



**Technical  
Publications**

**Direction 2332349-100  
Revision 01**

***Infinia*  
Site Preparation Manual  
Nuclear Medicine Imaging System**

## **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, calibration and testing shall be performed by qualified 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 engineer. All of Vendor's electrical work on these products will comply with the requirements of the applicable electrical codes.

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

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### AVERTISSEMENT

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## 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.

## ATENÇÃO

ESTE MANUAL DE SERVIÇO SÓ É DISPONÍVEL EM INGLÊS. CASO O PROVEDOR DE SERVIÇOS DO USUÁRIO NECESSITE DE UMA TRADUÇÃO, ESTA É DE RESPONSABILIDADE DO CLIENTE.  
NÃO TENHA TENTADO UTILIZAR O EQUIPAMENTO ANTES DE CONSULTAR E COMPREENDER O MANUAL DE SERVIÇO.  
A NÃO OBSERVÂNCIA DESTA PODE ACARRETTAR LESÕES AO PROVEDOR DE SERVIÇOS, OPERADOR OU PACIENTE CAUSADAS POR CHOQUE ELÉTRICO, MECÂNICO OU DE OUTRA NATUREZA.

## AVVERTENZA

IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLO IN LINGUA INGLESE.  
SPETTA ALL'UTENTE PROCURARSI UNA VERSIONE TRADOTTA NEL CASO IN CUI L'ADDETTO ALLA MANUTENZIONE DOVESSE RICHIEDERLA.  
NON TENTARE DI METTERE IN FUNZIONE L'APPARECCHIATURA PRIMA DI AVER CONSULTATO IL MANUALE DI MANUTENZIONE ED AVERNE COMPRESO PIENAMENTE IL CONTENUTO.  
LA MANCATA OSSERVANZA DI QUESTA AVVERTENZA PUÒ PROVOCARE LESIONI AL PERSONALE DI MANUTENZIONE, ALL'OPERATORE O AL PAZIENTE, DERIVANTI DA SCOSSE ELETTRICHE, URTI O RISCHI DI ALTRA NATURA.

## 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.



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# Chapter 1 – Introduction to Site Preparation

## 1.1 Overview

The best way to tackle a construction project of this complexity is to divide it into smaller, more easily managed tasks. Each task, now becomes a smaller project. At this point, the primary challenge is to coordinate all of these small projects in such a way as to have the entire project completed properly, and on time.

This manual will help to bring often overlooked details to the attention of the Project Coordinator. It will also simplify the task of site preparation for a first time Infinia Project Coordinator by outlining the planning procedures required prior to installation and assist the site preparation team with the following:

- Planning the site
- Ensuring adequate accessibility to the site
- Physical layout
- Providing construction, mechanical, electrical and environmental specifications
- Cables routing
- Connectivity
- Time Schedule
- Site Safety

This manual also provides the electrical, mechanical and environmental specifications necessary to determine construction requirements and cost evaluation.

It is important that the information contained herein is used in conjunction with the drawings prepared specifically for each site. The equipment and tools required to unpack, convey and install the Imaging System are detailed further on in this Manual.

### 1.1.1 Purpose

The purpose of this manual is to simplify the site preparation process and to provide the purchaser (or the purchaser's contractor) with the information necessary to prepare the site for the installation of a Infinia system

This information is also essential to the architects, construction engineers, electrical contractors, and all other personnel involved in the site preparation process.

**Important**

**Good site preparation is essential for a smooth and efficient installation. Poor site planning may compromise usability and/or patient comfort.**

### 1.1.2 Prerequisites

Verify all aspects of site configuration **before** construction is started. Once building operations have been completed, it may be difficult and/or costly to make changes.

It is advisable to use workers experienced in medical suite installations. Personnel with only general construction experience may not have the expertise to complete the required tasks within the designated time frame.

**Important**

**Since this equipment involves the use of radioactive isotopes, compliance with Nuclear Regulatory Commission regulations, or similar regulatory requirements (depending on the country), must be adhered to.**

**In most situations, this must be done prior to acquiring any source materials. This includes calibration sources which may have fairly long delivery lead times. These calibration sources may also have a short half life, and it may not be advisable to store them over long periods of time.**

**Regulatory compliance should be arranged early in the site planning process.**

### 1.1.3 Project Coordination

To insure a successful installation, it is preferable to have one person (a project coordinator) manage the entire project. The project coordinator should be involved in every phase of the installation, from conceptual planning through to system start up.

Ideally, the project coordinator should be thoroughly familiar with construction procedures and have a background in medical suite construction. If such a person is not available from existing staff, it is recommended that the services of a local Site Planner or Construction Manager be secured.

This person will be the primary contact and liaison between the purchaser and GE Medical Systems.

**Note**

The purchaser is responsible for assigning this post and providing GE with the relevant contact information.

The project coordinator should keep in close contact with all of the contractors, sub-contractors, GE Medical Systems, and administrative personnel, as well as the planners and architects. Keeping a schedule (and adjusting that schedule if necessary) is part of the project coordinators responsibility.

GE can provide a site planing service to assist the purchaser / project coordinator with the site planning. Please contact your local GE representative should any such assistance be required. GE personnel are willing and well qualified to help ensure that your installation is a successful one.

### 1.1.4 Purchaser's Responsibility

The purchaser is responsible for all site preparation, unless a special agreement has been entered into with GE Medical Systems.

Such preparation may include, but is not limited to the following tasks:

- Cost analysis, construction, renovation or alterations and modifications when not specifically provided for in the contract.
- Procurement of all the material required to carry out the work.
- Safe storage of the system equipment prior to and during installation.
- Fitting of cable trays and troughs.
- Installation of lighting.
- Air-conditioning and ventilation, suitable for the Infinia System.
- Fitting of adequate thermal protection devices.
- Installation of electrical conduit, junction boxes, ducting and outlets as required.
- Installation of special leaded wall covering (Hawkeye Option).
- Facility input power supplies and wiring.
- Demolition, debris removal and cleaning of construction site.
- Fire control devices as may be required by local codes.
- Permits, inspections, radiation licensing etc.
- Installation of any required networking materials which are external to the system's internal sub-net.
- Removal of packing and shipping material.
- Floor tile removal and replacement in area of table and gantry.

## 1.2 Manpower Requirements

All personnel participating in unpacking, conveying and installing the camera must be suitably qualified and approved. Specific manpower requirements for the various installation stages of the camera are shown in [Table 1–1](#) and [Table 1–2](#).

**Table 1–1:** Manpower Requirements - Unpacking, Conveying

Component	Task and Manpower
Gantry	Unpacking: at least 4 persons
	Conveying (with transport wheels) - at least 4 persons: <ul style="list-style-type: none"> <li>• 1 person to direct the operation</li> <li>• 4 persons (at least) to push the Gantry</li> <li>• 1 person in the front to steer the Gantry</li> </ul>
Patient Table	Unpacking: at least 4 persons (preferably 6) are required to lift the table from its crate if no fork lift is available
	Conveying (with transport wheels): at least 2 persons
Collimator Cart	Unpacking: at least 2 persons
	Conveying: at least 2 persons
Hawkeye	Unpacking: 1 person
	Conveying: 1 person
	Installing: 2 persons

**Table 1–2:** Manpower Requirements - Installation

Procedure	Manpower
System Installation	1 qualified Field Engineer and at least 1 assistant
System Calibration	1 qualified Field Engineer
Acceptance Test	1 qualified Field Engineer
Hawkeye Installation	1 qualified Field Engineer (1 extra hand for X-ray Tube installation)
Hawkeye Acceptance	1 qualified Field Engineer

## 1.3 Additional Considerations

### 1.3.1 Information

Below is a list of information which must be obtained and recorded *prior* to commencement of the system setup.

This is usually carried out on the fifth day of Installation.

Failing to acquire the information beforehand may cause serious delays in completing the system installation.

The required information is divided into four groups:

1. Information pertaining to the computer - this includes installed circuit boards.
2. System parameters - to be decided in consultation with the customer.
3. Local Area Network (LAN) information - provided by the local network administrator.
4. Wide Area Network (WAN) information - to be decided in consultation with the local network administrator as well as with the network administrators of the remote network.

A detailed list of the information required, as well as information sheets to be completed, are provided in [Chapter 2](#) of the *Software Installation & System Configuration* manual.

These information sheets **must** be kept up-to-date. Any software and system configuration changes should be noted. The information sheets should be readily available for future reference by service engineers.

### 1.3.2 Unloading Area

A suitable unloading area must be allocated. The unloading area must be large enough to accommodate the packed units, with additional space to allow for some of the system components to be unpacked.

The Weight and Dimensions of the shipped packages are given in [Section 2.1](#).

From the unloading site, there must be a free path to wheel the units into the installation room or into a lift which will carry them to the installation site. The path specifications are given in [Section 3.2](#). Special facilities must be provided if the units are to be transferred from an unloading site outside the building.

### 1.3.3 Cleaning

The computer hardware is cooled with small cooling fans mounted in various locations in the equipment. The equipment is sensitive to dust and dirt that may be drawn into the electronics by the cooling fans. Therefore, special attention should be given to cleaning the room. All dust and residue should be removed as an ongoing activity, and as a last step in the preparation process before bringing any of the equipment into the suite area. All such debris must be removed as it accumulates. The best cleaning method for removing dust and dirt, particularly fine dust is to use of a vacuum cleaner, not sweeping.

**Note**

**Just before the equipment is set in place is a good time to perform a thorough cleaning and sanitizing of the site. There may never again be an opportunity to execute such a detailed cleaning of these areas.**

### 1.3.4 Work Scheduling

The preparation of a Infinia Suite is much like that of other modalities that involve the installation of a Gantry, Patient Table, and Acquisition Computer.

One way to tackle a construction project of this complexity is to divide it into smaller, more easily managed tasks. Each task, now becomes a smaller project. At this point, the primary challenge is to coordinate all of these small projects in such a way as to have the entire project completed properly, and on time.

This document will help to bring the often overlooked details the attention of the Project Coordinator. It will also simplify the task of site preparation for the first time Infinia Project Coordinator.

Check lists are provided in [Appendix A](#) to assure that nothing is overlooked.

## 1.4 Regulatory Requirements

Every effort must be made to assure safe and efficient installation, and proper operation of the Infinia suite. Prepare the site, and install the equipment in close compliance with all local regulatory requirements.

	<p style="text-align: center;"><b>CAUTION</b></p> <p><b>Infinia uses radioisotopes which are regulated by various governing agencies. You will need to obtain all pertinent permits and licenses to comply with local regulations.</b></p>
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Stringent laws and standards apply to the installation and operation of any equipment that involves the use of radioactive isotopes. This section has been designed to alert the responsible personnel to the need for regulatory compliance. The purchaser is solely responsible for keeping the Infinia facility in compliance during preparation, installation and operation.

It is not practical to include all of the regulatory information that might apply in all situations. The purpose of this chapter is to serve as a guideline only, and is not intended to be used as a regulatory standard in any manner. Government agencies are charged with the responsibility of protecting the general public from hazardous materials. For radioactive sources in the United States of America, that agency is the Nuclear Regulatory Commission (NRC)

The NRC monitors the activity of all industries that are engaged in the use and handling of hazardous radioactive materials and licenses organizations to make use of such material. The installation of a PET imaging system falls into the category of a facility that must be regulated and monitored by this agency.

Some states have signed agreements with the NRC, allowing that state to regulate the use of radioactive material within the confines of their borders. The NRC can supply a list of the agreement states, with addresses. Installation of projects in those states which have not signed such an agreement, require an application to the NRC for licensing. Request for application should be made to:

United States Nuclear Regulatory Commission  
Washington, D.C. 20555

## 1.5 Time Schedule

### 1.5.1 Site Preparation

Time is a very important dimension for a project of this sort. If specific tasks are not completed in a timely manner, other tasks can be slowed, or even halted. It is important to allow the appropriate amount of time to accomplish each task. Before any work is started, it is advisable to secure commitments from contractors with respect to time requirements.

### 1.5.2 Job Progression

It is rarely advisable to have several trades working together at the same time. Generally speaking, the work should progress in the following manner:

1. Application to Regulatory Agencies for Site License.
2. Planning and preliminary design work.
3. Review of plans.
4. Revision of plans.
5. Drafting of final plans.
6. Application for construction permits.
7. Demolition (if required).
8. Structural revisions and framing.
9. Heating Ventilation and Air Conditioning (HVAC) rough-in.
10. Electrical rough-in.
11. Rough-in inspection.
12. Dry wall and wall covering.
13. Heating Ventilation and Air Conditioning (HVAC) trim.
14. Electrical trim.
15. Flooring, trim and painting.
16. Cleaning.
17. Final inspection.
18. Equipment installation.

### 1.5.3 System Installation

The optimal installation time of the basic system, assuming that *all* system parts arrived in proper working conditions, and assuming proper site preparation and acceptable site temperature, is six working days plus one additional day for installing the Hawkeye option.

**Important**

The presence of the Field Engineer is mandatory for the entire time period.

To better understand the installation work flow and relevant time frames, see [Figure 1-1](#) and [Figure 1-2](#)

### 1.5.4 System Options

The installation time for system options are covered separately in the Service Manuals specific to each option.

### 1.5.5 Installation Flow Chart

The installation procedure described hereafter assumes a standard site temperature of 24°C.

If your site temperature differs from that recommended, stabilize the Detectors' temperature to  $\pm 2^{\circ}\text{C}$  of your site temperature. Remove the Insulation Packaging from the Detectors only *after* the Gantry has been left in the room for at least 24 hours.

**Important**

**During prolonged transportation, the Detectors *must* be kept in a temperature controlled environment.**

The general installation procedure is represented in a flow chart given in [Figure 1-1](#) and [Figure 1-2](#). The procedures are divided on a per day basis, detailing the number of engineers required for each day.

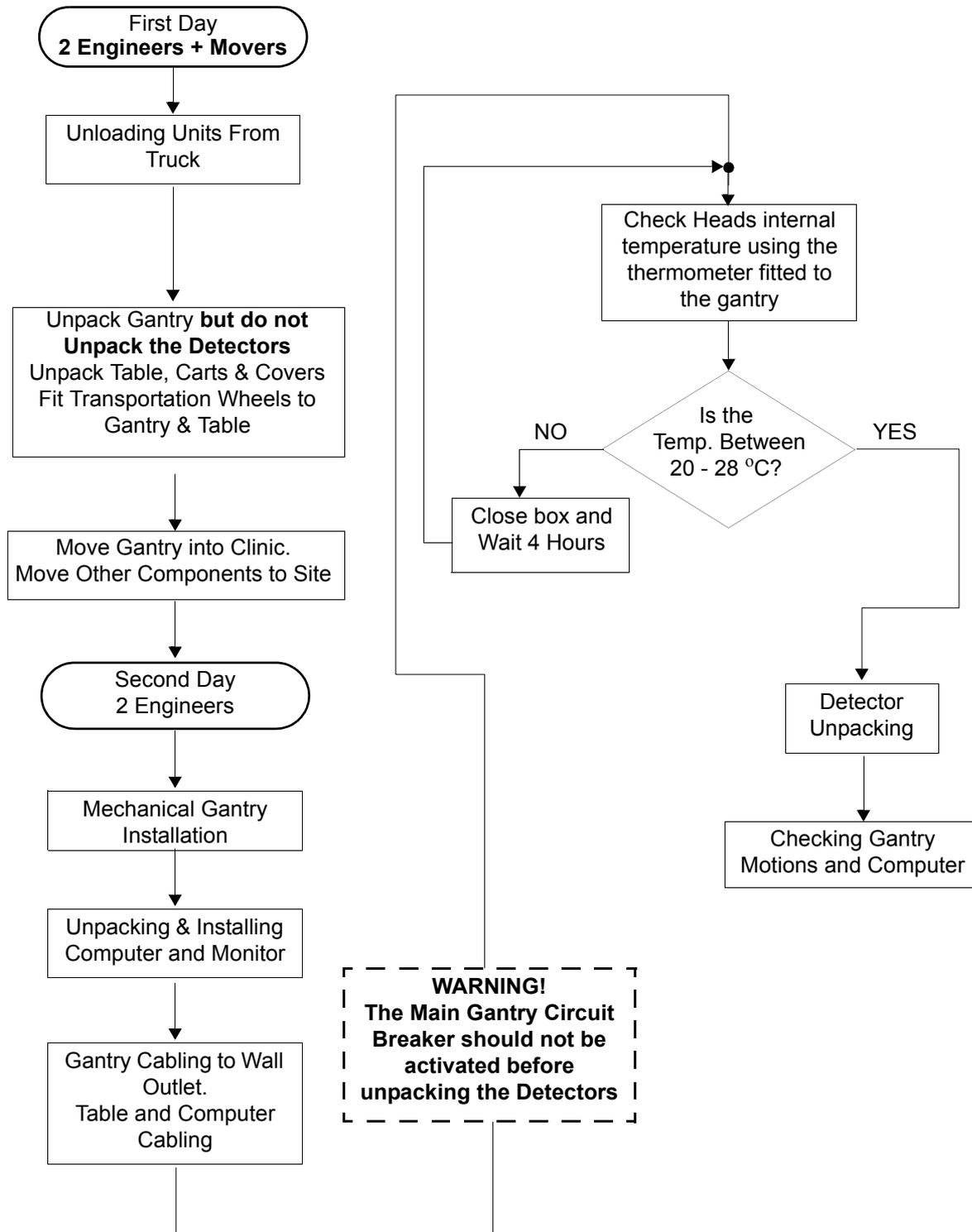
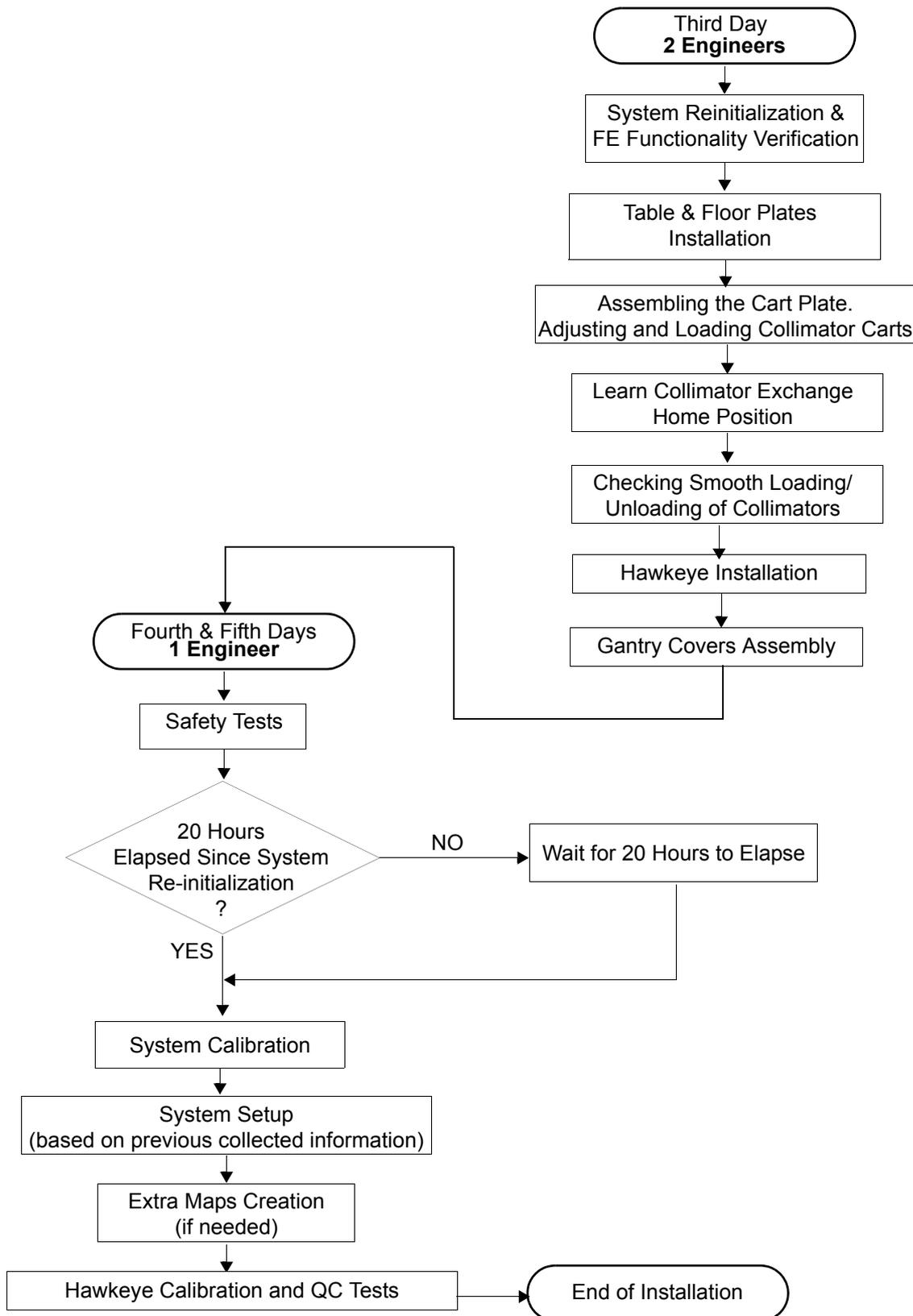


Figure 1-1 Camera Installation Flow Chart - Days 1 - 3



**Figure 1-2** Camera Installation Procedure - Days 4 - 6

## 1.6 Site Safety

### 1.6.1 Site Management

- Continually gather up and remove debris to keep the work site orderly.
- Plan for the disposal of scrap, waste and surplus materials.
- Keep the work area and all equipment tidy. Designate areas for waste materials and provide suitable containers.
- Keep stairways, passageways and gangways free of material, supplies and obstructions.
- Remove or bend over nails protruding from lumber.
- Do not allow rubbish to fall freely from any level of the project. Use chutes or other approved devices to dispatch the materials.
- Do not throw tools or other materials.
- Do not raise or lower any tool or equipment by its own cable or supply hose.

### 1.6.2 Flammable Material Storage

- Store flammable or explosive materials such as gasoline, oil and cleaning agents apart from other materials.
- Keep flammable and explosive materials in proper containers with contents clearly marked.
- Post signs prohibiting smoking, open flames and other ignition sources in areas where flammable and explosive materials are stored.
- Ventilate all storage areas properly.
- Ensure that all electric fixtures and switches are explosion-proof where flammable materials are stored.

### 1.6.3 Head Protection

Head protection (hard hats) must be worn in areas where there is a possible danger of head injuries from impact, flying or falling objects.

## 1.6.4 Fire Protection

Fire fighting equipment and fire warning systems should be installed on the site, in accordance with local regulations.

Fire fighting equipment must be strategically located, clearly marked and readily accessible at all times. The fire extinguishers must be periodically inspected, and maintained in operating conditions.

**Important****Never throw water on an electrical fire**

Water is an excellent conductor of electricity, and if water is thrown on an electrical fire, it will only spread the fire. For electrical fires a chemical fire extinguisher is recommended.

### 1.6.4.1 Using a Fire Extinguisher

1. Hold the fire extinguisher upright and pull the pin out.
2. Stand back at least 10 feet and aim the nozzle at the base of the fire.
3. Squeeze the lever or handle to release the extinguishing agent.
4. Sweep the nozzle from side to side.

### 1.6.4.2 Types of Fire Extinguishers

**Class A Extinguishers** will put out fires in ordinary combustibles, such as wood and paper.

**Class B Extinguishers** should be used on fires involving flammable liquids, such as grease, gasoline, oil, etc.

**Class C Extinguishers** are suitable for use on electrically energized fires.

**Class D Extinguishers** are designed for use on flammable metals and are often specific for the type of metal in question.

**Important**

Before trying to extinguish a Class C fire, you must first remove the electrical power source.

## 1.6.5 Electrical Protection

### 1.6.5.3 Power Tools

- Switch tools OFF before connecting them to a power supply.
- Disconnect power supply before making adjustments, fitting attachments or changing blades.
- Ensure tools are properly grounded or double-insulated. The grounded tool must have an approved 3-wire cord with a 3-prong plug and plugged into a properly grounded 3-pole outlet.
- Do not bypass the switch and operate the tools by connecting and disconnecting the power cord.
- Do not use electrical tools in wet conditions or damp locations unless tool is connected to a GFCI.
- Do not clean tools with flammable or toxic solvents.
- Do not operate tools in an area containing explosive vapors or gases.
- Keep power cords clear of tools during use.
- Suspend power cords over aisles or work areas to eliminate stumbling or tripping hazards.
- Do not carry electrical tools by the power cord.
- Do not tie power cords in tight knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.
- Check the insulation around the power cord to make sure it is in good condition. You should not see any exposed wires or frayed ends. Power cords in poor condition should be replaced, never taped or spliced.

#### **1.6.5.4 Outlets and Extension Cords**

- Make sure all electrical outlets are three-hole, grounded outlets. If there is water in the area, there should be a GFI or Ground Fault Interrupter outlet.
- There should be ample electrical capacity to run equipment without tripping circuit breakers or blowing fuses.
- Minimize extension cord use. Never place them under rugs. Use extension cords sparingly and check them periodically
- Don't use extension cords in areas that receive a lot of traffic because not only will it cause someone to trip, but constant traffic will wear out the insulating rubber cover.

#### **1.6.6 Eye and Face Protection**

Eye and face protection must be provided when machines or operations present potential for eye or face injury.

# Chapter 2 – System Specifications

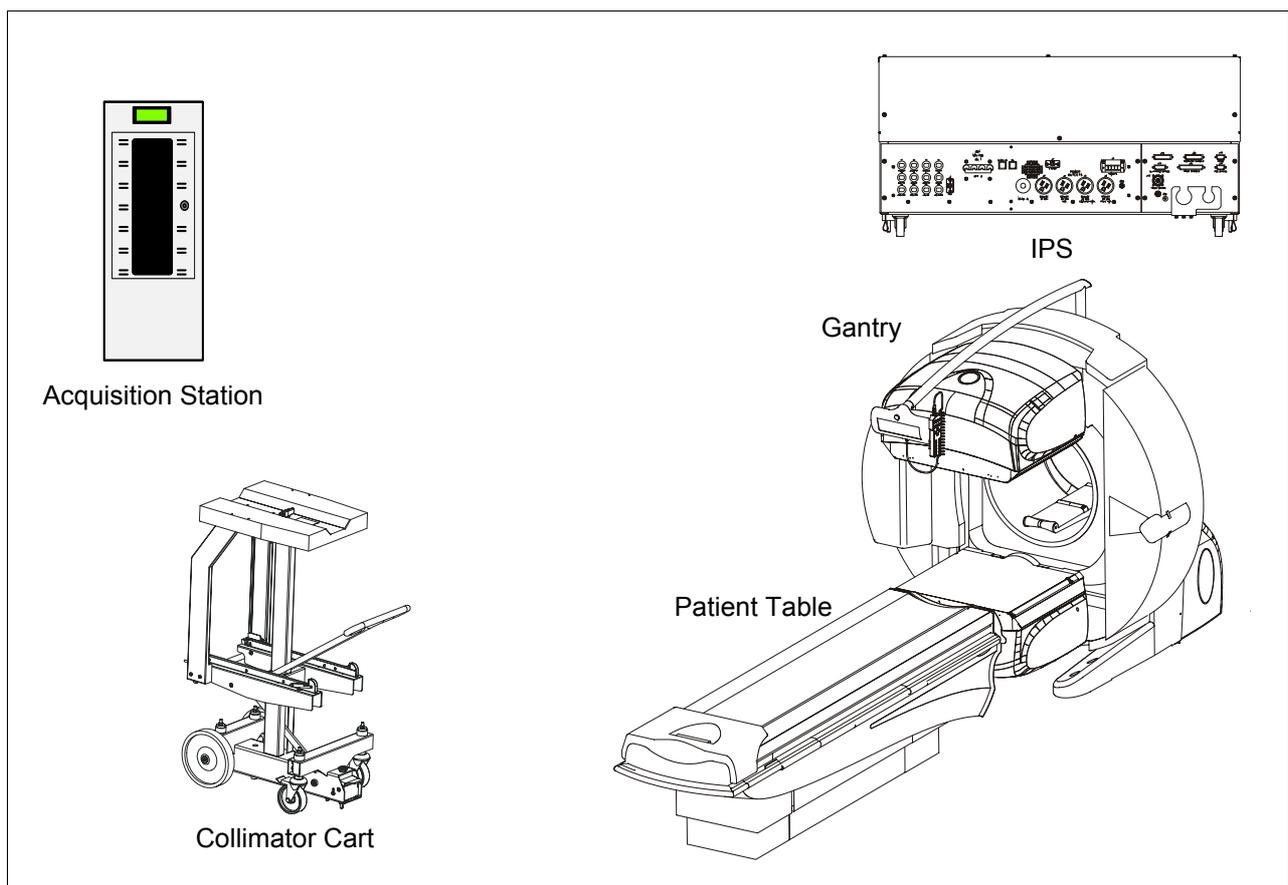
## 2.1 Overview

The Infinia System is made up of five main components:

- Gantry (with Detectors). See [Section 2.1.1](#)
- Integrated Power Supply (IPS). See [Section 2.1.2](#)
- Patient Table. See [Section 2.1.3](#)
- Acquisition Station. See [Section 2.1.4](#)
- Collimator Carts. See [Section 2.1.5](#)

Two options are available for the Infinia system

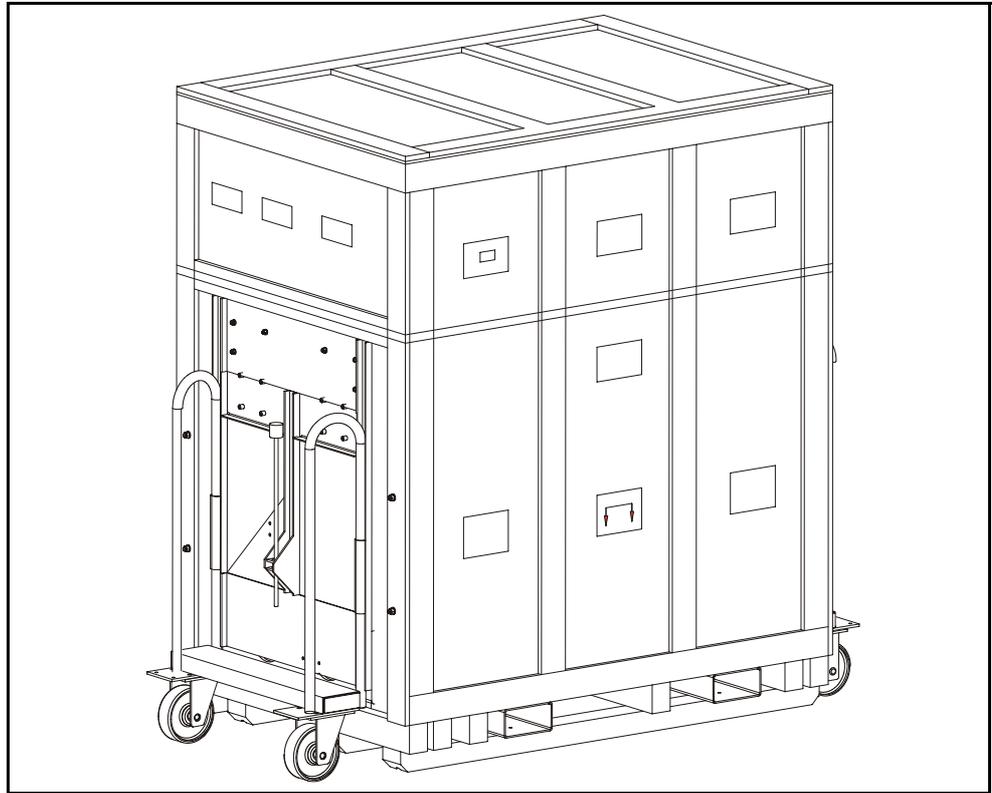
- Hawkeye
- Coincidence



**Figure 2-1** Infinia System Components

## 2.1.1 Gantry

The gantry is shipped in a wooden container with the detectors already fitted. The container is designed to provide limited protection against mechanical impact during the shipments. The Gantry covers are shipped in a separate container.



**Figure 2-2** Gantry Shipping Container

The Gantry Weights and Measurements are listed in [Table 2-1](#)

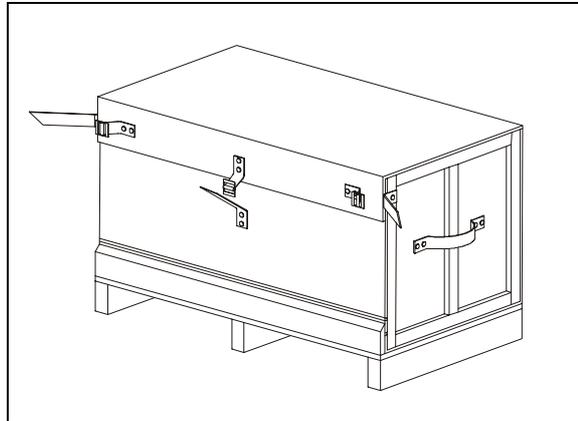
Weights and dimensions of the unpackaged system modules are shown in [Table 2-6](#)

**Table 2-1:** Gantry Crate Weights and Measurements

Unit	Weight	Dimensions / mm (in)		
	kg (lbs)	Height	Width	Depth
Gantry & Detectors	~3000 (6614)	2150 (84.7)	2330 (91.7)	1286 (50.6)
Covers		1443 (56.8)	1458 (57.4)	1058 (41.7)

## 2.1.2 Integrated Power Supply (IPS)

The Integrated Power Supply (IPS) is shipped separately and is attached to the gantry during installation.



**Figure 2-3** IPS Shipping Container

The Weights and Measurements of the IPS are listed in [Table 2-2](#)

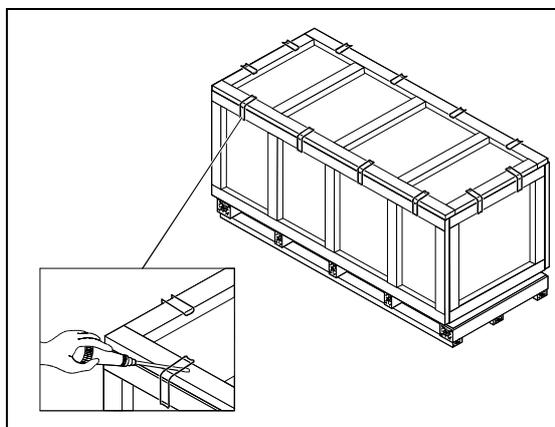
Weights and dimensions of the unpackaged system modules are shown in [Table 2-6](#)

**Table 2-2:** IPS Crate Weights and Measurements

Unit	Weight	Dimensions / mm (in)		
	kg (lbs)	Height	Width	Depth
IPS	41.2 (90.8)	418 (16.5)	877 (34.5)	454 (17.9)

### 2.1.3 Patient Table

The Patient Table is shipped in a wooden container designed to support the table and provide limited protection against mechanical impact.



**Figure 2-4** Patient Table Packing Container

The Weights and Measurements of the Patient Table are listed in [Table 2-3](#). Weights and dimensions of the unpackaged system modules are shown in [Table 2-6](#)

**Table 2-3:** Patient Table Crate Weights and Measurements

Unit	Weight	Measurements / mm (in)		
	kg (lbs)	Height	Width	Depth
Table	550 (1213)	1170 (46.1)	2660 (104.7)	910 (35.8)

### 2.1.4 Acquisition Station

The Acquisition Computer Weights and Measurements are listed in [Table 2-4](#).

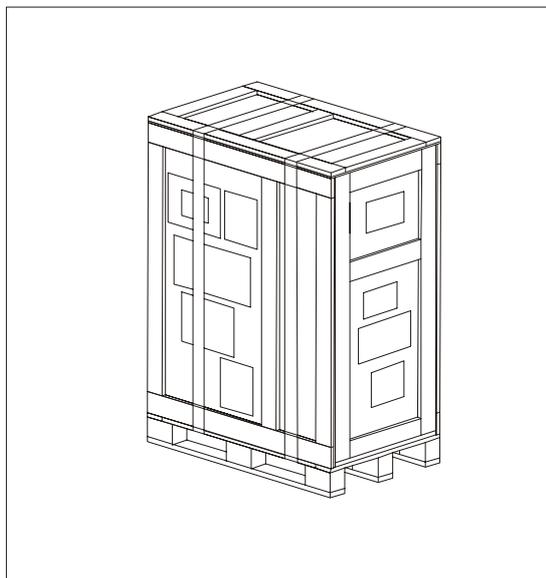
Weights and dimensions of the unpackaged system modules are shown in [Table 2-6](#)

**Table 2-4:** Acquisition Computer Container Weights and Measurements

Unit	Weight	Measurements / mm (in)		
	kg (lbs)	Height	Width	Depth
Computer, Monitor & Accessories	60 (132)	938 (36.9)	1325 (52.2)	895 (35.2)

## 2.1.5 Collimator Cart

The Collimator Cart is designed to transport and store two collimators, and is shipped with the collimators attached



**Figure 2-5** Collimator Cart Packing Container

The Collimator Cart Weight and Measurements are listed in [Table 2-5](#). Weights and dimensions of the unpackaged system modules are shown in [Table 2-6](#).

**Table 2-5:** Collimator Cart Crate Weights and Measurements

Unit	Weight	Measurements / mm (in)		
	kg (lbs)	Height	Width	Depth
Cart & Collimators: LEGP-35 - HEGP-6		1462 (57.6)	1080 (42.5)	750 (29.5)

## 2.1.6 Hawkeye System (Option)

These components of the Hawkeye option are shipped in three packages:

- X-ray Source assembly
- X-ray Detector assembly
- Mechanical Assembly, Documentation and Software CD

## 2.2 Weights and Dimensions of Unpackaged Components

Weights and dimensions of the unpackaged system components are shown in [Table 2–6](#).

**Table 2–6:** System Component Weights & Measurements

Unit	Net Weight	Measurements / mm (in)		
	kg (lbs)	Height	Width	Depth
Gantry (incl detectors)	2400 (5286)	1900 (74.8)	1750 (68.9)	1950 (76.8)
Gantry (without detectors)	2280 (5026)	1900 (74.8)	1750 (68.9)	1950 (76.8)
Collimator Cart	65 (143)	1257 (49.5)	907.5 (35.7)	500 (19.7)
Collimator LEGP-35	50 (110)			
Collimator LEHR-45	60 (132)			
Collimator HEGP-6	131 (289)			
Collimator MEGP-5	103 (227)			
Collimator Pinhole	98 (216)			
Table & Stretcher	400 (880)	Raised 867 (34.1) Lowered 567 (22.3)	2500 (98.4)	700 (27.5)
IPS	41.2 (90.8)	418 (16.5)	877 (34.5)	454 (17.9)

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## Chapter 3 – Unloading, Access and Conveyance

### 3.1 Unloading Area

A suitable unloading area must be allocated. The unloading area must be large enough to accommodate the packed units, with additional space to allow for some of the system components to be unpacked.

The Weight and Dimensions of the shipped packages are given in [Section 2.1](#).

From the unloading site, there must be a free path to wheel the units into the installation room or into a lift which will carry them to the installation site. The path specifications are given in [Section 3.2](#). Special facilities must be provided if the units are to be transferred from an unloading site outside the building.

#### 3.1.1 Cleaning

The computer hardware is cooled with small cooling fans mounted in various locations in the equipment. The equipment is sensitive to dust and dirt that may be drawn into the electronics by the cooling fans. Therefore, special attention should be given to cleaning the room. All dust and residue should be removed as an ongoing activity, and as a last step in the preparation process before bringing any of the equipment into the suite area. All such debris must be removed as it accumulates. The best cleaning method for removing dust and dirt, particularly fine dust is to use of a vacuum cleaner, not sweeping.

<b>Note</b>
-------------

**Just before the equipment arrives is a good time to perform a thorough cleaning and sanitizing of the site. There may never again be an opportunity to execute such a detailed cleaning of these areas.**

### 3.2 Access Path to Installation Area

From the unloading site, there must be a free path to wheel the components to the installation area, or into a lift which will carry them to the correct level. The size and weight specifications of the system components are given in [Table 3–1](#), and [Table 3–2](#).

It is important to verify that the route selected has sufficient clearance and load carrying capacity. Special facilities must be provided if the units are to be transferred from an unloading site outside the building

### 3.2.1 Access Specifications

The Weights and Measurements listed below **include** the moving wheels

**Table 3–1:** Gantry - Weights, Measurements and Clearance

Height of Gantry mounted on moving wheels	1,800 mm (71")
Weight of Gantry mounted on moving wheels	2,550 kg (5610 lb.)
Minimum hall width allowing the Gantry to be wheeled around 90° corners	1,800 mm (70.9")
Minimum width to allow gantry to move through 48" (1219 mm) doorway	2600 mm

**Note**

The Dolly wheels have no braking mechanism. Do NOT move or leave the Gantry on inclined surfaces.

**Table 3–2:** Patient Table - Weights, Measurements and Clearance

Minimum hall width allowing the Table to be wheeled around 90° corners	2,000 mm (78.74")
Path slope	< 4% (4 cm / 100 cm; 1.57" / 39.37")
Table length	2,505 mm (98.62")
Weight of Table mounted on moving wheels	410 kg (902 lb.)

### 3.3 Delivered Containers

The system and available options are delivered in the following containers:

#### **Gantry Container**

- Gantry with detectors installed
- Gantry display, packed inside Gantry crate
- Installation kit
- Gantry transportation dollies

#### **Computer Container**

- Computer
- Monitor
- Accessories
- Spare parts, manuals, system software

#### **Patient Table Container**

- Table
- Covers
- Table transportation wheels

#### **Cover Container**

- Gantry covers

#### **Collimator and Cart Container(s)**

- One package for each pair of collimators/shieldings mounted on a collimator cart

#### **IPS Container**

- IPS

#### **Hawkeye**

- Three packages.

## 3.4 Pre- Arrival Tasks

Before the system arrives, the project supervisor must acquaint himself with the safety measures for system unpacking and conveying as detailed in the Safety and Regulatory section of the Infinia System Service Manual.

**Note**

**Before the equipment arrives is a good time to perform a thorough cleaning and sanitizing of the installation site. There may never again be an opportunity to execute such a detailed cleaning of these areas.**

Ensure that the unloading area is free of rubble, and large enough to accommodate the packed units. There must also be enough free space to allow for unpacking and the fitting of Moving Wheels to the Gantry and Patient Table.

### 3.4.1 Unloading Requirements

Advanced booking for the services of a specialist moving contractor will need to be made. It is important to confirm that suitable moving & lifting apparatus will be available *on the day required* to lift and convey the equipment from the truck to the unpacking area - or alternatively to a pre-determined temporary storage area - and thereafter to the installation site.

Unloading of the Nuclear Imaging System Gantry, Table and Collimator Carts from the truck requires lifting equipment with appropriate lifting capacity.

The system is shipped in crates with specific arrangements for fork lift unloading. Pay careful attention to the center of gravity markings. It is recommended that a fork lift with a load carrying capacity in excess of 3000 kg / 6600 lb. (weight of fully crated Gantry) is used.

The system can also be unloaded using a crane. To lift the Gantry by crane, the upper and side panels of the crate must be removed while still on the truck, and a lifting jig (supplied in the Imaging System Moving Kit) must be attached to the Gantry.

Unloading of Patient Table and Collimator Carts by crane requires lifting straps with the appropriate carrying capacity.

**Note**

The use of specialist moving and lifting equipment is not only required during unloading, but also during unpacking and installing the Infinia system.

---

## Chapter 4 – Physical Planning of the Site

### 4.1 Selecting the Site

The Nuclear Imaging System requires one room, which will contain the following sub-systems:

- Gantry
- Table
- Computer + Monitor
- Collimator Cart(s)

Separate rooms are recommended for the following utilities:

- Office/Viewing/Processing Room
- Patient waiting room
- Patient preparation room
- Hot lab
- Dark room

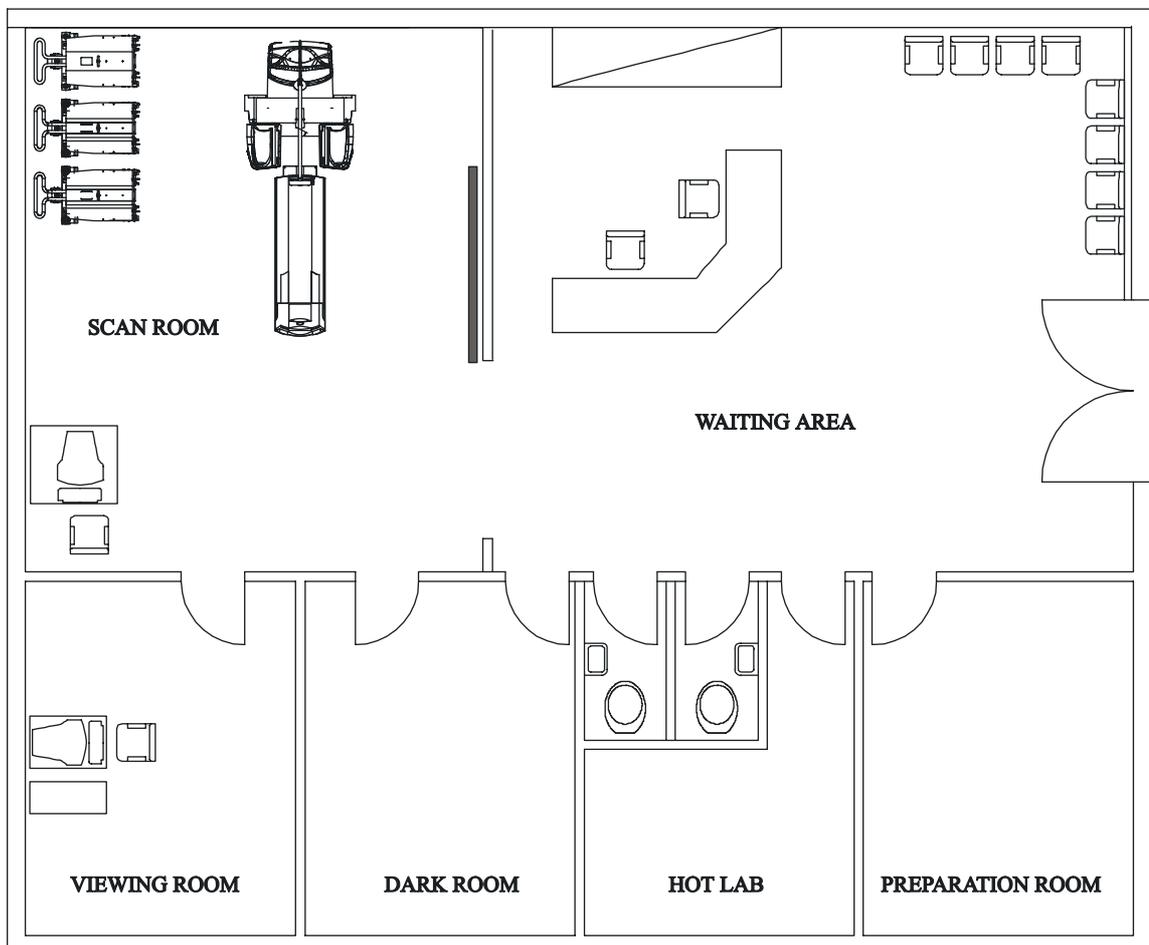
[Figure 4-1](#) shows typical site layout.

The selection of the scan area should be based on the following considerations:

- Easy access to Emergency Switch
- Influence of the surrounding rooms
- Camera heads should not face any radioactive source
- Distance to "hot areas" such as:
  - Hot laboratory
  - Patient toilets
  - Patient waiting/preparation rooms
- Distance from diagnostic area such as:
  - Processing room
  - Viewing room
- If the patient is rolled in on a bed, facilities should be provided to "slide" the patient onto the Scanning Table.
- Floor loading capacity, as per [Section 4 . 5 . 1](#) and [Figure 4-7](#).

The selection of the Acquisition Station area should be based on the following considerations:

- Position relative to the camera:
  - Gantry - Acquisition Station cable limitations
  - Convenient accessibility to Gantry and Table for daily activity
- Access to communication lines (for details refer to Chapter 7):
  - Ethernet connection
  - Telephone connection for Modem, if relevant
  - Connection to hardcopy device, if it is to be directly connected to the system
- Feasibility of Emergency Unit installation within operator reach



**Figure 4-1** Typical Area Layout

## 4.2 Room Size

Examples of optimum and minimum room layouts are shown in [Figure 4-4](#), and [Figure 4-5](#), respectively. The examples include the following items:

- Gantry
- Table
- Collimator Carts
- Acquisition Station
- Multi Imager
- Operator's Chair
- Emergency Button

When planning your room layout you must take into consideration the clearance area required for servicing the imaging system (see [Figure 4-6](#)), and the **room height**, which should be minimum 2.5 meters. This height is required for mounting the Crane used to lift and install the Detectors.

## 4.3 Room Shielding

Appropriate barriers such as walls, lead-shielded glass, lead shields, etc. must be installed to protect staff from unnecessary exposure to radiation. Since the Infinia system will involve the use and storage of radio nuclides, a qualified radiological health physicist must be consulted in the design of walls, and safety barriers, to assure appropriate attenuation.

Keep in mind that patients become significant sources of radioactivity. Consideration should be given to maximize the distance between the patient and operator during the uptake and acquisition phases of scan procedures.

### 4.3.1 Radiation Background

In order to facilitate and improve service and field calibration, the room should be far away from any source of radiation.

In case the room is close to the injection room or to the hot room (where the technologists prepare or receive the radioactive source) or to the patient waiting room (after injection), a careful background level verification should be performed.

Using a standard radiation counter, verify that at a height of between 0.5 to 1.5 meters above floor and a distance of between 0 to 10 cm of the room wall, the radiation background is lower than 0.1 mR/h. In case of failure, a lead shield wall should be added. In most of the cases a 5 mm lead wall will reduce the background level below the above value.

### 4.3.2 Shielding Screen for X-ray Radiation During Hawkeye Scan

If the Acquisition Station is placed in the same room as the camera, an attenuation screen must be placed between the Gantry and the Operator's Console. Clear glass or plastic screens are available with 1 mm lead equivalent attenuation, which will reduce the dose from low energy X-ray scatter by a factor of 10, at least.

The shielding screen is *not* a part of Hawkeye option. Therefore, if needed, it must be provided by the customer.

### 4.3.3 X-ray Scatter Plots

#### 4.3.3.1 Scatter Isocontour Plot

The X-ray Scatter Isocontour Plots shown in [Figure 4-2](#) were created using the following parameters:

- Body phantom
- Slice thickness 1\*10mm
- High Voltage – 140kV
- Current – 2.5mA,
- 37.5mAsec/scan

##### **Isodose Contours at 40cm above floor:**

The Iscontour levels in the elevation plot are: 10 - 100 MicroGrays per hour (1 - 10 mR/hour).

Since scan time is 15 second per slice the isocontours levels are 0.004 - 0.042 mR/SCAN respectively.

##### **Isodose Contours at 90cm above floor:**

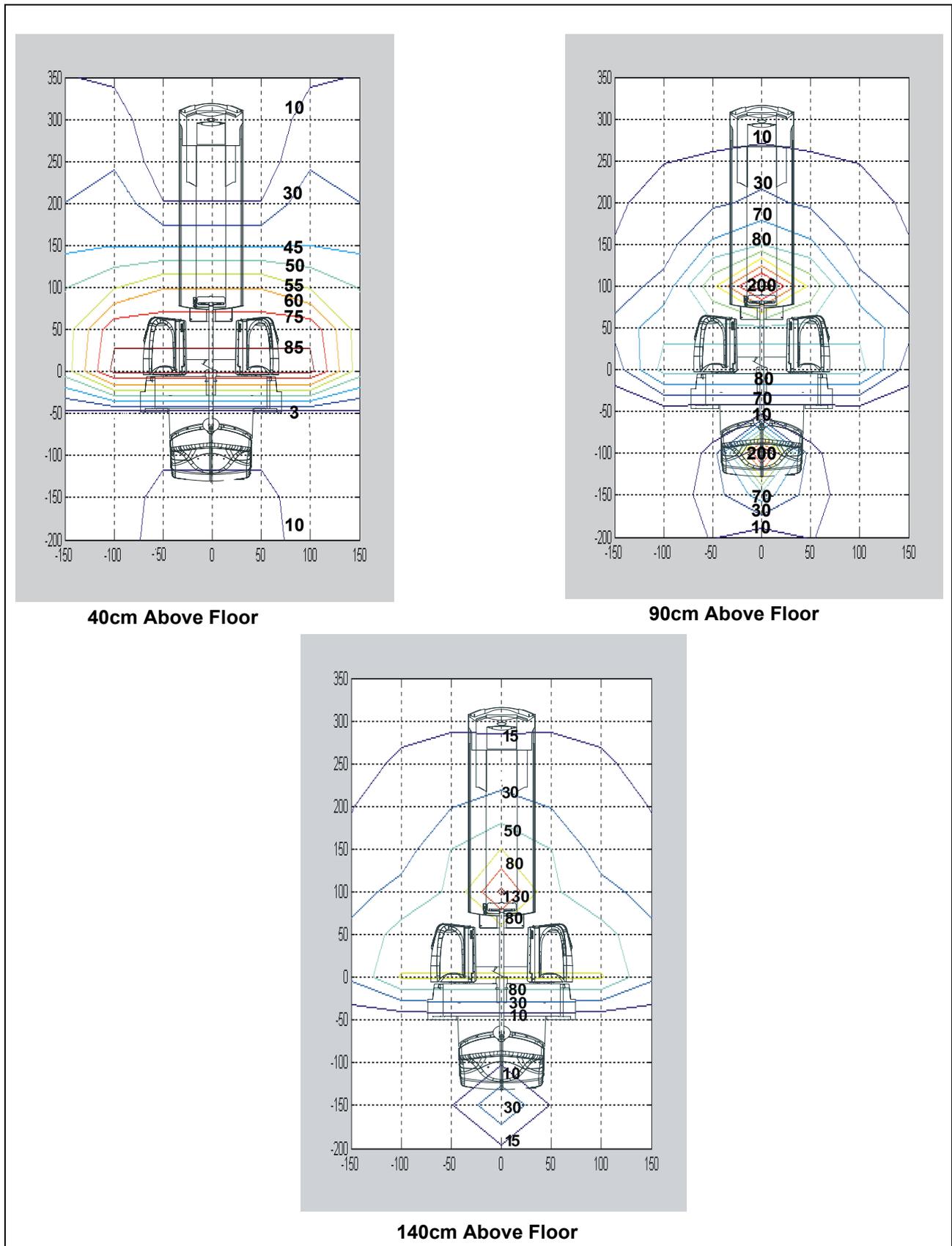
The Iscontour levels in the elevation plot are: 10 - 200 MicroGrays per hour (1 - 20 mR/hour).

Since scan time is 15 second per slice the isocontours levels are 0.004 - 0.083 mR/SCAN respectively.

##### **Isodose Contours at 140cm above floor:**

The Iscontour levels in the elevation plot are: 10 - 130 MicroGrays per hour (1 - 13 mR/hour).

Since scan time is 15 second per slice the isocontours levels are 0.004 - 0.054 mR/SCAN respectively.



**Figure 4-2** X-ray Scatter Radiation Isocontours in  $\mu\text{Gray/hr}$

### 4.3.3.2 Elevation Scatter Plot

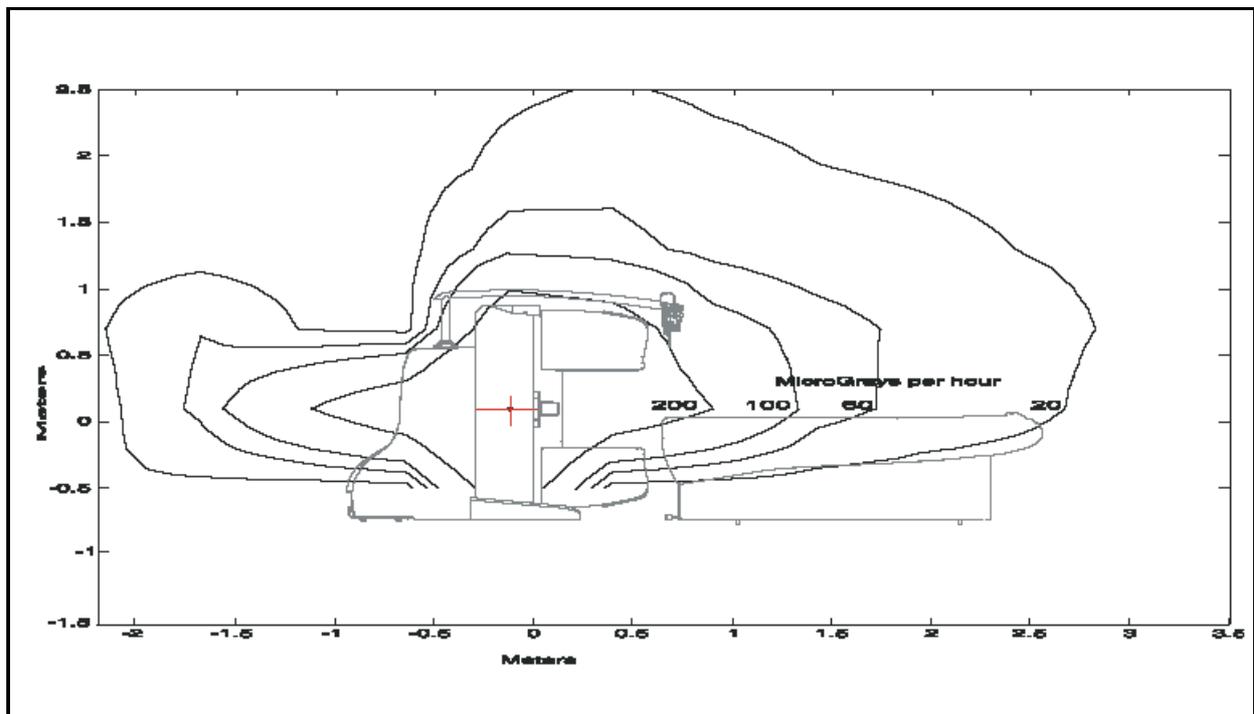
The X-ray Elevation Scatter Plot shown in [Figure 4-3](#) was created using the following parameters:

- Body phantom
- Slice thickness 1\*10mm
- High Voltage – 140kV
- Current – 2.5mA,
- 37.5mAsec/scan

The Isocontour levels in the elevation plot are: 20 - 200 MicroGrays per hour (2 - 20 mR/hour).

Since scan time is 15 second per slice the isocontours levels are 0.008 - 0.083 mR/SCAN respectively.

The elevation plot used has cylindrical symmetry 180 degrees around the center of rotation axis (from right to left of the COR axis above the floor).



**Figure 4-3** X-ray Scatter Radiation Isocontours in  $\mu\text{Gray/hr}$  - Elevation Plot

## 4.4 Room Layouts

The Optimum Room Size and the Maximum Room Size for Infinia are shown in [Figure 4-4](#) and [Figure 4-5](#) respectively.

The examples include the following items:

- Gantry
- Table
- Collimator Carts
- Acquisition Station
- Multi Imager
- Operator's Chair
- Emergency Button

The room layout for the Infinia with Hawkeye option differs from that recommended for the basic system in two respects:

- Location of the Acquisition Station. This change is required to protect the operator from exposure to X-ray radiation
- Distance of Gantry from the rear wall

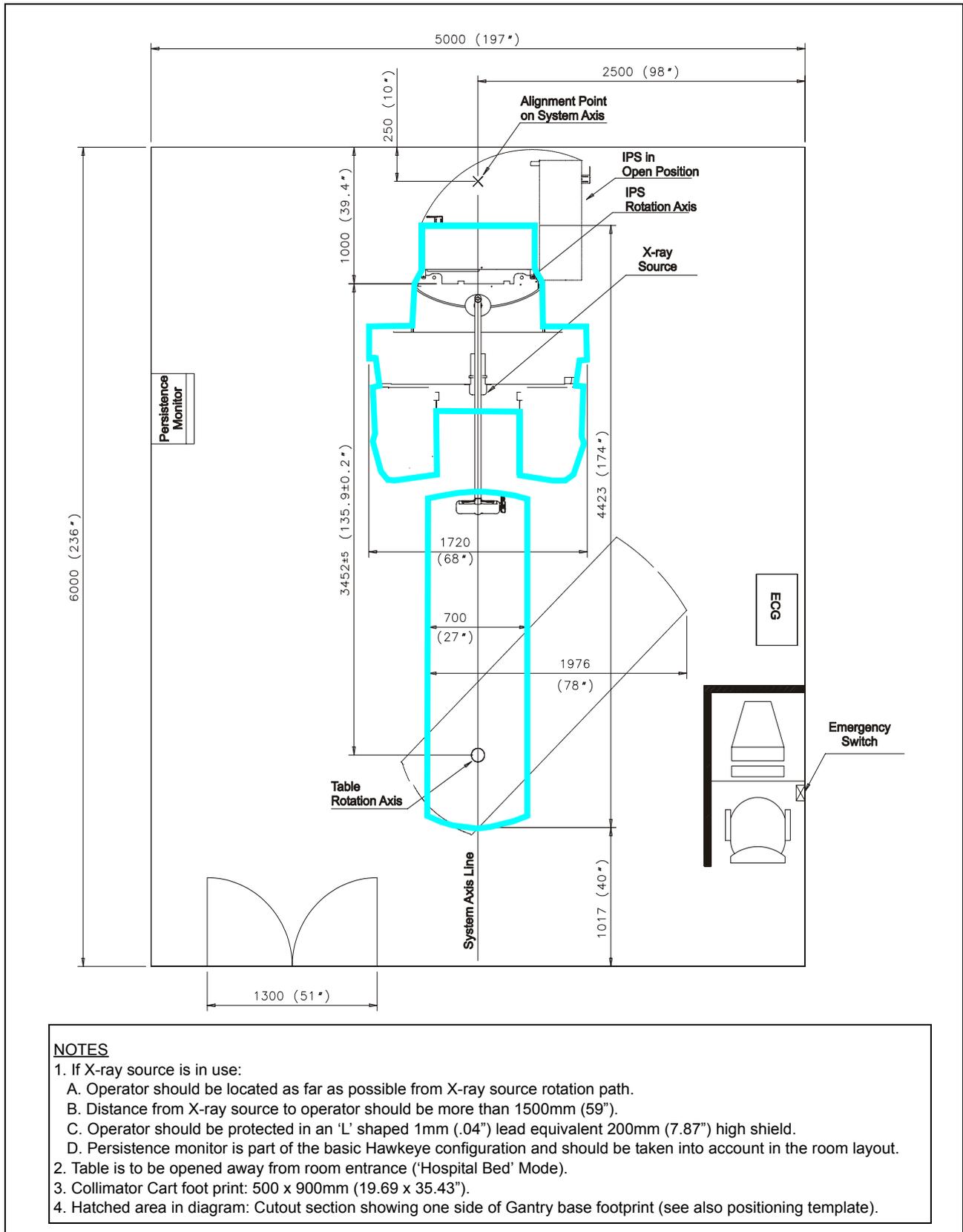
For system positioning in order to avoid X-ray penetration of adjacent rooms, please refer to [Figure 4-2](#). Note that  $10 \mu\text{Gray} = 1 \text{ mRem}$ .

**Note**

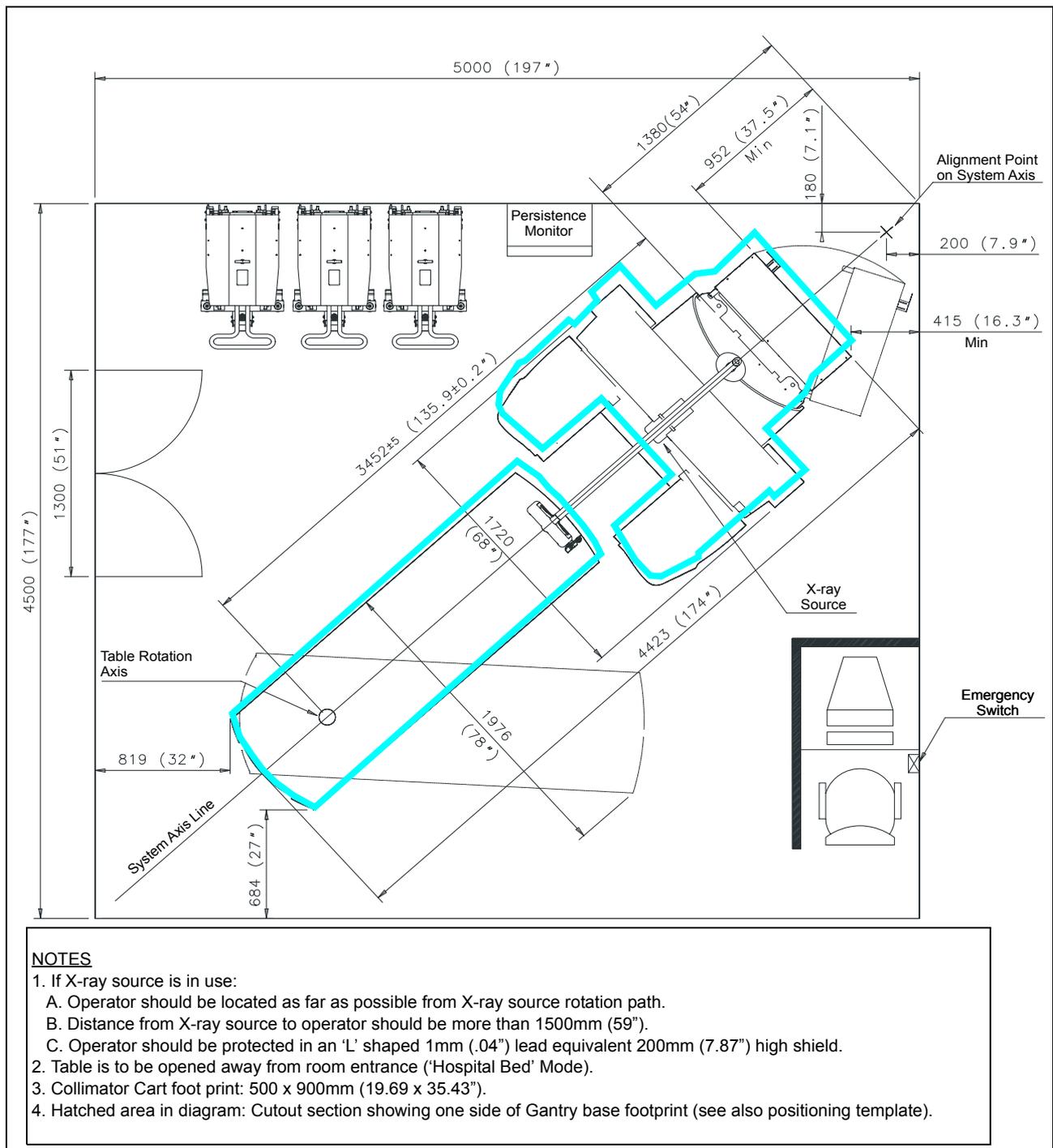
The dose values in [Figure 4-2](#) were measured while scanning a phantom, and represent the dose rate from leakage and scatter from the phantom while X-rays are ON.

### 4.4.1 Scan Room Design Considerations

1. When designing the layout of the system inside the scan room, make sure that the Table rotates to its slanted position away from the entrance to the room. This allows for adequate space to place a hospital bed under the Heads of the Gantry.
2. Collimator carts should NOT be positioned on the side of the Gantry to which the Table rotates. This ensures that the Collimator Carts may be moved directly to the Gantry by the shortest route (Collimator Cart footprint is 500 x 900 mm (19.7 x 35.4 inches)).
3. The Alignment Point (located on the system axis) must be clearly defined for each site by providing measurements to adjacent walls, either by physically marking it on the floor or by providing a site diagram.
4. When planning your room layout you must take into consideration the clearance area required for servicing the imaging system (see [Figure 4-6](#)), and the **room height**, which should be minimum 2.5 meters. This height is required for mounting the Crane used to lift and install the Detectors



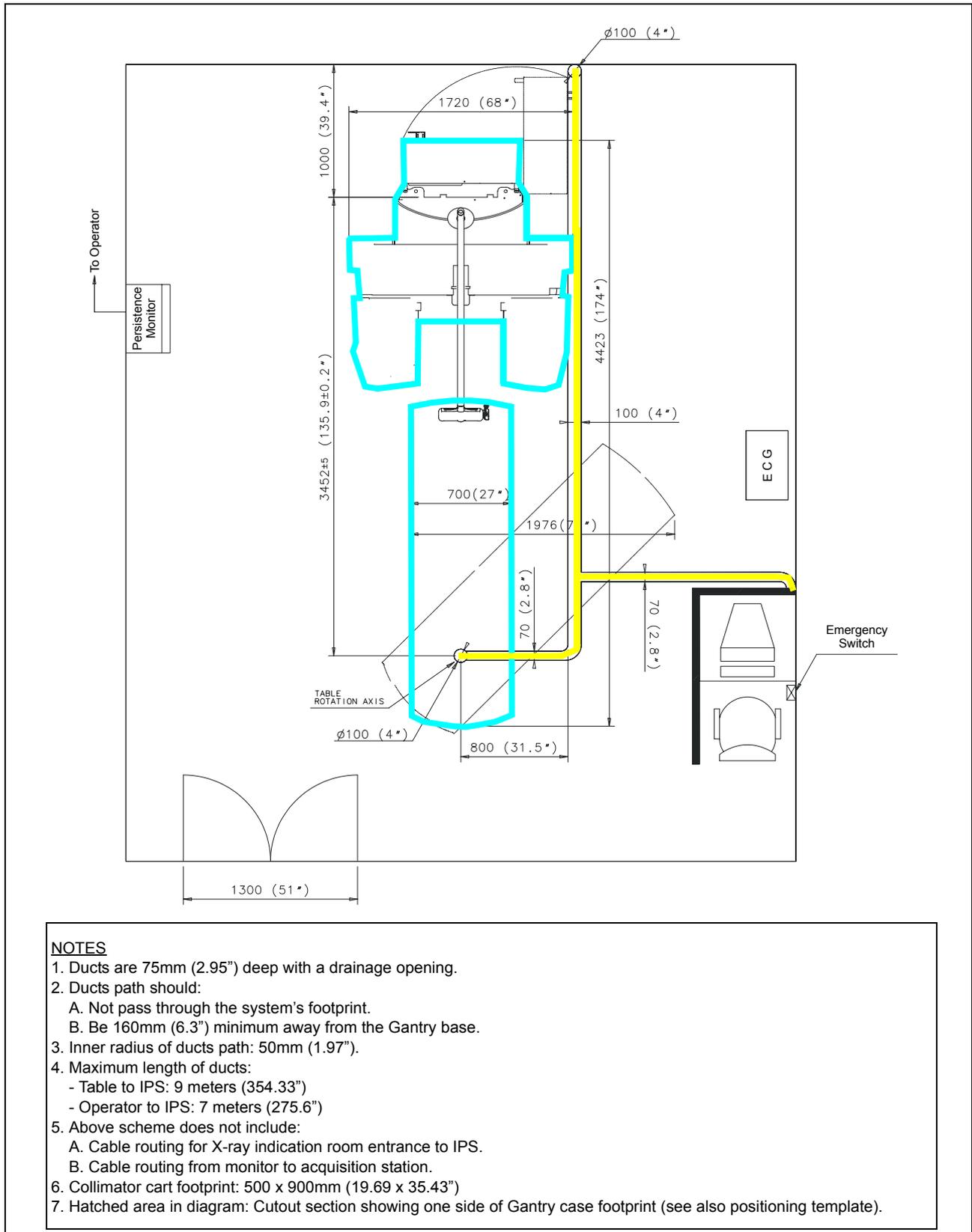
**Figure 4-4** Recommended Room Layout for Infinia Systems



**Figure 4-5** Minimum Room Layout for Infinia Systems

**Note**

- Clearance of 1380 mm (54") includes maximum Stretcher extension for systems with the Hawkeye option. This is the default clearance.
- For systems without the Hawkeye option, clearance of 880 mm (34.65") is sufficient for maximum Stretcher extension. However, the default clearance of 1380 mm (54") should be allowed for, whenever room size considerations permit, to enable upgrading the system to use the Hawkeye option in the future.



**Figure 4-6** Recommended Room Ducts Layout

## 4.5 Floor Preparation

### 4.5.1 General

The floor must be prepared so that it will support the floor loading as described in [Section 4.5.1.1](#).

**Important**

Floor loading capability must be confirmed by a local construction engineer.

In addition, the floor slope and flatness must meet the requirements mentioned in [Section 4.5.1.2](#), to ensure smooth access for loading/unloading collimators and phantoms to/from Collimator Carts and Heads.

Floor preparation differs according to its construction and level:

- Floor preparation of site where the construction is made of concrete and the site is on ground level (and on real ground), or where there is a possibility to cast concrete. See [Section 4.5.1.3](#) for an example.
- Floor preparation of site where the floor is made of a thin layer of concrete and is supported by a beam construction. See [Section 4.5.2.4](#) for an example.

To avoid damage to system cables during Table motion or Collimators loading/unloading, it is recommended that all cables should lie in sunken ducts when the site is on ground level, or under the floor in case of floors supported by beam construction.

#### 4.5.1.1 Floor Loading

The Gantry weighs approximately 2800 kg (6173 lb.) static weight and about 3300 kg (7275 lb.) dynamic load (at maximum rotation speed and asymmetric heads positioning). The Gantry applies a point loading of 4.2 kg/cm<sup>2</sup> (60 lbs/inch<sup>2</sup>).

The Hawkeye option weighs an additional 100 Kg (224 lb.).

The Scanning Table weighs about 400 kg (896 lb.).

The Collimator Cart loaded with two Collimators weighs between 170 to 430 kg (375 - 950 lb.), depending on the Collimators' type.

The entire room floor must tolerate the load of the loaded Collimator Cart.

The floor loading areas for the Gantry, Table and Collimator Carts (floor loading areas A, B, and C, respectively) are shown in [Figure 4-7](#).

### 4.5.1.2 Floor Slope and Flattened Area

To ensure proper Gantry motion and collimator exchange, the room floor must be leveled, and its surface must be smooth.

It is recommended that the floor in the entire room will be leveled and flattened, according to the specifications given below. If this is not possible, it is imperative that the system installation area (inside the dotted lines) [Figure 4-7](#) is leveled and flattened. The dimensions are shown in [Figure 4-7](#)

The floor slope should be within  $\pm 1 \text{ cm} / 430 \text{ cm}$  ( $\pm 3/8" / 170"$ ).

The floor surface should be smooth and have no more than 0.2 cm (1/16") deviation in any 150 cm (5') segment in all the room area.

To verify surface flatness of the entire room, use a straight edge of 150 cm (5') long ruler upon completion of the room.

No fill material is allowed to compensate for surface deviations.

### 4.5.1.3 Floor Material

To reinforce the required floor area, it is recommended to use cast concrete B-300 or stronger.

To level and flatten the floor it is recommended to use Micorox X-tra Fluid Grout, or Mipolam 410 (both described in Appendix B), or any other similar material. The material used to flatten the floor must be anti static.

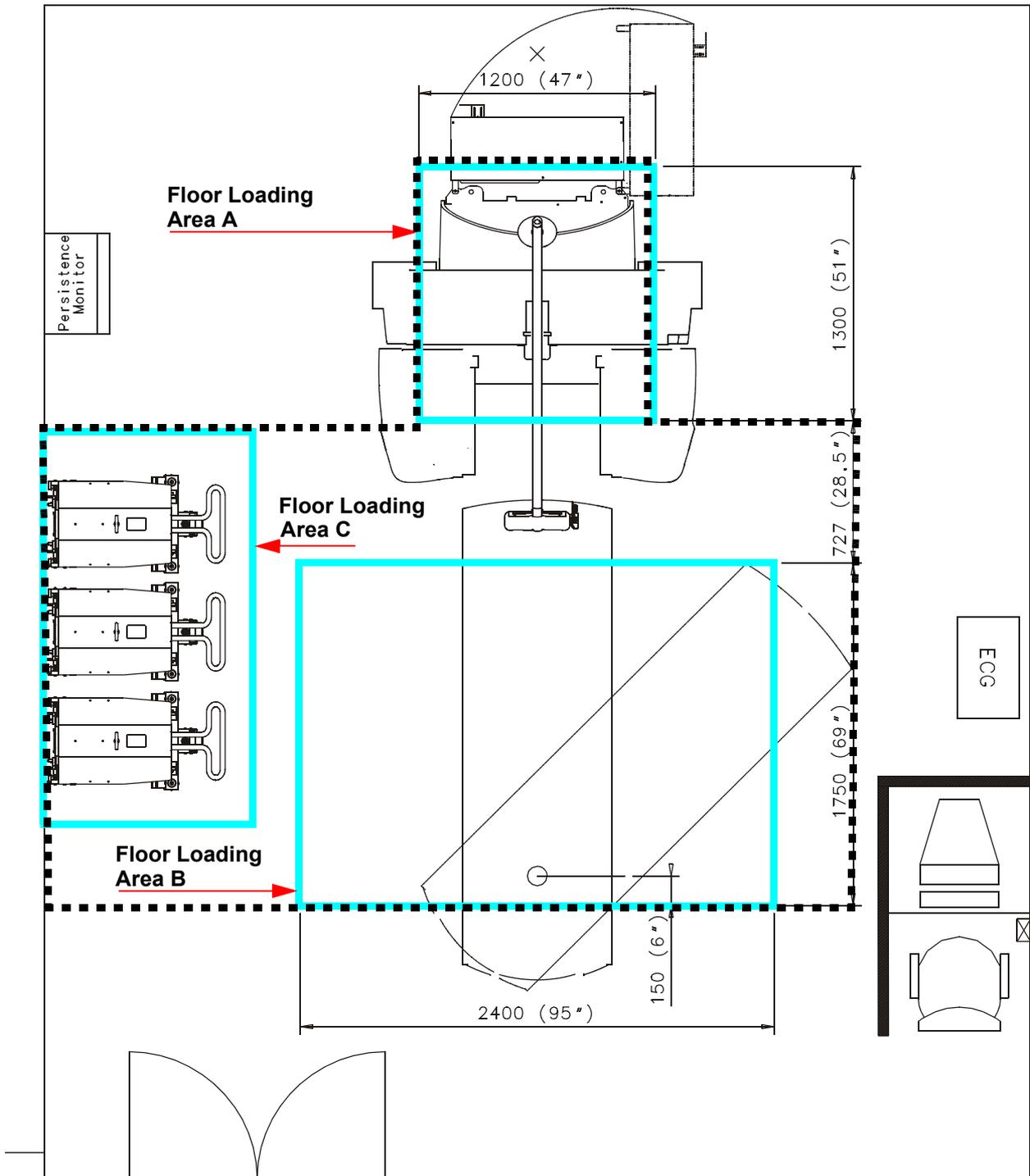


Figure 4-7 Floor Loading

## 4.5.2 Ground Floor Site

Preparation of ground floor consists of:

- Floor reinforcement, if needed.
- Preparation of built-in ducts
- Floor leveling and surface flattening

### 4.5.2.4 Reinforced Area

In case the Imaging System is to be installed on ground level and the floor is of concrete, a proper reinforced area must be prepared. It is recommended that the reinforced area be of cast concrete B-300 or stronger. The size and shape of the area should be according to [Figure 4-7](#).

### 4.5.2.5 Preparation of Built-in Floor Ducts

- The Gantry-Table cable must be routed within a duct either built-in or beneath the floor.
- The Gantry-Computer cable should also be routed within a duct, or at least part of it between the Gantry and the near-by wall.
- Ducts built in the floor should be beneath the floor surface, at 75 mm depth, at least.
- The minimum duct width is 70 mm.
- The optional Persistence Monitor (AXM-15) can be installed on a mechanical arm attached to any wall in the Gantry room according to the customer requirements. The Persistence Monitor cable of 15 meters length (49.215 ft.) may be routed in a plastic duct attached to the wall.
- An example of locations and measurements of floor ducts is provided in [Figure 4-6](#).

**A few recommendation for duct preparation are given below:**

1. If the concrete can not accommodate the ducts, drill through the floor and route the ducts beneath the floor.
2. The Table/Gantry cable must reach the Table from behind.
3. The duct containing the Table cable should be accurate in length:  $9.5 \pm 0.5$  meters ( $31.17 \pm 1.64$  ft.).
4. Building ducts under the Floor Plates should be avoided, except for the back Table Plate.
5. Ducts should not be built under the Gantry.

# Chapter 5 – Electric Installation Requirements

## 5.1 Voltage Requirements

The Infinia System is adaptable to the following international types of Mains power supplies:

- **3- phase 400V or 415V with Neutral plus Ground.**

OR

- **3- phase 208V plus Ground (no Neutral required).**
- The Infinia Input Transformer is connected according to the available mains.

Voltage Tolerance	+10%, -5% from nominal
Load Regulation	Maximum 5% for delta load of 20A per phase
Frequency	50 or 60 Hz $\pm$ 1Hz

Spikes Line to Neutral		
Spikes	Phase Voltage	
	230 V Line	120 V Line
Spike "A"	< 1200 V	< 900 V
Pulse Width	< 10 $\mu$ s	< 10 $\mu$ s
Rise Time	> 1 $\mu$ s	> 1 $\mu$ s
Spike "B"	< 800 V	< 400 V
Pulse Width	< 100 $\mu$ s	< 100 $\mu$ s
Spike "C"	< 400 V	< 200 V
Pulse Width	< 200 $\mu$ s	< 200 $\mu$ s
High Frequency (Line to Neutral)	< 1V RMS 0.15 to 30 MHz	

## 5.2 Power Requirements

Power consumption is 4.2 kVA (including Hawkeye Option), 3.6 kVA (without Hawkeye Option). Maximum load (current) is:

- 15 A per phase in case of three-phase star, 400 V ac line voltage (3 x 230 V for Europe), 20 A Circuit Breaker.  
In-rush current/phase, 30A 15 msac
- 17 A per phase in case of three-phase delta, 208 V ac line voltage (3 x 120 V for USA), 20 A Circuit Breaker  
In-rush current/phase, 60A 12 msac
- The circuit breaker should support the In-rush current and be capable of withstanding the short circuit current available. It should be the Thermal-Magnetic type.

The power source must be independent of all other loads.

The three-phase power must be dedicated circuit and include the following:

1. Permanent - not plug-in connection.
2. The connection must include THREE PHASE lines, NEUTRAL line and INSOLATED Ground line. The ground wire is same as or larger than the power wire.
3. The connection must include an ON/OFF switch, 3-pole 600V rated for the appropriate current, with phase indicator for each phase, located at the Mains power supply box mounted on the wall. The type of ON/OFF switch should be determined by a local specialist according to local regulations (US code requires a lockable switch). If this switch is under a decorative or protective cover, the label will be on the cover underneath the Main Switch. The switch or covers shall not be locked and the switch will be reachable for operators or service engineers.

In addition, the camera room should have several single phase wall outlets to be used for connection of general use. The location of these outlets depends on the specific site equipment and room layout.



### CAUTION

For minimum noise and interference, the electrical power to Infinia must be independent from other non-system electrical equipment.

The Gantry - Computer cable is terminated by a 3-outlets power box. One outlet to connect the computer, one to connect to the monitor and one free. The free outlet provides maximum 5 A.

### 5.2.1 Power Circuits

1. The Infinia system has one non detachable 5-conductors power cable:

Wires:	5 x AWG 10 (6mm sq.)
Diam:	15 mm
Length:	9 meters
Connection to 3-phase Mains: (permanent NOT plug-in)	<ul style="list-style-type: none"> <li>• 3-phase Mains</li> <li>• Neutral</li> <li>• Ground</li> <li>• Crimped terminal lugs (1/4" holes), nuts, washers and spring washers</li> </ul>

2. Other power cables:

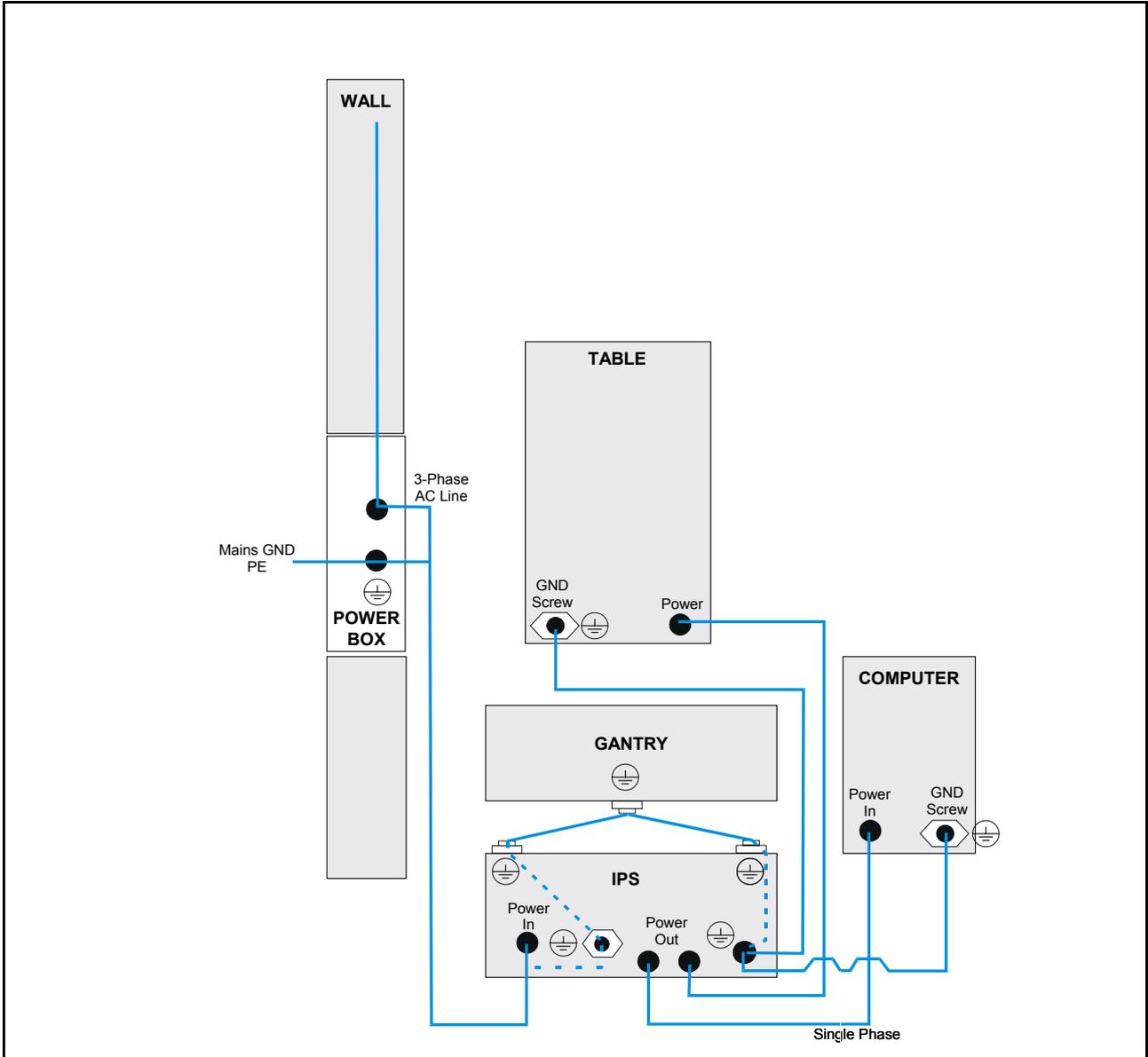
Table electrical cable:	<ul style="list-style-type: none"> <li>• Connected to Gantry</li> <li>• Length: 11 meters</li> <li>• Flexible - protected with 35mm conduit capable of withstanding 350N/100mm pressure</li> <li>• 40mm diam. clamps on ends</li> </ul>
Computer electrical cable:	<ul style="list-style-type: none"> <li>• Connected to Gantry</li> <li>• Length: 9.5 meters</li> <li>• Flexible - protected with 35mm conduit capable of withstanding 350N/100mm pressure</li> <li>• 40mm diam. clamps on ends</li> </ul>

3. Additional Mains wall outlets:

- Several additional single-phase 5A outlets for service engineer use. These are fed from the same Mains as the Infinia circuit breaker.
- Other mains outlets for clinical staff use are also fed from the Power Mains. However, it is recommended to separate these or mark them with a different color. Their Ground will be the same as for the whole room PE (Potential Equalization).

### 5.2.2 Grounding Requirements

The Infinia System is connected to Ground at a single point (see [Figure 5-1](#)). This point will be on the wall as a Ground Bus with a connection to a 5/16” hole Terminal Lug with a 1/4” screw, flat washer, spring washer and nut.



**Figure 5-1** System Grounding and Power Distribution

**Note**

The wall GND point is the patient room PE point, which is the Potential Equalization point.

The frame ground of the Table and the frame ground of the Computer are connected to the IPS frame ground to form a common ground. The Gantry frame ground is connected via the main ground screw to the main IPS ground. System grounding and power distribution are shown in [Figure 5-1](#).

### 5.2.3 Additional Requirements

1. **Line Conditioner and/or a Lightning Arrestor** - may be required to meet the above power requirements.
2. Customers should consider the advantages of raised flooring, conduits, floor ducts and surface raceway for running cables in accordance with local codes.

	<p><b>CAUTION</b></p> <p>Whenever possible, keep power cables away from signal and data cables.</p>
---	---

3. Missing Line phase or Over-voltage spikes will not endanger the system, but protection against these events is recommended.

	<p><b>WARNING</b></p> <p>The Infinia has an isolated transformer which is the only power input to the system. Therefore it is strictly forbidden to connect any electrical equipment not authorized by GE to the system.</p>
---	--

4. **Power Audit** - A site power audit is required for the Infinia product. This site power audit can be arranged with the GE Power Quality team, or through your sales person. A sample audit form is located in [Section A.4 on page A-9](#).
5. **Power line analyzer** - should be used to check the proposed Infinia site power for average line voltage, surges, sags, impulses, frequency and microcuts. A period that includes two weekends should be used to simulate several days of normal use. Analysis of the data and site history of any previous power problems with other X-ray systems or computer installations should be reviewed with your Power and Ground representative. Verify "brown-out" (low voltage) conditions which may occur during summer months will not exceed the allowable range shown in [Table 5-1](#).

**Table 5-1:** Allowable Input Voltages/Current Demand

Nominal Voltage	Absolute Range	Current (Amps)		Minimum Standard Overcurrent Protection
		Momentary	Continuous	
400	368-432	137	36	110-A
440	405-475	125	33	110-A

**Table 5-1:** Allowable Input Voltages/Current Demand

480	442-518	114	30	110-A
-----	---------	-----	----	-------

Some analyzer models which are suitable for power line monitoring are:

- Dranetz Model 658
- Dranetz Model 656
- Dranetz Model 626 with 6003, 3-phase AC monitor option
- BMI 3630
- RPM

## 5.3 X-ray Exposure Warning Lights

The Infinia provides the ability to power a series of exposure warning lights, which can be sited at the entry points to the scan room. Power is applied to the designated outlets on the rear gantry panel when the X-rays are ON. The light fittings are not part of the Infinia and should be procured by the customer. The external wiring to the lights is also not part of the Infinia.

## 5.4 Exposure Light Specifications

- Voltage: 24 V AC
- Current: Up to 2 A
- Fuse: 2.5 A S.B.
- Cable Connector: P2 “PHoenix Contact” PC 4/5-ST-7.62; No.18-04-93-3
- Housing: “PHoenix Contact” KGG-PC 4/5-F; No.18-37-34-0
- Location: “Header is located on the IPS Front Panel - J2 Hawkeye” shown in [Figure 5-1](#).

**Note**

The system provides active 24V AC output to the exposure warning light. The customer should provide passive light bulbs that can receive direct 24V AC input from the system.

## 5.5 Exposure Lights Cable

- The customer should provide a cable to the light fitting.
- The cable should have 3 wires, (GND Wire - Green/Yellow color).
- The nominal cross-sectional area of conductors of the power supply cords should not be less than 0.75 mm<sup>2</sup> Cu, and insulation 600 V.

**Note**

For systems with Hawkeye Option only.

## 5.6 X-ray Exposure Interlock

To prevent accidental exposure of someone entering the scan room when X-rays are ON, provision for an interlock system is made. When activated, the interlock issues an X-ray Disable signal. The interlock switch can be installed on any barrier such as a door, which limits access to the camera room. If the switch is open, the X-rays are disabled.

The interlock switch and associated cabling are not part of the Hawkeye option.

## 5.7 Interlock Signal Specifications

- Voltage: 5 V
- Current: 50 mA
- Cable Connector: P2 “PHoenix Contact” PC 4/5-ST-7.62; No.18-04-93-3
- Location: Header is located on the IPS Front Panel - J2 Hawkeye shown in [Figure 5-1](#).

## 5.8 Exposure Door Switch Cable

- The customer should provide a cable to the door fitting.
- The cable should have 2 wires.
- The nominal cross-sectional area of conductors of the power supply cords should not be less than  $0.75 \text{ mm}^2$  Cu, and insulation 300 V.
- The Door Switch Cable should be connected to P2, Pin #4, and #5.

## 5.9 Customer's Responsibility

To ensure a successful installation of the Infinia, the customer is required to:

- Schedule a service survey to verify that the system is working properly and meets the prerequisites listed in Section 8.1.3 of the Infinia Service Manual, *before* scheduling the installation of the Infinia.
- Ensure that the camera room can be locked during the installation procedure, and that it will not be accessed by unauthorized people.
- Provide storage space with a minimum size of 3 x 3 meters for storing the option, installation tools, and the removed system covers.

Failing to meet the above requirements will prolong the installation period.

## 5.10 Inter-Cabling

There are four major cables in the Imaging System, as specified in [Table 5–2](#) below:

**Table 5–2:** Major Cables List

<b>Cable Type</b>	<b>Length</b>
A. Table Cable (from Gantry to Table)	11.0 m (36.1 ft)
B. Computer Cable (from Gantry to Computer)	9.5 m (31.17 ft)
C. Main Power Cable (from Power Outlet to Gantry)	9.4 m (30.84 ft)
D. Computer to Persistence Monitor (optional)	15.0 m (49.22 ft)

---

## Chapter 6 – Environmental Conditions

### 6.1 Recommended Site Environment Specifications

Each system module comprises numerous electronic and mechanical components, which are sensitive to extreme temperatures, humidity, dirt and air pollution. The operational environment of any Nuclear Medicine system inevitably has a noticeable effect on its reliability. High temperatures increase the failure rate of almost any electronic component. Temperature cycling may induce temporary or permanent changes in electronic equipment and/or mechanical components and can influence the performance of the system. Fast temperature changes can cause physical damage to the Detector's crystal. Unfiltered air in the room can cause damage to the hard disk, floppy disk drive, optical disk, etc.

Therefore, the units of the Imaging System should be installed only in a clean, dust-free, temperature-controlled environment, as specified in [Table 6-1](#).

**Table 6-1:** Environment Specifications

<b>PARAMETER</b>	<b>REQUIRED ENVIRONMENT SPECIFICATIONS</b>
Temperature	20 - 25 °C (68 - 77 °F)
Maximum Gradient	3 °C / hour (5.4 °F / hour)
Humidity	40 - 60% RH non-condensing
Magnetic Field in Camera Room	Less than 1.2 Gauss

In addition to the specifications listed in [Table 6-1](#), free flow of air is required around the Computer. The Scan Room temperature and humidity are influenced by such factors as volume, temperature, humidity and flow pattern of incoming room air.

Operation is guaranteed up to 27 °C (81 °F). When designing the equipment control system, it should be noted that system cooling is required even in winter months.

Many sites have shut down their cooling facilities in the past and have used external atmospheric air to cool the system. The use of external cold air must be carefully controlled, to correct the temperature, humidity and air cleanliness levels, and ensure proper operation of scanner system.

## 6.2 Thermal Loads

The following thermal loads are relevant to the site environment:

- Equipment heat dissipation
- Room heaters and lights
- Number of persons in the scan room
- Dissipation through walls, ceilings, floors, doors, windows
- The thermal loads of the camera main units are listed in [Table 6-2](#).

**Table 6-2:** Equipment Thermal Loads

Equipment	Watts	BTU/Hour
Gantry	2,100	7,200
Patient Table	100	342
Hawkeye Option	200	685
Computer	350	1,200
Monitor	120	411
<b>Total (without Hawkeye Option)</b>	<b>2,570</b>	<b>8,811</b>
<b>Total (including Hawkeye Option)</b>	<b>2,770</b>	<b>9,496</b>

**Note**

Any additional equipment such as processing station or multi imager should be considered while calculating the total thermal load.

In addition to the heat generation specifications listed in Table 6-2, the amount of heat dissipated through walls, ceilings, and floors due to lighting, air ducting, heating, air conditioning, etc., should also be considered. The number of persons in the Scanning Site any given moment, will also have an effect on heat buildup.

As environmental factors change, varying levels of heat and humidity will be introduced or dissipate. Heating, cooling and humidity control equipment should therefore be used to maintain the required environmental conditions.

In order to maintain a proper air flow, the air conditioning duct arrangement should be planned so that cool air is not directed to the computer and the Gantry. Exhaust or return air vents should be located in the ceiling above the computer system. Air should be supplied by an overhead duct and diffuser or through a low wall system.

In planning the air conditioning installation, space must be provided for camera maintenance and environmental control system. Environmental control system installation plans must be submitted to the Vendor's Installation Department, in order to facilitate complete site planning.

## 6.3 Environmental Tests

### 6.3.1 Power Source Test

Tests must be performed on site main supplies, prior to the camera installation. The mains tests can be done with a unit Power-line Disturbance analyzer such as “DRANETZ - series 606”. Surveillance requires seven working days on site, on all three phases. Voltage measurements are as follows:

1. Slow average of mains voltage beyond  $\pm 10\%$ .
2. Surge or sag of RMS voltage beyond  $\pm 10\%$ .
3. Frequency variations beyond  $\pm 1\%$ .
4. Spikes higher than 400 V (230 V line), 200 V (120 V line), their amplitude and time duration.
5. Line regulation tests - should be performed after loading each phase (at the point where the camera switchboard will be connected).
6. Ground Conductivity - the resistance between True Ground point and the Electrical connection to the equipment must be less than 1.2 Ohm.

### 6.3.2 Temperature Tests

Prior to installing the Imaging System, humidity and temperature tests must be performed at the site area. Surveillance requires seven working days on site.

CAMERA WARRANTY AND SERVICE AGREEMENTS ARE  
CONTINGET UPON MAINTAINING THE SITE ENVIRONMENT  
ACCORDING TO THE ABOVE SPECIFICATIONS.

---

# Chapter 7 – Connectivity

## 7.1 General

The gamma camera is designed to be connected to a Local Area Network (LAN) and a Remote Area Network (WAN) in order to transfer studies to Processing & Reviewing (P&R) stations, viewing stations and hardcopy devices. For the LAN Ethernet is used, while WAN connectivity is provided via Modem. Both LAN and WAN use the Transmission Control Protocol / Internet Protocol (TCP/IP) or File Transfer Protocol (FTP).

Towards this goal the following must be prepared:

- Network connection
- IP Address
- Telephone line for modem connectivity, if relevant

In addition, network information, hardcopy devices data and DICOM data must be prepared prior to system installation, to ensure that the system can be configured properly without delay. Refer to Chapter 2 in the Installation Manual for the required information.

## 7.2 LAN Connection

The connection to the LAN is done via an Ethernet Adapter installed in the Acquisition Station. Therefore, the LAN connection must be on the wall next to the Acquisition station, so that the cable is not in the path of the Collimator Carts, or patient and operator access to the Table.

The actual connection to the network depends on the physical network media of the hospital, which is normally a Twisted Pair Cable, implementing the 10Base-T standard.

The LAN connection must meet the requirements of the standard used in your hospital or clinic. Consult the hospital network specialist or your local service for specific instructions.

## 7.3 IP Address

An IP address identifies both the network and the host attached to it.

Network IDs for networks that connect to the worldwide Internet are allocated by a central authority, the Internet Network Information Center (InterNIC), while the Host IDs are allocated by the Local Network Administrator.

For Internet connected networks, ask your local LAN Administrator to allocate an IP address for the camera or contact the InterNIC for allocating an IP address space for your hospital/clinic, whichever applies to your site.

For a camera to be connected over an internal network (that does not connect to the Internet), ask your local LAN Administrator, if any, for allocation of an IP address or consult your local service.

For description of the IP Address structure, refer to Chapter 2 in the Installation Manual.

## 7.4 Telephone Line & Socket for Modem Connection

For Modem connection a telephone line must be installed.

Since the Modem is installed in the Acquisition Station, the telephone socket must be installed on the wall next to the Acquisition station, so that the cable is not in the path of the Collimator Carts, or patient and operator access to the Table. If a telephone is connected to the modem line, the operator must have convenient access to the telephone.

## 7.5 Broadband For Remote Connectivity.

Serviceability strategy for the Infinia is based on remote accessibility via Insite over broadband connection.

**Important**

**Broadband connectivity should be ready prior to system installation in order to allow remote service and customer support from Day One of the installation.**

The following forms need to be completed to configure the broadband connection:

- [InSite Broadband - Add System\(s\) to a Connected Site on page 7-4](#)
- [Remote Service Broadband - Customer Site Assessment on page 7-5](#)

### 7.5.1 InSite Broadband - Add System(s) to a Connected Site

<b>Site Name:</b> _____	<b>FE Name:</b> _____
<b>City, State:</b> _____	<b>FE Phone:</b> _____
<b>Date:</b> _____	<b>FE Email:</b> _____

<p><b>1. Is this site already connected to GE InSite Broadband?</b>                  If Yes, Enter the System ID of a device that is already connected via Broadband (this helps validate the site)</p> <p>System ID: _____</p> <p>If No, you are using the wrong form!</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p>
---	--

<p><b>2. Update/Confirm the Customer IT Contact information.</b>                  This is the person who will be contacted to add the new System IP Address to their Encryption Domain.</p> <p><b>Customer IT Contact Name:</b> _____</p> <p><b>Telephone:</b> _____</p> <p><b>Email:</b> _____</p> <p><b>Notes:</b> _____</p> <p>_____</p> <p>_____</p>
--

<p><b>3. Field Engineer needs to provide the new system information.</b>                  All three fields required:</p> <table> <tr> <td><b>System ID:</b></td> <td><b>IP Address:</b></td> <td><b>Gateway Address:</b></td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </table>	<b>System ID:</b>	<b>IP Address:</b>	<b>Gateway Address:</b>	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
<b>System ID:</b>	<b>IP Address:</b>	<b>Gateway Address:</b>																
_____	_____	_____																
_____	_____	_____																
_____	_____	_____																
_____	_____	_____																
_____	_____	_____																

**If you have questions or need assessment support:**  
 Contact your Zone Champ or:  
**Joe Gracz - HQ Support**      1-262-524-5261      Joseph.Gracz@med.ge.com

**If you have questions or need assessment support in Europe:**  
 Contact Remi Lelong      +33-01-30-70-45-92      Remi.Lelong@med.ge.com

**Once you have completed both pages of this form:**  
 Please send it to:  
**Judy Heyer**      Fax# 414-918-4707      judy.heyer@med.ge.com

## 7.5.2 Remote Service Broadband - Customer Site Assessment

Site Name: _____	FE Name: _____
City, State: _____	FE Phone: _____
Date: _____	FE Email: _____

1. Does your site currently have a persistent (24x7) Internet connection?	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
2. Is the GEMS Diagnostic Imaging equipment on the Local Area Network and will it be accessible to the Internet?	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
3. Does your site have a VPN device today?	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
<p>4. Is the VPN device one of the models below? Please select the model from the options below."</p> <p><input type="checkbox"/> a) Cisco Pix Firewalls</p> <p><input type="checkbox"/> b) Cisco Routers</p> <p><input type="checkbox"/> c) Cisco 3000 Series (Altiga acquisition)</p> <p><input type="checkbox"/> d) Checkpoint Firewalls Software Version 4.1 and higher</p> <p><input type="checkbox"/> e) Nortel Contivity Software Version 3.2 or higher</p> <p><input type="checkbox"/> f) Redcreek</p> <p><input type="checkbox"/> g) Symantec (Raptor) firewalls</p> <p><input type="checkbox"/> h) Firebox</p> <p><input type="checkbox"/> i) Linux S/WAN</p> <p><input type="checkbox"/> j) Sidewinder</p> <p><input type="checkbox"/> k) Netscreen</p> <p><input type="checkbox"/> l) None</p> <p><input type="checkbox"/> m)Other _____</p> <p>*If None, the GEMS Connectivity Support Team can help determine device compatibility.</p>	

<b>5. Does your VPN device support "triple DES" Encryption?</b>	Yes <input type="checkbox"/>  No <input type="checkbox"/>																		
<b>6. Has approval been given to install this VPN connection?</b>  Site Approver's Name _____	Yes <input type="checkbox"/>  No <input type="checkbox"/>																		
<b>7. Provide your VPN Installer information.</b> This is the person who will be contacted to schedule the VPN installation.  <b>Customer Installer Name:</b> _____  <b>Telephone:</b> _____  <b>Email :</b> _____  <b>Notes:</b> _____ _____ _____																			
<b>8. Field Engineer needs to provide compatible system information.</b> All three fields required:  <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><b>System ID:</b></td> <td style="width: 33%;"><b>IP Address:</b></td> <td style="width: 33%;"><b>Gateway Address:</b></td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </table>		<b>System ID:</b>	<b>IP Address:</b>	<b>Gateway Address:</b>	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
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<b>Once you have completed both pages of this form:</b> Please send it to: <b>Judy Heyer</b> Fax# 414-918-4707                      judy.heyer@med.ge.com																			

# Chapter 8 – Unpacking and Conveying

This section is covered fully in the Infinia Installation Manual, but because the manuals are still inside one of the crates when the consignment arrives, unpacking and conveying instructions have also been included in this manual

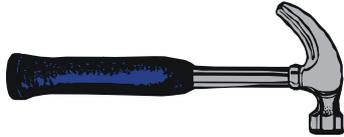
## 8.1 Overview

The equipment and tools required to unpack and convey the Infinia System are listed in the [Table 8-1](#) and must be available on site **before** the components can be unpacked or moved.

## 8.2 Unpacking Tools

These tools should be on site when the delivery truck arrives

**Table 8-1:** Unpacking Tools

Crowbar	
Carpenters Claw Hammer (large)	
Set of Allen keys (inch size)	
Set of Combination Wrenches (inch size)	
Socket Set - Inch Size(1/2 inch drive)	
Tin Snips (Metal band cutter)	

## 8.2.1 General Order of Operations

1. *Before* unpacking the camera units, the supervisor must be well acquainted with the safety measures for system unpacking and conveying, detailed in the Safety and Regulatory section of the System Service Manual.
2. *Before* releasing the carrier:
  - a. Inspect the containers/boxes for external damage. If any damage has been found, inform immediately the carrier and your office.
  - b. Check the containers/boxes against the delivery slip and verify that you have all the boxes. Inform immediately the carrier and your office about any missing packages.
3. Unpack the Gantry and Table in the unloading area as described in [Section 8.3](#) and [Section 8.5](#).  
All other units should be unpacked as close as possible to the clinic.

	<p><b>CAUTION</b></p> <p>The Gantry is shipped with the Detectors installed. It is important to move the Gantry onto the site and into in a temperature controlled environment as soon as it is unloaded. Do not remove the foam insulation until the Gantry has been inside the clinic and allowed to stabilize for a period of at least 24 hours.</p>
---	---

4. After unpacking, fit the transportation wheels (included in the Gantry crate) onto the Table, as described in the following sections.
5. Convey the Gantry into the clinic.
6. Fit the Transportation Wheels supplied in the transportation kit, and convey the Table onto the site.

	<p><b>CAUTION</b></p> <p>To avoid damage to the equipment, never wheel the Table onto the site using its integrated wheels.</p>
---	---

7. Release each Collimator Cart from the bottom palette of the container and wheel it onto the site.
8. Convey all the other units onto the site by means of a service wagon while they are still packed.
9. After unpacking, clear all packing material except for the Lifting Jig (UGP001187) and the Transportation Wheels crates.
10. Transportation Dollies and accessories to be shipped back for recycling (See *“Cleaning Up the Site and Removing the Shipping Dolly”* in the *Infinia Installation manual Direction 2332351-100*).

## 8.3 Gantry

The procedure used for unpacking and conveying the Gantry into the clinic depends on the available unloading equipment and accessibility to the Gantry on the truck.

Basically, there are two procedures:

- With a crane, provided that access to the Gantry for on-truck unpacking is enabled. Using a crane requires three steps:
  - Unpacking the Gantry on the truck.
  - Assembling the Lifting Jig onto the Gantry Transportation Dollies.
  - Unloading the Gantry using a crane.

For more details, refer to [Section 8.3.1 on page 8–4](#).

- With a fork lift.  
For more details, refer to [Section 8.3.1.2 on page 8–8](#).

According to the unique conditions at specific sites, any other procedure or any combination of the above two procedures can be applied to unload, unpack and convey the Gantry into the clinic.

**Note**

**For identifying the various transportation accessories referred to in the following sections, see “Infinia Site Preparation Manual, Direction 2332349-100” in the “Tools and Equipment” Appendix.**

## 8.3.1 Gantry Unpacking and Conveying

### 8.3.1.1 Unloading the Gantry Using a Crane

While the Gantry is still on the truck:

	<p><b>CAUTION</b></p> <p><b>Check the G-limit indicator attached to the front of the Gantry packing crate (on top of the Fragile label) and verify that its color is white.</b></p> <p><b>If the color is red, please notify the carrier that the Gantry was subjected to impact exceeding 10 g, and proceed with unpacking.</b></p>
---	--

1. Cut the packaging bands.
2. Remove the securing screws and nails from the packing crate
3. Remove the wooden top and the four wooden sides of the packing crate.
4. Remove the protective plastic cover.

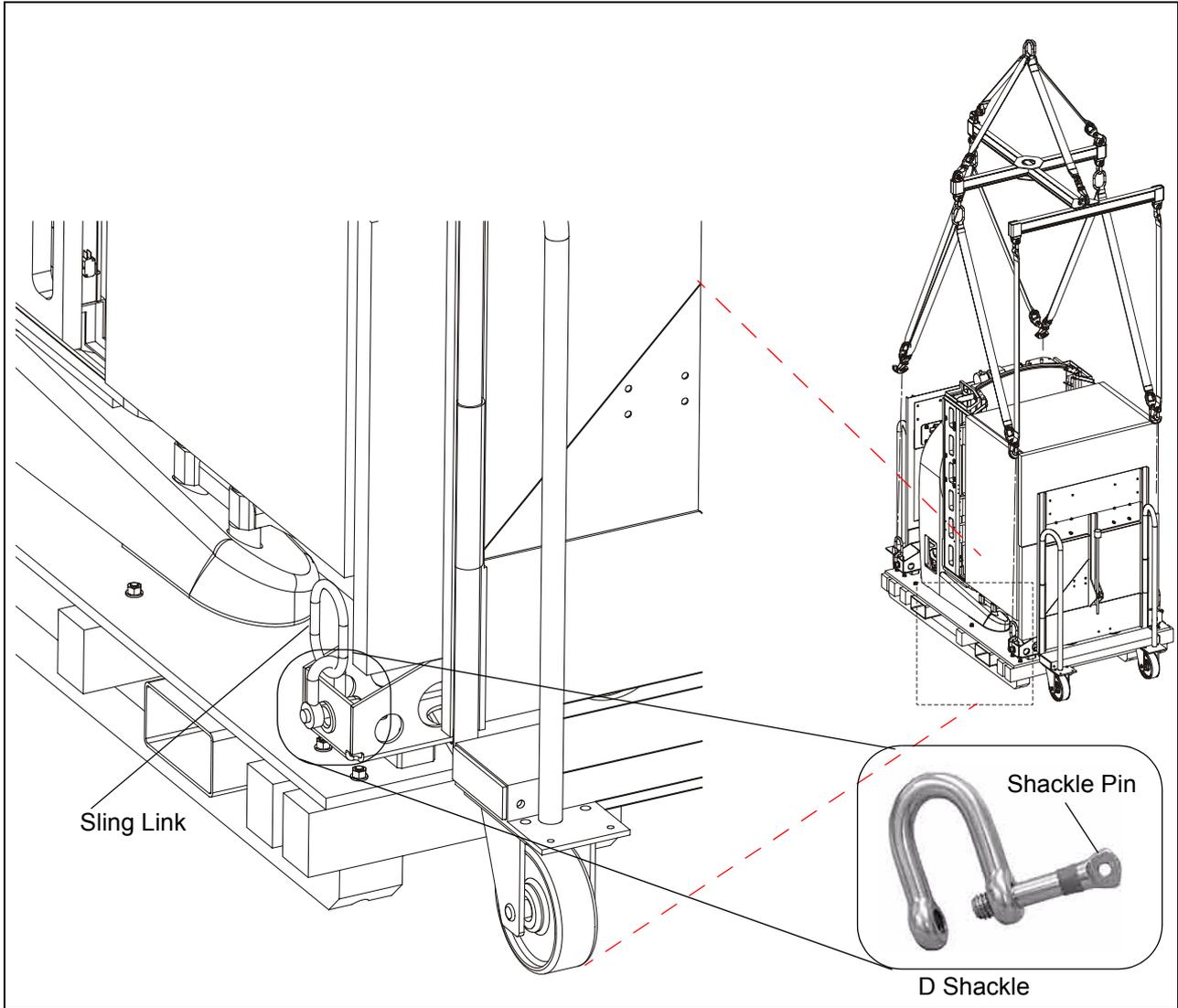
	<p><b>CAUTION</b></p> <p><b>Check the g-limit indicator attached to the right side of the Gantry Stator and verify that its color is white.</b></p> <p><b>If the color is red, please notify the carrier that the Gantry was subjected to impact exceeding 10 g and inform the field engineer responsible for installation.</b></p> <p><b>The field engineer must assess whether there is damage to the system and decide whether to proceed with installation.</b></p>
---	---

5. Verify that the Lifting Jig is in good condition (welding is not cracked).

**Note**

**The Lifting Jig (UGP001187) needs to be ordered from the local office.**

6. Unscrew the pins from the D shackles. Put sling links inside shackles and refit the pins into the D shackles through the holes in the four corners of the Stator support (rear of Gantry) and frame support assembly (front of Gantry). See [Figure 8-1](#) and [Figure 8-2](#).
7. Connect the lifting jig to the links (see [Figure 8-1](#)). Be sure to attach the jig in the correct orientation.

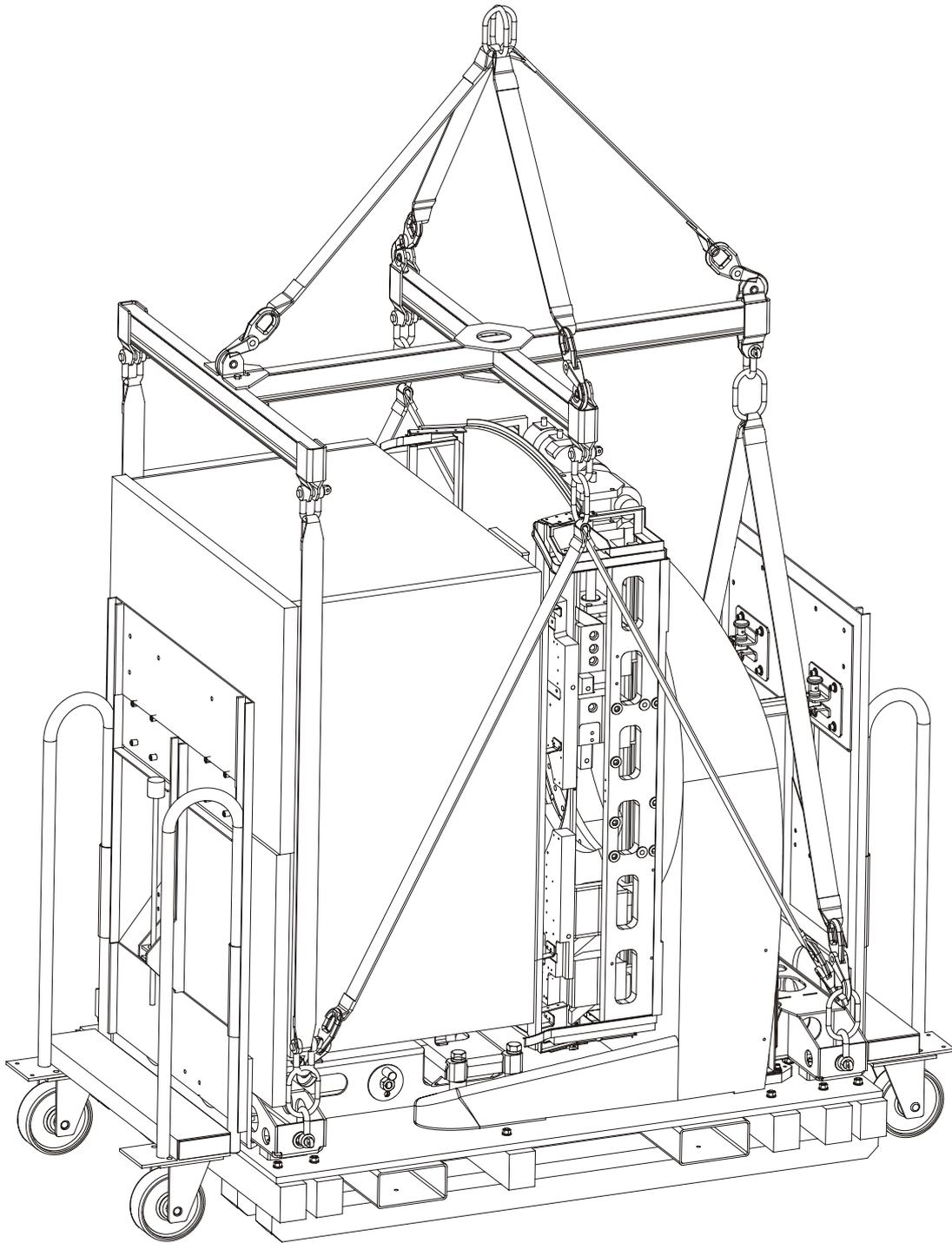


**Figure 8-1** Fitting the Lifting Assembly



**CAUTION**

Before lifting make sure that all hooks are properly connected to the links and all straps are free from obstacles.



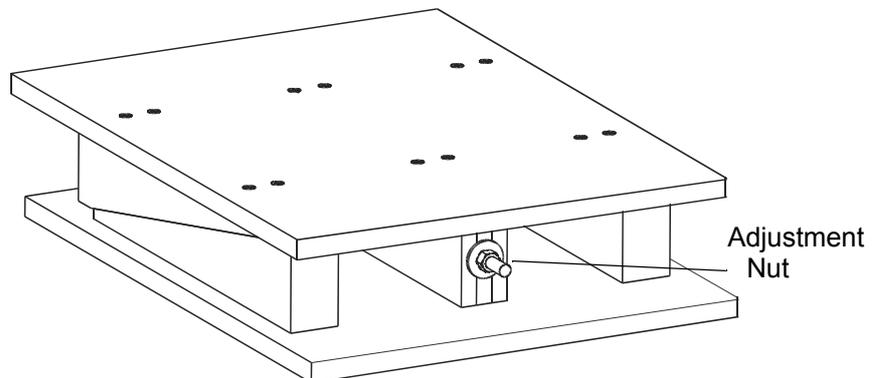
**Figure 8-2** Lifting Assembly Fitted in Place



**WARNING**

The Gantry is delivered with the Detectors already fitted.  
Do not remove the foam insulation until the Gantry has been standing inside the clinic and allowed to stabilize for a period of at least 24 hours.

8. Remove the Adjustable Detector Pallet used to support the Detectors, by releasing the adjustment nut that holds the two angular pieces together and tapping gently with a soft faced hammer.



**Figure 8-3** Adjustable Detector Pallet



**CAUTION**

Do NOT stand close to the Gantry during hoisting, and make sure that there are no obstacles in the hoisting path.

9. Using the crane, unload the Gantry from the truck onto the ground.
10. Using lead screws on both Dollies, raise Gantry so that the wheels of the Dolly take up the load.
11. Detach wooden pallet from Gantry by unscrewing eight screws, two in each corner of the Stator support welding and frame support assembly.
12. Do not remove the foam insulation from the detectors.

**Important**

The Detector insulation is designed to increase thermal insulation during transportation of the system and should remain in place until system initialization.

### 8.3.1.2 Unloading the Gantry with a Fork Lift

When the Gantry is unloaded from the truck by a fork lift, it is unpacked on the ground.

1. Adjust the forks of the Fork Lift to fit the openings of the metal bars of the Base Pallet of the gantry crate.
2. Guide the fork driver to insert the forks under the Gantry.

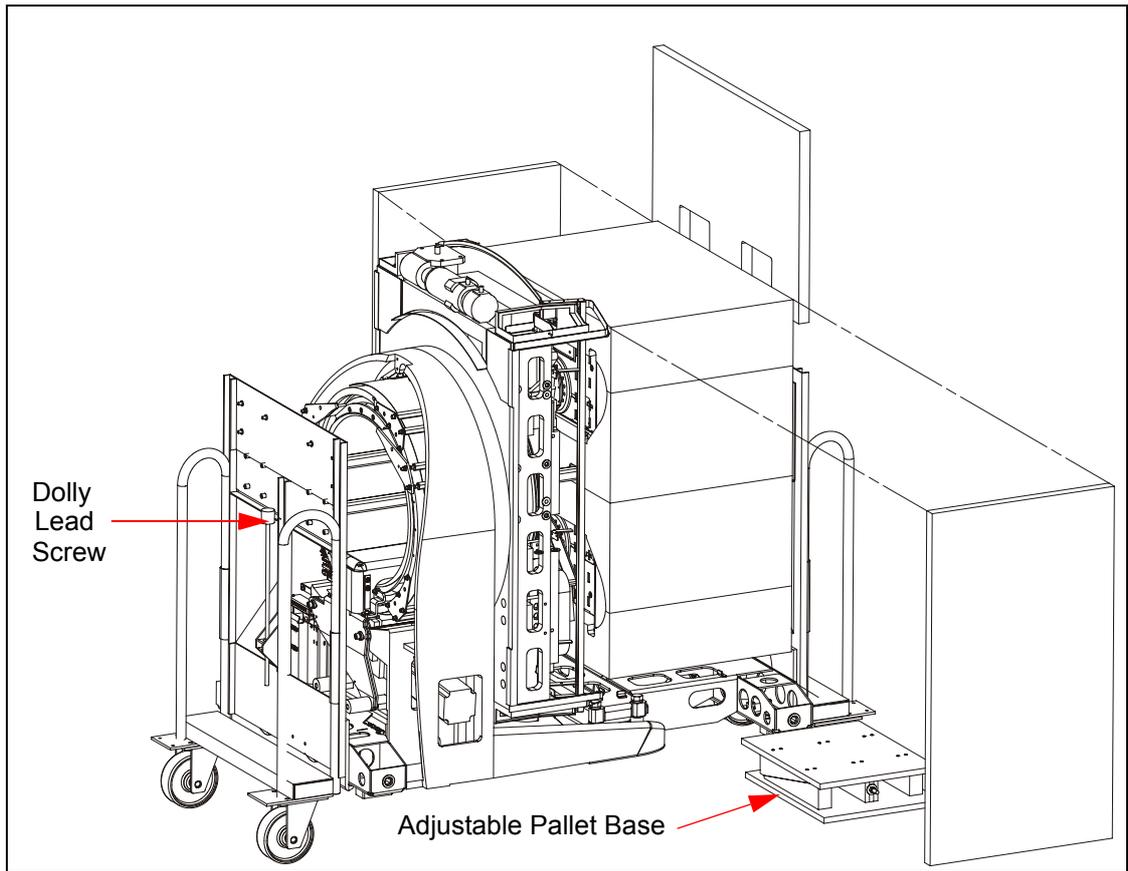
Then guide the driver in lifting the Gantry slowly and carefully, and moving it to the location from where it will be wheeled into the clinic.

	<p><b>CAUTION</b></p> <p><b>The gravity center of the Gantry is located at 45 cm from its rear side. Make sure that the Gantry does not tip over during hoisting.</b></p> <p><b>The Detectors are sensitive to vibrations and shock. Use extreme caution and prevent excessive shocks while handling the Gantry with the Fork Lift.</b></p>
---	---

3. Use a 5/8 socket and ratchet handle to turn the lead screw and raise the Gantry crate so that it's full weight is supported on the dolly wheels. (see [Figure 8-4](#)).
4. Remove the side walls of the Gantry crate.

	<p><b>CAUTION</b></p> <p><b>The Gantry is delivered with the Detectors installed. Do not remove the foam insulation until the Gantry is placed inside the clinic for a period of 24 hours at least, ensuring temperature stabilization.</b></p>
---	---

5. Referring to [Figure 8-1](#):
  - a. Remove the Base Adjustable Pallet used to support the Detectors, by releasing the screw that holds the two pieces together.
  - b. Release the Top Pallet by tapping it with a hammer.
6. Unfasten the eight screws holding the Base Pallet to the Dolly Front and Rear Adapters (there are two in each corner).

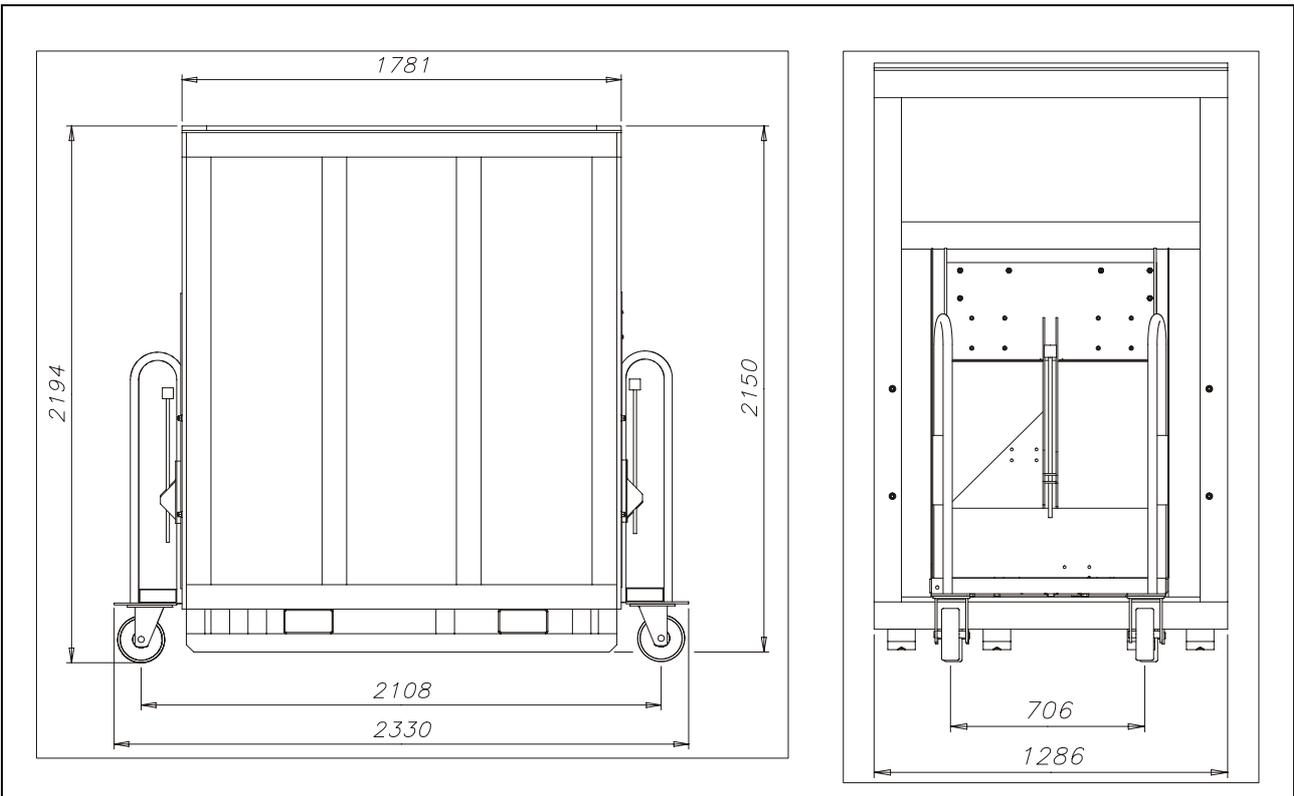


**Figure 8-4** Removal of Cranes and Base Pallet

### 8.3.2 Wheeling the Gantry to the Clinic

1. Before moving the Gantry to the clinic make sure that the conveyance path is free of obstacles and that the Gantry can negotiate all entrances, exits and corridors.

	<p><b>CAUTION</b></p> <p><b>Dolly wheels do not have braking mechanisms. Do NOT transport over sloping surfaces. The maximum slope permitted to maintain adequate safety is TBD.</b></p>
---	--



**Figure 8-5** Wheeling the Gantry

2. The Gantry is extremely heavy. At least four people are required to wheel the Gantry into the clinic with one supervising and one guiding.

	<p><b>CAUTION</b></p> <p><b>While pushing the Gantry beware not to touch any sensitive areas, such as slip rings, power supplies, etc.</b></p>
---	--

The transportation wheels should remain attached until the Gantry is properly positioned for anchoring. See [Section 8.3.1](#).

## 8.4 Hawkeye System Integrated Option

The electrical assembly components remain on the Gantry, while the other assemblies are removed after system integration to enable transportation of the Gantry from the unloading area into the site.

These components are shipped in three packages:

- X-ray Source assembly
- X-ray Detector assembly
- Mechanical Assembly, Documentation and Software CD.

**Table 8–2:** Hawkeye System Integrated Option Packages

Package	Dimensions (L, W, H)		Weight	
	cm	inch	kg	lb.
X-ray Source Assy.	L:110 W:65 H: 55	L:43.3 W:25.6 H:21.7	50	110
X-ray Detectors Assy.	L:110 W:65 H: 55	L:43.3 W:25.6 H:21.7	50	110
Mech. Assy., Documentation + SW	L:100 W:66 H: 72	L:39.4 W:26.0 H:28.4	50	110
Covers	Part of System Cover Package			

## 8.5 Patient Table

The table is unloaded from the truck either by a crane or by a fork lift. In both cases unload the Table while it is still in its original packing, and anchored to the crate.

Hoisting by crane will be done with proper hoisting straps, provided by the crane company.

### 8.5.1 Table Unpacking and Conveying

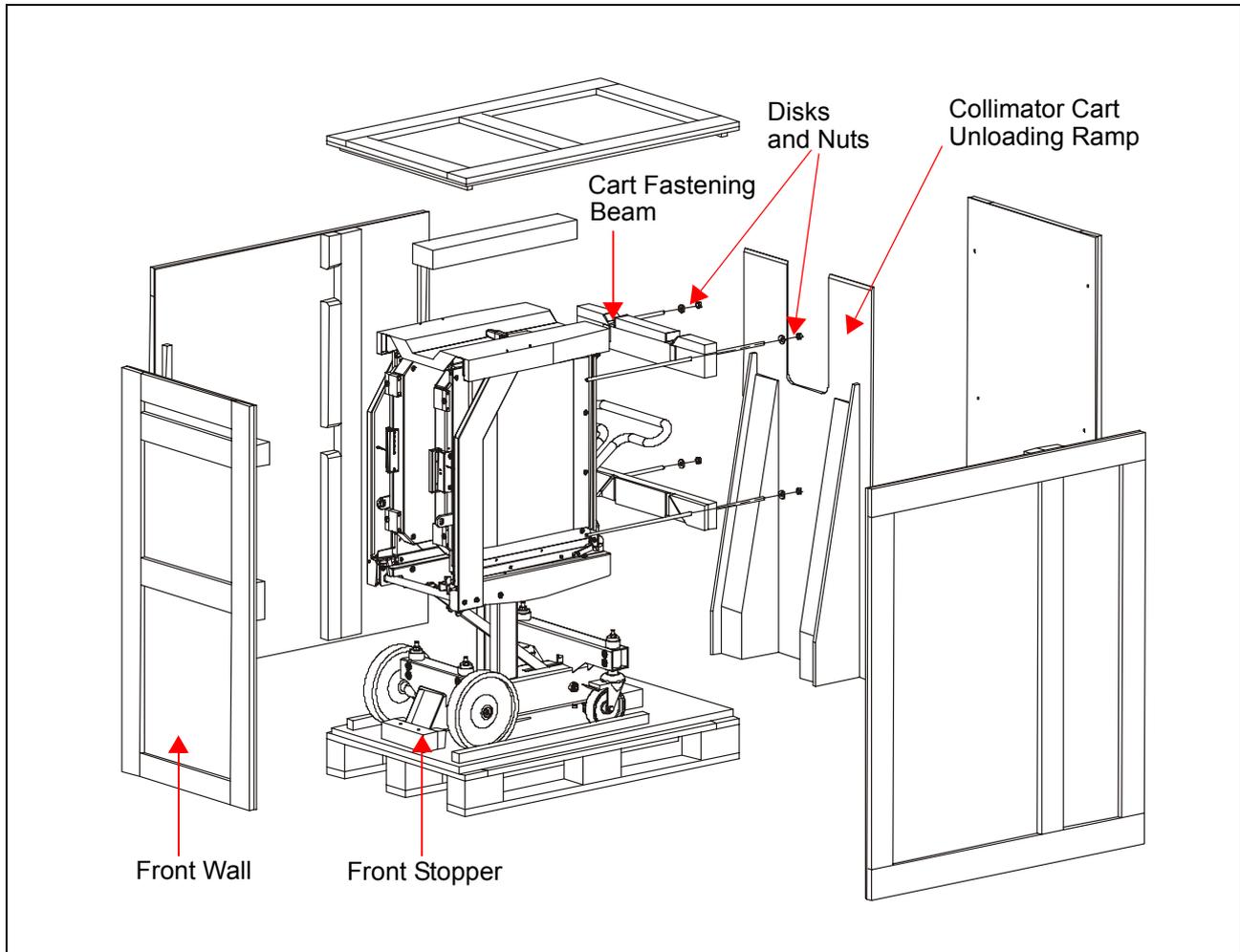
While the Table Crate is placed on a flat ground:

1. Cut the bands.
2. Remove the top cover.

3. Remove the four side covers.
4. Remove the nylon cover.
5. Place the Head Rest support packing in a safe place.
6. Remove the four tightening brackets that secure the Table to the bottom palette of the crate (three screws for each).
7. Disassemble the strip covers of the Table.
8. Disassemble the upper and lower long covers.
9. Assemble the Table Wheel Brackets (MEC002084 and MEC002086 supplied in the Gantry crate) onto the table with eight hex head NC 5/16"x 3/4" screws (HS00340512C) and flat washers (HW001010000).
10. Assemble the four table transporting wheels (HD000400006) on the brackets with sixteen Allen screws 3/8" x 1" (HS09340616C) washers (HW003408000) and nuts (HN00100814C).
11. Raise the Table from the crate palette, using a **fork lift**, as follows:  
Place the forks 60 cm apart (measured externally). Do not use forks with more than 14 cm width to lift the Table.  
Raise the Table symmetrically and place it on the transportation wheels.
12. Place the electrical cable and all covers on the Table.
13. Convey the Table into the site on the transporting wheels.
14. Clear the unpacking area from all packing materials.

## 8.6 Collimator Cart Unpacking

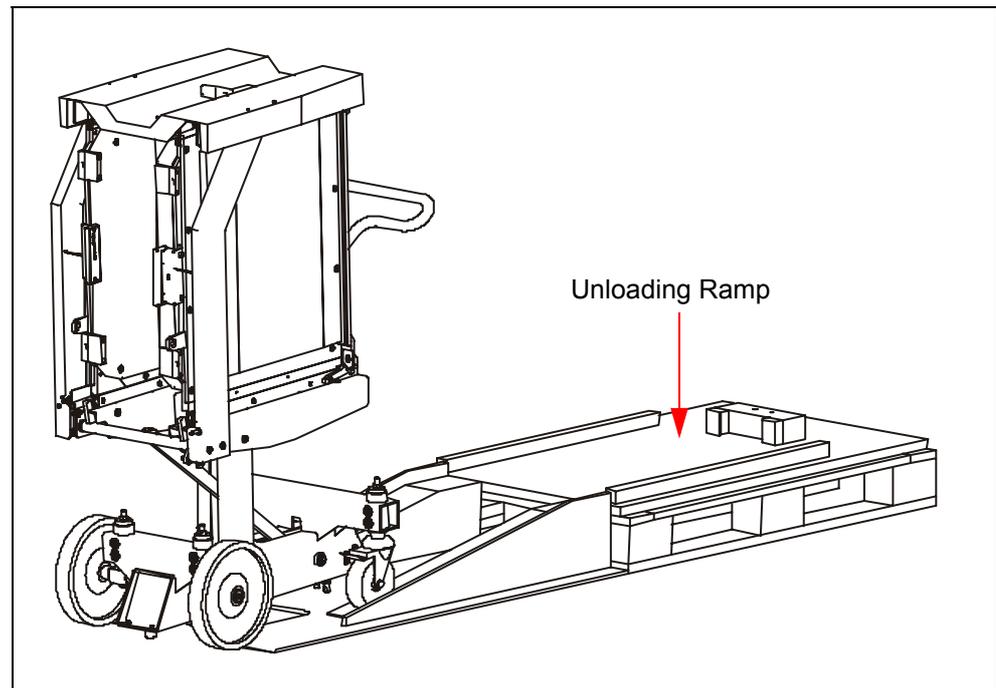
Figure 8-6 refers:



**Figure 8-6** Collimator Cart Unpacking

1. Remove the metal bands and packing brackets.
2. Remove the walls of the crate.  
  
The Front wall remains attached to the cart.
3. Unfasten the retaining nuts and disks that hold the cart fastening beams and detach the beams, allowing removal of the Front wall.
4. Put the Collimator Cart Unloading Ramp in front of the crate base.
5. Detach the Front Stopper.

6. Release the brakes on the cart rear wheels.
7. Slide the cart out of the crate.



**Figure 8-7** Removing Collimator Cart from Packing Crate



**CAUTION**

1. The collimator cart is heavy and must be moved with care to avoid damage or injury. Two persons are required to remove the cart from the crate.
2. Use caution when wheeling the cart and avoid uneven and/or inclined surfaces.

## 8.7 Unpacking the IPS

1. Open the packing crate containing the IPS.
2. Using a ratchet handle and extension piece fitted to a 5/8" socket, unfasten the shipping bracket bolts and remove the bracket.
3. Remove the front wall of the crate.
4. Lift and remove the IPS from the crate.

## 8.8 Unpacking the Detectors

Due to their extreme sensitivity to temperature gradients, the Detectors are shipped covered in specifically designed insulation material.

1. Verify that the room temperature is steady in the range of  $24\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ , and that the packed Detectors have been stabilized for at least 24 hours at between  $20^{\circ}$  and  $28^{\circ}$  C.
2. Remove the red protective foam covering the thermometer located on the front insulation wall. Verify that the temperature is not more than  $4^{\circ}\text{C}$  above or below the ambient temperature.
  - If the temperature is within the above range, proceed to Step 3.
  - If not, leave the Detector insulation in place for an additional four hours, then return to Step 1 above.
3. Cut the bands securing the insulation and remove the Top and Bottom Insulation pieces.

## 8.9 Conveyance Access and Clearance

From the unloading site, there must be a free path to wheel the components to the installation area, or into a lift which will carry them to the correct level. The size and weight specifications of the system components are given in [Table 8-3](#), and [Table 8-4](#).

It is important to verify that the route selected has sufficient clearance and load carrying capacity. Special facilities must be provided if the units are to be transferred from an unloading site outside the building

### 8.9.1 Access Specifications

The Weights and Dimensions listed below **include** the moving wheels

**Table 8-3:** Gantry - Weights and Dimensions

Height of Gantry mounted on moving wheels	1,794 mm (70.63")
Weight of Gantry mounted on moving wheels	2,550 kg (5610 lb.)
Minimum hall width allowing the Gantry to be wheeled around $90^{\circ}$ corners	1,600 mm (63")

**Note**

The Dolly wheels have no braking mechanism. Do NOT move or leave the Gantry on inclined surfaces.

**Table 8–4:** Patient Table - Weights and Dimensions

Minimum hall width allowing the Table to be wheeled around 90° corners	2,000 mm (78.74")
Path slope	< 4% (4 cm / 100 cm; 1.57" / 39.37")
Table length	2,505 mm (98.62")
Weight of Table mounted on moving wheels	410 kg (902 lb.)

---

# Appendix A – Pre-Installation Checklist

The following checklist should be completed by both the customer and the Vendor’s representative. Mark each **Yes** or **No** box, then sign the checklist.

Equipment Arrival Date: \_\_\_\_\_

**Planned Installation Date:** \_\_\_\_\_

## A.1 Site Information Contact Persons

**Table A-1:** Site Information Contact Persons

Site Name		System Administrator	
Department		Chief Technologist	
Street		Facilities Engineer	
City, State, Zip		Shipping/Receiving	
Country		Physician	
Telephone			

The questions to be answered are arranged according to four topics:

- Site preparation and required cables
- Unloading and conveyance to installation site
- Networking
- Radionuclides licenses

## A.2 Site Checklist

Table A-2: Site Checklist

Site Planning		Yes	No	Comment
Room Measurements	Does the camera room meet minimum size requirements?	<input type="checkbox"/>	<input type="checkbox"/>	
	Does room height meet the minimum height requirement?	<input type="checkbox"/>	<input type="checkbox"/>	
	Does the room layout leave sufficient free space for servicing?	<input type="checkbox"/>	<input type="checkbox"/>	
Room Layout	Are final Site Layout drawings completed and approved by the customer?	<input type="checkbox"/>	<input type="checkbox"/>	
	Are final Site Layout drawings approved by the Vendor?	<input type="checkbox"/>	<input type="checkbox"/>	
Floor Preparation	Can the floor tolerate the specified loads?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is construction necessary?	<input type="checkbox"/>	<input type="checkbox"/>	
	If yes, what is the scheduled completion date?			
	Does floor leveling meet the requirements?	<input type="checkbox"/>	<input type="checkbox"/>	
	Does floor flatness meet the specified requirements?	<input type="checkbox"/>	<input type="checkbox"/>	
Ducts	Is installation of the necessary ducts completed?	<input type="checkbox"/>	<input type="checkbox"/>	
	Do the ducts meet the required specifications?	<input type="checkbox"/>	<input type="checkbox"/>	
Emergency Button	Is the planned location of the emergency button easily accessible by the operator?	<input type="checkbox"/>	<input type="checkbox"/>	
Power Requirements	Does the three-phase wall outlet meet the specified requirements?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the three-phase power line stabilized?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is a wall outlet available for installation tools?	<input type="checkbox"/>	<input type="checkbox"/>	
Environmental Conditions	Are the specified requirements met, considering the system's thermal loads?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the magnetic field in the camera and workstation room less than 2 Gauss?	<input type="checkbox"/>	<input type="checkbox"/>	

**Table A-2: Site Checklist (Continued)**

Unloading and Conveyance to Installation Site		Yes	No	Comments
Loading Dock	Does the institution have a truck-height (44") loading dock?	<input type="checkbox"/>	<input type="checkbox"/>	
	Can a full-size truck access the truck-height loading dock?	<input type="checkbox"/>	<input type="checkbox"/>	
	If not, will institution arrange for a short truck delivery?	<input type="checkbox"/>	<input type="checkbox"/>	
Unloading by fork lift:	Does institution have a fork lift with weight capacity to lift a fully crated Gantry?	<input type="checkbox"/>	<input type="checkbox"/>	
	If not, will institution arrange for an appropriate fork lift?	<input type="checkbox"/>	<input type="checkbox"/>	
Unloading by crane	Is an area for crane hoisting planned?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is closing off of this area for the required period of time approved by the authorities?	<input type="checkbox"/>	<input type="checkbox"/>	
	Please provide the following information:  Name of rigging company: _____  Contact name: _____  Phone: _____			

**Table A-2: Site Checklist (Continued)**

Halls, Elevators and Doors	Are <u>all</u> door openings/hallways from loading dock to the camera room large enough for passage of the Gantry and/or the patient table mounted on the moving kit/wheels?	<input type="checkbox"/>	<input type="checkbox"/>	
	Can all pathways tolerate the weight of the Gantry mounted on Moving Kit/Wheels?	<input type="checkbox"/>	<input type="checkbox"/>	
	If elevator passage is required, can the elevator tolerate the weight and size of the Gantry + Moving Kit/wheels and the length of the Table?	<input type="checkbox"/>	<input type="checkbox"/>	
	Will the Patient Table clear all 90° corners?	<input type="checkbox"/>	<input type="checkbox"/>	
	Will the Gantry assembled on Moving Kit/Wheels clear all corners?	<input type="checkbox"/>	<input type="checkbox"/>	
	<b>Inclines:</b> Are there any inclines on the route to the camera room?	<input type="checkbox"/>	<input type="checkbox"/>	
	If so, what is the angle of incline			
	<b>Carpet &amp; Tile:</b> Will the camera be pushed across delicate carpets or tiles, requiring floor protection?	<input type="checkbox"/>	<input type="checkbox"/>	
Unloading and Conveyance to Installation Site (Continued)		Yes	No	Comments
Riggers	If camera can not pass through halls, elevators or doors, a rigging company must be employ. Will a rigging company be hired?	<input type="checkbox"/>	<input type="checkbox"/>	
	If so, please provide this information:  Name of rigging company: _____  Contact name: _____  Phone: _____  Attach a copy of the riggers company insurance policy.			
Temporary Storage	Will institution store the crated camera in the department?	<input type="checkbox"/>	<input type="checkbox"/>	
	If not, will institution arrange for delivery on first install day?	<input type="checkbox"/>	<input type="checkbox"/>	

**Table A-2: Site Checklist (Continued)**

Existing Equipment Moves	Does the institution want the Vendor to move existing equipment?	<input type="checkbox"/>	<input type="checkbox"/>	
	If yes, list the equipment and its required working conditions.  <u>Equipment Working Conditions</u>			
<b>Note that this may result in additional charges.</b>				
<b>Networking</b>				
	Are network site name, hostname and IP address defined?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is network cabling and hardware installation complete or has contractor been scheduled to complete work as required?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is a phone line installed for the Modem?	<input type="checkbox"/>	<input type="checkbox"/>	
	If so, the telephone number is:			
License	Yes	No	Comments	

**Table A-2:** Site Checklist (Continued)

	Does the site have a licenser for the radionuclides used for system calibration ( <sup>99m</sup> Tc)?	<input type="checkbox"/>	<input type="checkbox"/>	
	If not, when will license be obtained?	_____		
	Will customer insure that <sup>99m</sup> Tc is available during installation?	<input type="checkbox"/>	<input type="checkbox"/>	
	If Attenuation Correction option was ordered, has the site license for handling <sup>153</sup> Gd?	<input type="checkbox"/>	<input type="checkbox"/>	
	If Coincidence option was ordered: Has the site license for handling <sup>18</sup> FDG or <sup>68</sup> Ge?	<input type="checkbox"/>	<input type="checkbox"/>	
	If Coincidence option was ordered: Has the site license for handling <sup>131</sup> I?	<input type="checkbox"/>	<input type="checkbox"/>	
	If Coincidence option was ordered, will customer insure that <sup>18</sup> FDG/ <sup>68</sup> Ge and <sup>131</sup> I are available during the installation?			
Contact Persons	Is the primary field engineer identified?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the primary field engineer trained on the equipment?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the sales representative identified?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the customer system administrator identified?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the customer facility coordinator identified?	<input type="checkbox"/>	<input type="checkbox"/>	
General Access	Is the route to the installation room clear, are corridor / elevator requirements met?	<input type="checkbox"/>	<input type="checkbox"/>	
Room Shielding	Was the room shielding, relating to the other rooms and corridors, checked according to the site preparation requirements in this chapter?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the acquisition station area shielded properly?	<input type="checkbox"/>	<input type="checkbox"/>	

**Table A-2: Site Checklist (Continued)**

Room Environments & X-ray Accessories	The Thermal load of the Infinia is 2100W / 7200 BTU/H, does the room meets GEMS environmental specifications temperature and humidity?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the external X-ray exposure light installed?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the X-ray Interlock system available and installed?	<input type="checkbox"/>	<input type="checkbox"/>	
	Could the room be locked for the installation period?	<input type="checkbox"/>	<input type="checkbox"/>	
Equipment Receiving	Is the receiving dock identified?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is a pallet truck available locally?	<input type="checkbox"/>	<input type="checkbox"/>	
	Does forwarder supply a pallet truck?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the equipment delivery route defined / accepted by GEMS and the customer?	<input type="checkbox"/>	<input type="checkbox"/>	
	Is the storage of 3m X 3m area defined in the site?	<input type="checkbox"/>	<input type="checkbox"/>	
	Are all conveying means and architectural changes required facilitating equipment delivery done?	<input type="checkbox"/>	<input type="checkbox"/>	
Waste Packing	Are there any facilities for the disposal of empty wooden cases, foam blocks and large cardboard boxes?	<input type="checkbox"/>	<input type="checkbox"/>	
Networking	Is network established with site name, host name, Ethernet addresses, and IP address for the workstation?	<input type="checkbox"/>	<input type="checkbox"/>	
Completion Sign Off  Pre-installation completed: _____ Date: _____  Customer: _____  Vendor's Representative: _____				

## A.3 Network Readiness Table

Please fill in this table before equipment arrival.

**Table A-3:** Network Readiness Table

Assigned by the Hospital Net Admin if connecting to the Hospital LAN. Otherwise assigned by local GE On-Line Center	Hostname	IP	AE Title	Dicom Port	Wired (Y/N)?
Acquisition Host					
Processing Host					
Hardcopy Host					
LAN Net Mask					
Gateway to other networks					
Other					
Insite phone line					
Hub or Switch					

## A.4 Power & Grounding Survey

**Table A-4:** Infinia Power & Grounding Survey

Customer Name:					
System ID:			Date of Audit:		
Equipment:			Location:		
CONDITIONS/ PARAMETER	VOLTAGE (V RMS)	CONDITIONS/ PARAMETER	VOLTAGE (V RMS)	CONDITIONS/ PARAMETER	CURRENT (A RMS)
Phase A - Neutral		Phase C - A		Phase A	
Phase B - Neutral		Phase A - Ground		Phase B	
Phase C - Neutral		Phase B - Ground		Phase C	
Phase A - B		Phase C - Ground		Neutral	
Phase B - C		Neutral - Ground		Ground	
	<b>Ground Currents to Load:</b>				
Ground Current at MDC (A1) Power off:				mA	
Ground Current at MDC (A1) Power on:				mA	
	<b>Grounding Electrode:</b>				
Location:					
Ground impedance:	Ohms		Current measured:	mA	