GE does not take responsibility for any damages resulting from changes on drawings made by others. Errors may occur by not referring to the complete set of final issue drawings. GE cannot accept responsibility for any damage due to the partial use of GE final issue drawings, however caused. All dimensions are in millimeters unless otherwise specified. Do not scale from printed PDF files. GE accepts no responsibility or liability for defective work due to scaling from these drawings.

A mandatory component of this drawing set is the GE Healthcare Pre Installation manual. Failure to reference the Pre Installation manual will result in incomplete documentation required for site design and preparation.

Pre Installation documents for GE Healthcare products can be accessed on the web at: www.gehealthcare.com/siteplanning

**OPTIMA IGS 320-330**
**FINAL STUDY**

Drawn by | Verified by | Concession | S.O. (GON) | PIM Manual | Rev
--- | --- | --- | --- | --- | ---
RET | TST | - | - | 5537562-1-1EN | 3

Format | Scale | File Name | Date | Sheet
--- | --- | --- | --- | ---
A3 | 1/4"=1'-0" | EN-VAS-TYP-OPTIMA_IGS_3X0 WEB.DWG | 18/Feb/2020 | 01/20
## DISCLAIMER

**GENERAL SPECIFICATIONS**
- GE is not responsible for the installation of developers and associated equipment, lighting, cassette trays and protective screens or derivatives not mentioned in the order.
- The final study contains recommendations for the location of GE equipment and associated devices, electrical wiring and room arrangements. When preparing the study, every effort has been made to consider every aspect of the actual equipment expected to be installed.
- The layout of the equipment offered by GE, the dimensions given for the premises, the details provided for the pre-installation work and electrical power supply are given according to the information noted during on-site study and the wishes expressed by the customer.
- The room dimensions used to create the equipment layout may originate from a previous layout and may not be accurate as they may not have been verified on site. GE cannot take any responsibility for errors due to lack of information.
- Dimensions apply to finished surfaces of the room.
- Actual configuration may differ from options presented in some typical views or tables.
- If this set of final drawings has been approved by the customer, any subsequent modification of the site must be subject to further investigation by GE about the feasibility of installing the equipment. Any reservations must be noted.
- The equipment layout indicates the placement and interconnection of the indicated equipment components. There may be local requirements that could impact the placement of these components. It remains the customer’s responsibility to ensure that the site and final equipment placement complies with all applicable local requirements.
- All work required to install GE equipment must be carried out in compliance with the building regulations and the safety standards of legal force in the country concerned.
- These drawings are not to be used for actual construction purposes. The company cannot take responsibility for any damage resulting therefrom.

**CUSTOMER RESPONSIBILITIES**
- It is the responsibility of the customer to prepare the site in accordance with the specifications stated in the final study. A detailed site readiness checklist is provided by GE. It is the responsibility of the customer to ensure all requirements are fulfilled and that the site conforms to all specifications defined in the checklist and final study. The GE Project Manager of Installation (PMI) will work in cooperation with the customer to follow up and ensure that actions in the checklist are complete, and if necessary, will aid in the rescheduling of the delivery and installation date.
- Prior to installation, a structural engineer of record must ensure that the floor and ceiling is designed in such a way that the loads of the installed system can be securely borne and transferred. The layout of additional structural elements, dimensioning and the selection of appropriate installation methods are the sole responsibility of the structural engineer. Execution of load bearing structures supporting equipment on the ceiling, floor or walls are the customer’s responsibility.

**RADIO-PROTECTION**
- Suitable radiological protection must be determined by a qualified radiological physicist in conformance with local regulations. GE does not take responsibility for the specification or provision of radio-protection.

---

**GLOBAL SITE READINESS CHECKLIST (DI)**

<table>
<thead>
<tr>
<th>Field Service Name:</th>
<th>GON/SO Number:</th>
<th>Customer Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRC Status:</td>
<td>Site Visit Date for SRC:</td>
<td>SRC Status:</td>
</tr>
</tbody>
</table>

**General Site Planning**
- Room dimensions, including ceiling height, for all Exam, Equipment/Technical & Control rooms meets GE specifications.
- Ceiling support structure, if on the GE drawing, is at correct location and height according to the drawing specifications. Leve
- Rooms that will contain equipment, including staging areas if applicable, are construction debris free. Precautions must be taken to prevent debris from entering rooms containing equipment.
- Delivery route from truck to installation space has been reviewed, all communications have occurred, arrangements made for special handling (if needed). Floors along delivery route will support weight of the equipment, reinforcements arranged if needed.
- System power & grounding (PDB/MDP) is available as per GE specifications, installed at point of final connection and ready to use. Lock Out Tag Out is available.
- System power and grounded audit has been scheduled to be completed during installation of equipment. (If Required) GEHC PM to confirmed if needed.
- Adequate room illumination installed and working.
- Cableways (floor, wall, ceiling, etc.) ready for GE cables and are of correct length and diameter. Cableways routed per GE Final drawings and access openings installed as determined by GEHC PM. Surface floor duct installed at time of system installation.
- HVAC systems installed, and the site meets minimum environmental operational system requirements.
- Network outlets installed and computer network available and working.
- Hospital IT/connectivity contacts have been engaged and information has been added to Project management tool. (If Required)
- Floor levelness/fatness is measured and within tolerance, and there are no visible defects per GEHC specifications. Floor Strength and thickness have been discussed with customer/contractor and they have confirmed GE requirements are met.
- Customer supplied countertops where GE equipment will be installed are in place.

**Specific for Vascular**
- Vascular baseplates preparation complete per GE requirements.
- For IGS 730/740: Floor finish is according to the GE Specifications and protection is installed . Specifications for concrete substrate & Monopur 7 mm flooring have been met. Table baseplate installed and flush to the finished floor.
- For IGS 730/740: Room Interventional Reference Point (RIRP) value has been defined with the customer. Either 1120mm, 1278 mm or 1508 mm.
- Ensure that all third party suppliers are identified and have been informed about the project dates and how they need to proceed in accordance with their needs for interfacing to our equipment.
- Doors and windows complete or scheduled to be installed. If applicable, radiation protection (shielding) finished & radioprotection regulatory approval for installation obtained.

**PMI Signature:**
**Customer Signature:**
**FS Signature: optional**

---

**THE UNDERSIGNED, HEREBY CERTIFIES THAT I HAVE READ AND APPROVED THE PLANS IN THIS DOCUMENT.**

<table>
<thead>
<tr>
<th>DATE</th>
<th>NAME</th>
<th>SIGNATURE</th>
</tr>
</thead>
</table>

---

**TYPICAL** | **OPTIMA IGS 320-330** | **EN-VAS-TYP-OPTIMA_IGS_3X0-WEB.DWG** | **Rev A/Date 18/Feb/2020** | **C2 - Disclaimer - Site Readiness** | **02/20**
MAGNETIC INTERFERENCE SPECIFICATIONS

- Image intensifiers must be located in ambient static magnetic fields of less than 1 gauss to guarantee specified imaging performance.
- X-ray tubes must be located in ambient static magnetic fields of less than 10 gauss to guarantee specified performance.
- System electronics must be located in ambient static magnetic fields of less than 10 gauss to guarantee data integrity.
- Operators console equipment must be located in ambient static magnetic fields of less than 10 gauss to obtain specified geometric linearity.

CUSTOMER SITE READINESS REQUIREMENTS

- Any deviation from these drawings must be communicated in writing to and reviewed by your local GE Healthcare Installation project manager prior to making changes.
- Make arrangements for any rigging, special handling, or facility modifications that must be made to deliver the equipment to the installation site. If desired, your local GE Healthcare Installation project manager can supply a reference list of rigging contractors.
- New construction requires the following:
  1. Secure area for equipment,
  2. Power for drills and other test equipment,
  3. Capability for image analysis,
  4. Restrooms.
- Provide for refuse removal and disposal (e.g. crates, cartons, packing)
- It is the customer’s responsibility to contract a vibration consultant/engineer to implement site design modifications to meet the GE vibration specification. Refer to the system preinstallation manual for the vibration specification.

ELECTROMAGNETIC INTERFERENCE

The system is suitable for use in the specified electromagnetic environment. The purchaser or user of the system should assure that it is used in an electromagnetic environment as described below:

<table>
<thead>
<tr>
<th>EMISSIONS</th>
<th>TEST COMPLIANCE</th>
<th>ELECTROMAGNETIC ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio–Frequency Emissions</td>
<td>Group 1 Class A limits</td>
<td>The system is suitable for use in all establishments other than domestic and those directly connected to the low voltage power supply network that supplies buildings used for domestic purposes.</td>
</tr>
<tr>
<td>CISPR11</td>
<td>Group 1 Class A limits</td>
<td>The system uses RF energy only for its internal function. Therefore, the RF emission is very low and not likely to cause any interference in nearby electronic equipment.</td>
</tr>
<tr>
<td>Harmonic emissions IEC 61000–3–3</td>
<td>Not applicable</td>
<td>The system is suitable for use only in establishments not directly connected to a public low voltage power supply network.</td>
</tr>
<tr>
<td>Voltage fluctuations/</td>
<td>Not applicable</td>
<td>The system is suitable for use only in establishments not directly connected to a public low voltage power supply network.</td>
</tr>
<tr>
<td>flicker emissions IEC 61000–3–3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### BY ITEM

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>MAX HEAT OUTPUT (Btu)</th>
<th>WEIGHT (lbs)</th>
<th>MAX HEAT OUTPUT (W)</th>
<th>WEIGHT (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 1</td>
<td>Advantage workstation</td>
<td>2019</td>
<td>22</td>
<td>590</td>
<td>10</td>
</tr>
<tr>
<td>A 2</td>
<td>Operator console</td>
<td>341</td>
<td>19.6</td>
<td>100</td>
<td>9</td>
</tr>
<tr>
<td>A 3</td>
<td>System Control Cabinet</td>
<td>7378</td>
<td>1522</td>
<td>2160</td>
<td>600</td>
</tr>
<tr>
<td>A 4</td>
<td>Power Distribution Box</td>
<td>1534</td>
<td>326</td>
<td>450</td>
<td>148</td>
</tr>
<tr>
<td>A 5</td>
<td>Detector conditioner</td>
<td>217</td>
<td>32</td>
<td>110</td>
<td>45</td>
</tr>
<tr>
<td>A 6</td>
<td>COOLIX 4100 water chiller</td>
<td>23646</td>
<td>265</td>
<td>6930</td>
<td>120</td>
</tr>
<tr>
<td>A 7</td>
<td>Chiller Autotransformer</td>
<td>222</td>
<td>66</td>
<td>65</td>
<td>30</td>
</tr>
<tr>
<td>D 8</td>
<td>UPS Interface Box</td>
<td>-</td>
<td>9</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>D 9</td>
<td>20kVA Fluoro UPS UL</td>
<td>6751</td>
<td>1169</td>
<td>1980</td>
<td>530</td>
</tr>
<tr>
<td>A 10</td>
<td>X-ray buzzer</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td>A 11</td>
<td>OMEGA V long patient table</td>
<td>614</td>
<td>1300</td>
<td>180</td>
<td>590</td>
</tr>
<tr>
<td>A 12</td>
<td>Monitor suspension long bridge</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>A 13</td>
<td>Longitudinal stationary rail for XT suspension</td>
<td>-</td>
<td>139</td>
<td>-</td>
<td>63</td>
</tr>
<tr>
<td>D 15</td>
<td>Suspension with 4 LCD monitors</td>
<td>1157</td>
<td>225</td>
<td>339</td>
<td>102</td>
</tr>
<tr>
<td>D 16</td>
<td>Mavig rad shield and LED lamp with 2.5m ceiling track</td>
<td>-</td>
<td>143</td>
<td>-</td>
<td>65</td>
</tr>
<tr>
<td>D 17</td>
<td>External Transformer for LED Surgical Lamp</td>
<td>-</td>
<td>17</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>D 18</td>
<td>Injector head on table rail</td>
<td>-</td>
<td>15</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>D 19</td>
<td>Injector control</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>D 20</td>
<td>Injector electronics</td>
<td>320</td>
<td>37</td>
<td>94</td>
<td>17</td>
</tr>
<tr>
<td>D 21</td>
<td>Vitalining speaker</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D 22</td>
<td>Vitalining console</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D 23</td>
<td>Vitalining microphone</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D 24</td>
<td>Vitalining microphone (one on monitor bridge in exam room)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C 25</td>
<td>Cable drape rail</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C 26</td>
<td>Storage cabinet</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C 27</td>
<td>Control wall to ceiling with lead glass viewing window</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C 28</td>
<td>Shelf - customer to provide adequate wall support</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C 29</td>
<td>Counter top for equipment - provide grommeted openings as required to route cables</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C 30</td>
<td>Minimum door opening for equipment delivery is 44 in. w x 83 in. h (1118mm x 2108mm) contingent on a 96 in. (2438mm) corridor width</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C 31</td>
<td>150-AMP Local service disconnect for lock-out/ tag-out capability. (may be a fused disconnect, circuit breaker or safety switch.)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### EXAM ROOM HEIGHT

<table>
<thead>
<tr>
<th>FINISHED FLOOR TO FALSE CEILING</th>
<th>Minimum</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>9'-0&quot;</td>
<td>2.74m</td>
<td>10'-0&quot;</td>
</tr>
</tbody>
</table>

Door openings: Exam room min 1160 [50 in]. Technical room min 800 [36 in], req 1000 [40 in]
DELIVERY

THE CUSTOMER/CONTRACTOR SHOULD:

- Provide an area adjacent to the installation site for delivery and unloading of the GE equipment.
- Ensure that the dimensions of all doors, corridors, ceiling heights are sufficient to accommodate the movement of GE equipment from the delivery area into the definitive installation room.
- Ensure that access routes for equipment will accommodate the weights of the equipment and any transportation, lifting and rigging equipment.
- Ensure that all necessary arrangements for stopping and unloading on public or private property not belonging to the customer have been made.

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>DIMENSIONS</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GANTRY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LENGTH</td>
<td>2820 mm [111 in]</td>
<td>1060 kg [2340 lb]</td>
</tr>
<tr>
<td>WIDTH</td>
<td>1230 mm [48.4 in]</td>
<td></td>
</tr>
<tr>
<td>HEIGHT</td>
<td>2000 mm [79 in]</td>
<td></td>
</tr>
</tbody>
</table>

SHIPPING DOLLY FOR LC GANTRY

Both ends of the dolly can be removed which will shorten the LC gantry dolly to 2300 mm [90 in], also the right and left top handles can be removed which will make the width 1160 mm [46 in].

SCALE 1:50

SHIPPING WEIGHT: 1060 kg [2337 lb].
STRUCTURAL NOTES

- All steel work and parts necessary to support ceiling mounted tube hanger or other equipment are to be supplied by the customer or his contractors. The unistrut or equivalent structure should run continuous with no fittings extending below face of unistrut channel, run wall to wall, be parallel, square and in the same horizontal plane flush with finished ceiling. The system is to be cross braced vertically, horizontally and diagonally to allow no movement and a maximum of 1.58mm (1/16") deflection. (10) 12.7mm (1/2") dia. x 38.1mm (1 1/2") long bolts with unistrut 12.7mm (1/2") nuts with springs are to be provided by customer or his contractors for each stationary and auxiliary support rail. Closure strips shall be provided for areas of unistrut exposed and without mounting units.

- Methods of support for the steelwork that will permit attachment to structural steel or through bolts in concrete construction should be favored. Do not use concrete or masonry anchors in direct tension.

- All units that are wall mounted or wall supported are to be provided with supports where necessary. Wall supports are to be supplied and installed by the customer or his contractors. See plan and detail sheets for suggested locations and mounting hole locations.

- All ceiling mounted fixtures, air vents, sprinklers, etc. To be flush mounted, or shall not extend more than 6.35mm (1/4") below the finished ceiling.

- Control walls with tube hanger passage above shall be constructed to 2130mm (7'-0") high.

- Floor slabs on which equipment is to be installed must be level to 3.17mm (1/8") in 3050mm (10'-0")

- Minimum floor thickness of 203mm (8").

- Dimensions are to finished surfaces of room.

- Customers contractor must provide all penetrations in post tension floors.

- Customers contractor must provide and install any non-standard anchoring. Documents for standard anchoring methods are included with GE equipment drawings for geographic areas that require such documentation.

- Customers contractor must provide and install hardware for "through the floor" anchoring and/or any bracing under access floors. This contractor must also provide floor drilling that cannot be completed because of an obstruction encountered while drilling by the GE installer such as rebar etc.

- It is the customer's responsibility to perform any floor or wall penetrations that may be required. The customer is also responsible for ensuring that no subsurface utilities (e.g., electrical or any other form of wiring, conduits, piping, duct work or structural supports (i.e. post tension cables or rebar)) will interfere or come in contact with subsurface penetration operations (e.g. drilling and installation of anchors/screws) performed during the installation process. To ensure worker safety, GE installers will perform surface penetration operations only after the customer's validation and completion of the "GE surface penetration permit"
1. Area occupied by GE supplied positioner baseplate
2. Area occupied by GE supplied table baseplate
3. Mount X-Ray buzzer bracket on wall above ceiling
4. Area of radiation shield mounted to unistrut grid in ceiling
5. Support backing, locate as shown.
6. Stationary rails attached to gridded support in ceiling.
7. Cable drape rail attached to gridded support in ceiling.
8. Structural support in ceiling for fastening ceiling supported equipment. Supports to run continuous with no fittings extending below face of channel, run wall to wall, be parallel, square, and in the same horizontal plane, flush with the finished ceiling. Rails are mounted to these supports every 2'-2" and require 350 lbs. (597 lbs. in seismic regions) per bolt load. Methods of support that permit attachment to structural steel or through bolts in concrete should be favored. Do not use screw anchors in direct tension.

IF ACCESS IS NOT READILY AVAILABLE IT IS RECOMMENDED TO PROVIDE A TRAPDOOR IN THE CEILING TO ALLOW SERVICE ACCESS FOR CABLE MANAGEMENT.
LC GANTRY AND TABLE ANCHORING WITH NO BASEPLATE

**LAN GANTRY AND TABLE ANCHORING WITH NO BASEPLATE**

**FLOOR REQUIREMENTS AND CABLE MANAGEMENT**

**FLOOR REQUIREMENTS**

- The maximum pullout force per GE supplied anchor was calculated assuming:
  - A concrete compression strength of 17.24 MPa at 28 days (which is the minimum required compression strength).
  - Anchors installed to the required hole depth of 165.1 mm [6.5 in] minimum.
  - Center of anchor hole to concrete edge distance 79.4 mm [3.1 in].
  - Make sure to obtain data on compression strength of the concrete before using floor anchors.

- The floor slab on which the equipment is to be installed must be flat and level (1 mm [0.04 in]/1 m [40 in] where equipment is installed and 5 mm [0.2 in]/2 m [79 in] general levelness).

- Anchoring to the floor is intended to the structural elements and not to common screed.

- Do not glue the floor covering in the gantry zone.

**CONDUIT IN THE FLOOR**

**GANTRY UNDER FLOOR CABLING DETAILS**

**1** LC baseplate mounting location : 12 bolts
Pullout strength on each bolt 736 daN
- M20 Through-Bolts recommended (supplied by GE)
  Alternates:
  - M16 Mechanical anchors (supplied by GE)
  - Chemical anchors (not supplied by GE):
    HILTIHVU adhesive capsule + HAS Anchor rod

**2** Table mounting location : 4 bolts required
Pullout strength on each bolt 4432 daN
- M20 Through-Bolts recommended (supplied by GE)
  Alternates:
  - M16 Mechanical anchors (supplied by GE)
  - Chemical anchors (not supplied by GE):
    HILTIHVU adhesive capsule + HAS Anchor rod

**2b** Alternate bolt holes for seismic zones 1 and 2

**TYPICAL**

**NOTE:** PIPE, JUNCTION BOX AND DUCT OR CONDUIT ARE TO BE SUPPLIED AND IS TO BE INSTALLED BY CUSTOMER OR CUSTOMER’S CONTRACTOR

**NOT IN SCALE**

**FLOOR REQUIREMENTS**

- The maximum pullout force per GE supplied anchor was calculated assuming:
  - A concrete compression strength of 17.24 MPa at 28 days (which is the minimum required compression strength).
  - Anchors installed to the required hole depth of 165.1 mm [6.5 in] minimum.
  - Center of anchor hole to concrete edge distance 79.4 mm [3.1 in].
  - Make sure to obtain data on compression strength of the concrete before using floor anchors.

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**GANTRY UNDER FLOOR CABLING DETAILS**

**FLOOR REQUIREMENTS**

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  - A concrete compression strength of 17.24 MPa at 28 days (which is the minimum required compression strength).
  - Anchors installed to the required hole depth of 165.1 mm [6.5 in] minimum.
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  - Make sure to obtain data on compression strength of the concrete before using floor anchors.

- The floor slab on which the equipment is to be installed must be flat and level (1 mm [0.04 in]/1 m [40 in] where equipment is installed and 5 mm [0.2 in]/2 m [79 in] general levelness).

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**CONDUIT IN THE FLOOR**

**GANTRY UNDER FLOOR CABLING DETAILS**

**FLOOR REQUIREMENTS**

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  - A concrete compression strength of 17.24 MPa at 28 days (which is the minimum required compression strength).
  - Anchors installed to the required hole depth of 165.1 mm [6.5 in] minimum.
  - Center of anchor hole to concrete edge distance 79.4 mm [3.1 in].
  - Make sure to obtain data on compression strength of the concrete before using floor anchors.

- The floor slab on which the equipment is to be installed must be flat and level (1 mm [0.04 in]/1 m [40 in] where equipment is installed and 5 mm [0.2 in]/2 m [79 in] general levelness).

- Anchoring to the floor is intended to the structural elements and not to common screed.

- Do not glue the floor covering in the gantry zone.
XT RADIOGRAPHIC SUSPENSION, INBOARD MOUNTING

Reference Structural Layout for these dimensions

Supports to slab as required

Reference Structural Layout for these dimensions

Structural Support system is not supplied or installed by GE Healthcare

DETAIL 1

Contractor supplied and installed structural supports

GE supplied longitudinal stationary rail

NOT TO SCALE

Contractor supplied and installed finished ceiling (ceiling & supports must not extend below face of structural supports)

GE supplied spring nuts with bolts

DETAIL 2

Contractor supplied and installed structural supports

GE supplied cable drape support

GE supplied self-tapping screws

NOT TO SCALE

Contractor supplied and installed finished ceiling (ceiling & supports must not extend below face of structural supports)

GE supplied spring nuts with bolts

GE supplied cable drape rail
**MAVIG SUSPENSION MOUNTING METHOD**

2.5m CEILING TRACK

- Weight up to: 94 kg (207 lb) (75 kg (165 lb) system + 19 kg (42 lb) track)
- The required factor of safety is 4" for attaching to Unistrut or equivalent rails and "6" for attaching to the concrete ceiling.

**CONSULT MAVIG INSTALLATION MANUAL REV. POR03001 TO DESIGN AND MOUNT THE CEILING SUPPORT.**

**SCALE 1:20**

**SUSPENSION COLUMN LENGTHS AND INSTALLATION DETAILS**

- 3000 mm - 3200 mm (118.1 in - 126 in)
  - From Mounting Point to Finished Floor
  - Recommended 1000 mm (39.4 in) STATIONARY COLUMN
- 2880 mm - 3100 mm (113.4 in - 122 in)
  - From Mounting Point to Finished Floor
  - Recommended 850 mm (33.5 in) STATIONARY/TRACK COLUMN
- 2660 mm - 2900 mm (104.7 in - 114.2 in)
  - From Mounting Point to Finished Floor
  - Recommended 580 mm (22.9 in) TRACK COLUMN
- 2200 mm - 2700 mm (86.6 in - 106.3 in)
  - From Mounting Point to Finished Floor
  - Recommended 460 mm (18.1 in) STATIONARY/TRACK COLUMN

For rooms with higher mounting point than 3200 mm (126 in), a ceiling construction between structural ceiling and vertical column is suggested which needs to be designed by a structural engineer. All design and pre-installation activity must be done in accordance of the MAVIG Installation manual. Contact your GE Project Manager for OEM documentation. Installation of mounting plate performed by GE or a GE sub-contractor. NOT TO SCALE

**CEILING SUSPENSION DISCLAIMER**

**Safety and precautionary comments:**

- Only qualified, licensed technicians can perform electrical connections, installation, removal and repair. It is strongly recommended that at least two persons perform the installation.

- Installing the system: Prior to installation, a structural engineer must confirm that the mounting structure is strong enough to provide proper support for the entire system and any attached end devices. Installation must be completed according to local building codes.

- Determination of required installation hardware and torque values for installation of the ceiling column and ceiling track is the sole responsibility of the structural engineer.

- Ceiling mounted systems must be installed properly. Failure to follow the instructions provided may lead to a potentially dangerous and unstable condition of the system.

- GE and/or MAVIG is not responsible for unauthorized modifications made to the system or use of the system for unintended purposes. GE and/or MAVIG cannot be held liable for improper operation and modifications. Since improper modifications may impair proper operation, safety or reliability of the system, product modifications require written authorization from MAVIG.

- Under GE responsibility or under Customer responsibility, for all pre-installations, whatever is the non-standard cases described in MAVIG PIN and for which the standard anchoring/screws delivered with product shall not be used but shall be defined (and implemented in most cases) by the structural company.

**WARNING:**

- It is prohibited to alter the length of the ceiling column or remove any securing screws.

---

**MONITOR SUSPENSION RAIL MOUNTING SPECIFICATIONS**

- When a 23 daN force is applied vertically upward, downward or horizontally at any stationary rail mounting point, the attachment interface must not deflect more than 1.5 mm (0.06 in)
- When a 45 daN force is applied vertically upward at any stationary rail mounting point, the attachment interface must not deflect more than 1.5 mm (0.06 in)

**CEILING SUSPENSION DISCLAIMER**

- Diagonals lengths must be equal (tolerance ±6 mm ±0.24 in)
- All mounting point must be located on a common centerline (tolerance ±1.5 mm ±0.06 in)
- All mounting points must lie in the same horizontal plane (tolerance ±2 mm ±0.08 in)

**CEILING SUSPENSION DISCLAIMER**

- Each stationary rail must be mounted by bolts supplied or by 12 mm (0.47 in) as metric bolts. Maximum load per bolt is 160 daN, however each mounting bolt must not “PULL OUT” or otherwise fail under a vertically downward dead load of 635daN.
### TEMPERATURE AND HUMIDITY SPECIFICATIONS

#### IN-USE CONDITIONS

<table>
<thead>
<tr>
<th>EXAM ROOM</th>
<th>CONTROL ROOM</th>
<th>TECHNICAL ROOM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>Recommended</td>
<td>Max</td>
</tr>
<tr>
<td><strong>Temperature gradient</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 10 °C/h [50 °F/h]</td>
<td>≤ 10°C/h [50 °F/h]</td>
<td>≤ 10°C/h [50 °F/h]</td>
</tr>
<tr>
<td><strong>Humidity gradient</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 10%/h</td>
<td>≤ 10%/h</td>
<td>≤ 10%/h</td>
</tr>
</tbody>
</table>

#### STORAGE CONDITIONS

| | |
| Temperature | +10 °C [50 °F] to +40 °C [104 °F] |
| RH (1) non condensing | 10% to 70% |

(1) Relative humidity

#### AIR RENEWAL

According to local standards.

**NOTE**

In case of using air conditioning systems that have a risk of water leakage it is recommended not to install it above electric equipment or to take measures to protect the equipment from dropping water.

### HEAT DISSIPATION

<table>
<thead>
<tr>
<th>ROOM</th>
<th>DESCRIPTION</th>
<th>STAND BY</th>
<th>AVERAGE*</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>kW</td>
<td>BTU/hr</td>
<td>kW</td>
</tr>
<tr>
<td>Examination room</td>
<td>LC Gantry</td>
<td>0.41</td>
<td>1394</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>Patient table</td>
<td>0.34</td>
<td>1146</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>4 monitor</td>
<td>0.09</td>
<td>320</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>3/4”</td>
<td>2860</td>
<td>1/4”</td>
</tr>
<tr>
<td>Control room</td>
<td>Operator Console</td>
<td>0.33</td>
<td>1119</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>AW Workstation</td>
<td>0.59</td>
<td>2013</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>0'-1”</td>
<td>261'-0”</td>
<td>0'-1”</td>
</tr>
<tr>
<td>Technical room</td>
<td>System Cabinet</td>
<td>0.70</td>
<td>2387</td>
<td>1.53</td>
</tr>
<tr>
<td></td>
<td>Tube chiller</td>
<td>2.53</td>
<td>8619</td>
<td>5.50</td>
</tr>
<tr>
<td></td>
<td>Detector chiller</td>
<td>0.21</td>
<td>709</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td>Power Distribution Box</td>
<td>0.40</td>
<td>1364</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>Fluoro UPS UL</td>
<td>1.98</td>
<td>6751</td>
<td>1.98</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>0'-5”</td>
<td>1652'-6”</td>
<td>0'-9”</td>
</tr>
</tbody>
</table>

**WARNING**

The list contains only the principal components of the system and doesn’t contain any non-GE supplied equipment.

* This average corresponds to 11 cases in 10 hours.
1. All wires specified shall be copper stranded, flexible, thermo-plastic, color coded, cut 10 foot long at outlet boxes, duct termination points or stubbed conduit ends. All conductors, power, signal and ground, must be run in a conduit or duct system. Electrical contractor shall ring out and tag all wires at both ends. Wire runs must be continuous copper stranded and free from splices.

2. Wire sizes given are for use of equipment. Larger sizes may be required by local codes.

3. It is recommended that all wires be color coded, as required in accordance with national and local electrical codes.

4. Conduit sizes shall be verified by the architect, electrical engineer or contractor, in accordance with local or national codes.

5. Convenience outlets are not illustrated. Their number and location are to be specified by others. Locate at least one convenience outlet close to the system control, the power distribution unit and one on each wall of the procedure room. Use hospital approved outlet or equivalent.

6. General room illumination is not illustrated. Caution should be taken to avoid excessive heat from overhead spotlights. Damage can occur to ceiling mounting components and wiring if high wattage bulbs are used. Recommend low wattage bulbs no higher than 75 watts and use dimmer controls (except MR). Do not mount lights directly above areas where ceiling mounted accessories will be parked.

7. Routing of cable ductwork, conduits, etc., must run direct as possible otherwise may result in the need for greater than standard cable lengths (refer to the interconnection diagram for maximum usable lengths point to point).

8. Conduit turns to have large, sweeping bends with minimum radius in accordance with national and local electrical codes.

9. A special grounding system is required in all procedure rooms by some national and local codes. It is recommended in areas where patients might be examined or treated under present, future, or emergency conditions. Consult the governing electrical code and confer with appropriate customer administrative personnel to determine the areas requiring this type of grounding system.

10. The maximum point to point distances illustrated on this drawing must not be exceeded.

11. Physical connection of primary power to GE equipment is to be made by customers electrical contractor with the supervision of a GE representative. The GE representative would be required to identify the physical connection location, and insure proper handling of GE equipment.

12. GEHC conducts power audits to verify quality of power being delivered to the system. The customer's electrical contractor is required to be available to support this activity.

- All junction boxes, conduit, duct, duct dividers, switches, circuit breakers, cable tray, etc., are to be supplied and installed by customers electrical contractor.
- Conduit and duct runs shall have sweep radius bends
- Conduits and duct above ceiling or below finished floor must be installed as near to ceiling or floor as possible to reduce run length.
- Ceiling mounted junction boxes illustrated on this plan must be installed flush with finished ceiling.
- All ductwork must meet the following requirements:
  1. Ductwork shall be metal with dividers and have removable, accessible covers.
  2. Ductwork shall be certified/rated for electrical power purposes.
  3. Ductwork shall be electrically and mechanically bonded together in an approved manner.
- PVC as a substitute must be used in accordance with all local and national codes.
- All openings in access flooring are to be cut out and finished off with grommet material by the customers contractor.
- General contractor to insert pull cords for all cable run conduits between the equipment room and the operators control room.
- 10 foot pigtails at all junction points.
- Grounding is critical to equipment function and patient safety. Site must conform to wiring specifications shown on this plan.

CONNECTIVITY REQUIREMENTS

Broadband Connections are necessary during the installation process and going forward to ensure full support from the Engineering Teams for the customers’ system. Maximum performance and availability for the customers’ system is maintained and closely monitored during the lifetime of the system. Proactive and reactive maintenance is available utilising the wide range of digital tools using the connectivity solutions listed below:

- Site-to-Site VPN/GE Solution
- Site-to-Site VPN/Customer Solution
- Connection through Dedicated Service Network
- Internet Access - connectivity for InSite 2.0

The requirements for these connectivity solutions are explained in the broadband solutions catalogue (separate document).
**ELECTRICAL LAYOUT ITEM LIST**

1. **System emergency off (SEO)** (recommended height 1.2m [48"] above floor)
2. **X-Ray ON lamp (L1)** - 24 V
3. **X-Ray room warning light control panel**
4. **Duplex hospital grade, dedicated wall outlet 120-v, single phase power**
5. **Duplex hospital grade, dedicated ceiling outlet 120-v, single phase power**
6. **Network outlet**
7. **Duplex hospital grade, dedicated outlet 120-v emergency, single phase power, 15a**
8. **6-Gang hospital grade, dedicated wall outlet 115-V, single phase power**
9. **5-15R NEMA Receptacle, dedicated outlet 120-v, single phase power**

**Additional Conduit Runs (Contractor Supplied and Installed)**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Qty</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC Gantry</td>
<td>System Control Cabinet</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>LC Gantry</td>
<td>Table</td>
<td>1</td>
<td>4 and 2</td>
</tr>
<tr>
<td>Water line</td>
<td>LC Gantry</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Warning light controller</td>
<td>Warning light</td>
<td>1</td>
<td>½</td>
</tr>
<tr>
<td>Warning light controller</td>
<td>System Control Cabinet</td>
<td>1</td>
<td>½</td>
</tr>
<tr>
<td>Warning light controller</td>
<td>120-V 1 phase power</td>
<td>1</td>
<td>As Required</td>
</tr>
<tr>
<td>LED Transformer</td>
<td>Spooler</td>
<td>1</td>
<td>As Required</td>
</tr>
<tr>
<td>LED Trans. (LT) or lamp</td>
<td>120-V 1 phase power</td>
<td>1</td>
<td>As Required</td>
</tr>
<tr>
<td>LED Lamp</td>
<td>Spooler</td>
<td>1</td>
<td>Cables come with spooler</td>
</tr>
<tr>
<td>X-ray Buzzer</td>
<td>System Control Cabinet</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>X-ray Buzzer</td>
<td>Control Room</td>
<td>1</td>
<td>½</td>
</tr>
<tr>
<td>3-4 Monitor suspension</td>
<td>System Control Cabinet</td>
<td>2</td>
<td>2½</td>
</tr>
<tr>
<td>Monitor</td>
<td>Control Room</td>
<td>1</td>
<td>2½</td>
</tr>
<tr>
<td>Power Distribution Box</td>
<td>Emergency off</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Power Distribution Box</td>
<td>Emergency off</td>
<td>1</td>
<td>½</td>
</tr>
<tr>
<td>Power Distribution Box</td>
<td>System Control Cabinet</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>LOTO Disconnect</td>
<td>480-V 3 phase power</td>
<td>1</td>
<td>As Required</td>
</tr>
<tr>
<td>LOTO Disconnect</td>
<td>Power Distribution Box</td>
<td>1</td>
<td>As Required</td>
</tr>
<tr>
<td>Injector Electronics</td>
<td>Injector Head</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Injector Electronics</td>
<td>Injector Control</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Patient Monitoring</td>
<td>Monitor</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Patient Monitoring</td>
<td>TRAM/PDM/AMP</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
POWER SUPPLY FOR MAIN SYSTEM

480 V Main supply
3 phases+N
Conductors must conform to Max
Line Impedance of 0.12 Ohms

Technical Room
Main Isolator
not supplied by GE

L 3 x min. 16 AWG
120 V

L1 3 x min. 16 AWG
24V

L2 3 x min. 16 AWG
24V

SEO1 5 x min. 16 AWG
24V

SEO2 5 x min. 16 AWG
24V

RL 5 x min. 16 AWG
24V

Y 8 x min. 16 AWG
24V

BR 3 x min. 14 AWG
120 V

Power Distribution Box

3 phases + G
Conductors must conform to Max
Line Impedance of 0.12 Ohms

Technical Room
Tube Chiller Coolix

X-Ray Generator

System Control Cabinet
(X-Ray on)

(Room light)

Fluoro UPS

Fluoro UPS

NOTES:

· A wall circuit breaker or equivalent device with LOTO (Log-Out/Tag-Out) capability must be installed on the main power.
· All the cables entrances to the PDB are at the bottom of the cabinet.
· Max size of terminal block for PDB input cables: 4 x 3/0

Following cables shall be furnished locally:

· Power cable between PDB and X-Ray generator (max. 39.4 ft):
  4 x min. 2 AWG, Conductors must conform to Max Line Impedance of 0.12 Ohms
· Power cable between PDB and C1 cabinet (max. 39.4 ft):
  4 x min. 10 AWG
· Power cable between PDB and X-Ray tube Chiller Coolix (max. 78.7 ft): 4 x min. 12 AWG

Additional cables with Fluoro UPS option:

· Power cable between EMI filter and PDB (max. 9.85 ft)
· Power cables between PDB and Fluoro UPS: 5 x min. 6 AWG(x2)
· Ground cable between EMI filter and PDB

2 x min. 16 AWG
3 phases + G
4 x min. 12 AWG
max. 78.7 ft

4 x min. 12 AWG
max. 78.7 ft

3 phases + G
4 x min. 2 AWG
max. 39.4 ft

3 phases + G
4 x min. 10 AWG
max. 39.4 ft

3 phases + G
5 x min. 6 AWG
max. 78.7 ft

3 phases + G
5 x min. 6 AWG
max. 78.7 ft

3 phases + N + G
5 x min. 6 AWG
max. 78.7 ft
### POWER REQUIREMENTS

**POWER SUPPLY**
- 3 PHASES+N+G 380/400/420/440/460/480 V ±10%

**FREQUENCIES**
- 50/60 Hz ± 3 Hz

**MAXIMUM INPUT POWER (0.1 sec max)**
- 150 kVA

**CONTINUOUS (AVERAGE) POWER**
- 60 kVA

**MAXIMUM LINE RESISTANCE**
- 380 V: 0.09 Ω / 400 V: 0.096 Ω / 420 V: 0.102 Ω
- 440 V: 0.108 Ω / 460 V: 0.114 Ω / 480 V: 0.12 Ω

**PER 2 PHASES WIRES**

* An EMI filter, provided by GE, is required in front of the PDB.
* Neutral is mandatory for UPS control.
* TNC neutral point connection must not be used.
* In case of IT or delta configuration without neutral, an isolation transformer is needed (supplied by customer).
* Three-phase, 5 conductors (3 phase conductors, 1 neutral and 1 protective earth conductor).
* Power supply should come into a power distribution box (PDB) containing the protective units and controls.
* The section of the supply cable should be calculated in accordance with its length and the maximum line resistance per 2 phases.

### SUPPLY CHARACTERISTICS
- Power input must be separated from any others which may generate transients (elevators, air conditioning, radiology rooms equipped with high speed film changers...).
- All equipment installed with IGS system components must be powered separately (e.g. lighting, power outlets).
- Transients must be less than 2,000 V peak in common mode and 1,000 V in differential mode, with a duration limited to a few microseconds.

### GROUND SYSTEM
- At least 35mm² copper from main ground point to the PDB.
- The equipotential link will be by means of an equipotential bar. This equipotential bar should be connected to the protective earth conductors in the ducts of the non IGS cableways and to additional equipotential connections linking up all the conducting units in the rooms where IGS units are located.

### CABLES
- Power and cable installation must comply with the distribution diagram.
- All cables must be isolated and flexible, cable color codes must comply with standards for electrical installation.
- The cables from signalling and remote control (Y, SEO, L...) will go to PDB with a pigtail length of 1.5 m, and will be connected during installation.
- Each conductor will be identified and isolated (screw connector).

### CABLEWAYS
- The general rules for laying cableways should meet the conditions laid down in current standards and regulations, with regard to:
  - Protecting cables against water (Cableways should be waterproof).
  - Protecting cables against abnormal temperatures (Proximity to heating pipes or ducts).
  - Protecting cables against temperature shocks.
  - Replacing cables (Cableways should be large enough for cables to be replaced).
  - Only GE cables are running inside cableways.
  - Metal cableways should be grounded.

### LOTO DEVICES
- Core system: Means to isolate the system electrically from the SUPPLY MAINS (main isolator) with locking ability (LOTO capability) must be installed on the mains line to the PDB. This device must be compatible with the power input specifications of the system. The customer is responsible for the procurement, delivery and installation of this device.

---

### FEEDER TABLE

<table>
<thead>
<tr>
<th>MIN. FEEDER WIRE SIZE, AWG OR MCM (sq. mm)/VAC</th>
<th>MINIMUM FEEDER WIRE LENGTH - ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 (15)</td>
</tr>
<tr>
<td>480 V</td>
<td></td>
</tr>
<tr>
<td>*1/0 (55)</td>
<td>*1/0 (55)</td>
</tr>
</tbody>
</table>

* MINIMUM WIRE SIZE FOR CIRCUIT BREAKER, BASED ON RECOMMENDED OVERCURRENT PROTECTION.

---

**GENERAL NOTES**
- An EMI filter, provided by GE, is required in front of the PDB.
- Neutral is mandatory for UPS control.
- TNC neutral point connection must not be used.
- In case of IT or delta configuration without neutral, an isolation transformer is needed (supplied by customer).
- Three-phase, 5 conductors (3 phase conductors, 1 neutral and 1 protective earth conductor).
- Power supply should come into a power distribution box (PDB) containing the protective units and controls.
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