GE Medical Systems

Technical Publications

2188540

Revision 26

CT HiSpeed Series Preinstallation

Operating Documentation

WARNING

- **THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.**
- **IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.**
- **DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.**
- **FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.**

AVERTISSEMENT

- **CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.**
- **SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.**
- **NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.**
- **LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.**

WARNUNG

- **DIESES KUNDENDIENST–HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.**
- **FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.**
- **VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST–HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.**
- **WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.**

AVISO

- **ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS.**
- **SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEMS SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.**
- **NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.**
- **LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.**

ATENÇÃO

- **ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.**
- **SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEMS, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.**
- **NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.**
- **O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A‘ CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.**

AVVERTENZA

- **IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.**
- **SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEMS RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.**
- **SI PROCEDA ALLA MANUTENZIONE DELL’APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.**
- **NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL’ADDETTO ALLA MANUTENZIONE, ALL’UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.**

警告

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

注意:

- 本维修手册仅存有英文本。
- 非 GEMS 公司的维修员要求非英文本的维修手册时，客户需自行负责翻译。
- 未详细阅读和完全了解本手册之前，不得进行维修。
- 忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害。

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 everyone 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 material and devices are available. It is urged that such materials or devices be used.

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.

DAMAGE IN TRANSPORTATION

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 General Electric 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.

Call Traffic and Transportation, Milwaukee, WI (414) 827–3449 / 8*285–3449 **immediately** after damage is found. At this time be ready to supply name of carrier, delivery date, consignee name, freight or express bill number, item damaged and extent of damage.

Complete instructions regarding claim procedure are found in Section "S" of the Policy & Procedure Bulletins.

OMISSIONS & ERRORS

GE personnel, please use the GEMS CQA Process to report all omissions, errors, and defects in this documentation. Customers, please contact your GE Sales or Service represenatives.

CAUTION

Do not use the following devices near this equipment. Use of these devices near this equipment could cause this equipment to malfunction.

Devices not to be used near this equipment:

Devices which intrinsically transmit radio waves such as; cellular phone, radio transceiver, mobile radio transmitter, radio–controlled toy, etc.

Keep power to these devices turned off when near this equipment.

Medical staff in charge of this equipment is required to instruct technicians, patients and other people who may be around this equipment to fully comply with the above regulation.

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REVISION HISTORY

REV	Date	Primary Reason for Change
26	07/23/08	changed or Added: Clearance information (Sec. 2–1 to 2–4), OHSA regulation (CR13162300) for Gold Seal
25	09/30/05	PSR13050816 (Added: CCC Compliance Note (Sec 5, Sec 8))
24	6/27/03	Changed for NP–Linux : Noise (Sec 3)
23	6/4/03	Changed for NP–Linux : Options (Sec.1), Room size, Component Dimension (Sec.2), Noise (Sec 3)
22	12/12/02	Changed: Options (sec.1)
21	06/26/02	Changed: Power requirement (sec 4)
20	12/21/01	Added: PDB Notice (sec 4)
19	10/5/01	Added: PDU2 related (sec 2, sec 4)
18	8/10/01	Changed: Maximum Voltage Variation (sec4) Added: HiSpeed Plus (50kVA system) (sec 2, sec 3)
17	7/4/01	Changed: Option list (sec 1)
16	12/22/00	Changed: kVA (sec4) Removed: Hoist rings for PDU (sec2) Added: Cable rated and actual voltage (sec 5) LCD monitor for Ebisu+ (sec 2)
15	10/27/00	Added: Position of the OC anchor plate for Mobile (Sec 8),
14	7/6/00	Colored: (Introduction), Sec. 2, 3, 4, 5, 6, 7, 8, Appendix A. Removed: ‘Contents’ pages. Updated: The Gantry Dolly is changed to a new type. The system will be shipped with Software installed. Adopted the new revision control to other pages with REV 14.
13	5/19/00	Ebisu, mobile information, Twin
12	3/10/00	Mobile information
11	2/25/00	PDB Power Cable,
10	2/04/00	Radiation Protection
9	12/17/99	IRIX OS release note, Radiation Protection,
8	10/19/99	PDU specifications, Mobile anchor dimension, others
7	8/13/99	NP++, Ebisu, Mobile
6	4/01/99	Customer supplied cable dia. changed, Power requirementes, Interconnect list, Option List, Cable Inlet location, Cover Color Code,
5	11/30/98	Power requirement, Short–Foot–Print mode
4	8/31/98	Cooling Specification, IMS function
3	7/10/98	Lock out/Tag out description, Gantry Dolly
2	5/21/98	Service Area
1	4/10/98	Several Modifications
0	3/27/98	Initial Release

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 Medical Systems 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 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 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

WARNING

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 from15 – 30 degrees 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

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1-1 SYSTEM

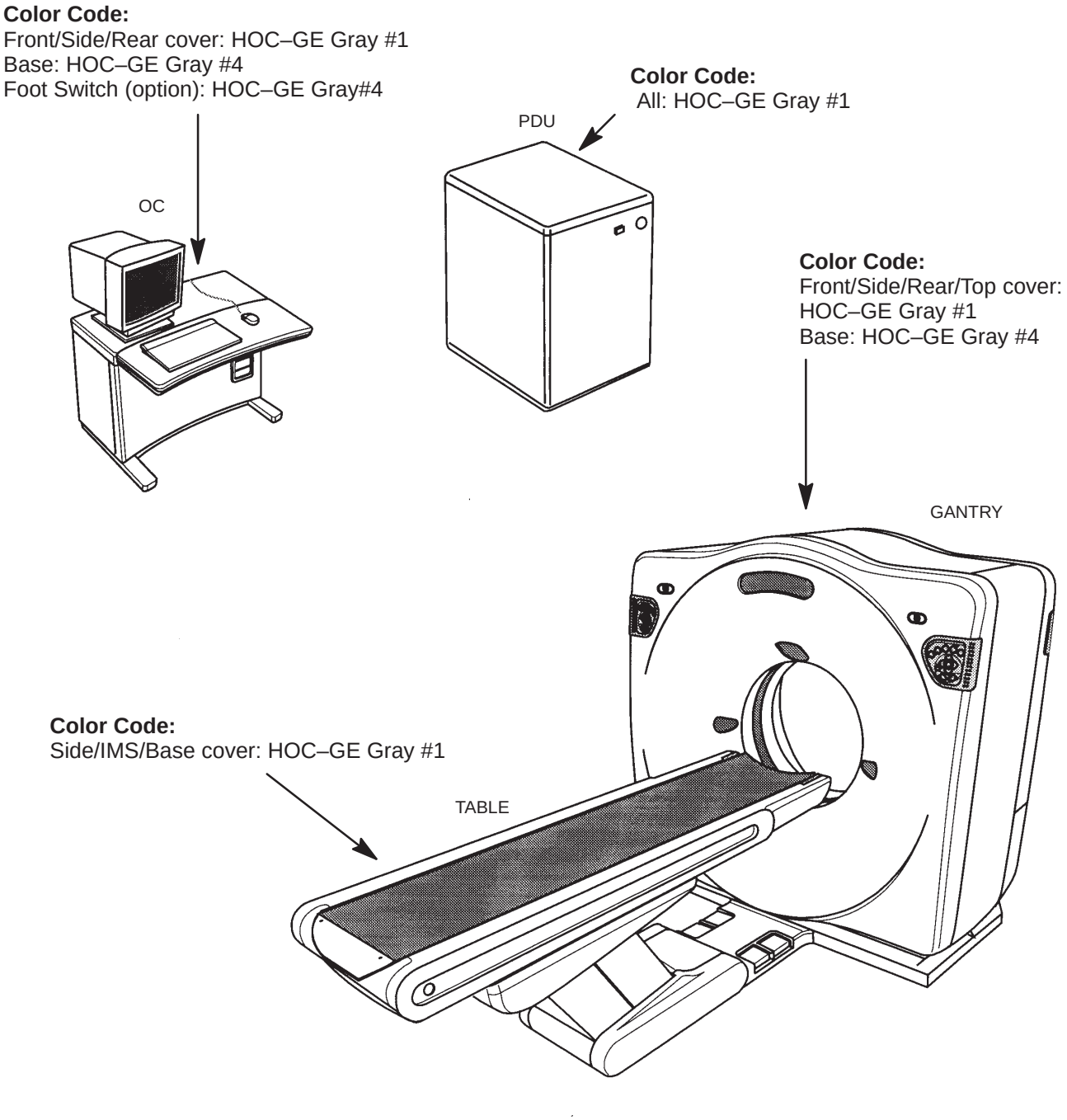
The Standard System consists of the following major components (see also Illustrations 1–1) :

- Patient Table
- Scanning Gantry containing X-ray tube, data acquisition system, X-ray generator, detector and Table/ Gantry processor.
- Operator's Console mainly consisting of:
  - 21" Color Monitor
  - keyboard and Mouse
- Power Distribution Unit (PDU)
- Patient Accessories such as:
  - Cradle Extender
  - Cradle Pad
  - Head/Knee Support Set
  - Head Holder Sets (Standard, Flat, or Coronal)
  - Phantom Holder Set
  - Patient Strap Set
  - Arm Board Set
  - Bag Holder

1-1 SYSTEM (continued)

- Service tools and accessories consisting of:
  - Service Tool kit
  - Gantry Service Tool (for Front/Rear cover replacement)
  - G-SAG Pin
  - X-RAY Tube Hoist
  - HV Spanner Wrench
  - X-RAY Beam Film Holders (one set of 3) for Beam–On–Window
  - Console chair
  - Anchor set (For Table/Gantry/PDU/OC)
  - Operator Manual, Service Manuals in English
- Installation Accessories consisting of:
  - Anchor Bolts
  - System Cables (See Section 5)
  - Hardware Key for Maintenance
- Phantoms consisting of:
  - 25 cm water
  - 42 cm polypropylene
  - Quality Assurance Phantom (Europe and U.S.A. only)
  - Phantom holder
  - XT Phantom

1-1 SYSTEM (Continued):



STANDARD SYSTEM COMPONENTS AND COLOR CODE
ILLUSTRATION 1–1

1-2 OPTIONS

The following option list shows items impacted to CT HiSpeed System Preinstallation. For more information, refer to the related option manual. (* indication attached in front of part number means that this is an option for the system with Linux–PC OC.)

Option	Manual Part Number	Items impacted to System Preinstallaion
0.5mm Slice scan	2294244–2 *2294244–3	None
3D	2208112–2 *2208112–3	None
Additional MOD Drive	2208093–2	None
Advanced IQ(FOV50) Option	2218339–2 *2218339–3	None
Advanced Vessel Analysis Option	*2381581	None
Asymmetric Scan	2294245–2 *2294245–3	None
Breath NAVI	2247803–2	None
Breath/Tilt Attachment	2247805–2	None
Camera Interface	2208088–4 2208089–4	None
Class C Service tool	2253520	None
ConnectPro	2221131–2 *2221131–3	None
CRT Monitor	2289378–2	None
CT Colonography Option	*2381580	None
Denta Scan	2208114–2 *2208114–3	None
Exposure Signal Output	2236571–2	None
Ext. Raw Data Disk (A or B)	2295267–2 2295268–2 *2208096–3	None
Ext. Image Disk 20K (A or B)	2295270–2	None

1-2 Options (Continued)

Option	Manual Part Number	Items impacted to System Preinstallaion
Fast Scan	2208101–2 2208102–2 2301476–2 *2208101–3 *2208102–3 *2301476–3	None
Helical Option	2208103–2 2208104–2 2208105–2 *2208104–3 *2208105–3	None
High Speed Recon	2208090–2 2208091–2 2208092–2	None
High Throughput Option	2225482–2	None
Hyper Cooling	2218338–2 *2218338–3	None
Intercom Foot Switch	2208094–2	None
InSite	2212867	Telephone line or broadband connection device
Language Option (European/China)	——	None
Laser positioning	2238772–3	None
LCD Monitor	2289379–2	None
Memory	2236956–2 *2381879	None
MPPS (V7 ConnectPro)	2365817–2	None
Navigator	2208115–2 *2208115–3	None
NX/I Linux OC Assy Option	*2381880	Linux OC. Refer to Section 2 Componet Dimensions of this manual.
Perfusion (A or B)	2294248–2 2295264–2 2295265–2 *2295264–3	None

1-2 Options (Continued)

Option	Manual Part Number	Items impacted to System Preinstallaion	
Power Option	2208098–2 2208099–2 2208100–2 2229118–2 *2208099–3 *2229118–3	None	
Prescribed tilt option	2247804–2	None	
Prospective Cardiac	2352098–2 *2352098–3	None	
Rear Control Panel	2201005–2	None	
Respiratory Gating	2295272–2 *2295272–3	None	
Side cover for Cardiac	2365816–2	None	
Smart Helical	2208116–2	None	
Smart Prep	2221130–2 *2221130–3	None	
SmartView	2224106–2(LCD) 2224105–2 (CRT) *2224106–3 (LCD) *2224105–3 (CRT)	CRT monitor with cart Dimension (H x W x D) Weight	1,524 x 762 x 850 mm 88.5 kg
		LCD monitor Dimension (H x W x D) Weight (LCD monitor + Column + Arm)	440 x 517 x 80 mm 22 kg
		Cooling Requirement	600 BTU/h (for CRT) 300 BTU/h (for LCD)
Slave Monitor	2214498–2	Power cable length	25 m (OC – PDU)
		Monitor Dimension (H x W x D) Weight	505 x 487 x 519 mm 28.5 lg
		Power Consumption	160 W
Smart Addition	2295266–2	None	
Smart Recon	2229799–2 *2229799–4	None	
Swedish Keyboard	2261452–2	None	
UPS option	2231576–2	H x W x D Weight	252 x 142.5 x 400 (mm) 12.93 (kg)

1-2 Options (Continued)

Option	Manual Part Number	Items impacted to System Preinstallaion
V7 Version Up kit	2365818–2	None
Volume Rendering Option	*2381579	None

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SECTION 2 – ROOM LAYOUTS

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2-1 REQUIRED SYSTEMS CLEARANCES

Note

Consult your local GE Sales and Service Representative about your specific needs

Some possible room size dimensions are shown in the table below.

Additional component dimensions are available in Illustration 2–19 through Illustration 2–26 of this document. Consult your local General Electric Project Manager of Installation (GE PMI) for your appropriate room specifications.

For equipment clearance requirements, refer to Section 2-2. Remember, sufficient Regulatory and Service clearances must be maintained around equipment for full operation, service and safety.

Cable length is an important consideration in room layout. Note also, that where possible, the cables should enter the gantry from the rear, utilizing the rear cable cover assembly. Alternate cable entry is possible at the center of the gantry (refer to the Installation template).

- Excess cable length cannot be stored behind the operator console or PDU.
- A long cable must not be cut or shortened.
- Excess cable may be stored in the cable wall or floor duct, provided sufficient space is available.
- All NEC 70–E Electrical Regulations regarding conduit or duct fill must be observed.

Table 2–1 Room Dimensions

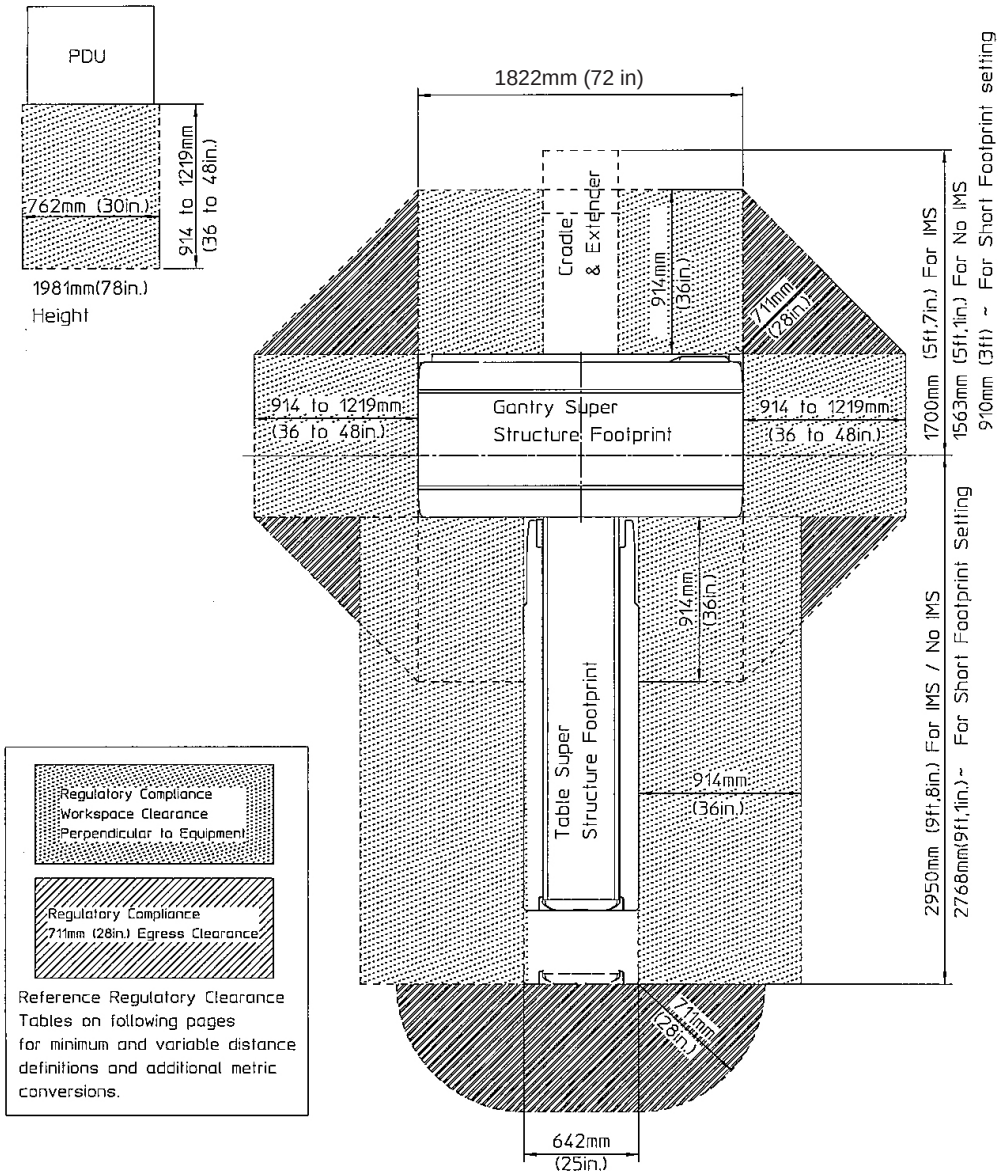
Typical Scan Room	Recommended Control Room
5.0 x 5.0 m (16 ft 5 in x 16 ft 5 in)	2.5 x 1.7 m (8 ft 2 in x 5 ft 7 in)

2-2 REGULATORY CLEARANCES

MINIMUM CLEARANCES UNDER U.S. FEDERAL REGULATIONS AND NATIONAL STANDARDS:
29 CFR 1910 (OSHA),
NFPA 70E (STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE)
NFPA 101 (LIFE SAFETY CODE):

Illustration 2–1 is a map of clearance requirements for U.S. regulatory compliance. See clearance tables on the following pages for detailed dimensional clearances. Please note: all systems installed in the United States must comply with all Federal and local regulations. For installations outside the United States, country–specific or other local regulatory clearance requirements must be met.

Illustration 2–1 Regulatory Clearance Requirements for System Configurations



2-2-1 Regulated Minimum Working Clearance by Major Subsystem

- Requirements apply to equipment operating at 600 V or less, where examination, adjustment, servicing, or maintenance is likely to be performed while live parts are exposed.
- Direction of Service Access is defined as perpendicular to the surface of the equipment being serviced.
- Required regulatory clearance distances must be maintained and may not be used for storage. This includes normal system operation as well as service inspection or maintenance.

Table 2–2 Console

Work Space Requirement	Minimum Clear Space in Inches	Additional Conditions
Direction of Service Access	N/A No exposed live part hazards	

Table 2–3 PDU

Work Space Requirement	Minimum Clear Space in Inches	Additional Conditions
Direction of Service Access (Front of PDU)	914 mm (36 in.)	1219 mm (48 in), if exposed live parts of 151 – 600 volts are present on both sides of workspace with the operator between. 1067 mm (42 in), if opposite wall is grounded and exposed live parts of 151 – 600 volts are present.
Service Access Width (Left–Right of workspace)	762 mm (30 in.)	This is the width of the working space in front of the equipment. 762 mm (30 in) min or the width of the equipment, whichever is greater.
Head Clearance	1981 mm (78 in.)	The height of the workspace measured from floor at the front edge of equipment to ceiling or overhead obstruction(s). 1981 mm (78 in) or height of equipment, whichever is greater.

Table 2–4 Gantry

Work Space Requirement	Minimum Clear Space in Inches	Additional Conditions
Direction of Service Access (All sides)	914 mm (36 in)	1219 mm (48 in), if exposed live parts of 151 – 600 volts are present on both sides of workspace with the operator between. 1067 mm (42 in), if opposite wall is grounded and exposed live parts of 151 – 600 volts are present.
Service Access Width (Left–Right of workspace)	762 mm (30 in)	This is the width of the working space in front of the equipment. 762 mm (30 in) min or the width of the equipment, whichever is greater.

2-2-1 Regulated Minimum Working Clearance by Major Subsystem (Continued)

Table 2–5 Table

Work Space Requirement	Minimum Clear Space in Inches	Additional Conditions
Direction of Service Access (Table Head)	N/A	N/A
Direction of Service Access (Table Sides)	914 mm (36 in)	*Can be reduced to 711 mm (28 in) provided a written and signed approval is obtained by the local team from the local AHJ (Authority Having Jurisdiction). Signed document must be on file within GE.
Direction of Service Access (Table Foot)	711 mm (28 in)	457 mm (18 in) minimum for Front Gantry Cover removal only if unobstructed egress space of 711 mm (28 in) is maintained around the equipment for room exit. This also means no trip hazards exist along the path of egress.
Service Access Width (Left–Right of workspace)	762 mm (30 in)	This is the width of the working space in front of the equipment. 762 mm (30 in) min or the width of the equipment, whichever is greater.

2-2-2 Terms and Definitions

EGRESS: The path of exit from within any room. U.S. regulatory requires a minimum of 711 mm (28 in) of continuous and unobstructed space including trip hazards along the path of exit.

WORK SPACE: This is the dimensional box required for safe inspection or service of energized equipment. It consists of depth, width, and height. The depth dimension is measured perpendicular to the direction of access. U.S regulation is minimum of 914 mm (36 in). Additional conditions can increase the minimum requirement. FCT defines this as the envelope of the component increase the minimum requirement. FCT defines this as the envelope of the component superstructure. For the NGPDU it is with the front panel removed. For the gantry and table, it is with the patient or external covers removed.

SERVICE ACCESS WIDTH: This is the width of the working space in front of the equipment, a minimum of 762 mm (30 in), or the width of the equipment, whichever is greater.

HEAD CLEARANCE: This is the height dimension of “Work Space”. The height of the workspace measured from floor at the front edge of equipment to ceiling or overhead obstruction(s), 1981 mm (78 in) or height of equipment, which ever is greater.

2-3 ADDITIONAL REGULATORY CLEARANCE INFORMATION

2-3-1 Regulatory Caution

Site prints are required for all system installations including relocation and moves. CT room layout, as shown on your site print, shall meet all regulatory requirements as described in the installation manual. Additional room components, such as cabinets, reduce room size. Equipment not shown on the site print may void the caution statement, making the room non–compliant. Actual site measurements before installation will be taken to determine room size and compliance.

2-3-2 Egress Clearance

Egress requires a clear, unobstructed route out of the room, either around the back of the gantry or around the back of the table. If your egress route is not around the back of the table, maintain 457mm (18 in) of clearance between the back of the table, with a continuous width of 3200 mm (126 in), 1600 mm (63 in) on each side of the table center line, on each side to any obstruction so that the front cover can be removed. Refer to the Pre–Installation manual for more details on service clearances.

2-3-3 Operational Caution

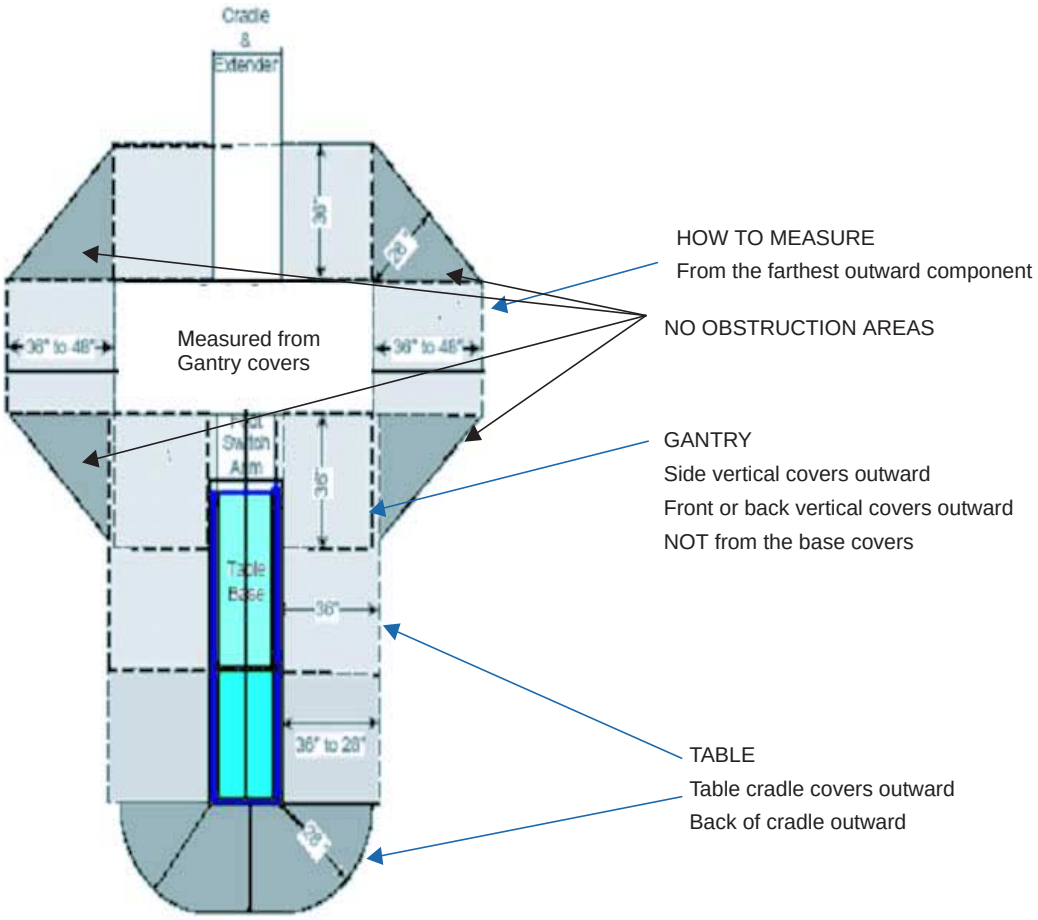
In a minimum room layout 356 mm – 686 mm (14 in – 27 in), the customer should consider workflow, customer access for patient care, and critical–care operations space requirements. Additionally, there may be limited equipment access on the gantry left side when loading patients or when positioning patient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

2-3-4 System Specifications

Table 2–6 System Specifications

Typical Room Size	Minimum Room Size
5.0 x 5.0 m (16 ft 5 in x 16 ft 5 in)	4.0 x 5.4 m (13 ft 1 in x 17 ft 9 in)

2-3-5 How to Measure



2-4 PREFERRED ROOM SIZES & REQUIREMENT LAYOUTS

NOTICE

Noise interference. The PDU must be kept away from the Gantry and OC at the following distances to prevent PDU noise from effecting the CRT's or image quality.

PDU – GANTRY: a minimum of 0.5 m (1 ft 8 in)
PDU – OC : a minimum of 1.5 m (4 ft 11 in) (See Notice Below).
OC – GANTRY: Less than 20m (65 ft 7 in)

NOTICE

For 480/460/440/415/400/380 V system, the PDU can be placed near the OC. However, for 200 V system, the PDU must be kept away from the OC at a minimum of 1.5 m (4 ft 11 in).

Table 2–7 contains a list of minimum room dimensions necessary for minimum service area and patient/traffic concerns in a CT suite. A typical room layout is shown in Illustration 2–2.

Table 2–7 Minimum Room Dimensions

ROOM	MINIMUM AREA m^2 (ft^2)	TYPICAL MINIMUM DIMENSIONS	CEILING
Gantry / Scan Room	21.6 m^2 (232.5 ft^2)	4 m x 5.4 m (13 ft 1 in x 17 ft 9 in)	2.3 m (7 ft 7 in)
Operator's Room / Equipment Room (See Note below.)	4.3 m^2 (46.3 ft^2)	2.5 m x 1.7 m (8 ft 2 in x 5 ft 7 in)	2.3 m (7 ft 7 in)

Note
Operator's room side depends on distance between PDU and OC.

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.

2-4 PREFERRED ROOM SIZES & REQUIREMENT LAYOUTS (Continued)

Illustration 2–2 Typical Room Layout

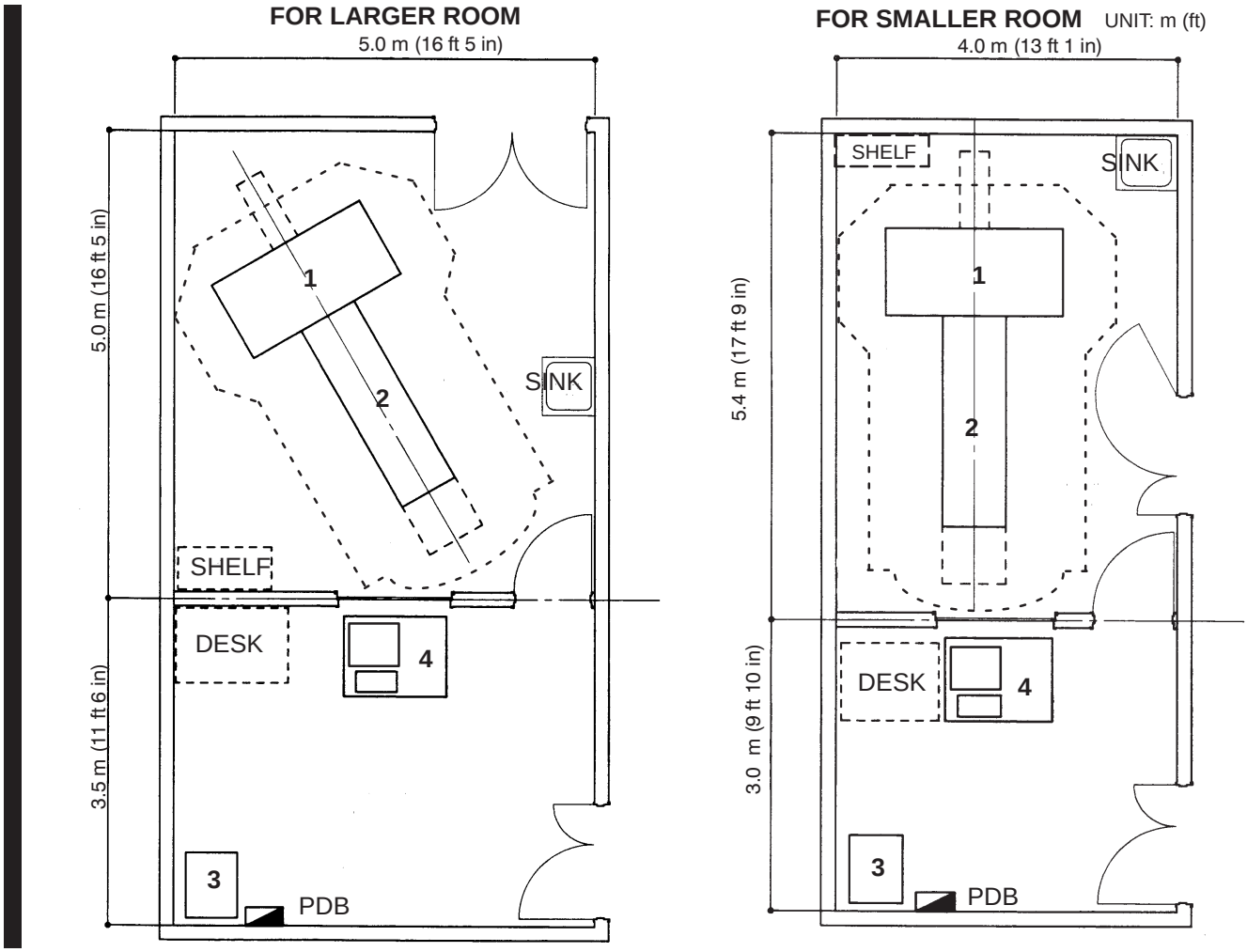


Table 2–8 Component Dimensions

COMPONENT	LENGTH	WIDTH	HEIGHT
	mm (in)	mm (in)	mm (in)
1. Gantry	1, 820 (72)	910 (36) 1,557 (61.3) (TILTED)	1,850 (73)
2. Patient Table	2,243 (88)	650 (26)	995 (39)
3. PDU	700 (27.6) or 716 (28.2) *1	550 (22)	820 (32)
4. Operator Console	1,100 (43)	860 (34) or 920 (36) *2	830 (33) (w/o CRT, Key-board)

*1 : The value in parenthesis refers to PDU2 (229XXXX).
*2: The value in parenthesis refers to Linux OC (2153675–12 or later)

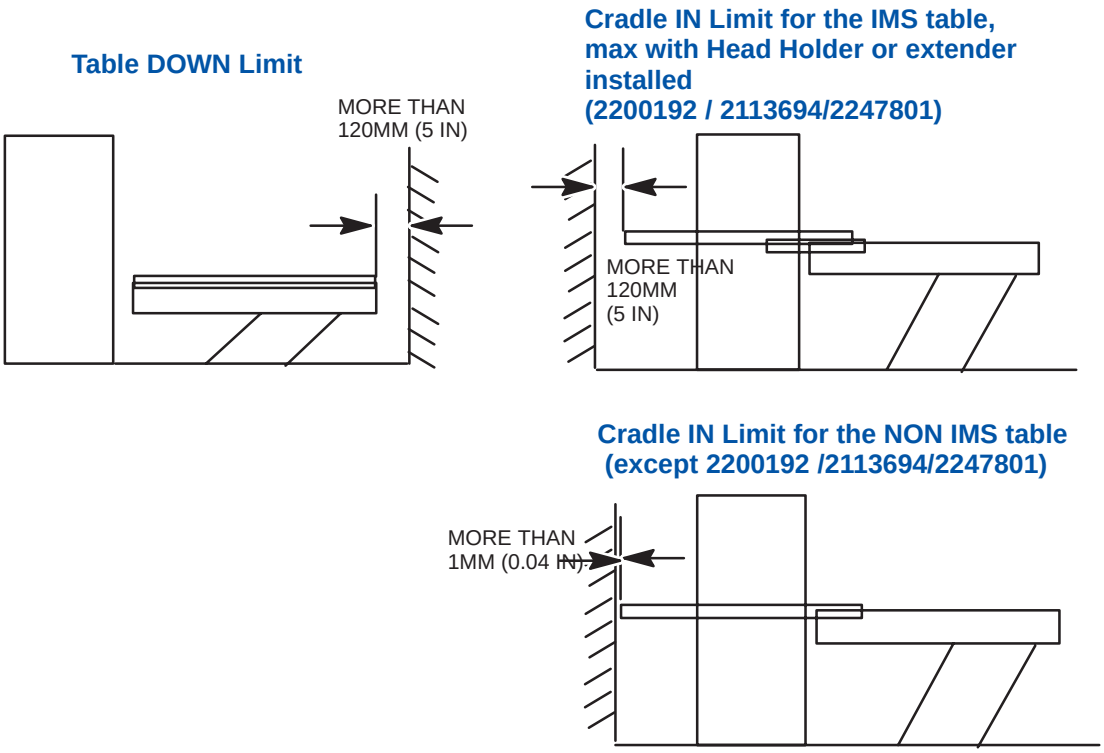
2-4 PREFERRED ROOM SIZES & REQUIREMENT LAYOUTS (Continued)

2-4-1 Consideration in Short–Foot–Print Mode

WARNING

PATIENT INJURY!
WHEN SHORT–FOOT–PRINT FUNCTION IS USED, AT THE MINIMUM THE FOLLOWING ROOM MUST BE DEDICATED TO PREVENT A PATIENT FROM PINCHING BETWEEN TABLE (OR CRADLE) AND WALL.

Illustration 2–3 Minimum Room for Short–foot–print mode



NOTICE

When table height is limited between 500 mm (20 in) and 800mm (32 in) as its DOWN limit, the Gantry front cover must be removed by two persons and with a special protector (2225358) or a blanket.

2-5 RADIATION PROTECTION

2-5-1 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.

2-5-2 Scatter Radiation

Illustrations 2–4 through 2–12 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 mR = 8.76×10^{-6} Gy (1 Gy = 114 R)

Use correction factors of Table 2–9 to adjust exposure levels to the usual scan technique at your site.

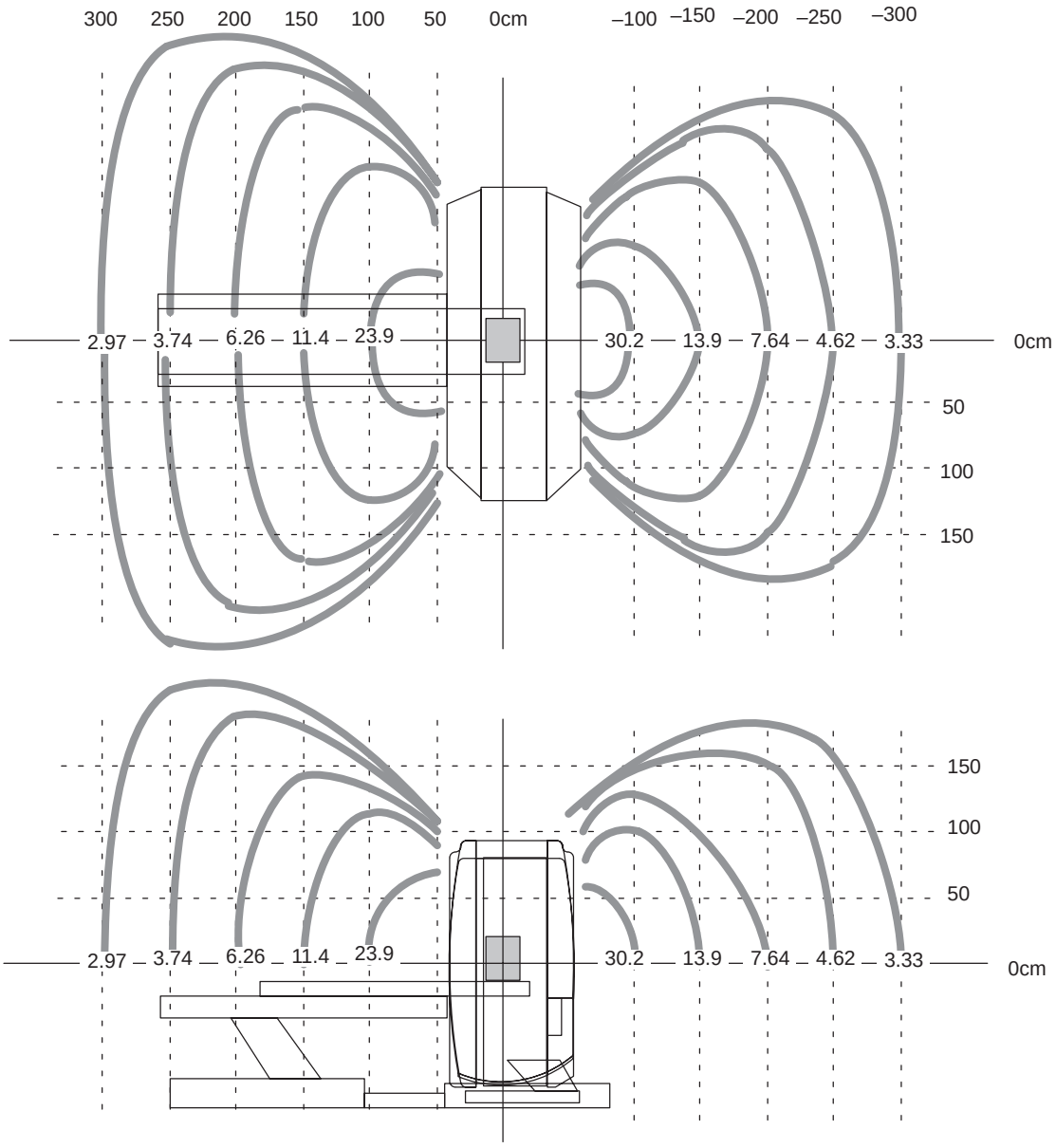
Table 2–9 Shielding Requirements Scaling

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

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed LX/i, FX/i, DX/i, DX/i M

Illustration 2–4 Typical Scatter Survey 120kV



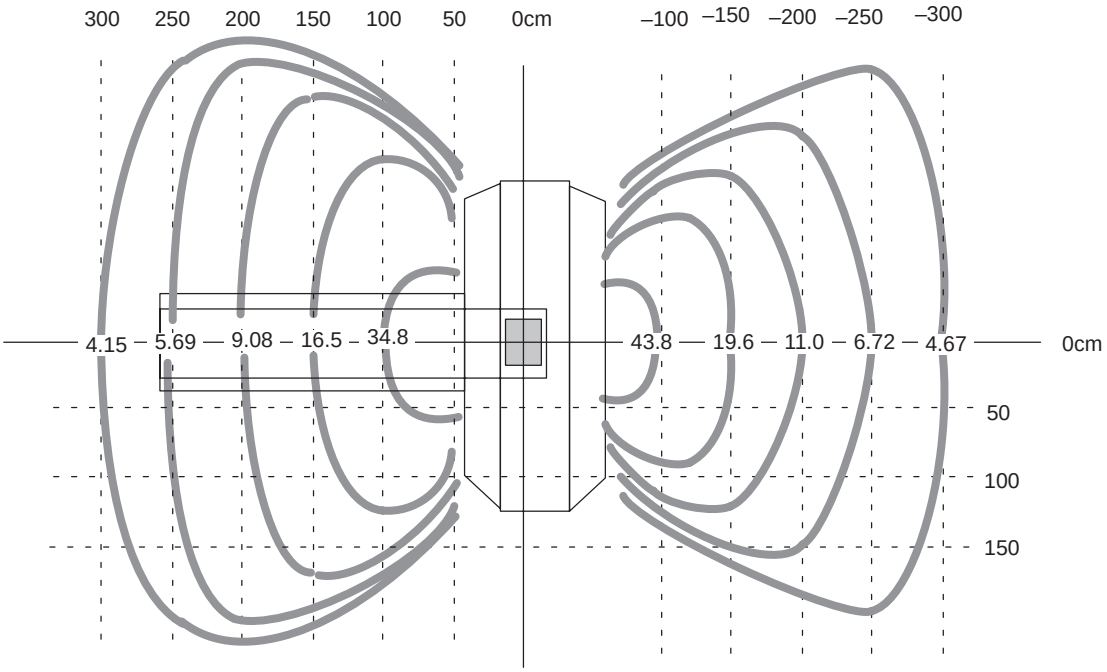
NOTE:
SCAN : 120KV, 130mA, 1.5SEC
10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed LX/i, FX/i, DX/i, DX/i M (Continued)

Illustration 2–5 Typical Scatter Survey 140kV



NOTE:

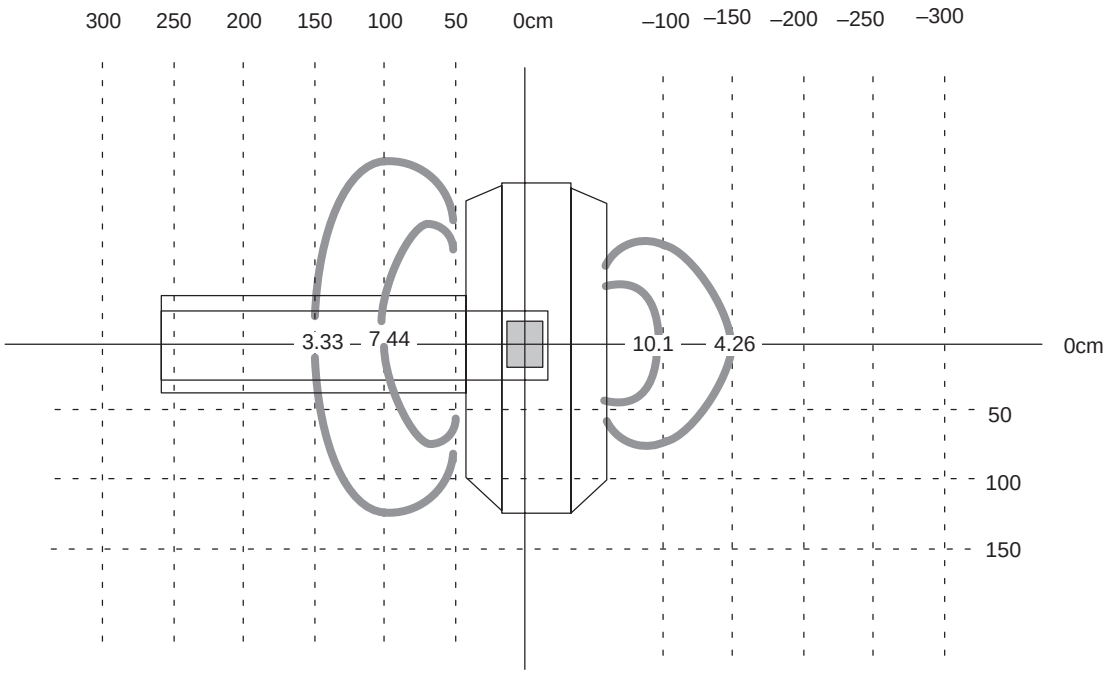
SCAN : 140KV, 130mA, 1.5SEC
10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed LX/i, FX/i, DX/i, DX/i M (Continued)

Illustration 2–6 Typical Scatter Survey 80kV



NOTE:

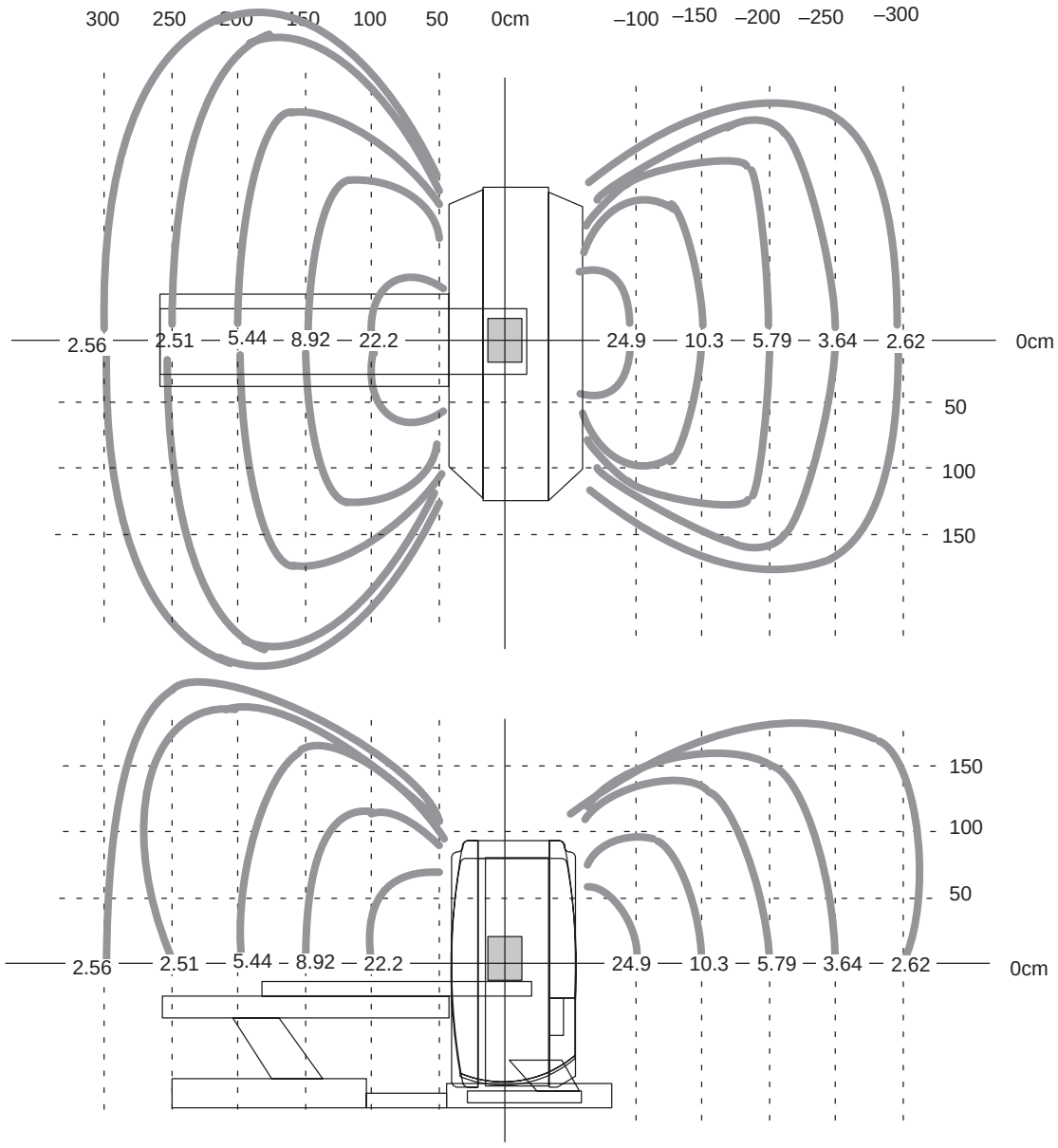
SCAN : 80KV, 130mA, 1.5SEC
10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed LX/i, FX/i, DX/i, DX/i M with Smart Filter Option

Illustration 2–7 Typical Scatter Survey 120kV



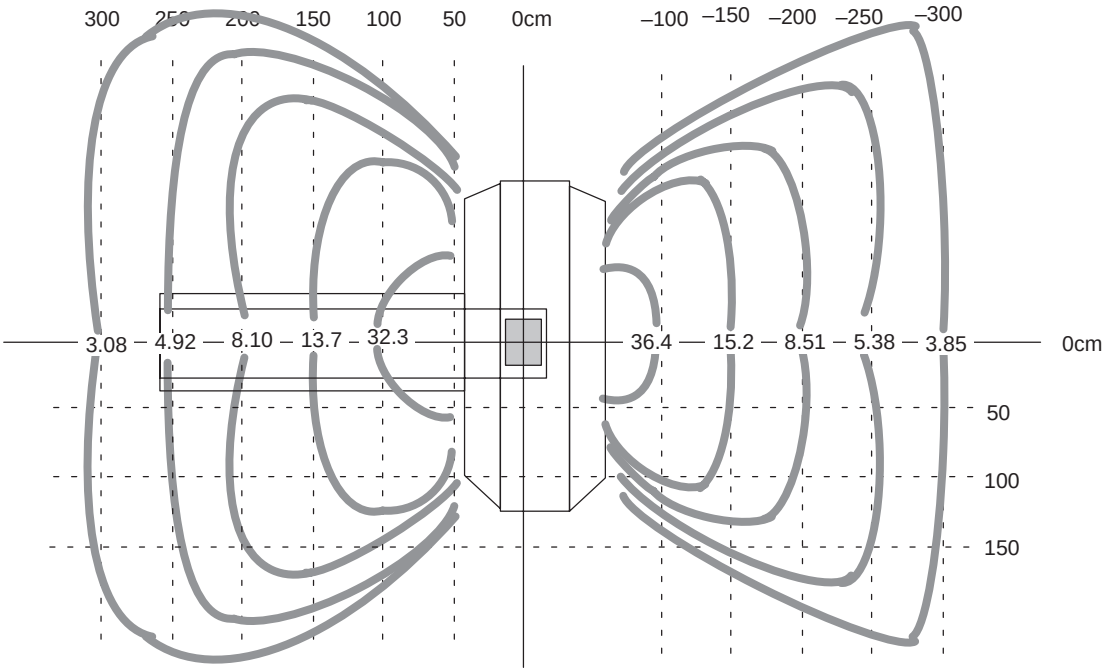
NOTE:
SCAN : 120KV, 130mA, 1.5SEC
10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed LX/i, FX/i, DX/i, DX/i M with Smart Filter Option (Continued)

Illustration 2–8 Typical Scatter Survey 140kV



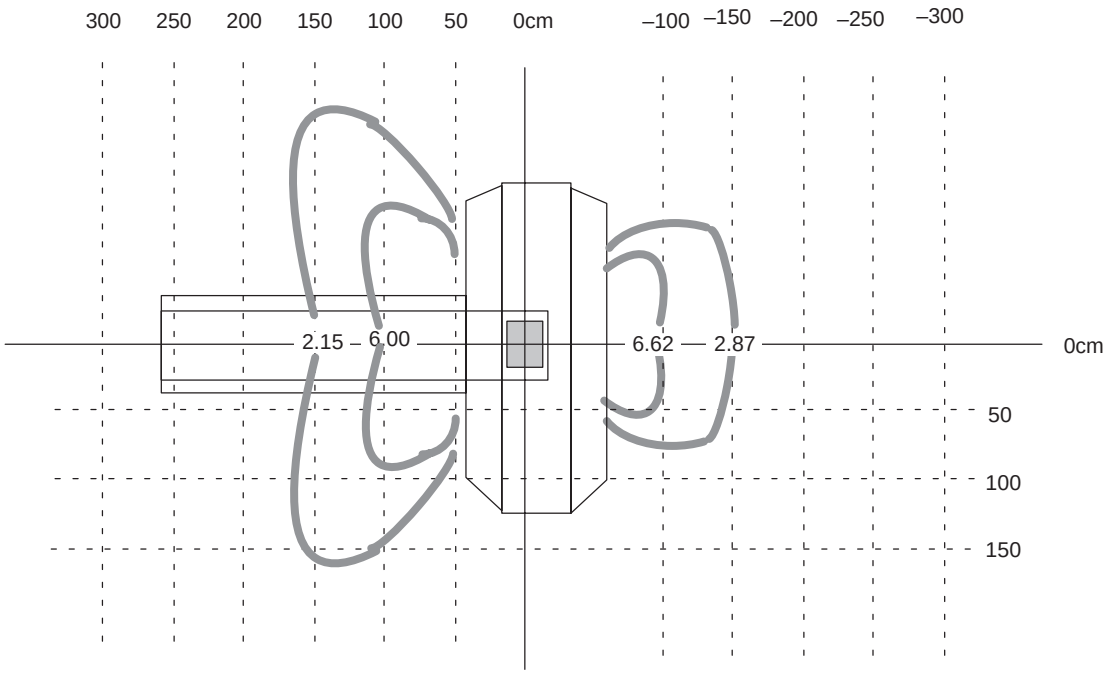
NOTE:
SCAN : 140KV, 130mA, 1.5SEC
10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed LX/i, FX/i, DX/i, DX/i M with Smart Filter Option (Continued)

Illustration 2–9 Typical Scatter Survey 80kV



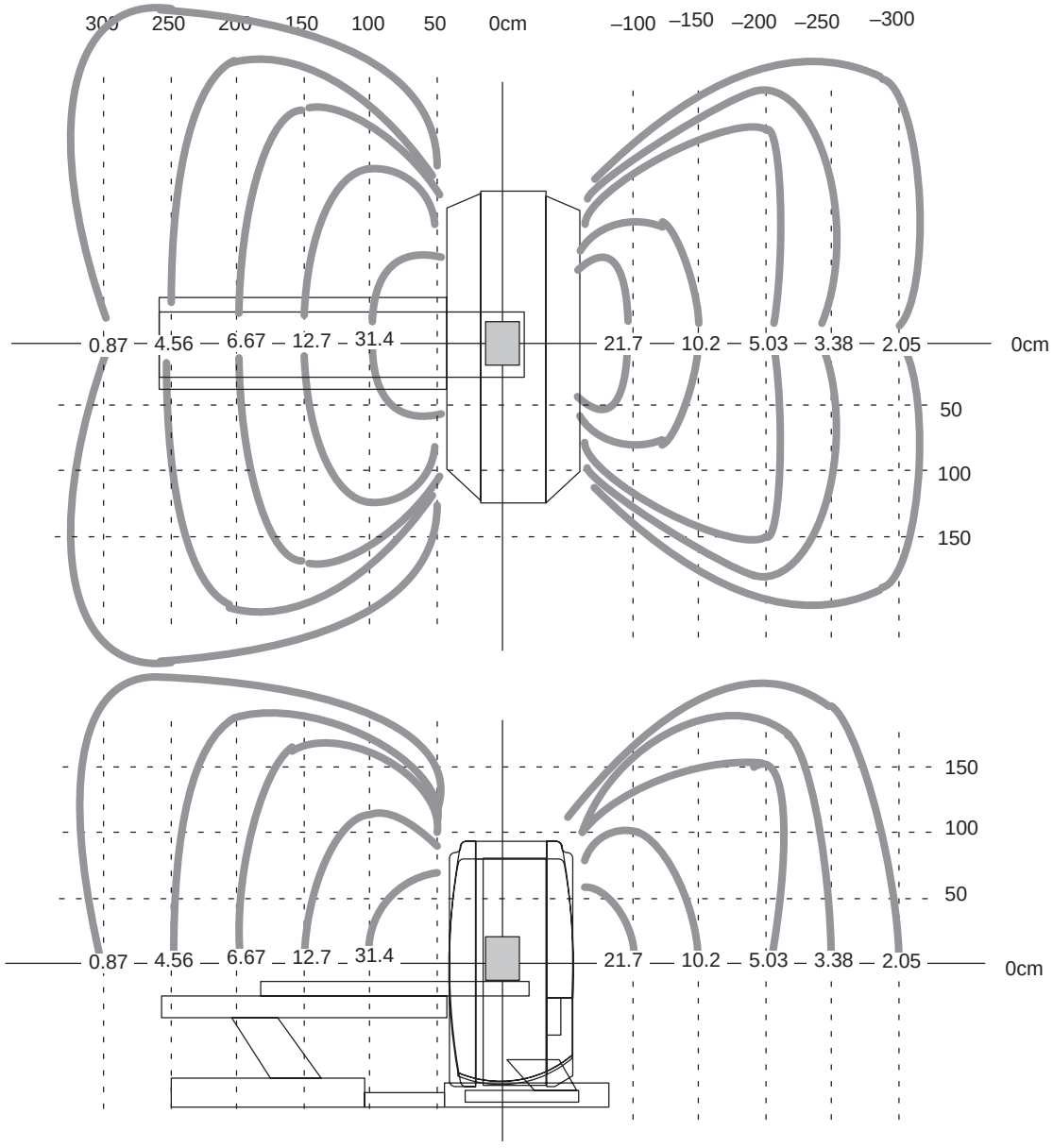
NOTE:
SCAN : 80KV, 130mA, 1.5SEC
10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed ZX/i series, HiSpeed Plus

Illustration 2–10 Typical Scatter Survey 120kV



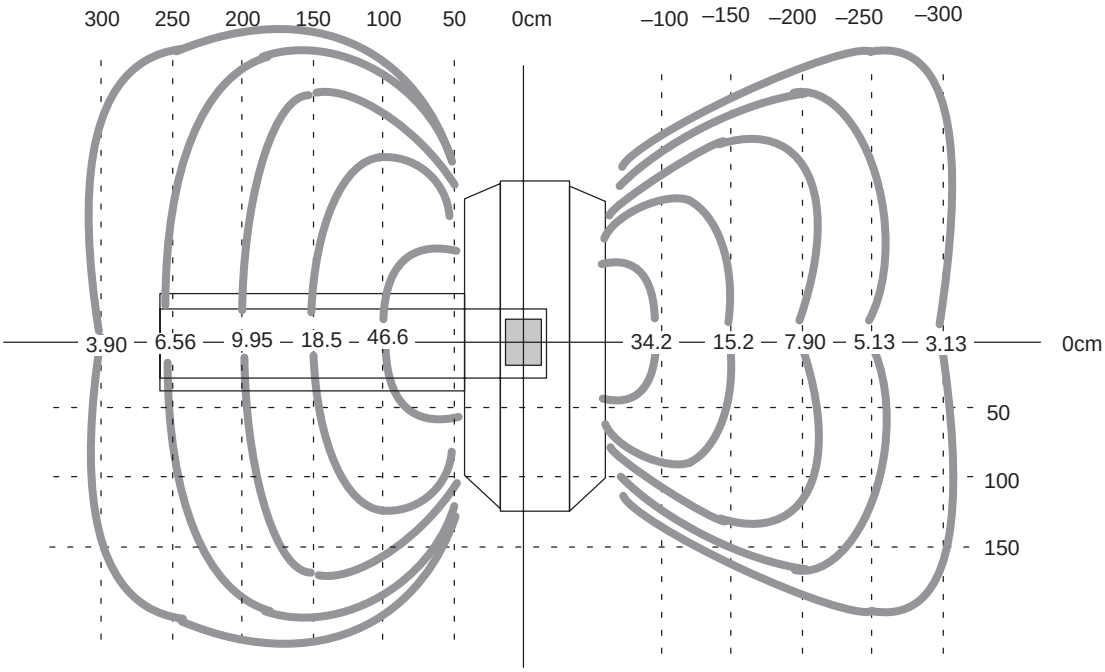
NOTE:
SCAN : 120KV, 130mA, 1.5SEC
10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed ZX/i series, HiSpeed Plus (Continued)

Illustration 2–11 Typical Scatter Survey 140kV



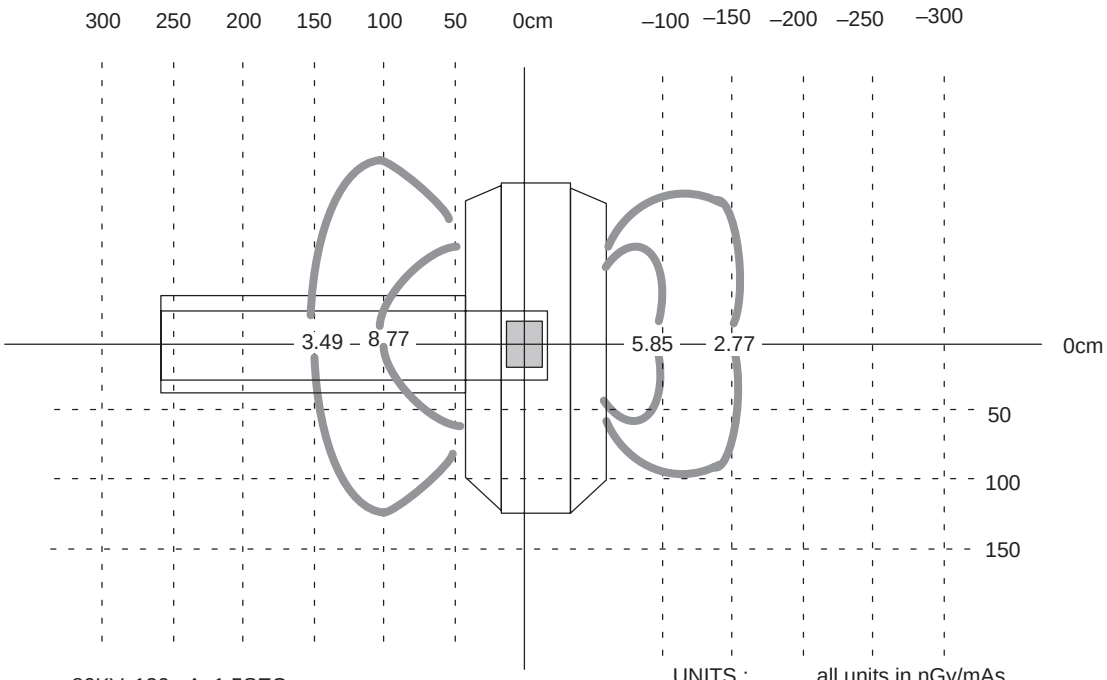
NOTE:
SCAN : 140KV, 130mA, 1.5SEC
10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs (at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed ZX/i series, HiSpeed Plus (Continued)

Illustration 2–12 Typical Scatter Survey 80kV



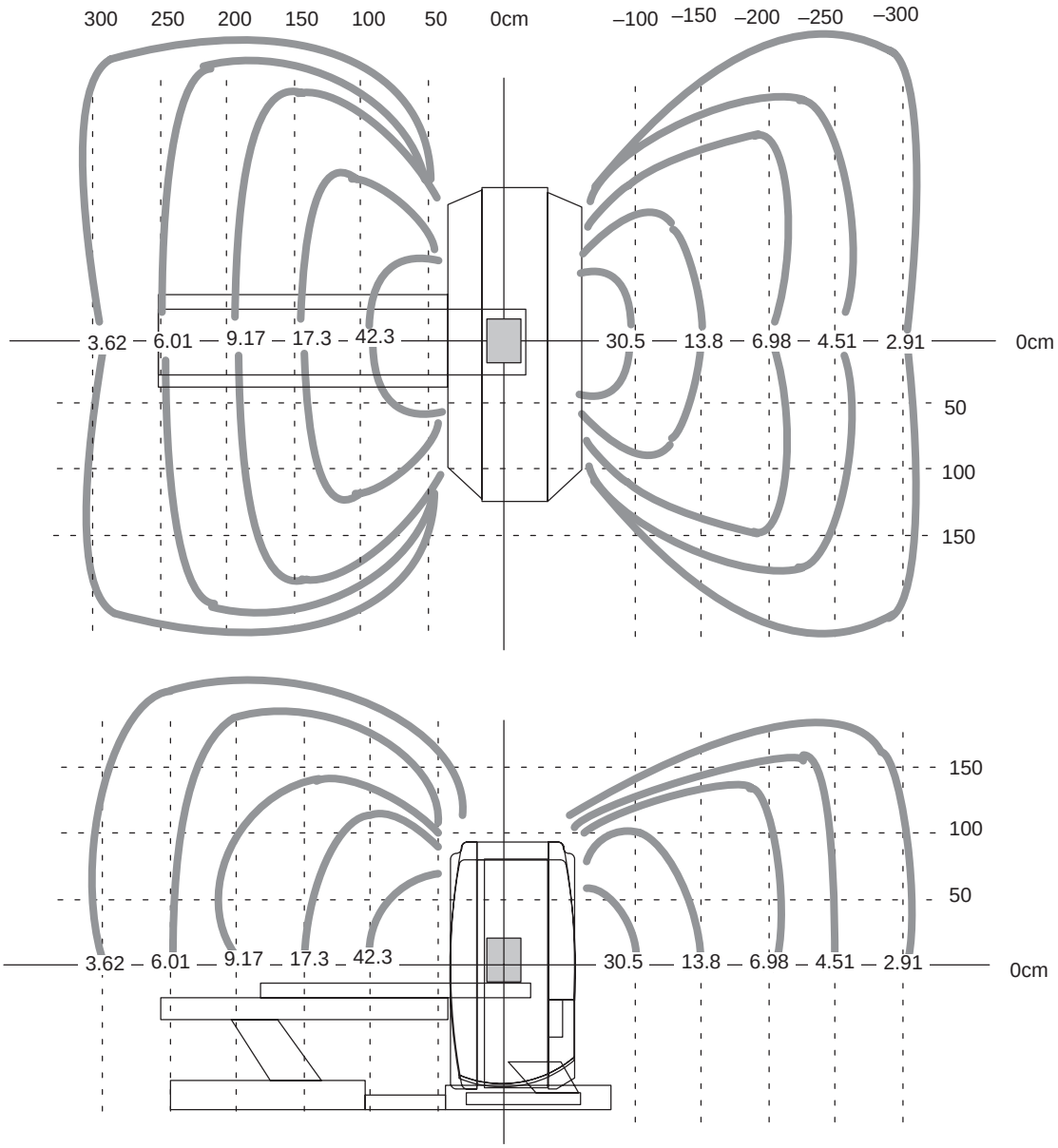
NOTE:
SCAN : 80KV, 130mA, 1.5SEC
10 mm SLICE THICKNESS
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed NX/i series

Illustration 2–13 Typical Scatter Survey 120kV



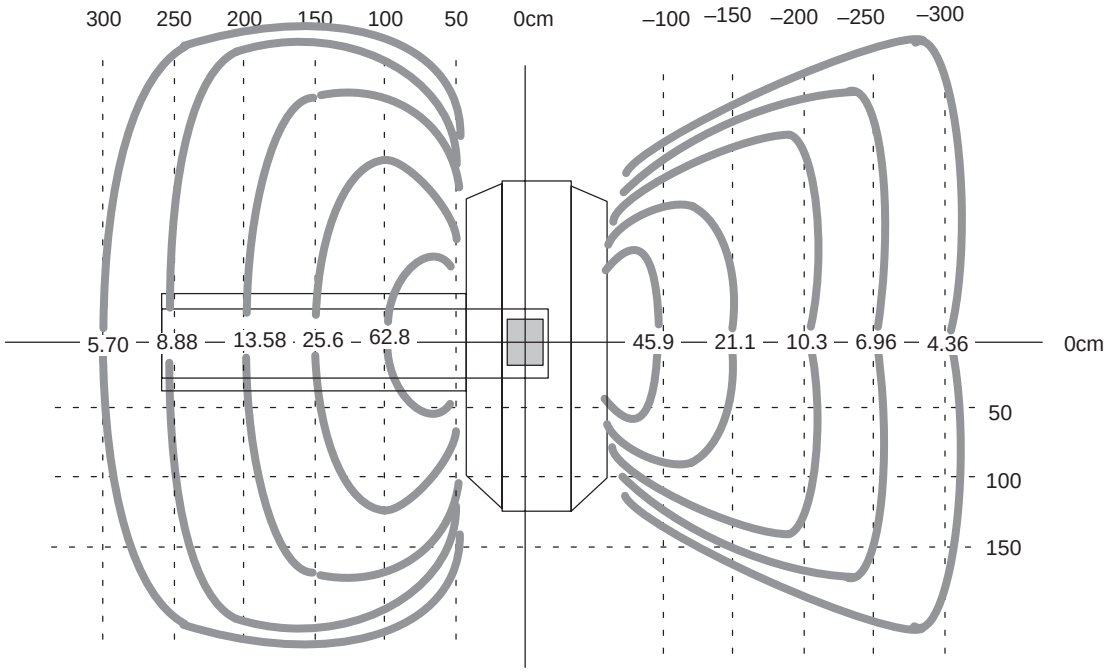
NOTE:
SCAN : 120KV, 130mA, 1.5SEC
7 mm SLICE THICKNESS x 2 slices
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed NX/i series (Continued)

Illustration 2–14 Typical Scatter Survey 140kV



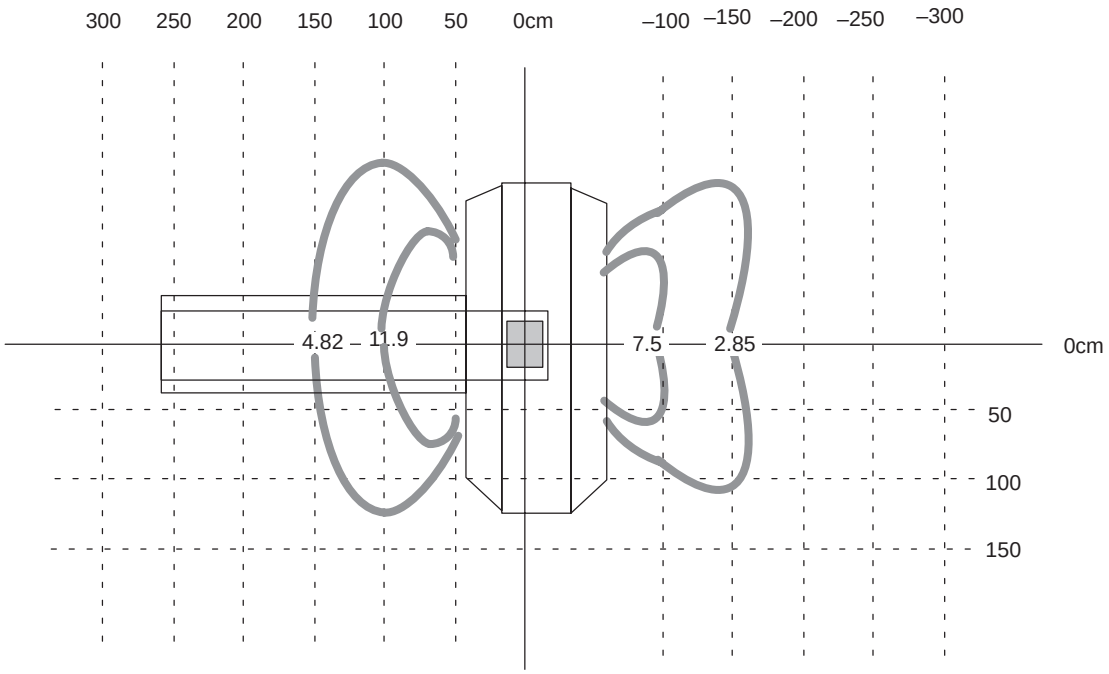
NOTE:
SCAN : 140KV, 130mA, 1.5SEC
7 mm SLICE THICKNESS x 2 slices
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-5 RADIATION PROTECTION (Continued)

❑ For HiSpeed NX/i series (Continued)

Illustration 2–15 Typical Scatter Survey 80kV



NOTE:

SCAN : 80KV, 130mA, 1.5SEC
7 mm SLICE THICKNESS x 2 slices
PMMA phantom (with a diameter of 32cm and a length of 16 cm)
Bowtie filter
Through Isocenter

UNITS : all units in nGy/mAs
(at Maximum dose rate)

2-6 CONSTRUCTION MATERIALS

2-6-1 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 x 10^3 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.

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 2–18. Refer to Illustrations 2–19 through 2–25 for Gantry and Table installation and anchoring.

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 2–10 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 205 kg (450 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).

2-6-2 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.

2-6-3 Walls

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

2-7 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.

Note

Optical fiber cables are very sensitive cable and will be damaged if it is coiled and the radius is too small. The minimum radius of the coil should be greater than 120mm.

Prerequisite:

- Gantry Cable Duct

NOTICE

A Gantry cable duct MUST be PREPARED to protect the Gantry system cables. This will be installed at the cable outlet of the rear base of the Gantry during Installation. See Illustrations 2–16 to 2–17.

2-7-1 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 (exiting) installation sites

2-7-2 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.

2-7-3 Conduit

Advantages:

- Conduit systems are relatively inexpensive and easily attainable

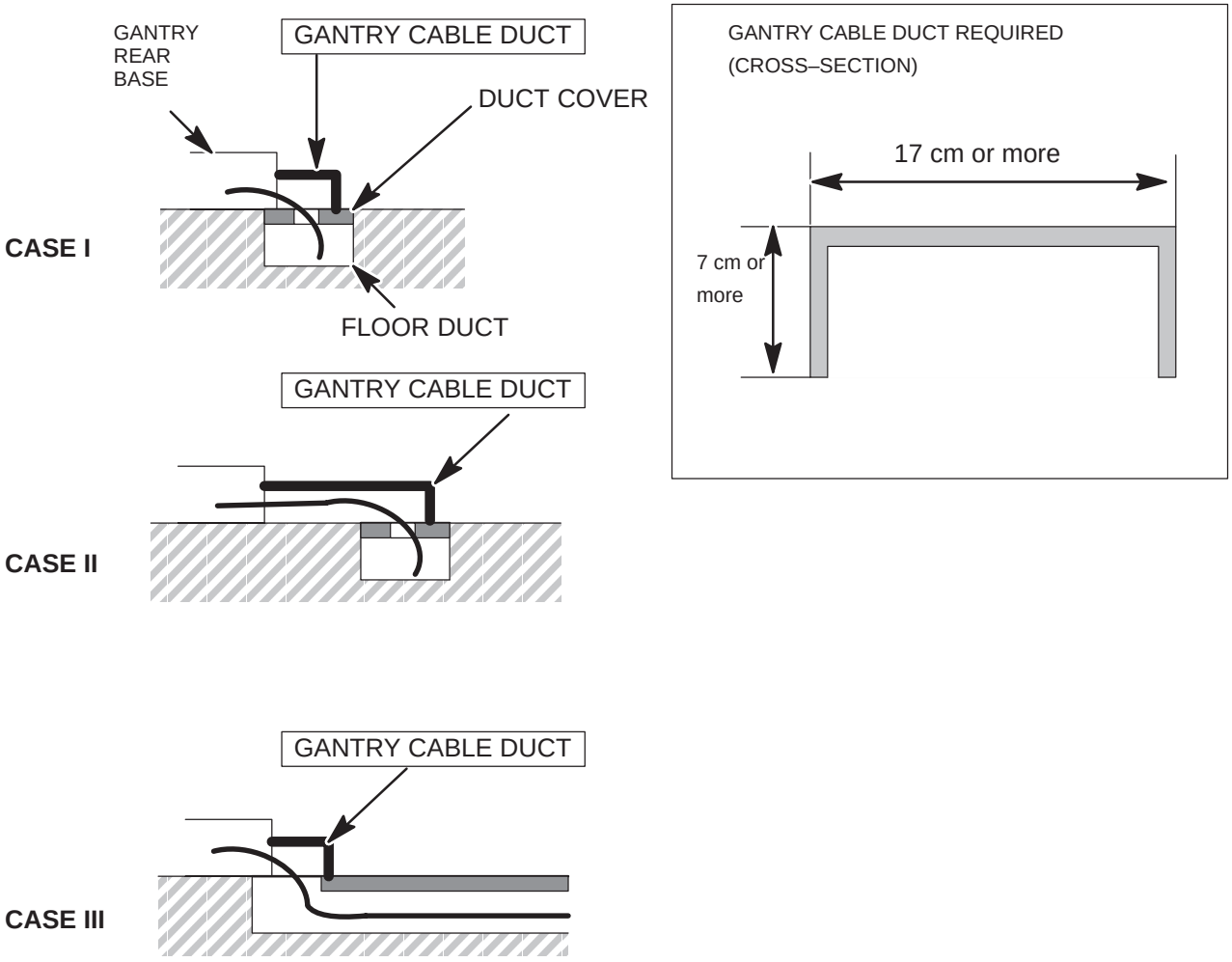
Disadvantages:

- 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

2-7-4 Gantry Cable Duct

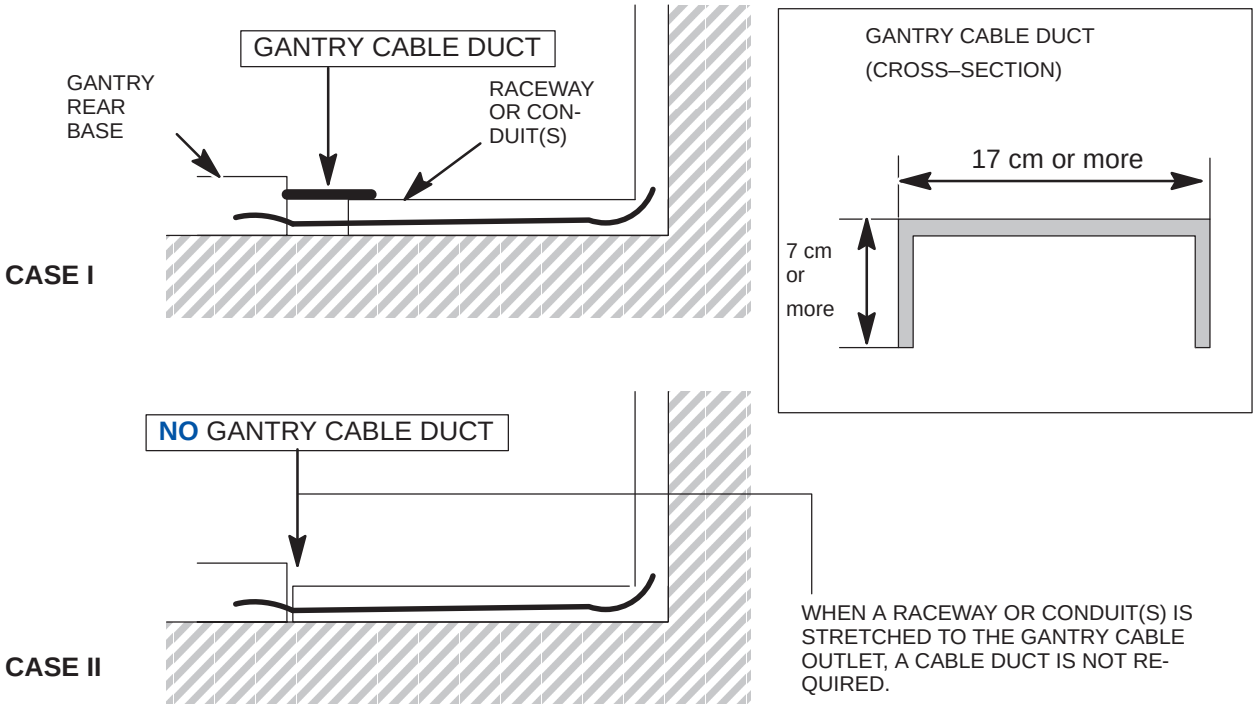
A Gantry Cable Duct must be installed at the cable outlet of Gantry rear base during installation, so that the system cable can be protected against stretch. See Illustrations 2–16 to 2–17.

Illustration 2–16 Gantry Cable Duct when Floor Duct is used



2-7-4 Gantry Cable Duct (Continued)

Illustration 2–17 Gantry Cable Duct when Raceway or Conduit(s) is used



2-8 ARCHITECTURAL REMINDERS

NOTICE

Noise interference. The PDU must be kept a sufficient distance from other equipment to prevent noise from effecting the CRT's or image quality. Refer to section 2–1, Room Sizes.

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 a media storage cabinet for MODs in Control Room that protects the media from Electro–Magnetic Interference.

3 Provide a lockable storage cabinet near the system for service manuals.

4 Provide film processing facilities for a Laser Camera.

5 Provide a hanger for an I.V. pole over the patient table.

6 Provide adequate security for the entire CT suite, including control/equipment and scanning rooms, *prior* to equipment delivery.

7 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.

2-9 FLOOR LOADING AND WEIGHTS

This section contains loading specifications for the CT system. Table 2–10 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 2–10 CT Floor Loading

COMPONENT	WEIGHT kg	OVERALL W x D x H mm	EFFECTIVE WEIGHT/AREA kg/m^2 Note 1	LOAD PATTERN mm	NORMAL METHOD
Scanning Gantry	1,090 1,170 (for ZXi, Plus ONLY)	1,820 x 910 x 1,850	740	Four leveling pads 60 diameter	Must be anchored to floor
Patient Table	295	650 x 2,243 x 995	1,000	Two leveling pads 50 diameter and two leveling pads 60 diameter.	Must be anchored to floor
Operator Console	175 Note2	1,100 x 860 (920) x 830 Note 2	340	Four casters 40 diameter, and two adjusters	Set on floor or anchored
PDU	157 (400V) 275 (200V)	550 x 700 (716) x 820 Note 3	745	Four leveling pads 37 diameter, Four casters	Set on floor or anchored

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 CRT/or LCD monitor.
CRT monitor: 28.5 kg (505 x 519 x 487 mm), LCD monitor: 12.5 kg (447 x 247 x 461 mm)
The value in parenthesis refers to Linux OC (2153675–12 or later).

Note 3: The value in parenthesis refer to PDU2 (229XXXX).

2-10 COMPONENT DIMENSIONS

To assist in completing your room layout, refer to Table 2–11 for a list of component illustrations which follow in this section.

Table 2–11 CT System Component Illustration List

ILLUSTRATION NAME
GANTRY AND TABLE ANCHORS/ADJUSTERS
SERVICE AREA OF GANTRY AND TABLE
SCANNING GANTRY
PATIENT TABLE
OPERATOR CONSOLE
POWER DISTRIBUTION UNIT

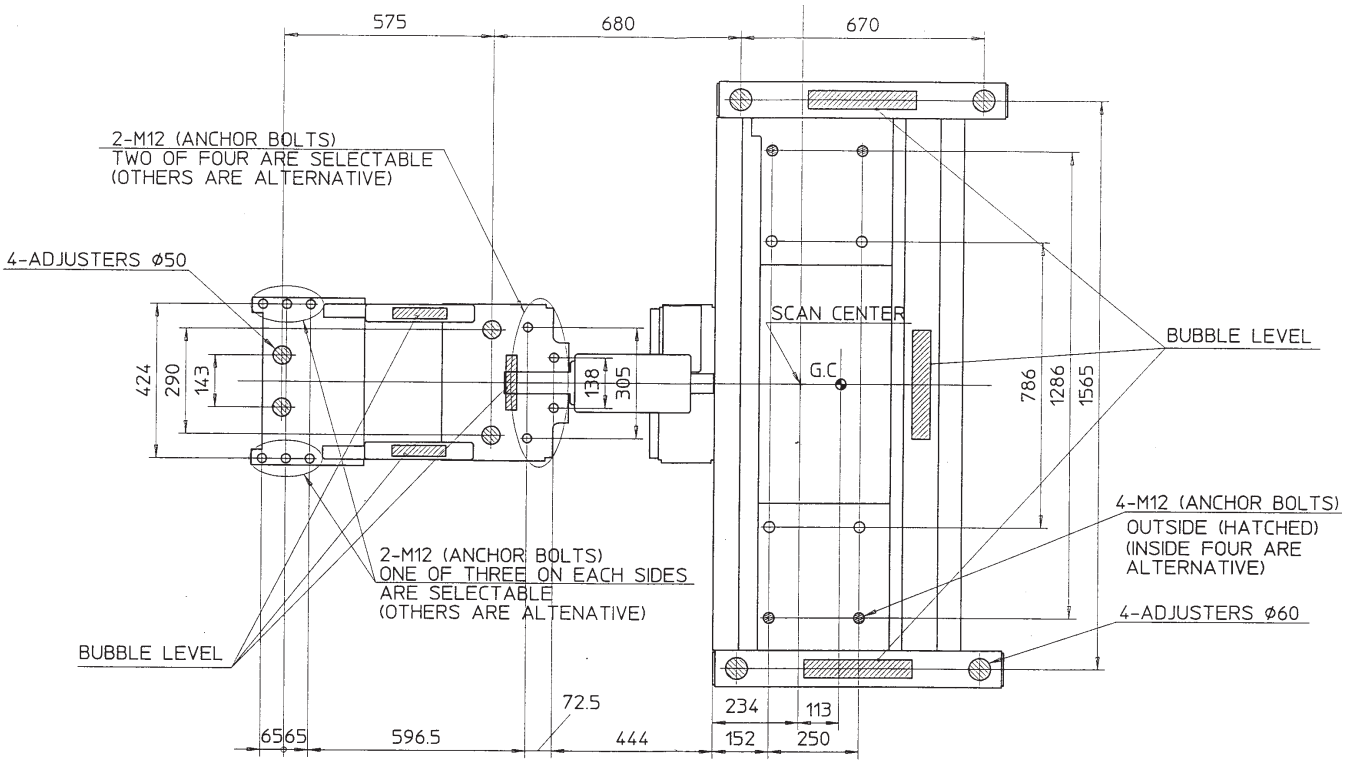
Note

All dimensions are in millimeters.

⊕: indicates center gravity.

2-10 COMPONENT DIMENSIONS (Continued)

Illustration 2–18 Gantry and Table Anchors/Adjusters



2-10 COMPONENT DIMENSIONS (Continued)

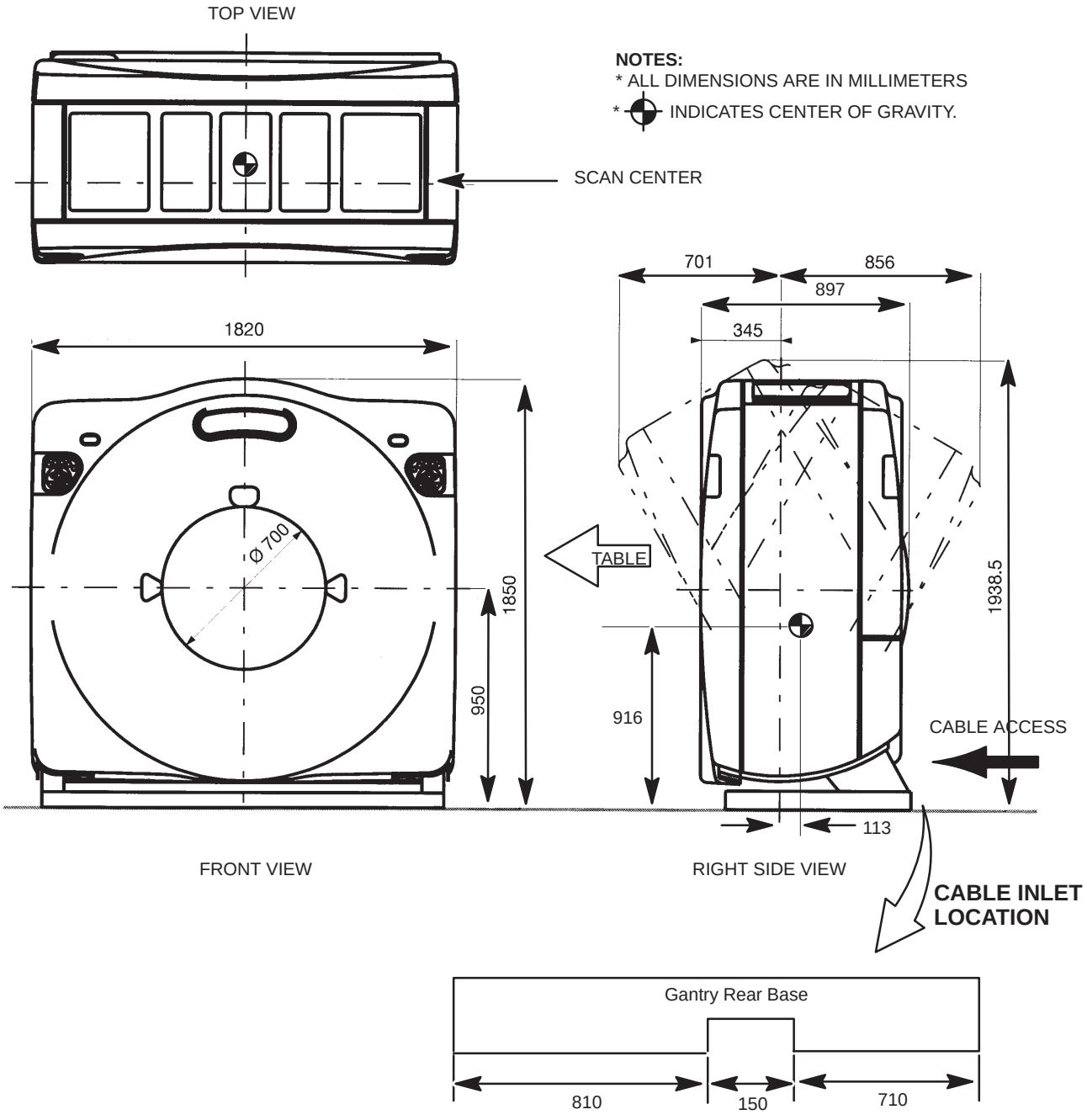
Table 2–12 Length for Short–Foot–Print Siting (A to E)

Service Area of Gantry and Table (Without IMS function)								
Table Height	A	B	Cmin	Cmax	Dmin	Dmax	Emin	Emax
400	412	1380	910	1563	0	653	4160	4813
450	404	1372	910	1563	0	653	4152	4805
500	395	1363	910	1563	0	653	4143	4796
550	382	1350	910	1563	0	653	4130	4783
600	363	1331	910	1563	0	653	4111	4764
650	339	1307	910	1563	0	653	4087	4740
700	310	1278	910	1563	0	653	4058	4711
750	274	1242	910	1563	0	653	4022	4675
800	230	1198	910	1563	0	653	3978	4631
Length “D” can be selected freely between Dmin and Dmax. However, Length “C” will be changed depending on “D” . So, “C” must be calculated using the formula: C=Cmax – D								

Service Area of Gantry and Table (With IMS function)								
Table Height	A	B	Cmin	Cmax	Dmin	Dmax	Emin	Emax
400	412	1380	910	1700	0	790	4160	4950
450	404	1372	910	1700	0	790	4152	4942
500	395	1363	910	1700	0	790	4143	4933
550	382	1350	910	1700	0	790	4130	4920
600	363	1331	910	1700	0	790	4111	4901
650	339	1307	910	1700	0	790	4087	4877
700	310	1278	910	1700	0	790	4058	4848
750	274	1242	910	1700	0	790	4022	4812
800	230	1198	910	1700	0	790	3978	4768
Length “D” can be selected freely between Dmin and Dmax. However, Length “C” will be changed depending on “D” . So, “C” must be calculated using the formula: C=Cmax – D								

2-10 COMPONENT DIMENSIONS (Continued)

Illustration 2–19 Scanning Gantry



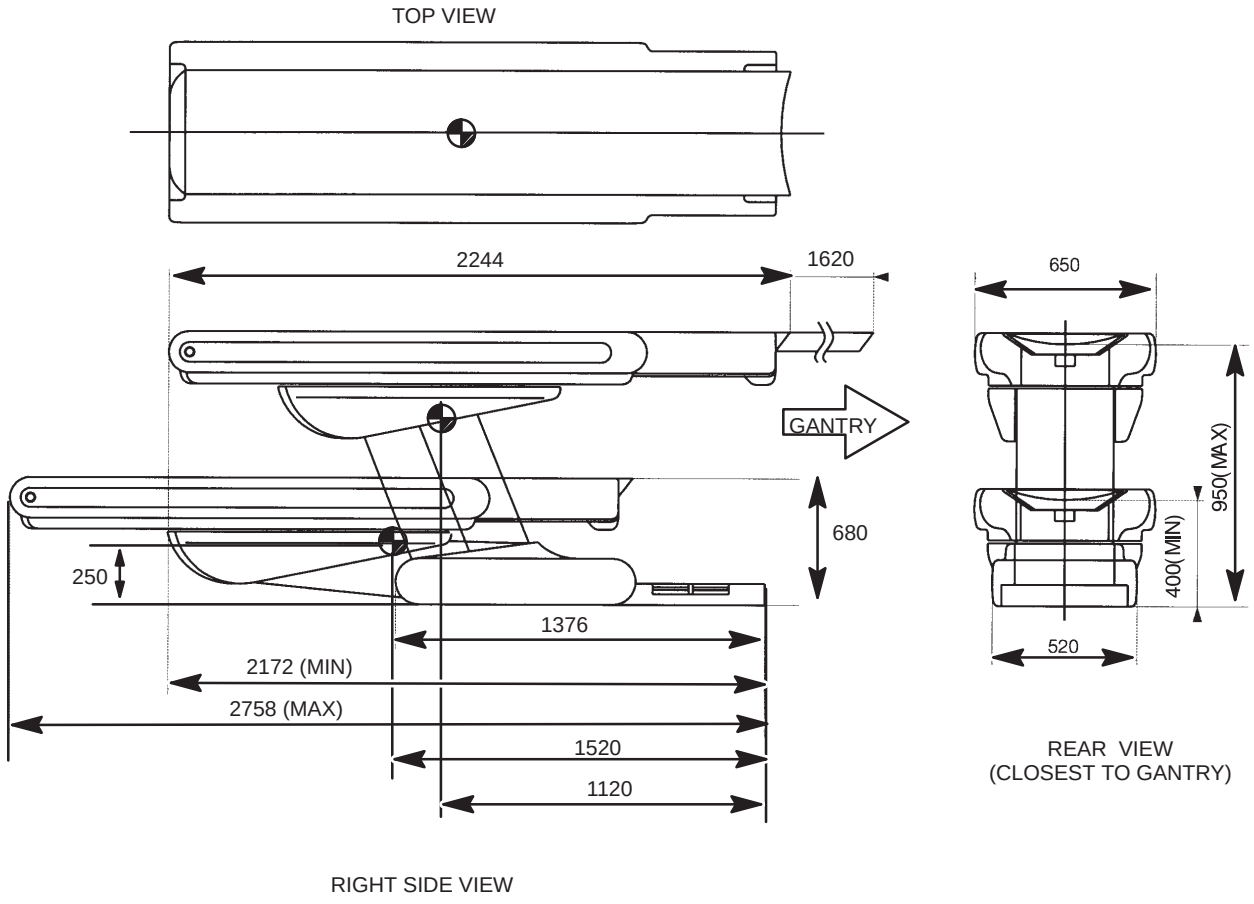
Note

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

2-10 COMPONENT DIMENSIONS (Continued)

Illustration 2–20 Patient Table (without IMS function)

NOTES:
* ALL DIMENSIONS ARE IN MILLIMETERS
* VETALATION : 115 watts (100 kcal/h)
* ⊕ INDICATES CENTER OF GRAVITY.

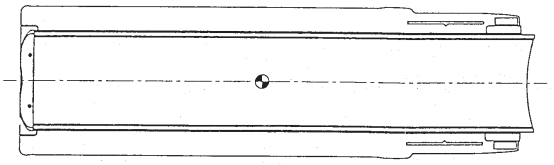


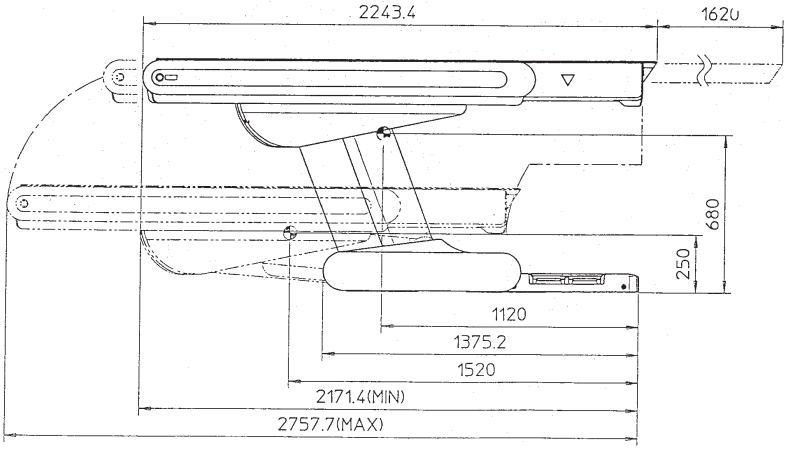
2-10 COMPONENT DIMENSIONS (Continued)

Illustration 2–21 Patient Table (with IMS function)

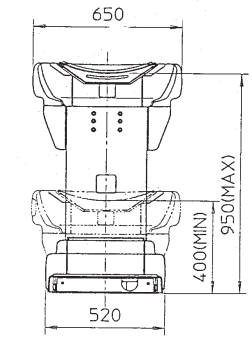
NOTES:
* ALL DIMENSIONS ARE IN MILLIMETERS
* VETALATION : 115 watts (100 kcal/h)
* ⊕ INDICATES CENTER OF GRAVITY.

TOP VIEW





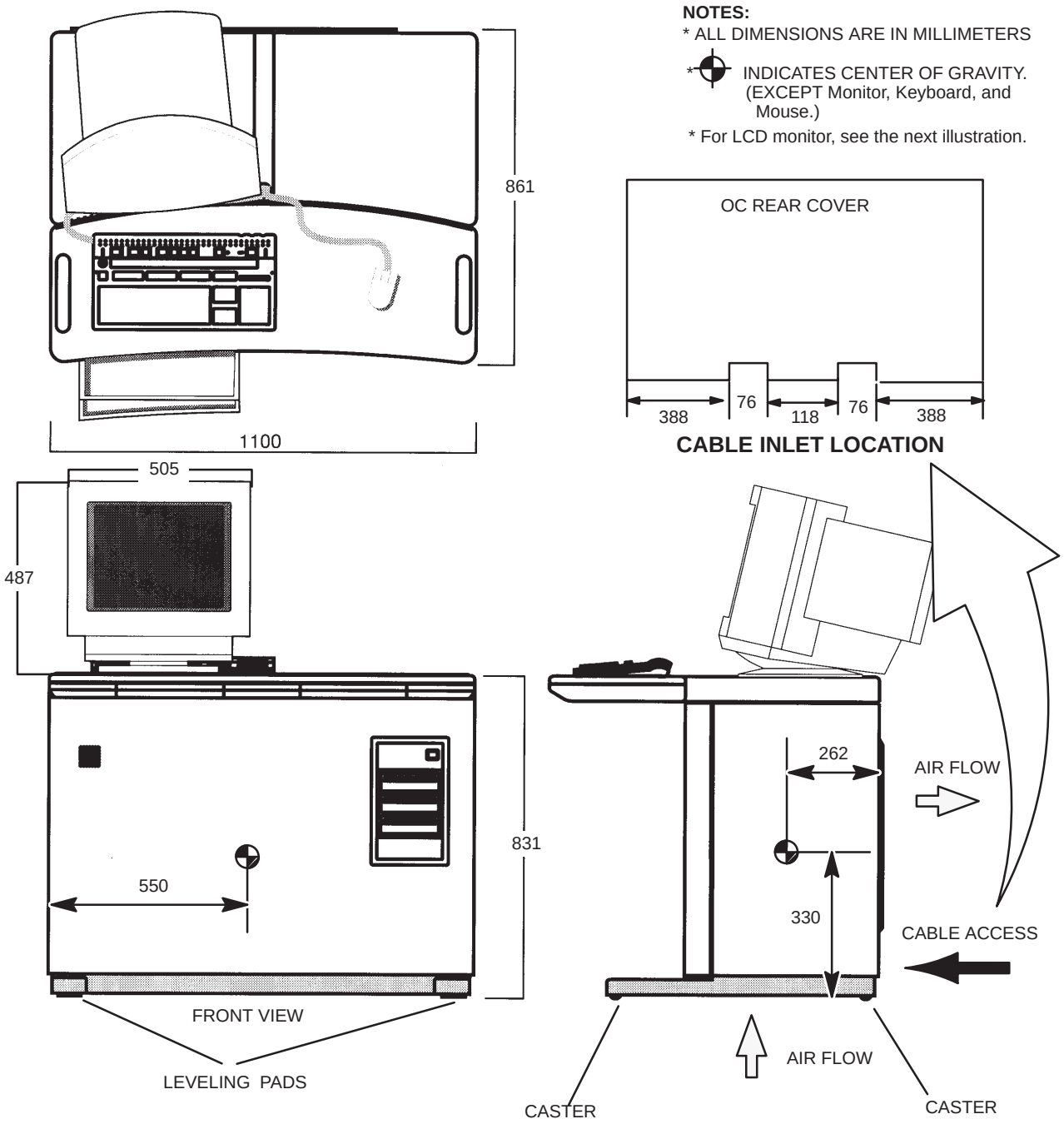
RIGHT SIDE VIEW



REAR VIEW
(CLOSEST TO GANTRY)

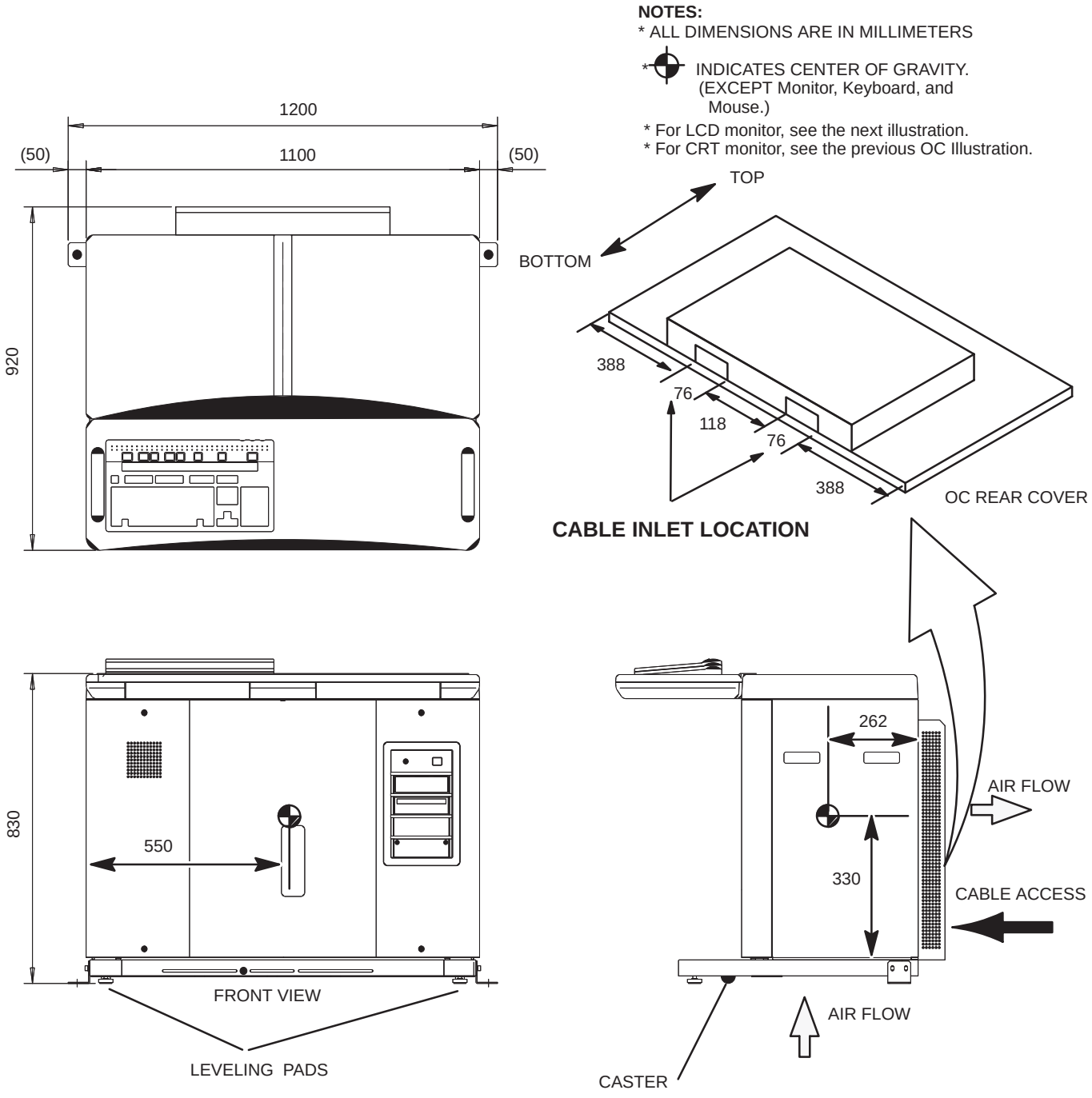
2-10 COMPONENT DIMENSIONS (Continued)

Illustration 2–22 Operator Console (e.x. CRT model)



2-10 COMPONENT DIMENSIONS (Continued)

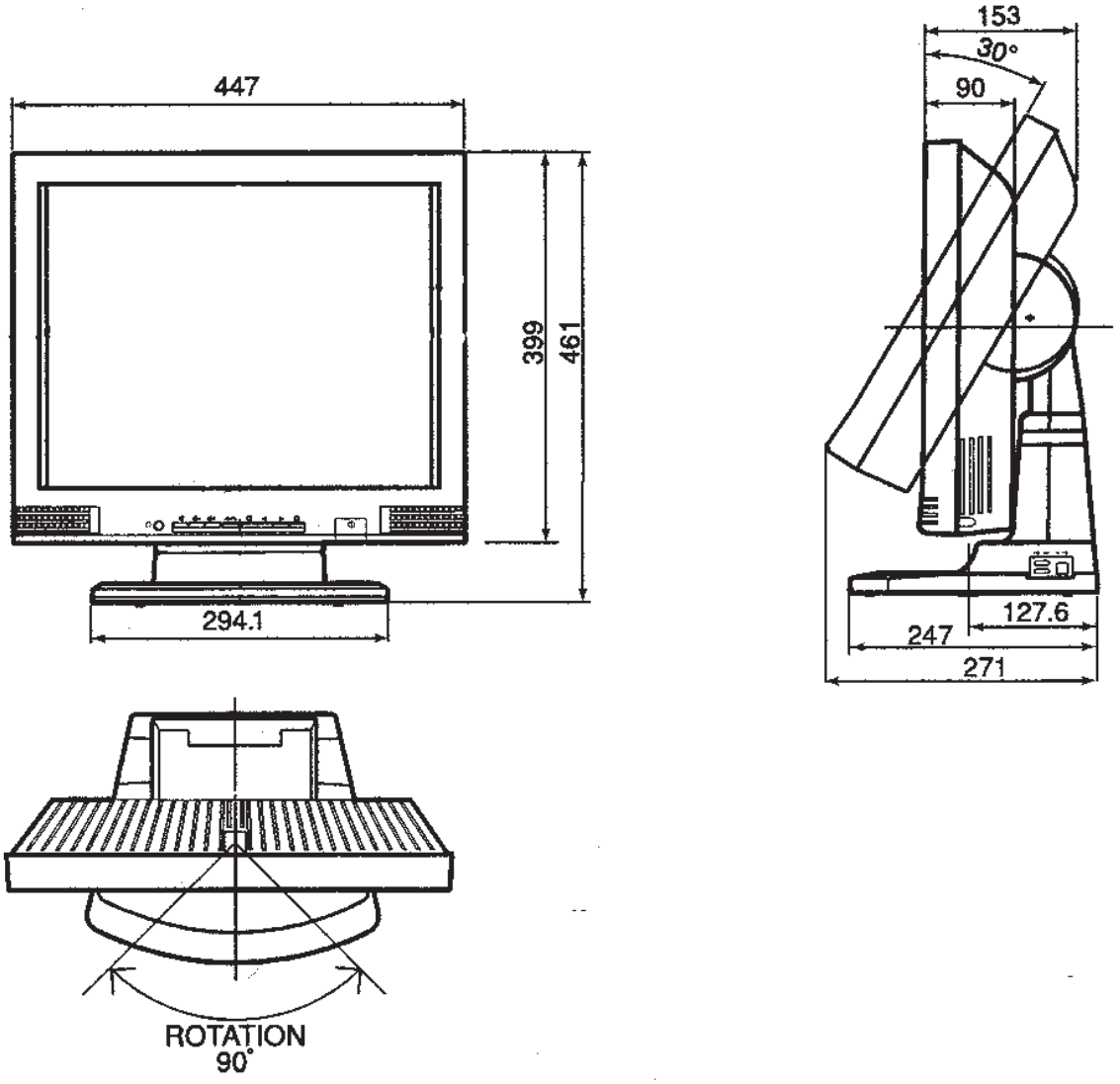
Illustration 2–23 Operator Console (Linux OC– 2153675–12 or later)



2-10 COMPONENT DIMENSIONS (Continued)

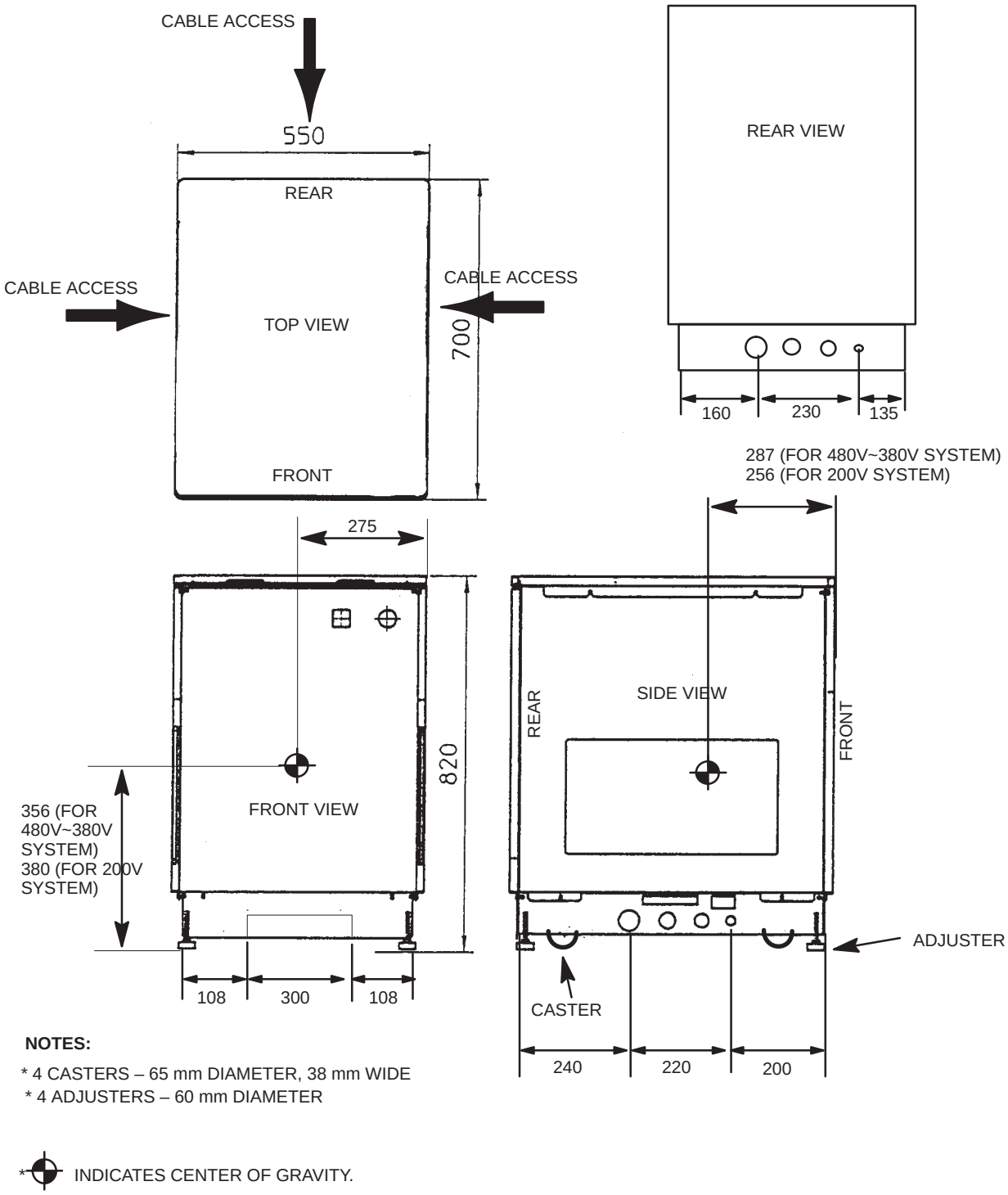
Illustration 2–24 LCD Monitor for Operator Console

NOTE:
* ALL DIMENSIONS ARE IN MILLIMETERS



2-10 COMPONENT DIMENSIONS (Continued)

Illustration 2–25 Power Distribution Unit for PDU1 (220xxxx or 224xxxx)



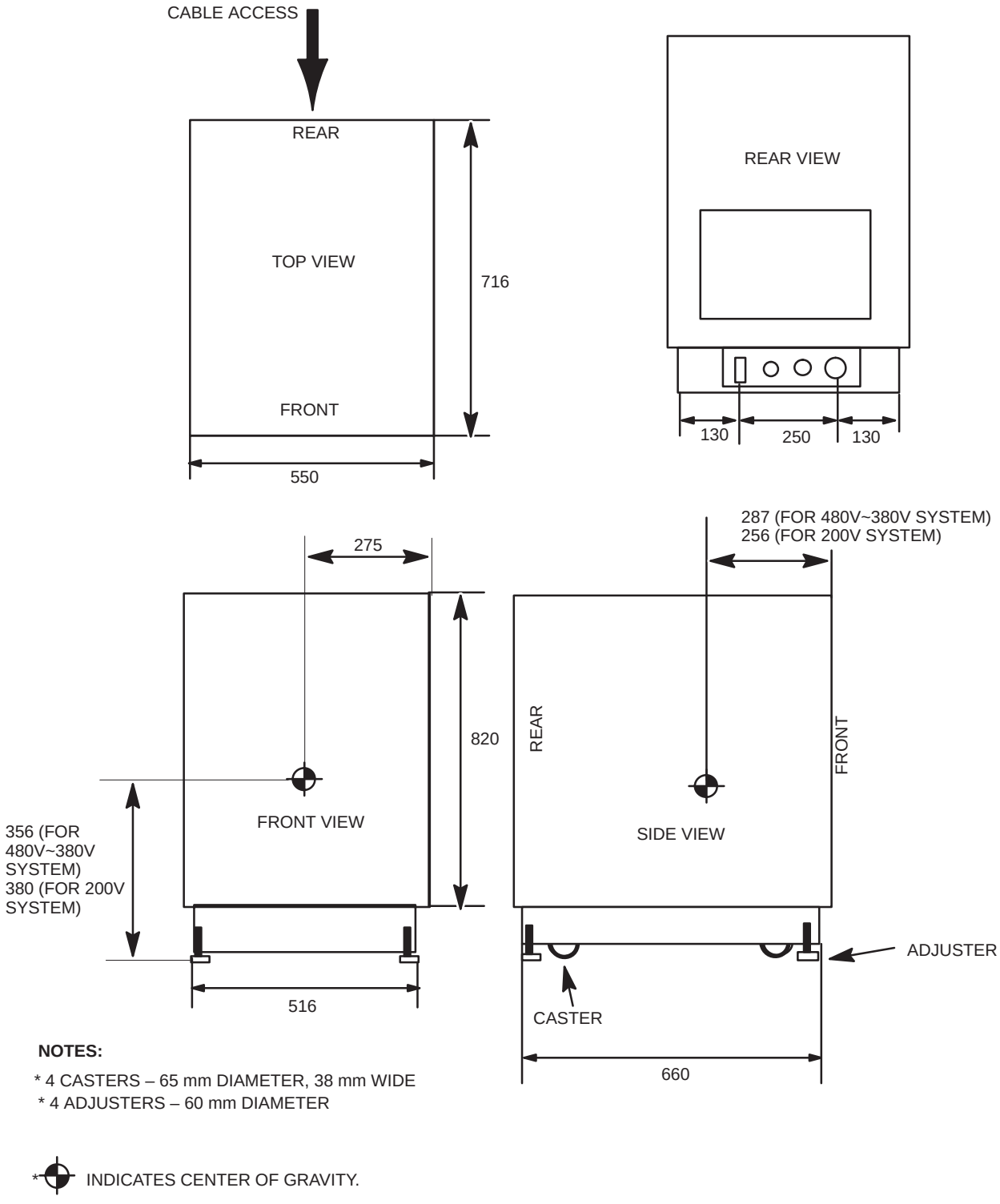
NOTES:

* 4 CASTERS – 65 mm DIAMETER, 38 mm WIDE
* 4 ADJUSTERS – 60 mm DIAMETER

* INDICATES CENTER OF GRAVITY.

2-10 COMPONENT DIMENSIONS (Continued)

Illustration 2–26 Power Distribution Unit for PDU2 (229xxxx)



NOTES:

* 4 CASTERS – 65 mm DIAMETER, 38 mm WIDE
* 4 ADJUSTERS – 60 mm DIAMETER

* INDICATES CENTER OF GRAVITY.

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SECTION 3 – SITE ENVIRONMENT

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3-2	TEMPERATURE AND HUMIDITY SPECIFICATIONS	3–3
3-3	COOLING REQUIREMENTS	3–3
3-4	ALTITUDE	3–5
3-5	LIGHTING	3–5
3-6	NOISE	3–5
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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 / EXAM ROOM :

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

OPERATOR'S CONTROL ROOM :

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

EQUIPMENT CONTROL ROOM :

- Temperature : 15°C ~ 30°C (at least 5 °C/hr gradient)
- Relative Humidity : 20 ~ 80 % RH (Non Condensing)

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 total cooling requirement for the CT system (excluding the option listed in Table 3–1) is approximately:

4,300 ~ 5300 kcal/h (5,018 ~ 6184 watts) for HiSpeed NX/i, LX/i, FX/i, DX/i, DX/i M, Plus
5,185 ~ 6,201 kcal/h (6,020 ~ 7,200 watts) for HiSpeed ZX/i, NX/i Pro

These values do not include people, lights and non-CT equipment. Use cooling Table 3–1 to calculate your cooling requirements for each room.

3-3 COOLING REQUIREMENTS (Continued)

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 for LX/i, FX/i, DX/i, DX/i M, Plus	3,331	3,868								
* Gantry for ZX/i	4,097	4,758								
Table	80	93								
PDU (480~380V System)	155	180								
PDU(200V System)	375	436								
** Operator Console	733	853								
Other										
Other										
ROOM SUB TOTALS										

Notes: * Gantry includes tube heat output based on the following typical maximum technique.
1 sec, 120 KV, 300 mA, 280 scans/hour
This is based on V.5 cooling. If the system is based on Venus cooling, which is standard for DX/i, you can save 400kcal/hour for Gantry. Means 2,900kcal/h.

For other techniques, calculate the following:
900 + (T x K x M x S ÷ 4200) kcal/h where, T: Scan Time, K: kV, M: mA, S: scans/hour

** Operator Console includes heat output from all the optional components.

3-4 ALTITUDE

The maximum elevation for a basic system (w/o options) is 2,500 m above sea level.
(For HiSpeed ZXi Series ONLY, up to 2,400 m above sea level)

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

NOTICE

Noise interference. The PDU must be kept a sufficient distance from other equipment to prevent noise from effecting the CRT's or image quality. Refer to section 2–1, Room Sizes.

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	48dB (A)	48dB (A)
O.C (Linux OC 2153675–12 or later)	57 dB (A)	57 dB (A)
GANTRY	65dB (A)	71dB (A)
GANTRY (For ZXi)	68dB (A)	69dB (A)
TABLE	–	52dB (A)
P.D.U	58dB (A)	70dB (A)

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 0.01gausses (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 VIBRATION SPECIFICATION

Vibration Specification for Operator Console should be within the following range:

Under Operation : Below 0.2 G (3 – 60 Hz)
Under No Operation : Below 0.5 G
Under Shipment : Below 0.5 G

3-10 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.

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SECTION 4 – POWER REQUIREMENTS

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4-3-2	Recommended Power Distribution System (U.S.A.)	4–7
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4-4	POWER SOURCE MONITORING	4–9
4-5	EMERGENCY POWER	4–9

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4-1 INTRODUCTION

The CT system does not include a power distribution box (PDB) which distributes necessary power to the system transformer in the PDU. Refer to Section 4–2, POWER REQUIREMENTS, 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, RECOMMENDED POWER DISTRIBUTION SYSTEM.

Configuration : Three–phase with full sized ground wire

Frequency : 50 ± 2 Hz or 60 ± 2 Hz

Voltage : 3 Phase 200 V, 380 V, 400 V, 415 V, 440 V, 460 V, or 480V

Note
200V is available for Japan ONLY.

Rating (Capacity of Transformer) :
65 kVA (for CT HiSpeed DXi/FXi/LXi/NXi/NXiS)
90 kVA (for CT HiSpeed ZXi/ZXi S/NXi Pro/NXi Plus)
Recommended: 90 kVA for all CT HiSpeed for future upgrade

For JAPAN Only:
50 kVA (for CT HiSpeed Plus)
75 kVA (for CT HiSpeed DXi/DXi B/FXi/LXi/NXi/NXiS)
100 kVA (for CT HiSpeed ZXi/ZXi S/NXi Pro/NXi Plus)
Recommended: 100 kVA for all CT HiSpeed for future upgrade

Average Power Demand : 23 KVA

Regulation : 5 % max at 50 (or 80) KVA max power demand (as measured at PDU input terminals)
Feeder size should be calculated to contribute a maximum of 2.5% regulation)

Note
Feeder size should be 22 ~ 35 mm^2, due to the PDU terminal sizes.

Maximum Voltage Variation : +10% to –5% from nominal steady state (50 Hz)
+6% to –5% from nominal steady state (60 Hz)

4-2 POWER REQUIREMENTS (continued)

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.

Daily Voltage Variation : + 10 % to – 5 % for 50 Hz or + 6 % to – 5 % for 60 Hz from nominal steady state (under the worst case line voltage conditions).

4-3 RECOMMENDED POWER DISTRIBUTION SYSTEM

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

Note

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

In the U.S., or other countries which have an ECPL (Energy Control and Power Lockout) law or similar law as ECPL; however, for the other countries which do not have such a law also, PDB's with a lockout capability should be used for field engineers' safety purpose.

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.

4-3-1 PDU Circuit Protection Characteristics

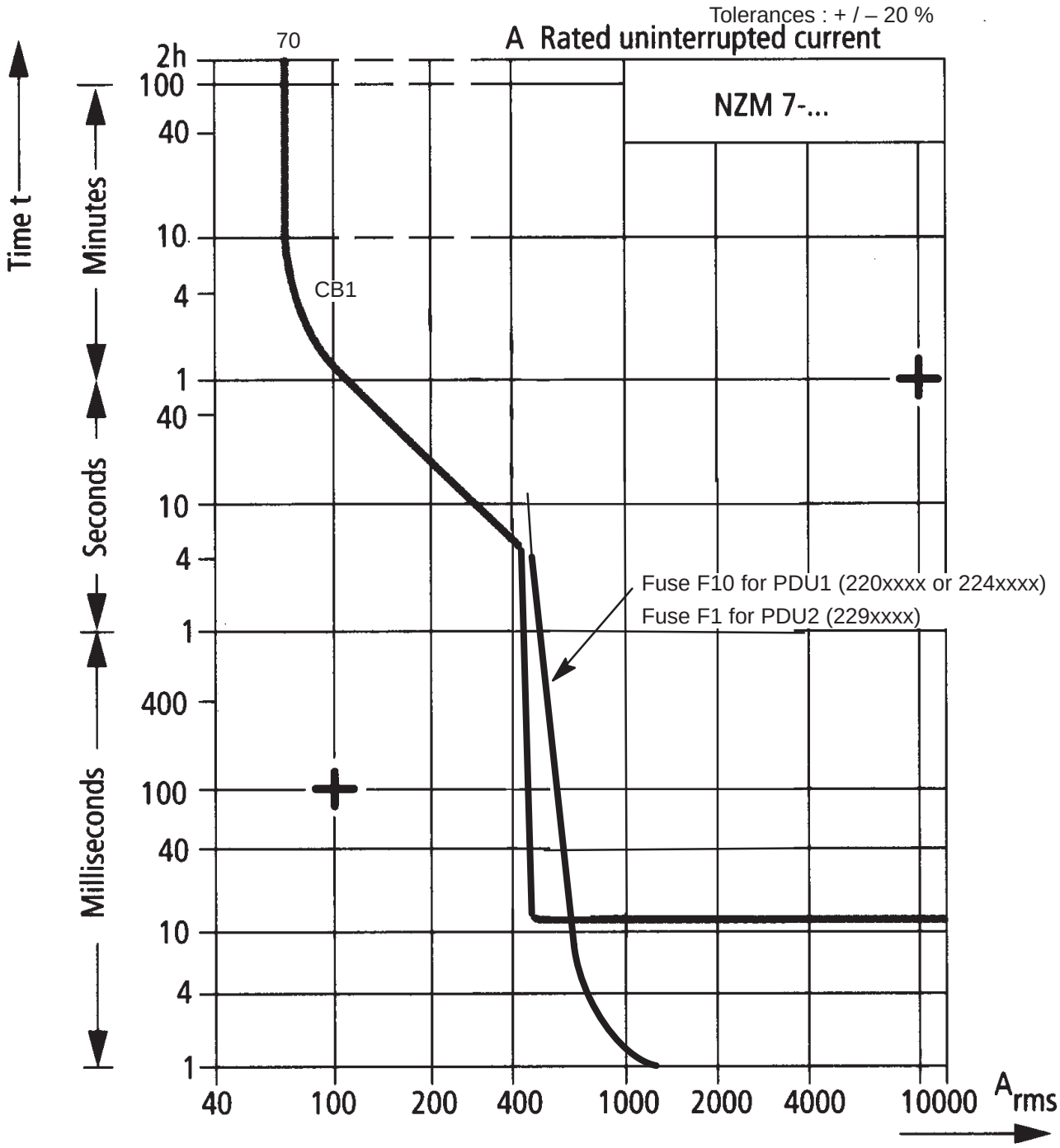
The PDU in the CT system contains the protection function against the load current as shown in the illustrations 4–1 and 4–2. When designing a hospital breaker, a protection circuit must be designed to meet those specifications and to prevent tripping of a hospital breaker when an overcurrent occurs due to a CT failure.

WARNING

IF A CIRCUIT PROTECTION AT A HOSPITAL WORKS FASTER THAN ONE IN THE PDU, THE HOSPITAL BREAKER WILL TRIP INSTEAD OF THE PDU'S. THIS MAY IMPACT FOR THE OTHER SYSTEMS SUPPLIED WITH POWER FROM A SAME SOURCE.

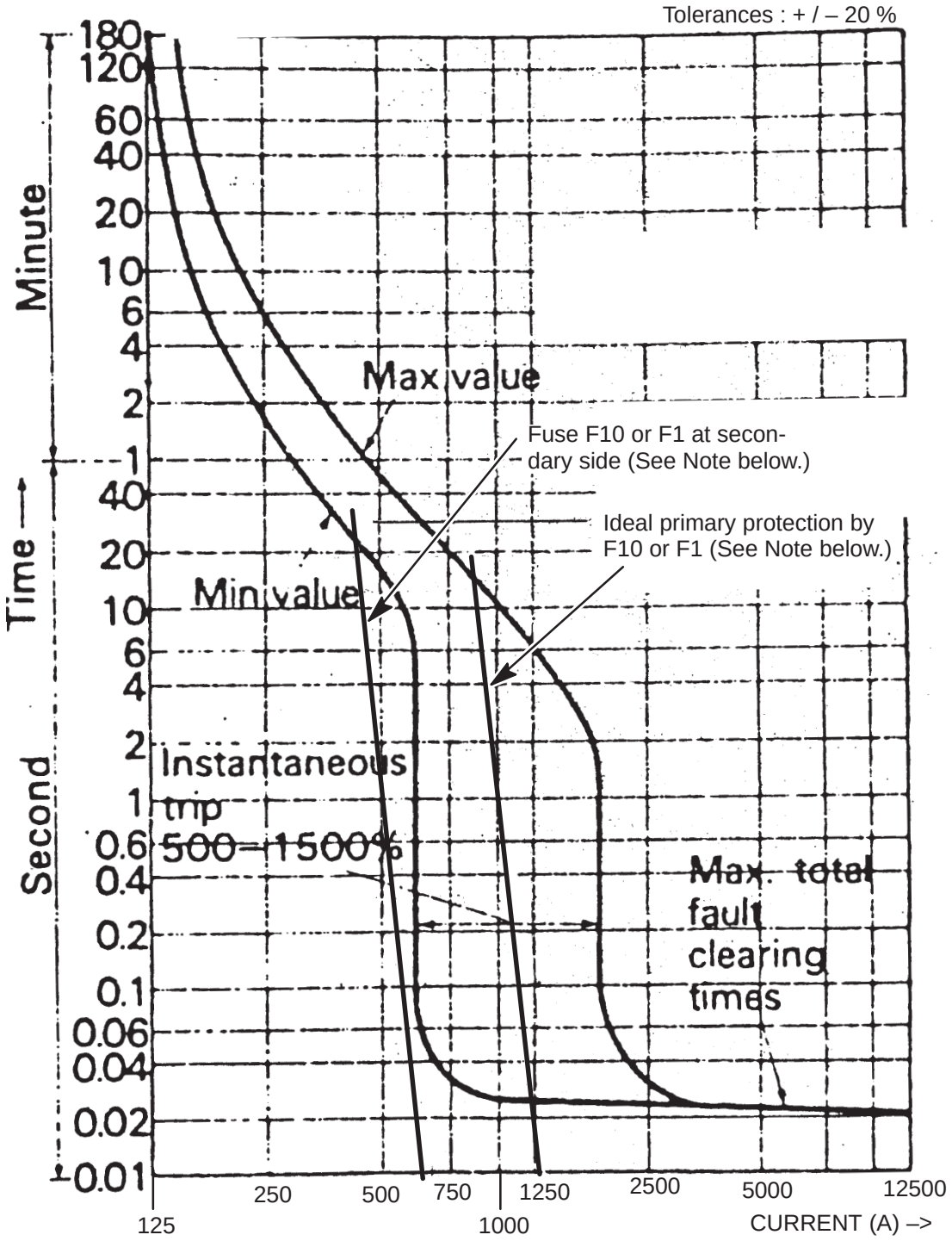
4-3-1 PDU Circuit Protection Characteristics (Continued)

Illustration 4–1 PDU (for 400V system) Circuit Protection Characteristics



4-3-1 PDU Circuit Protection Characteristics (Continued)

Illustration 4–2 PDU (for 200V system) Circuit Protection Characteristics

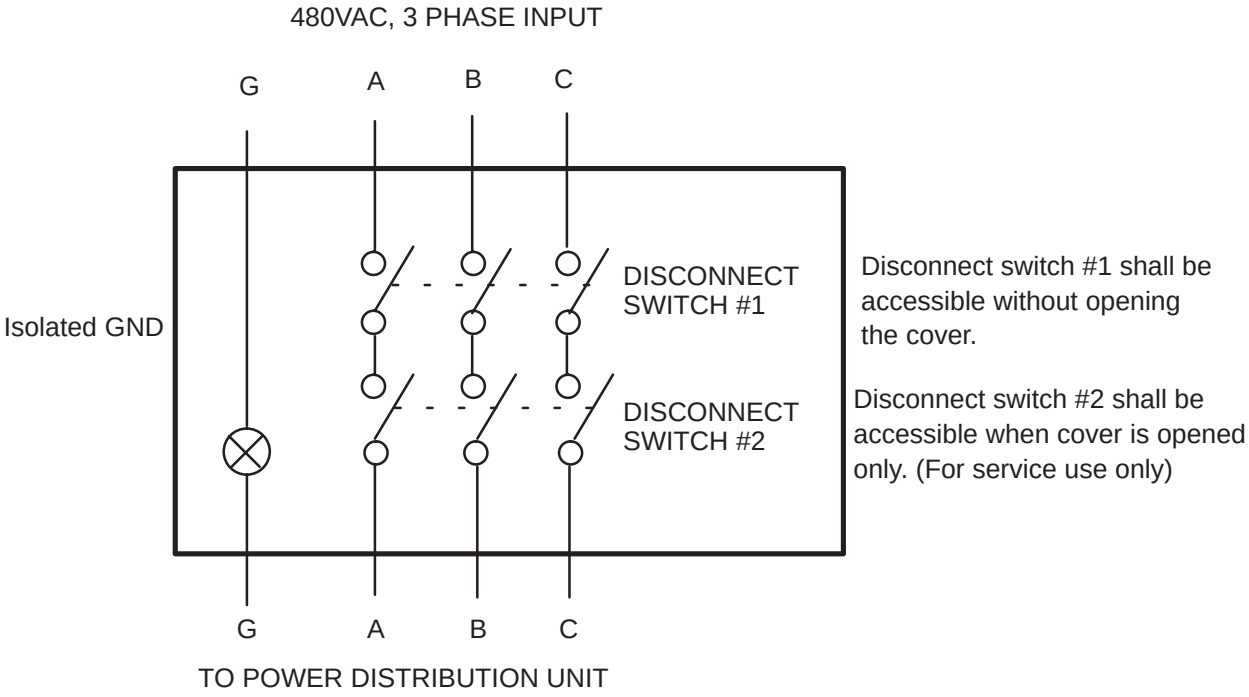


Note: Fuse F10 for PDU1 (220xxxx or 224xxxx)
Fuse F1 for PDU2 (229xxxx)

4-3-2 Recommended Power Distribution System (U.S.A.)

The Power Distribution Box shall be installed within 1.5m of the PDU.

Illustration 4–3 Power Distribution Box Interconnect (For U.S.A.)



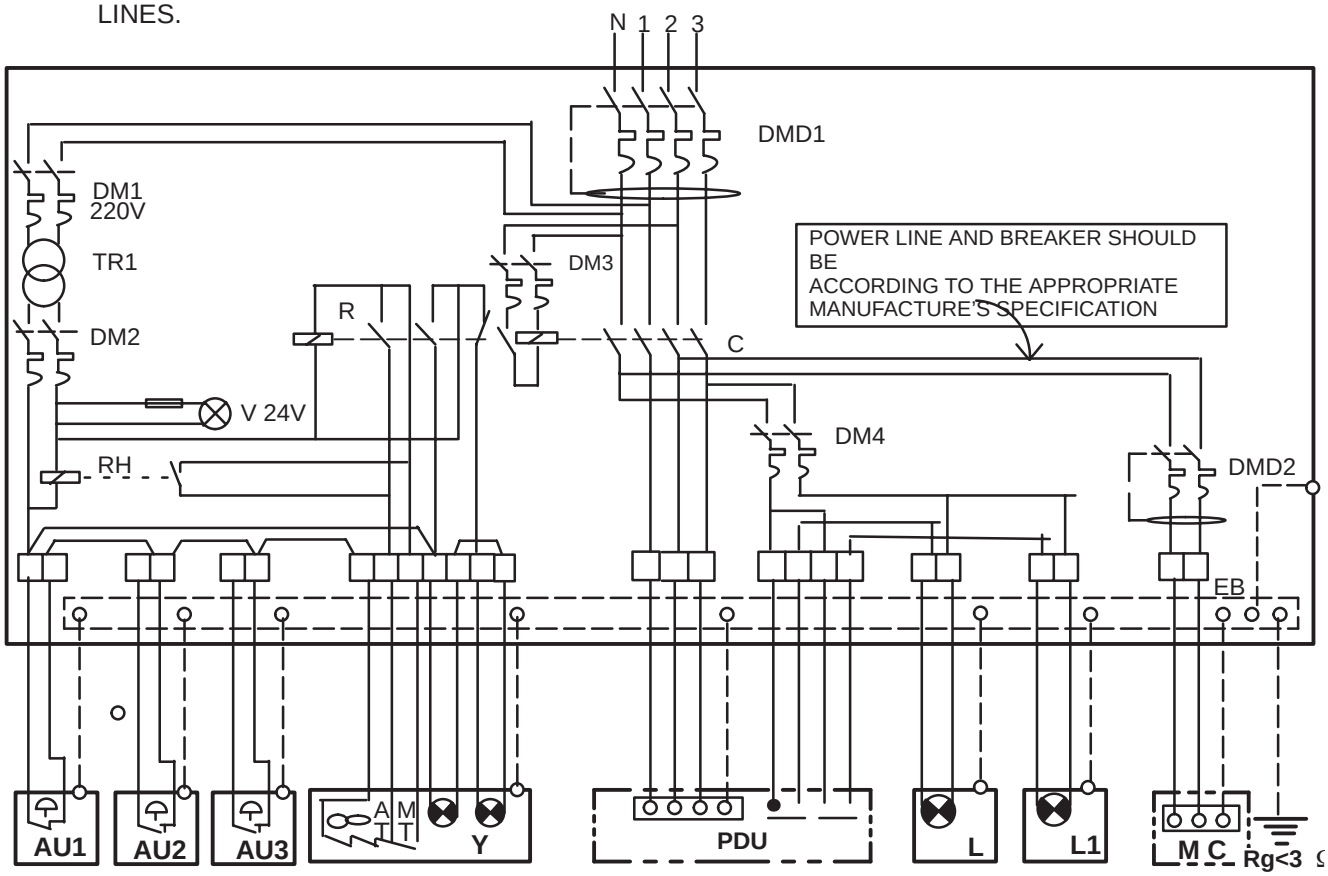
NOTE : The above are customer supplied items.
The panel has a open cover locked by mechanical key.

4-3-3 Recommended Power Distribution System (Europe)

The Power Distribution Box shall be installed within 1.5m of the PDU.

Illustration 4–4 Power Distribution Box Interconnect (For Europe)

NOTE: DEPENDING ON LOCAL REGULATIONS FUSES MAY BE REQUIRED ON THE INCOMING SUPPLY LINES.



PDB POWER DISTRIBUTION BOARD FOR CT EQUIPMENT NOT SUPPLIED BY GE

DMD1 DIFFERENTIAL THERMOMAGNETIC CIRCUIT BREAKER In=125A / Imag=2000A FOR 400V.DIFF. 300mA.

DMD2 DIFFERENTIAL THERMOMAGNETIC CIRCUIT BREAKER In= 15A / Imag= 71±20%. DIFF. 30mA.

DM1 THERMOMAGNETIC CIRCUIT BREAKER In= 2A. Imag= 12In±20%.

DM2 THERMOMAGNETIC CIRCUIT BREAKER In= 3A. Imag= 7In±20%.

DM3 / 4 THERMOMAGNETIC CIRCUIT BREAKER In= 1A. Imag= 7In±20%.

TR1 220V/24V TRANSFORMER P= 63VA.

V 24V TELLTALE LAMP RH RELAY WITH TEMPORARY CONTACT.

R 24V RELAY C 125A REMOTE CONTROLLED CONTACT

Y REMOTE CONTROL LOCKED WHEN POWERED OFF. ”ON”AND”OFF” IMPULSE BUTTONS WITH IND. LAMPS – RED=ON / GREEN=OFF LOCATED AT 1.50m ABOVE FLOOR

L YELLOW 220V LIGHT ABOVE THE MAIN ENTRANCE DOORS,INDICATES X–RAY GENERATION.

L1 RED 220V LIGHT INDICATOR CONTINUOUS OR FLASHING, ON WHEN LOW VOLTAGE IS SUPPLIED TO SYSTEM

AU1–2–3 ”BREAK THE GLASS” TYPE EMERGENCY STOP; 1,50m ABOVE FLOOR NEAR ACCESS DOORS; SUPPLY– 24V.

EB EQUIPOTENTIAL BAR LINKING ALL CONDUCTORS SYSTEM COMPONENT ROOMS

PDU POWER DISTRIBUTION UNIT:CABLES INLET ON SKIRTING BOARD WITH 2,00m EXTRA LENGTH.

MC MULTIFORMAT CAMERA OTHER THAN MFCIII, EG: LASER CAM

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

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5-1 INTRODUCTION

Section 5, SYSTEM CABLE INTERCONNECTION, addresses cable interconnections and customer furnished components for this CT system. Its subsections are broken down as follows:

- 5–1 INTRODUCTION
  Overall system interconnects, component designations
- 5–2 SYSTEM INTERCONNECTS
  All cable interconnects for the system
- 5–3 CONTRACTOR FURNISHED COMPONENTS
  Miscellaneous components typically provided by a contractor

5-1-1 Component Designators

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
	PDU	Power Distribution Unit
Customer Supplied	PDB	Power Distribution Box

5-1-2 Group Interconnects

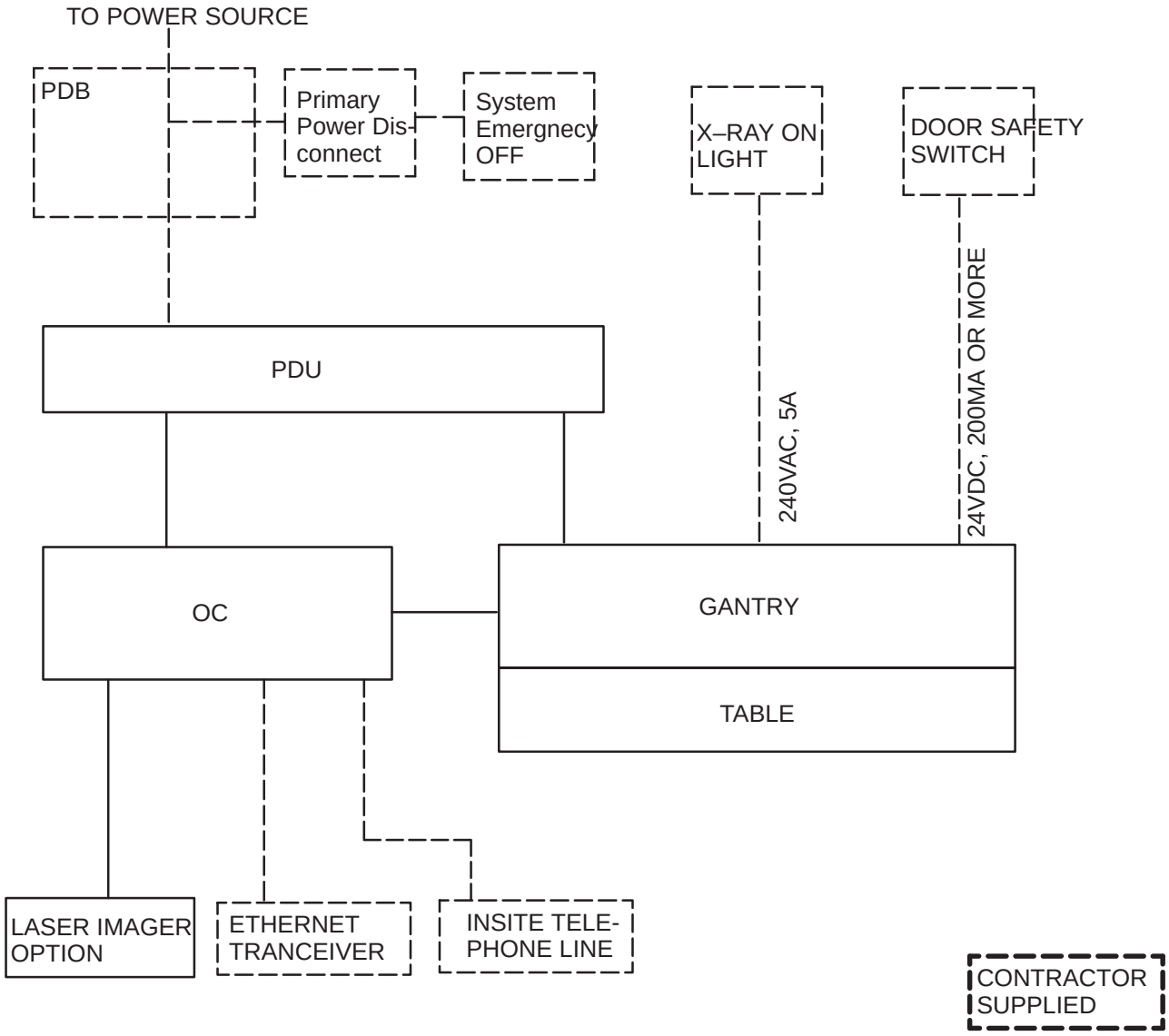
Illustration 5–1 shows the Group Interconnect Diagram for the CT system. Each group contains one or more cables. Refer to this diagram while using the tables in this section.

5-2 SYSTEM INTERCONNECTS

5–2–1 Introduction

Table 5–1, Illustration 5–1, and Illustration 5–2 contains information on all cable interconnections between basic system components.

Illustration 5–1 Interconnection Runs



IMPORTANT NOTE:

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

5–2–2 Definition of Terms

The definitions of terms used in Table 5–1 are:

- Group Number: identifying number assigned to bundles (i.e. groups) of cables as shown in Illustration 5–1, System Interconnect Diagram.
- Area: cross-sectional area of the combined cables in a group.

Note

The group area was found by adding up the circular cross-sectional areas of all individual cables within a group. It does not take into account any fill factors or air space between cables. Adhere to applicable electrical codes for fill factors.

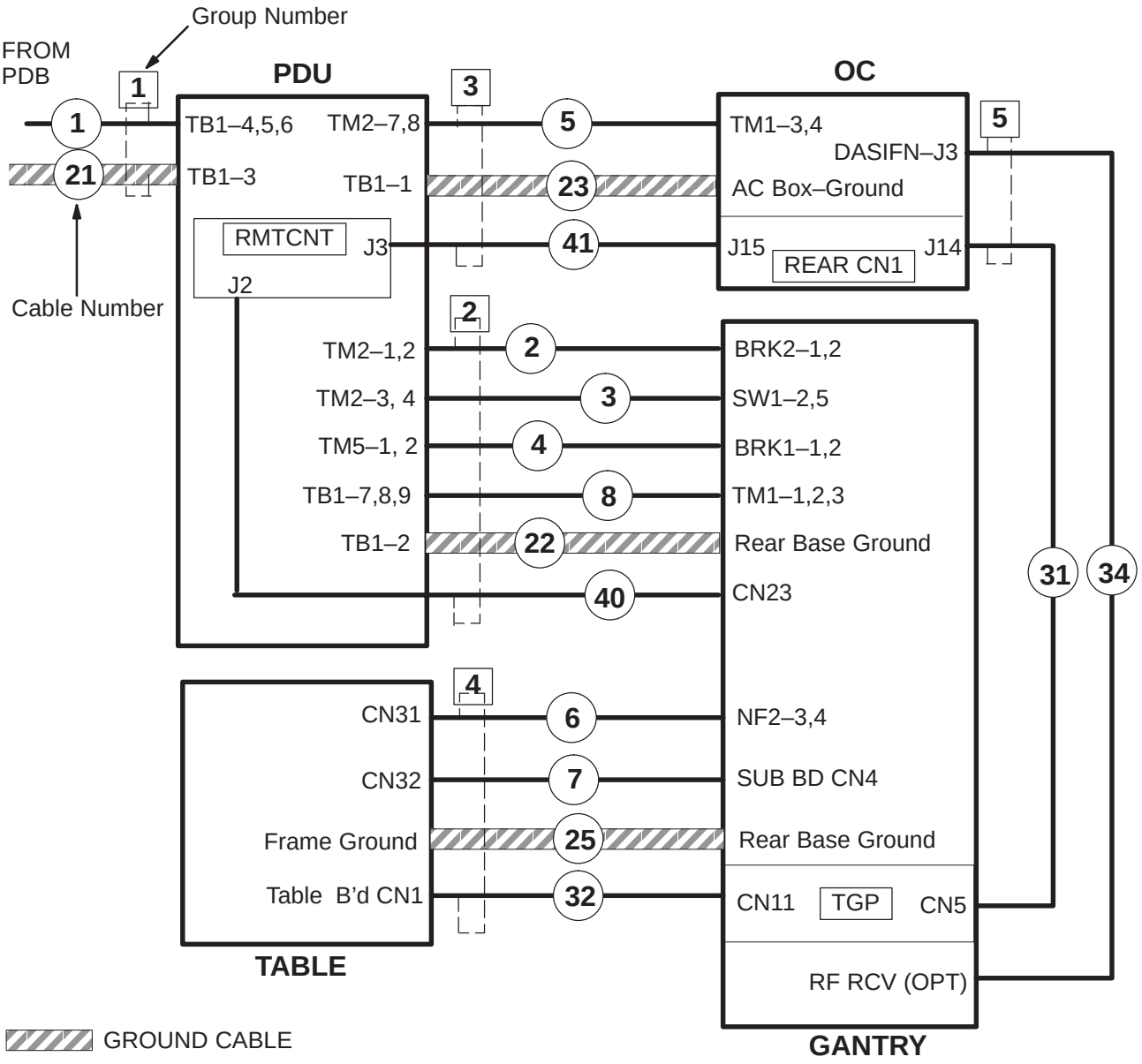
- Actual Length: total length of wire (see usable length).
- Usable Length: total length of a cable MINUS 1.5 m required for servicing and take up within cabinets and the PDU.

Note

Actual usable length will depend upon the routing within the PDU.

- Cable Number: unique number assigned to each cable identified in Illustration 5–2, System Interconnect Diagram.
- Cable Diameter: diameter of an individual cable.
- Cable Leads (AWG/No.): gauge of wires and total number of wires within a given cable.

Illustration 5–2 System Interconnect Diagram



Notes

- All units must be isolated from building structures.
- Cable specifications are found in table 5–1.
- Ground cable No.21 is not furnished with the system.
- Numbers inside of a box represent group number and numbers within a circle represent cable number.
- The Gantry can supply power for Scan Room X–ray On Light and/or System Power On Light. For details, refer to Installation manual.

Table 5–1 Cable Innerconnect List

Group No.	Group Area (mm^2)	FROM	TO	Cable Length		Cable Dia. (mm)	Cable Number	AWG#	Part Number	Rated Voltage	Actual Voltage	Notes
				Actual (m)	Usable (m)							
1	730	PDB	PDU TB1–4, TB1–5, TB1–6	Max. 20		12.5	1		–	AC 600V	AC 480 ~ 200V	Customer Supplied(*) (included in PDU Option kit for Japan**)
		PDB	PDU TB1–3	20 (Max.)	18	9.5	21		2202405	AC 600V	–	Ground UL1431
2	945	PDU TM2–1, TM2–2	SG BRK2–1, BRK2–2	19.5	18	10.7	2	#10	2175657	AC 600V	AC 200V	AC200V (Servo Amp) UL2516
		PDU TM2–3, TM2–4	SG SW1–2. SW1–5			10.1	3	#10	2175656	AC 600V	AC 115V	AC115V (T/G) UL2516
		PDU TM5–1, TM5–2	SG BRK1–1, BRK1–2			10.1	4	#10	2175655	AC 600V	AC 115V	AC115V (Slip Ring) UL2516
		PDU TB1–7, TB1–8, TB1–9	SG TM1–1. TM1–2. TM1–3			25	8	#3	2175654	AC 600V	AC 400V	AC400V, 3–phase (XG Power) UL2501
		PDU TB1–2	SG Ground Plate	20 (Max.)		12.1	22	#4	2176942	AC 600V	–	Ground UL1431
		PDU RMTCNT J2	SG CN23	19.5		10.7	40	#18	2175743	AC 600V	DC 24V	Emergency/ Safety Loop 105°C/300V or more UL2516
3	589	PDU TM2–7, TM2–8	OC TM1–3, TM1–4	19.5	18	22.7	5	#10	2175658	AC 600V	AC 115V	AC115V (Power) UL2516
		PDU TB1–1	OC AC Box–Ground	20 (Max.)	18	9.5	23	#6	2176943	AC 600V	–	Ground UL1431
		PDU RMTCNT J3	OC REAR CN1–J15	19.5	18	12	41		2175744	AC 600V	DC 24V	Emergency Off 105°C/300V or more

(Continued)

* Requires wiring makers, tags, tools, lugs, and solderless terminals with crimping tools for AWG.#14 through #4 (YPT–60 or equivalent).

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

** For Japan ONLY: The power cable between PDB and PDU are shipped with system.
This cable specifications: Actual length: 11m, usable length: 7m

Table 5–1 Cable Innerconnect List (Continued)

Group No.	Group Area (mm^2)	FROM	TO	Cable Length		Cable Dia. (mm)	Cable Number	AWG#	Part Number	Rated Voltage	Actual Voltage	Notes
				Actual (m)	Usable (m)							
4	See Note below.	SG NF2–3, NF2–4	PT CN31	3	2	–	6	#14	2176621	AC 600V	AC 115V	AC115V (Power) UL1015
		SG SUB BD CN4	PT CN32			–	7	#14 /18	2176622	AC 600V	AC 115V	AC115V (Valve/Pump) UL1015
		SG Ground Plate	PT Frame Ground		3	9.5	25	#6	2203071	AC 600V	–	Ground UL1431
		SG TGP CN11	PT Table b'd CN1		2	–	32		2176270	AC 300V	DC 5V, DC 24V	Control UL2464
5	300	SG TGP CN5	OC REAR CN1–J14	19.5	18	10	31		2196035	AC 300V	DC 12V	Communication / Intercom
		SG RF RCV OPT	OC DASIFN – J3			12	34		2200197	–	–	DAS data (Opt cable, See Notice.)
Note The cables in group No.4 run under the Gantry and do not require a raceway or duct.												

NOTICE

Use extreme caution when installing the optical fiber cable. It is fragile and should not be stepped on, kinked, or bent sharply.

5-3 CONTRACTOR FURNISHED COMPONENTS

To be determined in advance.

Installation Support Services personnel meet with the customer to create a list of contractor furnished components on a site by site basis.

SECTION 6 – SHIPPING DELIVERY

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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 –10° C to +50° C and relative humidity (non-condensing) should not exceed 10%. Storage duration should not exceed 90 days.

PACKAGE SYMBOLS (STORAGE)
ILLUSTRATION 6–1

6-3 GANTRY CONSIDERATION

The CT gantry is shipped with the dolly attached as shown in Illustration 6–2.

Note

The following dimensions exclude any attached wooden skids.

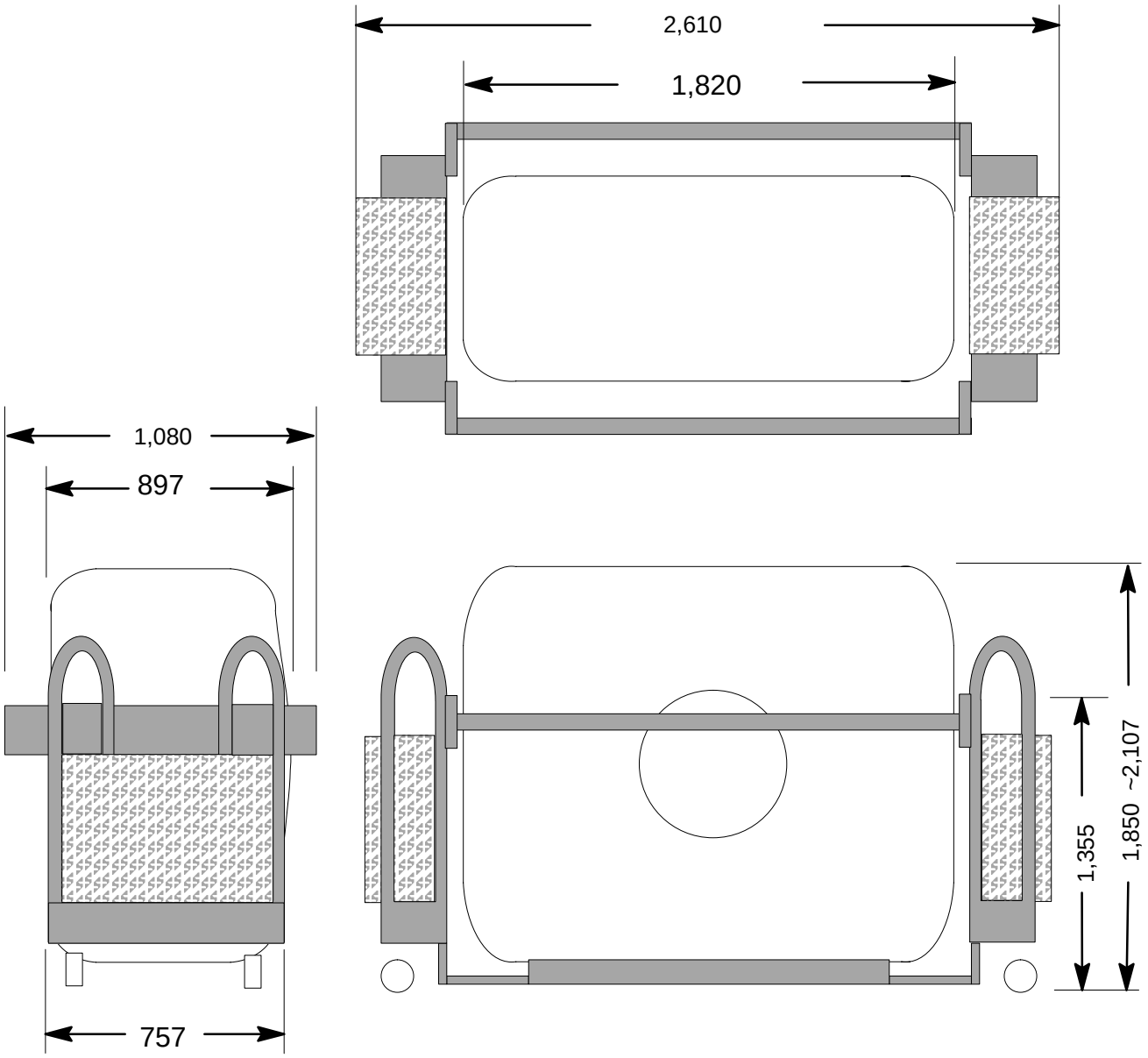
1 Check elevator weight capacity and size, if one is required to move the CT gantry from the point of delivery to the scanning room. The total weight of (gantry + dolly) is 1290 kg (1090 kg + 200 kg) and requires an elevator at least 2.6m long and 1.3 m wide, with the door closed.

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 LOAD	HEIGHT	WIDTH	LENGTH (CORNERS)	COMMENTS
INITIAL ENTRANCE / DOOR					
HALL TO ELEVATOR					
OTHER (CORNERS...)					
ELEVATOR					
ELEVATOR TO HALL					
HALL					
OTHER (CORNERS...)					
ENTRY TO ROOM					

6-3 GANTRY CONSIDERATION (continued)



NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS (mm)

GANTRY DIMENSIONS WITH CASTERS
ILLUSTRATION 6–2

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SECTION 7 – PREINSTALLATION CHECK LIST / TOOLS AND TEST EQUIPMENT

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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 6 ft (1.83 m) AC power leads available at the Console?
_____	_____	_____	- 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?
_____	_____	_____	- Do you have the IRIX OS CD–ROM?

7-1 PREINSTALLATION CHECK LIST (continued)

Where does system AC power originate? _____

To what point is the earth ground attached? (found in AC Power Panel, PowerTECH, etc.): _____

COMMENTS: _____

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SECTION 8 – MOBILE CT SYSTEM REQUIREMENTS

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8-1 SYSTEM CONFIGURATION

Note

Mobile installations should be done by GE approved vendors only. Refer to direction 2218879–100 for GE CT Mobile requirements in addition to the data provided here.

8-1-1 SYSTEM

Refer to Section 1–1, System for the items other than described below.

- Mobile Accessories consisting of:
  - Mobile Maintenance Kit

8-1-2 OPTIONS

The following option list shows items impacted to CT HiSpeed System Preinstallation. For more information, refer to the related option manual.

Option	Manual Part Number	Items impacted to System Preinstallaion
Camera Interface	2211259	None
SmartView	Not Applicable in the Mobile system.	
Site Assemble	2221875	None
High Speed Recon	2227160	None
Additional Hard Disk Drive	2227161	None
Main Memory	2227162	None
Rear Control Panel	2227163	None
Additional MOD Drive	2227164	None
Power Option	2231362	None
Fast Scan	2231363	None
Helical Option	2231364	None
Hyper Cooling	2231365	None
Advanced IQ(FOV50) Option	2231366	None
Intercom Foot Switch	Not Applicable in the Mobile system.	
Slave Monitor	Not Applicable in the Mobile system.	
Smart Recon	2233105	None
Exposure Signal Output	Not Applicable in the Mobile system.	

8-2 ROOM LAYOUTS

8-2-1 ROOM SIZES

Refer to Section 2–1, Room Sizes for the items other than described below.

Table 8–1 Component Dimensions

COMPONENT	LENGTH	WIDTH	HEIGHT
	mm	mm	mm
1. Gantry	1, 820	910 1,557 (TILTED)	1,850
2. Patient Table	2,243	650	995
3. PDU	700	550	820
4. Operator Console	1,100	860	xxx (w/o CRT, Keyboard)

8-2-2 RADIATION PROTECTION

Refer to Section 2–2, Radiation Protection.

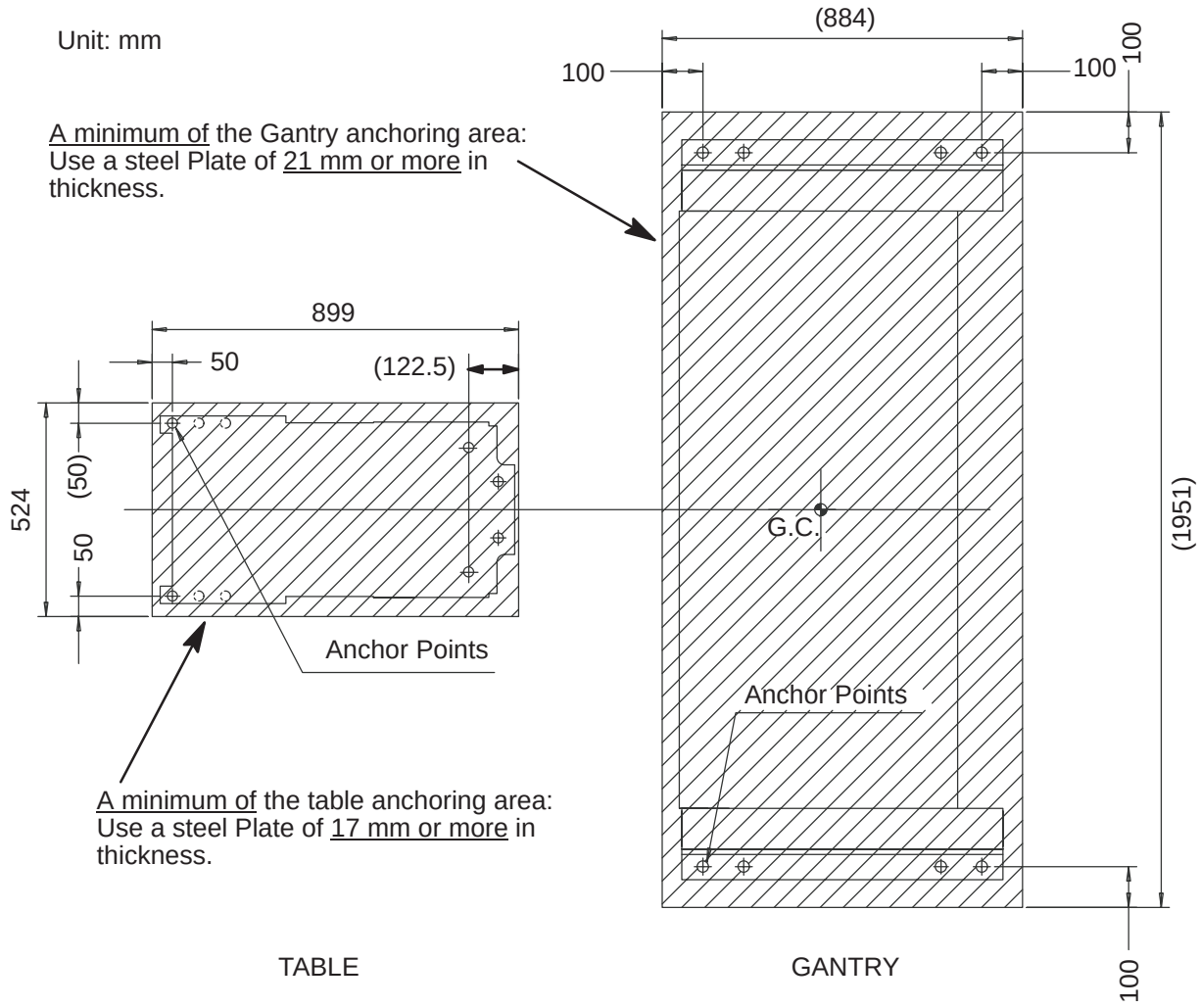
8-2-3 CONSTRUCTION MATERIALS

Floor

See Direction 2218879–100 Mobile CT System Requirements, Section 5, Equipment Mounting Requirements.

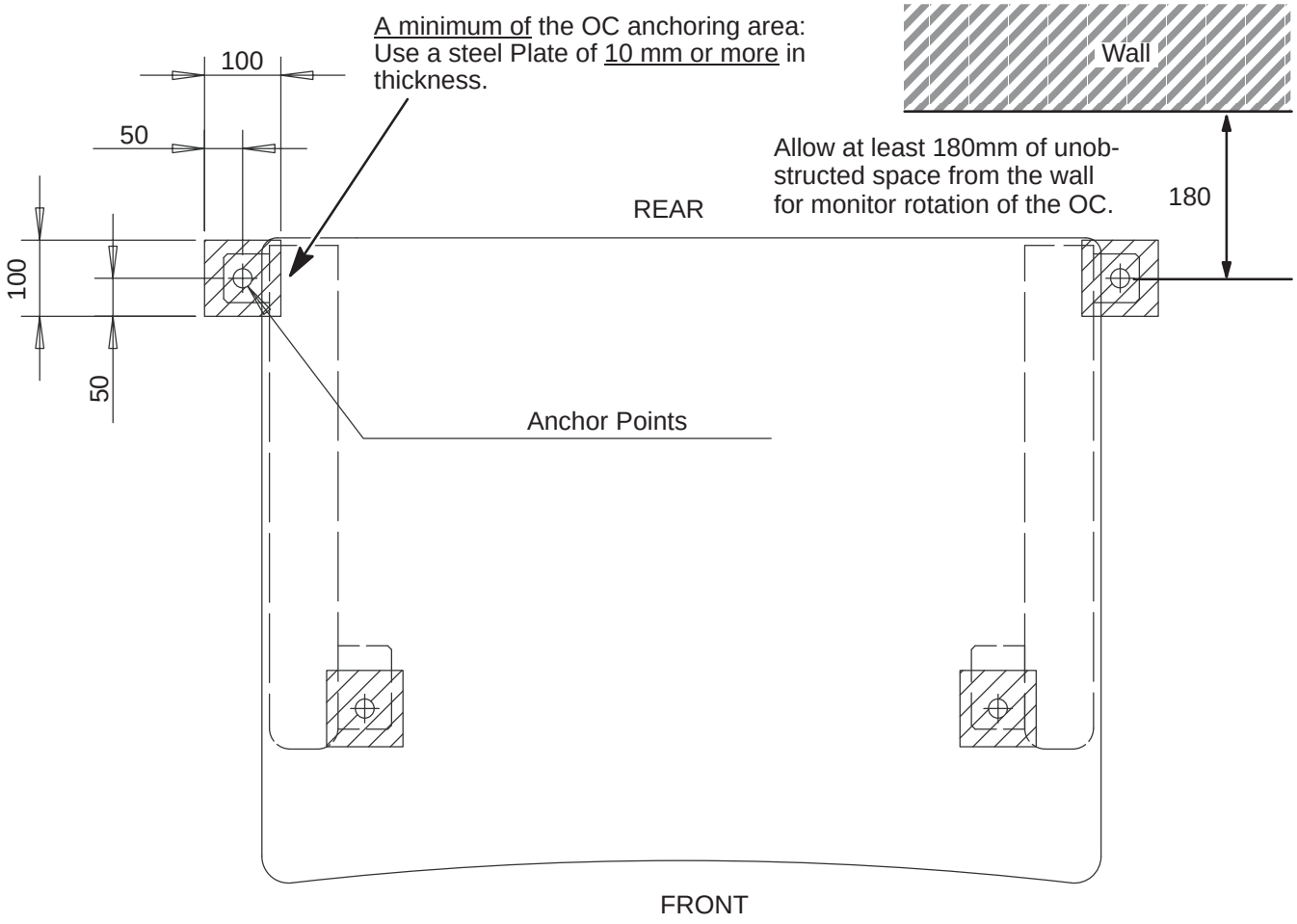
The floor where each equipment (Gantry, Table, OC, and PDU) will be anchored must be made by the steel plate. For the area and thickness of a steel plate, see illustrations below. These area are minimum requirements. Also, the surfaces of the steel plate MUST be flush with the floor surface made of non–steel materials.

Illustration 8–1 Steel Plates for Anchoring the Gantry and Table



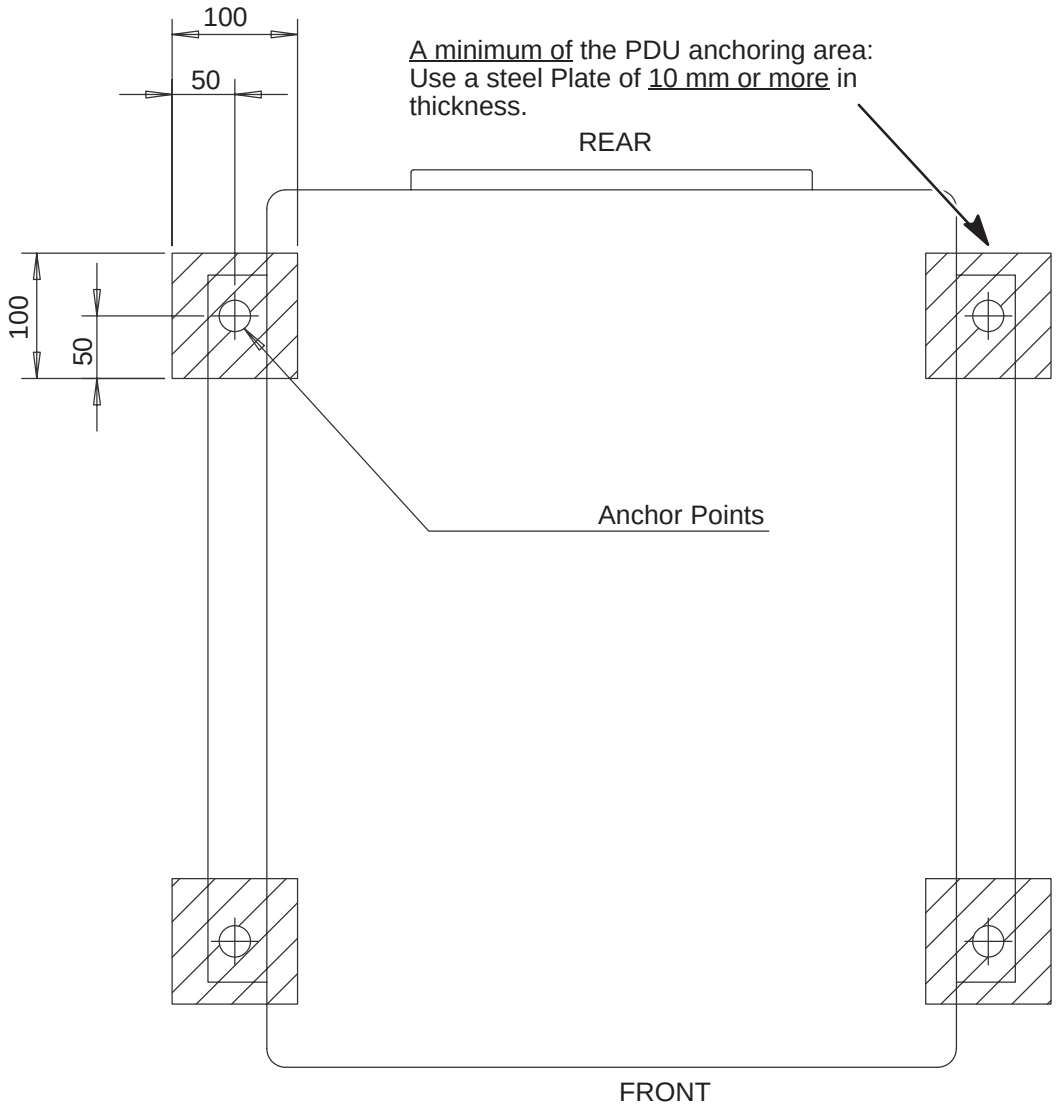
8-2-3 CONSTRUCTION MATERIALS (Continued)

Illustration 8–2 Steel Plates for Anchoring the OC



8-2-3 CONSTRUCTION MATERIALS (Continued)

Illustration 8–3 Steel Plates for Anchoring the PDU



Calculation

Refer to Section 2–3–2, Calculation.

Walls

See Direction 2218879–100 Mobile CT System Requirements, Section 5, Equipment Mounting Requirements.

8-2-4 CABLING CONSIDERATIONS

Refer to Section 2–4, Cable Considerations.

8-2-5 ARCHITECTURAL REMINDERS

Refer to Section 2–5, Architectural Reminders.

8-2-6 FLOOR LOADING AND WEIGHTS

Refer to Section 2–6, Floor Loading and Weights for the items other than described below.

- Floor flatness specifications for installation area of OC, Gantry, PDU, and Table : +/– 2mm

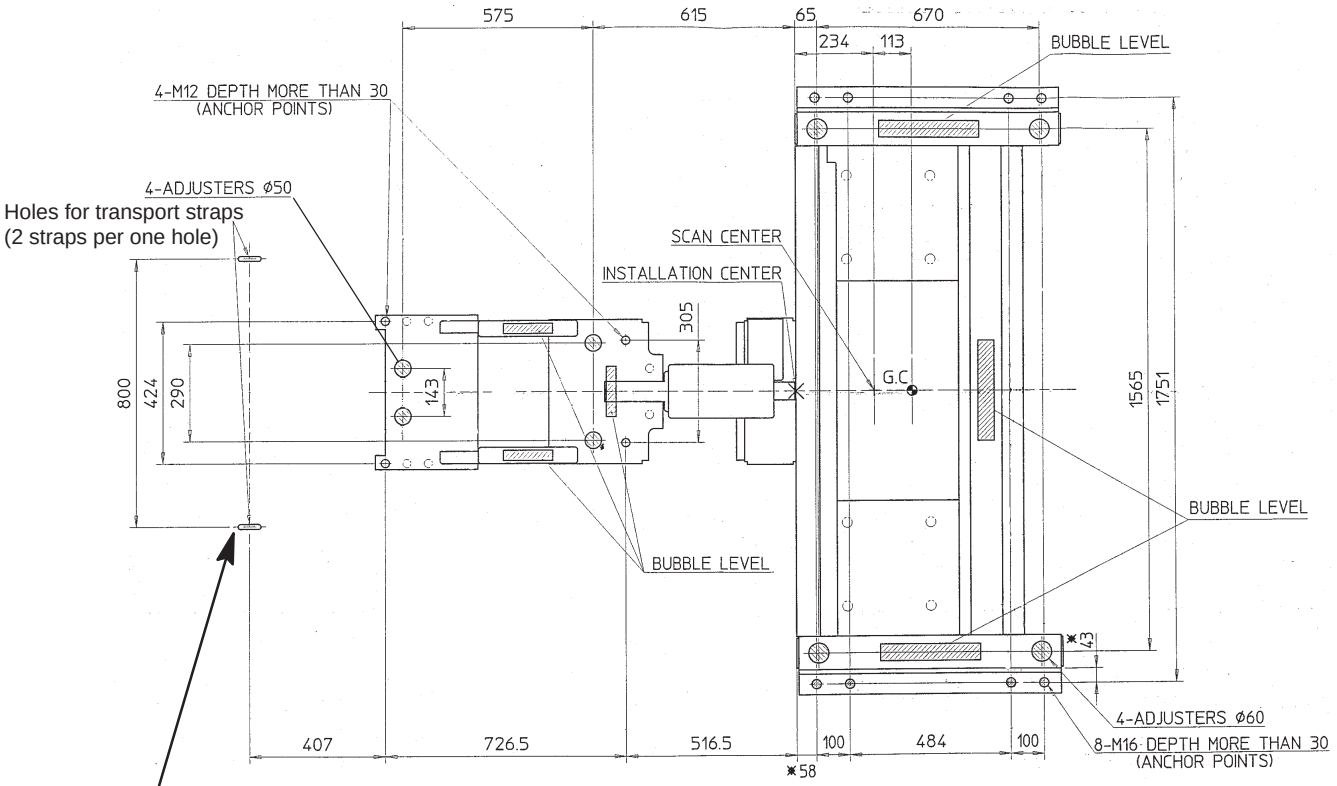
Table 8–2 CT Floor Loading

COMPONENT	WEIGHT kg	OVERALL W x D x H mm	EFFECTIVE WEIGHT/AREA kg/m^2 Note 1	LOAD PATTERN mm	NORMAL METHOD
Scanning Gantry	1,090 1,170 (for ZXi ONLY)	1,820 x 910 x 1,850	740	Four leveling pads 60 diameter	Must be anchored to floor
Patient Table	295	650 x 2,243 x 995	1,000	Two leveling pads 50 diameter and two leveling pads 60 diameter.	Must be anchored to floor
Operator Console	200	1,100 x 860 x 1, 414	340	Four casters 40 diameter, and two adjusters	Must be anchored to floor
PDU	157 (400V) 275 (200V)	550 x 700 x 820	745	Four leveling pads 37 diameter, Four casters 65 diameter x 38 width	Must be anchored to floor
Note 1 : Weight/Area is defined as NET Weight/Base Area. Consult a structural engineer for actual loading calculation.					

8-2-7 COMPONENT DIMENSIONS

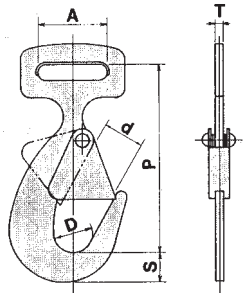
Refer to Section 2–7, Component Dimensions for the items other than described below.

Illustration 8–4 Gantry and Table Anchors/Adjusters



Breaking Force of Holes
: 500 kgf or more

Transport Strap Specifications

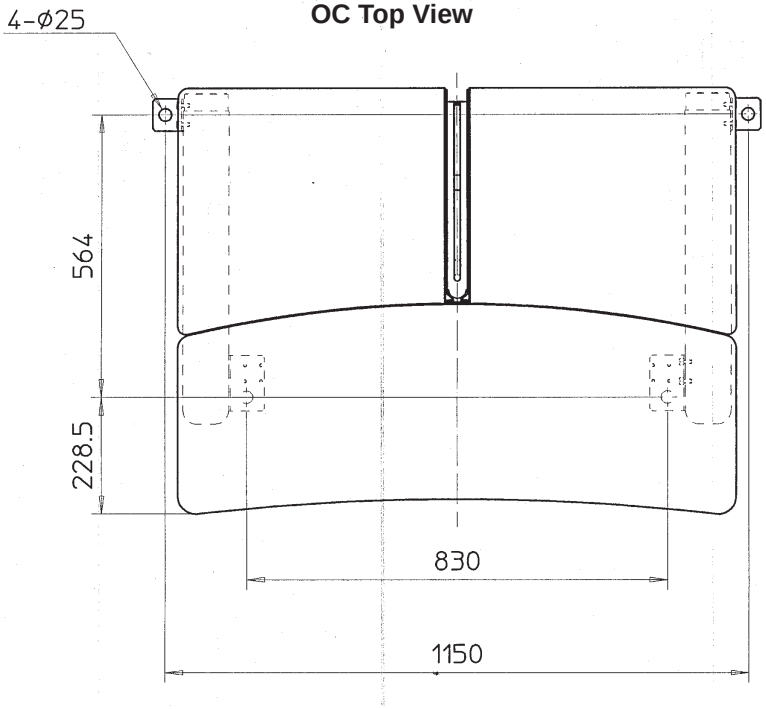


A: 36 mm
D: 20 mm
S: 15 mm
T: 4.5 mm
P: 95 mm
d: 22 mm
Breaking Force: 500 kgf

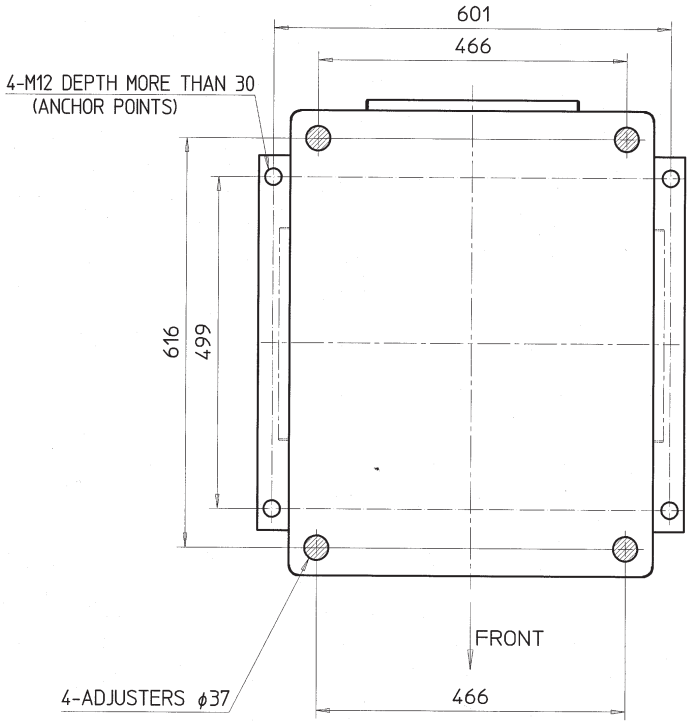
8-2-7 Component Dimensions (continued)

Illustration 8–5 OC and PDU Anchor

OC Top View



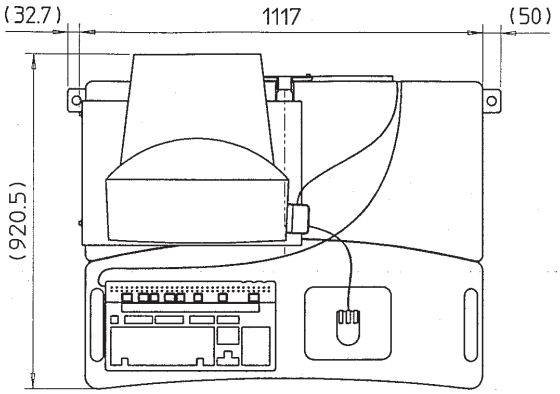
PDU Top View

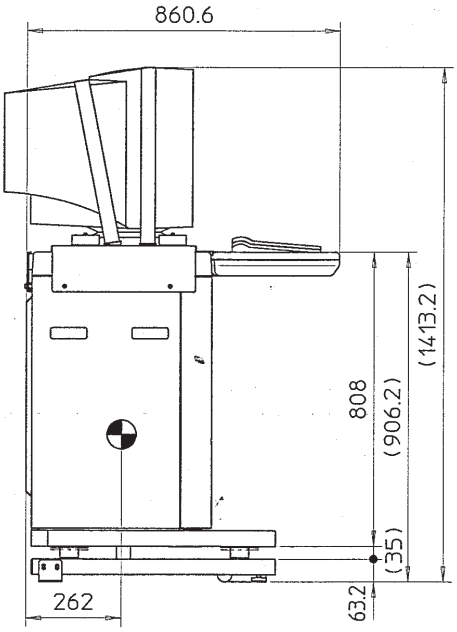


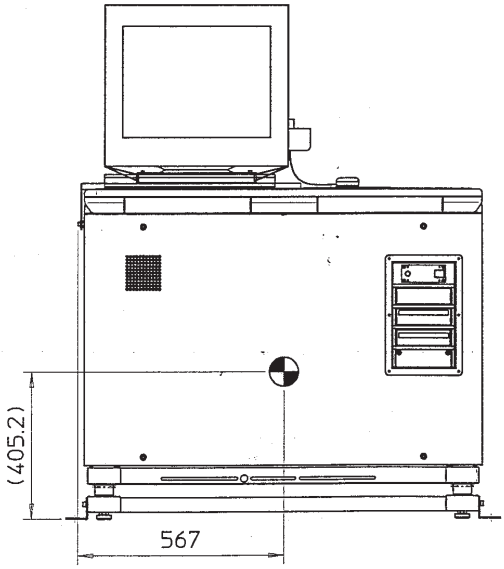
8-2-7 Component Dimensions (continued)

Illustration 8–6 Operator Console

The CRT is separated from the OC at shipment. It can also be installed onto either of left or right side of the OC.



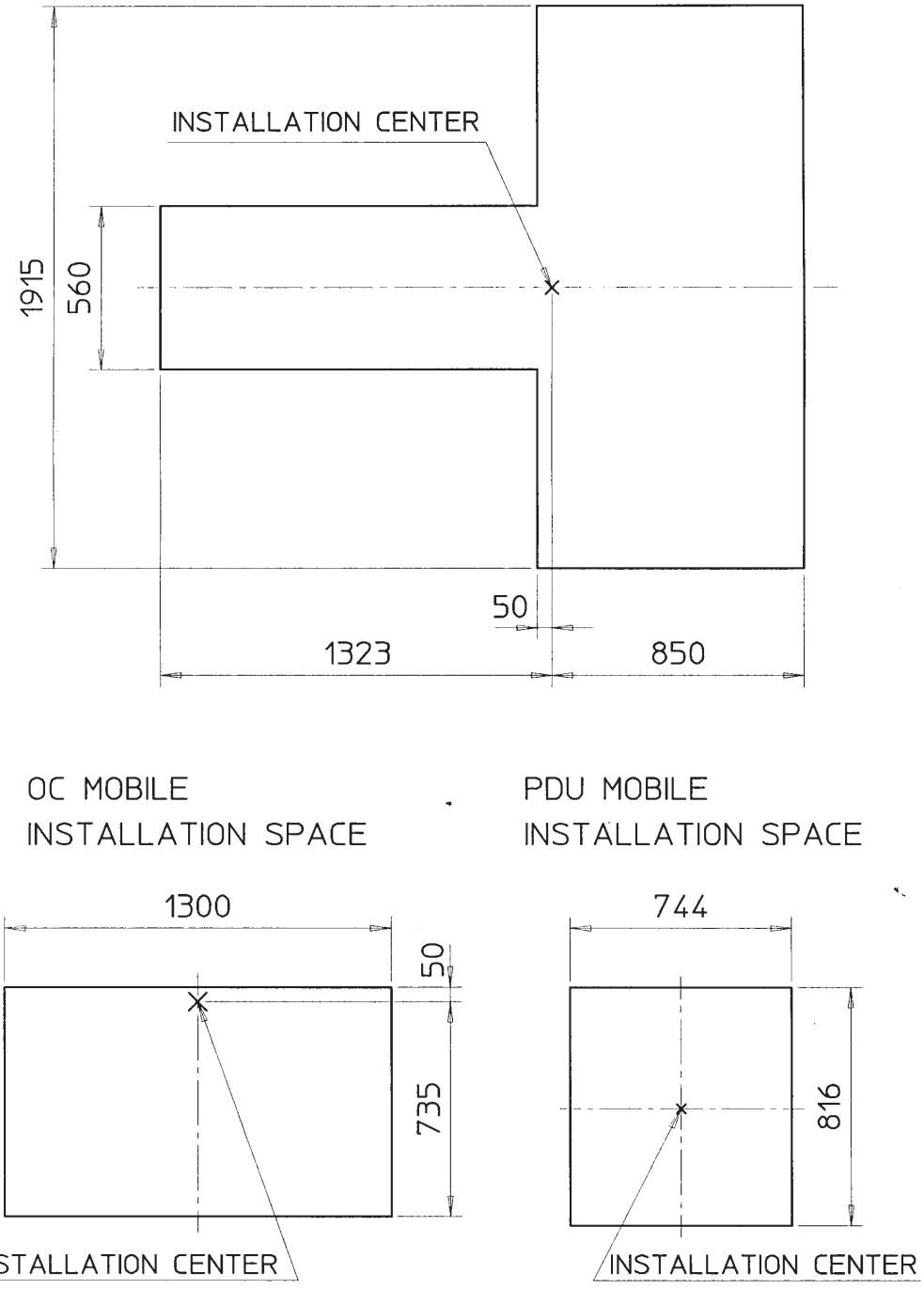




8-2-7 Component Dimensions (continued)

Illustration 8–7 Area to be finished Flatly

Flatness Specifications : + / – 2 mm



8-3 SITE ENVIRONMENT

8-3-1 INTRODUCTION

Refer to Section 3–1, Introduction.

8-3-2 TEMPERATURE AND HUMIDITY SPECIFICATIONS

See Direction 2218879–100 Mobile CT System Requirements, Section 5, Equipment Mounting Requirements.

8-3-3 COOLING REQUIREMENTS

Refer to Section 3–3, Cooling Requirements.

8-3-4 ALTITUDE

Refer to Section 3–4, Altitude.

8-3-5 LIGHTING

Refer to Section 3–5, Lighting.

8-3-6 NOISE

Refer to Section 3–6, Noise.

8-3-7 ELECTRO MAGNETIC INTERFERENCE

Refer to Section 3–7, Electro Magnetic Interference.

8-3-8 POLLUTION

Refer to Section 3–8, Pollution.

8-3-9 VIBRATION SPECIFICATION

Vibration Specification for Operator Console should be within the following range:

Under Operation : Below 0.2 G (3 – 60 Hz)
Under No Operation : Below 0.5 G
Under Shipment : Below 0.5 G
Under Transport :See Direction 2218879–100 Mobile CT System Requirements, Section 5, Equipment Mounting Requirements.

8-3-10 INSTALLING INSITE

Refer to Section 3–10, Installing InSite.

8-4 POWER REQUIREMENTS

Refer to Section 4, Power Requirements.

8-5 SYSTEM CABLE INTERCONNECTION

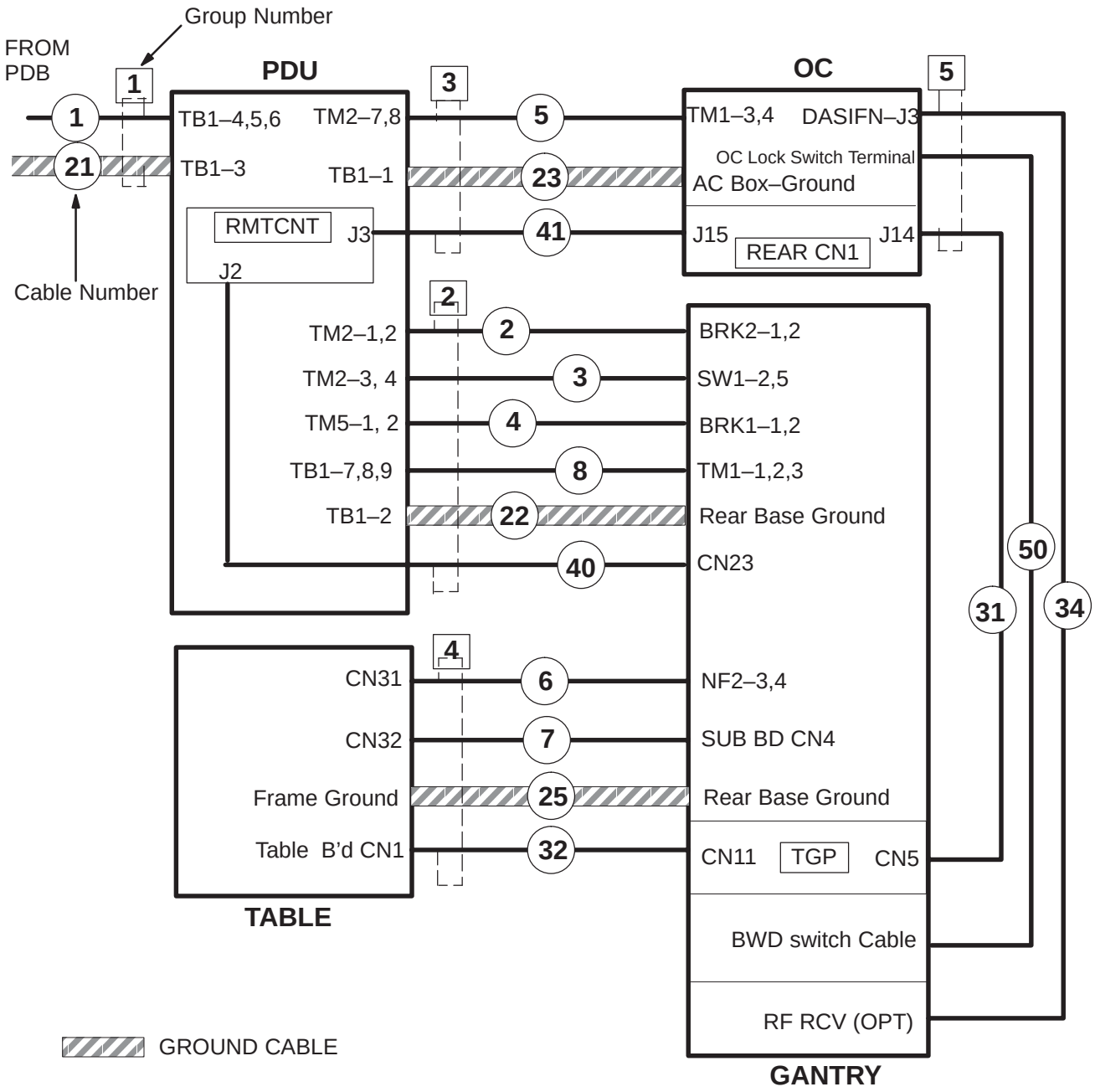
8-5-1 INTRODUCTION

Refer to Section 5–1, Introduction.

8-5-2 SYSTEM INTERCONNECTS

Refer to Section 5–2, System Interconnects for the items other than described below.

Illustration 8–8 System Interconnect Diagram



8-5-2 System Interconnects (continued)

Notes

- All units must be isolated from building structures.
- Cable specifications are found in table 5–1.
- Ground cable No.21 is not furnished with the system.
- Numbers inside of a box represent group number and numbers within a circle represent cable number.
- The Gantry can supply power for Scan Room X–ray On Light and/or Gantry Power On Light. For details, refer to Installation manual.

Table 8–3 Cable Innerconnect List

Group No.	Group Area (mm^2)	FROM	TO	Cable Length		Cable Dia. (mm)	Cable Number	Part Number	Notes
				Actual (m)	Usable (m)				
1	730	PDB	PDU TB1–4, TB1–5, TB1–6	Max. 20**		12.5	1	–	Customer Supplied(*) (included in SUT kit for Japan)
		PDB	PDU TB1–3	20 (Max.)	18	9.5	21	2202405	Ground UL1431
2	945	PDU TM2–1, TM2–2	SG BRK2–1, BRK2–2	19.5	18	10.7	2	2175657	AC200V (Servo Amp) UL2516
		PDU TM2–3, TM2–4	SG SW1–2. SW1–5			10.1	3	2175656	AC115V (T/G) UL2516
		PDU TM5–1, TM5–2	SG BRK1–1, BRK1–2			10.1	4	2175655	AC115V (Slip Ring) UL2516
		PDU TB1–7, TB1–8, TB1–9	SG TM1–1. TM1–2. TM1–3			25	8	2175654	AC400V, 3–phase (XG Power) UL2501
		PDU TB1–2	SG Ground Plate	20 (Max.)	18	12.1	22	2176942	Ground UL1431
		PDU RMTCNT J2	SG CN23	19.5	18	10.7	40	2175743	Emergency/ Safety Loop 105°C/300V or more

(Continued)

8-5-2 System Interconnects (continued)

Table 8–3 Cable Innerconnect List (Continued)

Group No.	Group Area (mm^2)	FROM	TO	Cable Length		Cable Dia. (mm)	Cable Number	Part Number	Notes
				Actual (m)	Usable (m)				
3	589	PDU TM2–7, TM2–8	OC TM1–3, TM1–4	19.5	18	22.7	5	2175658	AC115V (Power) UL2516
		PDU TB1–1	OC AC Box–Ground	20 (Max.)	18	9.5	23	2176943	Ground UL1431
		PDU RMTCNT J3	OC REAR CN1–J15	19.5	18	12	41	2175744	Emergency Off 105°C/300V or more
4	See Note below.	SG NF2–3, NF2–4	PT CN31	3	2	–	6	2176621	AC115V (Power) UL1015
		SG SUB BD CN4	PT CN32			–	7	2176622	AC115V (Valve/Pump) UL1015
		SG Ground Plate	PT Frame Ground		3	9.5	25	2203071	Ground UL1431
		SG TGP CN11	PT Table b'd CN1		2	–	32	2176270	Control UL2464
5	340	SG TGP CN5	OC REAR CN1–J14	19.5	18	10	31	2196035	Communication / Intercom
		SG RF RCV OPT	OC DASIFN – J3			12	34	2200197	DAS data (Opt cable, See Notice.)
		SG BWD SW Cable	OC Lock Switch Terminal	19.5	18	7	50	2248513	Ready for Transport 105°C/300V or more

* Requires wiring markers, tags, tools, lugs, and solderless terminals with crimping tools for AWG.#14 through #4 (YPT–60 or equivalent).

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

** For Japan ONLY: The power cable between PDB and PDU are shipped with system. This cable specifications: Actual length: 11m, usable length: 7m

Note

These cables run under the Gantry and do not require a raceway or duct.

NOTICE

Use extreme caution when installing the optical fiber cable. It is fragile and should not be stepped on, kinked, or bent sharply.

8-5-3 CONTRACTOR FURNISHED COMPONENTS

Refer to Section 5–3, Contractor Furnished Components.

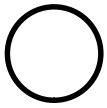
8-6 SHIPPING DELIVERY

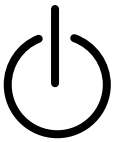
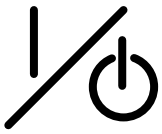
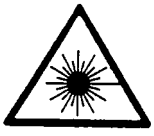
Refer to Section 6, Shipping Delivery.

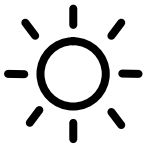
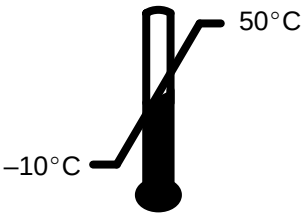
8-7 PREINSTALLATION CHECK LIST / TOOLS AND TEST EQUIPMENT

Refer to Section 7, Preinstallation Check List / Tools and Test Equipment.

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 –10° C and +50° C
	**System storage prior to installation:** Maintain non–condensing storage humidity below 90% 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,Class1 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.

GE Medical Systems

GE Medical Systems: Telex 3797371
P.O. Box 414, Milwaukee, Wisconsin 53201 U.S.A.
(Asia, Pacific, Latin America, North America)

GE Medical Systems – Europe: Telex 698626
283, rue de la Miniére, B.P. 34, 78533 Buc Cedex, France