REV	DATE	MODIFICATIONS
A	10/Jul/2018	First issue drawing / Final study based on MRI-

Typical

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01 - C1 - Cover Sheet
02 - C2 - Disclaimer - Site Readiness
03 - A1 - General Notes
04 - A2 - Equipment Layout
05 - A3 - Section Views
06 - A4 - Acoustic - Proximity Limits
07 - A5 - RF shielding
08 - A6 - Equipment Details (1)
09 - A7 - Equipment Details (2)
10 - A8 - Equipment Details (3)
11 - A9 - Delivery
12 - S1 - Structural Notes
13 - S2 - Structural Layout
14 - S3 - Structural Details
15 - M1 - Mechanical Layout
16 - M2 - HVAC-Venting
17 - M3 - Chilled Water
18 - M4 - Cryogenics (1)
19 - M5 - Cryogenics (2)
20 - E1 - Electrical Notes
21 - E2 - Electrical Layout
22 - E3 - Electrical Elevations
23 - E4 - Electrical Details
24 - E5 - Power Requirements
25 - E6 - Interconnections

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: *https://www.gehealthcare.com/support/manuals*

GE HealthCare

SIGNA EXPLORER/CREATOR
FINAL STUDY

Drawn by	Verified by	Concession	GON/Quote	PIM Manual	Rev
PMM	PMM	-	----	5538857-1EN	15

Format	Scale	File Name	Date	Sheet
A3	1/4"=1'-0"	DN-MRI-TYP-SIGNA-EXPLORER-SIGNA-CREATOR-NF.DWG	11/Mar/2025	01/24

DISCLAIMER

GENERAL SPECIFICATIONS

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

CUSTOMER RESPONSIBILITIES

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

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

CUSTOMER SITE READINESS REQUIREMENTS

REQUIRED MANUALS FOR SYSTEM PRE-INSTALLATION	
Description	**Document Number***
Product specific Pre-installation Manual	Refer to cover page
Magnet Room Venting	5850263
RF Shielded Room Pre-installation Requirements for MR systems	5850260
IEC Electromagnetic Compatibility	5850261
Acoustic Room Details	5850262
Magnet Venting Conformance Assessment Form	2705036
*documents can be accessed in multiple languages at *https://www.gehealthcare.com/support/manuals*	

- 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.
- The items on the GE HealthCare Site Readiness Checklist **DOC2949060** and Worksheet **DOC2949068** are REQUIRED to facilitate equipment delivery to the site. Equipment will not be delivered if these requirements are not satisfied.
  - 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. Restrooms.
  - Provide for refuse removal and disposal (e.g. crates, cartons, packing)
  - It is required to minimize vibrations within the scan room. 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 Pre-installation manual for vibration specifications.

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.
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 13in [.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. Remove, cover, or fill-in abandoned ducts or troughs from the Equipment and Magnet rooms. Access/computer room flooring in the Equipment room can either be removed or assessed and reinforced to support heavier cabinets.

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.

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:

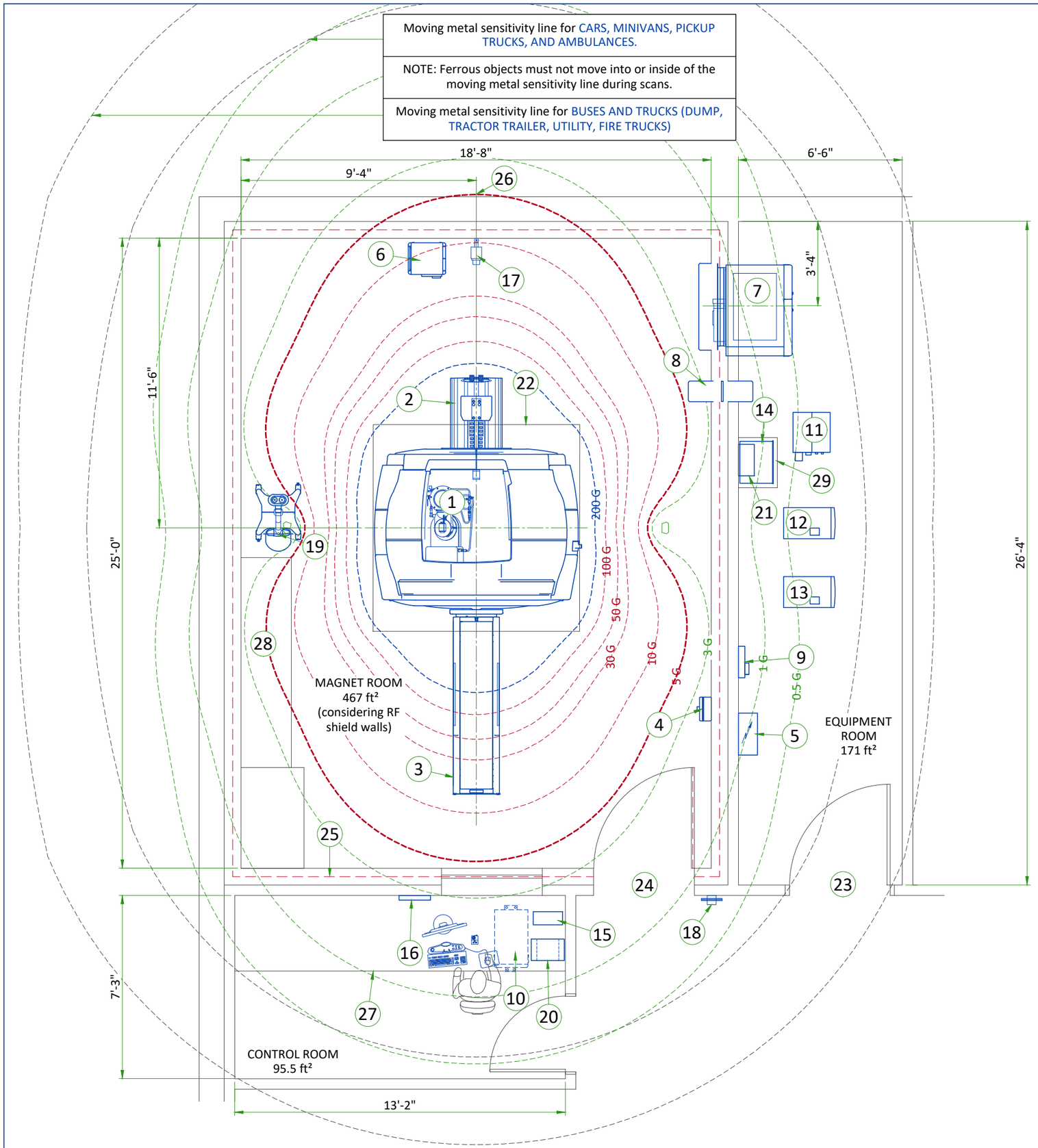
- Loose hardware/fasteners vibration or movement (electrical continuity must always be maintained)
- Flooring material including raised access flooring (panels & support hardware) and carpeting
- Electrical fixtures (i.e. Lighting fixtures, track lighting, emergency lighting, battery chargers, outlets)
- 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.

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 < 40mG RMS AC at the magnet location. EMI 4.43mGp-p DC, refer to Preinstallation Manual for additional information.
- Potential exists under fault conditions that the 5 gauss line may expand radially to 19.68 ft. [6.0 m] and axially to 24.61 ft. [7.5 m] for 2 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.

TYPCIAL MOVING MAGNETIC MASS	DISTANCE RADIALLY		DISTANCE AXIALLY	
Carts, Gurneys 100-400 lbs [45-182 kg]	3 Gauss line		3 Gauss line	
Forklifts, small elevator, cars, minivans vans, pickup trucks, ambulances (objects greater than 400 lbs [182 kg])	15.5 FT	4.72 M	21.0 FT	6.4 M
Buses and trucks (dump, tractor trailer, utility, fire trucks)	18.1 FT	5.52 M	24.5 FT	7.47 M



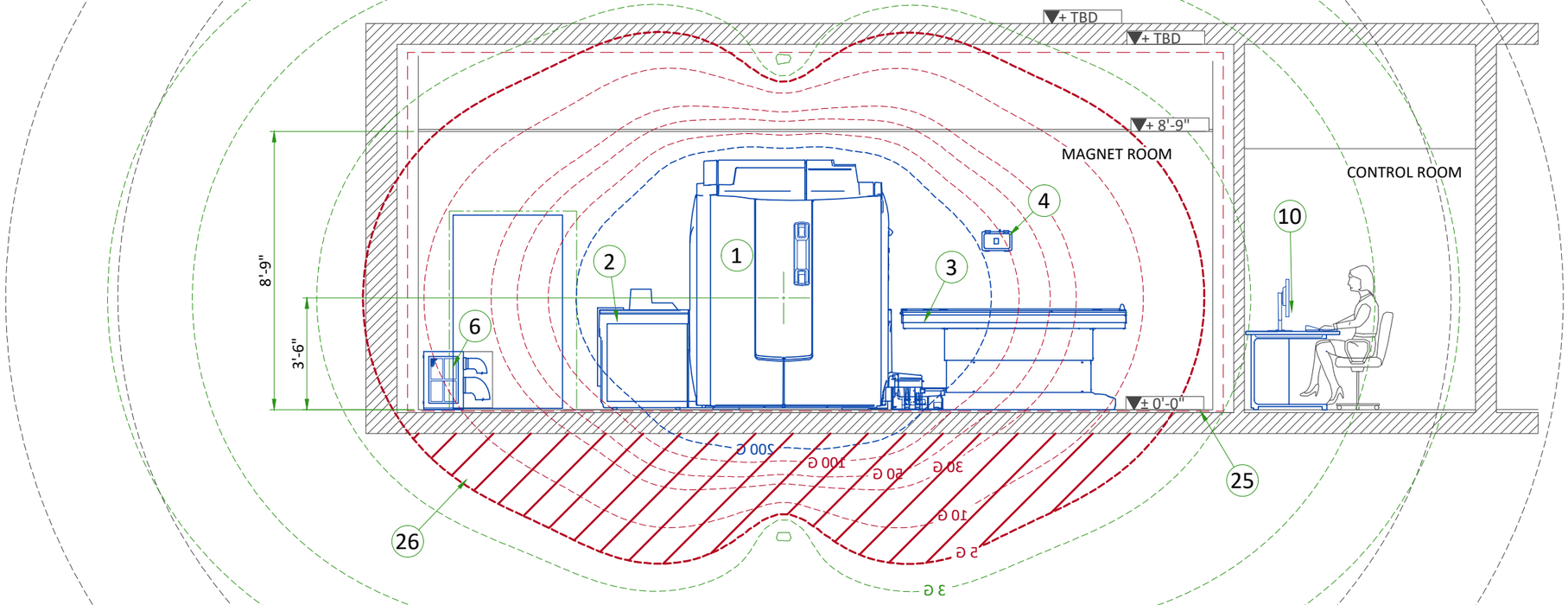
LEGEND			
A	GE SUPPLIED	D	AVAILABLE FROM GE
B	GE SUPPLIED/CONTRACTOR INSTALLED	E	EQUIPMENT EXISTING IN ROOM
C	CUSTOMER/CONTRACTOR SUPPLIED AND INSTALLED	*	ITEM TO BE REINSTALLED FROM ANOTHER SITE
	200 GAUSS		5 GAUSS
	100, 50, 30, 10 GAUSS		3, 1, 0.5 GAUSS

BY	ITEM	DESCRIPTION	MAX HEAT OUTPUT (BTU/h)	WEIGHT (lbs)	MAX HEAT OUTPUT (W)	WEIGHT (kg)
A	1	MAGNET (MAG)	8189	11731	2400	5320
A	2	REAR PEDESTAL (PED)	-	291	-	132
A	3	FIXED PATIENT TABLE (PT)	-	300	-	136
A	4	MAGNET RUNDOWN UNIT (MRU)	-	7	-	3.2
B	5	MAIN DISCONNECT PANEL (MDP)	901	135	264	61
A	6	BLOWER BOX (MG6)	3412	46	1000	21
A	7	SYSTEM CABINET (SC)	17060	2108	5000	956
A	8	PENETRATION PANEL (PP)	-	-	-	-
A	9	MAGNET MONITOR (MON)	205	10	60	4.5
A	10	OPERATOR CONSOLE (GOC)	4947	121	1450	55
A	11	CRYOCOOLER COMPRESSOR (CRY)	1706	276	500	125
A	12	WATER CHILLER FOR SYSTEM CABINET 8kW (LCS8)	5698	107	1670	48.5
A	13	WATER CHILLER FOR BRM GRADIENT COIL 4kW (LCS4)	13989	86	4100	39
A	14	MAGNETIC RESONANCE ELASTOGRAPHY (MRE)	481	53	141	24.22
A	15	700VA UPS	-	26	-	12
A	16	CCTV MONITOR	-	8	-	3.5
A	17	CCTV CAMERA	-	-	-	-
A	18	METAL DETECTOR (HAND HELD)	-	-	-	-
A	19	INJECTOR HEAD ON PEDESTAL	-	95	-	43
A	20	INJECTOR CONTROL	676	18	198	8
A	21	INJECTOR POWER SUPPLY	601	7	176	3
C	22	MAGNET ACCESS 2.5m x 2.5m [98.5in x 98.5in]	-	-	-	-
C	23	MINIMUM OPENING FOR EQUIPMENT DELIVERY IS 1016 mm x 2083 mm [40 in x 82 in], CONTINGENT ON A 1829 mm [72 in] CORRIDOR WIDTH				
C	24	MINIMUM OPENING FOR EQUIPMENT DELIVERY IS 1092 mm x 2083 mm [43 in x 82 in], CONTINGENT ON A 2438 mm [96 in] CORRIDOR WIDTH				
C	25	DEFINE RF SHIELD'S INSET ACCORDING TO PROVISIONS MADE BY THE RF SHIELD VENDOR				
C	26	WARNING! 5 GAUSS LINE OUTSIDE THE MAGNET ROOM LIMITS				
C	27	COUNTER TOP FOR EQUIPMENT- PROVIDE GROMMETED OPENINGS AS REQUIRED TO ROUTE CABLES				
C	28	BASE CABINET FOR STORAGE OF: SURFACE COILS, PATIENT POSITIONING PADS, PHANTOMS, ETC.				
C	29	SHELF				

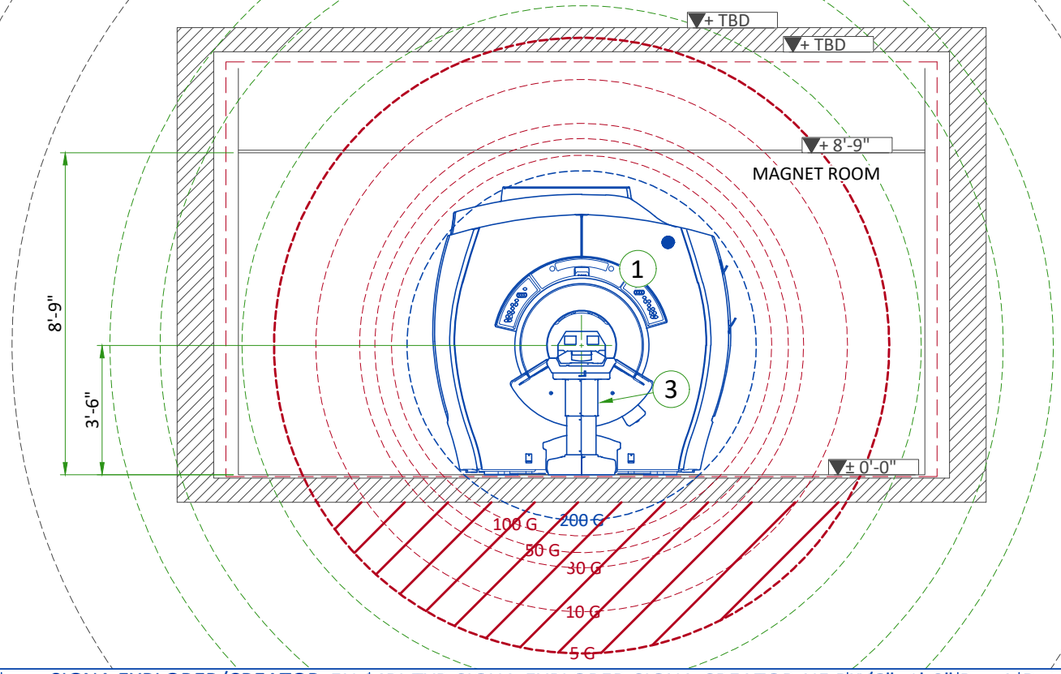
	RF SHIELD - 100 dB ATTENUATION

EXAM ROOM HEIGHT	
FINISHED FLOOR TO SLAB HEIGHT	TBD
FALSE CEILING HEIGHT	8'-9"

SIDE VIEW WITH MAGNETIC FIELD



FRONT VIEW WITH MAGNETIC FIELD



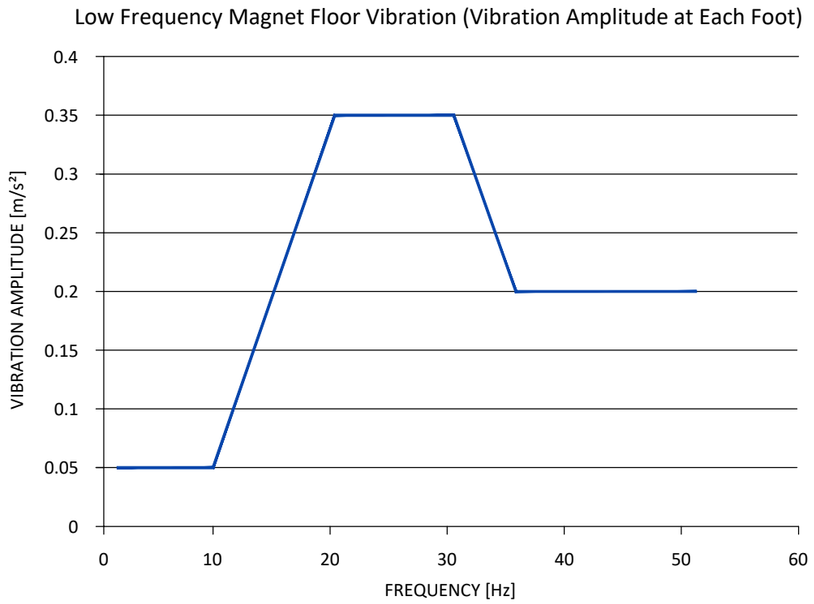
ACOUSTICS SPECIFICATIONS

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: 62dBA
Equipment Room: 80dBA
Magnet Room: 122dBA*
(maximum sound pressure level at magnet bore isocenter)

* Frequency: 20 Hz to 20kHz

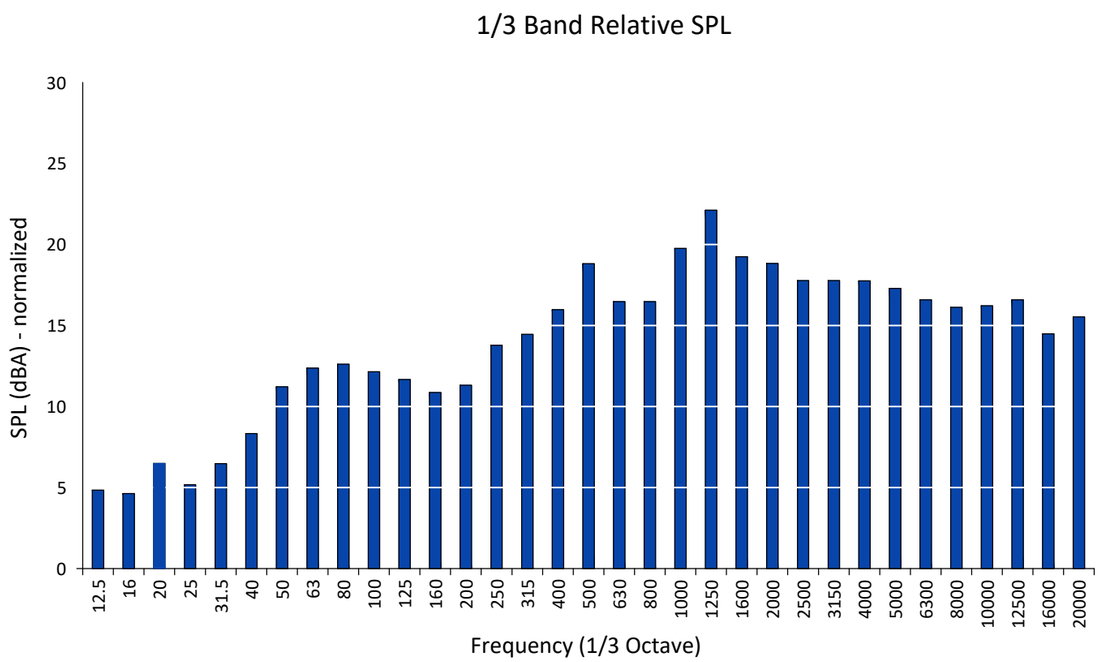
FREQUENCY (Hz)	AMPLITUDE (m/s^2)
2	0.05
10	0.05
20	0.35
30	0.35
35	0.2
50	0.2



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.

SOUND PRESSURE SPECTRAL DISTRIBUTION



MAGNETIC PROXIMITY LIMITS

Gauss (mT) Limit	Equipment
0.5 gauss (0.05mT)	Nuclear camera
1 gauss (0.1mT)	Positron Emission Tomography scanner, Linear Accelerator, Cyclotrons, Accurate measuring scale, Analog image intensifiers, Bone Densitometers, Video display (tube), CT scanner, Ultrasound, Lithotriptor, Electron microscope
3 gauss (0.3mT)	Power transformers, Main electrical distribution transformers
5 gauss (0.5mT)	Cardiac pacemakers, Neurostimulators, Biostimulation devices
10 gauss (1mT)	Magnetic computer media, Line printers, VCRs, Film processor, X-ray tubes, Emergency generators, Commercial laundry equipment, Food preparation area, Water cooling equipment, HVAC equipment, Major mechanical equipment room, Credit cards, watches, and clocks, Air conditioning equipment, Fuel storage tanks, Motors greater than 5 horsepower
50 gauss (5mT)	Metal detector for screening, LCD panels, Telephones
No Limit	Digital Detectors

The customer must provide detail defining ferrous material below the magnet to the Project Manager so the GE Healthcare MR Siting and Shielding team can review for compliance.

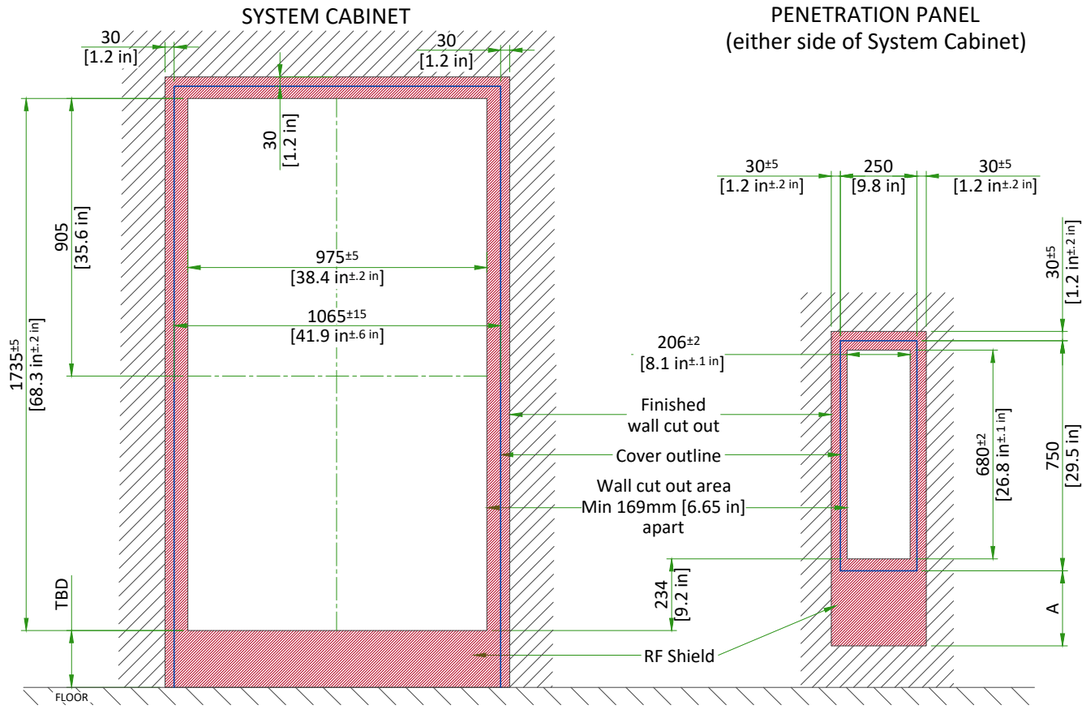
STEEL MASS LIMITS TO MAGNET ISOCENTER (3x3 m [10x10 ft] AREA UNDER MAGNET)

Limits Of Steel Mass		Distance Below Top Surface Of Floor	
kg/m^2	lbs/ft^2	mm	in
0	0	0 - 76	0-3
9.8	2	76 - 127	3-5
14.7	3	127 - 254	5-10
39.2	8	254 - 330	10-13
98.0	20	330+	13+

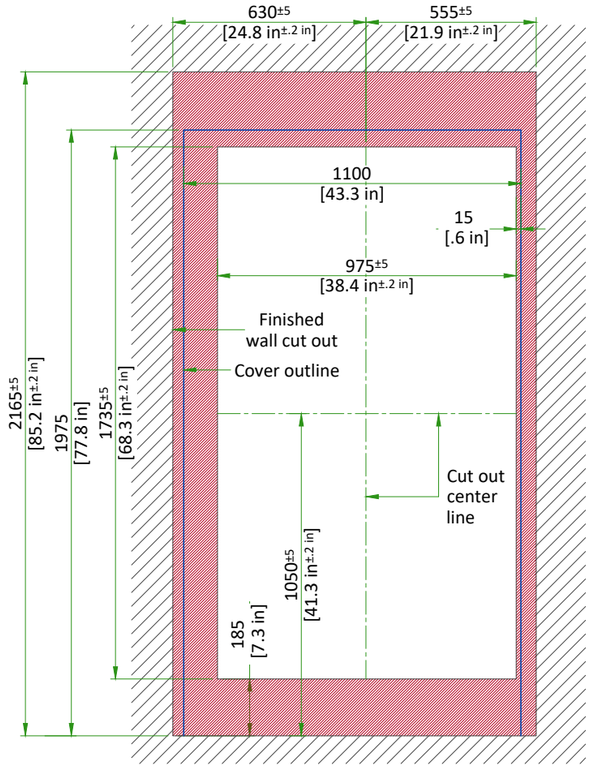
The actual field strength can be affected by Magnetic shielding, Earth's magnetic field, other magnetic fields and stationary or moving metal. This information must be used to evaluate potential site interaction of GE Healthcare equipment with other non-GE Healthcare equipment. Magnetic shielding can 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.

WALL OPENINGS

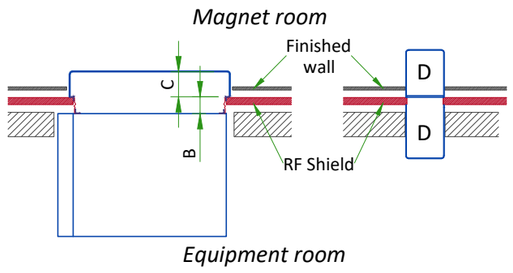
VIEW FROM MAGNET ROOM SIDE



SYSTEM CABINET VIEW FROM EQUIPMENT ROOM SIDE

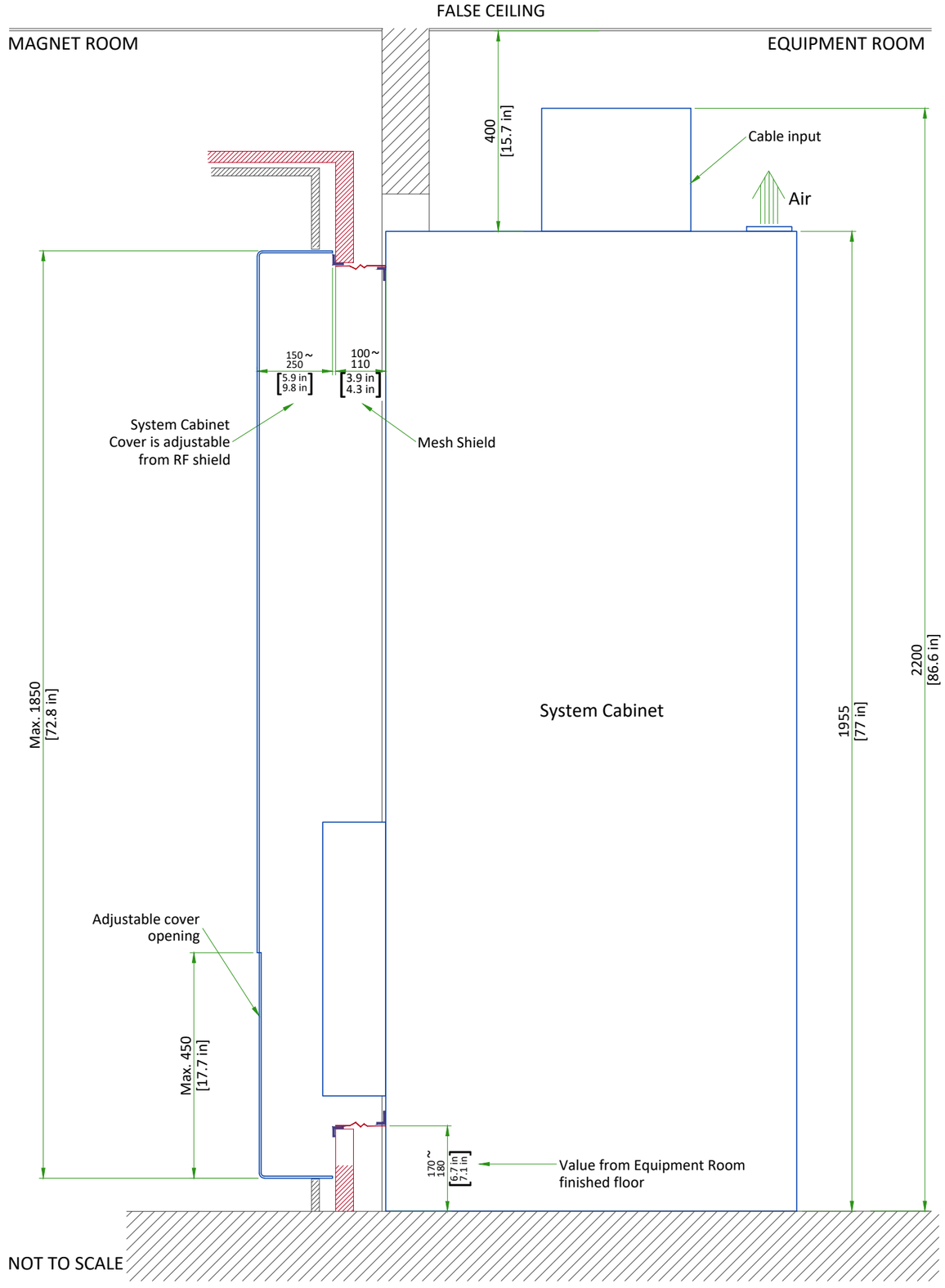


SYSTEM CABINET AND PENETRATION PANEL TOP VIEW

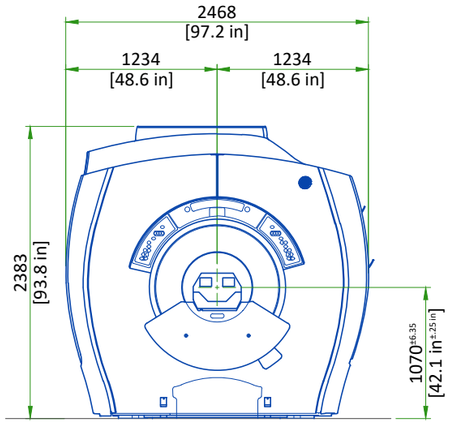


A. Value decided according to the site layout
B. Mesh Shield is adjustable between 100-110mm [4-4.3 in]
C. System Cabinet cover is adjustable between 150-250mm [5.9-9.8 in]
D. PP cover is adjustable between 300-400mm [11.8-15.7 in]

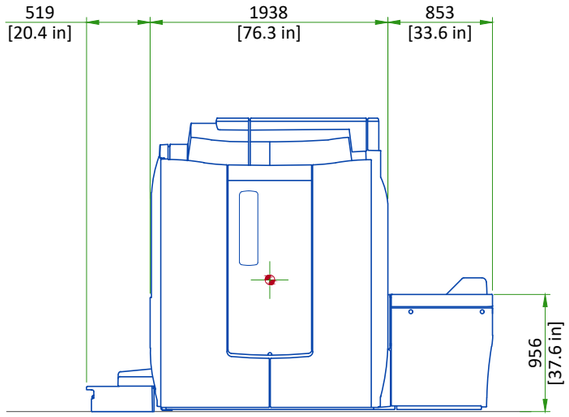
RF CAGE OPENING SIDE VIEW



MAGNET ENCLOSURE



FRONT VIEW



SIDE VIEW

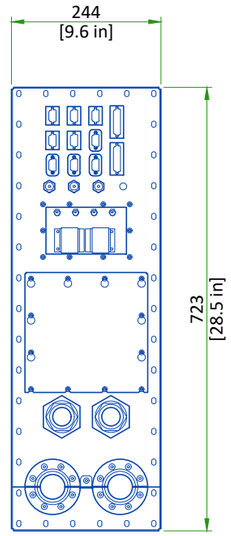
Notes:

1) Finished floor to magnet center line height must be within 1070mm ± 6.35mm [42 1/8in ± 1/4in] to allow patient table to properly dock to the enclosure.
2) 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.
3) Enclosure dimensions are for reference only, NOT FOR SITE PLANNING USE.

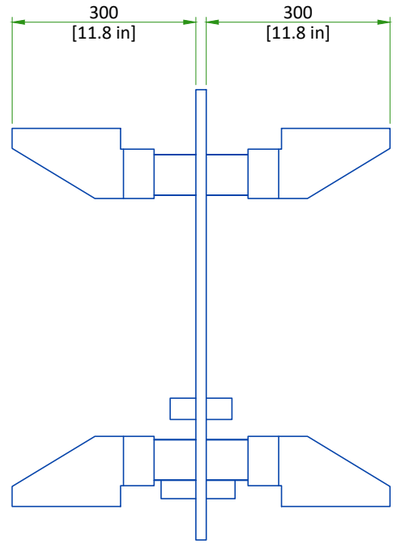
Center of gravity

PENETRATION PANEL

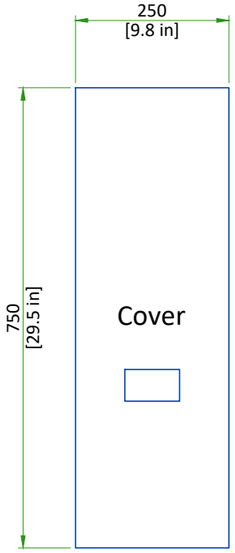
FRONT VIEW



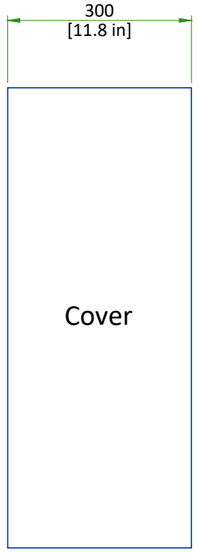
SIDE VIEW



FRONT VIEW



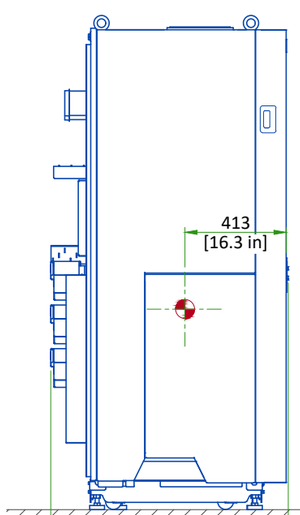
SIDE VIEW



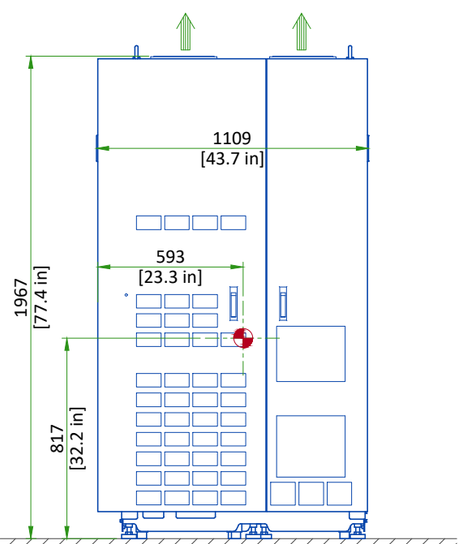
SCALE 1:10

SYSTEM CABINET

SIDE VIEW



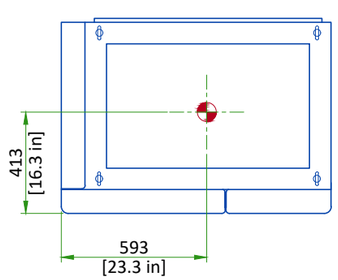
FRONT VIEW



Center of gravity

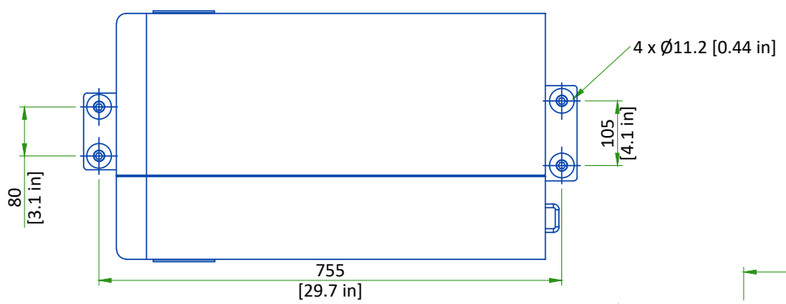
Air flow

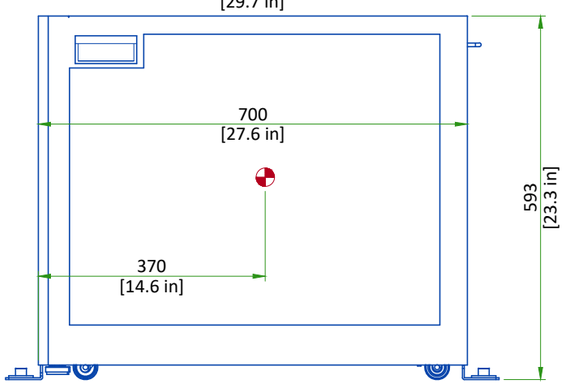
TOP VIEW



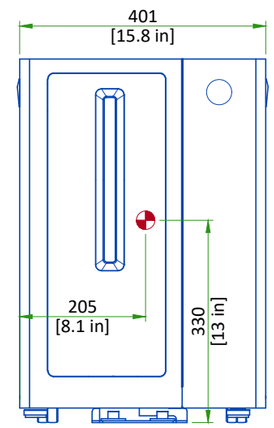
GLOBAL OPERATOR CABINET (GOC)

TOP VIEW





SIDE VIEW

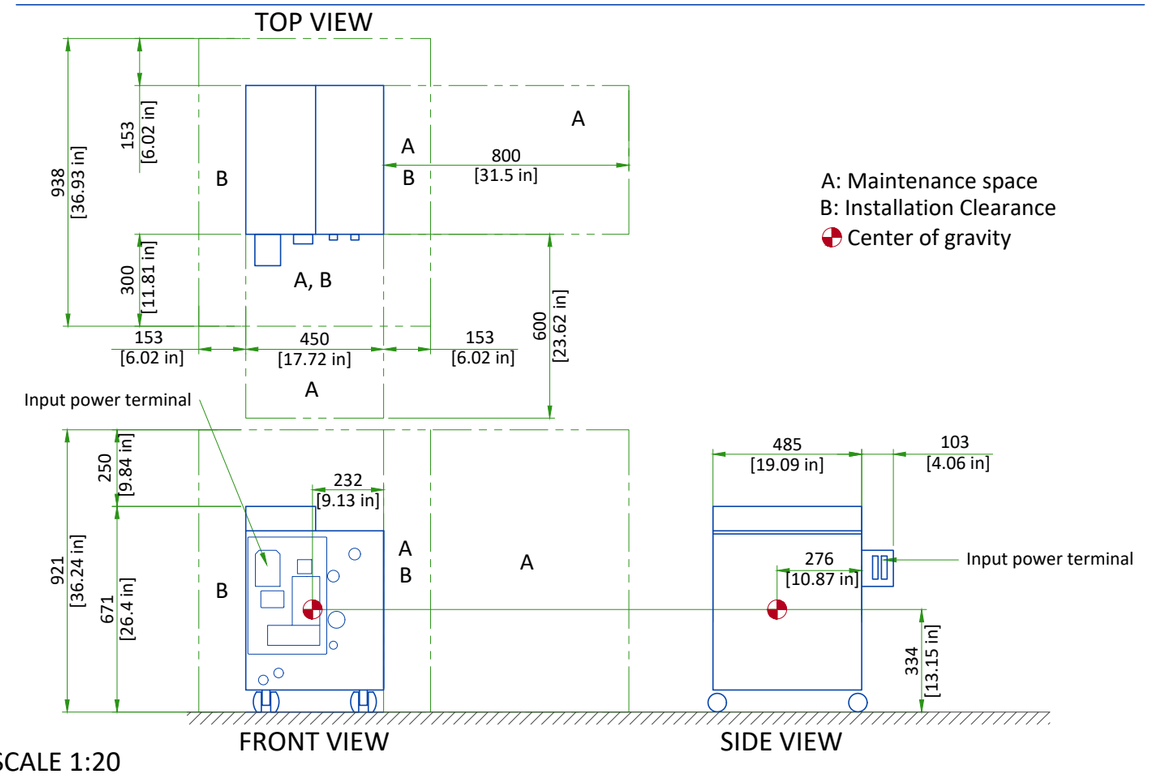


FRONT VIEW

Center of Gravity

SCALE 1:10

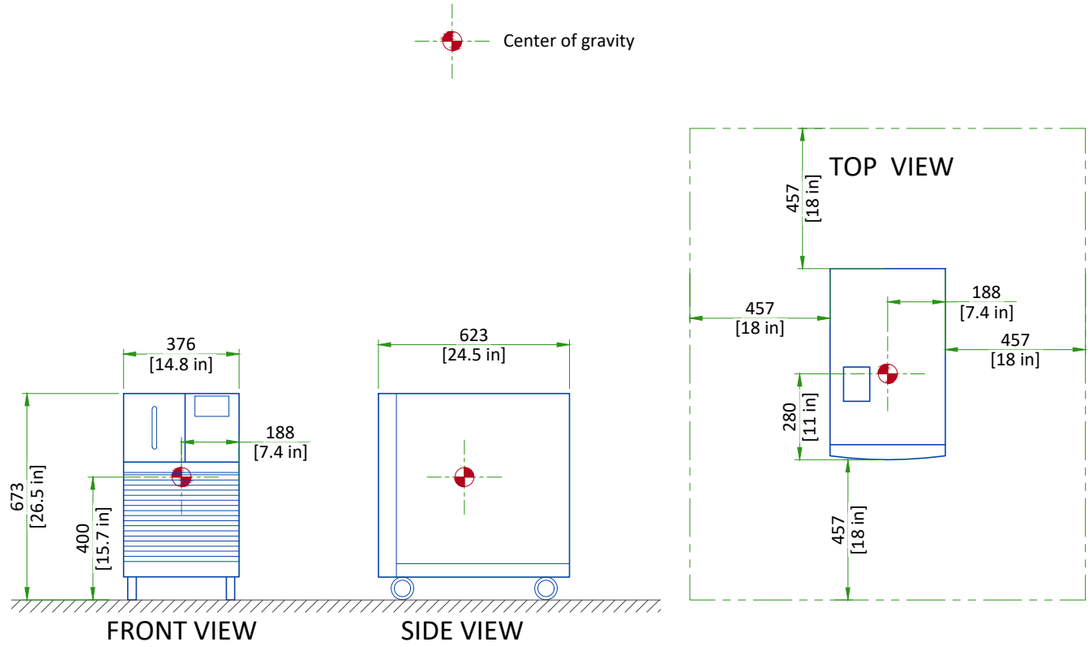
CRYOCOOLER COMPRESSOR (CRY)



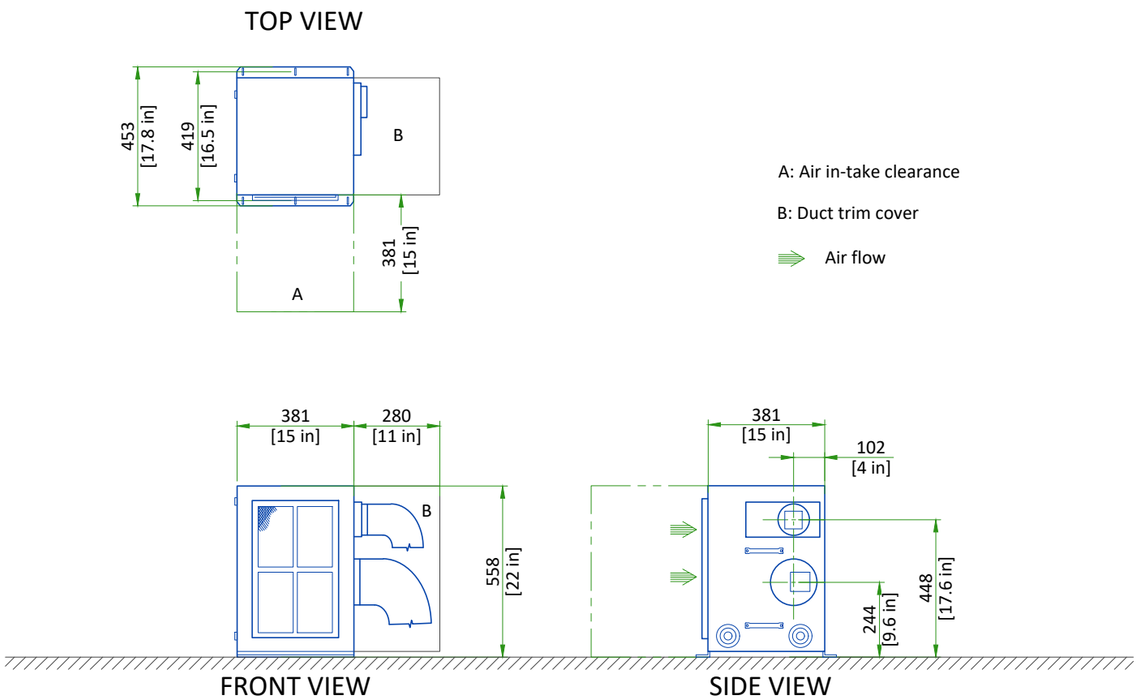
SCALE 1:20

WATER CHILLERS

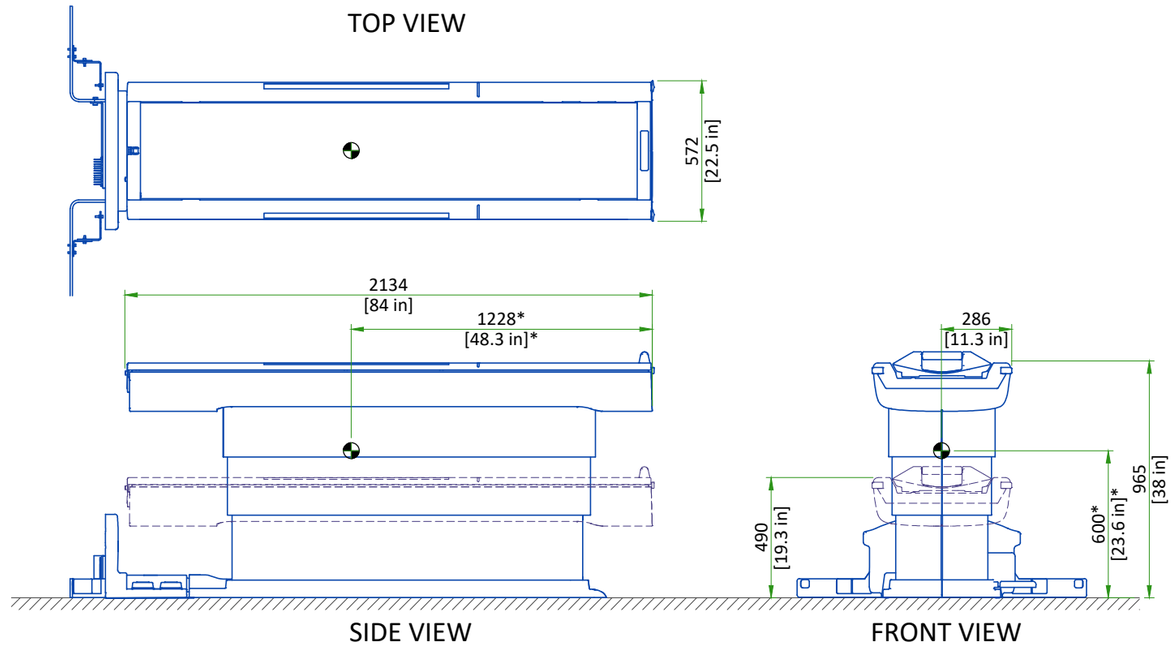
LCS4 and LCS8



BLOWER BOX



LOW HEIGHT FIXED PATIENT TABLE



*Patient is not on the table. Table is at the highest position. Refer to Preinstallation Manual for more information.

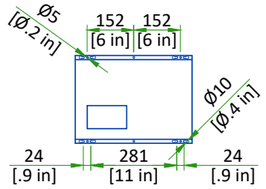
Center of gravity

SCALE 1:25

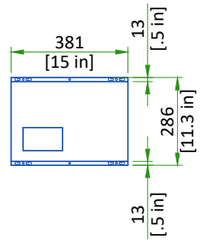
MAGNET MONITOR AND MAGNET RUNDOWN UNIT (MRU)

MAGNET MONITOR

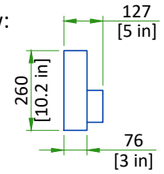
Mounting:



Front view:

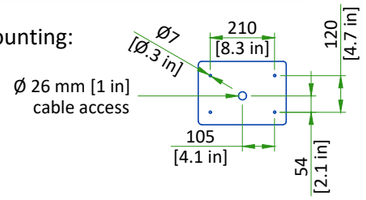


Side view:

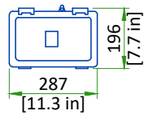


MAGNET RUNDOWN UNIT (MRU)

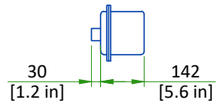
Mounting:



Front view:



Side view:

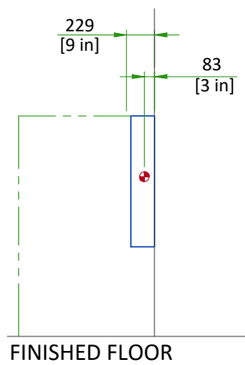


The bottom edge of the MRU must be mounted 1524 ±25 mm [60 ± 1 in] above the magnet room floor.

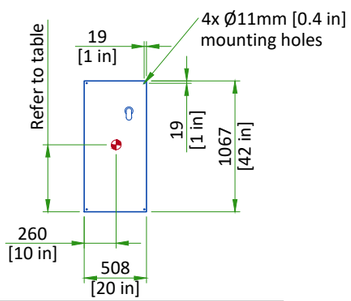
SCALE 1:20

MAIN DISCONNECT PANEL

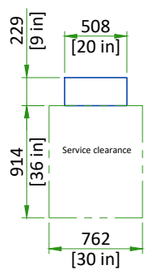
SIDE VIEW



FRONT VIEW



TOP VIEW



Center of gravity

NOT TO SCALE

MDP Center of Gravity

Catalogue	Dimension
M50022MB	552 [21.75 in]
M50022MC	546 [21.5 in]

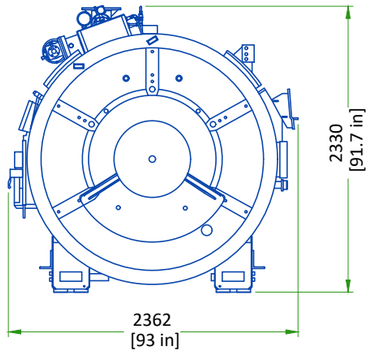
DELIVERY

ROUTING

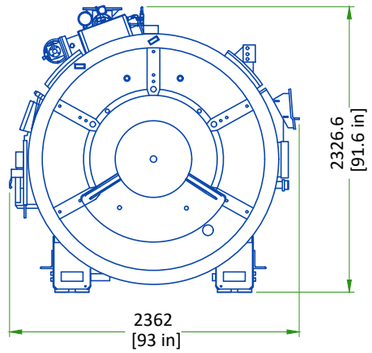
- The customer is solely liable for routing of components from dock to final site.
- GE must be able to move system components in or out with no need to uncrate or disassemble any of the components. The entire passageway must be cleared, adequately lighted and free from dust.
- The floor and it surfacing 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.

SPECIFICATIONS FOR MAGNET ROUTING

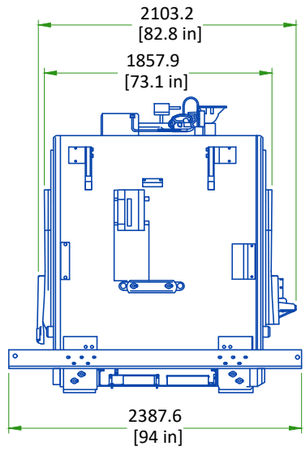
- Floor must be able to withstand a moving load of 5320 kg [11700 lb]
- Recommended opening height: 2.5m [98.5in], width: 2.5m [98.5in]. If recommended dimensions cannot be met refer to pre-installation manual for detailed specifications.
- Maximum slope: 30 degree



FRONT VIEW OF LCC MAGNET

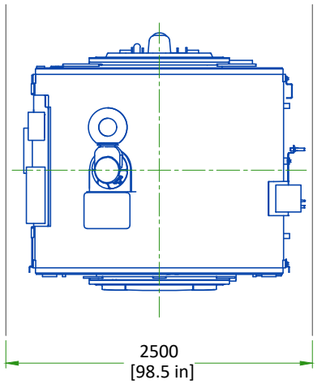


FRONT VIEW OF LCC-W MAGNET

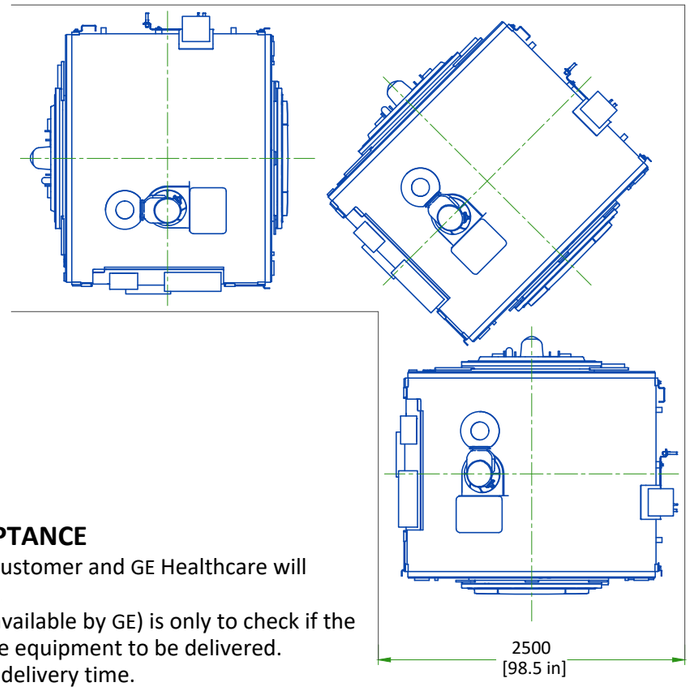


RIGHT SIDE VIEW OF LCC/LCC-W MAGNET

STRAIGHT PATH



PATH WITH 90 DEGREE TURN



INSTALLATION AND DELIVERY ACCEPTANCE

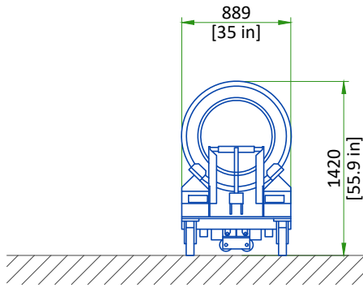
- A survey of the site established by the customer and GE Healthcare will make the decision for the delivery time.
- This survey of the site (a form is made available by GE) is only to check if the apparent conditions of the site allow the equipment to be delivered.
- If the site is not ready, GE can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

CRITICAL ITEMS FOR MAGNET DELIVERY

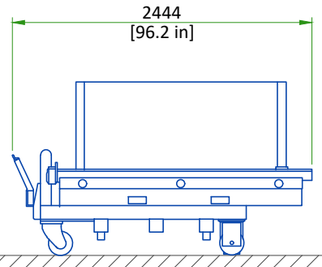
- 24/7 chilled water and three phase power for Cryocooler Compressor. Refer to Power Requirements detail for detailed specifications.
- 24/7 single phase power for the Magnet Monitor. Refer to Power Requirements detail for detailed specifications.
- Ethernet connections for magnet monitoring and phone lines for emergency use. Refer to Connectivity Requirements detail for additional information.
- Operational magnet room exhaust fan. Refer to Magnet Room Venting Requirements detail for detailed specifications.
- The Cryogen Vent system is installed, complete to outside the building and ready for connection to magnet or will be completed by RF cage closure. Connection delay not to exceed 24 Hours.

This is only a partial list of items required for delivery of the magnet. For a complete checklist refer to the Pre-Installation Manual (PIM) referenced on the cover sheet.

DIMENSIONS OF THE MAIN REPLACEMENT PARTS



Front view of the BRM Gradient



Side view of the BRM Gradient

EQUIPMENT	DIMENSIONS LxWxH		WEIGHT		NOTE
	mm	in	kg	lbs	
Replacement BRM gradient coil assembly on a shipping cradle/cart	889x2444x1420	35x96.2x55.9	1491	3287	Initial gradient coil assembly is shipped installed in the magnet. Shipping/installation cart is used to install re-placement coil assembly only.

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.

STRUCTURAL NOTES

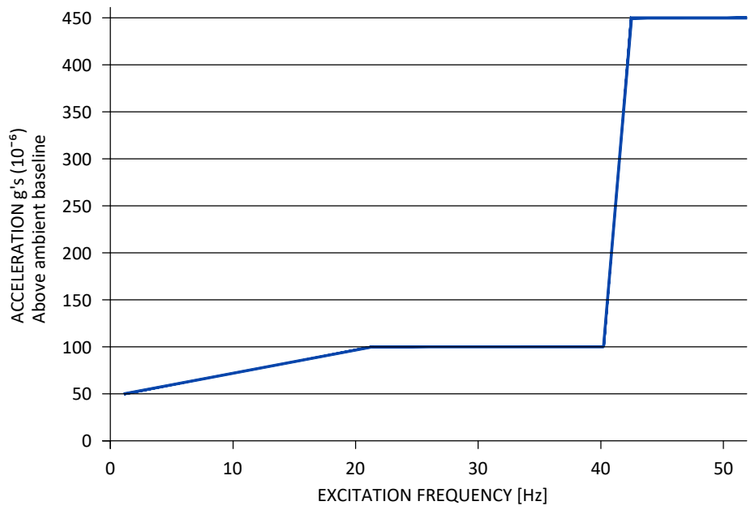
- All units that are wall mounted or wall supported are to be provided with supports where necessary. Wall supports are to be supplied and installed by the customer or his contractors.
- Dimensions are to finished surfaces of room.
- Certain MR procedures require an extremely stable environment to achieve 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 mr 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.
- Customer's contractor must provide all penetrations in post tension floors.
- Customer's 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.
- Customer's 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.
- Customer's 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"

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.

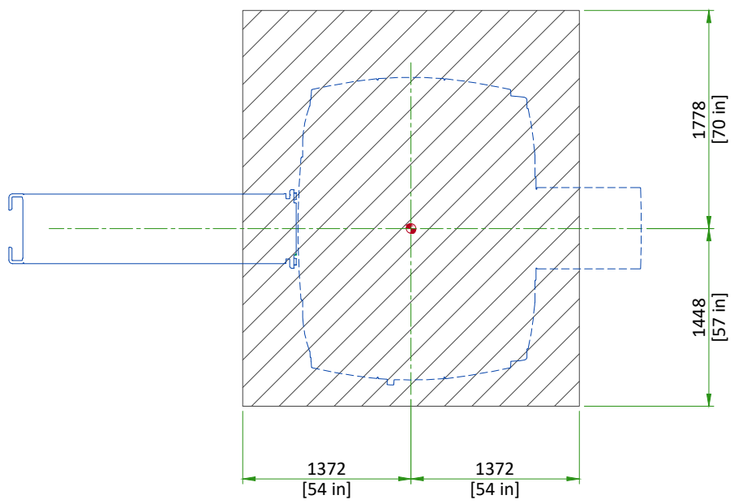
Transient vibration levels above the specified limits in the MR Site Vibration Test Guidelines must be analyzed. Any transient vibration that causes vibration to exceed the steady-state level must be mitigated.

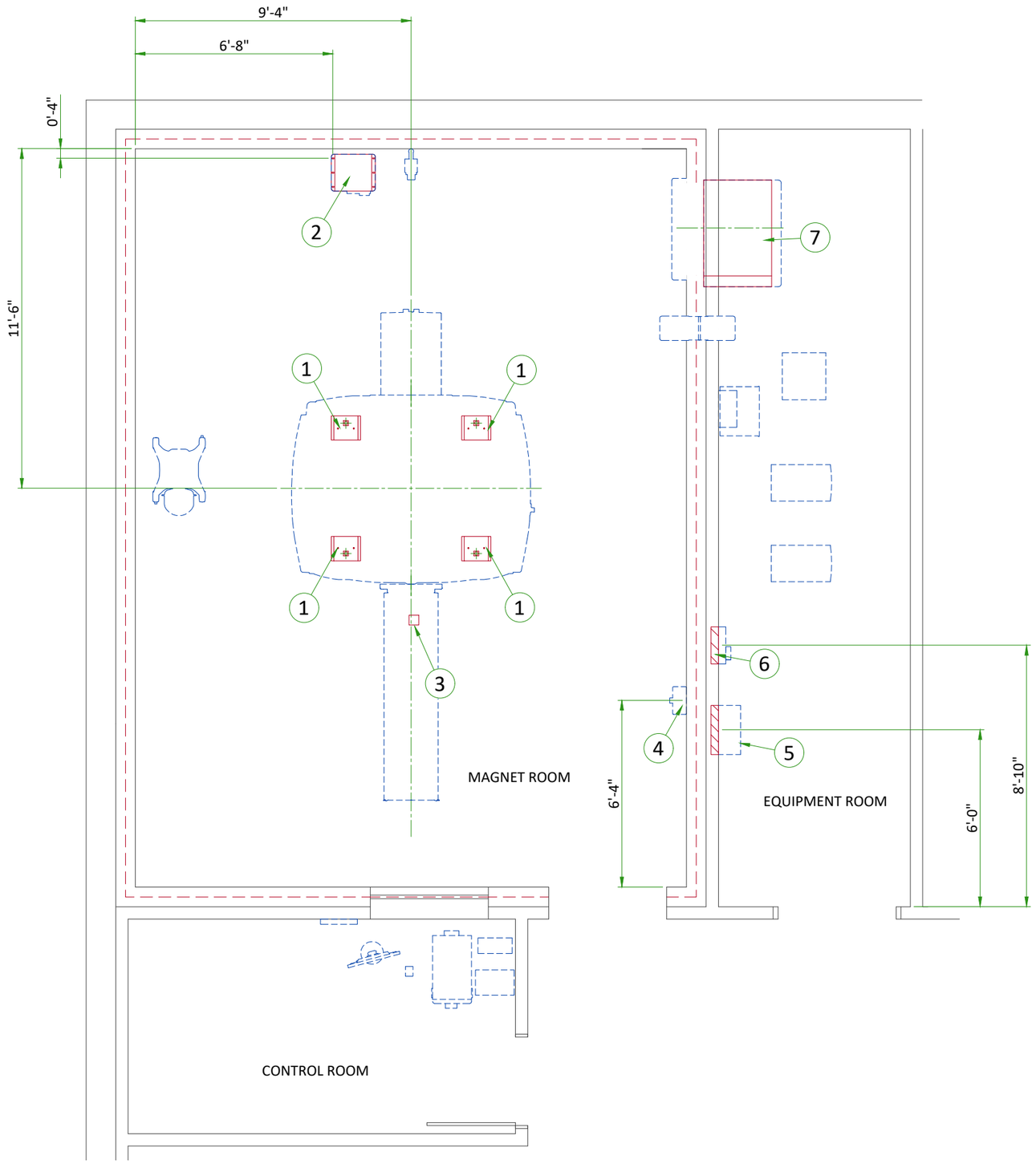
MAGNET STEADY-STATE VIBRATION SPECIFICATIONS



MINIMUM MAGNET CEILING HEIGHT (TOP VIEW)

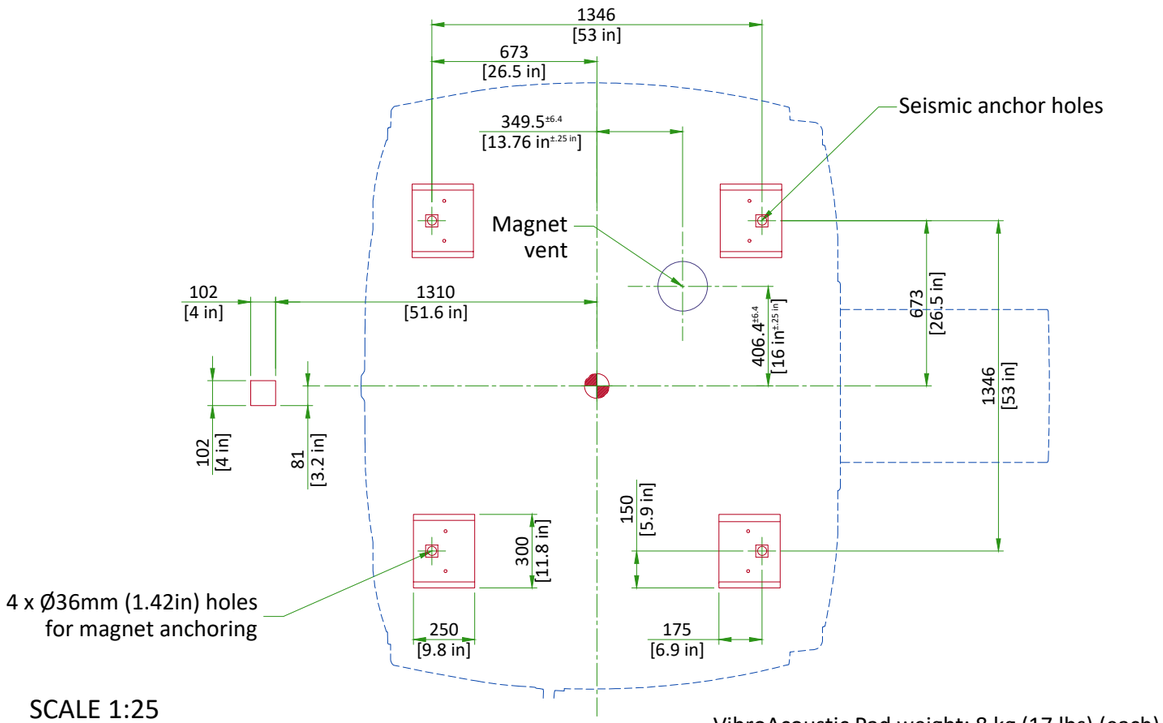
If the ceiling height is between 2500 mm (98.5 in) and 2667 mm (105 in), the flexible main lead extension for low ceiling height (2.5M Low Ceiling Kit-Passive, M7000GM) is required for ramping the magnet. Contact the GEHC PMI and GEHC Service Field Engineer for further evaluation.





ITEM	DESCRIPTION
	(GE SUPPLIED / CONTRACTOR INSTALLED)
1	Vibroacoustic dampening kit (see floor structural detail)
	(CONTRACTOR SUPPLIED & INSTALLED)
2	Floor Mounting area for Blower Box
3	Patient table dock rebar free area
4	Structural wall backing for Magnet Rundown Unit
5	Structural wall backing for Main Disconnect Panel
6	Structural wall backing for Magnet Monitor
7	Floor levelness area for Systems Cabinet

MAGNET ON VIBROACOUSTIC DAMPENING KIT

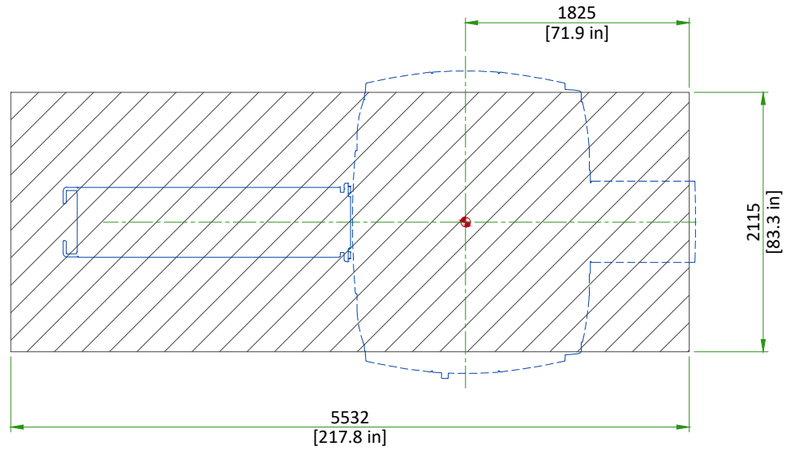


SCALE 1:25

VibroAcoustic Pad weight: 8 kg (17 lbs) (each)

MAGNET ROOM FLOOR SPECIFICATIONS

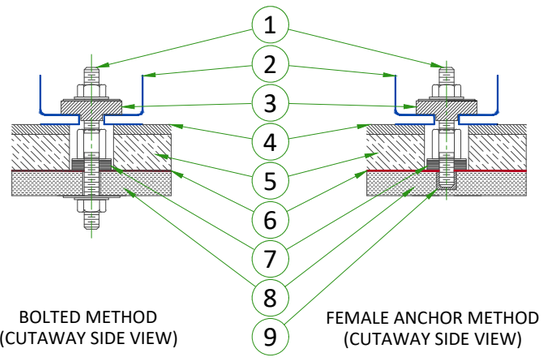
Magnet, Enclosure, and Patient Table areas must be flat and level within **3 mm (0.125 in)** within the shaded area shown.



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

SCALE 1:50

DOCK/TABLE FRAME ANCHOR MOUNTING REQUIREMENTS



BOLTED METHOD
(CUTAWAY SIDE VIEW)

FEMALE ANCHOR METHOD
(CUTAWAY SIDE VIEW)

1 Removable Anchor Rod (Male insert)
2 Dock
3 Clamp bracket
4 Finished floor
5 Filler Board or Grout
6 RF Shield
7 Conductive Fibrous Washer (RF seal)
8 Concrete
9 Female Anchor Insert

NOT TO SCALE

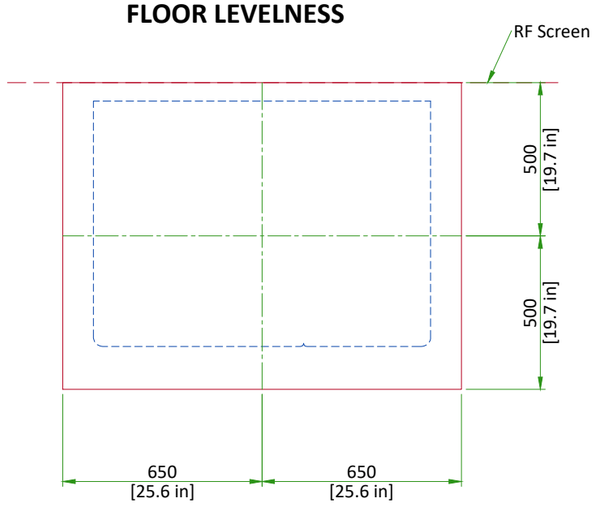
- The RF Shield vendor must design and install the dock/table frame anchor bolt
- The anchor bolt must be installed **after** the Magnet is installed
- The dock/table frame anchor must not contact floor rebar or other structural steel
- The dock/table frame anchor must electrically contact the RF shield at point of entry
- The RF shield vendor must perform a pull test on the anchor (equal to the clamping force). Results must be provided to the GE HealthCare Project Manager of Installation (PMI).

THE DOCK ANCHOR PROPERTIES MUST COMPLY WITH THE FOLLOWING REQUIREMENTS:

a. Anchors must be two-part assembly (male/female)
b. Female side must be expansion- or epoxy-type
c. 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)
d. Anchors must be electrically conductive
e. Anchors must be non-ferrous
f. Anchors must not induce galvanic corrosion with the RF shield
g. Anchors must be commercially procured
h. If anchoring a table, 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.
i. Anchors must meet the following clamping force: 2,669 N [600 lb]
j. The anchor rod must extend at least 35 mm [1.38 in] but not more than 60 mm [2.36 in] above the finished floor.
k. The anchor rod must be less tha 152 mm [6 in] in total length (length above the floor plus embedded length)
l. If underside of deck is metallic, then insulating bushing must be added to through bolt hardware to prevent grounding of shield at this point.

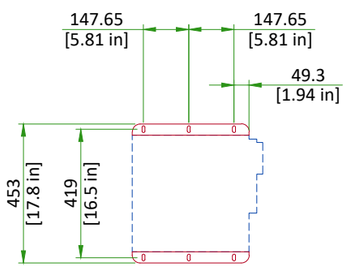
SYSTEMS CABINET & BLOWER BOX FLOOR REQUIREMENTS

SYSTEMS CABINET FLOOR LEVELNESS

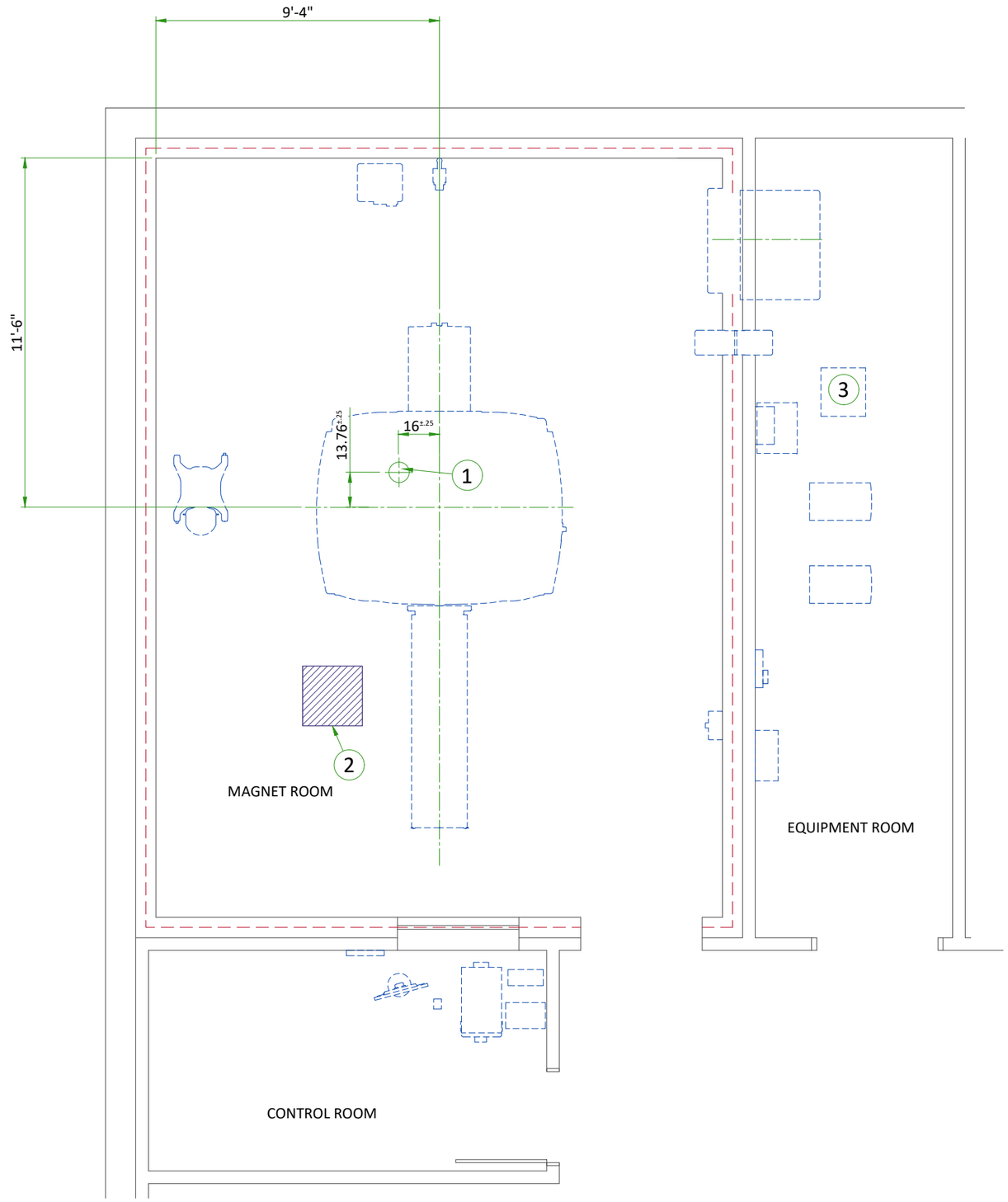


Specification of Floor
1. Floor slope: < +/- 0.5 deg
2. Floor surface: < +/-5mm
3. Non-compressible flooring material only, for example, no carpet allowed.

BLOWER BOX ANCHORING



NOTE: The blower box should be anchored with M6 bolts which can stand 0.217 Kilo Newton shear force and 0.076 Kilo Newton tension force.



ITEM	DESCRIPTION
1	Cryogen vent (200mm [8"] O.D.)
2	Emergency exhaust vent - refer to magnet room vent requirements (position to be defined)
3	(2) 13mm [1/2"] I.D. High pressure hoses and (4) 25mm [1"] compression clamps. 150 Micron filter, Shut off valves and By-pass valve as required.

MECHANICAL/PLUMBING NOTES

- All piping, fittings, supports, hoses, clamps, ventlation 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

TEMPERATURE AND HUMIDITY SPECIFICATIONS

IN-USE CONDITIONS

AREA	Temperature				Humidity		Maximum Room Gradient	
	Range		Change /Hr		Range %	Change %	°C	°F
	°C	°F	°C	°F				
EQUIPMENT ROOM at Inlet	15-28 *	59-82.4 *	3	5	30-75 *	5	3**	5**
MAGNET ROOM	15-21	59-69.8	3	5	30-60 *	5	3	5
CONTROL ROOM	15-32	59-89.6	3	5	30-75 *	5	3	5
OUTDOOR (11kw Chiller)	-30-43	-22-110	-	-	5-100	-	-	-

	MAGNET ROOM		CONTROL ROOM		EQUIPMENT ROOM	
SYSTEM HEAT DISSIPATION (base system only)	W	BTU	W	BTU	W	BTU
	3400	11604	1450	4947	7494***	25506***

NOTE
* Non-condensing humidity with 50% nominal at 18.3°C [65°F]
** Room temperature gradient specification applies from floor to height of top discharge of equipment cabinets.
Maximum ambient temperature is de-rated by 1°C [1.8°F] per 300 m [984 ft] above 800 m [2624.6 ft].
The altitude is from 30.5 m [100 ft] below sea level to 2438 m [7992 ft] above sea level.
*** The 11 kW Airsys Chiller is designed to locate external to the building and is not included in this value.
Heat output information: 15400 Watt (50500 BTU)

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.

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

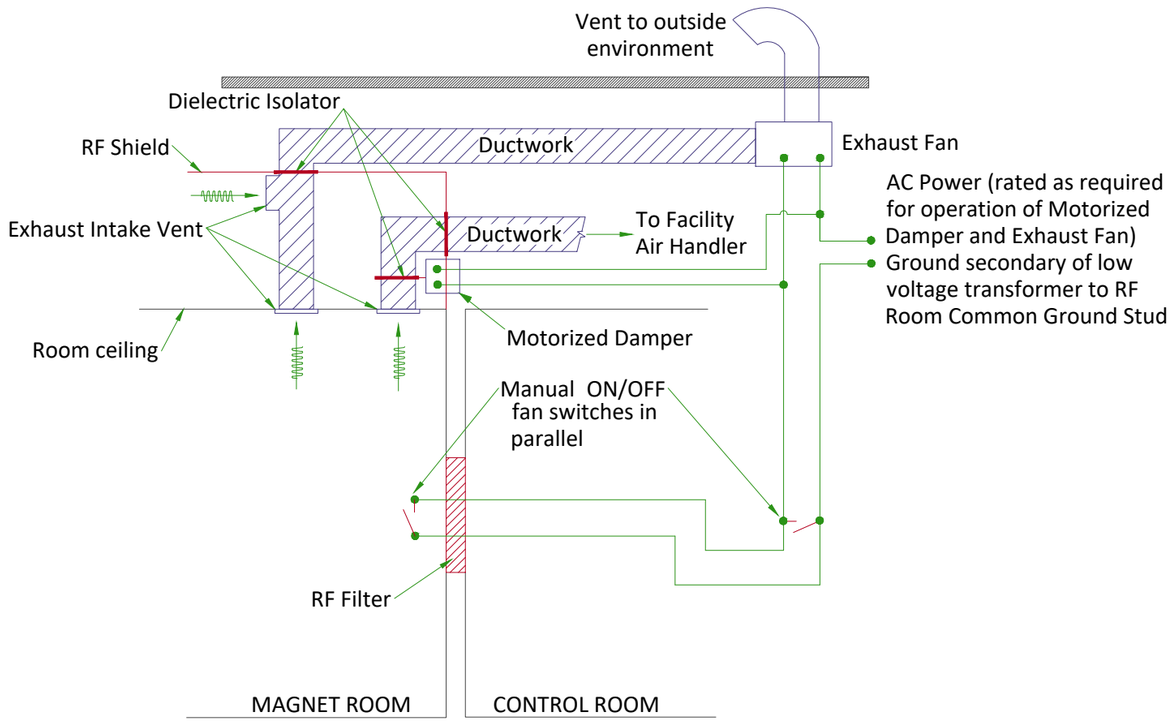
- Exhaust vent system is supplied by the customer.
- All items within the RF enclosure must be non-magnetic.
- The exhaust vent system must be tested and operational before the magnet is installed.
- The exhaust intake vent must be located near the magnet cryogenic vent at the highest point on the finished or drop ceiling.
- The Magnet room exhaust fan and exhaust intake vent must have a capacity of at least **1200 CFM (34 m^3/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

HEAT DISSIPATION DETAILS

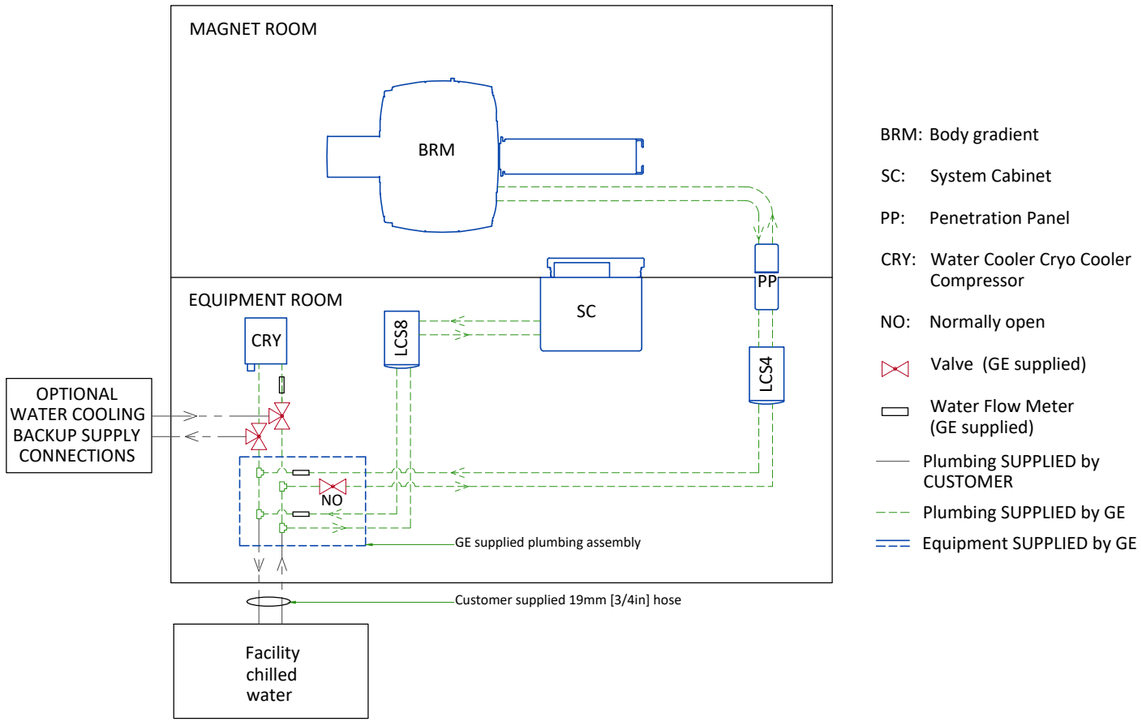
DESCRIPTION	ROOM	MAX W	MAX BTU
Magnet (MAG) and Patient Table (PT)	Magnet Room	2400	8189
Blower Box (MG6)	Magnet Room	1000	3415
Magnet Monitor (MON)	Control/Equipment Room	60	205
System Cabinet (SC)	Control/Equipment Room	5000	17000
Operator Workspace with LCD Color Display (GOC)	Control/Equipment Room	1450	4947
Water Chiller for BRM (LCS4)	Control/Equipment Room	1670	5695
Water Chiller for SC (LCS8)	Control/Equipment Room	1670	5695
Shield/Cryo Cooler Compressor - Water Cooled (CRY)	Control/Equipment Room	500	1706

Options			
GE pre-engineered Main Disconnect Panel (MDP)	Control/Equipment Room	264	900
Magnetic Resonance Elastography (MRE)	Equipment Room	200	682

MAGNET ROOM EXHAUST FAN SCHEMATIC



WATER COOLING



BRM: Body gradient

SC: System Cabinet

PP: Penetration Panel

CRY: Water Cooler Cryo Cooler Compressor

NO: Normally open

Valve (GE supplied)

Water Flow Meter (GE supplied)

Plumbing SUPPLIED by CUSTOMER

Plumbing SUPPLIED by GE

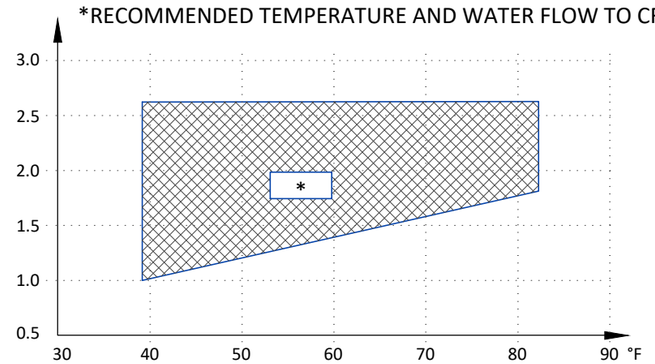
Equipment SUPPLIED by GE

CHILLED WATER SPECIFICATIONS

PARAMETER	REQUIREMENTS
Availability	Continuous
Cooling capacity	Minimum 20 kW
Minimum continuous heat load	7.5 kW
Inlet temperature to Chiller/Cryo Compressor	7 to 15°C [44.6 to 59° F]
Inlet pressure of Chiller/Cryo Compressor	Minimum 280 kpa [40 psi], maximum 690 kPa [100 psi]
Maximum Flow	70 L/min [18.5 gpm]
Minimum Flow	36 L/min [9.5 gpm]
Temperature rise at maximum flow	5°C [9° F] with 50% propylene glycol or ethylene glycol-water; 20kW heat
Temperature rise at minimum flow	10°C [18° F] with 50% propylene glycol or ethylene glycol-water; 20kW heat
Antifreeze	0-50% propylene glycol or ethylene glycol
Hose connections to the Chiller/Cryogen compressor (supplied by customer)	19mm [3/4 in]
Condensation protection	Condensation must be managed to prevent equipment damage or safety hazards
Water quality	Refer to pre-installation manual for detailed specifications

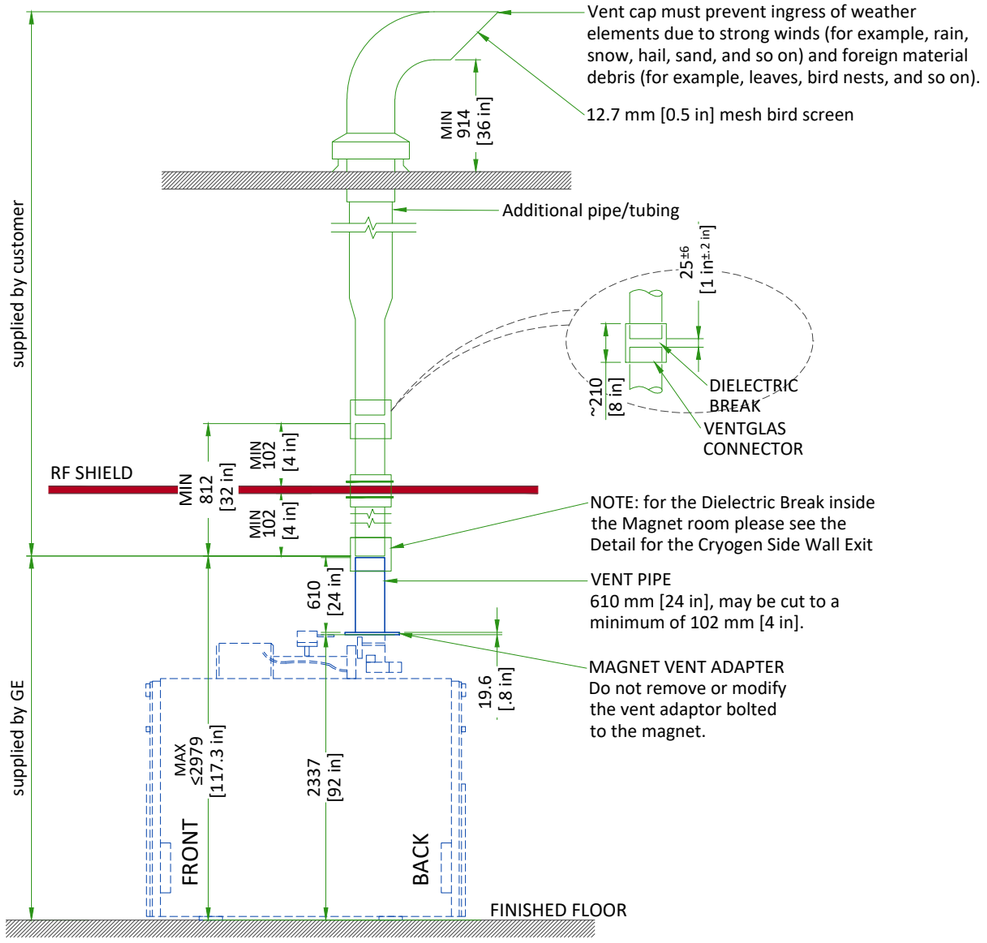
CITY WATER BACKUP SPECIFICATIONS FOR COMPRESSOR

INLET WATER FLOW/TEMPERATURE FOR CRYOCOOLER COMPRESSOR



	MIN	MAX
INLET TEMP	39.2°F (4°C)	82.4°F (28°C)
INLET FLOW	1.0 gpm (4 l/min)	2.6 gpm (10 l/min)
TEMP RISE	89.6°F at 1.0 gpm (32°C at 4 l/min flow)	53.6°F at 2.6 gpm (12°C at 10 l/min flow)
HEAT DISSIPATION (kW)	7.2 kW	
PRESSURE DROP	8.7 psi at 2.1 gpm flow (60 kPa at 8 l/min flow)	

TYPICAL CRYOGENIC VENT PIPE DETAIL



Waveguide is contractor supplied. Minimum 812 mm [32 in]. Must extend at least 102 mm [4 in] on magnet room side of the wall/ceiling and 25±6 mm [1±0.25 in] from the GE supplied pipe below isolation joint.

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

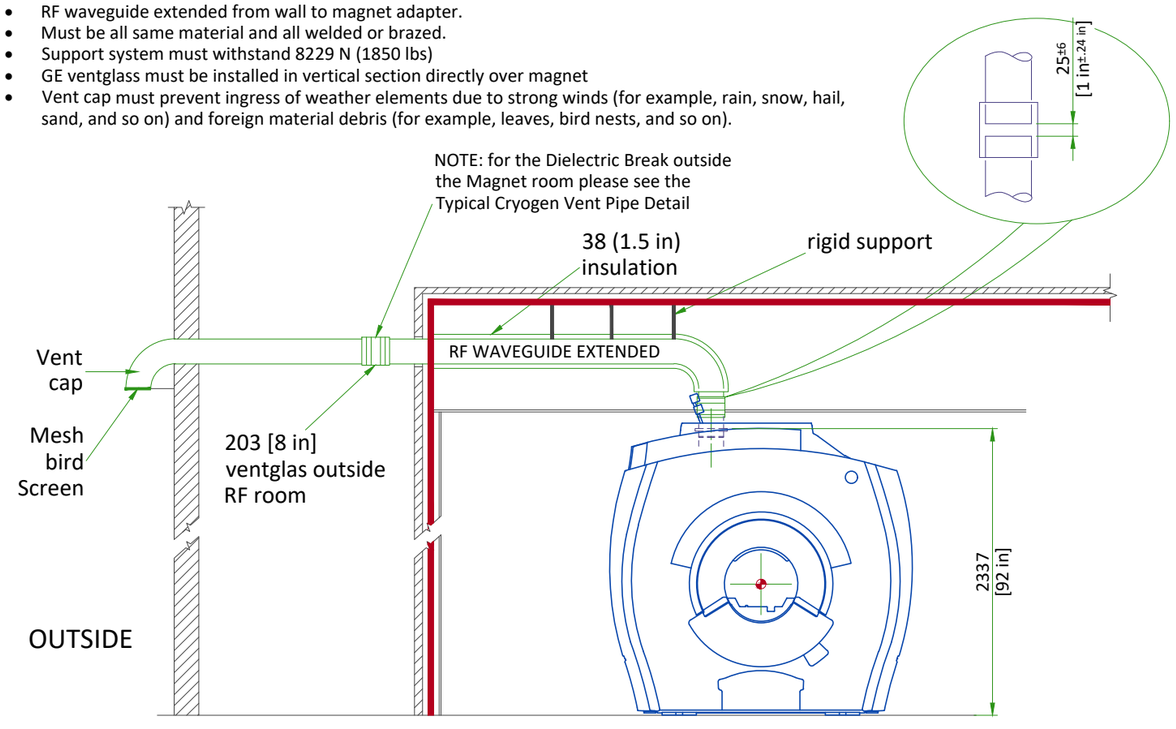
NOTE
All welds on the pipe must be ground down to a smooth 203 mm [8 in] diameter so that it can be clamped to the Ventglas with enough force.

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

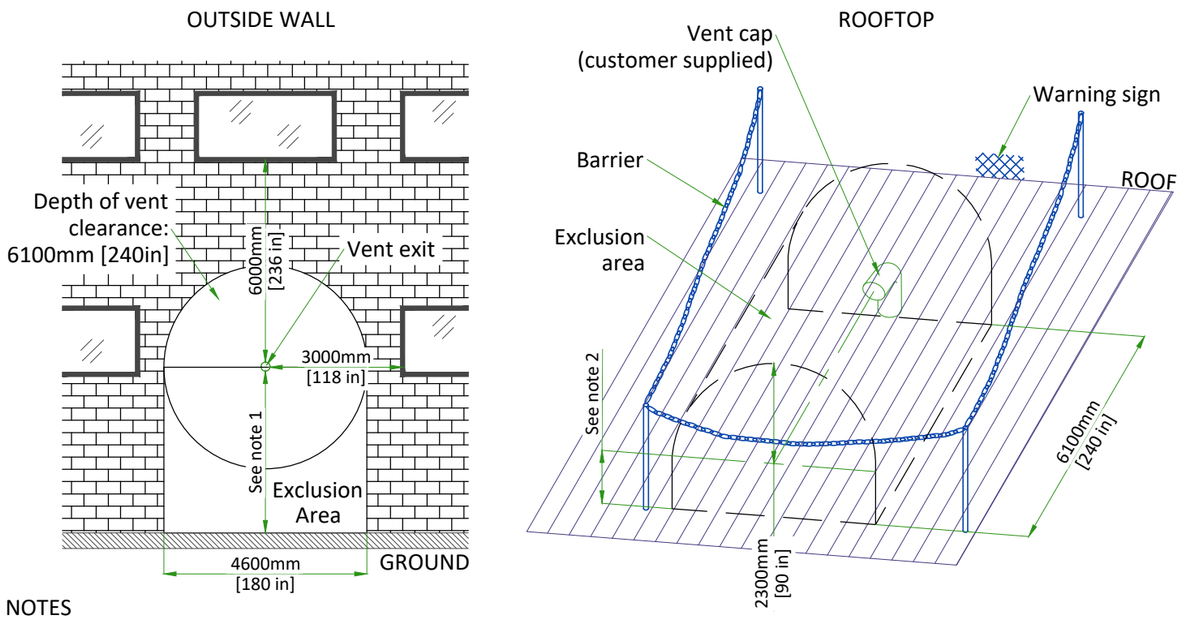
TYPICAL CRYOGEN SIDE WALL EXIT WITH LONG SWEEP ELBOW

KEY COMPONENTS :

- RF waveguide extended from wall to magnet adapter.
- Must be all same material and all welded or brazed.
- Support system must withstand 8229 N (1850 lbs)
- GE ventglass must be installed in vertical section directly over magnet
- Vent cap must prevent ingress of weather elements due to strong winds (for example, rain, snow, hail, sand, and so on) and foreign material debris (for example, leaves, bird nests, and so on).



CRYOGENIC VENTING (EXTERIOR)



NOTES

(1) Restricted area: minimum distance between vent pipe and ground is 3660mm [144 in]. Barriers are required. Public area: barriers are not required if height is > 5000mm [197 in].

(2) The bottom of the 90° elbow must be at least 914mm [36 in] above the roof deck (or higher if at risk of being blocked by drifting snow, sand, or other potential obstructions.)

NOT TO SCALE

MAGNET CRYOGENIC VENT SYSTEM PRESSURE DROP MATRIX

Outer dia. of pipe (D)	Distance of vent system component from magnet		Pressure drop for straight pipe		Std sweep 45° elbow		Long sweep 45° elbow		Std sweep 90° elbow		Long sweep 90° elbow		90° miter bend	
	m	ft	kPa/m	psi/ft	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi
8 in. (200mm)	0.00-3.05	0-10	1.629	0.072	3.877	0.562	2.585	0.375	7.269	1.054	4.846	0.703	14.539	2.108
	3.05-6.10	10-20	2.784	0.123	6.393	0.927	4.262	0.618	11.987	1.738	7.992	1.159	23.975	3.476
	6.10-9.15	20-30	4.172	0.184	8.712	1.263	5.808	0.842	16.535	2.369	10.890	1.579	32.670	4.737
	9.15-12.2	30-40	5.391	0.238	10.847	1.573	7.231	1.049	20.338	2.949	13.559	1.966	40.677	5.898
	12.20-15.25	40-50	6.460	0.286	12.812	1.858	8.541	1.239	24.023	3.483	16.015	2.322	48.046	6.967
	15.25-18.30	50-60	7.394	0.327	14.620	2.120	9.747	1.413	27.413	3.975	18.275	2.650	54.826	7.950
	18.29-24.39	60-80	8.913	0.394	17.813	2.583	11.875	1.722	33.400	4.843	22.266	3.229	66.799	9.686
	24.39-30.49	80-100	10.049	0.444	20.514	2.974	13.676	1.983	38.463	5.577	25.642	3.718	76.926	11.154
10 in. (250mm)	0.00-6.10	0-20	0.824	0.036	2.382	0.345	1.588	0.230	4.467	0.648	2.978	0.432	8.934	1.295
	6.10-12.22	20-40	1.607	0.071	4.035	0.585	2.690	0.390	7.565	1.097	5.043	0.731	15.130	2.194
	12.22-18.29	40-60	2.239	0.099	5.477	0.794	3.651	0.529	10.269	1.489	6.846	0.993	20.537	2.978
	18.29-24.39	60-80	2.745	0.121	6.733	0.976	4.489	0.651	12.625	1.831	8.416	1.220	25.249	3.661
	24.39-30.49	80-100	3.145	0.139	7.827	1.135	5.218	0.757	14.676	2.128	9.784	1.419	29.353	4.256
12 in. (300mm)	0.00-6.10	0-20	0.424	0.019	1.486	0.215	0.991	0.144	2.786	0.404	1.858	0.269	5.573	0.808
	6.10-12.22	20-40	0.829	0.037	2.501	0.363	1.667	0.242	4.689	0.680	3.126	0.453	9.377	1.360
	12.22-18.29	40-60	1.169	0.052	3.408	0.494	2.272	0.329	6.389	0.926	4.260	0.618	12.779	1.853
	18.29-24.39	60-80	1.453	0.064	4.218	0.612	2.812	0.408	7.908	1.147	5.272	0.764	15.816	2.293
	24.39-30.49	80-100	1.688	0.075	4.941	0.716	3.294	0.478	9.263	1.343	6.176	0.895	18.527	2.686
14 in. (350mm)	0.00-6.10	0-20	0.235	0.010	0.970	0.141	0.647	0.094	1.819	0.264	1.213	0.179	3.639	0.528
	6.10-12.22	20-40	0.459	0.020	1.619	0.235	1.079	0.157	3.036	0.440	2.024	0.293	6.072	0.880
	12.22-18.29	40-60	0.652	0.029	2.209	0.320	1.473	0.214	4.142	0.601	2.761	0.400	8.284	1.201
	18.29-24.39	60-80	0.817	0.036	2.745	0.398	1.830	0.265	5.147	0.746	3.431	0.498	10.293	1.493
	24.39-30.49	80-100	0.958	0.042	3.231	0.469	2.154	0.312	6.059	0.879	4.039	0.586	12.117	1.757
16 in. (400mm)	0.00-6.10	0-20	0.184	0.008	0.875	0.127	0.584	0.085	1.641	0.238	1.094	0.159	3.283	0.476
	6.10-12.22	20-40	0.356	0.016	1.444	0.209	0.962	0.140	2.707	0.392	1.804	0.262	5.413	0.785
	12.22-18.29	40-60	0.508	0.022	1.968	0.285	1.312	0.190	3.689	0.535	2.460	0.357	7.379	1.070
	18.29-24.39	60-80	0.642	0.028	2.451	0.355	1.634	0.237	4.596	0.666	3.064	0.444	9.191	1.333
	24.39-30.49	80-100	0.759	0.034	2.896	0.420	1.931	0.280	5.430	0.787	3.620	0.525	10.861	1.575

Notes

1. Refer to Magnet Room Venting manual 5850263-1EN for specifications of distances >100 ft (30.49 m).
2. Elbows with angles greater than 90 deg must not be used
3. Data in Table 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 17 psi (117.2 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 removable lighting fixtures and associated components must be non-magnetic.
- 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 DC power converter and RF sources are all located outside the magnet room RF shield.

  NOTE: LED lighting could cause image quality issues due to RF interference. Make sure a MR-compatible LED lighting solution is chosen.
- Battery chargers (e.g., used for emergency lighting) must be located outside the magnet room.
- LED Lighting or short filament length incandescent bulbs are recommended.
- Linear lamps are not recommended due to the high burnout rate.

CONNECTIVITY REQUIREMENTS

Your new GE Healthcare imaging modality will require local and remote connectivity to enable our full range of digital support:

- Local connectivity - This allows your system to connect to local devices such as PACS and modality worklist. We will require network information to configure the system(s), and a live ethernet port(s) prior to the delivery of the system(s).
- Remote connectivity - Your GE Healthcare service warranty includes InSite™ (applicable to InSite capable products), a powerful broadband-based service which enables digital tools that can help guard your hospital against equipment downtime and revenue loss by quickly connecting you to a GE Healthcare expert.

Depending on product family and software version, imaging systems can be connected in one of the following methods:

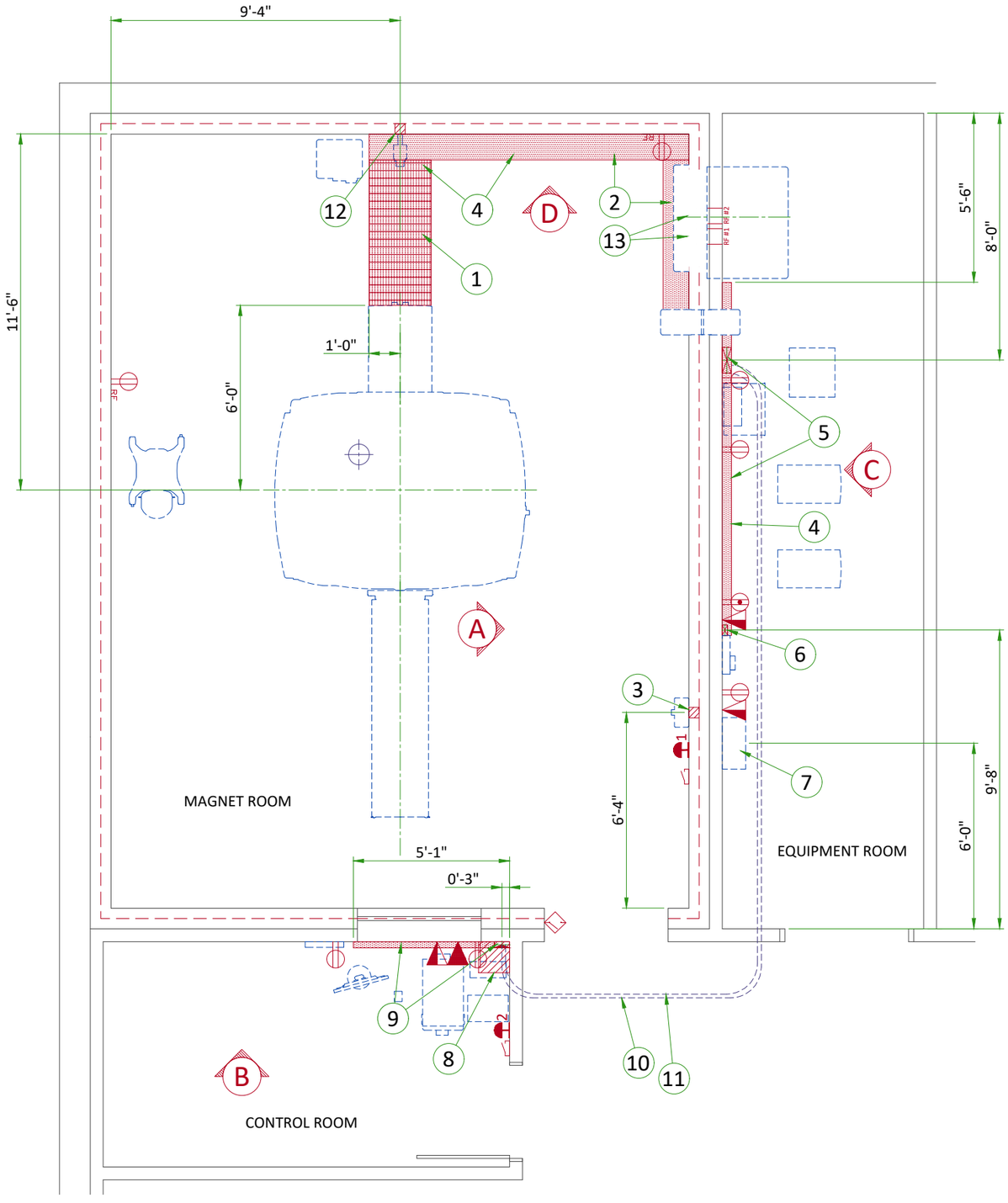
1. TLS over TCP Port 443 (Preferred method for new products) via:
   a. DNS resolution
   b. Customer-provided Proxy or
   c. GE Proxy (Available in some regions)
2. Site-to-Site IPsec VPN tunnel

Please provide the GE project manager with the contact information for the resource that can provide information required to set up these connections. GEHC will send out communication to these contacts, which will include the project's Connectivity requirements, and a Connectivity form. This form will need to be completed and returned to GEHC prior to delivery of the system to ensure the system is tested and connectivity is enabled prior to the completion of the installation.

ELECTRICAL NOTES

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. In some cases GEHC will specify ground wires to be sized larger than code. In these situations, the GEHC specification must be followed.
10. 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.
11. The maximum point to point distances illustrated on this drawing must not be exceeded.
12. Physical connection of primary power to GEHC equipment is to be made by customers electrical contractor with the supervision of a GEHC representative. The GEHC representative would be required to identify the physical connection location, and insure proper handling of GEHC equipment.
13. 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.
14. Every installation is unique. The electrical contractor will be required to support the installation of the GEHC equipment by providing knockouts, grommeted openings, bushings, etc. as required. All power connections to be performed by the electrician.

- All junction boxes, conduit, duct, duct dividers, switches, circuit breakers, cable tray, etc., are to be supplied and installed by customers electrical contractor. All junction boxes shall be provided with covers.
- Conduit and duct runs shall have gradual 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.
  4. PVC as a substitute must be used in accordance with all local and national codes.
- All openings in raceway and access flooring are to be cut out and finished off with grommet material by the customers contractor.
- Electrical contractor to provide measured pull strings in all conduit and raceway runs.
- Provide 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.

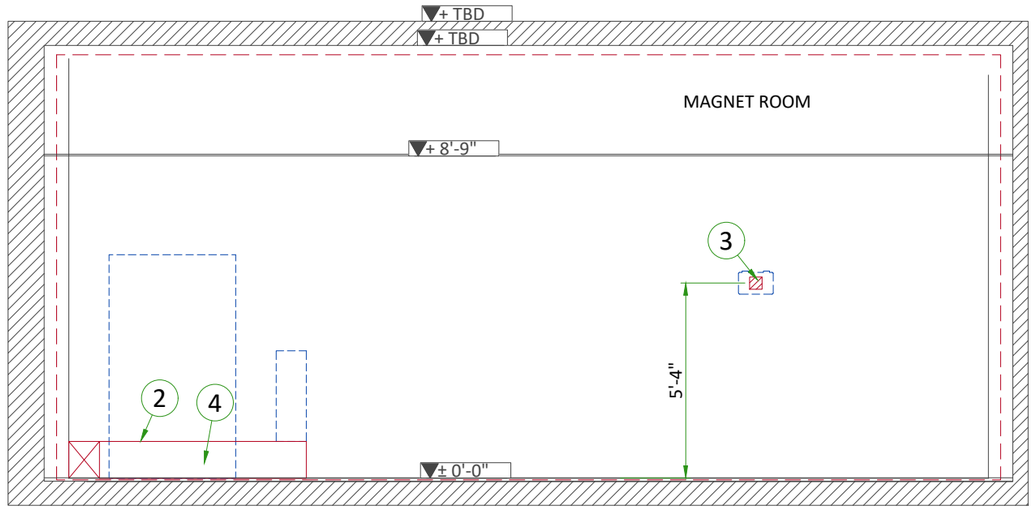


ITEM	Electrical Layout Item List
1	24" x 6" [600 x 150] Non-ferrous surface floor duct with minimum 2 dividers
2	12" x 10" [300 x 250] Non-ferrous surface floor duct with minimum 2 dividers
3	Box in wall 4" x 4" x 2" [100 x 100 x 50]
4	Liquid lines shall be routed in a liquid tight compartment separate from electrical lines
5	10" x 3 1/2" [250 x 100] Surface wall duct with minimum 2 dividers
6	4" x 2" [100 x 50] Raceway
7	Main disconnect panel
8	Box above ceiling size per local code
9	6" x 3 1/2" [150 x 100] Surface wall duct with minimum 2 dividers
10	Conduit above RF screen 2" [50]
11	Conduit above RF screen 3" [75]
12	Box in wall 4" x 4" x 4" [100 x 100 x 100]
13	RF Filters - grounded to RF shield at Common Ground Stud

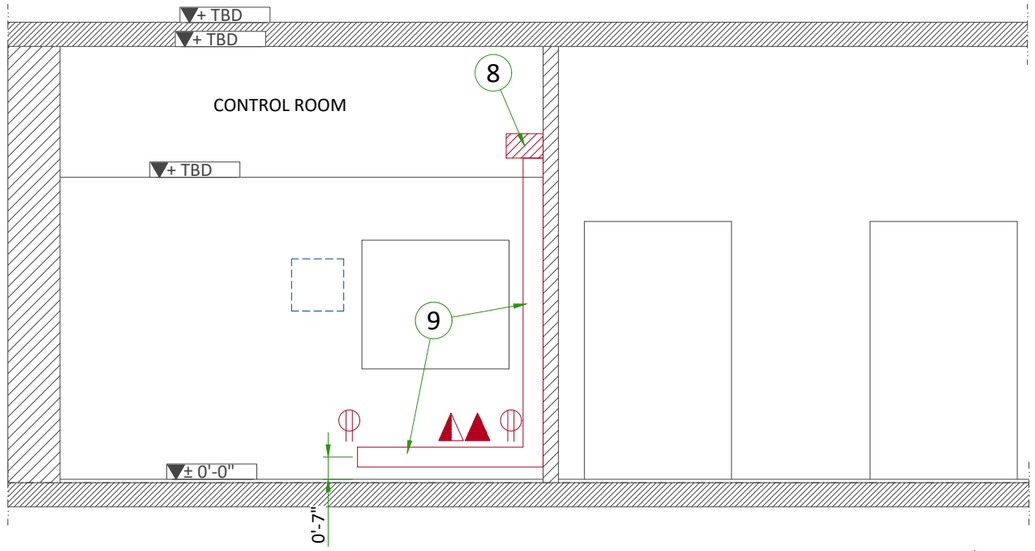
ITEM	QTY	Electrical Outlet Legend Customer/contractor supplied and installed items unless otherwise specified. Height above floor determined by local codes unless otherwise specified.
		System emergency off (EO1-2), (recommended height 1.2m [48"] above floor)
		Door interlock switch
		Emergency exhaust fan switch 1.2m [48"] height recommended)
		Duplex hospital grade, dedicated wall outlet 120-v, single phase power
		Network outlet
		Dedicated telephone lines/network connection
		Duplex hospital grade, dedicated outlet 120-v emergency, single phase power, 15a
RF		Duplex hospital grade, dedicated outlet 120-v, single phase outlet routed through RF filter

Additional Conduit Runs
(Contractor Supplied and Installed)

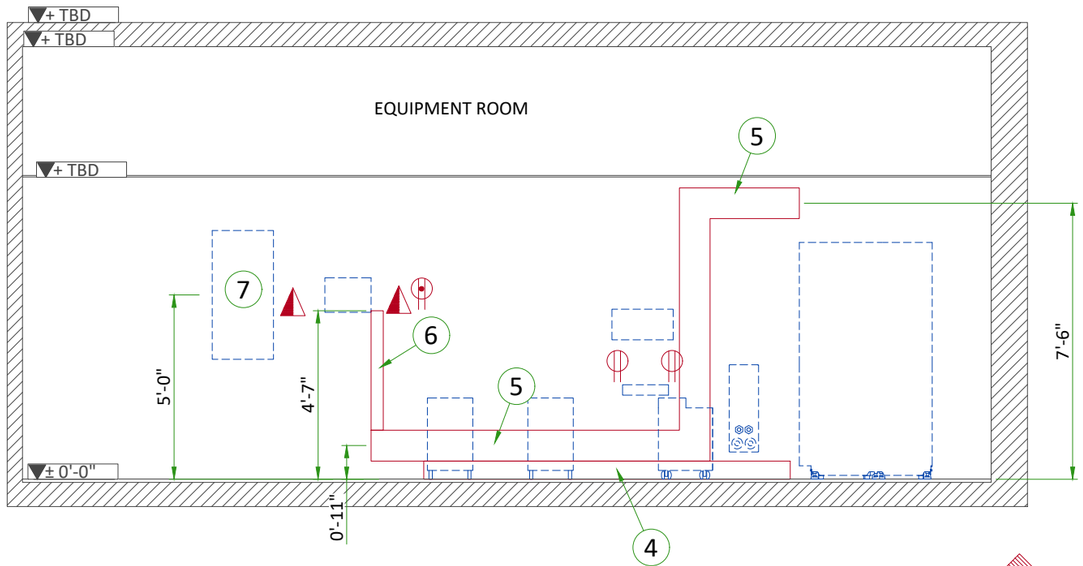
From (Bubble # / Item)		To (Bubble # / Item)	Qty	Size	
				In.	mm
7	Main Disconnect Panel	Facility Power	1	As req'd	As req'd
7	Main Disconnect Panel	Power Distribution Unit (inside Systems Cabinet)	1	As req'd	As req'd
		System emergency off 2	1	1/2	16
	System emergency off 2	Penetration Panel	1	1/2	16
	Door switch	Systems Cabinet	1	3/4	20
	System emergency off 1	Penetration Panel	1	3/4	20
3	Magnet Rundown Unit	Magnet	1	1	25
		RF filter #1	1	As req'd	As req'd
	RF filter #1	120-V 1Ø Power	1	As req'd	As req'd
	Room Light	RF filter #2	1	As req'd	As req'd
	RF filter #2	Facility emergency power	1	As req'd	As req'd
12	TV Camera	Waveguide or RF filter	1	1	25
8	TV Monitor		1	1	25
	Injector control unit	Waveguide or RF filter	1	2 1/2	70
	Injector head		1	As req'd	As req'd
	Integrated battery charging unit		1	As req'd	As req'd


+ TBD
+ TBD
MAGNET ROOM
+ 8'-9"
3
5'-4"
2
4
± 0'-0"

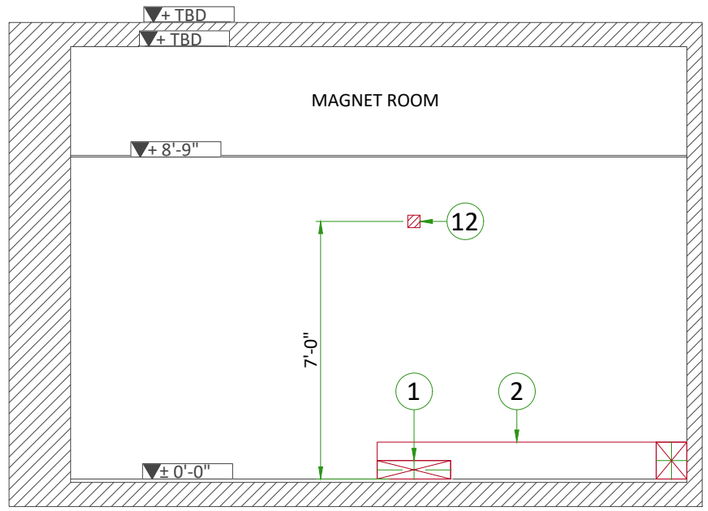
A


+ TBD
+ TBD
CONTROL ROOM
8
+ TBD
9
± 0'-0"
0'-7"

B


+ TBD
+ TBD
EQUIPMENT ROOM
5
+ TBD
7
6
5
5'-0"
4'-7"
7'-6"
± 0'-0"
0'-11"
4

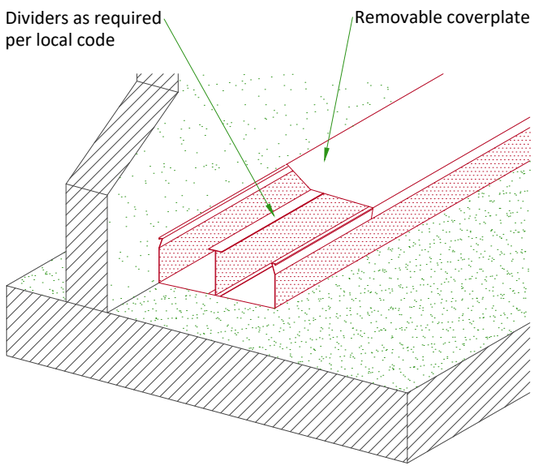
C


+ TBD
+ TBD
MAGNET ROOM
+ 8'-9"
12
7'-0"
1
2
± 0'-0"

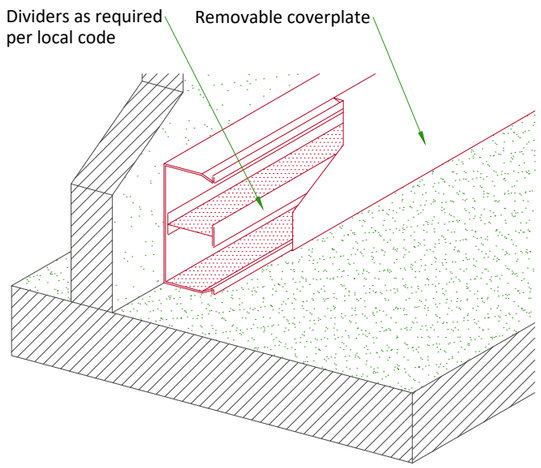
D

TYPICAL CABLE MANAGEMENT

DUCT ON THE FLOOR



DUCT ON THE WALL

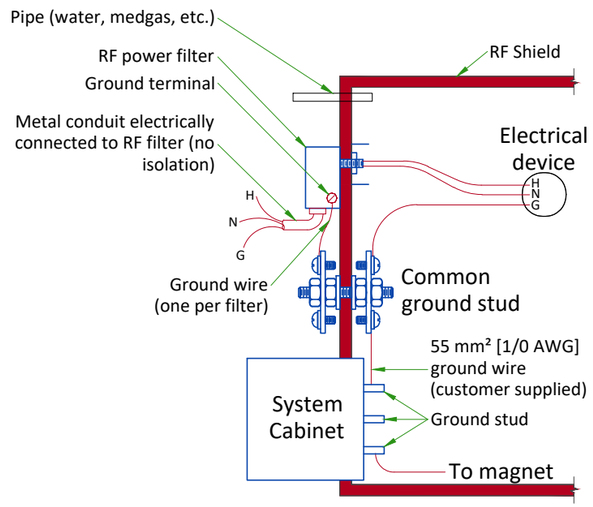


NOT TO SCALE

TYPICAL MAGNET ROOM GROUNDING

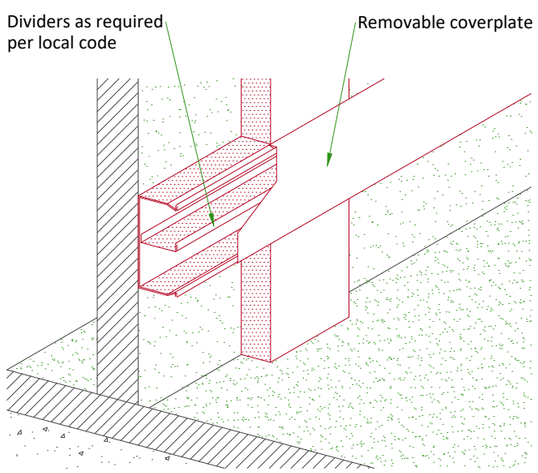
GROUNDING REQUIREMENTS

- All power lines into the RF shielded room require an RF filter.
- All electrical devices (for example, outlets, light fixtures, and so on) must have a ground wire from device power source and be grounded to the RF Shield at the RF Common Ground Stud.
- Resistance between any two grounded devices must not exceed 0.1 ohm to ensure equal potential ground system within the Magnet Room.
- Do not ground non-MR equipment to the MR ground system.
- If needed, electrical devices can be grounded at the System Cabinet rear panel.
- The common ground stud must be installed near the penetration point(s) of the GE equipment, into the RF shield between the Equipment Room and Magnet Room.
- For additional information refer to RF Shielded Room manual 5850260-1EN



TYPICAL CABLE MANAGEMENT

WALL DUCT



NOT TO SCALE

POWER REQUIREMENTS

SPECIFICATIONS OF MAIN POWER INPUT

Power Supply (3 Phases+G)	INPUT VOLTAGE (V) ±10%					
	Frequency 50Hz/60Hz					
	480	415	400	380	208	200
Total Current	40.9	47.3	49.1	51.7	94.9	98.1
Total System 50 Millisecond Power	38.3 kVA					
Total system Continuous Power	34 kVA					

- Governing electrical codes may require a neutral wire. If present, neutral must be terminated in MDP.
- 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%.
- Lock-out/Tag-out: The Main Disconnect Panel (MDP) shall provide an external single point lock-out/tag-out feature for the entire system and a means to externally lock-out/tag-out each output breaker independently. Each lock-out/tag-out feature shall accommodate a standard sized lock hasp.

SPECIFICATIONS OF MAGNET MONITOR POWER

MAGNET MONITOR REQUIRES A 110/220 VAC, 50/60 HZ, 2.0 A FACILITY SUPPLIED OUTLET. POWER AT THE OUTLET MUST BE CONTINUOUSLY AVAILABLE.

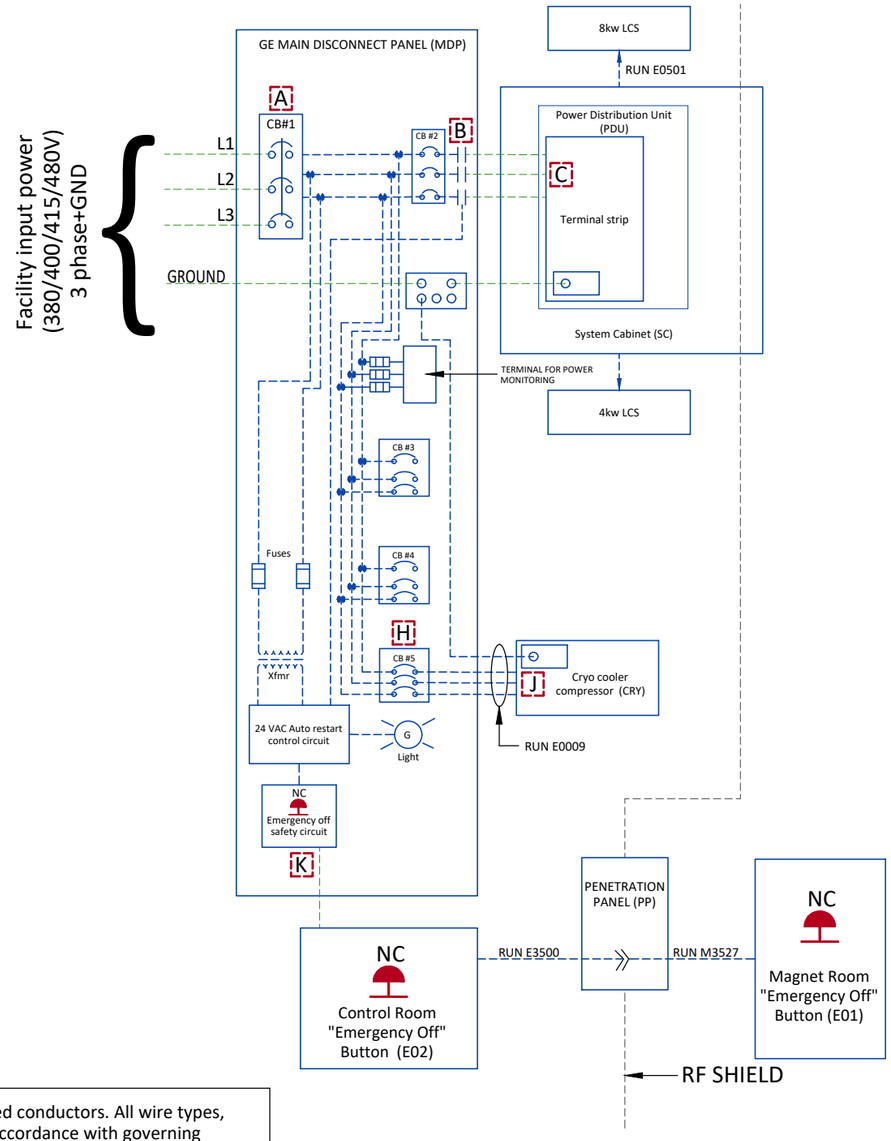
CABLES

- 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 the Distribution Panel/Box with a pigtail length of 1.5m [60in], and will be connected during installation.
- Each conductor will be identified and isolated (screw connector).

GUIDANCE ON SLECTION OF FEEDER AND TRANSFORMER FOR MR SYSTEM		
	Direct feed from facility to MR system	MR system fed by dedicated facility distribution transformer
Prerequisite Conditions		
MR System Incoming Voltage	480V 3-phase	
Minimum Source short-circuit kVA	1,925 kVA (at source of feeder to MDP)	2,600 kVA (at input to distribution transformer)
Minimum No-Load Voltage	460V	475V (transformer secondary tapped accordingly)
Feeder and Transformer Recommendations		
Dedicated Distribution Transformer Recommendations	N/A	Size: 75 kVA Impedance (Z): ≤5% K-Factor: ≥ K=20 100A overcurrent protection on secondary*
Maximum Feeder Length*	415 ft	415 ft
Feeder Size - 3-phase power conductors*	3 AWG Cu	3 AWG Cu
Feeder Size - Ground (USA)*	8 AWG Cu (equipment grounding conductor)	8 AWG Cu (supply side bonding jumper) 8 AWG Cu (equipment grounding conductor)
Feeder Size - Ground (Canada)*	8 AWG Cu (bonding conductor)	8 AWG Cu (bonding conductor)
* NOTE: Recommendations shown apply only to cases defined exactly as shown in this table and when not in conflict with local electrical codes . For all other cases, refer to the local codes and the System Voltage Regulation Calculator located on the GE Healthcare Site Planning Website		

POWER DISTRIBUTION

MAIN DISCONNECT PANEL (MDP) TYPE B



Incoming Power Supply 3 phase+G	
CB	M50022MA/MB/MC
1	100A
2	60A
3	25A
4	25A
5	25A

Cable SUPPLIED BY CUSTOMER
Cable SUPPLIED BY GE
Equipment SUPPLIED BY CUSTOMER
Equipment SUPPLIED BY GE

Accepts following range of stranded conductors. All wire types, color and sizing to be selected in accordance with governing electrical code(s).

Item	M50022MB/MC: (380V-480V)			
	Phase		Ground	
	sq mm	AWG/kcmil	sq mm	AWG/kcmil
A	6-70	10-2/0	16-120	6-250
B	6-35	10-2	16-120	6-4/0
C	6-35	10-1	6-35	10-1
D	2.5-50	14-1/0	2.5-25	14-4
E/G	4-6	12-10	4-6	12-10
F/H	2.5-50	14-1/0	2.5-25	14-4
J	2.5-6	14-10	2.5-6	14-10
K	0.5-2.5	22-12	N/A	N/A

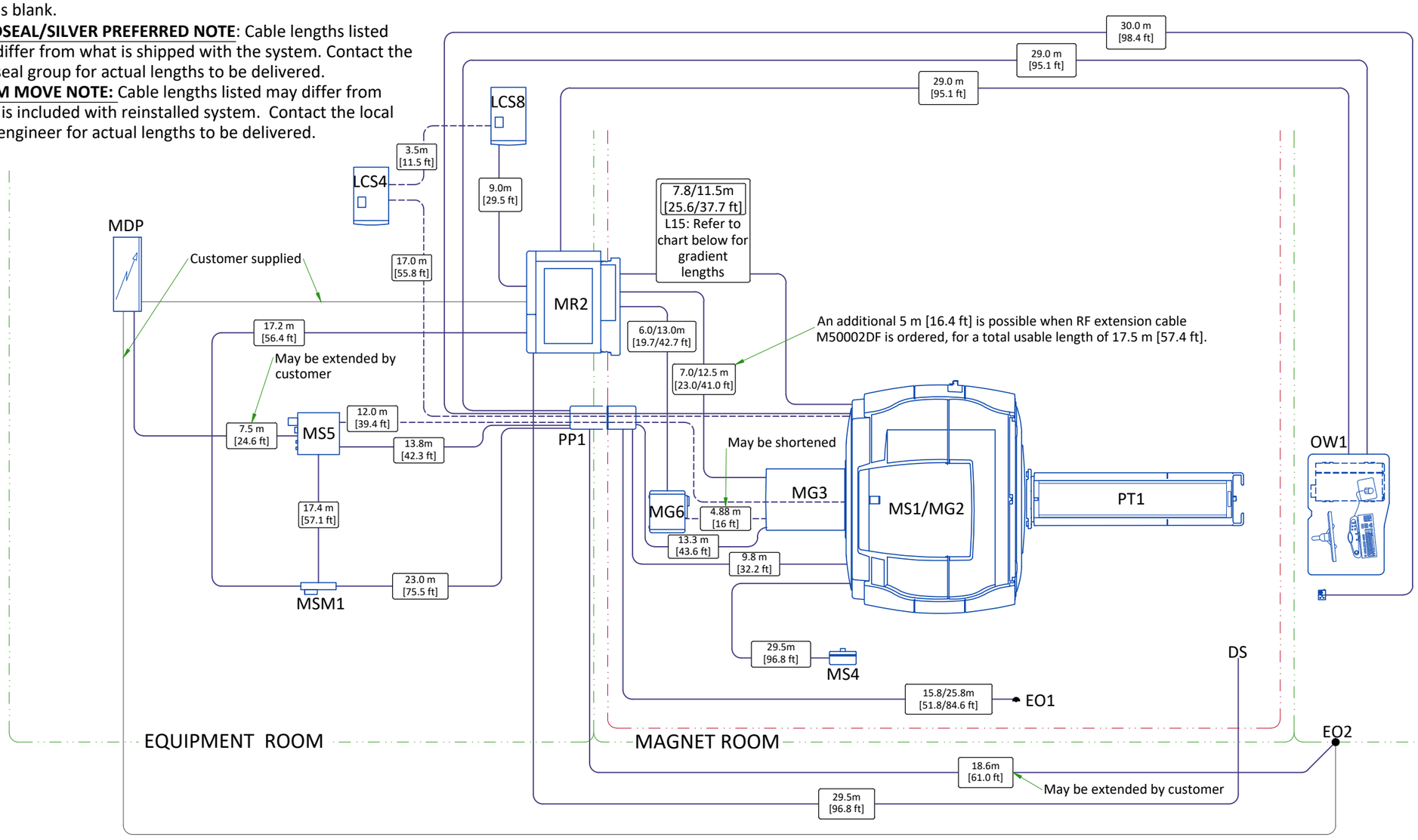
NOTES:
1) Two remote emergency "off" buttons are supplied with GE MDP(PDB) option, emergency off buttons are customer supplied if GE MDP(PDB) option not used.
2) If 3 phase wye with neutral and ground (5 wire system) input is used then neutral must be terminated inside the main disconnect panel and not brought to the power cabinet.
3) In some MDP configurations, output contactors may not be present. Confirm the details of the termination points with MDP manual delivered with MDP.

INTERCONNECTIONS

GENERAL NOTE: PMI must validate proposed selectables and send confirmation to OTR. Refer to MyProjects if Proposed field is blank.

GOLDSEAL/SILVER PREFERRED NOTE: Cable lengths listed may differ from what is shipped with the system. Contact the Goldseal group for actual lengths to be delivered.

ROOM MOVE NOTE: Cable lengths listed may differ from what is included with reinstalled system. Contact the local field engineer for actual lengths to be delivered.



Component Designator	Description
DS	Door interlock switch
EO1/EO2	Emergency off buttons
MDP	Main Disconnect Panel
MG2	Magnet Enclosure
MG3	Magnet Rear Pedestal
MG6	Blower Box
MR2	System Cabinet
MS1	Superconducting Magnet
MS4	Magnet Rundown Unit
MS5	Shield/Cryo Cooler Compressor Cabinet
MSM1	Magnet Monitor
OW1	Operator Workspace
PP1	Penetration Panel
PT1	Patient Transport Table
LCS4	4 kW LCS
LCS8	8 kW LCS

GRADIENT CABLE LENGTH OPTIONS

Length Identifier	Available lengths m (ft)	Proposed
L15 (Magnet Room)	4.8 [15.8]	-
	7.8 [25.6]	-
	11.5 [37.7]	-

CABLES ROUTING FOR OPTIONS

OPTION	FROM	TO	CABLE LENGTH		
				m	ft
Magnetic Resonance Elastography (MRE)	MRE	Magnet Isocenter	Nominal	7.31	24
			Maximum	10.06	33
	MRE	MR2		15.24	50
	MRE	Ethernet Hub in MR2		15.24	50
	MRE	Customer Supplied Outlet	60 Hz	6.09	20
			50 Hz	7.62	25