

GE Healthcare

Brivo CT315/325
PREINSTALLATION
Operating Documentation



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Rev 6

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(EN)

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(TR)

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**DAMAGE IN TRANSPORTATION**

All packages should be closely examined at time of delivery. If damage is apparent write "Damage In Shipment" on ALL copies of the freight or express bill BEFORE delivery is accepted or "signed for" by a GE representative or 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:

Fill out a report on <http://egems.med.ge.com/edq/home.jsp>

Contact the local service coordinator.



CERTIFIED ELECTRICAL CONTRACTOR STATEMENT

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

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



IMPORTANT! . . . X-RAY PROTECTION

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

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

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

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

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



LITHIUM BATTERY CAUTIONARY STATEMENTS



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.



OMISSIONS & ERRORS

Customers, please contact your GE Sales or Service representatives.

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

REVISION HISTORY

REV	Date	Primary Reason for Change
6	06/05/2012	Updated storage temperature from -30~50 to 0~30. (Sec. 6, Appendix) Updated storage humidity to 0~70%.
5	01/18/2011	Updated Notice to Warning for the neutral line description. (Sec. 4) Added cable connector size to system power/signal cables list for cable positioning. (Sec. 5)
4	08/16/2010	Added warning for the minimum room size. (Sec. 2)
3	06/01/2010	Added Multi-language warnings for French, Japanese, Portuguese-Brazil, Russian, Spanish and Turkish. Added adapter information. Added power adapter (option) in system major components. (Sec. 1) Updated room layout with adapter. (Sec. 2) Added Rear Cover Depth size. (sec. 2) Updated power frequency to 50/60±2%Hz. (Sec. 4) Updated figures for system cable interconnection and system interconnection diagram. (Sec. 5) Added notice for delivery procedure. (Sec. 6) Updated storage temperature from -10~50 to -30~50. (Sec. 6, Appendix)
2	11/06/2009	Updated Control Panel Color Code. (Sec. 1) Updated Sec 4-3 warning (delete 'e.g. GE A1 Panel). (Sec. 4) Updated Illustration 5-1 System Cable Interconnection. (Sec. 5) Updated Table 5-1 System Power/Signal Cables. (Sec. 5)
1	07/21/2009	Initial release.

PREINSTALLATION

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INTRODUCTION

This document contains the physical and electrical data necessary for planning and preparing a site for a System installation. "Preinstallation work" prepares customer facilities for the proper installation of products sold to them. Purchasers take responsibility for the arrangement and performance of this work at their expense. Such work includes:

1. Installation of the electrical conduit, junction boxes, ducts, outlets, line safety switches, and power distribution panel(s).

Note

The customer must provide metal conduit or metal raceway for power cable installation. In addition, GE also recommends the use of metal raceways for signal cable installation.

2. Installation of *AWG stranded copper* interconnecting wiring. The electrical contractor shall ring out and tag all wires at both ends. GE recommends the use of color-coded wires for easier identification and the use of insulated ground wires with a green base and a yellow stripe. Use continuous wires, without splices, throughout.
3. Any site renovation.
4. Alternations and modifications to products not specially provided for in sales contract.
5. Work that complies with local building and safety codes.

Unless specifically mentioned in the contract, GE Healthcare Division does not provide or install the wires, conduits, junction boxes, ducts, and power distribution panel described or illustrated in this Preinstallation Manual.

All CT site plans, preliminary concepts and final working drawings must be reviewed by GE Headquarters Architectural Planning personnel prior to construction or approval.

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 engineers. All of GE's electrical work on these products will comply with the requirements of the applicable electrical codes. The purchased of GE equipment shall only utilize qualified personnel (i.e., GE's field engineers, personnel for third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

General Site Environmental Notes

CHRONIC SYSTEM MALFUNCTION! IT IS ABSOLUTELY NECESSARY THAT THE CT ROOMS BE PREPARED AS OUTLINED IN THIS MANUAL BEFORE ANY SYSTEM INSTALLATION STARTS. OTHERWISE, CHRONIC SYSTEM MALFUNCTION MAY OCCUR. IN PARTICULAR, AIR QUALITY, DUST, OR FRESHLY PAINTED WALLS MUST BE STRICTLY MONITORED.

The customer or contractor has responsibility for meeting the following requirements before equipment installation begins:

- Adequate room lighting
- Minimum of one wall outlet available for power tools
- Power Distribution Box (3 phase or 1 phase or both) installed and power available.
- Finished ceiling installed.
- All wall and ceiling support structures installed.
- Room and adjacent corridors - dirt and dust free
- All junction boxes, raceway and conduit installed with cover plates, screws, and chase nipples readily available.
- All room warning lights and associated cabling installed and ready for connection
- Lead lined doors and control booth installed, before start of electrical calibration (required).
- At least one coat of paint on finished wall
- Ambient room temperature ranging from 15°C ~ 30°C before electrical checkout begins.
- Finished floor installed.
- HVAC (heating, ventilation, and air conditioning) system operating, checked and balanced in CT suite.
- Customer furnished stranded copper wire installed and identified.
- A clear path and adequate clearance through doorways and around corners from the loading dock or delivery site to the CT suite.

Note

Freight elevators must be checked for clearance and weight handling capacity, if applicable.

SECTION 1 - SYSTEM CONFIGURATION

1-1 SYSTEM

The Standard System consists of the following major components (see also Illustrations 1-1):

- Patient Table (Fix Table and Up/Down Table)
- Scanning Gantry containing OGP, DTB, Axial motor/Driver, Data Acquisition System, X-Ray Generator, Detector and Table/Gantry Processor.
- Operator's Console mainly consisting of:
 - Host PC
 - Monitor (19" LCD)
 - Keyboard and Mouse
 - Scan Control Box

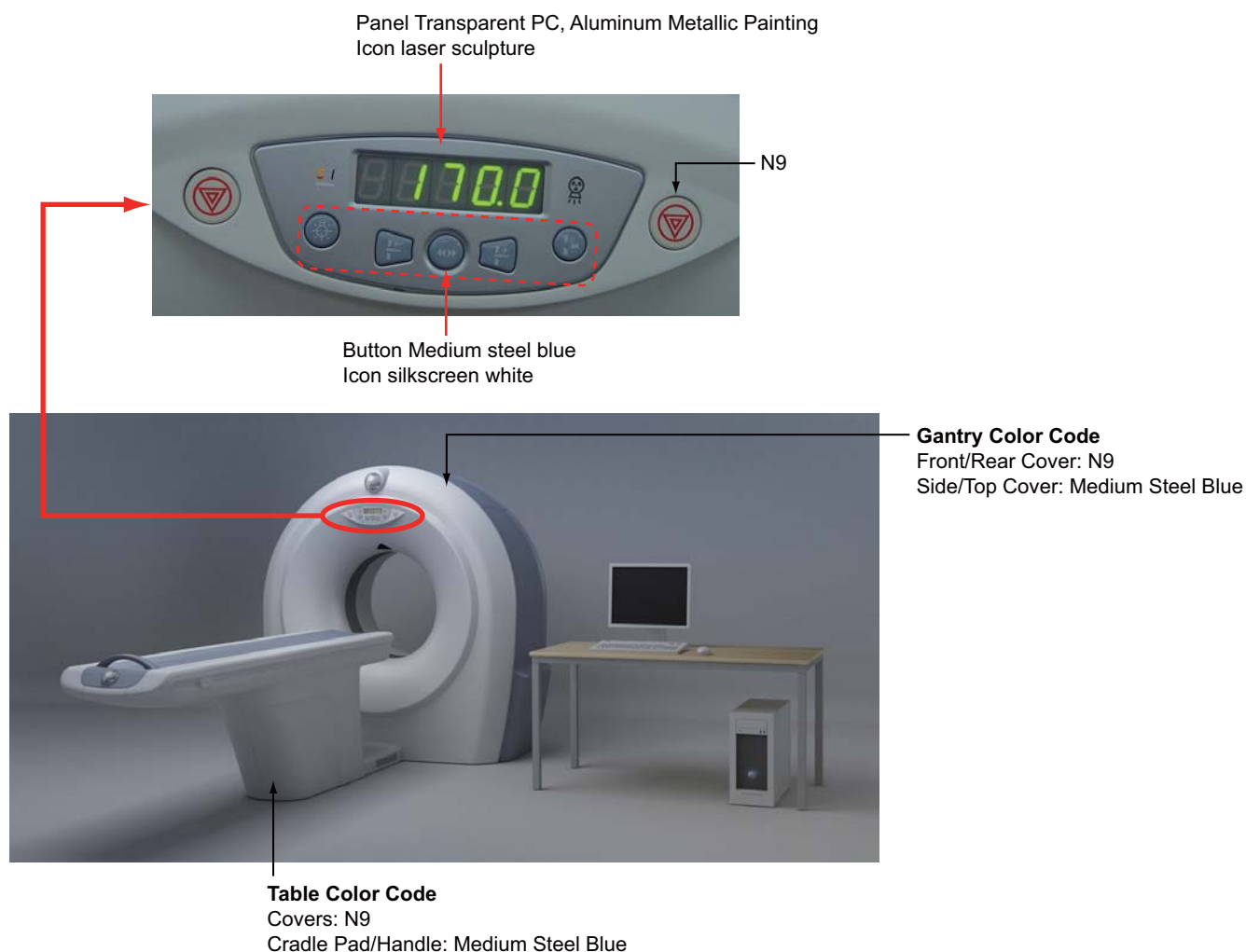
Note

The OC does NOT contain the OC (Operator's Console) table. A customer can order the optional table or provide their own (Recommended size: L x W x H 1200mm x 600mm x 750mm).

- Patient Accessories such as:
 - Cradle EXT ASM (2137478)
 - P9185DM Cradle Extender (2131056)
 - Limit Label (2198038)
 - Metalless Cradle Pad (2137668)
 - Extender Mattress (2137667)
 - Simple Head Holder (5334730)
 - Axial Head Holder
 - Coronal Head Holder
 - Pin
 - Phantom Holder (5395684)
 - Knee PAD (5334731)
 - Quality Assurance Phantom (2144715)
 - Body Strap B (P9150SG)

1-1 SYSTEM (CONTINUED)

- Service tools and accessories consisting of:
 - Gantry Service Tool (for Front/Rear Cover replacement)
 - X-Ray Beam Film Holders (one set of 3) for Beam-On-Window
 - Anchor Adjustment JIG 5389135 (For Table/Gantry)
 - Operator Manuals and Service Manuals
 - Anchor ADJ JIG and switch cables collector (B-cat)
 - Template for field installation
- Power Adapter (Option): Power Adapter Assembly contains power cables and ground cable from power adapter to CT PDU.

Illustration 1-1 Standard System Components and Color Code

1-2 OPTIONS

The following option list shows some items impacted to CT System Preinstallation..

Table 1-1 Options List

Option Name	Part Number
Desk	2285355
	2282152
	2282153
Chair	2285358
Steps Tool	5165267
Gantry Dolly	5346612
Adapter	5393114
UPS	B73982CA

SECTION 2 - ROOM LAYOUTS

2-1 ROOM SIZES

Table 2-1 Component Dimensions

COMPONENT		WIDTH (mm)	DEPTH (mm)	HEIGHT (mm)
Gantry		1,784	967	1,749
Patient Table	Fix Table	550	2,525	778
	Up/Down Table	580	2236(MIN) / 2536(MAX)	914
Host PC		210	530	440
LCD		425	206	435
Power Adapter (Option)		711	559	940

Table contains a list of room dimensions necessary for service area and patient/traffic concerns in a CT suite.

Table 2-2 Minimum Room Dimensions

ROOM		Minimum Room Size mm	Recommended Room Size mm	CEILING mm
Gantry / Scan Room	Fix Table	4555 x 2500 (No Adapter Inside)	4700 x 3180 (No Adapter Inside)	2400
			4700 x 3640 (Adapter Inside)	
	Up/Down Table	4200 x 2500 (No Adapter Inside)	4700 x 3180 (No Adapter Inside)	
			4700 x 3640 (Adapter Inside)	
Operator's Room/Control Room		1450 x 1860 (No Adapter Inside)	2500 x 3180	

In addition to the rooms listed above, a separate diagnostic room with Light Box, etc. and/or a patient preparation room are also recommended, but not required. The customer may determine the sizes (or need) for these rooms.



NOTICE

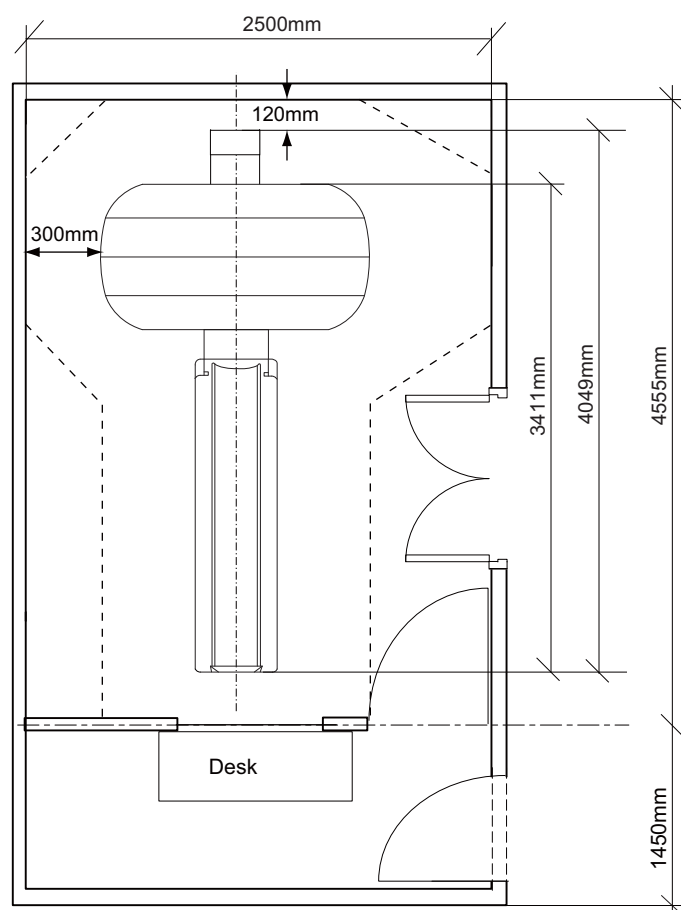
For systems installed in China, scan room are more than 30m² is recommended according to the national regulation.
For installations outside China, country-specific or other local regulatory clearance requirements must be met.

2-1-1 Minimum Room Size (No Adapter)

THIS ROOM CONFIGURATION DOES NOT TAKE INTO ACCOUNT THE FUTURE UPGRADES. THE DIMENSION IS THE MINIMUM SIZE WHICH CAN ONLY BE USED FOR CT SYSTEM RUNNING, THERE MAY BE SOME DIFFICULTIES IF FE PERFORMS SOME SERVICING SUCH AS GANTRY COVER, TUBE OR SLIPRING REPLACEMENT INSIDE THIS ROOM. IT IS STRONGLY SUGGESTED THAT RECOMMENDED ROOM SIZE IN SECTION 2-1-2 BE SELECTED.

This room configuration allows for no future upgrades. It has limited workspace and no in-room millwork.

Illustration 2-1 Minimum Room Size for Fix Table with Extender

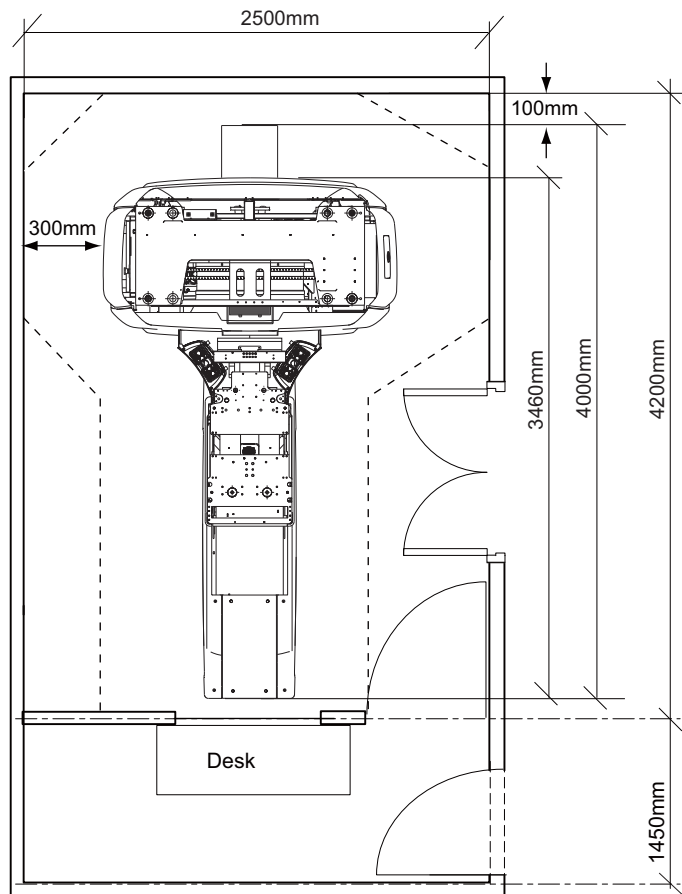


Note

Envelope of 300mm of the clearance space for PDU servicing of the Gantry left side. Gantry front cover **MUST** be removed by two person and with a special protector (such as cloth or blanket).

2-1-1 Minimum Room Size (No Adapter) (Continued)

Illustration 2-2 Minimum Room Size for Up/Down Table without Extender



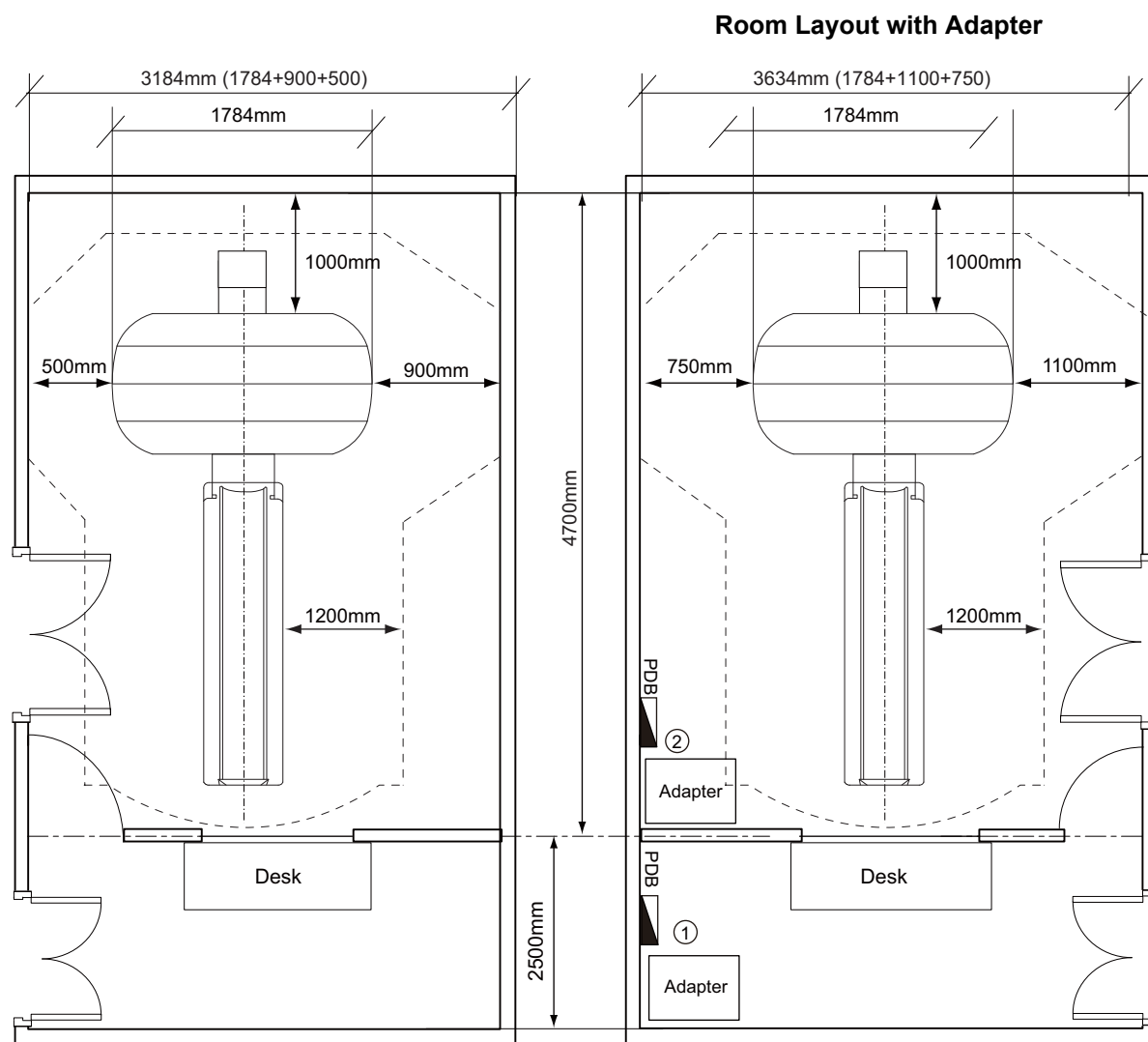
WARNING

PATIENT INJURY!
THE DISTANCE IS NO LESS THAN 120MM BETWEEN THE WALL AND THE TABLE
EXTENDER FOR PREVENTING PATIENT FROM PINCHING.

2-1-2 Recommended Room Size

Servicing of the CT system can be safely performed within the regulatory envelopes sufficient space must be maintained to remove system covers, and replace large system components (such as Tube, JEDI etc..). To achieve this clearance for the Gantry, clear space must be available to maneuver the gantry covers mounted on the service dollies. One service engineer can accomplish this.

Illustration 2-3 Recommended Room Layout



NOTE 1: One side of the Gantry is no less than 900mm for the Gantry Front/Rear Cover removal.

NOTE 2: The distance is no less than 1000mm between the Gantry Rear Cover and wall used to service SlipRing.

NOTE 3: ① and ② are two kinds of Adapter positions, ② is recommended adapter position.

2-2 RADIATION PROTECTION

2-2-1 Radiation Considerations

A qualified radiological health physicist should review Scan room shielding requirements while taking into consideration equipment placement, weekly projected workloads, and materials used for construction of walls, floors, ceiling, doors and windows.

2-2-2 Scatter Radiation

Illustrations 2-4 and 2-5 depict measurable levels within the scanning room while scanning a special phantom (PMMA for dose measurement) with the listed technique. Values are in nGy/mAs and apply to both 60 Hz and 50 Hz operation.

Note

$$1 \text{ mR} = 8.69 \times 10^{-6} \text{ Gy} (1 \text{ Gy} = 115 \text{ R})$$

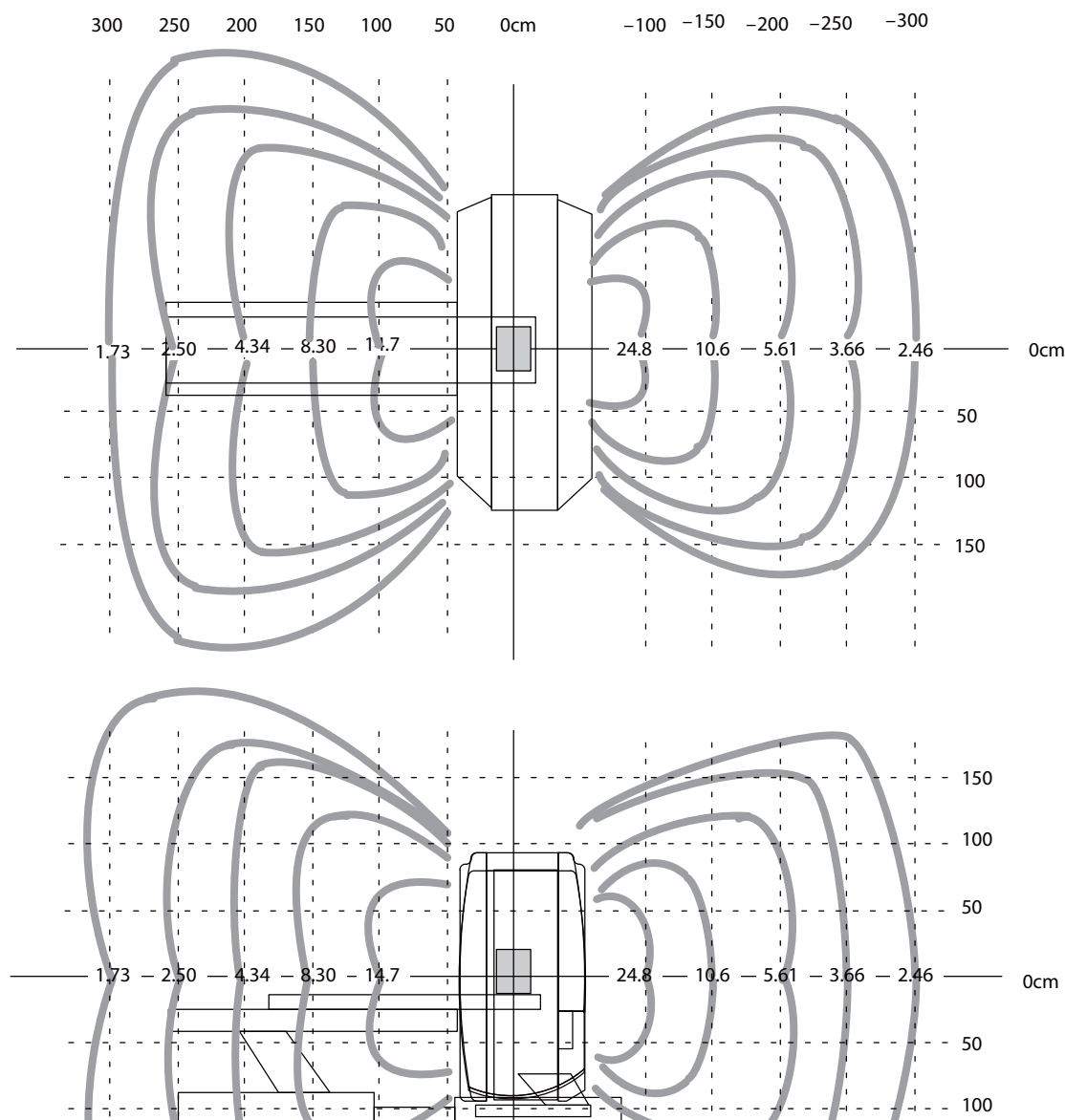
Use correction factors of Table 2-3 to adjust exposure levels to the usual scan technique at your site.

Table 2-3 Shielding Requirements Scaling

Changed Parameter	Multiplication Factor
mA	new mA / 130
Scan time	new scan time / 1.5
Thickness	new thickness / 10
Note : These factors are values with respect to "Typical scatter survey 120kV" (Illustration 2-4).	

2-2 RADIATION PROTECTION (CONTINUED)

Illustration 2-4 Typical Scatter Survey 120kV

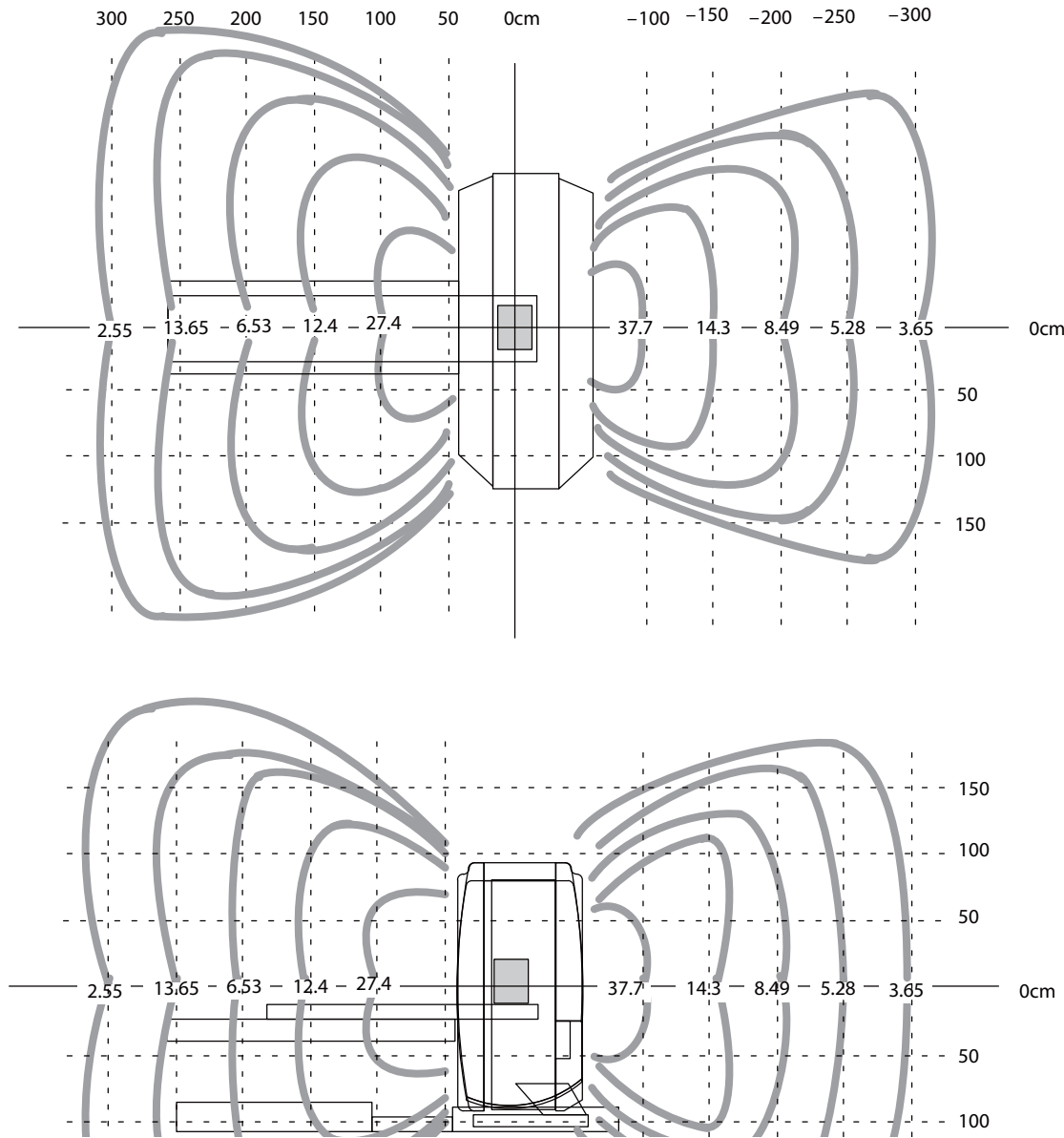


NOTE:
SCAN : 120KV, 130mA, 1.5SEC
1i: 10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs

2-2 RADIATION PROTECTION (CONTINUED)

Illustration 2-5 Typical Scatter Survey 140kV



NOTE:
SCAN : 140KV , 130mA, 1.5SEC
1i: 10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs

2-3 CONSTRUCTION MATERIALS

2-3-1 Floor

Use nonflammable floor material under the Gantry, or place a thin metal plate under the Gantry. Concrete floors must have a minimum strength of $f'c = 1.7 \times 10^3 \text{ N/cm}^2$ at 28 days, for mounting floor anchors.

More, they must have a minimum of 13,000 N as tensile load strength of the anchor.

Each customer must perform appropriate tests to determine concrete strength.

GE provided floor anchors are designed to be used ONLY on concrete floors that meet the concrete floor requirement. Supplied floor anchors must be installed by a trained contractor, and shall be set to a minimum depth of 100 mm for gantry and table at each anchor point.

Mounting Requirements	Gantry	Table
Minimum Floor Thickness (Concrete)	120mm	120mm
Recommended Drilling Depth	100mm	100mm

The Gantry and Table are anchored to the floor by a means that maintains their relative alignment and meets applicable building and other local codes, including seismic structural mounting requirements. It is the purchaser's responsibility to provide an approved support structure and mounting method. GE is not responsible for inadequate support structures or anchoring methods. Table and Gantry mounting dimensions are shown in Illustration 2-8.

The floor structure must withstand both the occupied weight of table and gantry load, as well as the individual contact area loading of these components. Refer to Table 2-4 CT FLOOR LOADING for floor loading specifications.

Gantry and patient Table support areas must rest on solid concrete or other basic flooring, *not* resilient tile or carpeting which slowly yields over a period of time and distorts table to gantry alignment. Avoid the use of carpeting in other areas also, since it generates static electricity and collects dust.

Other factors, including floor sag, must also be taken into consideration while searching for potential causes of misalignment between gantry and table. The cradle can potentially carry a 180 kg (397 lb.) patient, and the center of gravity changes as the cradle cantilevers. Factor in other extraneous moving weights such as personal equipment, (Oxygen tanks, injectors, etc.). Reduce system vibration to a minimum.

No part of the floor surface within the table and gantry, or the two interface areas between table and gantry should be higher than the support area for the table and gantry (Keep floor surfaces level).

The system shall meet all functional and performance specification when placed on a floor which has no greater than 6 mm (0.250") flatness over a 3 meter range, with flatness being defined as the distance between the highest and lowest points on the floor.

2-3-2 Calculation

GE requires calculations by a qualified individual which verify that the site and method of anchoring are adequate to support the loads and maintain table to gantry alignment. Location of supporting beams and columns may effect the positioning of the table to gantry assembly. Use of flush floor ducts or conduits in the floor should be carefully evaluated since it may significantly affect floor strength. Method and placement of anchoring bolts must not reduce structural strength of the floor.

2-3-3 Walls

Consult local building and seismic codes for special wall mounting requirements. Seismic codes may require special seismic kits.

Grounded Wall

Any wall that can be electrically conductive to earth ground. Masonry, concrete, and tile are considered conductive. Additional commonly found aspects of a wall should also be considered grounded. This is not an all-inclusive list:

- Medical gas ports and plates
- Metal doors and window frames
- Water sources and metallic sink structures
- Metallic wall-mounted cabinetry
- Equipment Emergency Off panels
- Industrial equipment (such as air conditioners and vents)
- Expansion joints
- Surface raceway
- Exposed wall conduits
- Floor outlets boxes

The following are not considered as grounded elements of a common wall:

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

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 Operator Workspace position.

Note

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

2-4 CABLING CONSIDERATIONS

Suggestions for running cables are listed below. Please consider the advantages and disadvantages of each method.

Take care to protect interconnecting cables from physical damage (including water). Branch circuit conductors that don't terminate directly to a piece of equipment must be enclosed in a metal raceway or metal wireway.

Regardless of the method chosen, make sure cable runs in the Gantry room, as well as throughout the system, comply with local and national codes.

Prerequisite:

- Gantry Cable Duct



NOTICE

A Gantry cable duct MUST be PREPARED (by a customer) to protect the Gantry system cables. This will be installed at the cable outlet of the left rear bottom of the Gantry during Installation. See Illustrations 2-6 to 2-7.

2-4-1 Floor Duct

Advantages:

- Gives an attractive, finished appearance to an installation
- Easy to access during system upgrades or room expansion
- Easily accommodates preterminated cables
- Recessed floor duct doesn't take up space needed by the customer for supplies and equipment
- Recessed floor duct doesn't pose a safety / trip hazard

Disadvantages:

- Requires a significant amount of work to install, especially in old (existing) installation sites

2-4-2 Raceway

Advantages:

- Surface-mounted raceways offer a practical solution to routing cables in existing installations.
- The entire raceway system contains removable covers, making it easy to add or remove cables
- The raceway can easily accommodate preterminated cables
- It is relatively easy to expand an existing raceway system during an installation or upgrade

Disadvantages:

- Floor-mounted raceways between the Gantry and the wall create safety / trip hazards.
- Wall mounted raceways take up space because they extend into the room area and customers cannot store items "flush" against the walls.

2-4-3 Conduit

Advantages:

- Conduit systems are relatively inexpensive and easily attainable

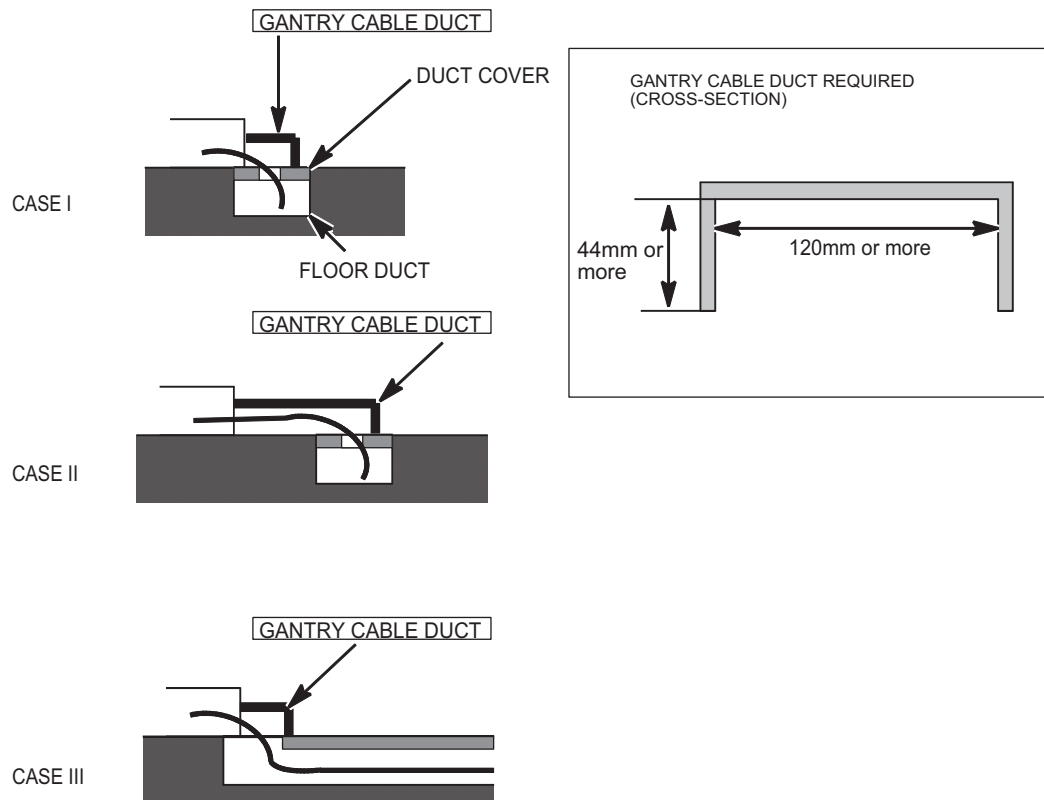
Disadvantages:

- Conduit has a relatively small diameter, which means preterminated cables often do not fit, or catch on previously installed cables (This can *significantly* increase system installation time!)
- Once installed, it is difficult to access or replace cables because conduit usually doesn't have removable covers, and the cables tend to tangle during installation

2-4-4 Gantry Cable Duct

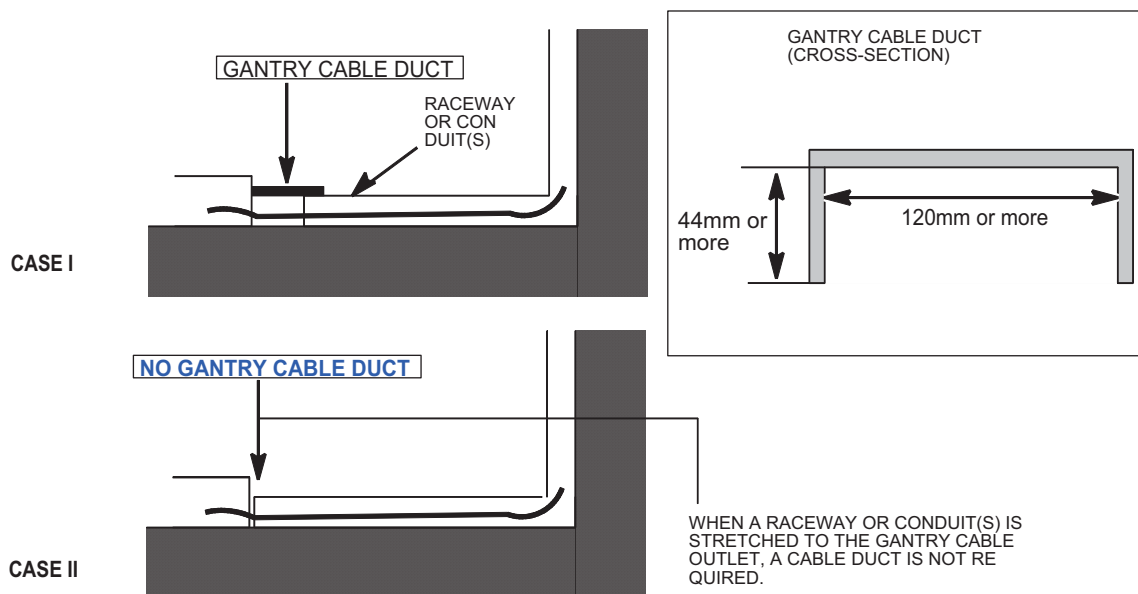
A Gantry Cable Duct must be installed at the cable outlet of Gantry left rear bottom during installation, so that the system cable can be protected against stretch. See Illustrations 2-6 to 2-7.

Illustration 2-6 Gantry Cable Duct when Floor Duct is used



2-4-4 Gantry Cable Duct (Continued)

Illustration 2-7 Gantry Cable Duct when Raceway or Conduit(s) is used



2-5 ARCHITECTURAL REMINDERS



NOTICE

Sulphur contamination. If a film processor is already, or will be, installed near the Gantry room, ensure that no air exchange can take place from the processor room to the Gantry room via air conditioning or other means. Sulphur contaminated air will damage the slip rings.

1. An operator seated at the operator's console must have an unobstructed view of the patient on the table.
2. Provide adequate security for the entire CT suite, including control/equipment and scanning rooms, *prior* to equipment delivery.
3. Do not install any film developer which is not equipped with an exhaust in the vicinity of the scan room to prevent exhaust gas from the developer from entering the scan room.

2-6 FLOOR LOADING AND WEIGHTS

This section contains loading specifications for the CT system. Table 2-4 lists the weights, floor loading and normal mounting methods for CT components. Local or seismic codes may require additional loading capacity for compliance.

The customer is responsible for obtaining approval of existing structural support, or for construction or reinforcement of existing structures to meet compliance requirements.

Table 2-4 CT Floor Loading

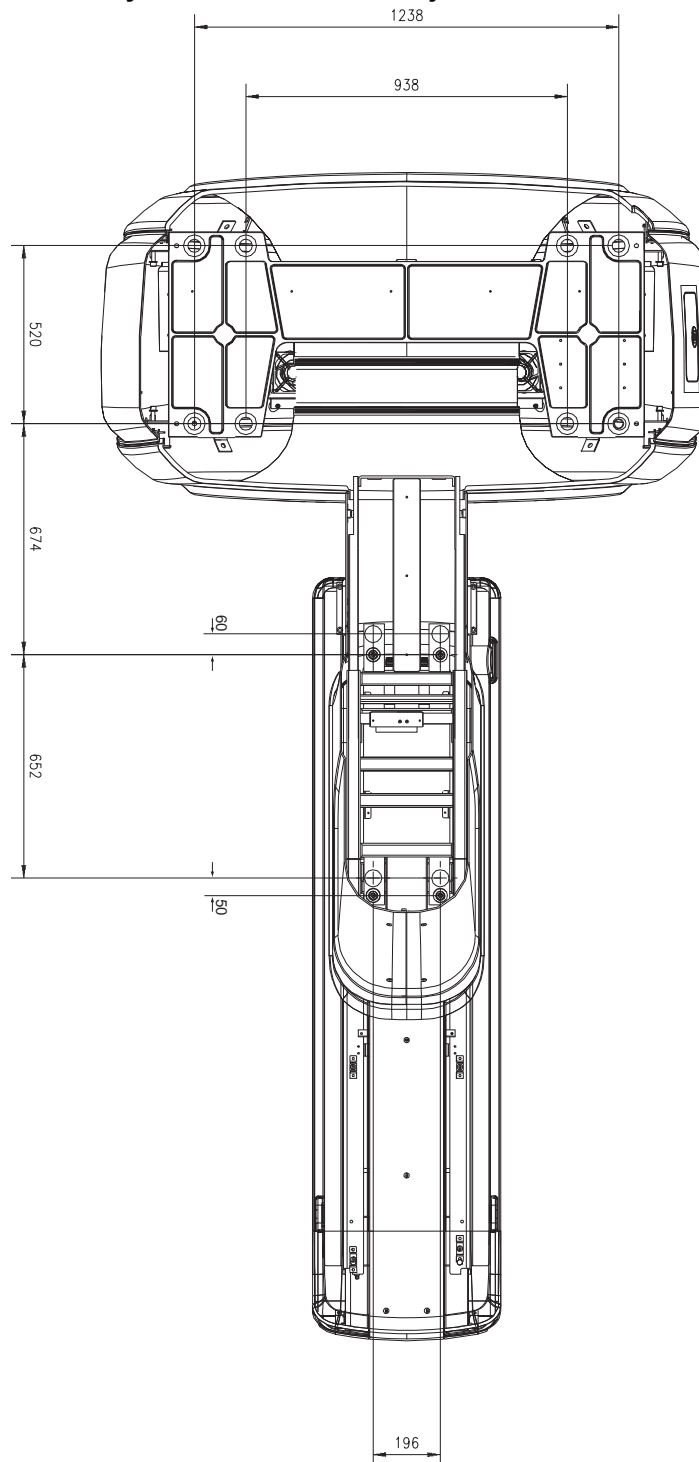
COMPONENT	WEIGHT kg	OVERALL W x D x H m	EFFECTIVE WEIGHT/AREA kg/m ² Note 1	LOAD PATTERN mm	NORMAL METHOD
Scanning Gantry	948	1,784 x 967 x 1,749	1580.2	Four leveling pads 63.5 diameter	Must be anchored to floor
Patient Table (Fix Table)	180	550 x 2,525 x 778	984.4	Four leveling pads 50 diameter	Must be anchored to floor
Patient Table (Up/Down Table)		580 x 2,236/2,536 x 914			Must be anchored to floor
Host PC	less than 30 Note 2	210 x 530 x 440			Set on desk or floor
Adapter	317	711 x 559 x 940		Four casters support areas of 28 x 22 (711 x 559)	Castors are for positioning and service. Set on floor. May be anchored to floor using angle brackets in seismic zones.
Note 1 : Weight/Area is defined as NET Weight/Base Area. Consult a structural engineer for actual loading calculation. Note 2 : Weight and Height do not include the keyboard and LCD. LCD Monitor: 6.5kg, 425 x 206 x 435 mm (W x D x H)					

2-7 COMPONENT DIMENSIONS

2-7-1 System without Up/Down Table

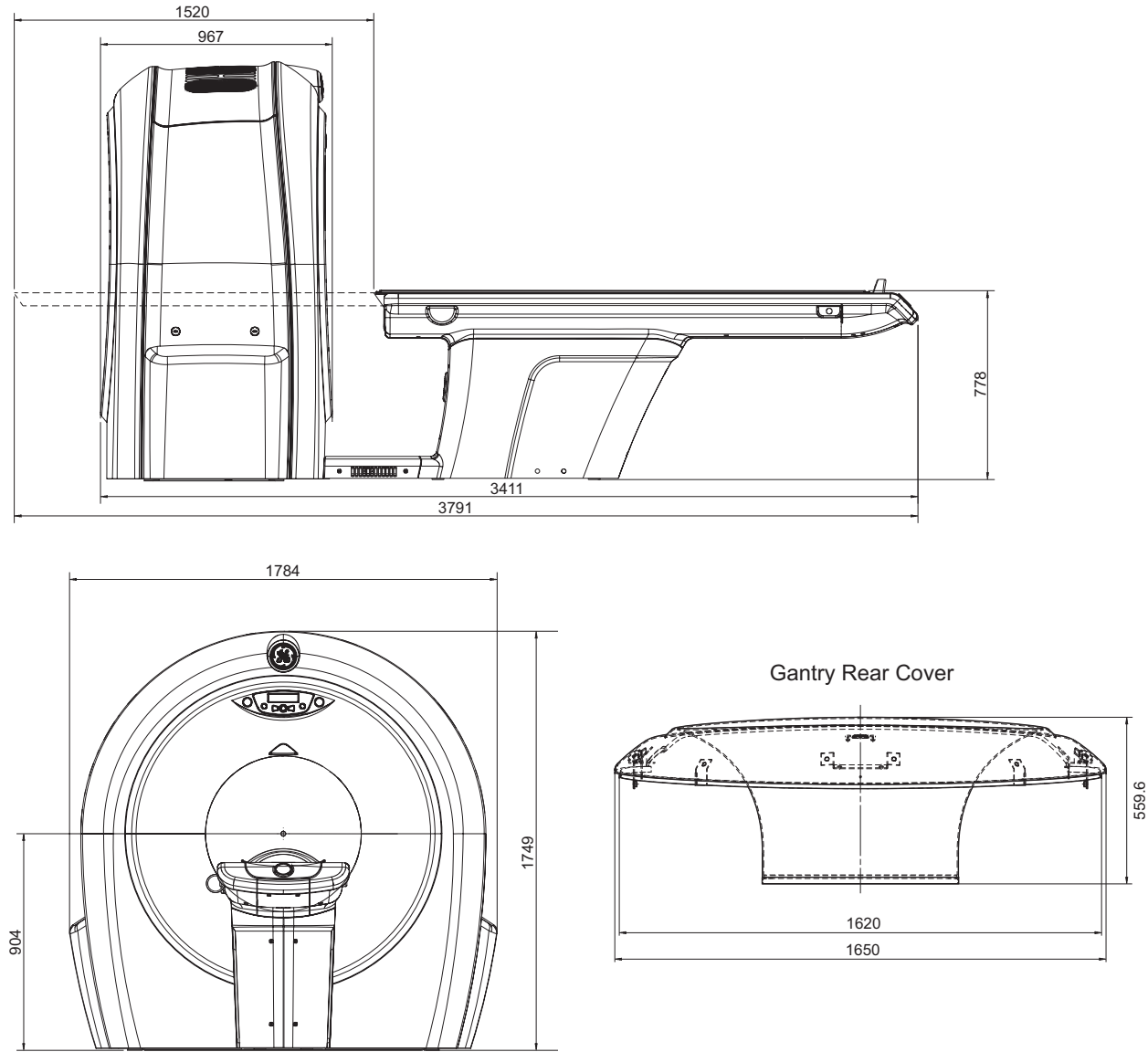
To assist in completing your room layout, refer to component illustrations which follow in this section.

Illustration 2-8 Gantry and Table Anchors/Adjusters



2-7 COMPONENT DIMENSIONS (CONTINUED)

Illustration 2-9 Gantry and Table

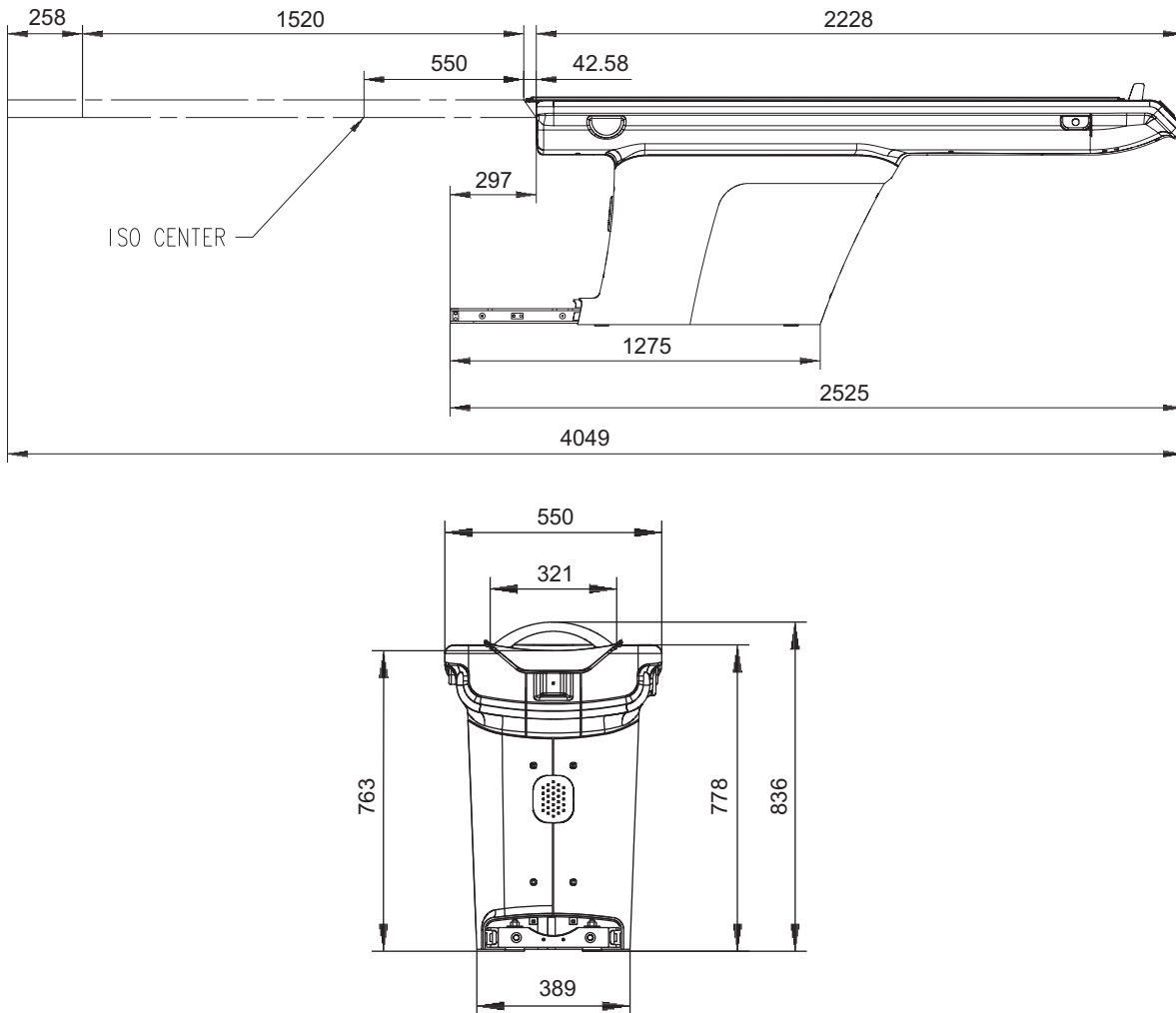


Note

Refer to the Section 6-3, GANTRY CONSIDERATION, for the gantry size including dollies.

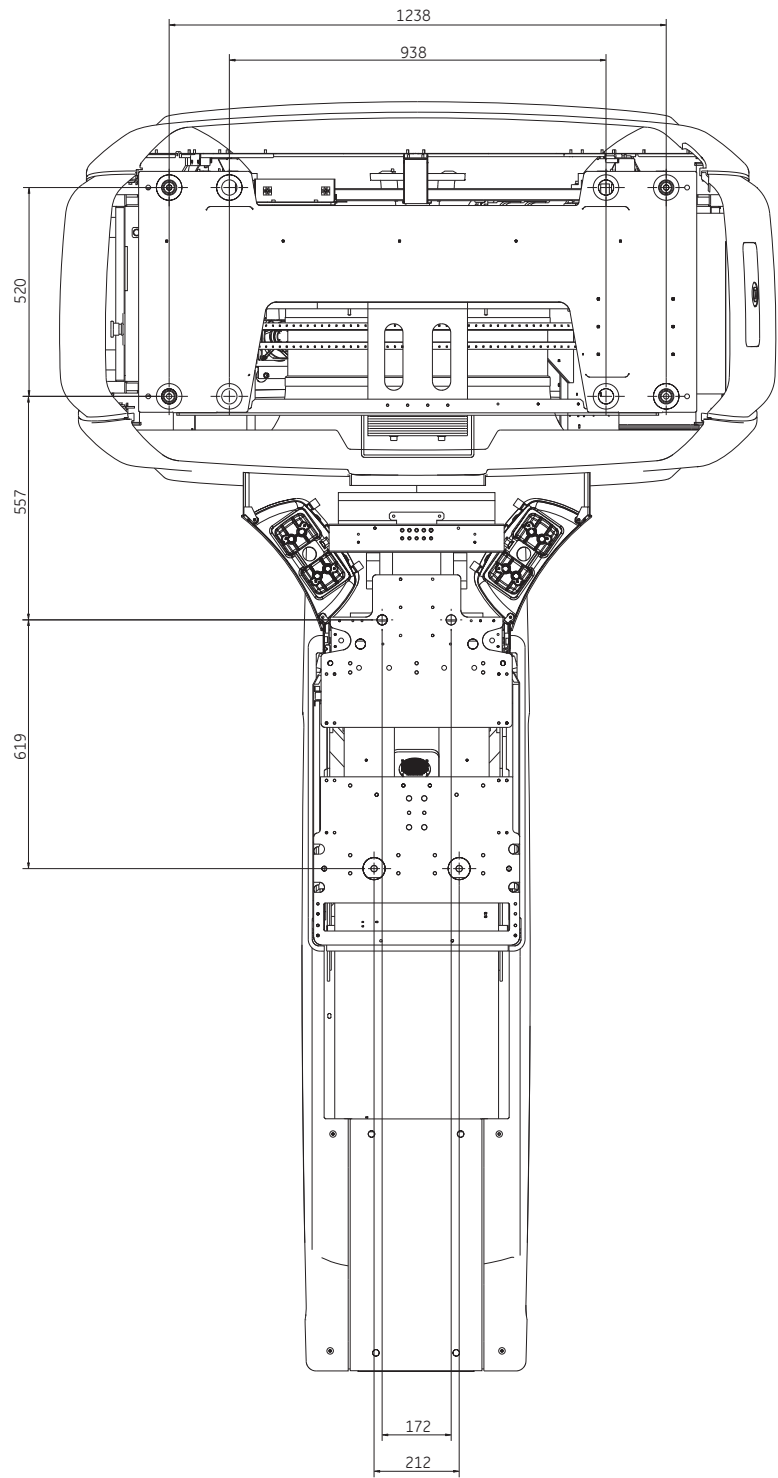
2-7 COMPONENT DIMENSIONS (CONTINUED)

Illustration 2-10 Patient Table



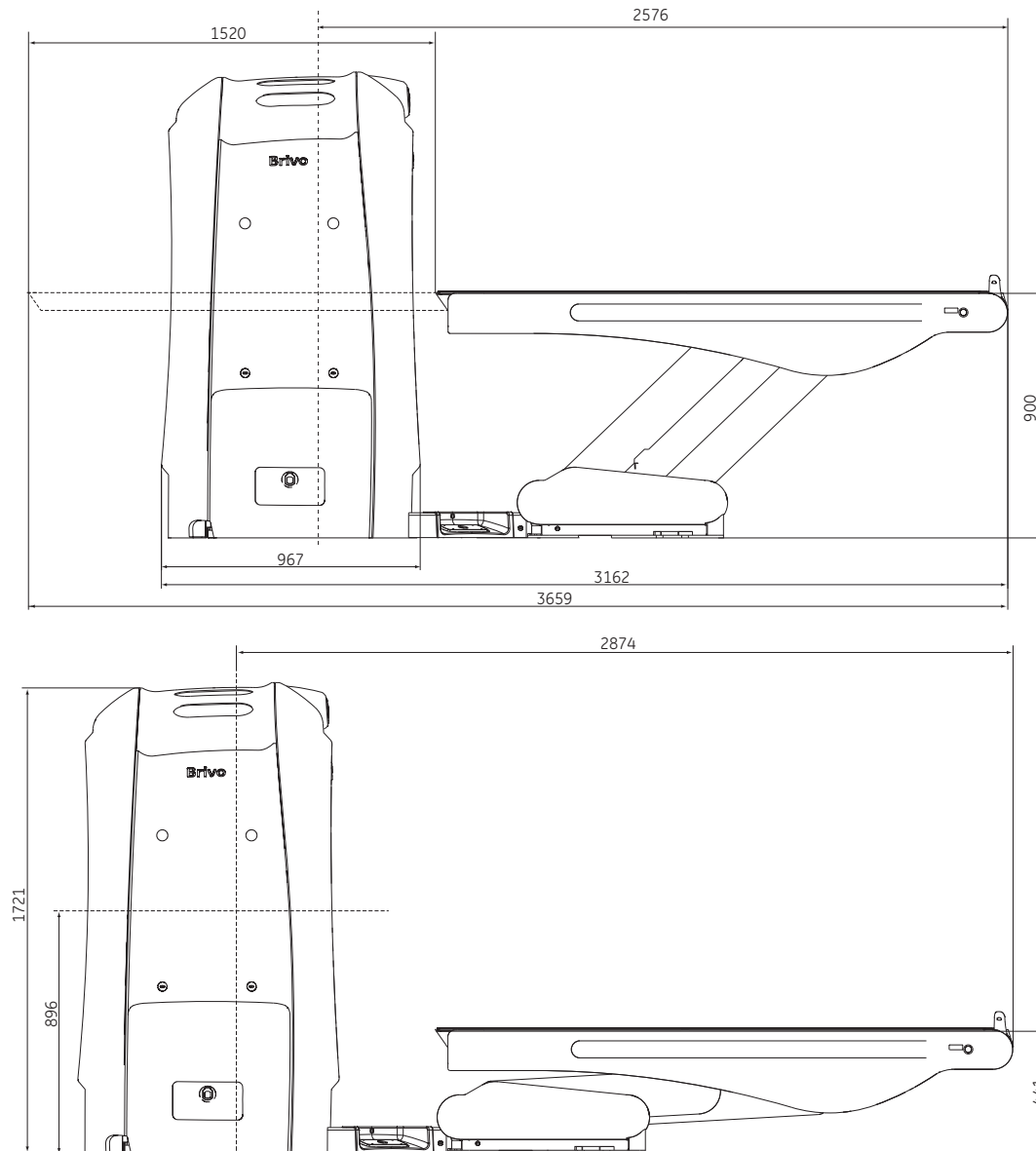
2-7-2 System with Up/Down Table

Illustration 2-11 Gantry and Table Anchors/Adjusters



2-7 COMPONENT DIMENSIONS (CONTINUED)

Illustration 2-12 Gantry and Table



2-7 COMPONENT DIMENSIONS (CONTINUED)

Illustration 2-13 Gantry Cover Size

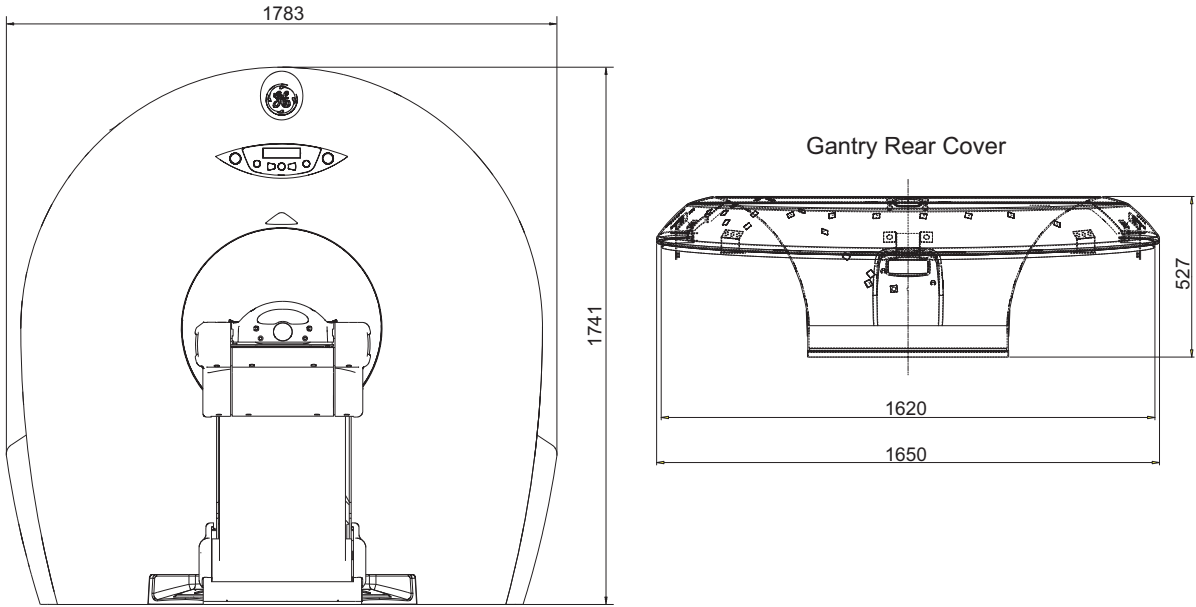
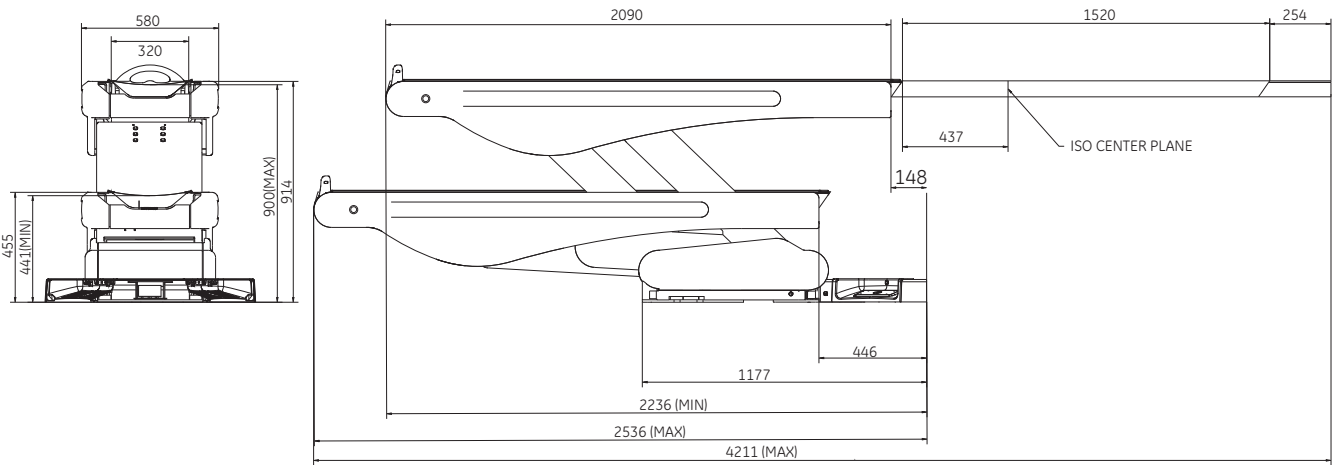


Illustration 2-14 Table Size



SECTION 3 - SITE ENVIRONMENT

3-1 INTRODUCTION

The rating and duty cycles of all subsystems are applicable only if the customer maintains room environment as specified in the following sections. Maintain a constant environment (i.e., holidays, weekends, etc.) to prevent exceeding these restrictions. Shut down the CT system whenever the environment exceeds specification.

GE recommends a dedicated back-up air conditioner for the Gantry / exam room to help maintain a constant temperature in the gantry detector when the building's air conditioner shuts down (failure, P.M., etc.). Do **NOT** install a humidifier in the operator's control room. A humidifier can cause failures by creating moisture on the electronic components.

3-2 TEMPERATURE AND HUMIDITY SPECIFICATIONS

During the installation and start-up of the system you must take continuous temperature checks to make sure the environment meets specifications listed as follows. Excessive temperature, coupled with reduced air flow from clogged filters, may overstress components and cause failures.

GANTRY / SCAN ROOM :

- Temperature : 20°C ~ 28 °C (at least 5 °C/hr gradient)
- Relative Humidity : 30 ~ 70 % RH

OPERATOR'S CONTROL / EQUIPMENT ROOM :

- Temperature : 15°C ~ 30°C (at least 5 °C/hr gradient)
- Relative Humidity : 20 ~ 80 % RH
- Air conditioning of the building may be sufficient.

Take care when locating the air conditioning supply and return ducts do not oppose equipment air flow. Direct incoming air vents toward equipment air intakes, and air return vents toward equipment exhausts.

3-3 COOLING REQUIREMENTS

The Gantry shall not exceed a heat dissipation of 3.5 kW (12,000 BTU/hr). This value does not include people, lights and non-CT equipment. Use cooling Table 3-1 to calculate your cooling requirements for each room.

Table 3-1 CT COOLING TABLE

CT COMPONENT	MAX HEAT OUTPUT		EXAM ROOM		OPERATOR CONTROL ROOM		EQUIPMENT ROOM		OTHER	
	kcal/h	watts	kcal/h	watts	kcal/h	watts	kcal/h	watts	kcal/h	watts
* Gantry	2,600	2,900								
Table	100	120								
Operator Console		860								
Other										
Other										
ROOM SUB TOTALS										
Notes: *Gantry includes tube heat output based on the following typical maximum technique. 1.5 sec, 120 KV, 130 mA, 260 scans/hour For other techniques, calculate the following: $900 + (T \times K \times M \times S \times B \div 4200)$ kcal/h where, T: Scan Time, K: kV, M: mA, S: scans/hour										

3-4 ALTITUDE

The system shall meet all functional and performance specifications when placed in a room that is at an elevation of altitude -420 meters to 3200 meters above sea level. (700~1060kPa)

3-5 LIGHTING

GE recommends a variable, indirect light source for patient comfort in the scanner room. Position lights to reduce reflection in the control room and ease eye strain caused by watching the monitors in subdued light. When using a video camera to monitor patients, increase lighting to at least 500 Lux (5,382 ft.cd.) in the scanner room.

GE recommends a variable light source in the operator's control room. GE also recommends a dual lighting system consisting of fluorescent lighting and tungsten dimmable lighting for both the scanner and control room.

Provide adequate lighting in the equipment room to aid in the service of equipment including the Power Distribution Unit

3-6 NOISE

Install acoustical ceilings, walls, and floors to reduce any background noise from cabinet blowers, etc. Typical noise level readings follow:

COMPONENT	STAND BY	OPERATING
O.C	< 56dB	≤ 56dB
GANTRY	< 70dB	< 70dB
TABLE	< 55dB	< 55dB
Adapter	<50dB	<60dB

3-7 ELECTRO MAGNETIC INTERFERENCE

The ambient static magnetic field within the region of the gantry should not exceed 1gauss (10^{-4} tesla). Ambient AC magnetic field must be below 0.01gauss (10^{-6} tesla) peak.

The ambient static magnetic field within the region of the OC and magnetic media should not exceed 10gauss (10^{-3} tesla).

If you know of, or suspect, the presence of such fields, consult GE Medical Systems personnel for recommendations.

Use the following information to reduce possible Electro Magnetic Interference.

1. The external field strength from a magnetic field source decreases rapidly with the distance from the source.
2. The external magnetic field leakage of a three phase transformer is much less than a bank of three single phase transformers having the equivalent power rating.
3. Large electric motors emit substantial EMI.
4. Steel reinforcing in the building structure can act as an effective conductor of EMI.
5. High powered radio signals can affect computers.
6. There is no substitute for maintaining good screening of cables or cabinets.
7. Ultrasound diagnostics equipment should not be placed in the same proximity as the CT System, poor imaging may result.

3-8 POLLUTION

Thoroughly clean the site prior to equipment delivery. Although individual components have filters for optimum air filtration, take care to keep air pollution to a minimum.

Do not use steel wool to clean tile floors. The fine metal fibers in steel wool can enter enclosures and cause internal shorts.

If carpeting is used, use anti-static carpeting or treat the carpeting with an anti-static solution. Static discharges can cause system failure or affect its operation.

Do not install any film developer which is not equipped with an exhauster in the vicinity of the scan room to prevent exhaust gas from the developer from entering the scan room

3-9 INSTALLING INSITE

Phone Line

When installing the InSite, instruct the customer to have a Direct Inward/Outward Dial voice grade line installed in the operator console room near the OC. The voice grade line interface must use a RJ-11 type phone connector. It is the customer's responsibility to have this phone line properly installed and verified.

Unique IP Address

Obtain a unique IP address; if the customer has already obtained a unique IP address or has their own process to give you one, you may use the one they give you to install InSite.

If the customer has not obtained a unique IP address or would like GE to get one for them, contact your local technical support center.

SECTION 4 - POWER REQUIREMENTS

4-1 INTRODUCTION

The CT system **does not** include a power distribution box (PDB) which distributes necessary power to PDU. Refer to Section 4-2, for power specifications and input requirements for the CT system.

To reduce voltage regulation problems and wiring costs, minimize the cable length between the primary power source and the power distribution unit. When routing cables, keep all phase conductors and ground cabling for a circuit in the same conduit/raceway/duct whenever possible. Route system signal and data cables away from power cables.



NOTICE

Do not route non-system wiring in system ducts or raceways.

4-2 POWER REQUIREMENTS

The power distribution box shall supply the following input power to the system's PDU cabinet. Perform all work in accordance with national and local electrical codes. Refer to Section 4-3.

Configuration : Three-phase + Neutral line with full sized ground wire

Frequency : 50/60 \pm 2% Hz

Voltage : The system shall operate on an electrical power supply with 380V (phase to phase line voltage), and 220V (phase to neutral) nominal input voltages.

Rating (Capacity of Transformer) :50 KVA

Average Power Demand : 15 KVA

Regulation : 5 % max at 50 KVA max power demand (as measured at PDU input terminals)
Feeder Wire size should be calculated to contribute a maximum of 2.5% regulation)

Note

Feeder size should be 22 ~ 35 mm², due to the PDU terminal sizes.

Maximum Voltage Variation : \pm 10 % max from nominal steady state (under the worst case conditions of line voltage).

Input Total Harmonic Distortion : 5 % max

Phase Balance : 3 % max of lowest phase to phase voltage

Voltage Transients : Transients, other than those created by the CT system, shall not be more than 1,000 volts peak with a duration of less than 100 nano seconds.

4-2 POWER REQUIREMENTS (CONTINUED)

Line Impedance Requirements: Apparent line impedance guaranteed by the customer should be equal or less than the following:

Voltage Range (V) 3 phase	Line Impedance (ohms) 50kW	Line Impedance (ohms) 75kW
380	0.15	0.10



NOTICE

Equipment requirements of the system a good ground wire insulation, and must be not less than 50mm² diameter multi-strand copper wire, grounding impedance is less than 2 ohms.

Daily Voltage Variation : + 10 % to - 5 % for 50/60 Hz from nominal steady state (under the worst case line voltage conditions).

4-3 RECOMMENDED POWER DISTRIBUTION SYSTEM

CT system need a separate power supply which can come from one of the below two ways:

- A dedicated transformer of 50kVA.
- Dedicated power supply cables which come directly from terminals of common transformer that has enough redundant capacity for 50kVA.



THE CUSTOMER SUPPLY THE NEUTRAL LINE FROM DISTRIBUTION TRANSFORMER TO POWER DISTRIBUTION BOX CAN NOT BE OPENED. (NO ANY FUSES AND BREAKERS ON NEUTRAL LINE.)

NO ANY OTHER LOADS ON CT POWER SUPPLY.

The customer should supply the cables from distribution transformer to power distribution box, cable diameter should ensure that the line voltage drop is less than 2%. Selected copper line, the following data for reference:

Distance from Distribution Transformer to PDB (m)	<70	<100	>100
Cable diameter (mm ²)	25	35	50

The basic system includes the distribution panel & Installation Transformer. However, a Power Distribution Box (PDB) is not included in the basic system.



The installation of the wall switch should comply with local wiring regulations and should also comply with relevant disconnection standards for all poles.



TO PREVENT POWER LOSS TO OTHER LOADS IN CASE OF AN UNEXPECTED CT OR PET SYSTEM FAULT, THE POWER FEEDER MUST HAVE OVERCURRENT PROTECTION SUCH THAT THE DOWN-STREAM OVERCURRENT PROTECTION DEVICES CLEAR THE FAULT BEFORE ANY UP-STREAM OVERCURRENT PROTECTION DEVICE OPENS.

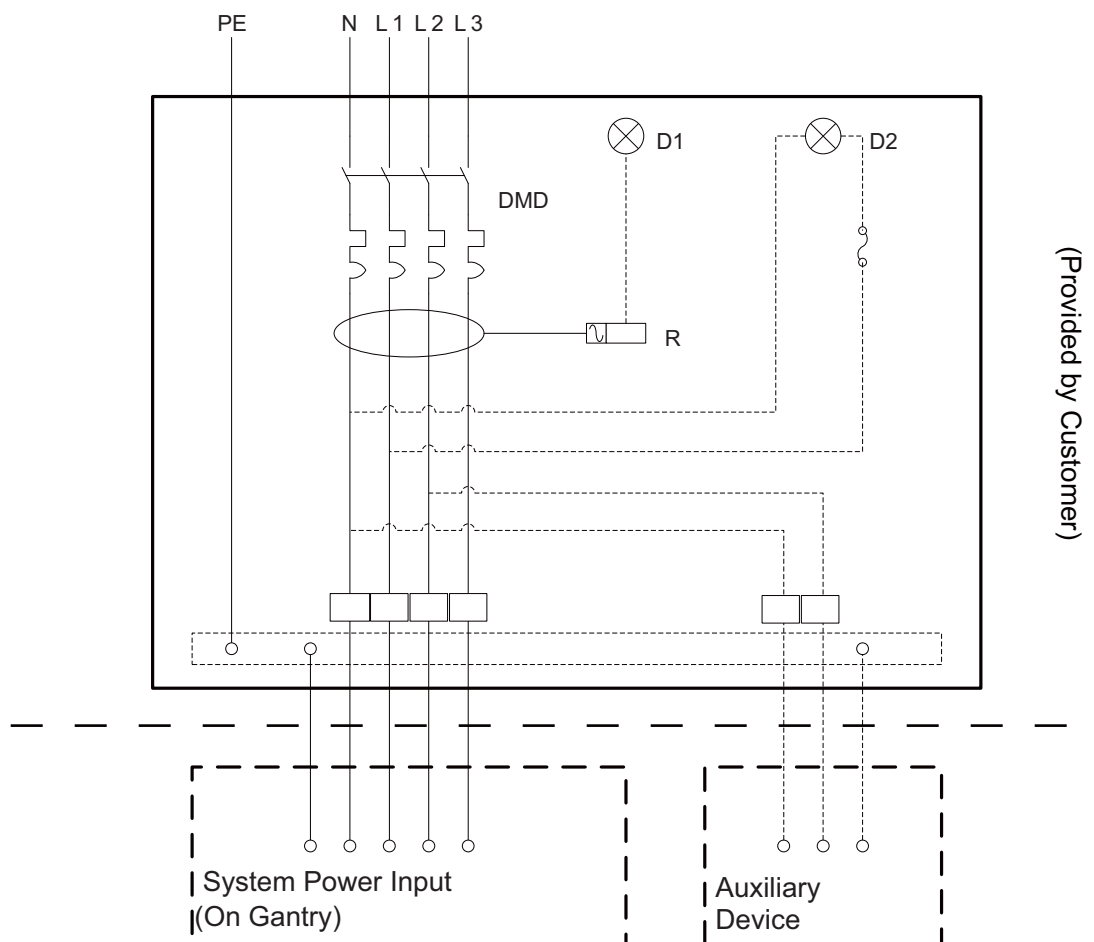
IMPORTANT NOTE:

To avoid cutting off the power of other equipment by unexpected faults of CT system, single-unit installation where the distribution transformer with ELB (Rated current sensitivity: 10 mA or more) and feeder in facility are dedicated to the CT system is recommended.

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4-3 RECOMMENDED POWER DISTRIBUTION SYSTEM (CONTINUED)

Illustration 4-1 Power Distribution Box Interconnect (No Adapter)



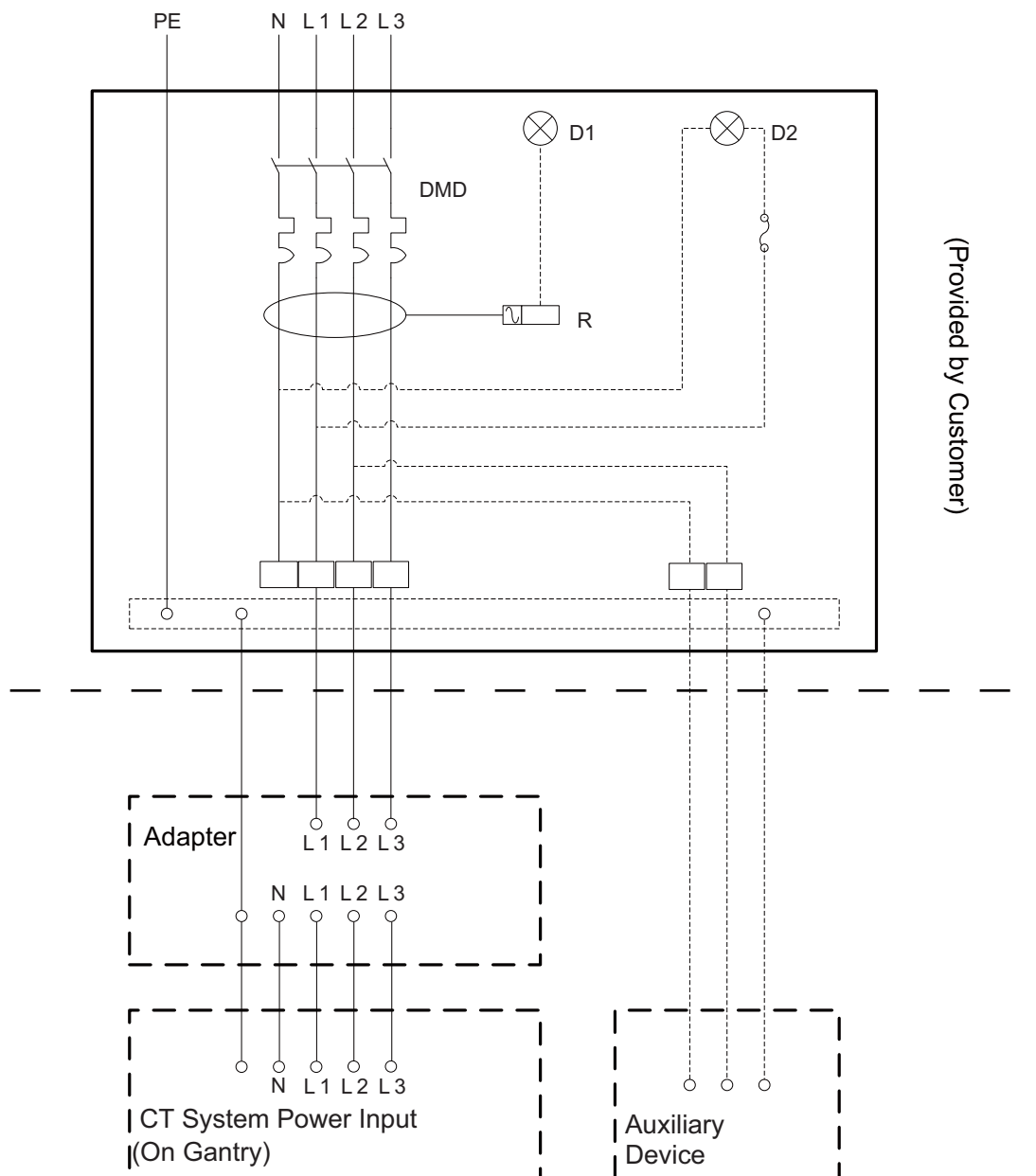
DMD DIFFERENTIAL THERMOMAGNETIC CIRCUIT BREAKER
 R RELAY FOR RESIDUAL CURRENT WARNING
 D1 RESIDUAL CURRENT WARNING INDICATOR
 D2 POWER SUPPLY INDICATOR

AUXILIARY DEVICE

AUXILIARY DEVICE MAY BE CONNECTED WITH CT SYSTEM
 INCLUDING LASER CAMERA, WORKSTATION, ETC.

4-3 RECOMMENDED POWER DISTRIBUTION SYSTEM (CONTINUED)

Illustration 4-2 Power Distribution Box Interconnect (With Adapter)

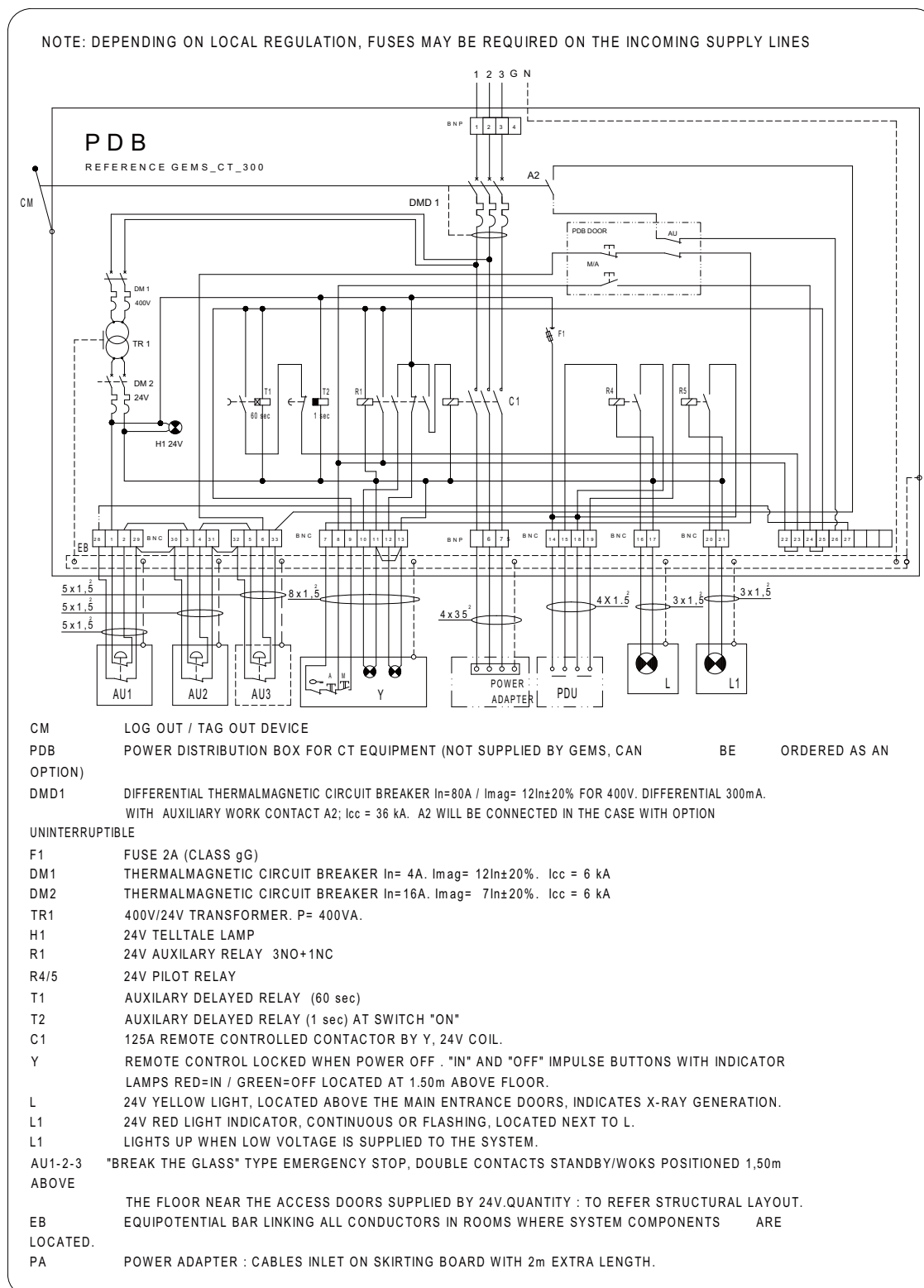


DMD DIFFERENTIAL THERMOMAGNETIC CIRCUIT BREAKER
R RELAY FOR RESIDUAL CURRENT WARNING
D1 RESIDUAL CURRENT WARNING INDICATOR
D2 POWER SUPPLY INDICATOR

AUXILIARY DEVICE
AUXILIARY DEVICE MAY BE CONNECTED WITH CT SYSTEM
INCLUDING LASER CAMERA, WORKSTATION, ETC.

4-3 RECOMMENDED POWER DISTRIBUTION SYSTEM (CONTINUED)

Illustration 4-3 Power Distribution Box Interconnect (for Europe)



4-4 POWER SOURCE MONITORING

Check the facility input power for the proposed system with a power line disturbance monitor for average line voltage, surges-sags, impulses and frequency. Two of the recommended line analyzers designed for unattended monitoring are the Dranetz Model 656 or 626 and BMI Model 4800.

Analysis should span a period that includes at least two weekends, to guarantee the coverage of several days of normal use. Consider the possibility of 'brown-out' conditions in summer as well. Check for the existence of power problems with large power consuming systems (x-ray units, MR system, etc.) or other computer installations at the proposed site, as they may affect the CT system. Review the results of this analysis with your GE representative to determine whether the site needs additional customer provided line conditioning.

4-5 EMERGENCY POWER

Primary power should be distributed from the customer's emergency line-safety power branch to an emergency lighting source in the exam room. Always check national and local codes for other emergency power requirements.

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SECTION 5 - SYSTEM CABLE INTERCONNECTION

5-1 INTRODUCTION

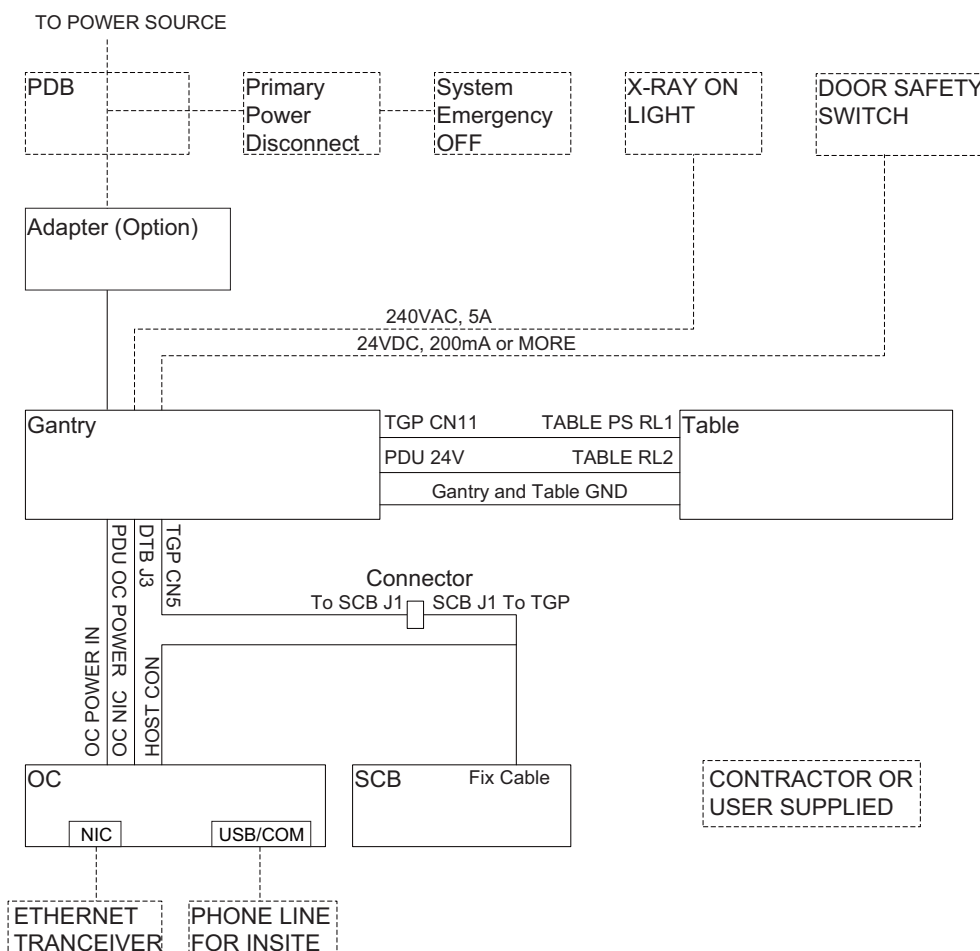
All subsystem cabinets and other components are referred to by their component designators in the diagrams and tables of this section. (For example, the Scanning Gantry is referred to as SG.)

	Component Designator	Component
Basic System	SG	Scanning Gantry
	PT	Patient Table
	OC	Operator Console
	ADAPTER (Option)	Adapter
Customer Supplied	PDB	Power Distribution Box

5-2 SYSTEM INTERCONNECTS

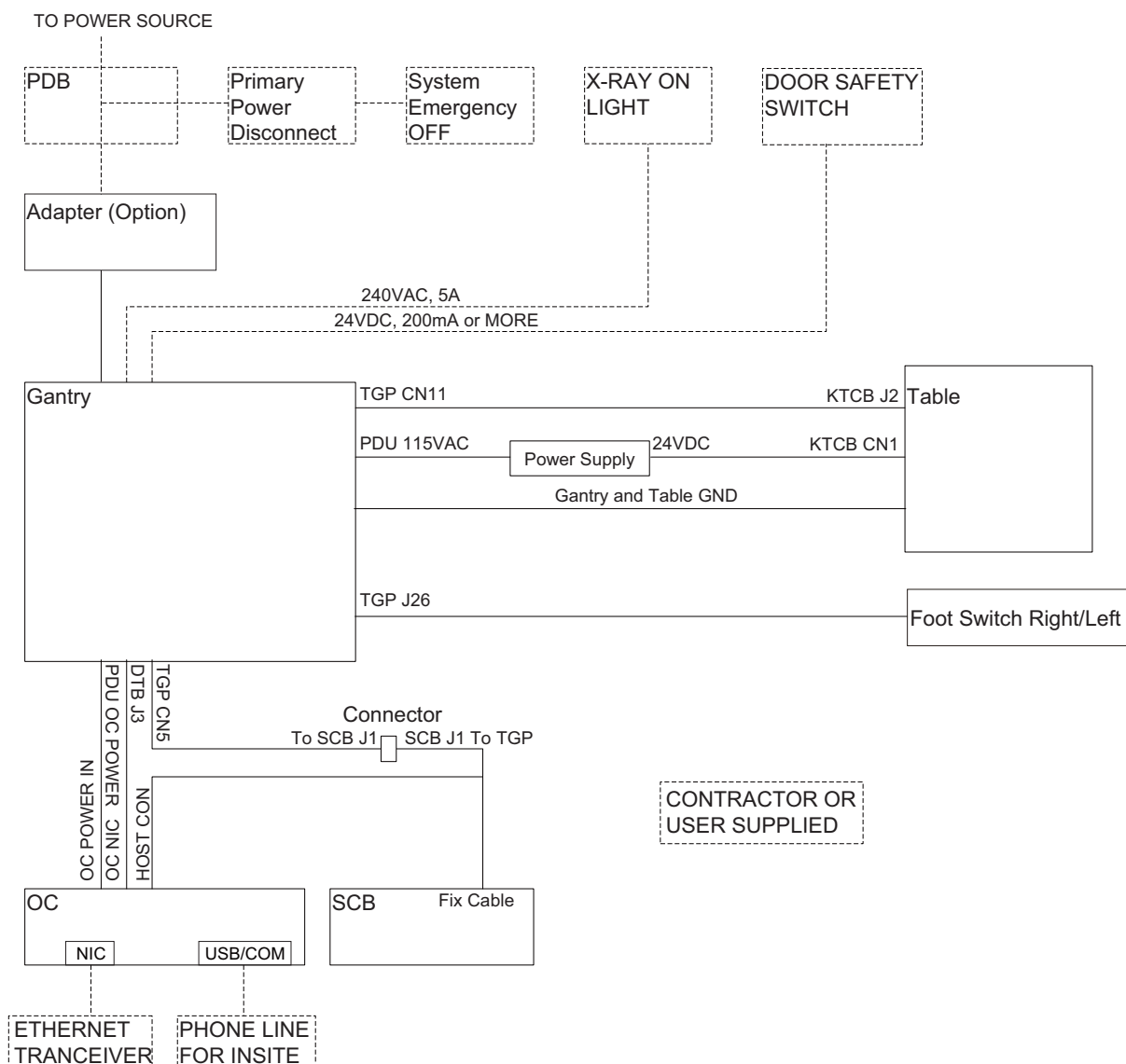
Table 5-1, Illustration 5-1 and Illustration 5-3 contains information on all cable interconnections between basic system components.

Illustration 5-1 System Cable Interconnection for Fix Table



5-2 SYSTEM INTERCONNECTS (CONTINUED)

Illustration 5-2 System Cable Interconnection for Up/Down Table



5-2 SYSTEM INTERCONNECTS (CONTINUED)

Illustration 5-3 System Interconnect Diagram for Fix Table

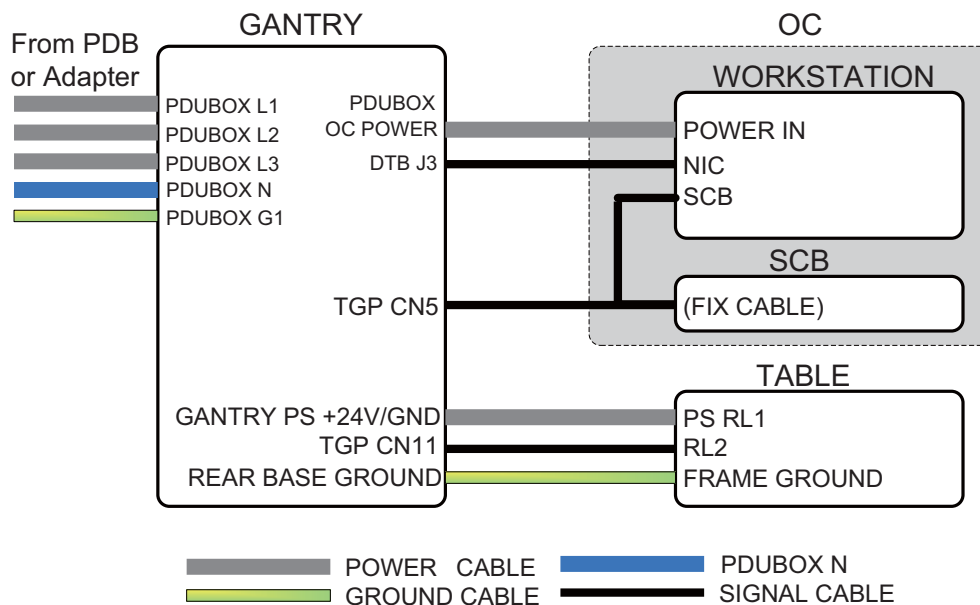
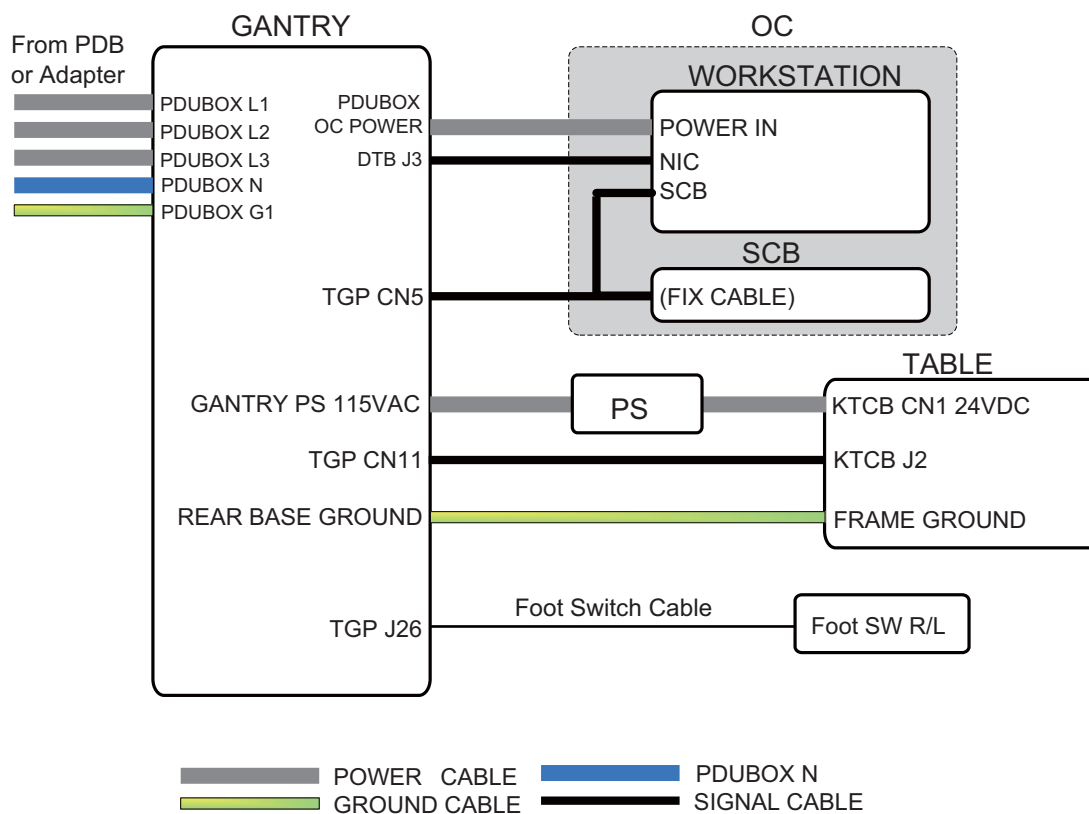


Illustration 5-4 System Interconnect Diagram for Up/Down Table



5-2 SYSTEM INTERCONNECTS (CONTINUED)

**NOTICE****In China, all cables used to provide system power and ground must be CCC certified.****Table 5-1 System Power/Signal Cables**

No	FROM	Part Number	TO	Part Number	Cable Length (m)	Contact Size (mm)	Conductors cross-sectional Area (mm ²)	Rated Voltage	Actual Voltage	Notes
1	PDB	-	PDU (L1, L2, L3, N)	--	--	-	22~35	AC 600V	AC 380V	Customer Supplied (3 Power Cables & 1 Neutral Cable)
		-	(or Adapter) (L1, L2, L3)							
2	PDB	-	Ground	-	-	-	22~35	AC 600V	-	GroundUL1431 Customer Supplied
3*	Adapter	-	PDU	5389328	22	16.5±0.2	-	-	-	Power Cable
4*	Adapter	-	Ground	5389329	22	-	-	-	-	Ground Cable
5*	Adapter	-	PDU	5389330	22	16.5±0.2	-	-	-	Adapter Emergency Stop Cable
6	TGP, CN5	-	SCB, J1	5321390	15±0.4	55.5x17	-	-	-	Signal Cable
7	DTB, J3	-	OC NIC	5321623/ 5321623-2	15±0.2	-	-	-	-	Network Cable
8	PDU, J3	-	LCD1/OC	5332759/ 5332759-2	16.5±0.5	35±0.2 26±0.2	-	-	-	Power Cable
9	Gantry PS RL	-	Table Driver Board 24VDC	5322528	-	-	-	-	-	Power Cable
10	TGP, CN11	5321396/ 5321396-3	Table, RL2	5322518	-	-	-	-	-	Signal Cable for speaker
11	Gantry, GND	5327740	Table, GND	5326620	-	-	-	-	-	Ground Cable

*: These parts with "****" are used with adapter as option.

SECTION 6 - SHIPPING DELIVERY

WARNING

TIP HAZARD !! TOP HEAVY ASSEMBLIES WILL TIP EASILY. USE CAUTION WHEN MOVING EQUIPMENT TO PREVENT TIPPING.

6-1 SHIPMENT

The CT system is packed for overseas air shipment or van shipment with minimum tear-down of components. The system shipment contains cartons, components crated or shipped on skids, and the gantry with shipping dollies attached.

6-2 STORAGE REQUIREMENT

If the CT system goes into storage before installation, store it in a warehouse protected from weather. Storage temperature should not exceed 0° C to +30° C and relative humidity should not exceed 70%, excluding condensation.

Storage duration should not exceed 90 days, if system has been stored for more than three months, you will need to complete a visual inspection, looking for damage due to improper storage. Check for the latest software revisions, options, and component changes. Contact the OLC or CT support central for additional information.

Illustration 6-1 Package Symbols (Storage)



6-3 DELIVERY PROCEDURE

When transporting the CT system, ensure that the system is not exposed to temperatures or humidity outside the following specifications.

Temperature: -40°C to +70°C

Humidity: 10~90% humidity, including condensing



NOTICE

Component freezing occurs if CT system is exposed to temperatures below 0°C for a period longer than two days. Allow a minimum of 12 hours for the CT system to adjust to ambient room temperature, prior to installation. (It's better to keep the CT system in transportation packaging for 12 hours for acclimatization.)

6-4 GANTRY CONSIDERATION

The CT Gantry is shipped without the dolly.

After the system is shipped to field, uninstall the gantry top covers, front and rear covers, and then install the gantry dollies and delivery to scan room.

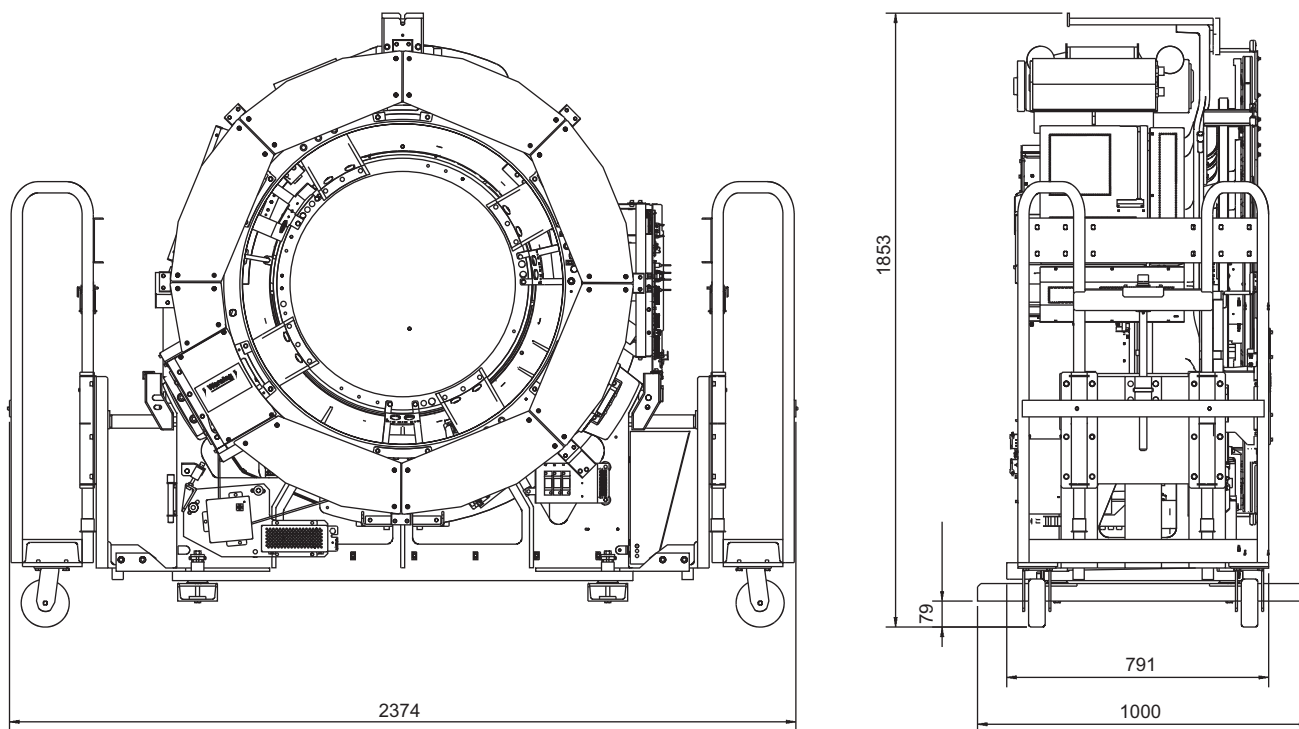
Note

The following dimensions exclude any attached wooden skids.

1. Check elevator weight capacity and size, if one is required to move the CT gantry and table from the point of delivery to the scanning room. The total weight of (Gantry + Dollies) is 1,060 kg (860 kg + 200 kg); the total weight of (Table + Dolly) is 188.5 kg, the total length of (Table + Dolly) is 2,525mm, and requires an elevator at least 2.6m long and 1.1m wide, with the door closed.
2. Use Table 6-1, and Illustration 6-2 to check that the route planned for the Gantry and Table is acceptable.

Table 6-1 Routing Check

	Floor	Height	Width	Length (corners)	Comments
Initial Entrance/ Door					
Hall to Elevator					
Other (Corners, ...)					
Elevator					
Elevator to Hall					
Hall					
Other (Corners, ...)					
Entry to Room					

6-4 GANTRY CONSIDERATION (CONTINUED) (OPTION)**Illustration 6-2 Gantry Dimensions with Dollies**

Gantry Length: 2374mm
High: 1853mm
Width: 791mm(without front and rear cover)
Transportation Support (bottom): 1000mm

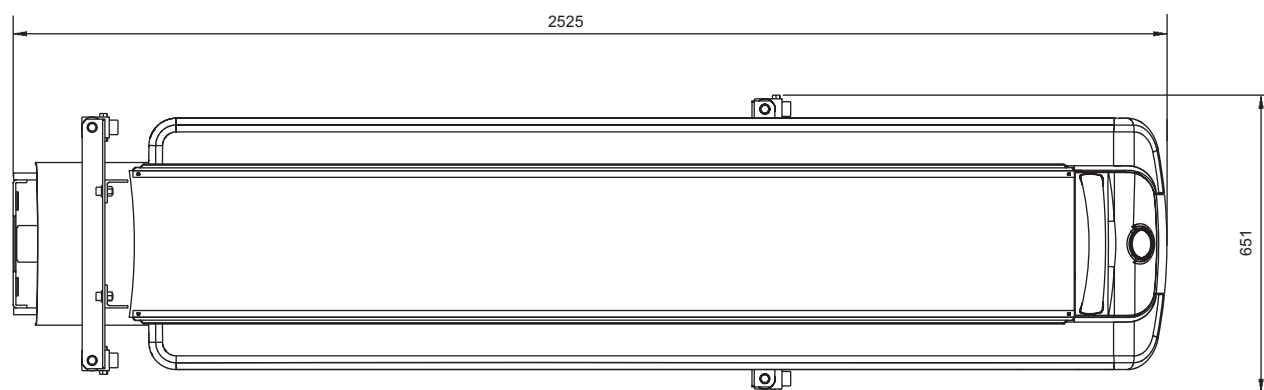


Table Length: 2525mm
Width: 651mm

SECTION 7 - PREINSTALLATION CHECK LIST / TOOLS AND TEST EQUIPMENT

7-1 PREINSTALLATION CHECK LIST

Note

It is important that the system not be delivered unless the site is ready.

SITE NAME: _____	MACHINE TYPE: _____
SITE ADDRESS: _____	ROOM NUMBER: _____
CITY/STATE/ZIP: _____	PHONE NUMBER: _____
SALESMAN: _____	FDO NUMBER: _____
FIELD ENGINEER: _____	DELIVERY DATE: _____
ROOM DIMENSIONS: _____	CEILING HEIGHT: _____

YES	NO	N/A	
_____	_____	_____	- Is the room ready for equipment delivery?
_____	_____	_____	- Were corridors, elevators and doors checked for potential delivery problems?
_____	_____	_____	- Has all older equipment been removed from the scan suite?
_____	_____	_____	- Is the air-conditioning / humidity control operating properly?
_____	_____	_____	- Is all work completed which creates excessive amounts of dirt/dust?
_____	_____	_____	- Is there ample lighting in all rooms of the suite?
_____	_____	_____	- Are the walls painted?
_____	_____	_____	- Is the floor finished?
_____	_____	_____	- Are lockable doors installed on the suite?
_____	_____	_____	- Is space available to store books, phantoms, accessories, tools, etc.?
_____	_____	_____	- Has a Radiation Physicist inspected the room?
_____	_____	_____	- Have seismic code requirements been met?
_____	_____	_____	- Is the correct AC power in place?
_____	_____	_____	- Is the wiring complete according to the drawings in Section 4?







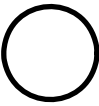



7-1 PREINSTALLATION CHECK LIST (CONTINUED)










YES	NO	N/A	
_____	_____	_____	- Is stranded copper wire, in the correct gauge, used throughout?
_____	_____	_____	- Are outlets available for power tools?
_____	_____	_____	- Are shunt disconnects available and operational?
_____	_____	_____	- Has the AC power been checked with a disturbance analyzer? (Dranetz, etc.)
_____	_____	_____	- Are covers available for all AC panels, cable raceways and duct work?
_____	_____	_____	- Are interconnect cable raceways, ducts, etc. installed where needed?
_____	_____	_____	- Do raceways, ducts, etc. have cable opening/exits at correct locations?




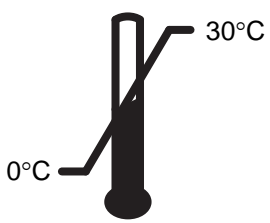

Where does system AC power originate?

[illegible]

APPENDIX A - SYMBOLS AND CLASSIFICATION

Symbol	Publication	Description
	417-5032	Alternating Current
	335-1	Three-phase Alternating Current
	335-1	Three-phase Alternating Current with neutral conductor
		Direct Current
	417-5019	Protective Earth (Ground)
	348	Attention, consult ACCOMPANYING DOCUMENTS
	417-5008	OFF (Power: disconnection from the mains)
	417-5007	ON (Power: connection to the mains)
		Warning, HIGH VOLTAGE
		Emergency Stop

Symbol	Publication	Description
		Type B
	417-5339	X-ray Source Assembly Emitting
	417-5009	Standby
		Start
		Table Set
		Abort
		Intercom
		(on Operator Console) Power On: light on Standby: light off
		Warning sign : Radiation of Laser Apparatus

Symbol	Description
	Microphone (Mic)
	Contrast
	Brightness
	System storage prior to installation: Maintain storage temperature between 0° C and +30° C
 Humidity 0-70% Excluding Condensation	System storage prior to installation: Maintain non-condensing storage humidity below 70% DO NOT store system longer than 90 days
Air Pressure 700-1060hPa	System storage and shipment: Maintain Air Pressure between 700 and 1060hPa

CLASS 1 EQUIPMENT

Any permanently installed equipment containing operator or patient accessible surfaces must provide backup protection against electric shock, in case the BASIC INSULATION fails. In addition to BASIC INSULATION, Class 1 equipment contains a direct connection to a PROTECTIVE (EARTH) CONDUCTOR which prevents shocks when a person touches a broken piece of equipment or touches two different equipment surfaces simultaneously.

TYPE B EQUIPMENT

CLASS I, II, or III EQUIPMENT or EQUIPMENT with INTERNAL ELECTRICAL POWER SOURCES provide an adequate degree of protection against electric shock arising from (allowable) LEAKAGE CURRENTS or a breakdown in the reliability of the protective earth connection.

ORDINARY EQUIPMENT

Enclosed EQUIPMENT without protection against the ingress of water.

OPERATION of EQUIPMENT**CONTINUOUS OPERATION WITH INTERMITTENT LOADING.**

Operation in which EQUIPMENT is connected continuously to the SUPPLY MAINS. The stated permissible loading time is so short that the long term on-load operating temperature is not attained. The ensuing interval in loading is, however, not sufficiently long for cooling down to the long term no-load operating temperature.

EQUIPMENT not suitable for use in the presence of a FLAMMABLE ANESTHETIC MIXTURE WITH AIR or WITH OXYGEN or NITROUS OXIDE

CLEANING

The system is NOT WATERPROOF. It is NOT designed to protect internal components against the ingress of liquids. Clean external system surfaces (Gantry, table, consoles and accessories) with a soft cloth dipped in hot water and wrung DAMP/DRY. (NOT dripping!) IF NECESSARY, use only mild (dish washing liquid) soap to remove dirt.

**NOTICE**

Avoid damage to equipment! Some spray and wipe cleaners etch and permanently cloud clear plastic surfaces!! Use only warm water and mild liquid soap to clean surfaces.

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