GE Healthcare

INNOVA IGS 520-530-540
FINAL STUDY

TYPICAL

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

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.

<table>
<thead>
<tr>
<th>REV</th>
<th>DATE</th>
<th>MODIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>06/Dec/2018</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| C1  | 01 - Cover Sheet       | S3 - 11 - Structural Details (1) |
| C2  | 02 - Disclaimer - Site Readiness | S4 - 12 - Structural Details (2) |
| A1  | 03 - General Notes     | S5 - 13 - Structural Details (3) |
| A2  | 04 - Equipment Layout  | M1 - 14 - HVAC                   |
| A3  | 05 - Section Views     | E1 - 15 - Electrical Notes       |
| A4  | 06 - Equipment Dimensions (1) | E2 - 16 - Electrical Layout     |
| A5  | 07 - Equipment Dimensions (2) | E3 - 17 - Electrical Elevation  |
| A6  | 08 - Delivery          | E4 - 18 - Power Requirements     |
| S1  | 09 - Structural Notes  | E5 - 19 - Interconnections       |
| S2  | 10 - Structural Layout |               |

<table>
<thead>
<tr>
<th>Drawn by</th>
<th>Verified by</th>
<th>Concession</th>
<th>S.O. (GON)</th>
<th>PIM Manual</th>
<th>Rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMM</td>
<td>TST</td>
<td>-</td>
<td>-</td>
<td>5730939-1EN</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Format</th>
<th>Scale</th>
<th>File Name</th>
<th>Date</th>
<th>Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>1/4&quot;=1'-0&quot;</td>
<td>EN-VAS-TYP-IGS-5-WEB.DWG</td>
<td>06/Dec/2018</td>
<td>01/19</td>
</tr>
</tbody>
</table>
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 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.

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 INNOVA IGS 520-530-540 | EN-VAS-TYP-IGS-S-WEB.DWG | DOC1809666 Rev. 6 | C2 - Disclaimer - Site Readiness | 02/19
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</td>
<td>The system is suitable for use in all establishments other than domestic and those directly</td>
</tr>
<tr>
<td>CISPR 11</td>
<td>limits</td>
<td>connected to the low voltage power supply network that supplies buildings used for domestic</td>
</tr>
<tr>
<td></td>
<td>Group 1 Class A</td>
<td>purposes.</td>
</tr>
<tr>
<td></td>
<td>limits</td>
<td>The system uses RF energy only for its internal function. Therefore, the RF emission is very</td>
</tr>
<tr>
<td></td>
<td>Not applicable</td>
<td>low and not likely to cause any interference in nearby electronic equipment.</td>
</tr>
<tr>
<td>Harmonic emissions</td>
<td>Not applicable</td>
<td>The system is suitable for use only in establishments not directly connected to a public low</td>
</tr>
<tr>
<td>IEC 61000–3–2</td>
<td></td>
<td>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</td>
</tr>
<tr>
<td>flicker emissions</td>
<td></td>
<td>voltage power supply network.</td>
</tr>
<tr>
<td>IEC 61000–3–3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The GE HPI Technical Support Group is an additional resource that can provide answers for general GE product sitting questions and can be reached at (877)-305-9677 or mail to: HPITechCOE@ge.com

For Accessory Sales: (866) 281-7545 Options 1, 2, 1, 2 or mail to: gehcaccessorysales@ge.com

<table>
<thead>
<tr>
<th>LEGEND</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>GE Supplied</td>
<td>C</td>
<td>Customer/contractor supplied and installed</td>
<td>D</td>
</tr>
<tr>
<td>B</td>
<td>GE Supplied/contractor installed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BY</th>
<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</td>
<td>1</td>
<td>Advantage workstation</td>
<td>2019</td>
<td>22</td>
<td>590</td>
<td>10</td>
</tr>
<tr>
<td>A</td>
<td>2</td>
<td>Operator console</td>
<td>1365</td>
<td>628</td>
<td>400</td>
<td>285</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
<td>C.FRT Cabinet</td>
<td>2388</td>
<td>1171/1195</td>
<td>700</td>
<td>531/541</td>
</tr>
<tr>
<td>A</td>
<td>4</td>
<td>Power Distribution Unit</td>
<td>717</td>
<td>32</td>
<td>210</td>
<td>9.5</td>
</tr>
<tr>
<td>A</td>
<td>5</td>
<td>Detector chiller</td>
<td>23646</td>
<td>265</td>
<td>6930</td>
<td>120</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>Main Disconnect Panel</td>
<td>205</td>
<td>19</td>
<td>60</td>
<td>9</td>
</tr>
<tr>
<td>A</td>
<td>7</td>
<td>Xray buzzer</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td>A</td>
<td>8</td>
<td>COOLIX 4100 water chiller</td>
<td>341</td>
<td>19.6</td>
<td>100</td>
<td>9</td>
</tr>
<tr>
<td>D</td>
<td>9</td>
<td>8kVA UPS</td>
<td>1760</td>
<td>185</td>
<td>520</td>
<td>84</td>
</tr>
<tr>
<td>A</td>
<td>10</td>
<td>LC gantry</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>A</td>
<td>11</td>
<td>OMEGA V long patient table</td>
<td>614</td>
<td>1635</td>
<td>180</td>
<td>74.15</td>
</tr>
<tr>
<td>A</td>
<td>12</td>
<td>Monitor suspension long bridge</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>A</td>
<td>13</td>
<td>Longitudinal stationary rail for XT suspension</td>
<td>-</td>
<td>68</td>
<td>-</td>
<td>31</td>
</tr>
<tr>
<td>D</td>
<td>14</td>
<td>Large Display Monitor with two backup monitors</td>
<td>-</td>
<td>419</td>
<td>-</td>
<td>190</td>
</tr>
<tr>
<td>D</td>
<td>15</td>
<td>Mavig rad shield and MACH 3 lamp with 2.5m ceiling track</td>
<td>-</td>
<td>143</td>
<td>-</td>
<td>65</td>
</tr>
<tr>
<td>D</td>
<td>16</td>
<td>External Transformer for MACH 3 Surgical lamp</td>
<td>-</td>
<td>17</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>D</td>
<td>17</td>
<td>Injector head on table rail</td>
<td>-</td>
<td>15</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>D</td>
<td>18</td>
<td>Injector control</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>19</td>
<td>Injector electronics</td>
<td>320</td>
<td>37</td>
<td>94</td>
<td>17</td>
</tr>
<tr>
<td>D</td>
<td>20</td>
<td>Vitalinq speaker</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td>21</td>
<td>Vitalinq console</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td>22</td>
<td>Vitalinq microphone</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td>23</td>
<td>Vitalinq microphone (one on monitor bridge in exam room)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>24</td>
<td>Cable drape rail</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>25</td>
<td>Storage cabinet</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>26</td>
<td>Control wall to ceiling with lead glass viewing window</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>27</td>
<td>Shelf - customer to provide adequate wall support</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>28</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</td>
<td>29</td>
<td>Minimum door opening for equipment delivery is 44 in. w x 83 in. h [1118mm x 2108mm], contingent on a 9 ft [2438mm] corridor width</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], rec 1000 [40 in]
8kVA UPS

TOP VIEW
FRONT VIEW
SIDE VIEW

SCALE 1:10
Center of Gravity

C-FRT CABINET

TOP VIEW
FRONT VIEW
SIDE VIEW

SCALE 1:50
Center of Gravity

DETECTOR CONDITIONER

Plan View
Front View
Side View

Scale 1:10
Center of Gravity

GANTRY

FRONT VIEW
TOP VIEW
SIDE VIEW

SCALE 1:50
Center of Gravity
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>LENGTH</th>
<th>WIDTH</th>
<th>HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMEGA TABLE BASE ASSEMBLY (ON PALLET)</td>
<td>2140 [84.2 in]</td>
<td>960 [38 in]</td>
<td>1240 [49 in]</td>
</tr>
<tr>
<td>OMEGA TABLE TOP ASSEMBLY (ON PALLET)</td>
<td>840 [33 in]</td>
<td>3470 [137 in]</td>
<td>220 [9 in]</td>
</tr>
<tr>
<td>GANTRY (SHIPPING DOLLY)</td>
<td>2790 mm [110 in]</td>
<td>1255 mm [49.5 in]</td>
<td>2000 mm [79 in]</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 2190 mm [86 in]. It is recommended that only one side should be removed when delivering through hospital.

SHIPPING WEIGHT: 1060 kg [2340 lb].

SCALE 1:50
**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. Support backing, locate as shown
4. Mount X-Ray buzzer bracket on wall above ceiling
5. Rad shield/lamp suspension axis - anchoring with M10 screws (see ceiling structural details)
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.
**FLOOR REQUIREMENTS AND CABLE MANAGEMENT**

**FLOOR REQUIREMENTS**
- The maximum pullout force per GE supplied anchor was calculated assuming:
  - A concrete compression strength of \(17.24 \text{ MPa}\) at 28 days (which is the minimum required compression strength).
  - Anchors installed to the required hole depth of \(165.1 \text{ mm} \ (6.5 \text{ in})\) minimum.
  - Center of anchor hole to concrete edge distance \(79.4 \text{ mm} \ (3.1 \text{ in})\).
- 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 \(1 \text{ mm} \ (0.04 \text{ in})/1 \text{ m} \ (40 \text{ in})\) where equipment is installed and \(5 \text{ mm} \ (0.2 \text{ in})/2 \text{ m} \ (79 \text{ in})\) 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 CABLEING DETAILS**

**TABLE AXIS**
- Table pivot point \(\Omega 550 \ [\Omega 21.62 \text{ in}]\)
- Table side \(\Omega 225 \ [\Omega 9.00 \text{ in}]\)
- Table cable inlet through concrete slab
- Table axis \(\Omega 100 \ [\Omega 4 \text{ in}]\)
- Cable inlet for patient monitoring, size as required

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

**LC Gantry Baseplate** (supplied by GE)

**1. LC Gantry 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):
    - HILTI HVU adhesive capsule + HAS Anchor rod

**2. Table Mounting Location**
- 4 bolts and 4 additional bolts for seismic zones
- 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):
    - HILTI HVU adhesive capsule + HAS Anchor rod

**NOT IN SCALE**
- Water lines
- Conduit for water lines
- Gauntlet baseplate
- Water cable trough or conduit
- Electrical cable trough or conduit
- Concrete floor
- 38 [1.5 in] I.D. conduits for water lines
- Thru-floor fitting
- 114 [4.5 in] I.D. J.D. fitting
- Water cable inlet through concrete slab
- 305x305x125 Box [12x12x6 in] or similar
- 610x610x305 Box [24x24x12 in] or similar
- 23 [0.9 in]
- Opening for 152 [6 in] conduit
- 152 [6 in] I.D. pipe or conduit
- 102 [4 in]
- 154 [6 in] I.D. pipe or conduit
- 225 [9 in] dia. opening thru floor
- Suitable external diameter

**DATE:** 06/Dec/2018

**INNOVA IGS 520-530-540 TYPICAL S3 - Structural Details (1)**
XT RADIOGRAPHIC SUSPENSION, INBOARD MOUNTING

- Contractor supplied and installed finished ceiling (ceiling & supports must not extend below face of structural supports)
- GE supplied spring nuts with bolts
- GE supplied longitudinal stationary rail
- GE supplied cable drape support
- GE supplied cable drape rail

Structural Support system is not supplied or installed by GE Healthcare

**DETAIL 1**
- Contractor supplied and installed structural supports
- GE supplied longitudinal stationary rail
- 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
- GE supplied spring nuts with bolts
- GE supplied cable drape rail

Ceiling height as specified on installation drawings

Reference Structural Layout for these dimensions

Supports to slab as required

Reference Structural Layout for these dimensions

Stationary Rail

Structural Supports

NOT TO SCALE
**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: PDOR3001 TO DESIGN AND MOUNT THE CEILING SUPPORT.

**SCALE 1:20**

**SUSPENSION COLUMN LENGTHS AND INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>Length Range</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 mm - 3200 mm</td>
<td>[118.1 in - 126 in] false ceiling</td>
</tr>
</tbody>
</table>
| 2880 mm - 3100 mm   | [113.4 in - 122 in] from Mounting Point to Finished Floor
| 2660 mm - 2900 mm   | [104.7 in - 114.2 in] from Mounting Point to Finished Floor
| 2200 mm - 2700 mm   | [86.6 in - 106.3 in] from Mounting Point to Finished Floor

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 supporting structure (bridge, chair, Unistrut channel, other channels, direct anchorage in concrete, transversal beam, etc...) a certificate must be obtained from a structural engineer. This certificate shall include the definition of fasteners and of their tightening torque, especially for the transversal beam, etc...

**WARNING:**

It is prohibited to alter the length of the ceiling column or remove any securing screws.
TEMPERATURE AND HUMIDITY SPECIFICATIONS

**IN-USE CONDITIONS**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>EXAM ROOM</th>
<th>CONTROL ROOM</th>
<th>TECHNICAL ROOM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td>Min</td>
<td>Recommended</td>
<td>Max</td>
</tr>
<tr>
<td>15 °C [59 °F]</td>
<td>22 °C [72 °F]</td>
<td>32 °C [90 °F]</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature gradient</strong></td>
<td>≤ 10 °C/h</td>
<td>≤ 10 °C/h</td>
<td>≤ 10 °C/h</td>
</tr>
<tr>
<td><strong>RH (1) non condensing</strong></td>
<td>30% to 70%</td>
<td>30% to 75%</td>
<td>30% to 75%</td>
</tr>
<tr>
<td><strong>Humidity gradient</strong></td>
<td>≤ 10% /h</td>
<td>≤ 10% /h</td>
<td>≤ 10% /h</td>
</tr>
</tbody>
</table>

**STORAGE CONDITIONS**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>15 °C [59 °F] to +40 °C [104 °F]</th>
<th>10% to 80%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pressure</strong></td>
<td>700 hPa to 1030 hPa</td>
<td></td>
</tr>
</tbody>
</table>

**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.

**8 kVA UPS**

Systems with 8 kVA UPS shall be stored for less than 14 weeks if the storage temperature is above +30°C, and less than 25 weeks if storage temperature is above +25°C.

**HEAT DISSIPATION**

<table>
<thead>
<tr>
<th>ROOM</th>
<th>DESCRIPTION</th>
<th>HEAT OUTPUT (kW)</th>
<th>HEAT OUTPUT (BTU/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exam room</strong></td>
<td>LC gantry and table</td>
<td>0.41</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>Large Display Monitor (LDM)</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>Typical injector</td>
<td>0.09</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>1.00</td>
<td>1.14</td>
</tr>
</tbody>
</table>

- **Control room**
  - DL console and live monitor | 0.10 | 0.10 | 0.10 | 0.10 |
  - AW Workstation | 0.59 | - | 0.59 | 0.59 |
  - TOTAL | 0.69 | 0.10 | 0.69 | 0.69 |

- **Technical room**
  - C-FRT cabinet | 0.70 | 0.70 | 0.70 | 0.70 |
  - PDU | 0.40 | 0.40 | 0.40 | 0.40 |
  - Coolix tube chiller | 3.53 | 4.49 | 5.49 | 6.93 |
  - Detector Conditioner | 0.21 | 0.21 | 0.21 | 0.21 |
  - MDP (Mains Disconnect Panel) | 0.06 | 0.06 | 0.06 | 0.06 |
  - UPS 8 kVA | 0.52 | 0.52 | 0.52 | 0.52 |
  - TOTAL | 4.42 | 6.38 | 7.38 | 8.82 |

**ERROR**

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

1. Moderate Use corresponds to 8 cases in 10 hours.
2. Typical Use corresponds to 11 cases in 10 hours.
3. Maximum Use is during the case.
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. 600x600x300 [24"x24"x12"] Box below floor at gantry

2. 300x300x150 [12"x12"x6"] Box below floor for water lines at gantry

3. 200x200x150 [8"x8"x6"] Box below floor at table

4. 450x450x150 [18"x18"x6"] Pull box above ceiling for monitors

5. 500x500x300 [20"x20"x12"] Box below floor in technical/equipment room

6. 500x500x300 [20"x20"x12"] Box below floor in control room

7. 600x600x300 [24"x24"x12"] Box below floor in technical/equipment room

8. 600x600x300 [24"x24"x12"] Box below floor in control room

9. Empty 3" [75mm] conduit below floor for waterlines

10. 10" x 3 1/2" [250mm x 100mm] Surface wall duct with minimum 2 dividers

11. 18" x 3 1/2" [450mm x 100mm] Surface wall duct with minimum 2 dividers

12. 450x450x150 [18"x18"x6"] Pull box above ceiling in technical/equipment room

13. 18" x 3 1/2" [450mm x 100mm] Pull box above ceiling in control room

ITEM | QTY | Outlet Legend for GE Equipment
--- | --- | ---
System emergency off (SEO), (recommended height 1.2m [48"] above floor) | 1 |
X-Ray ON lamp (L1) - 24 V | 1 |
Duplex hospital grade, dedicated wall outlet 120-v, single phase power | 1 |
Duplex hospital grade, dedicated ceiling outlet 120-v, single phase power | 1 |
Network outlet | 1 |
Duplex hospital grade, dedicated ceiling outlet 120-v, single phase power, 15a | 1 |
6-Gang hospital grade, dedicated wall outlet 115-V, single phase power | 1 |
5-15R NEMA Receptacle, dedicated outlet 120-v, single phase power | 1 |
115-V 6-GANG 5-15R | 1 |

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>Gantry</td>
<td>CFRT Cabinet</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>Gantry</td>
<td>Table</td>
<td>1</td>
<td>100 and 50</td>
</tr>
<tr>
<td>Control Room</td>
<td>CFRT Cabinet</td>
<td>1 and 2</td>
<td>89 and 64</td>
</tr>
<tr>
<td>Water line</td>
<td>Gantry</td>
<td>1</td>
<td>75</td>
</tr>
<tr>
<td>Warning light controller</td>
<td>Warning light</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Warning light controller</td>
<td>Power distribution unit</td>
<td>1</td>
<td>13</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 Transformer</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>XRay-Buzzer</td>
<td>CFRT Cabinet</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>XRay-Buzzer</td>
<td>Control Room</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>Monitor</td>
<td>Control Room</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>Large Display Monitor</td>
<td>CFRT Cabinet</td>
<td>1</td>
<td>75 and 19</td>
</tr>
<tr>
<td>CFRT Cabinet</td>
<td>Control Room</td>
<td>1</td>
<td>75</td>
</tr>
<tr>
<td>CFRT Cabinet</td>
<td>Tram/PDM</td>
<td>2</td>
<td>75</td>
</tr>
<tr>
<td>Power distribution unit</td>
<td>Emergency off</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Power distribution unit</td>
<td>Emergency off</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Main Disconnect Panel</td>
<td>Power distribution unit</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Main Disconnect Panel</td>
<td>480-V 3 phase power</td>
<td>1</td>
<td>As Required</td>
</tr>
<tr>
<td>Patient Monitoring</td>
<td>Monitor Bridge</td>
<td>1</td>
<td>75</td>
</tr>
<tr>
<td>Patient Monitoring</td>
<td>TRANS/PERM/AHP</td>
<td>2</td>
<td>75</td>
</tr>
</tbody>
</table>

[REV. A] Date: 06/Dec/2018 | E2 - Electrical Layout (2) | 18/19
E4 - Power Requirements

**POWER REQUIREMENTS**

<table>
<thead>
<tr>
<th>POWER SUPPLY</th>
<th>3 PHASES+G 380/400/415/480 V ±10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREQUENCIES for 380/400/415V</td>
<td>50/60 Hz ± 3 Hz</td>
</tr>
<tr>
<td>FREQUENCY for 480V</td>
<td>60 Hz ± 3 Hz</td>
</tr>
<tr>
<td>PEAK POWER CONSUMPTION</td>
<td>150 kVA (0.1 sec max)</td>
</tr>
<tr>
<td>MOMENTARY POWER CONSUMPTION</td>
<td>100 kVA</td>
</tr>
<tr>
<td>LONG TIME POWER CONSUMPTION</td>
<td>18 kVA</td>
</tr>
<tr>
<td>MAXIMUM LINE RESISTANCE PER 2 PHASE WIRES</td>
<td>380 V : 0.09 Ω / 400 V : 0.096 Ω / 415 V : 0.102 Ω / 480 V : 0.12 Ω</td>
</tr>
</tbody>
</table>

- Three-phase, 4 conductors (3 phase conductors, 1 protective earth conductor)
- Power supply should come into a Mains Disconnect Panel (MDP) 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 35 mm² copper from main ground point to the MDP.
- 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 (SEO, L...) will go to MDP 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**

- The MDP shall provide means of disconnecting the mains power from the system, with LOTO capability to ensure safe service operation. It can be done by the input breaker if it has disconnecting capability, or by a separate disconnection device.
- LOTO device is installed on the MDP input breaker or on the disconnecting device, there shall be no voltage at the output of the MDP.

**POWER DISTRIBUTION**

**POWER SUPPLY FOR MAIN SYSTEM**

- **Mains supply**
  - 3 phases+N
  - (480 V)
  - Ground (Min 35 mm² or same size as feeder wire, whichever is larger)

- **Grounding**
  - 100 A
  - (MDP)

- **Technical Room**
  - 24 V
  - 480 V
  - Imag = 10 ln

- **Emergency Off**
  - (Exam room)
  - Warning Light Control Box
  - L
  - 2-No.14 Black
  - 2-No.14 Green
  - 1-No.14 Green
  - 1-No.14 White
  - 1-No.14 Black
  - (480 V)

- **Emergency Off**
  - (Control room)
  - Warning Light Control Box
  - L
  - 2-No.14 Black
  - 2-No.14 Green
  - 1-No.14 Green
  - 1-No.14 White
  - 1-No.14 Black

- **Equipment**
  -顾客供应
  - 2-No.14 Green
  - 2-No.14 White
  - 2-No.14 Black

- **Equipment**
  - CSE (Technical room)
  - 3-No.2 Black
  - 1-No.2 Green

- **Equipment**
  - CSE (Exam room)
  - 2-No.14 Black
  - 2-No.14 Green
  - 1-No.14 Green
  - 1-No.14 White

- **Equipment**
  - CSE (Control room)
  - 2-No.14 Black
  - 2-No.14 Green
  - 1-No.14 Green
  - 1-No.14 White

- **Equipment**
  - CSE (Exam room*
  - 2-No.14 Black
  - 2-No.14 Green
  - 1-No.14 Green
  - 1-No.14 White

- **Equipment**
  - CSE (Control room)
  - 2-No.14 Black
  - 2-No.14 Green
  - 1-No.14 Green
  - 1-No.14 White

- **Equipment**
  - PDU
  - Power distribution unit

*Refer to local codes, see layout for quantity and location

1. Two dry contacts: “System ON” and “X-Ray ON”, both released by PDU. Max. voltage = 24 V and the UPS emergency shutdown. able with 2m [6.5 ft] extra length on the floor behind the back of PDU
2. If length < 6m [19.7ft] - Cable with 2m [6.5 ft] extra length on the floor behind the back of PDU
3. Cable with 2m [6.5 ft] extra length on the floor behind the back of PDU
In all cases qualified personnel must verify that the feeder (at the point of take-off) and the run to the GE system meet all the requirements stated in the PIM.

For a single unit installation, the minimum transformer size is 225KVA, with 2.4% rated regulation at unity power factor. Resultant maximum allowable feeder regulation is 3.6%. The ground wire to earth shall be a minimum of AWG 2/0 (UL) or 35 mm² (CE) or the same size (100%) as feeder wires, which ever is larger.

When a Fluoro UPS is or will be installed, a neutral line is mandatory. If it scheme as earthing system is used, an isolation transformer is required with Delta-Wye or Delta-Star connection.

* Minimum wire size for circuit breaker, based on recommended overcurrent protection.

<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>480 VAC</td>
<td>30 (9)</td>
</tr>
<tr>
<td></td>
<td>400 (122)</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

- Handswitch support
- 1 phase power
- X-ray on lamp (L1) - 24V
- X-ray room warning light control panel
- System emergency off (SEO), (recommended height 1.2m [48"] above floor)
- Ceiling light/Controller
- Warning light/Controller
- 1Ø power
- UPS
- PDU