	-	7.1	4.2

Figure 10-8 Typical Stray Radiation in µGy per 100 mAs – Body, Horizontal Plane 20 mm Collimation

	1.5m	1m	0.5m	0.0m	0.5m	1.0m	1.5m
1.5m	0.8	3.2	4.2	4.4	4.1	3.2	0.7
1.0m	0.2	1.3	8.1	10.6	8.4	1.1	0.2
0.5m	0.1	-	-	40.6	-	-	0.1
0.0m	0.2	-	-	ISO	-	-	0.2
0.5m	0.3	2.1	21.8	46.0	20.7	1.6	0.3
1.0m	2.2	5.6	8.4	10.7	8.2	5.3	2.3
1.5m	2.4	3.3	3.7	4.5	3.9	3.2	2.4
2.0m	1.7	2.0	2.2	2.4	2.2	2.0	1.7
2.5m	1.2	1.4	1.4	1.4	1.4	1.3	1.2
3.0m	0.9	0.9	1.0	1.0	1.0	0.9	0.9
3.5m	0.7	0.7	0.7	0.7	0.7	0.7	0.7

Figure 10-9 Typical Stray Radiation in µGy per 100 mAs – Head, Vertical Plane 20 mm Collimation

	3.5m	3.0m	2.5m	2.0m	1.5m	1.0m	0.5m	0.0m	0.5m	1.0m	1.5m
+1.5m	0.5	0.7	0.9	1.3	1.9	2.1	0.9	-	0.2	0.2	0.6
+1.0m	0.5	0.7	1.0	1.4	2.3	4.0	2.1	-	0.2	1.2	2.4
+0.5m	0.4	0.6	0.9	1.4	2.5	5.6	14.9	-	-	6.0	3.0
0.0m	0.3	0.4	0.6	1.1	2.0	5.2	23.9	ISO	22.6	6.4	2.8
-0.5m	0.1	0.0	0.1	-	-	-	13.9	-	-	4.7	2.5

Figure 10-10 Typical Stray Radiation in µGy per 100 mAs – Head, Horizontal Plane 20 mm Collimation

	1.5m	1m	0.5m	0.0m	0.5m	1.0m	1.5m
1.5m	0.5	2.0	2.6	2.8	2.6	2.0	0.4
1.0m	0.1	0.9	5.5	6.4	5.7	0.8	0.1
0.5m	0.1	-	-	22.6	-	-	0.1
0.0m	0.1	-	-	ISO	-	-	0.1
0.5m	0.3	1.4	13.9	23.9	14.9	1.3	0.3
1.0m	2.1	3.5	4.4	5.2	4.4	3.6	2.3
1.5m	1.6	1.9	1.9	2.0	1.9	1.9	1.6
2.0m	1.1	1.1	1.1	1.1	1.0	1.1	1.1
2.5m	0.7	0.7	0.6	0.6	0.7	0.7	0.7
3.0m	0.5	0.5	0.4	0.4	0.4	0.7	0.5
3.5m	0.4	0.3	0.3	0.3	0.3	0.3	0.4

Chapter 11 Network Requirements

11.1 Network Connections

The network requirements listed in this chapter should allow you to connect the system to:

- Hospital/facility networks
- Filming cameras
- PACS
- Workstations
- Patient Information Systems

11.1.1 Network Type

Revolution ASCEND systems require a broadband network connection.

11.1.2 Network Speed

The customer and the customer's IT contact should ensure that the site provides access to broadband using one of the following interface types:

- 100BASE-TX (100 Mbit/s)
- 1000BASE-T (1000 Mbit/s [1 Gbit/s]).

11.1.3 Network Cable Routing

The CT system connects to the facility's network through the console. To enable proper network cabling, the customer and the customer's IT contact should:

- Provide an RJ45 wall outlet within 2 m (79 in.) of the console location.
- Provide a patch cable, not to exceed 3.05 m (10 ft), to connect the console to a wall box. (See Notes on Figure 13-1 Interconnection Runs on page 153)
- Complete any cable duct-work or conduit installation that the customer site-unit might require to route connecting network cables to the workstation, camera, and console.
- Ensure that the run from the hospital/facility switch to the CT wall outlet does not exceed 88 m (290 ft). Bandwidth performance degrades significantly when the length exceeds 91 m (300 ft).
- Use of STP (Shielded Twisted Pair) cable is not allowed.

11.2 Customer Broadband Responsibilities

11.2.1 Contact GE to Find Zone Broadband Specialist

Contact your GE PMI to obtain the name of the zone broadband specialist who will:

- Work with the Customer Champion to complete any identified infrastructure changes.

- Provide IP addresses for new CT equipment.
- Provide a VPN compatible appliance that will support the IPSec tunneling protocol and 3DES data encryption.
- Utilize an Internet Service Provider that supports static routing.

11.2.2 Provide GE with IT Contact Information for the Site

Provide your GE PMI with an accurate site address, telephone number, contact name, and e-mail address for the customer IT contact who will:

- Coordinate VPN activities between Radiology/Cardiology and the Information Technology (IT) departments.
- Act as a focal point in assuring site broadband infrastructure meets GE requirements for connection, as determined by a mutual assessment with the GE connectivity team.
- Complete an equipment assessment with the GE connectivity team to determine site readiness for broadband.

11.3 Digital Service and Connectivity Requirements

11.3.1 Background

GE Healthcare provides digital service and asset management through its InSite Connectivity Platform.

InSite RSvP (Remote Service Platform) is the latest connectivity platform that will eventually replace the existing InSite 1 connectivity infrastructure in the system.

GE can proactively monitor the key operational parameters of your medical systems to provide early warning of potential issues to head off costly and unscheduled downtime. The GE online engineers can recalibrate key operational parameters to help ensure optimal system performance or can dispatch a field engineer to assist in mitigating the issue. Additionally, automated software downloads require reliable connectivity platform to ensure software updates and upgrades in a timely manner to keep the system working efficiently. Software downloads also significantly reduce the time it takes to upgrade your GE Healthcare devices, which means the scheduled system downtime and clinical workflow interruptions are greatly reduced.

The two major technical components of InSite RSvP are Agent and Server. The Agent is installed on the GE Healthcare equipment at the customer sites while the Server resides within GE Healthcare. The role of the Agent is to:

- monitor device performance data on an ongoing basis,
- establish secure communications to the Server via the Internet,
- and send fault information and log files to the Server

The Server uses the secure Web Services to communicate with the Agent. It processes the performance and fault information provided by the Agent.

11.3.2 InSite RSVP Connectivity Requirements

The Agent establishes connectivity from behind the safety of your corporate firewall, adhering to all the security policies set up by your network administrators. To your network, the Agent is just another

computer on the LAN. To set up the InSite 2.0 Agent at your site, the only networking requirements are as follows:

1. A physical connection or a route to an existing enterprise LAN
2. Allow outbound Internet access for the device using HTTPS protocol over port 443

A GE Healthcare Field Engineer will configure network connections for InSite RSVP connectivity according to the site IT requirements.

Customer IT personal would need to ensure the following details to enable connectivity at install:

1. DNS IP Address or Proxy IP address and authentication information as applicable is made available when requested by the GE Field Engineer or Project manager of Installation
2. In case it is required to whitelist, only certain URLs being used by GE Healthcare, here is a list that could be used:
   a. Enterprise production: https://insite.gehealthcare.com:443
   b. Flexera URL: https://gehealthcare-ns.flexnetoperations.com

InSite RSVP utilizes existing the outbound broadband internet connection. It uses the Secure Sockets Layer (SSL) and complies with the existing firewall rules and Web proxies. Once the Agent has established a secure tunnel, the connection is visible only to InSite RSvP clients and services (applications or users)

NOTE

For GE HealthCare Personnel only:

1. If a customer is not able to provide the internet connection then GE HealthCare needs to provide the internet connection along with the required router device.
2. If a customer has GE HealthCare provided internet connection or has GE HealthCare provided router device running on the customer provided internet connection then consult the customer if the same set is to be used.

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Chapter 12 Power Requirements

Be sure to communicate all necessary information in this chapter to the electrical contractor employed at the installation site.

12.1 Introduction

The Power Distribution Unit (PDU) supplied with the system transforms and distributes power to all system components. The PDU constitutes the only power entry point required to operate the system. To minimize voltage regulation effects, keep power wiring between the facility main distribution panel and the PDU as short as possible.

When routing the power wiring, all three-phase wires and ground must run in the same conduit or raceway duct. Route power wires separate from the system control and signal cables, using a separate conduit or trough in a raceway duct. You may use a metallic conduit, floor duct, or surface raceway for running cables, depending upon local codes and practices. However, ensure that cable passageways are large enough to install additional cables with all other cables already installed. Do not use non-metallic conduit.

12.2 System Input Power

12.2.1 Power Source Configuration

The system operates on a three-phase, solidly grounded four-wire wye or Delta power source. The neutral wire does not need to run to the system, (i.e., four-wire connection). If you are running a NEUTRAL wire, terminate it in the A1/MDP box.

A dedicated feeder from the nearest Main Distribution Panel (MDP) should supply power to the system. In accordance with the National Electric Code (U.S.) and similar applicable national and local codes, the site MUST provide a protective disconnect device with LOCK-OUT and TAG-OUT provisions in the power line supplying the PDU, and MUST locate the protective disconnect device within 10 m (32 ft) of the PDU, visible to PDU service personnel. The disconnect device appears as *A1/MDP* in the interconnection schematic diagrams.

12.2.2 Rating

The system operates on three-phase power that meets the following specifications:

For 100kVA (72kW peak)

- Voltage: 200 to 240VAC, 380 to 480 VAC
- Capacity: 100 kVA
- Frequency: 50 or 60 Hz ± 3 Hz
- Maximum power demand = 100 kVA @ 0.85 PF at a selected technique of 140 kV, 515 mA.
- Average effective (RMS) power demand at maximum duty cycle = 20 kVA.
- Idle power demand (without rotation and X-ray) = 5 kVA.

For 75kVA (55kW peak)

- Voltage: 200 to 240VAC, 380 to 480 VAC
- Capacity: 75 kVA
- Frequency: 50 or 60 Hz ± 3 Hz
- Maximum power demand = 75 kVA @ 0.85 PF at a selected technique of 140 kV, 395 mA.
- Average effective (RMS) power demand at maximum duty cycle = 20 kVA.
- Idle power demand (without rotation and X-ray) = 5 kVA.

The A1/MDP disconnect device referenced above must provide overcurrent protection for the system and have at least one Emergency Off switch within the scan suite, near the console. The rating of the A1/MDP disconnect device depends on the nominal line voltage at the site. Refer to Recommended Power Distribution System for minimum rating requirements and suggested disconnect devices.

12.2.3 Regulation

Total load regulation, as measured at the PDU input terminals, must not exceed 6%. The capacity of the facility transformer and size and length of feeder wires directly affect the load regulation presented to the system. Refer to 12.3 Recommended Power Distribution System on page 139, for recommended single-unit installation specifics.

12.2.4 Phase Imbalance

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

12.2.5 Sags, Surges and Transients

Sags and surges of the power line must not exceed the absolute range limits shown in 12.3.3 System Power Requirements on page 140. Limit maximum transient voltages to 1500 V peak.

12.2.6 Grounding

The customer's electrician needs to perform the following tasks:

- Bond metal conduit, raceway, or the armor of armored cable used to power the system to the PDU cabinet and to the PDU cabinet and the A1/MDP Disconnect
- Run a dedicated 1/0 (50 mm^2) or larger insulated copper ground wire from the main distribution panel to the PDU with the phase wires.
- Run the ground wire with the three-phase wires from the power source to the A1/MDP Disconnect and from A1/MDP Disconnect to the PDU. Grounding does not require a neutral wire.

NOTE
The shield or armor of armored cable ALONE does NOT provide sufficient grounding.

Bond the ground wire to the intermediate distribution panels through which it passes in accordance with local codes. The resistance between the PDU ground and the facility earth ground must not exceed 0.5 ohm. In addition,

- The facility ground for the CT system must originate at the system power source (i.e., transformer or first access point of power into the facility) and be continuous to the CT system A1/MDP Disconnect in the room
- Main facility ground conductor to A1/MDP Disconnect must be appropriately sized insulated copper wire.
- Run a dedicated 1/0 (50 mm^2) or larger insulated copper ground wire from A1/MDP to PDU. The main facility ground to the A1/MDP disconnet must meet local codes, in all cases the recommended ground wire is a 1/0 (50 mm^2) ground wire.

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12.2.7 Potential Equalization Conductor (Reference IEC 60601-1-2 2007; 2014; 2020)

The voltage of a conductor or body to earth is called the “potential” of this conductor or body. The earth is electrically neutral and thus has the potential “zero”. The unit of measurement for the potential is volt. This terminal will be used for Option installation. Refer to each Option manual of instruction for use.

12.3 Recommended Power Distribution System

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

12.3.1 Using a Dedicated Distribution Transformer (Recommended)

The recommended power distribution system for a CT system is a dedicated feeder from the facility main isolation transformer. The minimum recommended transformer size for a dedicated distribution transformer provided for the system is 125 kVA (100kVA standard) or 93.75kVA (75kVA option), rated 2.4% regulation at unity power factor. 12.3.3 System Power Requirements on page 140 shows the minimum recommended feeder size and overcurrent protection device based on line voltage for this configuration.

12.3.2 Using an Existing Distribution Transformer

If it proves necessary to power the system from an existing distribution transformer and secondary feeder, such as the equipment distribution panel of an X-ray department, avoid installation with other X-ray equipment that uses rapid film changers. These changers use a large number of high-powered, closely-spaced exposures, which may coincide with the CT scan and produce image artifacts.

12.3.3 System Power Requirements

Be sure that the site can meet all of the minimum power requirements listed below before installing the system:

For 100kVA

- Maximum power demand = 100kVA @ 0.85 PF: at a Selected Technique of 140 kV, 515 mA.
- Average effective (RMS) power demand at maximum duty cycle = 20 kVA.
- Average power demand at maximum duty cycle = 10 kVA
- Maximum allowable total source regulation is 6%.
- Minimum recommended transformer size: greater than125 kVA, with 2.4% rated regulation at unity power factor. Resultant maximum allowable feeder regulation is 3.6%.

Table 12-1 Nominal Line Voltage Ranges

Nominal line voltage MUST fall within ONE of these ranges.									
Nominal Line Voltage [V]	200	220	240	380	400	420	440	460	480
Peak Power [KVA]	100	100	100	100	100	100	100	100	100
Hi-Line Limit, +10% [V]	220	242	264	418	440	462	484	506	528
Lo-Line Limit, -10% [V]	180	198	216	342	360	378	396	414	432
Continuous Line Current [A]	58	52	48	30	29	27	26	25	24
Momentary Line Current [A]	289	262	241	152	144	137	131	126	120
Maximum Line Current [A]	321	292	267	169	160	153	146	139	134
Minimum Recommended Circuit Breaker [A]	150	150	150	110	110	100	100	90	90

Table 12-2 Minimum Feeder Wire Size

Feeder Length (Power Substation to A1/MDP Disconnect)	**Minimum Feeder Wire Size, AWG-kcmil or MCM (sq. mm)/ VAC**					
	380 VAC	**400 VAC**	**420 VAC**	**440 VAC**	**460 VAC**	**480 VAC**
15 m (50 ft)	2 (35)	2 (35)	4 (25)	4 (25)	4 (25)	4 (25)
30 m (100 ft)	2 (35)	2 (35)	4 (25)	4 (25)	4 (25)	4 (25)
46 m (150 ft)	2 (35)	2 (35)	4 (25)	4 (25)	4 (25)	4 (25)
61 m (200 ft)	2 (35)	2 (35)	4 (25)	4 (25)	4 (25)	4 (25)
76 m (250 ft)	1 (35)	1 (35)	2 (35)	2 (35)	2 (35)	4 (25)
91 m (300 ft)	1/0 (50)	1/0 (50)	1 (35)	1 (35)	2 (35)	2 (35)
107 m (350 ft)	2/0 (70)	1/0 (50)	1/0 (50)	1 (35)	1 (35)	1 (35)
122 m (400 ft)	2/0 (70)	2/0 (70)	1/0 (50)	1/0 (50)	1/0 (50)	1 (35)

Table 12-3 Minimum Feeder Wire Size

Feeder Length (Power Substation to A1/MDP Disconnect)	Minimum Feeder Wire Size, AWG-kcmil or MCM (sq. mm)/ VAC		
	200 VAC	220 VAC	240 VAC
15 m (50 ft)	1/0 (50)	1/0 (50)	1/0 (50)
30 m (100 ft)	2/0 (70)	1/0 (50)	1/0 (05)
46 m (150 ft)	4/0 (120)	3/0 (95)	3/0 (95)
61 m (200 ft)	250 (120)	4/0 (120)	4/0 (120)
76 m (250 ft)	300 (150)	250 (120)	250 (120)
91 m (300 ft)	350 (185)	300 (150)	250 (120)
107 m (350 ft)	400 (185)	350 (185)	300 (150)
122 m (400 ft)	400 (185)	350 (185)	350 (185)

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

NOTE
Please select nearest cable size as per to local standards.

Table 12-4 Minimum Sub-Feeder Wire Size

Sub-feeder Length (A1/MDP to PDU)	Minimum Sub-feeder Wire, AWG-kcmil or MCM (sq. mm)					
	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
9.7536 m (32 ft)	2 (35)	2 (35)	4 (25)	4 (25)	4 (25)	4 (25)

Table 12-5 Minimum Sub-Feeder Wire Size

Sub-feeder Length (A1/MDP to PDU)	Minimum Sub-feeder Wire, AWG-kcmil or MCM (sq. mm)		
	200 VAC	220 VAC	240 VAC
9.7536 m (32 ft)	1/0 (50)	1/0 (50)	1/0 (50)

For 75kVA

- Maximum power demand = 75kVA @ 0.85 PF: at a Selected Technique of 140 kV, 395 mA.
- Average effective (RMS) power demand at maximum duty cycle = 20 kVA.
- Average power demand at maximum duty cycle = 10 kVA
- Maximum allowable total source regulation is 6%.
- Minimum recommended transformer size: greater than 93.75 kVA, with 2.4% rated regulation at unity power factor. Resultant maximum allowable feeder regulation is 3.6%.

Table 12-6 Nominal Line Voltage Ranges

Nominal line voltage MUST fall within ONE of these ranges.									
Nominal Line Voltage [V]	200	220	240	380	400	420	440	460	480

Table 12-6 Nominal Line Voltage Ranges (Table continued)

Nominal line voltage MUST fall within ONE of these ranges.									
Peak Power [KVA]	75	75	75	75	75	75	75	75	75
Hi-Line Limit, +10% [V]	220	242	264	418	440	462	484	506	528
Lo-Line Limit, -10% [V]	180	198	216	342	360	378	396	414	432
Continuous Line Current [A]	58	52	48	30	29	27	26	25	24
Momentary Line Current [A]	217	197	180	114	108	103	98	94	90
Maximum Line Current [A]	241	219	200	127	120	115	109	105	100
Minimum Recommended Circuit Breaker [A]	120	110	110	70	60	60	60	60	50

Table 12-7 Minimum Feeder Wire Size

Feeder Length (Power Substation to A1/MDP Disconnect)	**Minimum Feeder Wire Size, AWG-kcmil or MCM (sq. mm)/ VAC**					
	380 VAC	**400 VAC**	**420 VAC**	**440 VAC**	**460 VAC**	**480 VAC**
15 m (50 ft)	4 (25)	4 (25)	4 (25)	4 (25)	4 (25)	4 (25)
30 m (100 ft)	4 (25)	4 (25)	4 (25)	4 (25)	4 (25)	4 (25)
46 m (150 ft)	4 (25)	4 (25)	4 (25)	4 (25)	4 (25)	4 (25)
61 m (200 ft)	2 (35)	4 (25)	4 (25)	4 (25)	4 (25)	4 (25)
76 m (250 ft)	2 (35)	2 (35)	2 (35)	4 (25)	4 (25)	4 (25)
91 m (300 ft)	1 (35)	1 (35)	2 (35)	2 (35)	2 (35)	4 (25)
107 m (350 ft)	1/0 (50)	1/0 (50)	1 (35)	1 (35)	2 (35)	2 (35)
122 m (400 ft)	2/0 (70)	1/0 (50)	1/0 (50)	1 (35)	1 (35)	1 (35)

NOTE
Please select nearest cable size as per to local standards.

Table 12-8 Minimum Feeder Wire Size

Feeder Length (Power Substation to A1/MDP Disconnect)	**Minimum Feeder Wire Size, AWG-kcmil or MCM (sq. mm)/ VAC**		
	200 VAC	**220 VAC**	**240 VAC**
15 m (50 ft)	1 (35)	2 (35)	4 (25)
30 m (100 ft)	1/0 (50)	1/0 (50)	1 (35)
46 m (150 ft)	3/0 (95)	2/0 (70)	2/0 (70)
61 m (200 ft)	4/0 (120)	4/0 (120)	3/0 (95)
76 m (250 ft)	250 (120)	250 (120)	4/0 (120)
91 m (300 ft)	300 (150)	250 (120)	250 (120)
107 m (350 ft)	350 (185)	300 (150)	250 (120)
122 m (400 ft)	350 (185)	350 (185)	300 (150)

NOTE
Please select nearest cable size as per to local standards.

Table 12-9 Minimum Sub-Feeder Wire Size

Sub-feeder Length (A1/MDP to PDU)	Minimum Sub-feeder Wire, AWG-kcmil or MCM (sq. mm)					
	380 VAC	400 VAC	420 VAC	440 VAC	460 VAC	480 VAC
9.7536 m (32 ft)	2 (35)	2 (35)	4 (25)	4 (25)	4 (25)	4 (25)

NOTE
Please select nearest cable size as per to local standards.

Table 12-10 Minimum Sub-Feeder Wire Size

Sub-feeder Length (A1/MDP to PDU)	Minimum Sub-feeder Wire, AWG-kcmil or MCM (sq. mm)		
	200 VAC	220 VAC	240 VAC
9.7536 m (32 ft)	1/0 (50)	1/0 (50)	1/0 (50)

NOTICE

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.*This Page Intentionally Blank.*

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Chapter 13 Interconnection Data

13.1 Introduction

The customer and the customer's electrical contractor should refer to the information in this section when establishing network and power interconnections for the system. Please note the following:

- Figure 1 shows interconnection runs for a 50/60 Hz system.
- Table 1 shows component designators for supplied equipment and options and wall power outlets.
- Table 1 lists customer-installed wiring and supplied cables. The actual length of each run is less than the length of supplied cables to allow for routing inside the equipment. Cable diameters and sizes of connectors are provided to aid in sizing conduit and access plates.
- GE Supplied (Standard, Short Length 5867933) (Reference IEC 60601-1-2 6.8.3.201) on page 146 lists details for connection to the system and GE approved accessories using standard (short) length and non-standard (long) length cables, respectively. Details appear for the following types of runs, when appropriate:
  - Flush-floor duct
  - Computer floor
  - Through-wall bushing
  - Junction box
  - Surface floor duct
  - Through-floor duct
  - Wall duct
  - Conduit
- To minimize the need for additional junction boxes, use either a cable raceway system or a raised computer floor. This system uses prefabricated cables with large plugs. Therefore, try to avoid conduit or pipe for cable runs.

13.2 Component Designators

Table 13-1 Component Designators

DESIGNATOR	APPLIES TO	SOURCE
A1	Primary power disconnect	**Contractor supplied**
MDP	Main distribution panel	**Contractor supplied**
CT1	Patient table	System
CT2	Gantry	System
OC1	console/computer	System
PDU	Power Distribution Unit	System
SEO	System emergency off	**Contractor supplied**
SM	Slave monitor	Option
WL	"X-ray on" warning light	**Contractor supplied**
DS	Door Interlock Switch	**Contractor supplied**

Table 13-1 Component Designators (Table continued)

DESIGNATOR	APPLIES TO	SOURCE
BBNC	Broad-band network connection	**Contractor supplied**

13.3 Interconnect Runs, Wiring and Cables

13.3.1 GE Healthcare Supplied (Standard Length 5867933) (Reference IEC 60601-1-2 6.8.3.201(IEC 60601-1 Edition 2 Scheme) / 5.2.2(IEC60601-1 Edition 3 Scheme))

Table 13-2 GE Healthcare Supplied Cables (Standard Run) - UL Information

Run #	Length, Actual (Usable)		Part #	Description	UL Cable Information								Pull Size mm (Inches)
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia.mm (inch)	# of Cond	Size AWG	
050	28 (20)	9 (6)	2343529-2	HVDC, PDU to Gantry	2587	FT4	600	+ & - 350VDC	90	23.0 (0.906)	3	(2) 4 (1) 8	45 (1.77)
051	28 (20)	9 (6)	2343530-2	HVAC, PDU to Gantry	2587	FT4	600	440Y/254	90	11.0 (0.433)	4	14	45 (1.77)
052	28 (20)	9 (6)	2343528-4	LVAC, PDU to Gantry	2587	FT4	600	120/208Y	90	20.0 (0.787)	5	8	20.0(0.787)
053	65 (60)	20 (18)	5808965-2	LVAC, PDU to Console	2587	FT4	600	120VAC	90	12.0 (0.472)	3	10	58 (2.28)
054			n/a	LVAC, Gantry to Table	1015		600	120VAC			3	14	
055	28 (20)	9 (6)	2371450-2	Ground, PDU to Race-way	1284	FT1	600	0	105	16.0 (0.630)	1	1/0	16.0 (0.630)
056	69 (56)	21 (17)	2371450-4	Ground, Raceway to Console	1283	FT1	600	0	105	12.0 (0.472)	1	2	12.0 (0.472)

Table 13-2 GE Healthcare Supplied Cables (Standard Run) - UL Information (Table continued)

Run #	Length, Actual (Usable)		Part #	Description	UL Cable Information								Pull Size mm (Inches)
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia.mm (inch)	# of Cond	Size AWG	
100	32.5 (20)	10 (6)	5419992-2	Signal, Gantry TGPU to PDU	2464	FT4	300	<30VDC	80	13.0 (0.512)	25	22	17 x 58 (0.68 x 2.30)
101	71 (60)	22 (18)	5419981-2	Signal, Gantry TGPU to OC	2464	FT4	300	<30VDC	80	13.0 (0.512)	25	22	17 x 58 (0.68 x 2.30)
102	68 (60)	22 (18)	5454760	Signal (LAN), Gantry to OC		FT4	300	<30VDC		6.0 (0.236)	8	24	16 (0.63)
103	65 (60)	20 (18)	5478856-2	Fiber Optic, Gantry to OC			N/A	N/A		7.0 (0.276)	1	N/A	15 (0.59)
104			N/A	Signal, Gantry to Table		FT4	300		80	6.0 (0.236)	25	22	

13.3.2 GE Healthcare-Supplied (Optional, Long Run Length 5867933-2) (Reference IEC 60601-1-2 6.8.3.201(IEC 60601-1 Edition 2 Scheme) / 5.2.2(IEC60601-1 Edition 3 Scheme))

Table 13-3 GE Healthcare Supplied Cables (Option Run) - UL Information

Run #	Length, Actual (Usable)		Part #	Description	UL Cable Information								Pull Size mm (Inches)
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia.mm (inch)	# of Cond	Size AWG	
050	62 (56)	19 (17)	2343529	HVDC, PDU to Gantry	2587	FT4	600	+ & - 350VDC	90	23.0 (0.906)	3	(2) 4 (1) 8	45 (1.77)

Table 13-3 GE Healthcare Supplied Cables (Option Run) - UL Information (Table continued)

Run #	Length, Actual (Usable)		Part #	Description	UL Cable Information								Pull Size mm (Inches)
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia.mm (inch)	# of Cond	Size AWG	
051	62 (56)	19 (17)	2343530	HVAC, PDU to Gantry	2587	FT4	600	440Y/254	90	11.0 (0.433)	4	14	45 (1.77)
052	62 (53)	19 (16)	2343528-3	LVAC, PDU to Gantry	2587	FT4	600	120/208Y	90	20.0 (0.787)	5	8	20.0 (0.787)
053	82 (76)	25 (23)	5808965	LVAC, PDU to Console	2587	FT4	600	120VAC	90	12.0 (0.472)	3	10	58 (2.28)
054	-	-	n/a	LVAC, Gantry to Table	1015		600	120VAC			3	14	
055	62 (53)	19 (16)	2371450	Ground, PDU to Race-way	1284	FT1	600	0	105	16.0 (0.630)	1	1/0	16.0 (0.630)
056	86 (72)	26 (22)	2371450-3	Ground, Raceway to Console	1283	FT1	600	0	105	12.0 (0.472)	1	2	12.0 (0.472)
100	69 (56)	21 (17)	5419992	Signal, Gantry TGPU to PDU	2464	FT4	300	<30VDC	80	13.0 (0.512)	25	22	17 x 58 (0.68 x 2.30)
101	85 (72)	26 (22)	5419981	Signal, Gantry TGPU to OC	2464	FT4	300	<30VDC	80	13.0 (0.512)	25	22	17 x 58 (0.68 x 2.30)
102	85 (72)	26 (22)	5454760-2	Signal (LAN), Gantry to OC		FT4	300	<30VDC		6.0 (0.236)	8	24	16 (0.63)
103	85 (76)	25 (23)	5478856	Fiber Optic, Gantry to OC			N/A	N/A		7.0 (0.276)	1	N/A	15 (0.59)
104	-	-		Signal, Gantry to Table		FT4	300		80	6.0 (0.236)	25	22	

13.3.3 GE Healthcare Supplied (Cables of Options) (Reference IEC 60601-1-2 6.8.3.201(IEC 60601-1 Edition 2 Scheme) / 5.2.2(IEC60601-1 Edition 3 Scheme))

Table 13-4 GEMS Supplied Cables for Options - UL Information

OPTION	LENGTH, ACTUAL (USABLE)		PART #	DESCRIPTION	UL CABLE INFORMATION								PULL SIZE MM (INCHES)
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia.mm (inch)	# of Cond	Size AWG	
Injector	100	30.5	5169456	GANTRY TO INJECTOR	1007	VW-1	300	<30VDC	80	1.57 (0.062)	3	22	45 (1.78) Dia
	8..2	2.5	5317258	POWER CABLE INJECTOR TO CONSOLE (NEMOTO)	62	FT-2	300	120VAC	60	9.4 (0.37)	3	14	36 (1.41) Dia
	11.5	3.5	5506487	POWER CABLE INJECTOR TO CONSOLE (MEDRAD)	62	FT2	300	120VAC	105	9.4 (0.37)	3	14	
Cardiac	18	5.5	5314085	GANTRY TO EKG MONITOR	2919	UL1685 UL loading	30	<30VDC	80	6.45 (0.254)	6	24	37 (1.45) Dia
Adv4DResp	100	30.5	5199717	GANTRY TO RPM UNIT	2464	FT4	300	<30VDC	80	6.6 (0.26)	4	22	37 (1.45) Dia
DepthCamera(ExpressMo	98.4	30	5809034-3	DEPTH CAMERA TO CONSOLE	-	UL1666 CMR or above	-	-	-	-	-	22	-

Table 13-4 GEMS Supplied Cables for Options - UL Information (Table continued)

OPTION	LENGTH, ACTUAL (USABLE)		PART #	DESCRIPTION	UL CABLE INFORMATION								PULL SIZE MM (INCHES)
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp. Rating (C)	Dia.mm (inch)	# of Cond	Size AWG	
de)	82	25	5821716	GND - Depth Camera to Console	-	UL1028	-	-	-	-	-	8	-
RCP	2.3	0.7	5854842-2	RCP CABLE HARNESS		UL	-	-	-	-	-	-	-
	82	25	5854840	RCP INTERFACE CABLE		UL	-	-	-	-	-	-	-

13.3.4 UPS Wiring Cables (Reference IEC 60601-1-2 6.8.3.201(IEC 60601-1 Edition 2 Scheme) / 5.2.2(IEC60601-1 Edition 3 Scheme))

Table 13-5 UPS Wiring Cables

Run #	Length Actual (Usable)		Part #	Description	UL Cable Information								Pull Size
	ft	m			UL Style	Flam. Rating	Voltage Rating	Voltage Actual	Temp.Rating (C)	Dia.mm (inch)	# of Cond	Size AWG	mm (inches)
060	15 (11)	4.6 (3.3)	5817583	POWER CABLE, NGPDU TO UPS	2587	FT4	600	208VAC	105	21.0 (0.827)	5	8	21.0 (0.827)
060 (alt)	15 (11)	4.6 (3.3)	5169294	POWER CABLE FOR 2PH UPS	2587	FT2	600	208VAC	90	20.0 (0.787)	4	8	20.0 (0.787)
061	15 (11)	4.6 (3.3)	5817584	POWER CABLE, UPS DISCONNECT PANEL TO NGPDU	2587	FT4	600	208VAC	105	21.0 (0.827)	4	8	21.0 (0.827)
061 (alt)	15 (11)	4.6 (3.3)	5169294-2	POWER CABLE FOR 2PH UPS	2587	FT2	600	208VAC	90	20.0 (0.787)	4	8	20.0 (0.787)
110	46 (41)	14.0 (12.5)	5817581	UPS CONTROL CABLE	2587	FT1	300	120VAC	80	7.0 (0.276)	5	18	7.0 (0.276)
110 (alt)	46 (41)	14.0 (12.5)	5169224	UPS CONTROL CABLE	1063	FT1	600	120VAC	90	8.6 (0.338)	6	18	8.6 (0.338)

13.3.5 A1/MDP UPS

Table 13-6 A1/MDP UPS

PDU Type & Model No.	Maximum Mom. kVA Rating	Required Main Disconnect (A1/MDP) Catalog No.			Partial UPS Kit Catalog No.
		Global except EMEA		EMEA	
		440V - 480V, 90A	380V - 420V, 110A	380V - 420V, 125A	
NGPDU-81 2326492-81	100kVA	**E4502BB** (incl. Auto Restart & Integrated UPS Control)	**E4502BC** (incl. Auto Restart & Integrated UPS Control)	**E45021BB** (incl. Auto Restart & Integrated UPS Control)	**E4502KZ (WSO)** **B77552DA (BHW/HINO)**(includes 5820687 Liebert GTX4 model 10kVA, 2ph UPS & hardware kit) REQUIRES one of the A1/MDP Panels shown at left

13.3.6 Contractor/Customer-Supplied

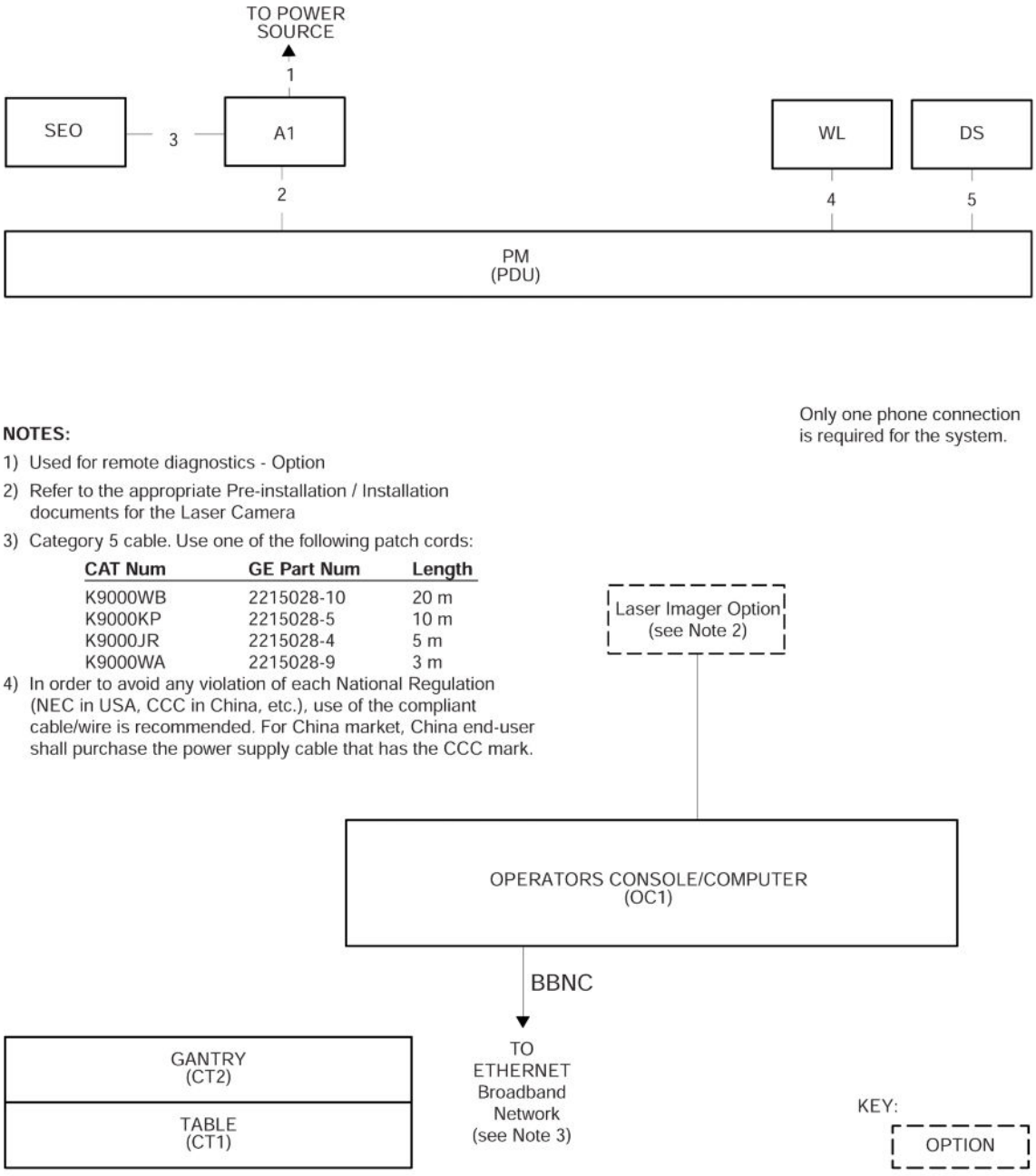
Table 13-7 Runs 1, 2, 3, 4 and 5 Connections

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
RUN NO. 1 FROM PRIMARY POWER SOURCE TO FACILITY DISCONNECT (POWER SOURCE - A1/MDP) **NOTE** The primary power ground to A1/MDP disconnect must meet local codes, in all cases the recommended ground wire is a 1/0 (50 mm^2) ground wire. Maximum Run Length *									
3	*	POWER						3 (1)	3(1)
1	1/0 (50)	GROUND						3 (1)	3 (1)
RUN NO. 2 FROM FACILITY DISCONNECT TO POWER DISTRIBUTION UNIT (A1/MDP - PM)									
3	*	POWER						3 (1)	3(1)
1	1/0 (50)	GROUND						3 (1)	3 (1)
-	-	NEUTRAL -- Not Required						3 (1)	3 (1)
RUN N0. 3									
FROM FACILITY DISCONNECT TO SYSTEM EMERGENCY OFF (A1 /MDP- SEO)									
2 1	14 (2.5) 14 (2.5)	POWER GROUND						6 (2) 6 (2)	6 (2) 6 (2)
BEVCO PANEL - FROM FACILITY DISCONNECT TO EMERGENCY POWER OFF (A1/MDP - EPO)									
2	14 (2.5)	Partial UPS EPO Circuit						6 (2)	6 (2)

Table 13-7 Runs 1, 2, 3, 4 and 5 Connections (Table continued)

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**
2	14 (2.5)	Facility Disconnect EPO Circuit						6 (2)	6 (2)
1	14 (2.5)	GROUND						6 (2)	6 (2)
RUN NO. 4 POWER DISTRIBUTION UNIT TO WARNING LIGHT CONTROL (PDU - WL)									
2	14 (2.5)	WARNING LIGHT 24 VOLT CONTROL TS6 1, 2, 3, 4, 5, 6, 7, 8							
RUN NO. 5 POWER DISTRIBUTION UNIT TO SCAN ROOM DOOR INTERLOCK (PDU - DOOR SWITCH)									
2	14 (2.5)	SCAN ROOM DOOR INTER LOCK TS6 9, 10							
*	REFER TO Table 12-4 Minimum Sub-Feeder Wire Size on page 141 and Table 12-5 Minimum Sub-Feeder Wire Size on page 141 FOR AWG (MM2) WIRE SIZES								
RUN NO. n/a BBNC									
1	customer deter-mined	Hospital Broadband Net-work Connection (Wall Jack: Placed on the wall behind the console.)							

Figure 13-1 Interconnection Runs



13.3.7 Fuse

Refer to use Replacement Procedures in Replacement section of Service Methods (5987662-8EN) in SIMS Content Viewer.

13.4 Contractor Supplied Components

Table 13-8 Contractor-Supplied Components

REFERENCE	ASSOCIATED EQUIPMENT	MATERIAL/LABOR SUPPLIED BY CUSTOMER CONTRACTOR	USA VENDOR / CAT NO. GE CATALOG
A1/MDP 380 - 480V 50/60 Hz	Fusible Disconnect and Magnetic Contactor	3 Pole, 380V - 480V, Combination breaker with magnetic contactor. Includes control transformer, optional UPS interface, On/Off controls and auto-restart feature.	*1 Recommend*1: • E4502BB (90A) • E4502BC (110A) • E45021BB (125A)
BBNC (required)	Broad-Band Network Connection	Broad-Band network connection wall jack, located within 1m (39inches) of Operator Console location, for internal hospital networking and InSite Broad-Band connectivity. Cabling to conform to facility's IT standards.	
	System Components	Reference the system installation drawings supplied by Installation Support Services within your geographic area.	

*1 *Refer to on page 151

13.5 Scan Room Warning Light and Door Interlock

Figure 13-2 TS6 X-Ray Warning Light Connections

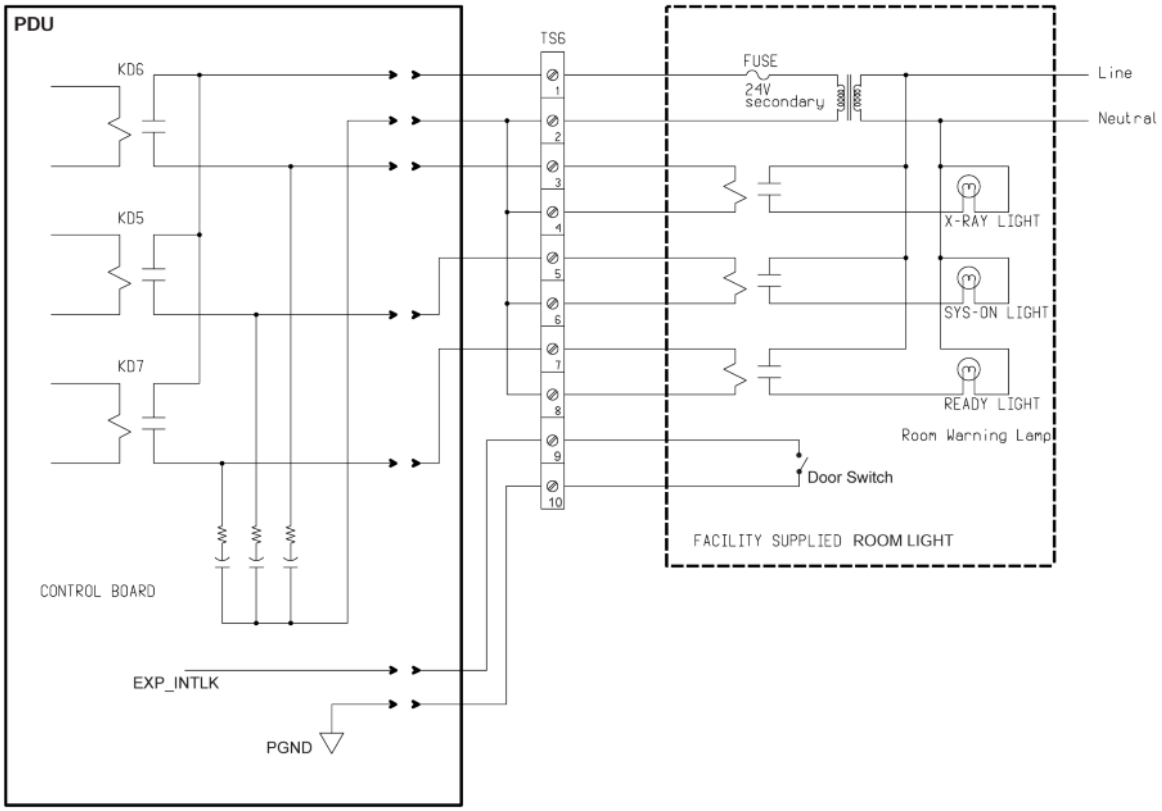


Figure 13-3 TS6 Room Door Interlock Connections - Without a Door Interlock

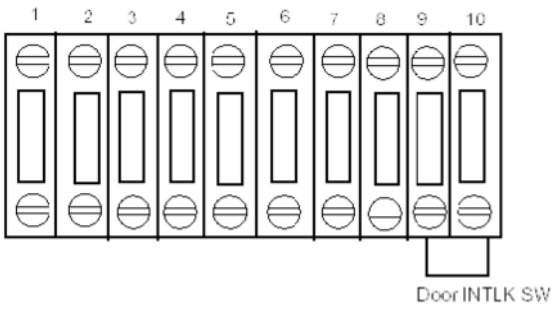
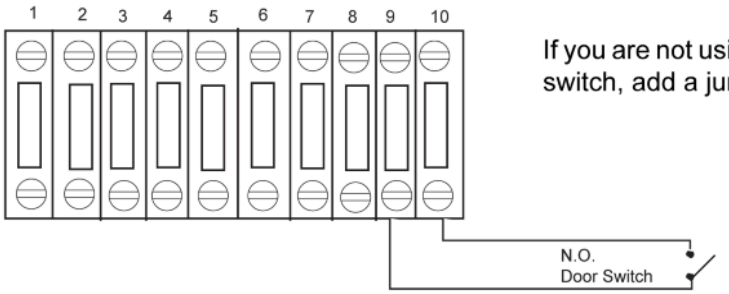


Figure 13-4 TS6 Room Door Interlock Connections - With a Door Interlock



13.6 Typical Customer Supplied Wiring

Primary Power Disconnect

Requires LOTO compatible disconnect to install this system.

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

Details refer to DOC2058932 on SIMS Content Viewer. This is a restricted file, contact your PMI for specific questions or concerns.

13.7 Gantry Power Connection

Gantry power and signal cables entrance is located at the rear of the gantry. Rear Cable Entry Box (B75762CC/B7877ZB) is provided as option for the site where the cables to the gantry cannot be brought up inside the gantry base.

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Chapter 14 Delivery and Storage Requirements

This chapter provides information necessary for planning a safe and successful delivery of the system from GE HealthCare to the receiving area of the installation site, and from the receiving area of that facility to the scan suite.

14.1 Delivery Types and System Lifting and Rigging Restriction

⚠ DANGER

PERSONAL INJURY OR DEATH, EQUIPMENT DAMAGE. TIP HAZARD.

THE MAIN SUB-SYSTEMS (GANTRY, TABLE, PDU…) ARE HEAVY AND MAY TIP OVER IF TILTED PAST 10 DEGREES.

WHEN TRANSPORTING THE SUB-SYSTEMS TO THE FINAL DESTINATION, DO NOT EXCEED TILT ANGLE EQUAL TO, OR GREATER THAN 10 DEGREES IN EITHER DIRECTION OF AXIS.

NOTE
The system shall never be lifted by the dollies.

Your Project Manager of Installation will determine the most appropriate means of transporting the system to your facility. However, the type of receiving area at the facility where the installation will occur determines, to a large extent, the method used to transport the system to that facility. When planning for delivery, facilities fall into two general categories: those with a loading dock, and those without a loading dock.

14.1.1 Loading Dock Deliveries

Facilities with a loading dock in their receiving area can generally accommodate delivery of the system by van. This is the preferred method of transporting the system to the installation site, as dock-to-dock shipment by van minimizes the possibility of dropping the gantry. Also, packing the CT system for van shipment involves minimum tear-down of components. This system is shipped Lean packed on pallets and dollies with approximately 10 units.

14.1.2 Ground (Non-Loading Dock) Deliveries

Facilities without a loading dock usually require ground delivery by either liftgate or appropriately sized forklift. Such deliveries require unloading the system components from the truck and then rolling them across smooth sidewalks or other paved surfaces into the facility.

14.1.2.1 Liftgate Truck

Delivery of the system by liftgate truck requires an appropriate capacity truck with a liftgate capable of lifting 3 tons. If using a rollback truck, the Project Manager of Installation should be on-site at the time of delivery to supervise this operation in person.

14.1.2.2 Tiltbed Truck - NOT Approved

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, then a Fork-lift truck shall instead be used.

14.1.2.3 Forklift Truck

NOTE
The tines on the fork truck need to be a minimum of 8' long in order to pick the gantry on the lifting skid past the center point of gravity.

A forklift can be used to unload the gantry, provided that the lifting option is ordered and delivered. The system will arrive with a lifting skid attached to the gantry and table. This option cannot be added later as an on-site addition.

14.2 Delivery to the Scan Suite

Once at the installation site, conveyance of the system into the scan suite may involve special considerations, such as vertical lifting, or transportation though stairwells, which involves additional planning by the Project Manager of Installation.

14.2.1 Lifting

Both vertical and horizontal lifting require professional riggers.

If delivery requires horizontal lifting, the PMI should contact with CT engineering team with installation concession.

If delivery requires vertical lifting and deviates from the requirement outlined in the PIM then engineering must be contacted for approval.

14.2.1.1 Stairway Deliveries

Stairways with angles at or less than 45 degrees can accommodate delivery of system components. If the site requires delivery through stairwells, the PMI adds the appropriate identifier to the order to ensure proper packaging of the system, and submit Concession Request before attempting the procedure.

14.2.1.2 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 subsystems must be lifted by crane or other lifting method the PM or person responsible for local siting of the system shall NOT proceed with the installation without consulting directly with GE HealthCare Engineering.

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

If lifting is still required:

1. The entire 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 so no lifting straps or cables come in contact with any part of the gantry or table subsystems or its side dollies.
4. The lifting platform shall bear the entire load. No part of the subsystem shall bear any load during the lift.

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

14.2.2 Floor Protection

GE recommends floor protection along the delivery path from the dock/receiving area to scan room.

14.2.3 Un-loading and un-packing the System

Retain the packaging surrounding the following components:

- Console-Shipped on a shock resistant skid. Do not remove the skid.

- UPS-Shipped on a shock resistant skid. Do not remove the skid.

14.3 Dollies

14.3.1 Installations within the United States

Typically, domestic shipments (shipments within the United States) involve the use of dollies for moving the gantry, table, and console. After completing installation, return the dollies to GE using the shipping document found in Box #1.

14.3.2 Zero Clearance Dollies

Deliveries involving small elevators with a depth of at least 2692 mm (106 in.) require zero clearance dollies. Zero clearance dollies allow movement of the gantry in tight areas; avoid using them for normal dock or van deliveries. To order zero clearance dollies, go to: http://www.umi-dollyshop.com.

14.3.3 Tilting Table Dollies (Not Applicable for NG Elite Table)

Deliveries involving small elevators with a depth of at least 2438 mm (96 in.) require tilting table dollies. If storing the system prior to installation, do not order tilt dollies. If you are unable to obtain tilt dollies for delivery, substitute riggers in their place. A limited number of tilt dollies exist for U.S. deliveries. To order tilt dollies, go to: http://www.umi-dollyshop.com.

14.3.4 Installations Outside of the United States

Customers may purchase dollies (B78502CA/ B7850GD) for shipments outside of the United States. After removing the system from the crates, DO NOT return dollies shipped outside of the US to GE Healthcare in Milwaukee, WI, USA. Instead, forward them to the local GE office or warehouse.

Zero Clearance and Tilting Table dollies can be purchased through UMI, To buy tilt dollies, go to: http://www.umi-dollyshop.com.

14.4 Gantry Delivery Considerations

14.4.1 Gantry Shipping State

The gantry ships with most covers installed, and the assembly mounted between two dollies. Two side rails, bolted to the dollies, stabilize the dollies and protect the gantry. Use the dolly elevating casters to lift the gantry off its base and roll it into position.

Gantry with lightweight shipping dollies, (see Figure 14-1 Gantry with lightweight Shipping Dollies and Side Rails on page 161).

Gantry with old shipping dollies, (see Figure 14-2 Gantry with old Shipping Dollies and Side Rails on page 161).

Figure 14-1 Gantry with lightweight Shipping Dollies and Side Rails

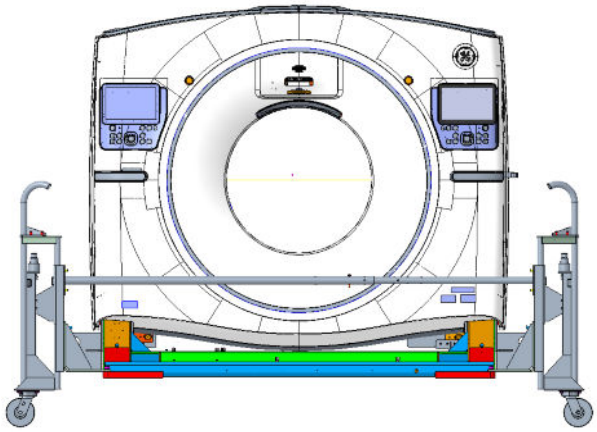

Figure 14-2 Gantry with old Shipping Dollies and Side Rails

14.4.2 Door Openings

Unobstructed door openings, for moving equipment into the building, must measure 1067 mm X 2083 mm (42 in. X 82 in.) minimum. Corridors with a width of 2439 mm (8 ft.) also prove helpful.

14.4.3 Elevator Requirements

When moving the gantry from the receiving location to the scanning room, pay special attention to elevator size and capacity. Removing side rails and one dolly after placing the gantry in the elevator reduces the gantry width/length and elevator depth requirements.

Due to gantry component weight differences all weights listed below are averages. This change can measure ±18.14 kg (±40 lb). Contact the elevator manufacturer if the gantry weight exceeds elevator capacity.

Gantry with new dolly, (see Table 14-1 Size of Gantry & New Dollies, with and without Side Rails on page 161)

Table 14-1 Size of Gantry & New Dollies, with and without Side Rails

Configuration	Length	Width	Height	Weight
Dollies On, Side Rails On	3024 mm (119 in.)	1290 mm (51 in.)	2209 mm (87 in.)	2003.2 kg (4416 lb)

Table 14-1 Size of Gantry & New Dollies, with and without Side Rails (Table continued)

Configuration	Length	Width	Height	Weight
Dollies On, Side Rails Removed	3024 mm (119 in.)	1039 mm (40.9 in.)	2209 mm (87 in.)	1978 kg (4361 lb)
Dollies Off, Covers Off	2084 mm (82 in.)	915 mm (36 in.)	1863 mm (73 in.)	1805 kg (3979 lb) *
				* Side Cover Brackets off, Front Cover on

Gantry with old dolly, (see Table 14-2 Size of Gantry & Old Dollies, with and without Side Rails on page 162).

Table 14-2 Size of Gantry & Old Dollies, with and without Side Rails

Configuration	Length	Width	Height	Weight
Dollies On, Side Rails On	2910 mm (115 in.)	1290 mm (51 in.)	2000 mm (79 in.)	2089 kg (4605 lb)
Dollies On, Side Rails Removed	2910 mm (115 in.)	1039 mm (40.9 in.)	2000 mm (79 in.)	2063 kg (4548 lb)
Dollies Off, Covers Off	2084 mm (82 in.)	915 mm * (36 in.)	1863 mm (73 in.)	1805 kg (3979 lb)
				* Front Cover Brackets off, Bore Cover on

The minimum hallway and door size for a gantry with covers and dollies attached but side rails removed, is 1016 mm (40 in.). For alternative lifting arrangements and instructions, contact GE Healthcare Installation Support Services.

14.5 Table Delivery Considerations

1. **NG Elite 1700 STD Table and NG Elite 2000 Heavy Table:**
   The table shipped without bellow and base covers, bellow and base covers are in separated boxes.

   (For NG Elite 1700 STD Table) mounted with four dollies.

   (For NG Elite 2000 Heavy Table) mounted with four STD dollies and one small dolly

   For the NG Elite table dimensions with dollies, refer to Table 14-3 NG Elite Table Dimensions with dollies on page 162 .

   Table 14-3 NG Elite Table Dimensions with dollies

	Length		Width		Height		Weight	
	mm	in	mm	in	mm	in	kg	lb
NG Elite 1700 STD Table	2524	100	936	36.8	1049	41.3	582	1283
NG Elite 2000 Heavy Table	2949	116.1	936	36.8	1049	41.3	630	1389

2. **VT1700V / VT2000 / VT2000x:**
   The table is shipped without side covers installed. Covers are shipped in separate boxes. The table is mounted with two dollies.

   For the table dimensions with dollies, refer to Table 14-4 Table Dimensions with dollies on page 163.

Table 14-4 Table Dimensions with dollies

	Length		Width		Height		Weight	
	mm	in	mm	in	mm	in	kg	lb
VT2000 / VT2000x	2997	118	762	30	1143	45	632	1390
VT1700V	2489	98	762	30	1143	45	576	1270

14.6 Standalone Console Delivery Consideration

The dimensions of the console alone (as shipped) measure:

Z8G4/Z8G5 Host Computer: 730 mm (28.7 in.) deep, 330 mm (13 in.) wide, and 620 mm (24.4 in.) high.

14.7 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, humidity, and altitude shall be maintained within the following range up to two weeks duration.

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

Table 14-5 Shipping Temperature, Humidity and Altitude Ranges

Temperature	Humidity	Altitude
-40 to +70 degrees C (-40 to +158 degrees F)	10% to 100% (including condensing)	-549m to 5486m (-1,800ft to 18,000ft)

Table 14-6 Shipping Temperature and Humidity Ranges for Excluded Items

Items	Temperature	Humidity
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) NO	5% to 95% **NOTE** Relative humidity (non-condensing)

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 cabinet from the shipping skid until after the unit has been delivered to the scan suite location.

14.8 Storage Requirements

NOTICE

Failure to adhere to storage requirements can result in equipment damage.

14.8.1 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 PM for long-term storage procedures.

Table 14-7 Humidity and Ambient Temperatures for Storage**

Ambient temperature shall be maintained within a range of:	0 to +30° C (+32 to +86° F)
Maximum rate of change in the temperature shall be no greater than:	3° C 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.	

14.8.2 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:
  - Dust control measures deployed in the radiology suite area.
  - Scan suite access limited to a single entrance
  - Radiology suite sealed off from the remaining construction area.
  - 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.

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Chapter 15 Handling Requirements

Communicate the information in this chapter to any personnel who will transport, move, or otherwise handle the system components during transportation and delivery of the system.

15.1 Transportation

To avoid dropping the gantry, it is recommended that the system is transported from GE to the facility of the installation site, shipping dock-to-dock in a van. However, facilities without a loading dock may transport the system using liftgate or flatbed trucks, provided that no dropping or mis-handling of the system occurs. These methods involve unloading system components from the truck and then rolling them across SMOOTH sidewalks or other paved surfaces.

15.2 Handling Requirements

The design of the system does not tolerate dropping, shock, vibration, tipping, or hoisting. Be sure to communicate these handling requirements to all parties involved in transporting, moving, and handling system components.

15.2.1 Avoid Dropping

Never drop the gantry, console, table, or PDU. A drop from a height greater than 13 mm (0.5 in.) may cause structural damage to the frame or other major components. Damage resulting from a drop (e.g., bent frame, misalignment) may not become apparent until after the system is installed.

15.2.2 Avoid Shocks and Vibrations

The design of the system, including the gantry, console, table, and PDU, does not tolerate excessive shock or vibration, which may occur during unloading. For example, rolling the console across a "washboard" style ramp may vibrate components, causing loose or broken connections. Damage resulting from shock or vibration (e.g., monitor, CD-ROM, hard-drive, or console failure) may not become evident until after the system is installed.

15.2.3 Avoid Tipping

All system components must remain upright at all times; avoid tipping them. Move the gantry by rolling it on its dollies ONLY, do NOT hoist it. Avoid tipping or lifting the gantry when moving it through hallways, doorways, elevators, etc.

NOTICE

Lifting the gantry requires engineering approval for each occurrence. Your GE PMI should contact CT Engineering for all special lifting requirements, as unauthorized gantry lifting can cause gantry bearing damage.

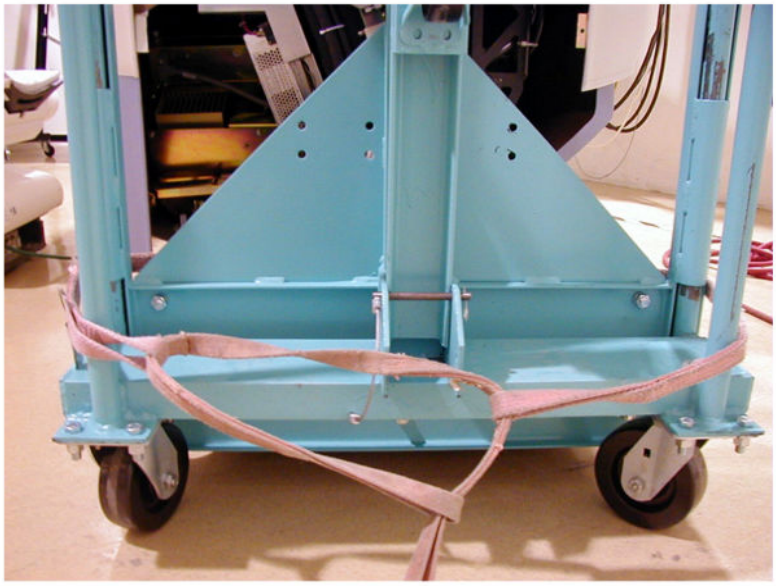
15.2.4 Flat-bed Truck Removal (NOT Approved Tilting)

Flat-bed Truck Removalwrecker, attach the straps to the LOWEST possible point on the dolly, and lower the gantry at the SLOWEST reasonable rate, (see Figure 15-1 Proper Gantry Strap Location on page 168).

⚠ CAUTION

Tilt-bed truck is no longer an approved delivery methods. It is allowed to use a tilt-bed truck (tilt disabled) as a flatbed truck and use a forklift or crane to unload a system.

Figure 15-1 Proper Gantry Strap Location



⚠ WARNING

SOME ASSEMBLIES MAY BE TOP-HEAVY. BE CAREFUL NOT TO TIP!

Appendix A Regulatory Clearances for US

A.1 Regulatory Clearances

There are federal regulations and national standards which determine the minimum clearances for United States (US) installations. These include:

- 29 CFR 1910 (OSHA)
- NFPA 70E (Standard for Electrical Safety in the Workplace)
- NFPA 101 (Life Safety Code)
- Americans with Disabilities Act

NOTICE

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

Clearance Requirements

A map of clearance requirements necessary for proper operation and serviing of the system is provided in section *Service Clearance Requirements*. This is for standard layout in the suggested room size. Refer to the appendix for alternate layouts and room configurations.

NOTICE

The maps and dimensions shown in this manual depict the required clearances for proper equipment operation and service only. The purchaser is responsible for federal, state, and local codes regarding facility egress and related facility requirements. The use of alternate layouts puts severe limitations on space for patient care and work flow. Customer approval of site drawings signifies customer agreement to these limitations.

A.2 Minimum Regulatory Workspace Clearances by Major Subsystem

These requirements apply to equipment operating at 600 V or less, where examination, adjustment, servicing, or maintenance is likely to be performed with live parts exposed.

The customer MUST maintain the required regulatory clearance distances and may NOT use these area for storage. This applies during normal system operation as well as during service inspection and maintenance.

Direction of Service Access refers to a direction perpendicular to the surface of the equipment serviced..

Table A-1 CONSOLE – minimum work-space clearances

Workspace Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (front and rear of console)	Not applicable. (no exposed live part hazards.)	
Service Access Width (front and back of work-space)		Refers to the width of the working space in front of equipment. 762 mm (30 in) minimum or the equipment width, whichever is greater.
Head Clearance	1981 mm (78 in.)	Refers to the height of the work-space measured from the floor at the front edge of the equipment to the ceiling or any overhead obstructions. 1981 mm (78 in) or the height of the equipment, whichever is greater.

NOTE

Distances are measured to the finished covers.

Table A-2 NGPDU — minimum work-space clearances

Workspace Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of PDU)	914 mm (36 in.)	1219 mm (48 in) if exposed live parts of 151-600 V are present on both sides of the work-space with the operator between. 1067 mm (42 in) if the opposite wall is grounded and exposed live parts of 151-600 V are present.
Service Access Width (Front of Work-space)	762 mm (30 in.)	Refers to the width of the working space in front of equipment. 762 mm (30 in) minimum or the equipment width, whichever is greater.
Head Clearance	1981 mm (78 in.)	Refers to the height of the work-space measured from the floor at the front edge of the equipment to the ceiling or any overhead obstructions. 1981 mm (78 in) or the height of the equipment, whichever is greater.

Table A-3 GANTRY – minimum work-space clearances

Workspace Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (All Sides)	914 mm (36 in.)	1219 mm (48 in), if exposed live parts of 151-600 V are present on both sides of the work-space with the operator between. 1067 mm (42 in), if the opposite wall is grounded and exposed live parts of 151-600 V are present.
Service Access Width (Left-Right of Workspace)	762 mm (30 in.)	Refers to the width of the working space in front of equipment. 762 mm (30 in) minimum or the equipment width, whichever is greater.

Table A-3 GANTRY – minimum work-space clearances (Table continued)

Workspace Requirement	Minimum Clear Space	Additional Conditions
Head Clearance	1981 mm (78 in.)	Refers to the height of the work-space measured from the floor at the front edge of the equipment to the cei-lilng or any overhead obstructions. 1981 mm (78 in) of the height of the equipment, whichever is greater.

NOTE
Distances are measured from the finished covers.

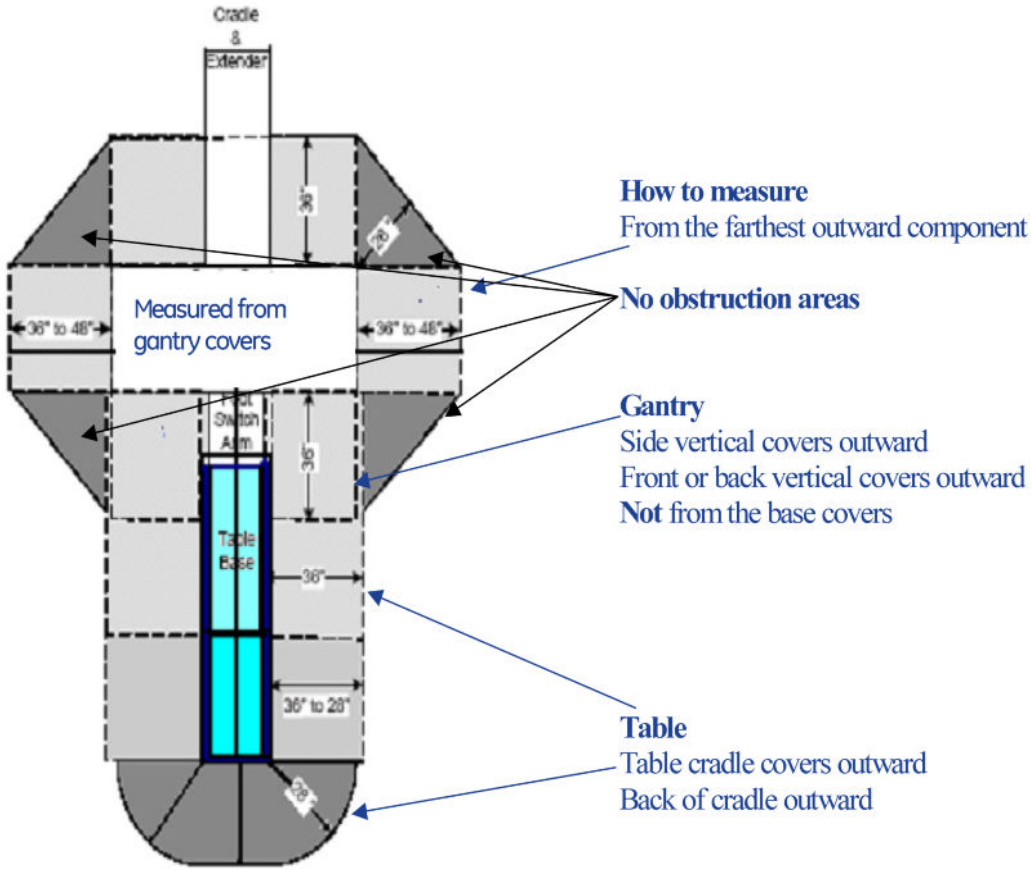
Table A-4 TABLE – minimum work-space clearances

Workspace Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Table Head)	not applicable	
Direction of Service Access (Table Sides)	914 mm (36 in.)	Can be reduced to 711 mm (28 in) provided the local team obtains written and signed approval from the local AHJ (Authority Having Jurisdiction). GE must have the signed document on file.
Front Cover Removal (table foot)	686 mm (27 in)	457 mm (18 in) minimum for front gantry cover removal. Refer to the appendix for alternate front cover removal op-tions.
Service Access Width (Left-Right of Workspace)	762 mm (30 in.)	Refers to the width of working space in front of equipment. 762 mm (30 in) minimum or the equipment width, whichev-er is greater.
Head Clearance	1981 mm (78 in.)	Refers to the height of the work-space measured from the floor at the front edge of the equipment to the ceiling or any overhead obstructions. 1981 mm (78 in) minimum or the equipment height, whichever is greater.

NOTE
Distances are measured from the finished covers.

A.3 How to Measure

Figure A-1 Measuring Minimum Regulatory Clearances



⚠ CAUTION

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

⚠ CAUTION

In the minimum room layout (356 mm to 686 mm (14 in to 27 in) the customer should consider workflow, customer access for patient care and critical care operations space requirements.**Additionally, this layout may offer only limited equipment access on the gantry left side when loading patients or when positioning patient equipment in the room between the gantry and the wall.**

NEC Conduit and Duct Fill Rate

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

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

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

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Appendix B Alternate Cover Removal Options

B.1 Overview

The room dimensions and clearance dimensions shown in this manual assume a room configuration in which the front and rear gantry covers are removed and stored straight back/ forward from the gantry. However, not all room configurations are the same, meaning covers can be stored in other available spaces. For example, some rooms are long and skinny, while other rooms are short and wide. Some rooms may have a support column in the way, while other rooms have an adjacent room to store the gantry covers. For this reason, some alternative cover removal options for different room configurations are presented in this appendix.

B.2 Front Cover Removal

Rather than storing the front cover straight forward from the gantry at the foot of the table, the cover can be moved and stored on the right or left side of the table if there is space available while still maintaining service access to the table. Additionally, the cover can be moved out of the scan room to a temporary storage location.

The standard procedure for removing the front cover is with the table all the way down. A second method for front cover removal is with the table partially raised and the IMS moved into the bore of the gantry by table service switch. Under this method, the minimum length of the room can be reduced.

NOTICE

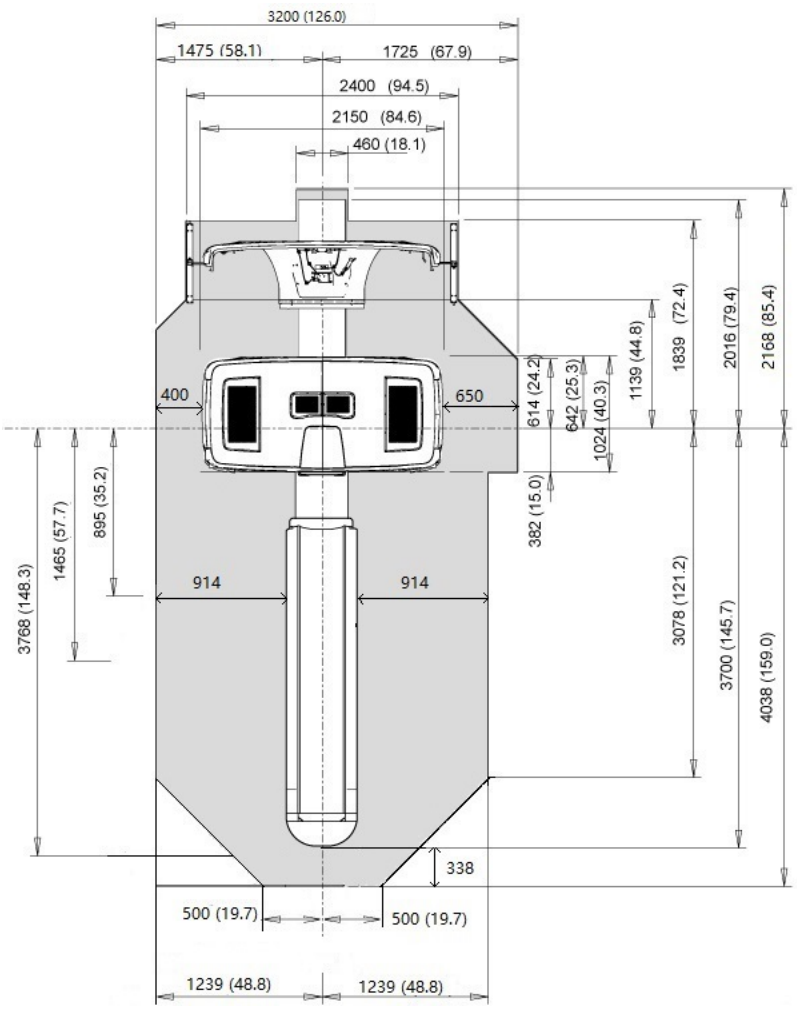
A room size that utilizes the table-up cover removal method has severe limitations in space for patient care and work flow. The map and dimensions shown in this manual depict the required clearances for proper equipment operation and service only. The customer/purchaser is responsible for federal, state and/or local codes regarding facility egress and related facility requirements.

B.3 Rear Cover Removal

Rather than storing the rear cover straight back from the gantry, the cover can be moved and stored on the right or left side or angled if there is space available while still maintaining service access to the gantry. Additionally, the cover can be moved to the side of the table or out of the scan room to a temporary storage location.

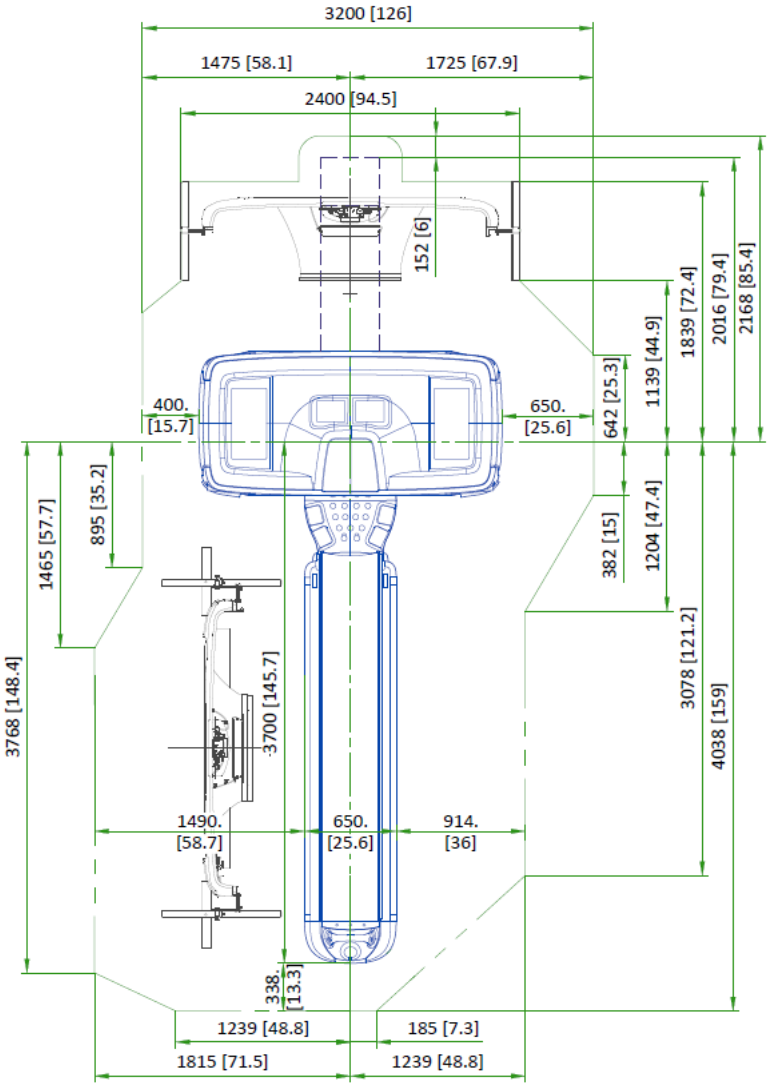
For rooms with a surface floor duct (without ramps) behind the gantry, the rear cover cannot be moved to the side of the gantry. Due to the weight of the gantry cover, lifting it over a surface floor duct without ramps is prohibited.

Figure B-1 Standard Service Access (VT2000/VT2000x Table)



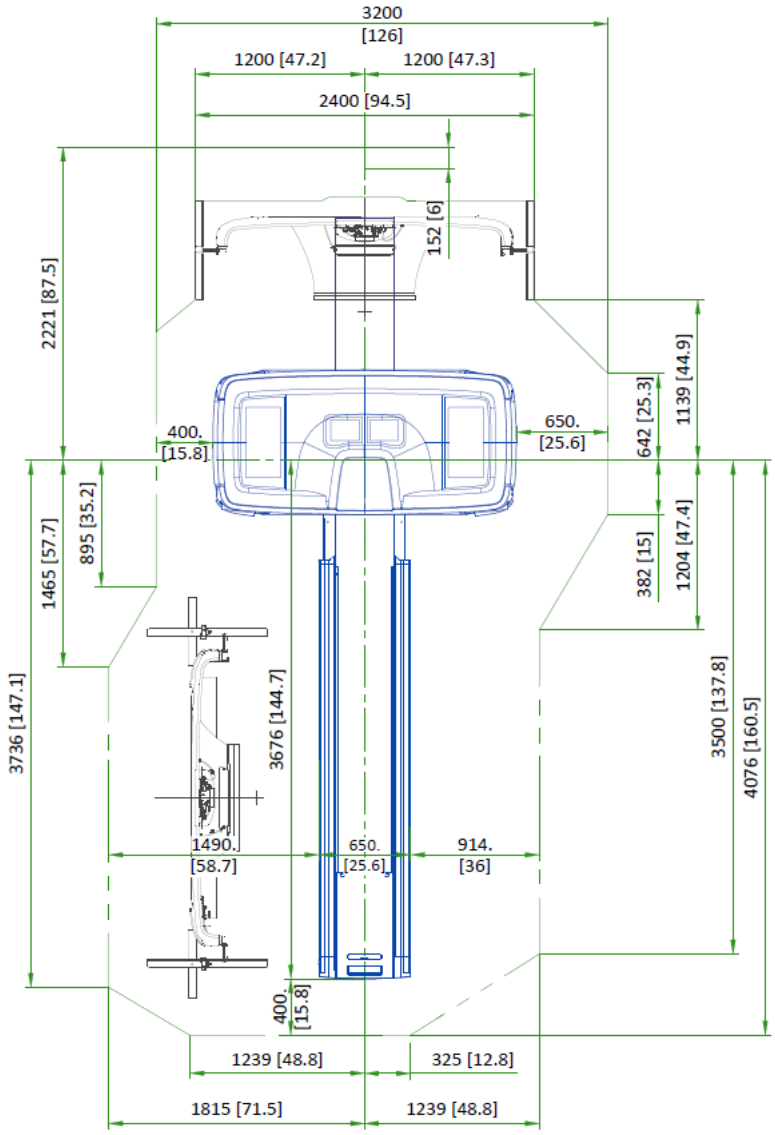
NOTE
Unit: mm (in)

Figure B-2 Cover Removal Clearance (VT2000 /VT2000x - Gantry Front Cover Removal and Storage to Left Side)



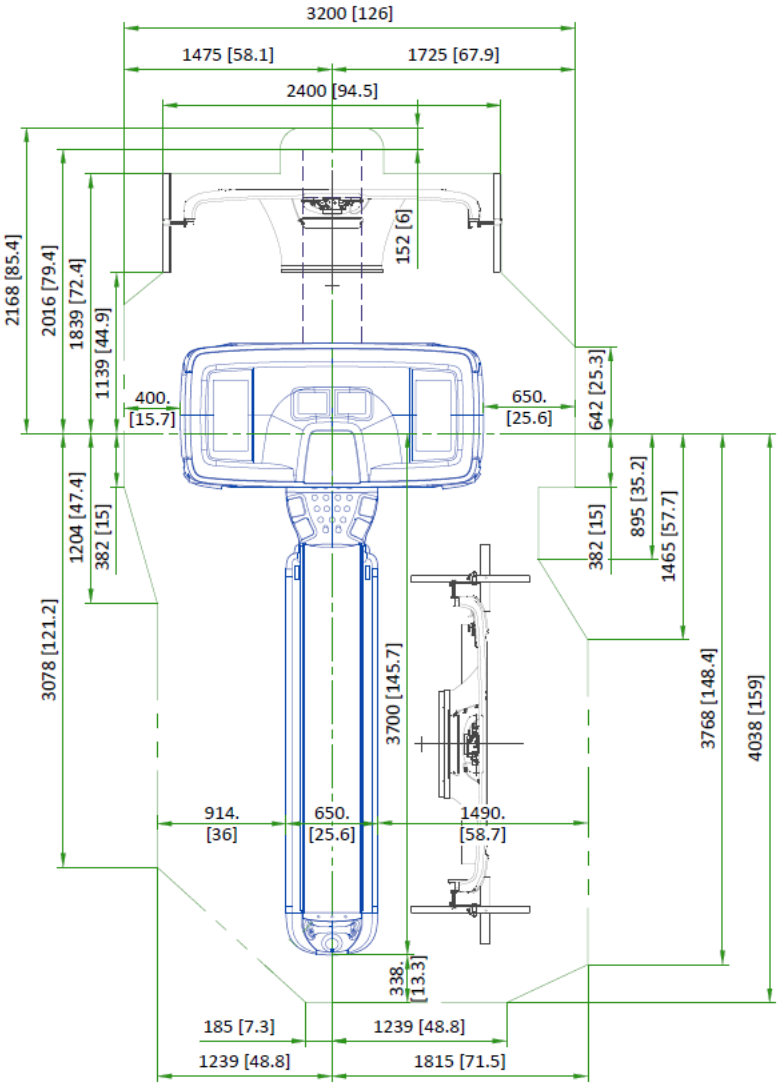
NOTE
Unit: mm (in)

Figure B-3 Cover Removal Clearance (NG Elite 2000 - Gantry Front Cover Removal and Storage to Left Side)



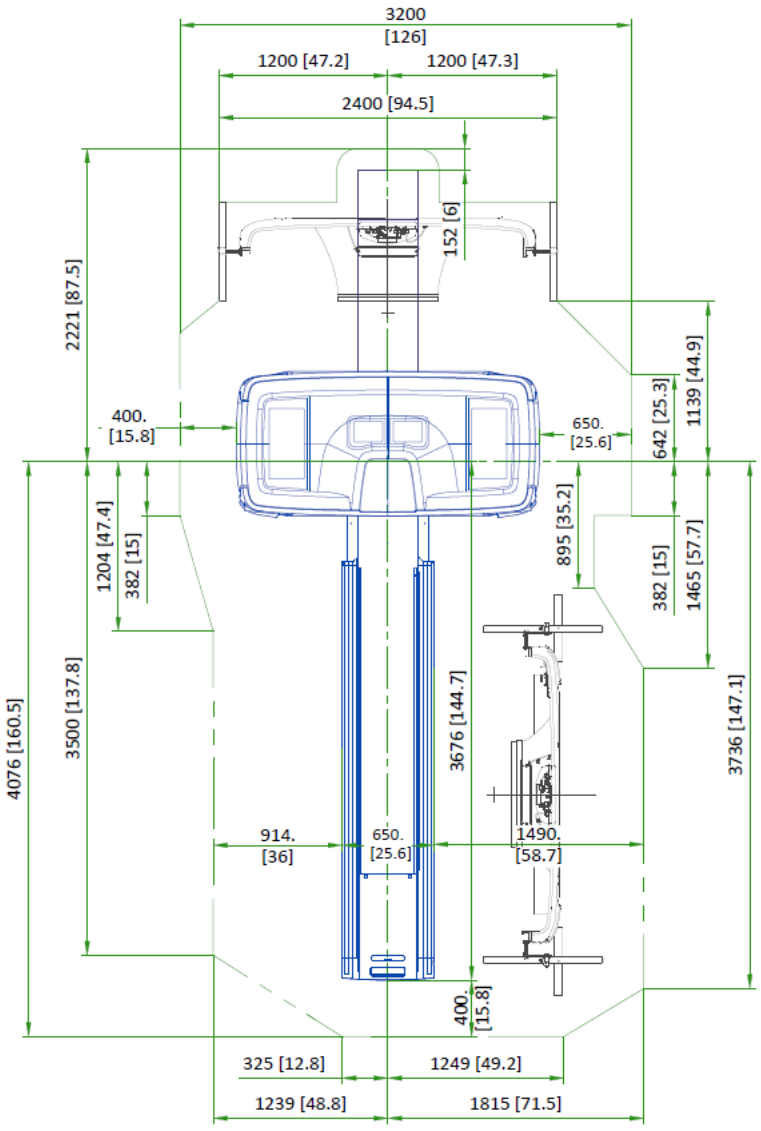
NOTE
Unit: mm (in)

Figure B-4 Cover Removal Clearance (VT2000/VT2000x - Gantry Front Cover Removal and Storage to Right Side)



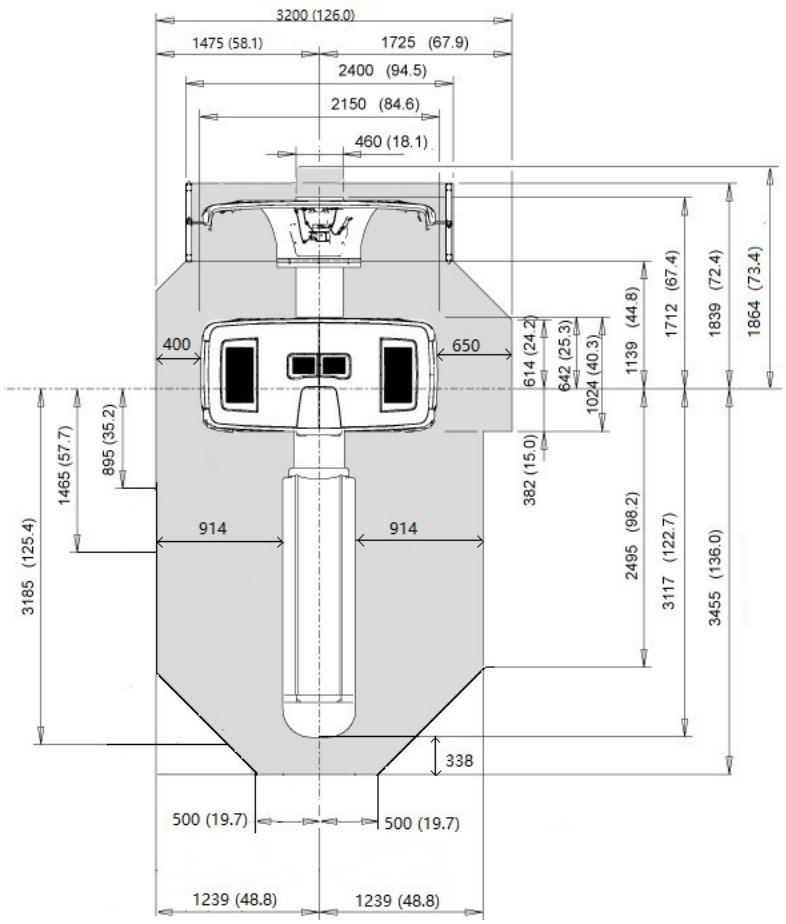
NOTE
Unit: mm (in)

Figure B-5 Cover Removal Clearance (NG Elite 2000 - Gantry Front Cover Removal and Storage to Right Side)



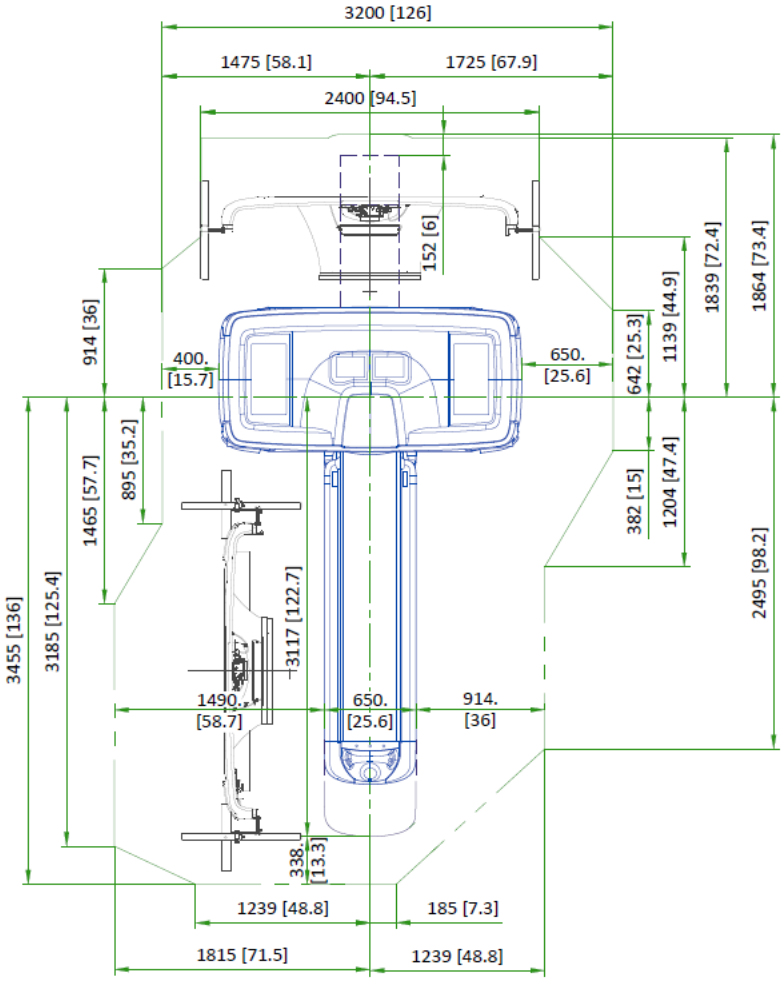
NOTE
Unit: mm (in)

Figure B-6 Standard Service Access (VT1700V Table)



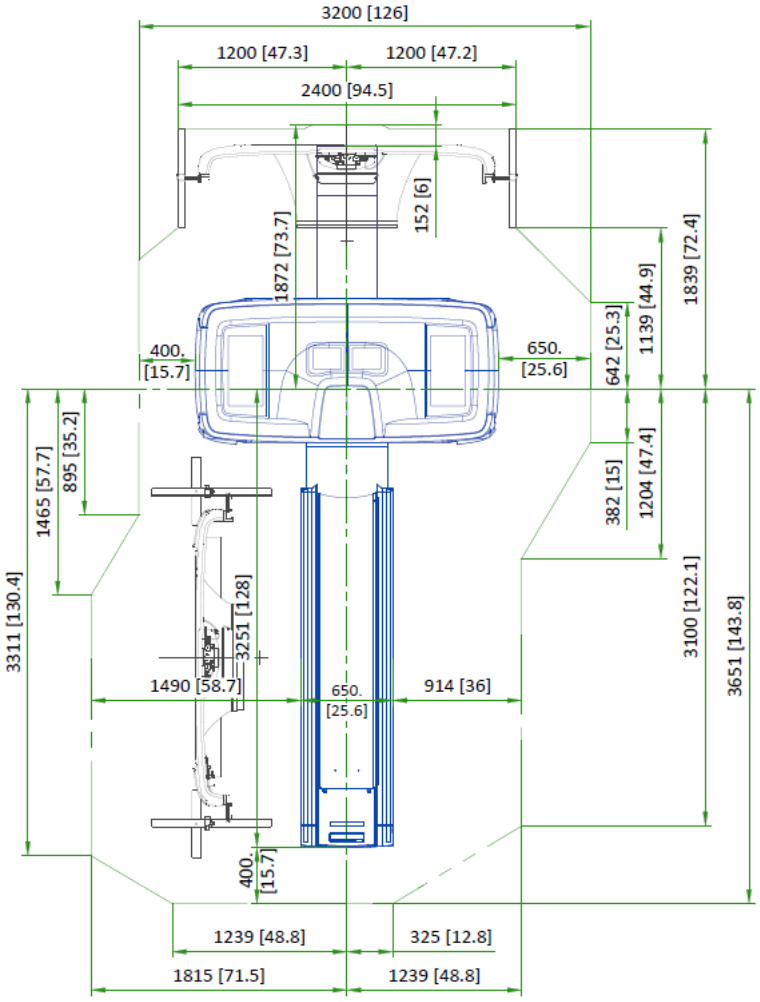
NOTE
Unit: mm (in)

Figure B-7 Cover Removal Clearance (VT1700V - Gantry Front Cover Removal and Storage to Left Side)



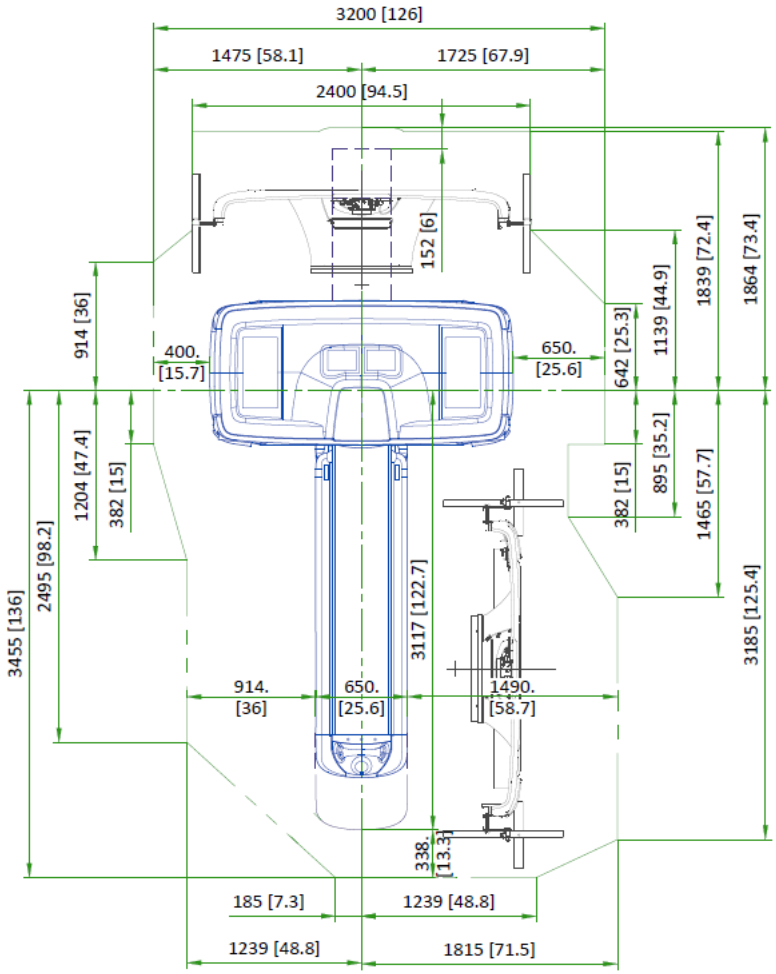
NOTE
Unit: mm (in)

Figure B-8 Cover Removal Clearance (NG Elite 1700 - Gantry Front Cover Removal and Storage to Left Side)



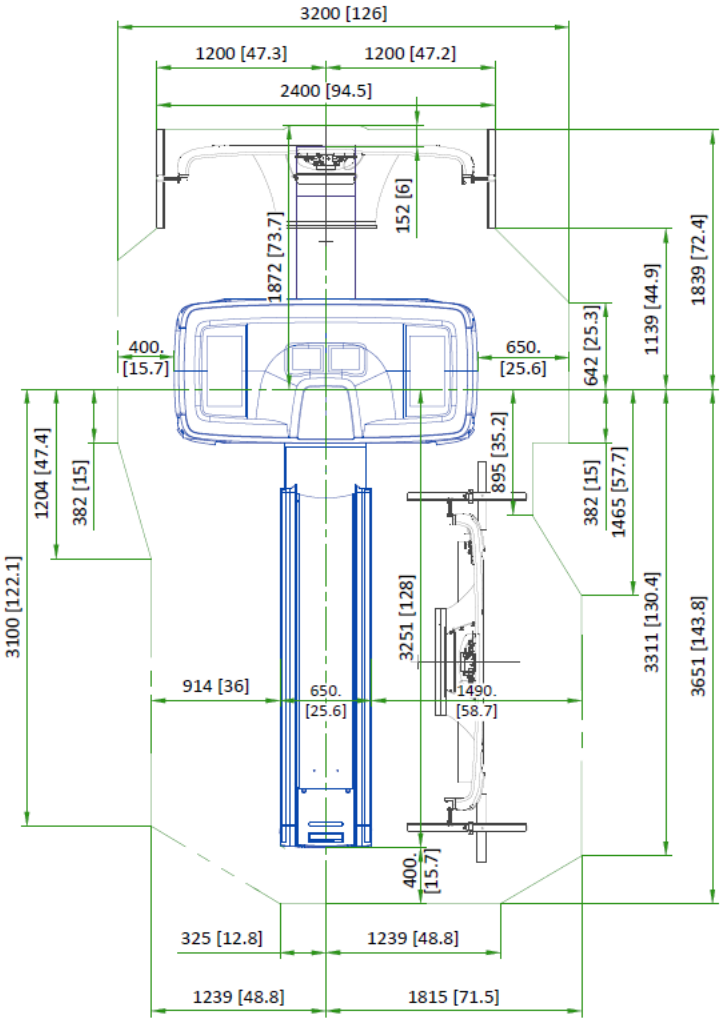
NOTE
Unit: mm (in)

Figure B-9 Cover Removal Clearance (VT1700V - Gantry Front Cover Removal and Storage to Right Side)



NOTE
Unit: mm (in)

Figure B-10 Cover Removal Clearance (NG Elite 1700 - Gantry Front Cover Removal and Storage to Right Side)



NOTE
Unit: mm (in)

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