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

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GE Healthcare

SIGNA ARCHITECT / DISCOVERY MR750W FINAL STUDY

Drawn by
Verified by
Concession
S.O. (GON)
PIM Manual
Rev

PMM
PMM
-
-
5670003
8

Format
Scale
File Name
Date
Sheet

A3
1/4"=1'-0"
EN-MRI-TYP-DISCOVERY_MR750W-WEB.DWG
26/Aug/2019
01/24
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.
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.

IMAGE QUALITY CONSIDERATIONS

Broadband RF noise is a single transient or continuous series of transient disturbances caused by an electrical discharge. Low humidity environmental conditions will have higher probability of electrical discharge. The electrical discharge can occur due to electrical arcing (micro arcing) or merely static discharge. Some potential sources capable of producing electrical discharge include:

- Loose hardware/fasteners vibration or movement (electrical continuity must always be maintained)
- Flooring material including raised access flooring (panels & support hardware) and carpeting
- Electrical fixtures (i.e. Lighting fixtures, track lighting, emergency lighting, battery chargers, outlets)
- Ducting for HVAC and cable routing
- RF shield seals (walls, doors, windows etc.)

For additional information regarding image quality, refer to the pre-installation manual listed on the cover sheet.

MRI SITE PLANNING REMINDERS

Please refer to pre-installation checklist in pre-installation manual listed on the cover sheet for items critical to image quality.

1. The layout should be arranged so that the 5g line is contained to the magnet room. If not possible, a barrier is recommended to prevent entry to the 5g field area.
2. The spaces around, above, and below the magnet must be reviewed for effects of the 5g, 3g, 1g, and .5g fields. Refer to the proximity limit chart in the MR pre-installation manual referenced on the cover sheet.
3. For moving metal, the restriction lines typically extend outside of the MR space. Please confirm there are no moving metal concerns within these areas. An EMI study is recommended if the restriction lines are violated.
4. For vibration, analysis to be completed as required per pre-installation manual.
5. For EMI, review the site for the location of the main electrical feeders, AC devices, or distribution systems. An EMI study is recommended if large AC systems are nearby.
6. Details of the floor below the magnet must be reviewed. The structural engineer must verify that the quantity of steel in the volume 10ft [3.1m] x 10ft [3.1m] x 1ft [.3m] deep (below the magnet) does not exceed the allowable steel content as given in the MR pre-installation manual referenced on the cover sheet.
7. All access/computer flooring is to be removed in both the magnet room and equipment room.

MAGNETIC INTERFERENCE SPECIFICATIONS

- The customer must establish protocols to prevent persons with cardiac pacemakers, neurostimulators, and biostimulation devices from entering magnetic fields of greater than 5 gauss (exclusion zone).
- Main power transformers must remain outside the 3 gauss field. EMI < 17.1mG AC. EMI < 4.1mG DC.
- Potential exists under fault conditions that the 5 gauss line may expand radially to 14.8 ft. [4.5 m] and axially to 19.7 ft. [6.0 m] for 8 seconds or less. It should be noted that normal rampdowns or magnet rundown unit initiated quenches will not cause the magnetic field to expand.
- It is recommended every site consider the event of a quench and plan accordingly (such as placing 5 gauss warning signs at expanded locations).
- The ferrous metal objects listed below must not move into or inside of the moving metal sensitivity line during scans.

<table>
<thead>
<tr>
<th>TYPICAL MOVING MAGNETIC MASS</th>
<th>DISTANCE RADIALY</th>
<th>DISTANCE AXIALLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carts, Gurneys 100-400 lb [45-182 kg]</td>
<td>3 Gauss line</td>
<td>3 Gauss line</td>
</tr>
<tr>
<td>Forklifts, small elevator, cars, minivans, vans, pickup trucks, ambulances (objects greater than 400 lbs [182 kg])</td>
<td>20.0 FT</td>
<td>6.05 M</td>
</tr>
<tr>
<td></td>
<td>25.0 FT</td>
<td>7.65 M</td>
</tr>
<tr>
<td>Buses and trucks (dump, tractor trailer, utility, fire trucks)</td>
<td>23.2 FT</td>
<td>7.10 M</td>
</tr>
<tr>
<td></td>
<td>29.2 FT</td>
<td>8.90 M</td>
</tr>
</tbody>
</table>

Responsibility for the coordination, design, engineering, and site preparation resides with the customer and their project architects and contractors. GE does not, by providing reviews and furnishing comments and assistance, accept any responsibility beyond its obligations as defined in the MR system, sale/purchase agreement.
Warning! 5 Gauss line outside the Magnet room limits.

Note: Define RF shield's inset according to provisions made by the RF Shield vendor.
MAGNETIC PROXIMITY LIMITS

**Steel Mass Limits to Magnet Isocenter (3x3 m [10x10 ft] Area Under Magnet)**

- **Limits of Steel Mass**
  - Distance From Magnet Isocenter
  - Distance Below Top Surface of Floor

<table>
<thead>
<tr>
<th>Steel Mass (kg/m²)</th>
<th>Distance From Magnet Isocenter (m)</th>
<th>Distance Below Top Surface of Floor (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 - 1143</td>
<td>0 - 76</td>
</tr>
<tr>
<td>9.8</td>
<td>2 - 1143 - 1194</td>
<td>45 - 47 - 76 - 127</td>
</tr>
<tr>
<td>14.7</td>
<td>3 - 1194 - 1321</td>
<td>47 - 52 - 127 - 254</td>
</tr>
<tr>
<td>39.2</td>
<td>8 - 1321 - 1397</td>
<td>52 - 55 - 254 - 330 - 10 - 13</td>
</tr>
<tr>
<td>98.0</td>
<td>20 - 1397+</td>
<td>55+ - 254+ - 330+ - 13+</td>
</tr>
</tbody>
</table>

The actual field strength can be affected by Magnetic shielding, Earth’s magnetic field, other magnetic fields and stationary or moving metal. This information must be used to evaluate potential site interaction of GE Healthcare equipment with other non-GE Healthcare equipment. Magnetic shielding can be installed to prevent interaction between the magnet and nearby sensitive devices. The GE Healthcare Project Manager of Installation (PMI) can work with the customer to coordinate the magnetic shielding site evaluation. The customer is responsible for installation of all magnetic shielding.

**ACOUSTICS SPECIFICATIONS**

Acoustic and vibroacoustic information is provided for site planning and architectural design activities. It is the customer’s responsibility to hire a qualified acoustic engineer for solutions to further attenuate this transmitted noise and vibration, if required. The actual room noise level may vary based on room design, optional equipment, and usage:

- Control Room: 62 dBA
- Equipment Room: 80 dBA
- Magnet Room: 127 dBA

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**Magnetic Proximity Limits**

* The isogauss contour plots depicted on this drawing represent magnetic fringe fields resulting from the normal operation of the magnet provided with the MR system. The actual magnetic field intensity at any point in the vicinity of the magnet when installed may vary from the contour plots due to factors such as the concentrating effects of nearby ferrous objects ambient magnetic fields, including the earth’s magnetic field. Therefore, the contours shown are only approximations of actual field intensities found at a corresponding distance from the magnet’s isocenter.

**Sound Pressure Spectral Distribution**

1/3 Band Relative SPL

**Acoustic and Vibroacoustic Information**

- Low Frequency Magnet Floor Vibration (Vibration Amplitude at Each Foot)

**ISOGAUSS PLOTS**

- The isogauss contour plots depicted on this drawing represent magnetic fringe fields resulting from the normal operation of the magnet provided with the MR system. The actual magnetic field intensity at any point in the vicinity of the magnet when installed may vary from the contour plots due to factors such as the concentrating effects of nearby ferrous objects ambient magnetic fields, including the earth’s magnetic field. Therefore, the contours shown are only approximations of actual field intensities found at a corresponding distance from the magnet’s isocenter.

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  - Distance Below Top Surface of Floor

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**Sound Pressure Spectral Distribution**

1/3 Band Relative SPL
Shaded area indicates floor to ceiling minimum height of 2500 mm (98.5 in). Special service procedures are required if ceiling height is between 2500 mm and 2667 mm (985 in and 105 in).

PENETRATION PANEL CLOSET

An enclosure (i.e. closet) must be provided to restrict access to the PEN panels and for storage of excess interconnections.
- The PEN closet must have a mechanical locking mechanism to restrict access to the PEN panels
- The PEN closet must maintain the minimum service area outside the 200 Gauss in the magnet room.
- PEN closet must allow free air exchange of 400CFM (680 m³/hour) between the Magnet room and PEN closet for MR system blowers. Airflow may be achieved through door louvers or other openings in the PEN closet that meet all other PEN closet requirements

A closet service hatch must be provided if the room does not allow the PEN panel blower box removal path to remain completely outside the 200 Gauss line.

NOTE: If the room size is sufficiently large so the SPW blower box can be removed without entering the 200 Gauss line, a closet service hatch is not required.

The closet service hatch must meet the following requirements:
- Must be located within the PEN closet on the RF wall allowing access to the Equipment room
- May be located anywhere within the PEN closet (between 254 [10 in] and 1524 mm [60 in] with unobstructed pass-through)
- Must be minimum 508x508 mm [20x20 in]
- Must maintain RF shield integrity for all service access
- May use any design (quick disconnect RF panel, blanker panel, hinged door, etc.) as long as all other requirements are met
- The closet service hatch removal must take less than 15 minutes (replacement must also take less than 15 minutes)
Note: Center of gravity is approximate and includes the GE Healthcare supplied VibroAcoustic Dampening Kit, but does not include cryogens, gradient assembly, side mounted electronics, or enclosures. Enclosure dimensions are for reference only, NOT FOR SITE PLANNING USE.

**Center of gravity**

---

**Penetration Cabinet Clearance**

**Top View**
- Service clearance
- Cable drop area
- Blower box
- Penetration panel

**Front View**
- 6 M12 x 1.75 mm Thread pitch mounting holes (3 on each side of cabinet)
- Service clearance
- Airflow clearance

**Side View**
- 50 ± 25 mm from RF shield room wall required for proper connection to penetration panel and cabinet airflow
- Center of gravity

---

**Global Operators Cabinet (GOC)**

**Top View**
- Service clearance
- Airflow clearance
- Installation clearance
- Service clearance

**Side View**
- Center of Gravity

**Front View**
- Scale 1:10
SECONDARY PENETRATION WALL (SPW)

A: Airflow clearance
B: Installation clearance
C: Center of Gravity

CRYOCOOLER COMPRESSOR (CRY)

A: Maintenance space
B: Installation Clearance

POWER, GRADIENT, RF CABINET (PGR)

A: Airflow clearance
B: Dolly installation clearance
C: Service clearance
D: Cable strain relief
E: Cable clearance

HEAT EXCHANGER CABINET (HEC)

A: Airflow clearance
B: Installation clearance
C: Service clearance

Shipping without fluid
Shipping with fluid

Additional service clearance required for Magnet Monitor. It can be installed on either side of the HEC.

Cable Tray: bottom must be at least 483mm [19.02in] above cabinet.

INPUT: 236 [9.3 in] 244 [9.6 in]
OUTPUT: 151 [6 in] 170 [6.7 in]

TOP VIEW
FRONT VIEW
SIDE VIEW

SCALE 1:20
DELIVERY

ROUTING
- The customer is solely liable for routing of components from dock to final site.
- GE must be able to move system components in or out with no need to uncrate or disassemble any of the components. The entire passageway must be cleared, adequately lighted and free from dust.
- The floor and its surfacing must be able to withstand the live load of components and handling equipment.
- Floor surfacing must be continuous.
- The customer must protect any fragile flooring surfaces.

MINIMUM SPECIFICATIONS FOR MAGNET ROUTING
- Floor must be able to withstand a moving load of 7691 daN
- Height: 2.5m [98.5in], width: 2.7m [106in]
- Maximum slope: 30 degree

MINIMUM SPECIFICATIONS FOR MAGNET ROUTING
Recommended minimum opening for side (wall) delivery : 2750 (width) x 2750 (height)

INSTALLATION AND DELIVERY ACCEPTANCE
- A survey of the site established by the customer and GE will make the decision for the delivery time.
- This survey of the site (a form is made available by GE) is only to check if the apparent conditions of the site allow the equipment to be delivered.
- If the site is not ready, GE can delay the delivery time.

CRITICAL ITEMS FOR MAGNET DELIVERY
- 24/7 chilled water and 480v power for shield/cryo cooler
- 24/7 120v power for the magnet monitor
- Phone lines for magnet monitoring and emergency use
- Magnet room exhaust fan
- Cryogen venting (if roof hatch, completed within 24 hrs)

This is only a partial list of items required for delivery of the magnet. For a complete checklist refer to the pre-installation manual referenced on cover sheet.

GRADIENT COIL REPLACEMENT

The weight bearing structure of the site should support any additional weight of the main replacement parts occurring during maintenance of the magnet, throughout the whole lifecycle of the MR.

---

**EQUIPMENT**

<table>
<thead>
<tr>
<th>DIMENSIONS</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>LxWxH</td>
<td>kg</td>
</tr>
<tr>
<td>991x2536x1499</td>
<td>1449</td>
</tr>
</tbody>
</table>

Initial gradient coil assembly is shipped installed in the magnet. Shipping/installation cart is used to install replacement coil assembly only.
VIBRATION SPECIFICATIONS

Excessive vibration can affect MR image quality. Vibration testing must be performed early in the site planning process to ensure vibration is minimized. Both steady state vibration (exhaust fans, air conditioners, pumps, etc.) and transient vibrations (traffic, pedestrians, door slamming, etc.) must be assessed. The Magnet cannot be directly isolated from vibration. Any vibration issue must be resolved at the source.

Transient vibration levels above the specified limits in the MR Site Vibration Test Guidelines must be analyzed. Any transient vibration that causes vibration to exceed the steady-state level must be mitigated.

MAGNET STEADY-STATE VIBRATION SPECIFICATIONS

VIBRATION TRANSMITTED THROUGH VIBROACOUSTIC MAT

STRUCTURAL NOTES

- 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.
- Dimensions are to finished surfaces of room.
- Certain MRI procedures require an extremely stable environment to achieve high resolution image quality. Vibration is known to introduce field instabilities into the imaging system. The vibration effects on image quality can be minimized during the initial site planning of the MRI suite by minimizing the vibration environment. See PROXIMITY LIMITS, PATIENT TABLE DOCK ANCHOR MOUNTING REQUIREMENTS AND VIBROACOUSTIC DAMPENING KIT details for additional information.
- Standard steel studs, nails, screws, conduit, piping, drains and other hardware are acceptable if properly secured. Any loose steel objects can be violently accelerated into the bore of the magnet. Careful thought should be given to the selection of light fixtures, cabinets, wall decorations, etc. To minimize this potential hazard. For safety, all removable items within the magnet room such as faucet handles, drain covers, switch box cover plates, light fixture components, mounting screws, etc. Must be non-magnetic. If you have a specific question about material, bring it to the attention of your GE project manager of installations.
- Floor levelness refer to MAGNET ROOM FLOOR SPECIFICATIONS DETAIL, this floor levelness requirement is important for accurate patient table docking.
- Non-movable steel such as wall studs or HVAC components will produce negligible effect on the active shield magnet.
- 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.
- Customers contractor to provide and install appropriate supports for the storage of excess cables.
- 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”
<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vibroacoustic dampening kit (see floor structural detail)</td>
</tr>
<tr>
<td>2</td>
<td>Magnet curtain kit (CONTRACTOR SUPPLIED &amp; INSTALLED)</td>
</tr>
<tr>
<td>3</td>
<td>Patient table dock anchoring</td>
</tr>
<tr>
<td>4</td>
<td>Structural wall backing for Main Disconnect Panel</td>
</tr>
<tr>
<td>5</td>
<td>Structural wall backing for Magnet Rundown Unit</td>
</tr>
<tr>
<td>6</td>
<td>Structural wall backing for Main Bypass Panel</td>
</tr>
</tbody>
</table>

Diagram: Typical S2 - Structural Layout

- 1/4" = 1'-0"
**CABLE CONCEALMENT**

- Front of magnet

**NOTE:**
- This drawing is to be used only as a design intent document. Refer to GE installation manual for tray install.
- Actual tray installation may be site dependent.
- This drawing not to scale.

---

**MAGNET ON VIBROACOUSTIC DAMPENING KIT "VIBROPAD"**

- Magnet
- Enclosure
- Patient Table areas must be flat and level within 3 mm [0.12 in] within the shaded area shown.

**VibroAcoustic Pad weight:**
- 8 kg [17 lbs] (each)

**NOT TO SCALE**

---

**MAGNET ROOM FLOOR SPECIFICATIONS**

- The finished floor must support the weight of all components (e.g., patient table, gradient coil replacement cart) throughout operation and service life.

---

**PATIENT TABLE DOCK ANCHOR MOUNTING REQUIREMENTS**

- The RF Shield vendor must design and install the dock anchor bolt
- The dock anchor hole must be drilled after the Magnet is installed
- The dock anchor must not contact floor rebar or other structural steel
- The dock anchor must electrically contact the RF shield at point of entry
- The RF shield vendor must perform a pull test on the anchor (equal to the clamping force).

The dock anchor properties must comply with the following requirements:

- Anchors must be two-part assembly (male/female)
- Female side must be expansion- or epoxy-type
- Male side must be a bolt or threaded rod with appropriate-sized nut (bolt or rod must be removable - not epoxied or cemented in place)
- Anchors must be electrically conductive
- Anchors must be non-magnetic
- Anchors must not induce galvanic corrosion with the RF shield
- Anchors must be commercially procured
- The anchor rod hole clearance in the table frame anchor base is 11 mm (0.43 in). The anchor rod diameter must be sized appropriately.
- The anchor rod must extend 60 mm ± 13 mm [2.25 in ± 0.5 in] above the finished floor
- The anchor rod must be less than 152 mm [6 in] in total length (length above the floor plus embedded length)
- If underside of deck is metallic, then insulating bushing must be added to through bolt hardware to prevent grounding of shield at this point.

---

**CABLE CONCEALMENT**

- Customer/contractor installed cable concealment frame
- Customer/contractor to provide opening and install frame.

**NOTE:**
- This drawing is to be used only as a design intent document. Refer to GE installation manual for tray install.
- Actual tray installation may be site dependent.
- This drawing not to scale.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cryogen vent (200mm [8&quot;] O.D.)</td>
</tr>
<tr>
<td>2</td>
<td>Emergency exhaust vent - refer to magnet room vent requirements (position to be defined)</td>
</tr>
<tr>
<td>3</td>
<td>Pressure equalization vent - refer to magnet room vent requirements (position in ceiling to be defined)</td>
</tr>
<tr>
<td>4</td>
<td>38mm [1.5&quot;] NPT Male connectors, at 2.1m [82.67&quot;] above floor, (2) 38mm [1.5&quot;] copper lines (insulated) and (2) shut off valves. refer to chilled water block diagram</td>
</tr>
<tr>
<td>5</td>
<td>Closet must allow free air exchange of 400 CFM between magnet room and closet</td>
</tr>
<tr>
<td>6</td>
<td>Provide as needed - low pressure rubber multipurpose hose, inside dia. 1/2&quot; working pressure range: 250 to 499 PSI - refer to the manual city water back-up system detail</td>
</tr>
<tr>
<td>7</td>
<td>(2) 50mm [2&quot;] I.D. High pressure hoses and (2) 50mm [2&quot;] to 38mm [1.5&quot;] Reducers</td>
</tr>
</tbody>
</table>

**MECHANICAL/PLUMBING NOTES**

- All piping, fittings, supports, hoses, clamps, ventilation systems, etc. are to be supplied and installed by the customer or his contractors.
- For complete design and requirements, specifications and guidelines refer to the pre-installation manual: system cooling, cryogen venting, waveguides and exhaust venting.
- An emergency water cooling back-up supply is recommended for continuous cryogen compressor operation. If using an open loop back-up design, ensure a drain is provided. Please refer to the pre-install manual for optional back-up coolant supply requirements.
In case of using air conditioning systems or chilled water piping 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.

NOTE
According to local standards.

Maximum ambient temperature for the Equipment room at inlet is derated by 1°C per 300 m (984 ft) above 2000 m (6562 ft) (not to exceed 2600 m [8530 ft]).

Humidity gradient
Relative humidity (1)
System heat dissipation

<table>
<thead>
<tr>
<th>TEMPERATURE AND HUMIDITY SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DESCRIPTION</strong></td>
</tr>
<tr>
<td>Magnet Room (MAG) and Patient Table (PT)</td>
</tr>
<tr>
<td>Blower Box (MB6)</td>
</tr>
<tr>
<td>Penetration Panel Cabinet (PEN)</td>
</tr>
<tr>
<td>Penetration Panel Cabinet (PEN)</td>
</tr>
<tr>
<td>Secondary Penetration Wall (SPW)</td>
</tr>
<tr>
<td>Main Disconnect Panel (MDP)</td>
</tr>
<tr>
<td>Power, Gradient, RF Cabinet (PGR)</td>
</tr>
<tr>
<td>Cryocooler Compressor (CRY)</td>
</tr>
<tr>
<td>Heat Exchanger Cabinet (HEC)</td>
</tr>
<tr>
<td>Magnet Monitor (MON)</td>
</tr>
<tr>
<td>Operator Workspace equipment (OW)</td>
</tr>
<tr>
<td>Multi-Nuclear Spectroscopy Cabinet (MNS)</td>
</tr>
<tr>
<td>BrainWave HW Lite Cabinet (BW) with options</td>
</tr>
<tr>
<td>CADstream</td>
</tr>
<tr>
<td>MR Elastography (MRE)</td>
</tr>
</tbody>
</table>

**NOTE**
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**AIR EXCHANGE**
According to local standards.

**NOTE**
In case of using air conditioning systems or chilled water piping 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 DETAILS**

**MAGNET ROOM VENTING REQUIREMENTS**

**HVAC VENT REQUIREMENTS**
- HVAC vendor must comply with Magnet room temperature and humidity specifications and RF shielding specifications.
- RF Shield vendor must install open pipe or honeycomb HVAC waveguides.
- All serviceable parts in the Magnet room (e.g.: diffusers) must be non-magnetic.
- Waveguides must be nonmagnetic and electrically isolated.
- Incoming air must contain at least 5% air from outside the Magnet room (inside or outside the facility) to displace residual helium.

**EMERGENCY VENT REQUIREMENT**
- Exhaust vent system is supplied by the customer.
- All items within the RF enclosure must be non-magnetic.
- The exhaust vent system must be tested and operational before the magnet is installed.
- The exhaust intake vent must be located near the magnet cryogenic vent at the highest point on the finished or drop ceiling.
- The Magnet room exhaust fan and exhaust intake vent must have a capacity of at least 1200 CFM (34 m³/min) with a minimum of 12 room air exchanges per hour.
- The exhaust fan must be placed above RF shielding located outside 10 gauss (1mT) and with appropriate waveguide.
- The system must have a manual exhaust fan switch near the Operator Workspace and in the Magnet room near the door (the switches must be connected in parallel).
- All system components must be accessible for customer inspection, cleaning and maintenance

**PRESSURE VENT REQUIREMENT**
- A pressure equalizing vent is required in the magnet room ceiling or in the wall, at the highest point possible.
- The vent minimum size must be (610 mm x 610 mm [24 in x 24 in]) or equivalent.
- The pressure equalization vent must be located so any Helium gas is not vented into occupied areas.

Note: Location may affect acoustic noise transmission into occupied areas.

**MAGNET ROOM EXHAUST FAN SCHEMATIC**
### CHILLED WATER SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHILLER SIZE</strong></td>
<td>Minimum 70 kW</td>
</tr>
<tr>
<td><strong>INLET TEMPERATURE</strong></td>
<td>Minimum 70 kW</td>
</tr>
<tr>
<td>42.8 to 53.6°F (6 to 12°C)</td>
<td>measured at the inlet to the HEC</td>
</tr>
<tr>
<td><strong>Hose connections to the HEC (supplied by customer)</strong></td>
<td>1.5 inch (38.1 mm) male NPT</td>
</tr>
<tr>
<td><strong>MINIMUM FLOW</strong></td>
<td>30 gpm (114 l/min)</td>
</tr>
<tr>
<td><strong>MAXIMUM FLOW</strong></td>
<td>35 gpm (132 l/min)</td>
</tr>
<tr>
<td><strong>Pressure drop in HEC Cabinet</strong></td>
<td>40% propylene glycol, 60% water</td>
</tr>
<tr>
<td>34.8 psi (2.4 bars)</td>
<td></td>
</tr>
<tr>
<td>47.8 psi (3.3 bars)</td>
<td></td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>Continuous</td>
</tr>
<tr>
<td><strong>Antifreeze</strong></td>
<td>No more than 40% propylene glycol</td>
</tr>
<tr>
<td><strong>Temperature rise at minimum flow</strong></td>
<td>17.3°F (9.6°C) with 40% propylene glycol-water 3730 J/(kgK) specific heat, 1021 kg/m³ density, 70 kW heat</td>
</tr>
<tr>
<td><strong>Temperature rise at maximum flow</strong></td>
<td>15.1°F (8.4°C) with 40% propylene glycol-water 3730 J/(kgK) specific heat, 1021 kg/m³ density, 70 kW heat</td>
</tr>
<tr>
<td><strong>Maximum inlet pressure to HEC</strong></td>
<td>87 psi (6 bar)</td>
</tr>
<tr>
<td><strong>Minimum continuous heat load</strong></td>
<td>7.5 kW</td>
</tr>
<tr>
<td><strong>Hoses to be provided by customer</strong></td>
<td>1.5 inch (38.1 mm) minimum hose inside diameter</td>
</tr>
<tr>
<td><strong>Total hardness</strong></td>
<td>Less than 200 ppm</td>
</tr>
<tr>
<td><strong>Suspended matter</strong></td>
<td>Less than 10 ppm</td>
</tr>
<tr>
<td><strong>Particle size</strong></td>
<td>Less than 100 micron</td>
</tr>
<tr>
<td><strong>Facility filter</strong></td>
<td>100 micron or smaller with a field-changeable filter</td>
</tr>
<tr>
<td><strong>Condensation protection</strong></td>
<td>Facility plumbing to the HEC must be properly routed and insulated to prevent equipment damage or safety hazards</td>
</tr>
</tbody>
</table>

### CITY WATER BACKUP SPECIFICATIONS FOR COMPRESSOR

- Inlet flow: 1.5 gpm (6 l/min)
- Inlet temperature: 50°F (10°C)
- Temperature rise at minimum flow: 17.3°F (9.6°C)
- Temperature rise at maximum flow: 15.1°F (8.4°C)
- Maximum inlet pressure to HEC: 87 psi (6 bar)
- Minimum continuous heat load: 7.5 kW

### MANUAL CITY WATER BACKUP SYSTEM (SAMPLE-DIMPLEX)

- Automatic city water backup system for compressor
- Valve handles will be connected by a mechanical linkage
- Cover threaded rod with heat shrink tubing
- Condensation protection: Facility plumbing to the HEC must be properly routed and insulated to prevent equipment damage or safety hazards

### CHILLED WATER BLOCK DIAGRAM

- Facility chilled water
- Power, Gradient, RF Cabinet (PGR)
- Heat Exchanger Cabinet (HEC)
- Magent (MAG)
- Cryocooler Compressor (CRY)
- Gradient Coil (XRM)
- Automatic backup
- Valve handles will be connected by a mechanical linkage
- Cover threaded rod with heat shrink tubing

### CITY WATER SYNOPTIC

- Facility chilled water
- Automatic city water backup system
- Valve handles will be connected by a mechanical linkage
- Cover threaded rod with heat shrink tubing

### RF SHIELD

- Run pipe through waveguide
- GE customer
- Automatic backup for compressor

### MANUFACTURER

- GE customer
- Automatic backup for compressor

---

**Signa Architect / Discovery MR750W-DW**

**Typical**

**Date** 26/Aug/2019

**Rev** A

**M3 - Chilled Water**

**16/24**
TYPICAL CRYOGEN SIDE WALL EXIT WITH LONG SWEEP ELBOW

KEY COMPONENTS:
- RF waveguide extended from wall to magnet adapter
- Must be all same material and all welded
- Support system must withstand 11125 N [2500 lbs]
- GE ventglas must be installed in vertical section directly over magnet

TYPICAL CRYOGENIC VENT PIPE DETAIL

Waveguide is contractor supplied. Minimum 812 mm [32 in]. Must extend at least 100 mm [4 in] on magnet room side of the wall/ceiling and 25±6 mm [1±.2 in] from the GE supplied pipe below isolation joint. Magnet room end must not be more than 2969 mm [117 in] above finished floor.

1. The 203 mm [8 in] OD vent material must be one of the following materials with the wall thickness indicated:
   a. SS 304: Minimum 0.89 mm [0.035 in]; Maximum 3.18 mm [0.125 in]
   b. AL 6061-T6: Minimum 2.11 mm [0.083 in]; Maximum 3.18 mm [0.125 in]
   c. CU DWV, M or L: Minimum 2.11 mm [0.083 in]; Maximum 3.56 mm [0.140 in]

2. Either tubes or pipes may be used and must be seamless or have welded seams

NOTE
All welds on the pipe must be ground down to a smooth 203 mm [8 in] diameter so that it can be clamped to the Ventglas with enough force.

3. Corrugated pipe or spiral duct must not be used
4. If required, bellows pipe less than 300 mm [12 in] in length may be used as a thermal expansion joint
5. The vent pipe must withstand the maximum pressure listed in the Pre-Installation Manual
6. Waveguide vent material must match the outside diameter of the magnet flanged vent adapter

CRYOGENIC VENTING ( EXTERIOR )
### Magnet Cryogenic Vent System Pressure Drop Matrix

<table>
<thead>
<tr>
<th>Outer dia. of pipe (D)</th>
<th>Distance of vent system component from magnet (m)</th>
<th>Pressure drop for straight pipe (psi/ft)</th>
<th>Std sweep 45º elbow (psi)</th>
<th>Long sweep 45º elbow (psi)</th>
<th>Std sweep 90º elbow (psi)</th>
<th>Long sweep 90º elbow (psi)</th>
<th>90º miter bend (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft</td>
<td>m</td>
<td>psi/ft</td>
<td>kPa/ft</td>
<td>psi</td>
<td>kPa</td>
<td>psi</td>
<td>kPa</td>
</tr>
<tr>
<td>8 in. (200mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-10</td>
<td>0.00-3.05</td>
<td>0.14</td>
<td>3.22</td>
<td>1.12</td>
<td>7.70</td>
<td>0.74</td>
<td>5.13</td>
</tr>
<tr>
<td>10-20</td>
<td>3.05-6.10</td>
<td>0.24</td>
<td>5.49</td>
<td>1.83</td>
<td>12.63</td>
<td>1.22</td>
<td>8.42</td>
</tr>
<tr>
<td>20-30</td>
<td>6.10-9.15</td>
<td>0.36</td>
<td>8.23</td>
<td>2.49</td>
<td>17.20</td>
<td>1.66</td>
<td>11.45</td>
</tr>
<tr>
<td>40-40</td>
<td>9.15-12.2</td>
<td>0.47</td>
<td>10.65</td>
<td>3.11</td>
<td>21.42</td>
<td>2.07</td>
<td>14.26</td>
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<td>40-50</td>
<td>12.20-15.25</td>
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<td>12.80</td>
<td>3.67</td>
<td>25.32</td>
<td>2.45</td>
<td>16.68</td>
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<tr>
<td>60-60</td>
<td>15.25-18.30</td>
<td>0.65</td>
<td>14.68</td>
<td>4.20</td>
<td>28.95</td>
<td>2.79</td>
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<tr>
<td>80-80</td>
<td>18.29-24.39</td>
<td>0.77</td>
<td>17.44</td>
<td>5.13</td>
<td>35.34</td>
<td>3.41</td>
<td>23.53</td>
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<td>10 in. (250mm)</td>
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<td></td>
<td></td>
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<tr>
<td>0-20</td>
<td>0.00-6.10</td>
<td>0.06</td>
<td>1.280</td>
<td>0.62</td>
<td>4.29</td>
<td>0.41</td>
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<td>7.25</td>
<td>0.70</td>
<td>4.83</td>
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<td>40-60</td>
<td>12.22-18.29</td>
<td>0.17</td>
<td>3.904</td>
<td>1.43</td>
<td>9.86</td>
<td>0.95</td>
<td>6.56</td>
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<td>80-80</td>
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<td>0.21</td>
<td>4.859</td>
<td>1.76</td>
<td>12.14</td>
<td>1.17</td>
<td>8.07</td>
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<tr>
<td>12 in. (300mm)</td>
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<td>0.00-6.10</td>
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<tr>
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<td>0.041</td>
<td>0.937</td>
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<td>3.00</td>
<td>0.29</td>
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<td>1.353</td>
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<td>18.29-24.39</td>
<td>0.075</td>
<td>1.702</td>
<td>0.73</td>
<td>5.06</td>
<td>0.49</td>
<td>3.36</td>
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<tr>
<td>14 in. (350mm)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-20</td>
<td>0.00-6.10</td>
<td>0.08</td>
<td>0.180</td>
<td>0.125</td>
<td>0.85</td>
<td>0.85</td>
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<td>6.10-12.22</td>
<td>0.017</td>
<td>0.380</td>
<td>0.206</td>
<td>1.42</td>
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<tr>
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<td>12.22-18.29</td>
<td>0.024</td>
<td>0.552</td>
<td>0.281</td>
<td>1.94</td>
<td>1.87</td>
<td>1.29</td>
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<td>18.29-24.39</td>
<td>0.031</td>
<td>0.669</td>
<td>0.349</td>
<td>2.41</td>
<td>2.23</td>
<td>1.60</td>
</tr>
<tr>
<td>16 in. (400mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-20</td>
<td>0.00-6.10</td>
<td>0.04</td>
<td>0.083</td>
<td>0.065</td>
<td>0.45</td>
<td>0.45</td>
<td>0.30</td>
</tr>
<tr>
<td>20-40</td>
<td>6.10-12.22</td>
<td>0.008</td>
<td>0.174</td>
<td>0.108</td>
<td>0.75</td>
<td>0.75</td>
<td>0.50</td>
</tr>
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<td>40-60</td>
<td>12.22-18.29</td>
<td>0.011</td>
<td>0.253</td>
<td>0.148</td>
<td>1.02</td>
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<td>0.68</td>
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<td>80-80</td>
<td>18.29-24.39</td>
<td>0.014</td>
<td>0.323</td>
<td>0.184</td>
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<td>80-100</td>
<td>24.39-30.49</td>
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<td>0.383</td>
<td>0.222</td>
<td>1.49</td>
<td>1.44</td>
<td>0.99</td>
</tr>
</tbody>
</table>

Notes:
1. Elbows with angles greater than 90 deg must not be used.
2. Data in Table 2 is based on the following facts and assumptions:
   a. Initial flow conditions at magnet interface
   b. EM energy (13MJ) is dumped to He during quench and rises He temperature to 10 Kelvin
   c. Gas temperature starting at 10 Kelvin and increase with length determined by thermal energy balance
   d. 90% He is assumed to be evacuated within 30 sec. None left after quench.
   e. Absolute roughness is assumed to be 0.25 mm.
   f. R/D = 1.0 for standard sweep elbows, R/D = 1.5 for long sweep elbows where D = outer diameter of pipe; R = radius of bend
3. The total pressure drop of the entire cryogenic vent system must be less than 20 psi (138 kPa). The calculation starts at the magnet vent interface and ends at the termination point outside the building.
**LIGHTING REQUIREMENTS**

- All lighting fixtures and associated components must meet all RF shielded room and RF grounding requirements (e.g., track lighting is not recommended due to possible RF noise).
- All lighting must use direct current (the DC must have less than 5% ripple).
- 300 lux must be provided at the front of the magnet for patient access and above the magnet for servicing.
- Fluorescent lighting must not be used in the magnet room.
- Lighting must be adjusted using a discrete switch or a variable DC lighting controller.
- Scr dimmers or rheostats must not be used.
- DC led lighting may be used if the power source is located outside the magnet room RF.
- Battery chargers (e.g., used for emergency lighting) must be located outside the magnet RF room.
- Short filament length bulbs are recommended.
- Linear lamps are not recommended due to the high burnout rate.

**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 NOTES**

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.
   1.1. Aluminum or solid wires are not allowed.
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.
### CABLE TRAYS REQUIREMENTS IN MAGNET ROOM

1. Ceiling
2. Finished Floor
3. Magnet isocenter. Gradient cables must be centered on magnet isocenter.
4. Minimum cable tray height required at back of Magnet: 2581 mm [101.5 in].
   Tray height may be lower at other points to avoid obstructions.
5. Maximum height from floor to top of tray (anywhere in Magnet room): 3251 mm [128 in].
6. Minimum distance from top of cable tray to ceiling or other obstruction: 254 mm [10 in].
7. Tray end to isocenter: 1245 ±12 mm [49 ±0.5 in].
8. Other cable termination to isocenter: 864 ±12 mm [34 ±0.5 in].
9. Minimum distance between trays: 12 mm [0.5 in].
10. Non-ferrous cable support
11. Distance from isocenter to edge of right cable tray 60mm [2.36 in].

### CABLE TRAY REQUIREMENTS (SIDE-BY-SIDE)

- **330 [13 in]** Min bend radius
- **305 [12 in]**
- **150 [6 in]**
- **450 [18 in]**

### CABLE WAYS IN EQUIPMENT ROOM

- **Cable Ladder**
- **Cable Tray**
- **Cable Trays detail side-by-side:** (2x450mm [18in])

### CABLE WAY TO PENETRATION PANEL

### CABLE WAY TO PENETRATION PANEL REQUIREMENTS IN THE EXAM ROOM SIDE VIEW

- **330 [13 in]** Min bend radius
- **200 [8 in]**
- **330 [13 in]**
- **305 [12 in]**
- **150 [6 in]**
- **300 [12 in]**
- **305 [12 in]**
- **150 [6 in]**
- **330 [13 in]**
- **200 [8 in]**
- **200 [8 in]**
- **330 [13 in]**
- **330 [13 in]**

The end of the cable way must be contained in the pen closet (cables must not rest directly on the wall opening).
POWER REQUIREMENTS

SPECIFICATIONS OF MAIN POWER INPUT

<table>
<thead>
<tr>
<th>POWER SUPPLY</th>
<th>380/400/415/480V ±10%, THREE-PHASE + N + G</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREQUENCIES</td>
<td>50/60Hz ± 3Hz</td>
</tr>
<tr>
<td>POWER FACTOR</td>
<td>0.9</td>
</tr>
<tr>
<td>MAXIMUM INPUT POWER (5 sec MAX)</td>
<td>123kVA</td>
</tr>
<tr>
<td>INSTALLED LOAD</td>
<td>99kVA</td>
</tr>
<tr>
<td>STAND-BY POWER</td>
<td>&lt;17kVA</td>
</tr>
</tbody>
</table>

- Power input must be separated from any others which may generate transients (elevators, air conditioning, radiology rooms equipped with high speed film changers...).
- Total harmonic distortion less than 2.5%.
- Phase imbalance must not exceed 2%.

SPECIFICATIONS OF BACK-UP POWER SUPPLY

FOR MAGNET MONITOR

<table>
<thead>
<tr>
<th>POWER INPUT</th>
<th>EMERGENCY POWER SUPPLY, SINGLE PHASE + GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER DEMAND</td>
<td>2kVA</td>
</tr>
<tr>
<td>VOLTAGE</td>
<td>110V / 220V</td>
</tr>
<tr>
<td>FREQUENCY</td>
<td>50/60Hz ± 3Hz</td>
</tr>
</tbody>
</table>

FOR CRYOCOOLER COMPRESSOR

<table>
<thead>
<tr>
<th>POWER INPUT</th>
<th>380/400/415/480V, THREE-PHASE + G</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER REQUIREMENT</td>
<td>MIN 9kVA</td>
</tr>
<tr>
<td>POWER CONSUMPTION</td>
<td>MAX 7.2kW / STEADY STATE 6.5kW at 50Hz</td>
</tr>
<tr>
<td>Max 8.3kW / STEADY STATE 7.5kW at 60Hz</td>
<td></td>
</tr>
<tr>
<td>FREQUENCY</td>
<td>50/60Hz ± 3Hz</td>
</tr>
</tbody>
</table>

CABLES

- Power and cable installation must comply with the distribution diagram.
- Size of the Main power input cable is determined by the customer, taking its length and admissible voltage drops into consideration.
- All cables must be isolated and flexible, cable color codes must comply with standards for electrical installation.
- The cables from signaling and remote control (Y, Emergency Off Buttons, L...) will go to Main Panel with a pigtail length of 1.5m (60in), and will be connected during installation.
- Each conductor will be identified and isolated (screw connector).

GROUND SYSTEM

- The equipotential link must be connected to the earth's bar. The impedance of the earth bar must be less than or equal to 2 ohms.
- The grounding conductor will run from the equipment back to the power source/main grounding point and always travel in the same conduit with the feeders.

GROUNDING CONDUCTOR WILL RUN FROM THE EQUIPMENT BACK TO THE POWER SOURCE/MAIN GROUNDING POINT AND ALWAYS TRAVEL IN THE SAME CONDUIT WITH THE FEEDERS.

POWER DISTRIBUTION

480V (277V) BUILDING POWER

- 300 A (E02) MDP MINIMUM 3 PHASE, kW = 0.65 PER PHASE
- MAIN LIMIT: (2) 600-AMP KER new, PER PHASE

POWER INPUT TO THE MDP

- BIPOLAR RELAY
- FUSES 200 A
- AUTO RESTART CIRCUIT
- BATTERY BACKUP
- DC SAFETY CIRCUIT
- UV TRIP

POWER DISTRIBUTION UNIT (PDU)

- 300 AMP MINIMUM 3 PHASE, 4W + G

FOR CRITICAL APPLICATIONS

- 400FT (122M) CABLE SUPPLIED BY GE
- GE DIGITAL

GENERAL NOTES

- The HEAT EXCHANGER CABINET (HEC) PROVIDES POWER TO THE CRYOCOOLER COMPRESSOR (CRY) WHICH MUST OPERATE 24 HOURS PER DAY, 7 DAYS PER WEEK TO MAXIMIZE PROPER UNINTERRUPTED MAGNET OPERATION.
- USE E3030, M0009, M3030 AND E4002 ARE GE SUPPLIED CABLES. ALL OTHER WIRING IS CUSTOMER SUPPLIED.
- TWO REMOTE FLUSH WALL MOUNTED EMERGENCY OFF BUTTONS ARE SUPPLIED WITH THE MDP.
- MDP PROVIDES CIRCUIT BREAKERS FOR POI (LOCATED IN THE POWER CABINET (PGR)) AND THE HEAT EXCHANGER CABINET (HEC).
- ALL MDP OUTPUT CIRCUITS DROP ON LOSS OF POWER. THE HEC CIRCUIT WILL AUTOMATICALLY RESTART UPON RESTORATION OF POWER.
- EMERGENCY OFF LOCKS OUT ALL CONTRACTORS.
- GE MDP SHORT CIRCUIT CURRENT RATING IS 25,000 AMPERES AT 480 VAC.
- GE MDP IS UL AND CUL LABELED.
- ALL CIRCUITS REQUIRE GROUND WIRES.
- THE WIRE SIZE FOR THE EMERGENCY-OFF CIRCUIT IS 12-22 AWG CUSTOMER SUPPLIED.

FEEDER TABLE

<table>
<thead>
<tr>
<th>MIN. FEEDER WIRE SIZE</th>
<th>MINIMUM FEEDER WIRE LENGTH - ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG OR MCM (sq. M)</td>
<td></td>
</tr>
<tr>
<td>100 (30.5)</td>
<td>3/0 (85)</td>
</tr>
<tr>
<td>150 (46)</td>
<td>3/0 (85)</td>
</tr>
<tr>
<td>200 (61)</td>
<td>3/0 (85)</td>
</tr>
<tr>
<td>250 (76)</td>
<td>3/0 (85)</td>
</tr>
<tr>
<td>300 (85)</td>
<td>3/0 (85)</td>
</tr>
<tr>
<td>350 (107)</td>
<td>3/0 (85)</td>
</tr>
<tr>
<td>400 (122)</td>
<td>3/0 (85)</td>
</tr>
<tr>
<td>450 (137)</td>
<td>3/0 (85)</td>
</tr>
</tbody>
</table>

GROUND RULES

- 4/0 (55) MINIMUM 2 PHASE, kW = 0.65 PER PHASE
- MAX 8.3kW / STEADY STATE 7.5kW at 60Hz
- MAX 7.2kW / STEADY STATE 6.5kW at 50Hz
- MIN 9kVA

GENERAL NOTES

- In all cases qualified personnel must verify that the feeder (at the point of take-off) and the run to the MR system meet all the requirements stated in the PAM.
- For a single unit installation, the minimum transformer size is 225kVA. A regulated transformer is not required unless voltage changes exceed +/- 10% over a period of 1 hour or longer.
- Grounding conductor will run from the equipment back to the power source/main grounding point and always travel in the same conduit with the feeders.

RF COMMON GROUND STUD

DO NOT GROUND RF ROOM TO TERMINAL STUDS OTHER THAN THE PDU