

GE Healthcare

# Magnet Handling

for

1.5T R, RD and HM Series Magnets

3.0T W, WB and UA Series Magnets



Operating Documentation

5475706

Revision 06

(5475706TPH\_R006.pdf)

## Important Information, Language

### ПРЕДУПРЕЖДЕНИЕ

(BG)

Това упътване за работа е налично само на английски език.

- Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод.
- Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа.
- Неспазването на това предупреждение може да доведе до нараняване на доставчика на услугата, оператора или пациента в резултат на токов удар, механична или друга опасност.

### 警告

(ZH-CN)

本维修手册仅提供英文版本。

- 如果客户的维修服务需要非英文版本，则客户需自行提供翻译服务。
- 未详细阅读和完全理解本维修手册之前，不得进行维修。
- 忽略本警告可能对维修服务人员、操作人员或患者造成电击、机械伤害或其他形式的伤害。

### 警告

(ZH-HK)

本服務手冊僅提供英文版本。

- 倘若客戶的服務供應商需要英文以外之服務手冊，客戶有責任提供翻譯服務。
- 除非已參閱本服務手冊及明白其內容，否則切勿嘗試維修設備。
- 不遵從本警告或會令服務供應商、網絡供應商或病人受到觸電、機械性或其他危險。

### 警告

(ZH-TW)

本維修手冊僅有英文版。

- 若客戶的維修廠商需要英文版以外的語言，應由客戶自行提供翻譯服務。
- 請勿試圖維修本設備，除非您已查閱並瞭解本維修手冊。
- 若未留意本警告，可能導致維修廠商、操作員或病患因觸電、機械或其他危險而受傷。

### UPOZORENJE

(HR)

Ovaj servisni priručnik dostupan je na engleskom jeziku.

- Ako davatelj usluge klijenta treba neki drugi jezik, klijent je dužan osigurati prijevod.
- Ne pokušavajte servisirati opremu ako niste u potpunosti pročitali i razumjeli ovaj servisni priručnik.
- Zanimarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika.

### VÝSTRAHA

(CS)

Tento provozní návod existuje pouze v anglickém jazyce.

- V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka.
- Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah.
- V případě nedodržování této výstrahy může dojít k poranění pracovníka prodejního servisu, obslužného personálu nebo pacientů vlivem elektrického proudu, respektive vlivem mechanických či jiných rizik.

**ADVARSEL**

(DA)

Denne servicemanual findes kun på engelsk.

- Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse.
- Forsøg ikke at servicere udstyret uden at læse og forstå denne servicemanual.
- Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk stød, mekanisk eller anden fare for teknikeren, operatøren eller patienten.

**WAARSCHUWING**

(NL)

Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar.

- Als het onderhoudspersoneel een andere taal vereist, dan is de klant verantwoordelijk voor de vertaling ervan.
- Probeer de apparatuur niet te onderhouden alvorens deze onderhoudshandleiding werd geraadpleegd en begrepen is.
- Indien deze waarschuwing niet wordt opgevolgd, zou het onderhoudspersoneel, de operator of een patiënt gewond kunnen raken als gevolg van een elektrische schok, mechanische of andere gevaren.

**WARNING**

(EN)

This service manual is available in English only.

- If a customer's service provider requires a language other than English, it is the customer's responsibility to provide translation services.
- Do not attempt to service the equipment unless this service manual has been consulted and is understood.
- Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.

**HOIATUS**

(ET)

See teenindusjuhend on saadaval ainult inglise keeles.

- Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest.
- Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist.
- Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.

**VAROITUS**

(FI)

Tämä huolto-ohje on saatavilla vain englanniksi.

- Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla.
- Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen.
- Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.

**ATTENTION**

(FR)

Ce manuel d'installation et de maintenance est disponible uniquement en anglais.

- Si le technicien d'un client a besoin de ce manuel dans une langue autre que l'anglais, il incombe au client de le faire traduire.
- Ne pas tenter d'intervenir sur les équipements tant que ce manuel d'installation et de maintenance n'a pas été consulté et compris.
- Le non-respect de cet avertissement peut entraîner chez le technicien, l'opérateur ou le patient des blessures dues à des dangers électriques, mécaniques ou autres.

**WARNUNG**

(DE)

Diese Serviceanleitung existiert nur in englischer Sprache.

- Falls ein fremder Kundendienst eine andere Sprache benötigt, ist es Aufgabe des Kunden für eine entsprechende Übersetzung zu sorgen.
- Versuchen Sie nicht diese Anlage zu warten, ohne diese Serviceanleitung gelesen und verstanden zu haben.
- Wird diese Warnung nicht beachtet, so kann es zu Verletzungen des Kundendiensttechnikers, des Bedieners oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.

**ΠΡΟΕΙΔΟΠΟΙΗΣΗ**

(EL)

Το παρόν εγχειρίδιο σέρβις διατίθεται μόνο στα αγγλικά.

- Εάν ο τεχνικός σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει τις υπηρεσίες μετάφρασης.
- Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό αν δεν έχετε συμβουλευτεί και κατανοήσει το παρόν εγχειρίδιο σέρβις.
- Αν δεν προσέξετε την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στον τεχνικό σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.

**FIGYELMEZTETÉS**

(HU)

Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el.

- Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészíttetése.
- Ne próbálja elkezdni használni a berendezést, amíg a karbantartási kézikönyvben leírtakat nem értelmezték.
- Ezen figyelmeztetés figyelmen kívül hagyása a szolgáltató, működtető vagy a beteg áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.

**AÐVÖRUN**

(IS)

Þessi þjónustuhandbók er aðeins fáanleg á ensku.

- Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálþjónustu.
- Reynið ekki að afgreiða tækið nema að þessi þjónustuhandbók hefur verið skoðuð og skilin.
- Brot á sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklings frá raflosti, vélrænu eða öðrum áhættum.

**AVVERTENZA**

(IT)

Il presente manuale di manutenzione è disponibile soltanto in lingua inglese.

- Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione.
- Procedere alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto.
- Il mancato rispetto della presente avvertenza potrebbe causare lesioni all'addetto alla manutenzione, all'operatore o ai pazienti provocate da scosse elettriche, urti meccanici altri rischi.

**警告**

(JA)

このサービスマニュアルには英語版しかありません。

- サービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。
- このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないでください。
- この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

**경고  
(KO)**

본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다.

- 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우, 번역 서비스를 제공하는 것은 고객의 책임입니다.
- 본 서비스 매뉴얼을 참조하여 숙지하지 않은 이상 해당 장비를 수리하려고 시도하지 마십시오.
- 본 경고 사항에 유의하지 않으면 전기 쇼크, 기계적 위험, 또는 기타 위험으로 인해 서비스 제공자, 사용자 또는 환자에게 부상을 입힐 수 있습니다.

**BRĪDINĀJUMS  
(LV)**

Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā.

- Ja klienta apkopes sniedzējam nepieciešama informācija citā valodā, klienta pienākums ir nodrošināt tulkojumu.
- Neveiciet aprikojuma apkopi bez apkopes rokasgrāmatas izlasīšanas un saprašanas.
- Šī brīdinājuma neievērošanas rezultātā var rasties elektriskās strāvas trieciena, mehānisku vai citu faktoru izraisītu traumu risks apkopes sniedzējam, operatoram vai pacientam.

**ISPĒJIMAS  
(LT)**

Šis eksploatavimo vadovas yra tik anglų kalba.

- Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba – ne anglų, suteikti vertimo paslaugas privalo klientas.
- Nemėginkite atlikti įrangos techninės priežiūros, jei neperskaitėte ar nesupratote šio eksploatavimo vadovo.
- Jei nepaisysite šio įspėjimo, galimi paslaugų tiekėjo, operatoriaus ar paciento sužalojimai dėl elektros šoko, mechaninių ar kitų pavojų.

**ADVARSEL  
(NO)**

Denne servicehåndboken finnes bare på engelsk.

- Hvis kundens serviceleverandør har bruk for et annet språk, er det kundens ansvar å sørge for oversettelse.
- Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått.
- Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer.

**OSTRZEŻENIE  
(PL)**

Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.

- Jeśli serwisant klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta.
- Nie próbować serwisować urządzenia bez zapoznania się z niniejszym podręcznikiem serwisowym i zrozumienia go.
- Niezastosowanie się do tego ostrzeżenia może doprowadzić do obrażeń serwisanta, operatora lub pacjenta w wyniku porażenia prądem elektrycznym, zagrożenia mechanicznego bądź innego.

**ATENÇÃO  
(PT-BR)**

Este manual de assistência técnica encontra-se disponível unicamente em inglês.

- Se outro serviço de assistência técnica solicitar a tradução deste manual, caberá ao cliente fornecer os serviços de tradução.
- Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica.
- A não observância deste aviso pode ocasionar ferimentos no técnico, operador ou paciente decorrentes de choques elétricos, mecânicos ou outros.

**ATENÇÃO**  
(PT-PT)

Este manual de assistência técnica só se encontra disponível em inglês.

- Se qualquer outro serviço de assistência técnica solicitar este manual noutra língua, é da responsabilidade do cliente fornecer os serviços de tradução.
- Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica.
- O não cumprimento deste aviso pode colocar em perigo a segurança do técnico, do operador ou do paciente devido a choques eléctricos, mecânicos ou outros.

**ATENȚIE**  
(RO)

Acest manual de service este disponibil doar în limba engleză.

- Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere.
- Nu încercați să reparați echipamentul decât ulterior consultării și înțelegerii acestui manual de service.
- Ignorarea acestui avertisment ar putea duce la rănirea depanatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.

**ОСТОРОЖНО!**  
(RU)

Данное руководство по техническому обслуживанию представлено только на английском языке.

- Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует самостоятельно обеспечить перевод.
- Перед техническим обслуживанием оборудования обязательно обратитесь к данному руководству и поймите изложенные в нем сведения.
- Несоблюдение требований данного предупреждения может привести к тому, что специалист по техобслуживанию, оператор или пациент получит удар электрическим током, механическую травму или другое повреждение.

**UPOZORENJE**  
(SR)

Ovo servisno uputstvo je dostupno samo na engleskom jeziku.

- Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge.
- Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo.
- Zanemarivanje ovog upozorenja može dovesti do povređivanja serviser, rukovaoca ili pacijenta usled strujnog udara ili mehaničkih i drugih opasnosti.

**UPOZORNENIE**  
(SK)

Tento návod na obsluhu je k dispozícii len v angličtine.

- Ak zákazníkov poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka.
- Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obsluhu a neporozumiete mu.
- Zanedbanie tohto upozornenia môže spôsobiť zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie.

**ATENCIÓN**  
(ES)

Este manual de servicio sólo existe en inglés.

- Si el encargado de mantenimiento de un cliente necesita un idioma que no sea el inglés, el cliente deberá encargarse de la traducción del manual.
- No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio.
- La no observancia del presente aviso puede dar lugar a que el proveedor de servicios, el operador o el paciente sufran lesiones provocadas por causas eléctricas, mecánicas de otra naturaleza.

**VARNING**

(SV)

Den här servicehandboken finns bara tillgänglig på engelska.

- Om en kunds servicetekniker har behov av ett annat språk än engelska, ansvarar kunden för att tillhandahålla översättningstjänster.
- Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken.
- Om du inte tar hänsyn till den här varningen kan det resultera i skador på serviceteknikern, operatören eller patienten till följd av elektriska stötar, mekaniska faror eller andra faror.

**OPOZORILO**

(SL)

Ta servisni priročnik je na voljo samo v angleškem jeziku.

- Če ponudnik storitve stranke potrebuje priročnik v drugem jeziku, mora stranka zagotoviti prevod.
- Ne poskušajte servisirati opreme, če tega priročnika niste v celoti prebrali in razumeli.
- Če tega opozorila ne upoštevate, se lahko zaradi električnega udara, mehanskih ali drugih nevarnosti poškoduje ponudnik storitev, operater ali bolnik.

**DİKKAT**

(TR)

Bu servis kılavuzunun sadece ingilizcesi mevcuttur.

- Eğer müşteri teknisyeni bu kılavuzu ingilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer.
- Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz.
- Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.

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## **Chapter 1      Damage in Transportation**

### **1.      Damage in Transportation**

All packages should be closely examined at time of delivery. If damage is apparent, have notation "Damage in Shipment" written on all copies of the freight or express bill before delivery is accepted or "signed for" by a General Electric representative or a hospital receiving agent. Whether noted or concealed, damage **MUST** be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

To file a report:

Call 1-800-548-3366 and use option 6

Or

Contact your local service coordinator for more information on this process.

## Chapter 2 Safety Alert Usage

### 2. Safety Alert Usage

The following ANSI (American National Standards Institute) Z535.4 definitions are applied to notify users of the potential for personal injury:



INDICATES AN IMMINENTLY HAZARDOUS SITUATION THAT, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY. DANGER IS LIMITED TO EXTREME SITUATIONS.



INDICATES A POTENTIAL HAZARDOUS SITUATION THAT, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.



INDICATES A POTENTIAL HAZARDOUS SITUATION THAT, IF NOT AVOIDED, MAY RESULTING MINOR OR MODERATE INJURY.

The following ANSI Z535.2 definition is applied to notify users of the potential for property damage only:



Indicates information or company policy that relates directly or indirectly to the safety of personnel or protection of property.

## Chapter 3 Overview

### 3. Overview

The Magnet Handling manual addresses moving, storage, delivery and installation of any R, RD, HM, W, WB or UA (as defined by the first character of the magnet serial number) Series zero boil-off magnet. The sequence of events involved in magnet delivery and installation, along with functions, responsibilities and associated documentation are shown below.

Photos and images contained within this manual are representative of the system(s) and configuration(s) shipped. The system received may vary slightly.

The latest release of this manual can be obtained through the support documentation library at [gehealthcare.com](http://gehealthcare.com) or through your GE Healthcare Field Service Representative. Before using this document, confirm that you are using the most current released version of this document.

#### Magnet Handling Functions and Responsibilities

	Function	Responsibility	Reference Document
1	MR Magnet Safety Document Review & Compliance	GE Project Manager of Installation (PMI), GE Field Engineer and Rigger	5452735, MR Service Safety Manual
2	Site Delivery and Review: <ul style="list-style-type: none"> <li>• Access and Route</li> <li>• Clearances</li> </ul>	GE Project Manager of Installation (PMI), GE Field Engineer and Rigger	Appropriate Pre-Installation manual and this Delivery and Installation manual.
3	Magnet Transportation	Transportation Team, Rigger	Truck Loading Specs, this document
4	Magnet Delivery	Rigger	Magnet Unloading & Movement Chapter in this manual.
5	Place VibroAcoustic Damping Mats (Sites receiving option)	Rigger	VibroAcoustic Damping Mat Placement Chapter in this manual.
6	Moving Magnet to MR Suite	Rigger	Moving Magnet to MR Suite Chapter in this manual.
7	Magnet Leveling and Bolt Down	Rigger	Magnet Leveling, Foot Shimming and Bolt Down Chapter in this manual.
8	Magnet Cryocooler Connections pending room installation as soon as possible but no later than <b>24 Hours</b>	GE Field Engineer	Magnet Storage Conditions, Pending Ramp Chapter in this manual.
9	Magnet Conversion to Operating Configuration	GE Field Engineer	Installation/Conversion sections (for the defined magnet style) in the appropriate Magnet & Cryogen Manual
10	Exhaust Gas Vent Connection as soon as possible - must be done prior to ramping magnet	GE Field Engineer	Exhaust Gas Vent Connection Section (for the defined magnet style) in the appropriate Magnet & Cryogen Manual
11	Continue with Magnet Commissioning using the Set-Up and Calibration Chapter (for the defined magnet style) in the appropriate Magnet and Cryogen Manual: 5495019, Magnet & Cryogen Manual for Actively Shimmed Magnets (1.5T R Series, 3.0T W, WB Series) or 5495018, Magnet & Cryogen Manual for Passively Shimmed Magnets (1.5T HM, RD Series, 3.0T UA Series)		

## Chapter 4 Truck Loading Specs



### CAUTION

REVIEW GUIDELINES WITH CARRIER PRIOR TO TRANSPORTING MAGNET.  
THESE GUIDELINES MUST BE FOLLOWED TO PREVENT ANY POTENTIAL DAMAGE TO THE MAGNET DURING SHIPPING.



### NOTICE

Any other shipping configuration MUST be demonstrated through testing and be approved by GE Medical Systems.

#### 4. Magnet Loading Requirements

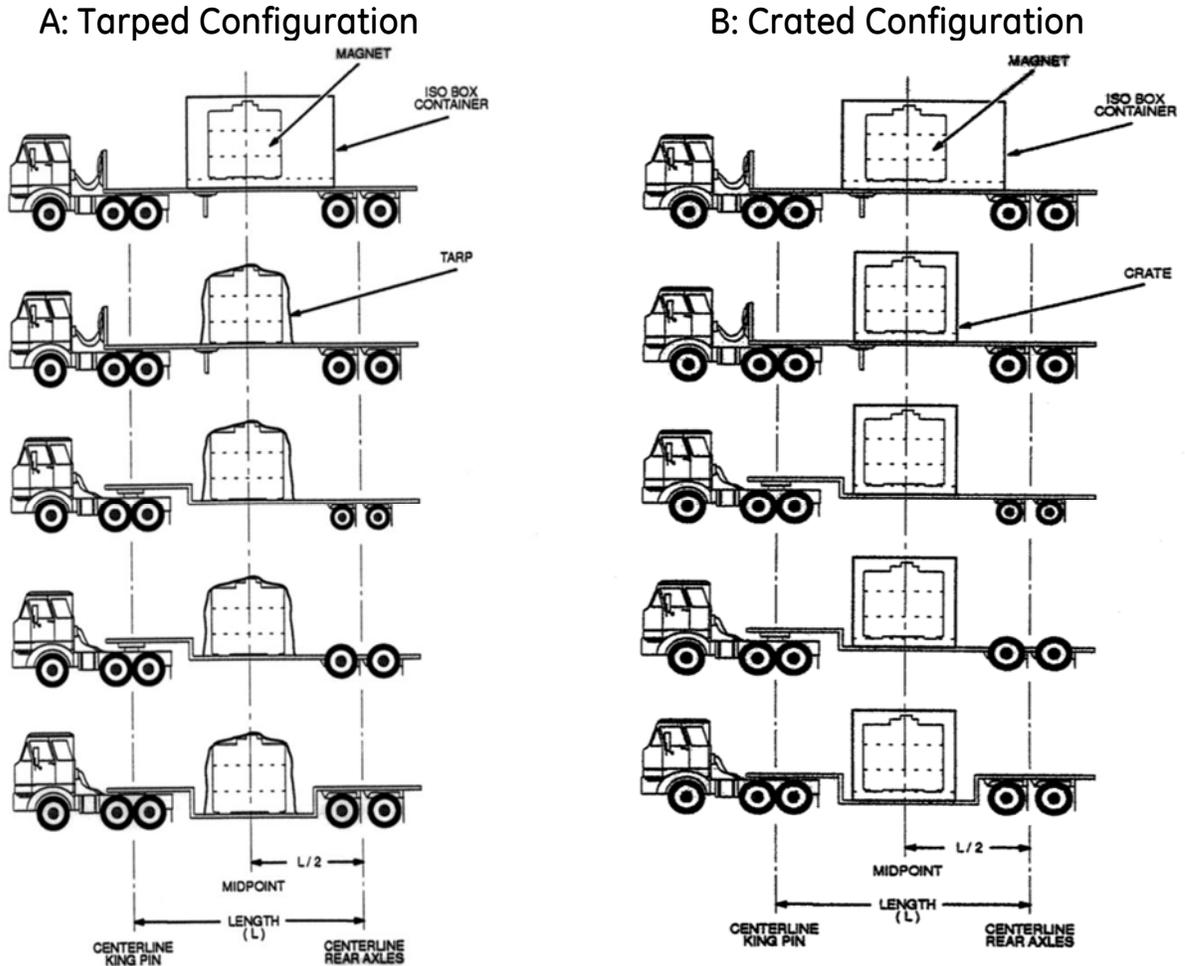
- Air Ride trailers MUST be used.
- Only ONE magnet per trailer is allowed, except 1.5T R, RD and HM Series and 3.0T UA Series magnets, where two are allowed (Illustration 4-2).
- Magnet must be centered on trailer with magnet bore parallel to truck per Illustration 4-1, and 4-2.
- Magnet MUST NOT be positioned over trailer axles.

Serialization	Max Tilt Allowed When Suspended by Lifting Lugs	Shipping Modes Allowable (Note 1)	Forklift Capability (Note 2)	Shipping Capability	Max Shock Load	Comments
R, RD	30°	A, T, B	Yes	Warm & Cold	1.5 G's	Notes 2, 3 Apply
W, WB	30°	A, T, B	Yes	Warm & Cold	1.5 G's	Notes 2, 3 Apply
HM	30°	A, T, B	Yes	Warm & Cold	1.5 G's	Notes 2, 3 Apply
UA	30°	A, T, B	Yes	Warm & Cold	1.5 G's	Notes 2, 3 Apply

**Notes:**

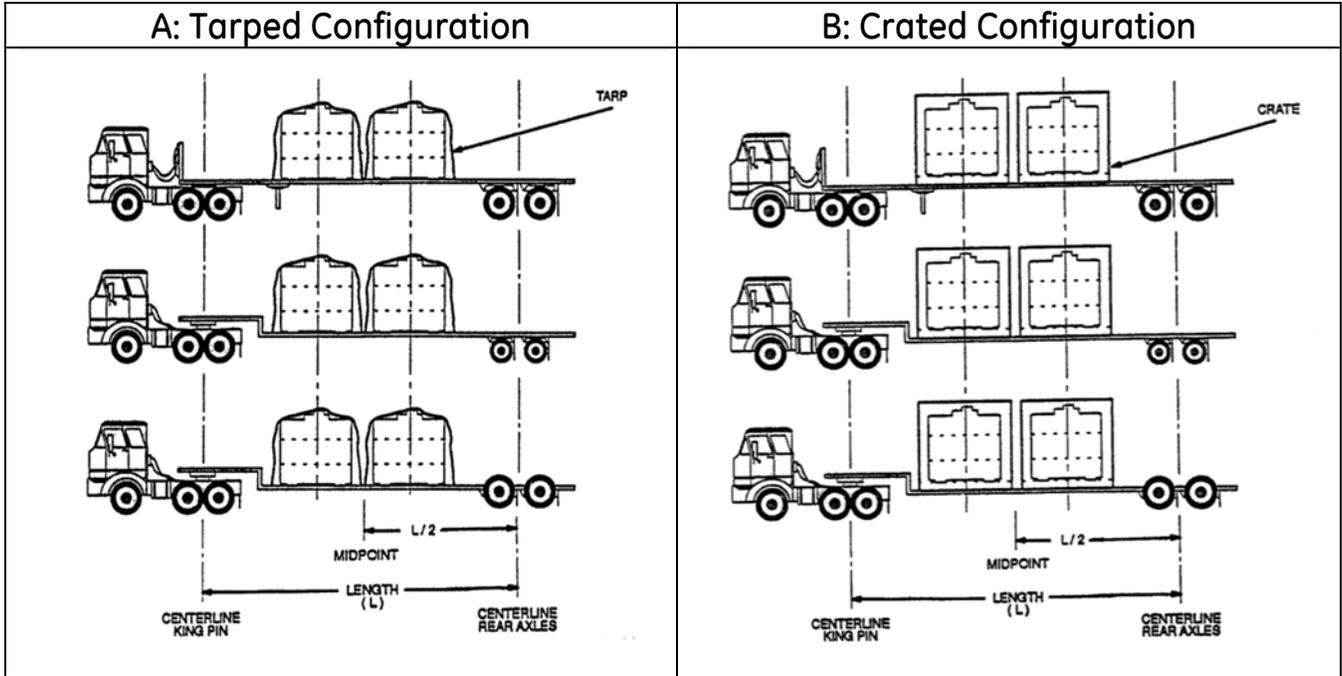
1. Keys for Shipping Mode Symbols:
  - a. A-Airplane (any plane that has openings large enough to accept a magnet).
  - b. T-Air Ride Trailer (refer to the attached illustrations for magnet loading requirements). Magnets should be centered between trailer axles and NOT be placed over trailer axles.
  - c. B-Boat or ocean going ship.
2. Extreme care must be exercised during forklift. The magnet crate must be picked up from the sides only. The forks MUST be placed directly under the four (4) feet of the magnet. The magnet can be identified by the steel plates attached to the pallet. Refer to Section 6 for more detailed handling requirements pertaining to forklift and/or crane moves.
3. 1.5T R, RD and HM Series and 3.0T UA Series magnets may be shipped with two on the same truck. See loading illustration 4-2 for details. Acceptable dual load configurations are as follows:
  - a. Two 1.5T (R, RD and HM Series) Magnets or
  - b. Two 3.0T UA Series Magnets or
  - c. One 1.5T (R, RD and HM Series) Magnet and One 3.0T UA Series Magnet.
4. Crate and/or Frame Top and sides are NOT to be used to secure the magnet to the trailer. Magnets should be secured to trailer using crate/magnet base.

Magnet Ground Transportation Truck Loading Requirements  
Illustration 4-1



Only way W, WB magnets can be shipped

Two Magnet Ground Transportation Truck Loading Requirements  
1.5T R, RD and HM Series, 3.0T UA Series Only  
Illustration 4-2



## Chapter 5 Pre-Delivery Instructions



### NOTICE

- Rigger is responsible for actual equipment/procedures used to lift and move a magnet into the customer facility, including through a raised opening in an exterior wall. The following EXAMPLE procedure only outlines the concept of one method.
- Impacts/jolts/drops to the magnet while lifting/moving/lowering the magnet can cause expensive internal magnet damage. Lift/move/lower smoothly. Do not allow the magnet to bump or hit anything forcefully. Avoid tilting the magnet more than the maximum tilt (30° from horizontal level) as magnet damage may result. Do not apply any force to the magnet enclosures. Protect all customer surfaces during any and all move operations.
- Make sure all equipment anchors are located in conformance with the site's architectural drawings and are installed and tested per the *Anchor Hardware Requirements for MR Equipment inside RF Shield Room* section of the appropriate Pre-Installation manual. Improperly located anchors can cause image quality issues.

### 5. Pre-Delivery Instructions

- 5.1 Before magnet delivery the GE PMI and Rigger **must**:
  - 5.1.1. Visit the magnet site with the rigging foreman before magnet delivery to plan the move. GE PMI must hand deliver a copy of this document to the rigging foreman.
  - 5.1.2. Review the guidelines for shipping/handling and for equipment/tools with the rigging foremen in Magnet Unloading & Movement Chapter of this manual.
  - 5.1.3. Caution the rigger that the magnet is extremely fragile. Sudden jolts can damage the magnet. (Make riggers aware of the cost of a magnet replacement. This usually promotes more care while handling the magnet.)
  - 5.1.4. Make sure all routes and paths leading to the magnet room are level and free from obstacles and holes. (The rigger will be required to construct platforms where needed.)
  - 5.1.5. Verify clearance dimensions along the path to the magnet room meet the requirements stated in the appropriate Pre-Installation manual. In the case of a magnet being lifted by a crane through a raised opening, make sure the opening is at least 96 in. (2,439 mm) wide and 102 in. (2,591 mm) tall.
  - 5.1.6. If roller dollies are to be used, have the rigger bring steel plates to place along the delivery route.
  - 5.1.7. Rigger must take actions necessary to ensure that walls, floors, etc. along the transportation route/path are be protected from potential damage.
- 5.2 Before magnet delivery the GE PMI and Shield Room Vendor **must**:
  - 5.2.1. Verify that floor levelness specifications stated in the appropriate Pre-Installation manual are met after the finished flooring is installed.
  - 5.2.2. Verify that the vent is located according to the specifications stated in the appropriate Pre-Installation manual.
  - 5.2.3. Verify that markings are present on the magnet room floor where VibroAcoustic Damping Mats will be located if the site is getting the VibroAcoustic Damping Option A or the SV VibroAcoustic Kit. Markings should be in accordance to the specifications stated in the appropriate Pre-Installation manual.

## Chapter 6 Magnet Unloading and Movement



### **WARNING**

POTENTIAL ASPHYXIATION HAZARD.

LOSS OF MAGNET VACUUM WILL RESULT IN THE RAPID EXPULSION OF HELIUM GAS, WHICH CAN CAUSE ASPHYXIATION IN ENCLOSED AREAS. USE EXTREME CAUTION TO NOT CONTACT OR DAMAGE THE VACUUM VESSEL DURING MAGNET TRANSIT OR SITING.



### **WARNING**

POTENTIAL INJURY HAZARD.

MAGNET IS AN UNBALANCED LOAD. TILTING CAN RESULT IN A HAZARDOUS CONDITION THAT CAN RESULT IN MAGNET DAMAGE OR SERIOUS PERSONAL INJURY.

TO PREVENT TILTING:

- MAKE SURE THE LIFTING APPARATUS (CRANE, SPREADER BEAM, ETC.) MEETS THE SPECIFICATIONS STATED IN THIS MANUAL
- ORIENT SPREADER BEAM PARALLEL TO LIFTING RAILS.
- ADJUST LIFTING CABLES/SLINGS AND SPREADER BEAM LIFT POINT TO LEVEL MAGNET BEFORE FULLY LIFTING MAGNET OFF THE SURFACE.
- MAKE SURE THE ENTIRE AREA WHERE LIFTING WILL OCCUR IS FREE OF OBSTRUCTIONS AND UNAUTHORIZED PERSONNEL.
- MAKE SURE THE SURFACE WHERE THE MAGNET WILL BE PLACED AFTER LIFTING IS FLAT.
- DO NOT CRANE LIFT A MAGNET DURING DANGEROUS WEATHER CONDITIONS.



### **NOTICE**

- Tasks in this section are to be performed by riggers, not by GE Service Personnel.
- Weights referenced in Equipment Requirements Tables are RIGGING weights (rounded up from actual weights) and are not actual shipping weights. Refer to magnet shipping documents for ACTUAL weights of Magnet and Crate.
- Do NOT use a crane to lift a magnet that is on a pallet or inside a crate. Crane lifting can ONLY be done using the magnet lifting rails, which are not accessible while the magnet is inside the crate.

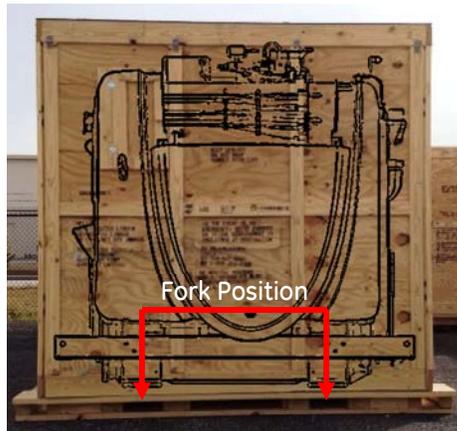
**6. Magnet Unloading and Movement**

**6.1 Shipping Cage/Crate Configurations**



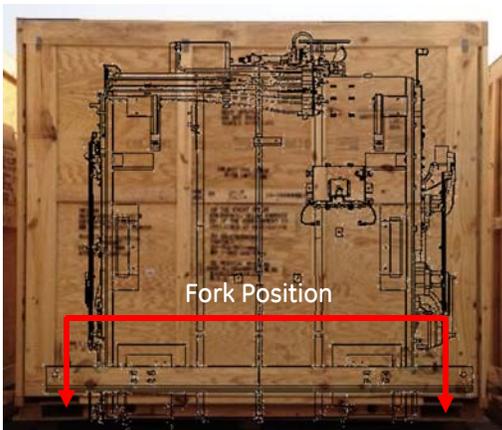
Domestic Shipping Cage, 5151624

- Approved for use on truck transportation ONLY. (Not approved for flight usage.)
- Cage/Frame positioned over/around magnet after magnet is loaded onto truck.
- Cage must be removed prior magnet unload from truck (making orange beams accessible).



Shipping Crate, 2225808 or 5140792 or 5165707

- Approved for use on truck or air transportation.
- Forklift approved moves ONLY (crane movement of magnet in crate not permitted).
- Crate designed to position forklift forks directly beneath magnet feet - lifting from the SIDE of the magnet, perpendicular to the magnet bore
- Minimum distance between forks = 40 in. (1,016 mm)



96-inch Shipping Crate, 5334870

- Approved for use on truck or air transportation.
- Forklift approved moves ONLY (crane movement of magnet in crate not permitted).
- Crate designed to position forklift forks beneath orange lifting beams mounted onto magnet feet - lifting from the SIDE of the magnet, perpendicular to the magnet bore
- Minimum distance between forks = 81.1 in. (2,060 mm)

*Note: Magnet images superimposed on crates are for reference only. Magnet images shown are representative and may differ from the configuration shipped.*

6.2 Equipment Requirement Tables

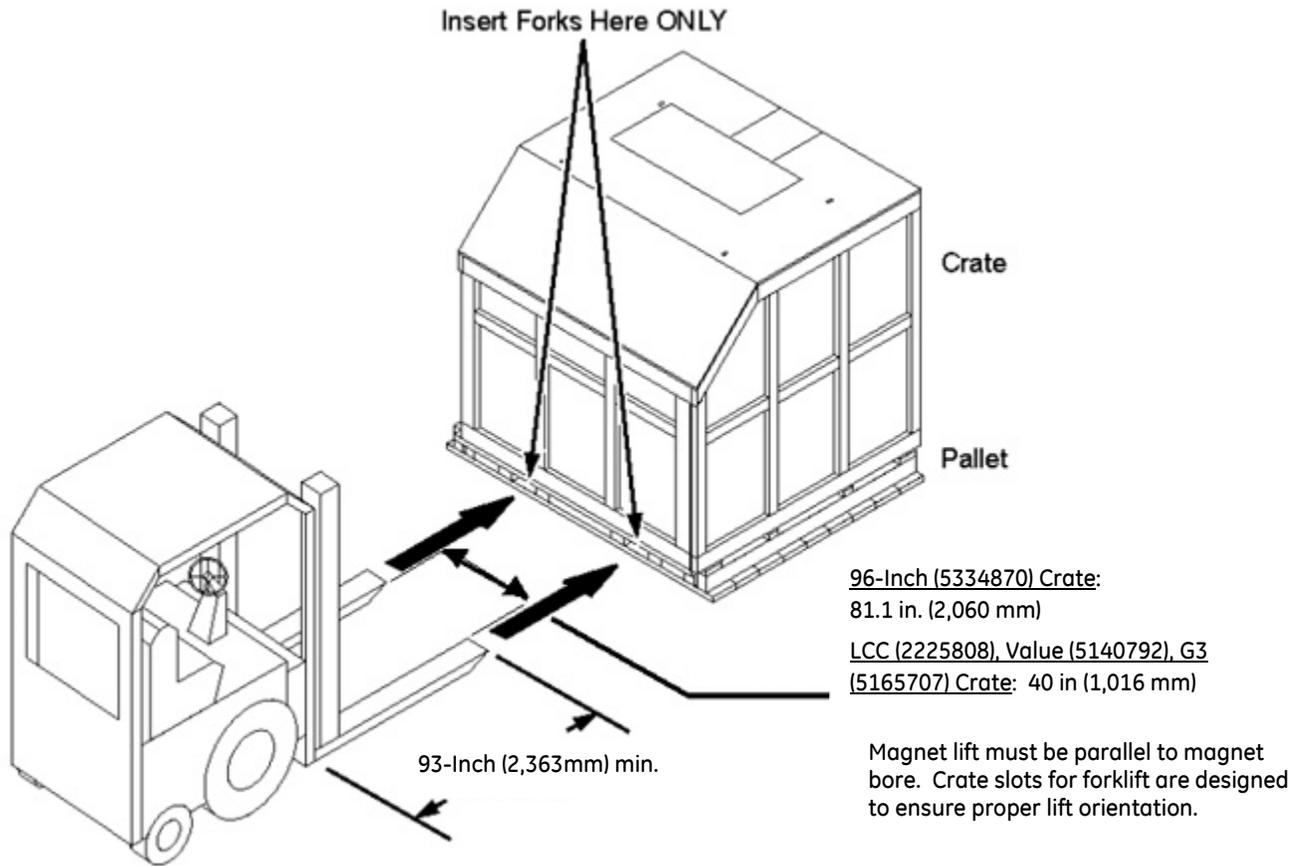
Forklift Requirements				
Forklift and Forklift Equipment must be rated for the referenced Magnet Loads				
Item & Quantity	Equipment Specification/Rating		Furnished By	Function
Forklift Quantity = 1	MAGNET ONLY <i>(as shipped configuration with gradient, does not include Crate)</i> Weight	<u>1.5T R, RD Series:</u> 12,100 lbs. (5,490 kg) <u>1.5T HM Series:</u> 11,500 lbs. (5,217 kg) <u>3.0T W, WB Series:</u> 25,800 lbs. (11,703 kg) <u>3.0T UA Series:</u> 16,800 lbs. (7,621 kg)	Rigger	Unloading or Moving Magnet
	CRATED MAGNET Weight	<u>1.5T R, RD Series:</u> 14,100 lbs. (6,396 kg) <u>1.5T HM Series:</u> 13,500 lbs. (6,124 kg) <u>3.0T W, WB Series:</u> 27,800 lbs. (12,610 kg) <u>3.0T UA Series:</u> 18,800 lbs. (8,528 kg)		
	MAGNET ONLY Minimum Distance Between Forks using Lifting Rails	<u>1.5T R, RD Series, 3.0T W, WB Series, 3.0T UA Series:</u> 80 in. (2,032 mm) <u>1.5T HM Series:</u> 70 in (1,778 mm)		
	CRATED MAGNET Minimum Distance Between Forks	<u>96-Inch (5334870) Crate:</u> 81.1 in. (2,060 mm) <u>LCC (2225808), Value (5140792), G3 (5165707) Crate:</u> 40 in (1,016 mm)		
	Minimum Fork Length	93 in. (2,363 mm)		

Crane Requirements				
Crane and Crane Equipment must be rated for the referenced Magnet Loads				
Item & Quantity	Equipment Specification/Rating		Furnished By	Function
Crane Quantity = 1	MAGNET ONLY <i>(as shipped configuration with gradient, does not include Crate)</i> Weight	<u>1.5T R, RD Series:</u> 12,100 lbs. (5,490 kg) <u>1.5T HM Series:</u> 11,500 lbs. (5,217 kg) <u>3.0T W, WB Series:</u> 25,800 lbs. (11,703 kg) <u>3.0T UA Series:</u> 16,800 lbs. (7,621 kg)	Rigger	Unloading or Moving Magnet
	Crate ONLY Weight	2000 lbs. (908 kg)		
Spreader Beam Quantity = 1	Distance Between Lifting Points, Underside of Spreader Beam	90 in. to 96 in. (2,286 mm to 2,439 mm)		
Slings, Hoists, Bridles, Shackles	Requirement to be determined by rigger. <i>Refer to Magnet Weights noted above</i>			

<b>Miscellaneous Equipment and Tools</b>			
<b>Miscellaneous Equipment and Tools must be rated for the referenced Magnet Loads</b>			
Item	Equipment/Tool Required	Responsible	Function
Magnet Mechanical Interface Drawing (Bare Magnet) NOTE: Interface Drawings may NOT contain shipping configurations and are FOR REFERENCE ONLY	<u>1.5T R, RD Series:</u> 5334538IDW <u>1.5T HM Series:</u> 5337016IDW <u>3.0T W, WB Series:</u> 5171937IDW or 5304995IDW <u>3.0T UA Series:</u> 5390616IDW	Project Manager of Installation (PMI)	Identify magnet dimensions and features
MAGNET ONLY <i>(as shipped configuration with gradient, does not include Crate)</i> Weight	<u>1.5T R, RD Series:</u> 12,100 lbs. (5,490 kg) <u>1.5T HM Series:</u> 11,500 lbs. (5,217 kg) <u>3.0T W, WB Series:</u> 25,800 lbs. (11,703 kg) <u>3.0T UA Series:</u> 16,800 lbs. (7,621 kg)	Reference	Moving Magnet
Hydraulic or Toe Jack	Must support one end of magnet on two jacks or both ends of magnet on 4 jacks. <i>Refer to Magnet Weights noted above</i>	Rigger	Raise Magnet for roller dollies or leveling plates
Roller Dollies	Must support magnet on 4 dollies. <i>Refer to Magnet Weights noted above</i>	Rigger	Moving Magnet
Level (Length)	24 in. to 36 in. (610 mm to 915 mm) < 12 in. (305 mm)	Rigger	Level the Magnet
Magnet Leveling Kit	46-260888G4	Rigger	Level the Magnet
Torque Wrench and Socket	Tighten the bolts on magnet to achieve: 250 ft-lbs (339 Nm). Deep socket size is dependent on anchor selection	Rigger	Bolt Down Magnet

- 6.3 Removal of Subsystem Crates
  - 6.3.1. During this procedure, carefully inspect all packaging for damage that may have occurred during shipping.
  - 6.3.2. Remove all subsystem crates, except the magnet crate, from the trailer/transport using a crane or forklift. Inspect all crates for visible damage. Use the procedure in Damage In Transportation to report any damage found.
  - 6.3.3. Move subsystem crates to a receiving location protected from the weather, preferably close to and at the same level as the MR suite/magnet room.
- 6.4 In-Transit Handling with Crane
  - 6.4.1. Do NOT lift the magnet/crate/pallet package using a crane.
  - 6.4.2. Crane lifting can only be done using the magnet lifting rails, which are not accessible while the magnet is inside the crate.
  - 6.4.3. Avoid tilting magnet; every effort should be made to minimize tilt during transport or movement. Tilt must NOT exceed 30° from horizontal level.
- 6.5 In-Transit Handling with Forklift, Crated Magnet
  - 6.5.1. Position a forklift meeting the requirements stated in Equipment Requirements Tables beside the magnet crate/pallet.
  - 6.5.2. Carefully insert the forklift forks completely into the holes provided in the long side of the shipping pallet.
  - 6.5.3. Smoothly lift the crate/pallet with the forklift, and move the crate/pallet to the desired location.
  - 6.5.4. Lower the entire package to rest on a flat, smooth surface. Do not rest magnet/crate/pallet on any surface that is not flat or strong enough to support the magnet/crate/pallet package.
  - 6.5.5. Avoid tilting magnet; every effort should be made to minimize tilt during transport or movement. Tilt must NOT exceed 30° from horizontal level.

Forklift Lifting Points of Magnet/Crate/Pallet Package



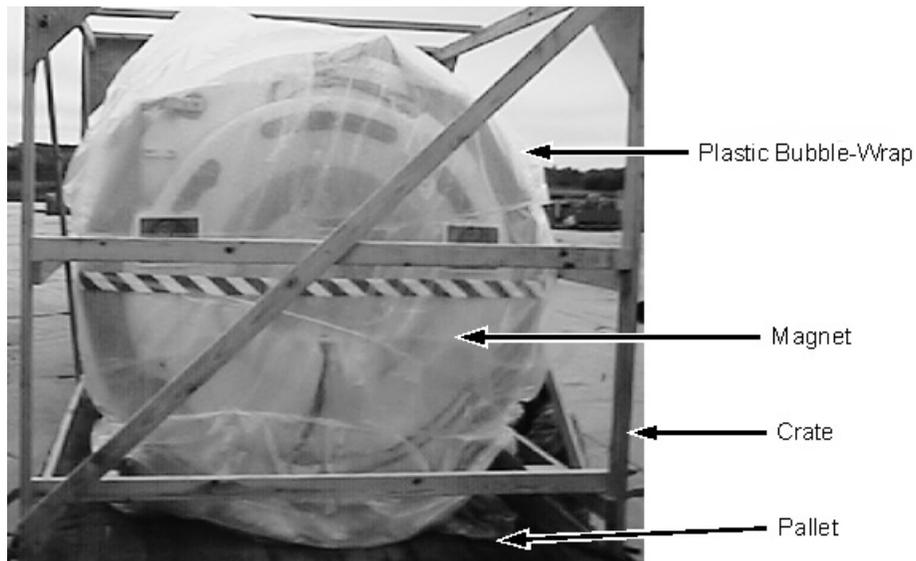
**NOTICE**

Extreme care must be exercised during forklift operations:

- Forklift must meet the minimum capacity and dimension requirements stated in Equipment Requirements Table.
- The magnet must be picked up from the magnet side orientation only with the forks inserted into the designated slots on the crate.
- The magnet is extremely fragile. Sudden jolts can damage the magnet
- Do not allow the crate/pallet to bump or hit anything forcefully.
- Avoid tilting the magnet/crate/pallet package more than the maximum tilt specified (30° from horizontal level) as magnet damage may result.

- 6.6 Removal of Shipping Cage, Cage Configuration
  - 6.6.1. Care must be taken not to scrape or hit the sides of the magnet. The magnet is shipped inside plastic bubble-wrap. The bubble-wrap should be left intact until the magnet is anchored in the magnet room.
  - 6.6.2. Remove the shipping cage from the magnet using a crane,
    - a. Strap frame in four locations.
    - b. Lift the cage straight up and move away from the magnet
  - 6.6.3. Alternative: Unbolt the boards on one end of the cage and move the cage away from the magnet in the other direction.

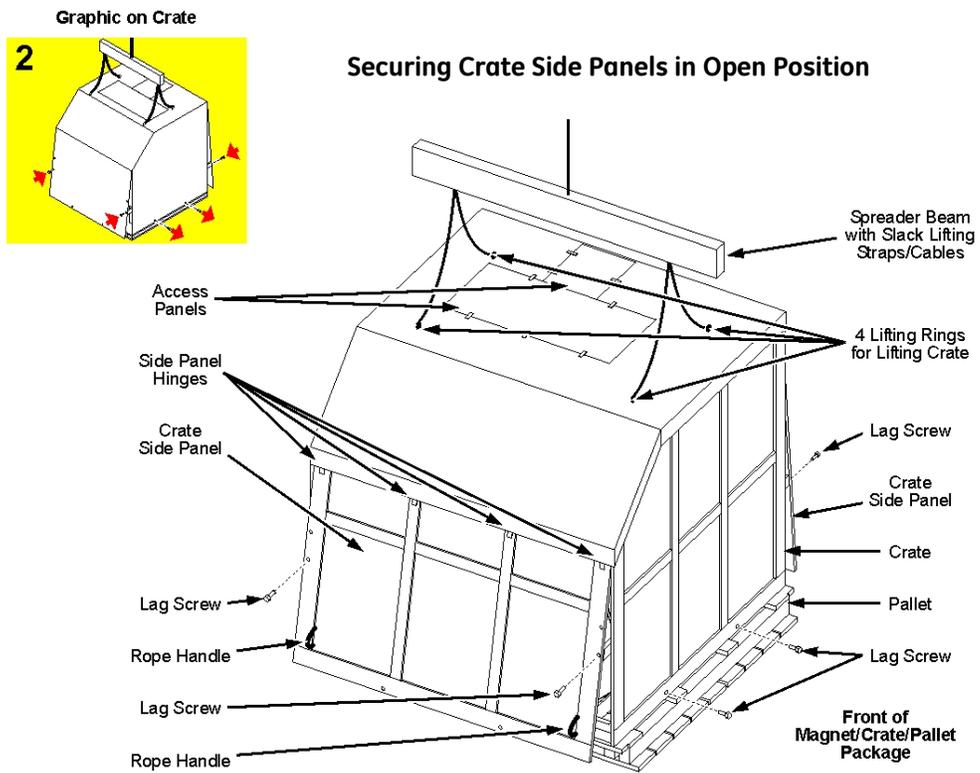
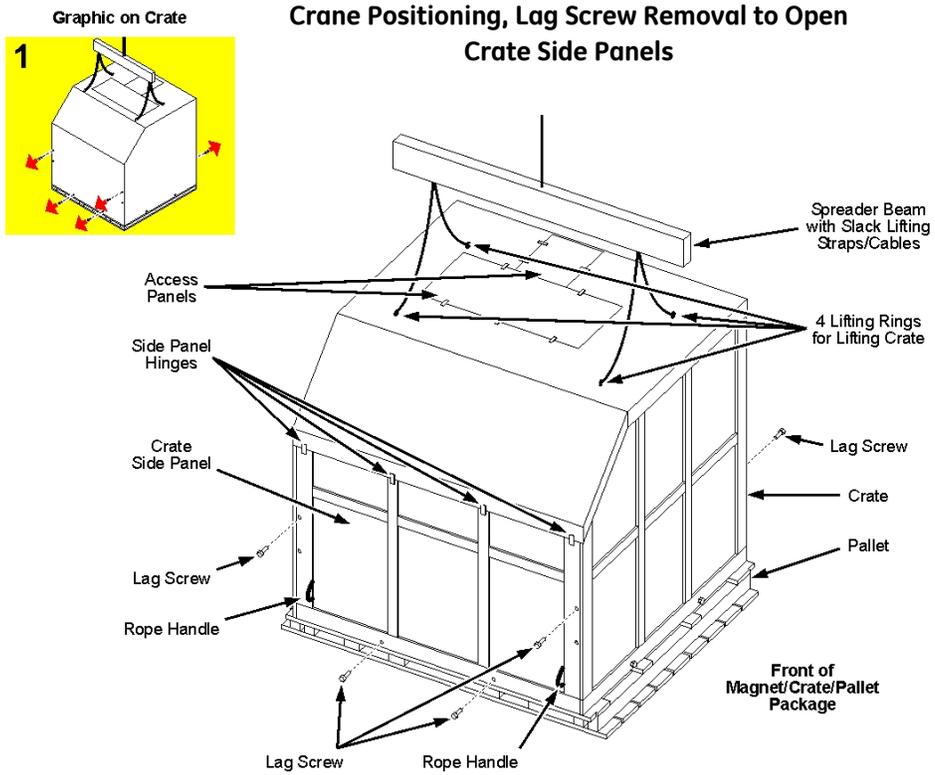
**Shipping Cage Configuration (Domestic Shipping Option)**

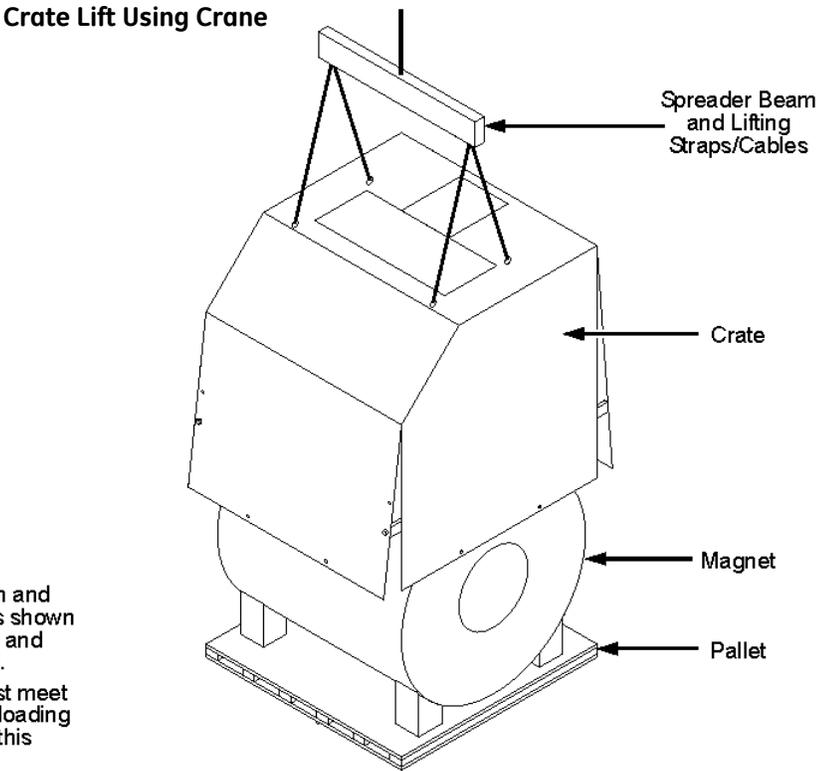
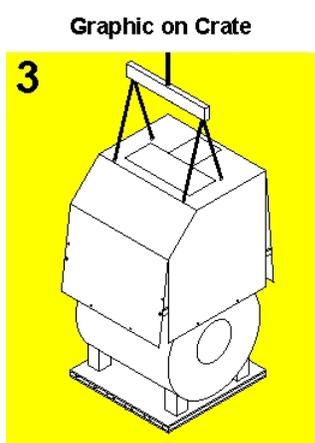
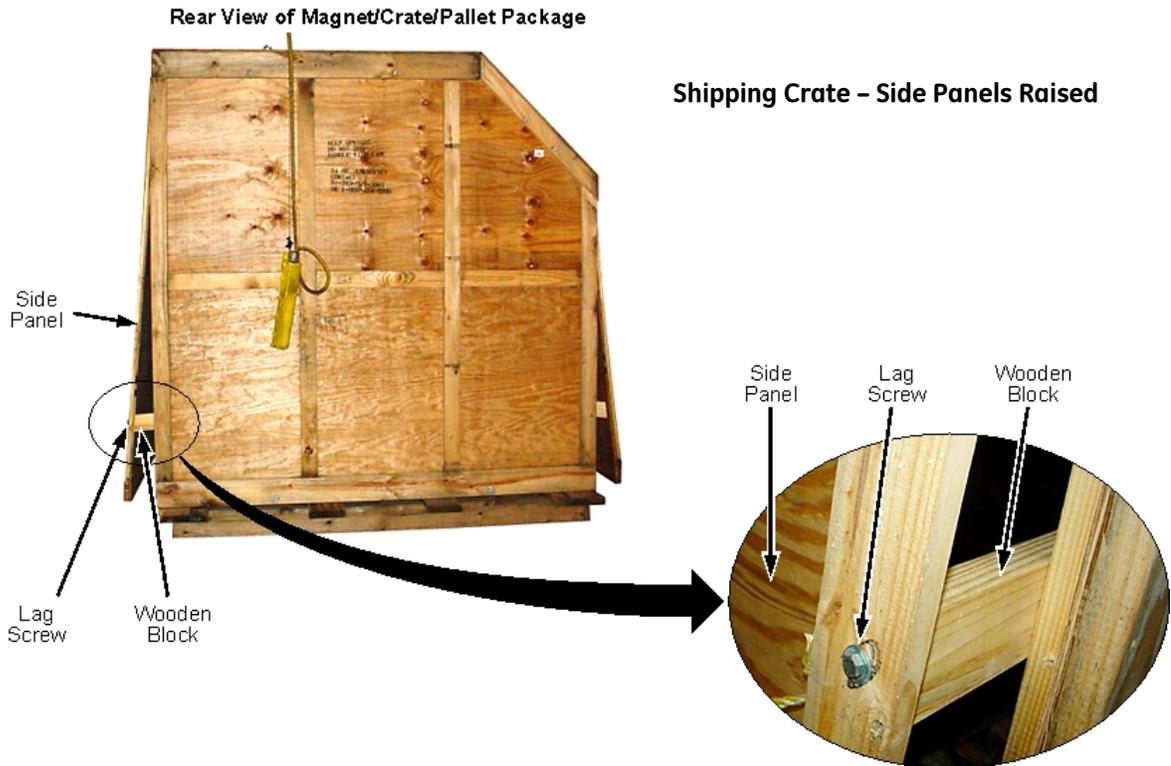


**NOTICE**

- Do NOT lift the magnet/crate/pallet package using a crane. Crane lifting can only be done using the lifting rails, which are not accessible while the magnet is inside the crate.
- Remove the magnet's shipping crate while the magnet/crate/pallet package is on the trailer/transport.
- Damage to the magnet and/or magnet enclosures may result if the crate is removed while the crate's side panels are in their closed (shipping) position, or if the crate is disassembled while the magnet is inside the crate.
- Care must be taken not to scrape or hit the sides of the magnet. The magnet is shipped inside plastic bubble-wrap. The bubble-wrap should be left intact until the magnet is anchored in the magnet room.
- Do not remove any lag screws on the crate or pallet until the crane is positioned, and the slings/cable bridles are attached to the lifting rings on the crate.

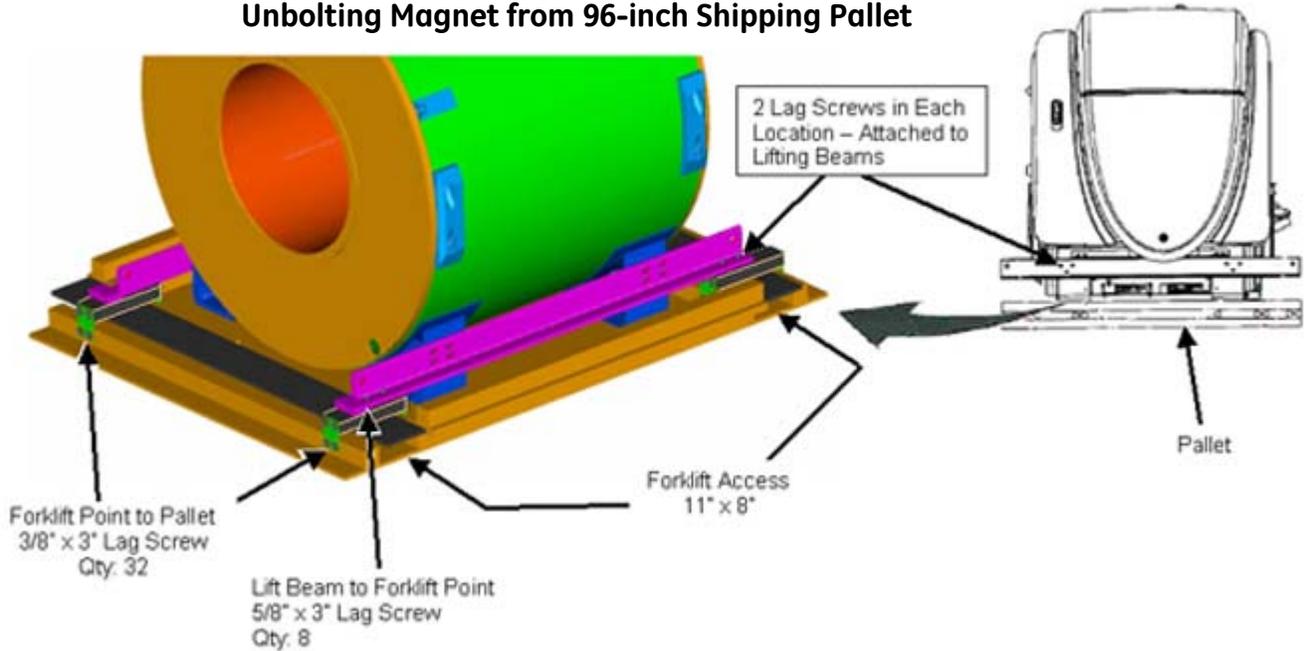
- 6.7 Removal of Shipping Crate, Crate Configuration
  - 6.7.1. Crane Positioning
    - a. Position a crane meeting the specifications stated in the Crane Requirements Table above the center of the crate.
    - b. Either a hook/shackle and slings or a spreader beam and sling/cable bridles may be used during crate removal.
    - c. Attach the slings/cable bridles to the lifting rings on top of the crate as shown.
  - 6.7.2. Shipping Crate Lifting Configuration
    - a. Remove the lag screws along the lower edges of the crate's left and right side panels that secure those panels to the pallet. (Graphic 1 on the shipping crate.) Do not remove the lag screws securing the crate's front and back end panels to the pallet until after the crate's side panels are secured in their open position.
    - b. Remove the lag screws securing the crate side panels to the crate end panels. (Graphic 1 on the shipping crate.) Do not remove the hinges along each crate side panel's upper edge.
    - c. Pull open the crate's left and right side panels using the rope handle on each side panel. (Graphic 2 on the shipping crate.) The crate's left and right side panels are hinged along their upper edges.
    - d. Swing the wooden block found inside each vertical corner of the crate outward. (See Illustration below.)
    - e. Attach the loose end of each block to the adjoining side panel using one of the lag screws removed previously. (See Illustration below.)
    - f. Remove the lag screws along the lower edges of the crate's front and back end panels that secure those panels to the pallet. (Graphic 2 on the shipping crate.)
  - 6.7.3. Lifting Crate off Pallet
    - a. Tighten the slings/cable bridles and carefully begin lifting the crate. (Graphic 3 on the shipping crate.) If the crate does not remain approximately level, carefully lower the crate and adjust the lifting configuration, then lift the crate again.
    - b. Crane lift the crate top off the magnet's shipping pallet and fully above and clearing the magnet; place the crate in a clear area.
  - 6.7.4. Removing Magnet from Pallet
    - a. Unbolt and remove the four 1 in. (25.4 mm) nuts securing the magnet to the pallet through the ORANGE lifting beams. (See example below.)
    - b. Rig and lift the magnet off the pallet in conformance with the Forklift Unloading (when using a forklift) or Crane Unloading (when using a crane) subsections of this manual.





**NOTE:** Use of a spreader beam and cable bridles or slings is shown here. A hook or shackle and slings can also be used. All equipment used must meet or exceed the size and loading specifications stated in this manual.

### Unbolting Magnet from 96-inch Shipping Pallet



#### **CAUTION**

POTENTIAL INJURY HAZARD. PUSHING MAGNET ENCLOSURES MAY RESULT IN BODILY INJURY TO PERSONNEL. DO NOT PUSH MAGNET ENCLOSURES.



#### **NOTICE**

To prevent magnet damage:

- Do not apply any force to the magnet enclosures.
- Only use equipment/tools that meet the specifications stated in Equipment Requirements Tables.
- Do not move the magnet to the MR Suite while the magnet is on its shipping pallet.
- Before moving magnet to MR Suite, refer to Moving Magnet to MR Suite.

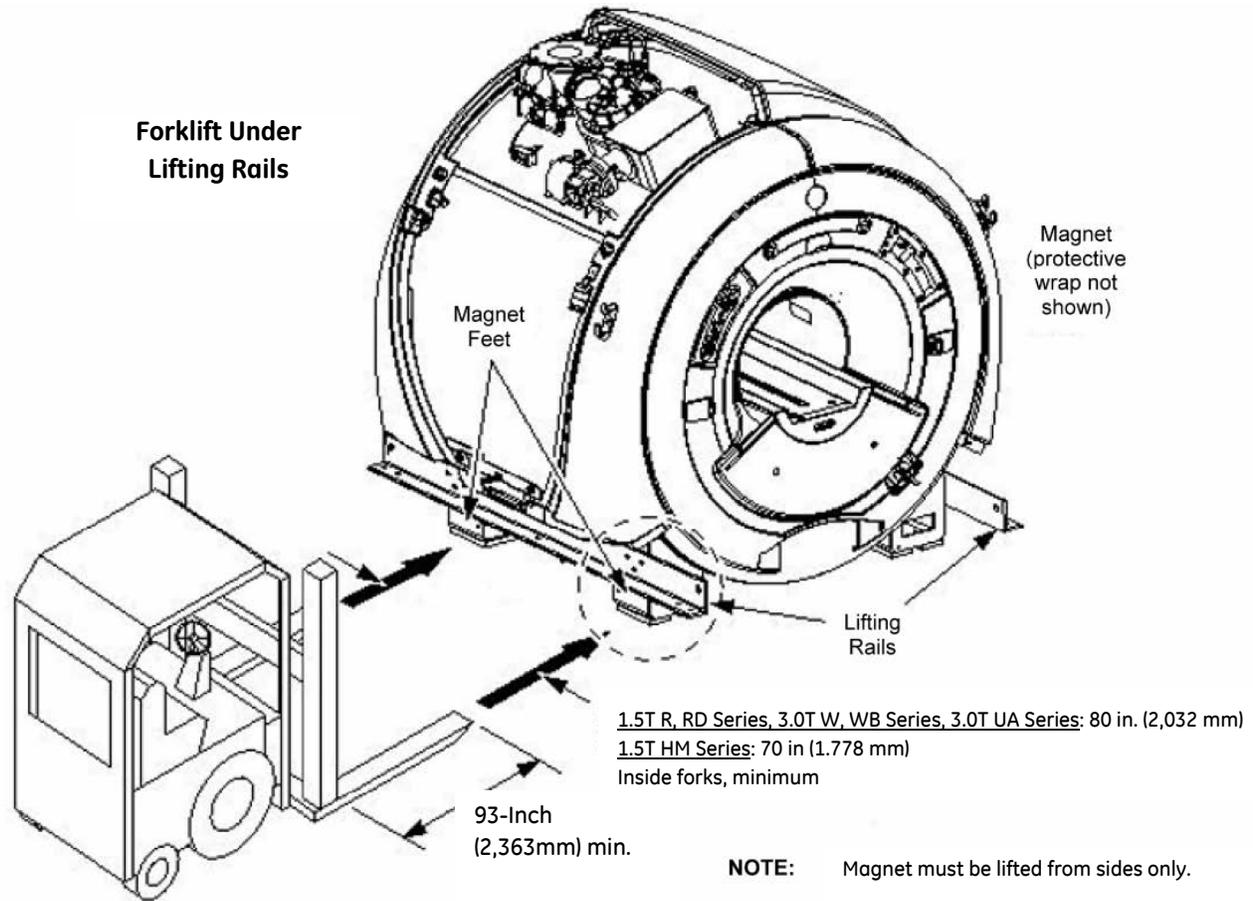
**NOTICE**

Extreme care must be exercised during forklift operation:

- Forklift must meet the minimum capacity and dimension requirements stated in Equipment Requirements Table.
- The magnet must be picked up from the sides only. The forks must be placed under the lifting rails.
- The magnet must be lifted smoothly to avoid impact or jolts to the system, which may cause damage to the magnet.
- Forklift forks can damage the magnet enclosure or components. Use protective padding around the forks.
- Impacts/jolts to the magnet while lifting/moving/lowering the magnet can cause expensive internal magnet damage. Lift/move/lower smoothly. Do not allow the magnet to bump or hit anything forcefully. Avoid tilting the magnet more than the maximum tilt (30° from horizontal level) as magnet damage may result. Do not apply any force to the magnet enclosures.

### 6.8 Unloading or Moving with a Forklift – Uncrated Magnet

- 6.8.1. Position a forklift that meets the specifications stated in the Equipment Requirements Tables at the side of the magnet facing the magnet. Locate the forks under the lifting rails to the outside of the magnet feet as indicated in the illustration below.
- 6.8.2. Wrap the full length of each fork with protective padding material to prevent damage to the magnet's enclosure.
- 6.8.3. Carefully drive the forklift until the forks are completely under both lifting rails in the areas shown in the illustration below.
- 6.8.4. Lift the forks to right below the lifting rails, adjust the distance between forks so that padded forks lightly touch the enclosure, and finish raising the forks to the lifting rails.
- 6.8.5. Lift the magnet with the forklift.
- 6.8.6. Smoothly move the magnet to the desired location, and carefully lower to rest on a flat surface.



**NOTE:** Magnet must be lifted from sides only.

Forks must be position under both ends of lifting rails outside of and 10 in. (254 mm) away from magnet feet.

Outsides of feet are 60 in. (1524 mm) apart for 1.5T R, RD Series Magnets and 3.0T W, WB, UA Series Magnets.

Outsides of feet are 50 in. (1270 mm) apart for 1.5T HM Series Magnets.

Lifting rails are 94 in. (2388 mm) long.



One on Left Side  
 One on Right Side

**Do Not Push Signs**



Two on Front End  
 Two on Rear End





**WARNING**

POTENTIAL SERIOUS INJURIES.

SERIOUS INJURIES AND MAGNET/EQUIPMENT DAMAGE ARE POSSIBLE WHEN MOVING A MAGNET THROUGH A RAISED OPENING IN AN EXTERIOR WALL. DO NOT BEGIN UNTIL:

- A COMPLETE WALK-THROUGH OF THE CRANE LIFT PROCESS WAS PERFORMED PRIOR TO THE ACTUAL EVENT TO MAKE SURE ALL PROCESS DETAILS ARE COVERED.
- ALL NECESSARY EQUIPMENT IS ON SITE AND INSPECTED FOR SAFETY AND LOAD RATINGS.
- ALL NECESSARY PERSONNEL ARE TRAINED AND READY.
- MAKE SURE THE ENTIRE AREA WHERE LIFTING WILL OCCUR IS FREE OF OBSTRUCTIONS AND UNAUTHORIZED PERSONNEL.
- MAKE SURE THE SURFACE WHERE THE MAGNET WILL BE PLACED AFTER LIFTING IS FLAT.
- DO NOT CRANE LIFT A MAGNET DURING DANGEROUS WEATHER CONDITIONS.



**WARNING**

POTENTIAL INJURY HAZARDS.

TO PREVENT LIFTING CONDITIONS THAT MAY BE HAZARDOUS TO PERSONNEL AND DAMAGE THE MAGNET AND EQUIPMENT:

- MAKE SURE THE ENTIRE AREA WHERE LIFTING WILL OCCUR IS FREE OF OBSTRUCTIONS AND UNAUTHORIZED PERSONNEL.
- MAKE SURE THE SURFACE WHERE THE MAGNET WILL BE PLACED AFTER LIFTING IS FLAT.
- DO NOT CRANE LIFT A MAGNET DURING DANGEROUS WEATHER CONDITIONS.



**NOTICE**

• Impacts/jolts to the magnet while lifting/moving/lowering the magnet can cause expensive internal magnet damage. Lift/move/lower smoothly. Do not allow the magnet to bump or hit anything forcefully. Avoid tilting the magnet more than the maximum tilt (30° from horizontal level) as magnet damage may result. Do not apply any force to the magnet enclosures.

- Do NOT crane lift a magnet that is on a pallet or inside a cage or crate.
- Crane lifting can only be done using the magnet lifting rails, which are not accessible while the magnet is inside a cage or crate.

6.9 Unloading with a Crane to Ground - Uncrated Magnet

- 6.9.1. Make sure there are no obstructions in the area where lifting will occur and that a flat surface is available to position the magnet after lifting.
- 6.9.2. Position the hook of a crane and spreader beam, that meet the specifications stated in the Equipment Requirements Tables, centrally over the magnet to ensure a vertical lifting force on the lifting cables/slings.
- 6.9.3. Attach the rigging to the lifting cables/slings at each end of the magnet. (See illustration below.)
- 6.9.4. When beginning to lift the magnet if it does not remain close to level, carefully lower the magnet and adjust the lifting configuration, then lift the magnet again.
- 6.9.5. Smoothly move the magnet to the desired location, and carefully lower so it rests on a flat surface.

- 6.10 Crane Lift through Raised Opening in Exterior Wall
  - 6.10.1. Verify that the opening is at least 96 in. (2,439 mm) wide and 102 in. (2,591 mm) tall, minimum. The magnet should pass through the opening side first without hitting the opening. (A larger opening will make both the operation easier and accidental magnet damage less likely.)
  - 6.10.2. Position the hook of a crane and spreader beam, that meet the specifications stated in the Equipment Requirements Tables, centrally over the magnet to ensure a vertical lifting force on the lifting cables/slings. (Refer to Crane Lift Configuration Illustration.)
  - 6.10.3. Rig the magnet with chain hoists toward the building, lifting cables/slings away from the building and a spreader beam as shown in Crane Lift Configuration Illustration.
  - 6.10.4. Attach lifting straps to both ends of the lifting rail to face toward the building. (See Crane Lift Configuration Illustration.)



**NOTICE**

DO NOT CRANE LIFT CRATED/PALLETED MAGNET.  
Crated/palletted magnets must be handled in conformance with crated/palletted magnet section of this manual.

Crane Lift Configuration

**NOTE:**  
Align spreader beam parallel to magnet bore.

**NOTE:**  
Wire rope recommended for better length match and stretch control.

Spreader Beam with Top Rigging

Two-Legged Cable Bridle/Sling (Spreader Beam to Crane)

Spreader Beam with Top Rigging

Spreader Beam Distance Between Lifting Points

Two-Legged Cable Bridle/Sling (Spreader Beam to Lifting Rail)

MAGNET REAR

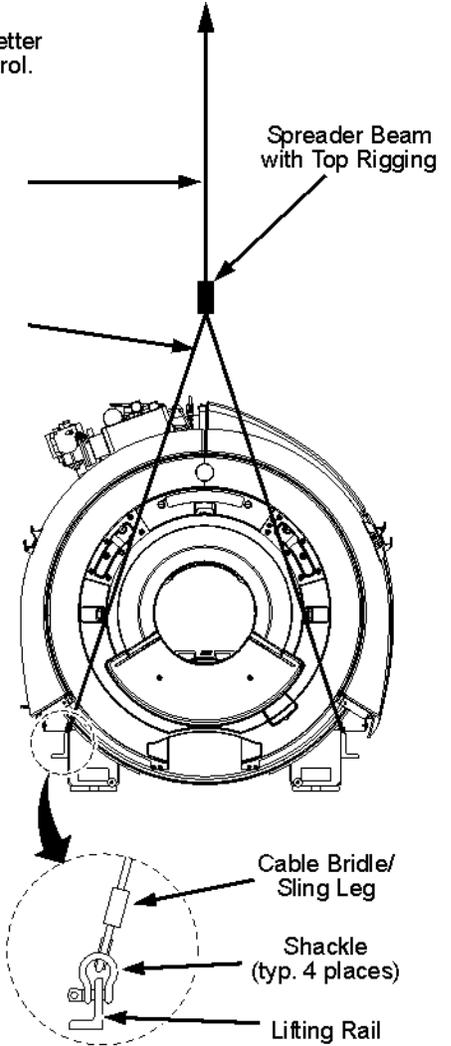
MAGNET FRONT

7.5 inch (190 mm)

Center of Gravity (CG) is offset ~1 inch (25 mm) to rear of magnet isocenter.

Lifting Rail

Lifting Holes (Each End of Each Lifting Rail)



# Chapter 7 Magnet Storage Conditions



POTENTIAL COLD BURN OR ASPHYXIATION HAZARD!  
GASEOUS HELIUM (ODORLESS, COLORLESS GAS) IS DISCHARGED FROM THE MAGNET VENTING ACTIVITIES. WEAR PROTECTIVE CLOTHING, NONABSORBENT GLOVES AND GOGGLES WHEN VENTING THE MAGNET. DO NOT POSITION YOURSELF ON OR NEAR THE VENTING REGION.



- For detailed information pertaining to the operation, function and maintenance of the coldhead and compressor, please refer to the appropriate cryocooler and/or compressor vendor technical publication/operating manual (Vendor Manual CD32ZZ-271K, CD32ZZ-273H, CD32ZZ-272J, CD32ZZ-056M, CD32ZZ-060Q).
- For detailed information pertaining to the operation, function and maintenance of the MM3, please refer to the appropriate MM3 technical publication/operating manual (5124576, Magnet Monitor 3 Hardware Installation).
- The above noted documents are available through the support documentation library at [gehealthcare.com](http://gehealthcare.com) or through your GE Healthcare Field Service Representative.

## 7. Magnet Storage Conditions

This magnet has superconducting coils immersed in a liquid helium vessel that is surrounded by an insulating cryostat. Due to site readiness delay, sometimes it's necessary to store the magnet in its shipping configuration at a warehouse. During this storage period the magnet cryocooler must be connected to the compressor and the monitoring system (MM3) to maintain proper temperature and pressure and minimize helium loss as well as risk for internal icing issues.

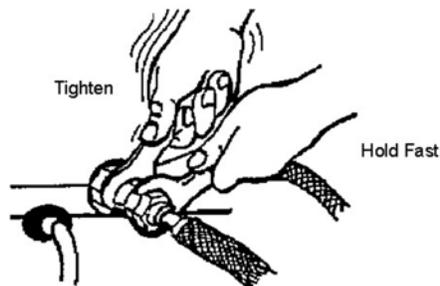
### 7.1. Connecting the Magnet to the Compressor

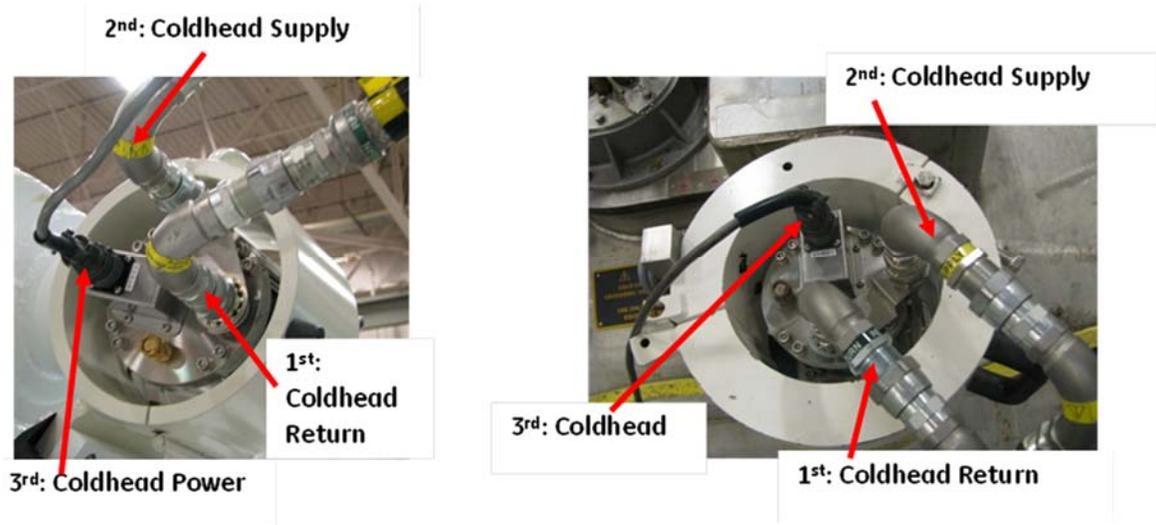
#### 7.1.1. Confirm the following

- Compressor supply static pressure is 1.6MPa – 1.7MPa
- O-Rings present in Coldhead Supply and Coldhead Return line connectors.

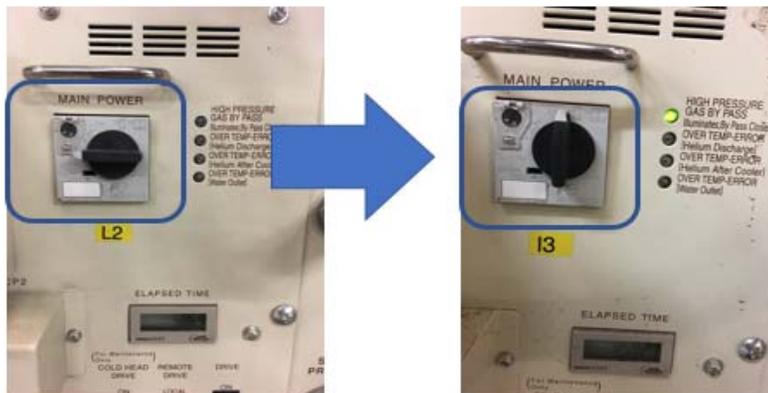
#### 7.1.2. Connect the Coldhead Compressor Lines IN THE FOLLOWING ORDER (typical connection configurations shown below):

- Always use two wrenches: one to hold and one to tighten. The hold wrench maintains the backside adapter connection, making gas leaks in the system less likely. Do not overtighten.
- Attach the Coldhead Return Line FIRST.
- Attach the Coldhead Supply Line SECOND.
- Attach the Coldhead Power Cable THIRD.





7.1.3. At the compressor, turn the main power switch to the ON position.



7.1.4. At the compressor, flip the drive switch to the ON position.



7.1.5. When removing a unit from the compressor, perform the above process in REVERSE order.

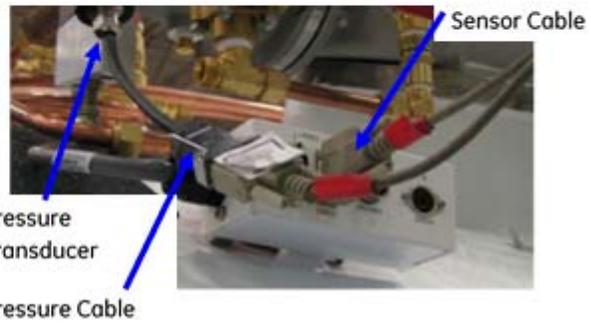
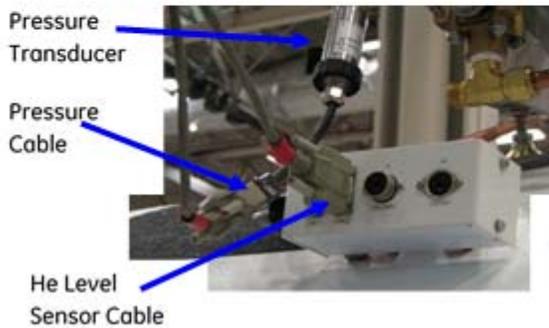
- 7.2. Magnet Monitoring Connections
  - 7.2.1. Attach the Magnet Pressure Cable to the Pressure Transducer.
  - 7.2.2. Attach the Helium Level Sensor Cable into the LHe1 or LHe2 port (typical connection ports shown below).



Fig 1. Instrumentation Box for R, W, and WB magnets



Fig 2. Instrumentation Box for HM, RD, and UA magnets



Connect the pressure cable to the pressure transducer as shown below.



When connecting the cables, do not route the cables in a way that causes unnecessary strain or bending on the cables. Hand-tighten the screws on each connector; loose connections can cause reading errors.

7.3. Magnet Monitoring Connections at Warehouse

7.3.1 Inspect Cables

Check the cables used to monitor the magnet's pressure and helium level before connecting them to the magnet. Make sure all pins are straight and almost level with the connector casing, i.e. not pushed back. The cables should also not have any broken insulation. IF VISUAL DAMAGE IS FOUND, ACQUIRE NEW CABLE AND REPLACE AS SOON AS POSSIBLE.

Each Magnet Monitor should have dedicated cable set, which is firmly attached to the unit. Swapping cables between different magnet monitoring units can cause early failure of the connectors.

7.3.2 Power ON Magnet Monitor

Turn on the Magnet Monitor and wait until it goes through its internal boot-up sequence. After that it will cycle between the date, helium level and pressure.

Check Pressure Reading

Compare the pressure reading displayed on the Magnet Monitor to the analog pressure gauge on the magnet. The reading should be within  $\pm 0.5$  PSI of the reading on the Magnet Monitor. If not contact your local Online Center.



7.4. Magnet Monitoring

Using the Magnet Monitor III (MM3) front panel user interface, monitor magnet pressure and helium level at least once per day to minimize loss of liquid helium and minimize internal icing situations.

7.4.1. The Front Panel of the MM3 unit is made up of the following elements:

- LEDs showing AC Power, Heater activity, and Alarm activity.
- LCD Display for User Interaction.
- 16-button soft keypad.

7.4.2. Monitor Helium Pressure and Helium Level from the Home Screen. Pressing Home puts the display into normal operating mode. This mode displays the following information:

Screen	Display
1	Date Software Revision <span style="float: right;">Title Number of Alarms</span>
2	He Level x.xx %
3	He Pressure x.xxx psi

MM3 Front Panel User Interface – He Pressure / He Level



7.4.3. At the time of Helium Level monitoring, press the Sample button to initiate a Helium Level sample. It may take up to 90 seconds to update the display with the new level(s). Helium level requirements may vary according to purchase agreements. Work with your Logistics Team and/or Field Service Contact to determine helium level requirements.

7.4.4. Helium Pressure can be monitored from the Home screen. Systems with helium pressures maintaining above 5.0 psi ± 0.1 psi during normal operation should have Service notified of the situation.

- 7.5. Magnet Monitoring at Warehouse
  - 7.5.1. Following are some of the typical values on magnet arrival
    - Magnet arrival pressure between 5PSI and 7PSI.
    - Helium level reading should not decrease by more than 15% from the arrival level
    - The pressure should not be <0.9PSI
  - 7.5.2. If a magnet falls outside of any of the above criteria contact the local Online Center

## Chapter 8 In-Transit Service & Magnet System Checks

### 8. In-Transit Service and Magnet System Checks



# NOTICE

In-transit service and Magnet Electrical Checks MUST be performed by qualified personnel only and in STRICT conformance with the Liquid Helium Fill procedure stated in the appropriate manual:

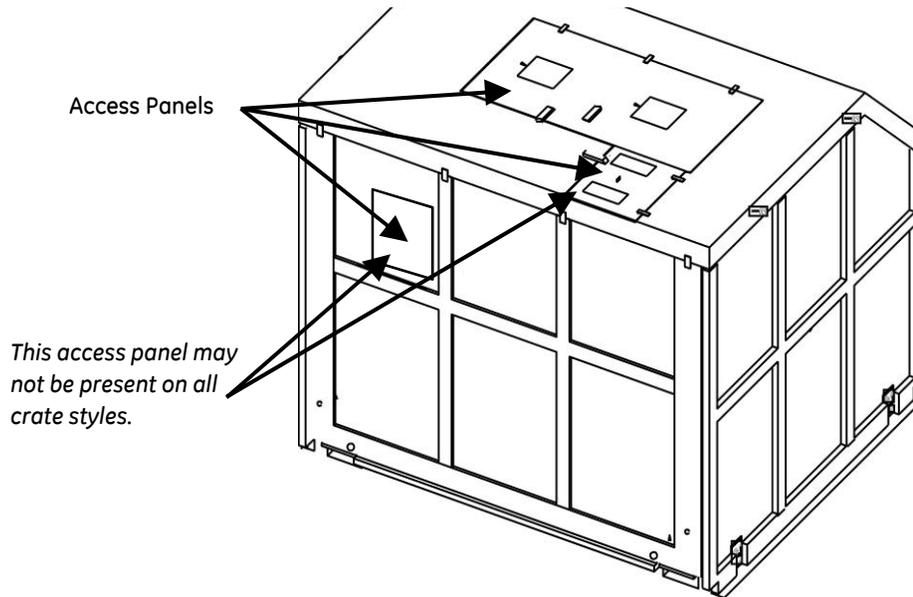
- 5495019, Magnet & Cryogen Manual for Actively Shimmed Magnets (1.5T R Series, 3.0T W, WB Series) or
- 5495018, Magnet & Cryogen Manual for Passively Shimmed Magnets (1.5T HM, RD Series, 3.0T UA Series)
- 5452735, MR Service Safety Manual.

The above noted documents are available through the support documentation library at [gehealthcare.com](http://gehealthcare.com) or through your GE Healthcare Field Service Representative. Magnet Electrical Checks must be performed after the magnet is sited in the MR Suite.

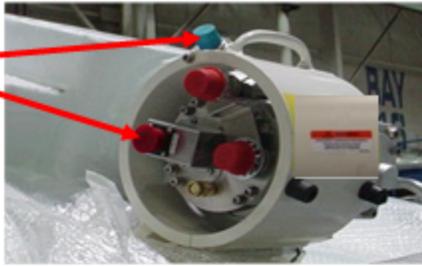
#### 8.1 In-Transit Helium Refill

In-transit helium refill is performed based upon the magnet shipping date per the documents stated above. Access the plumbing through the access panels identified in the illustration below. In-Transit plumbing is configuration examples shown below.

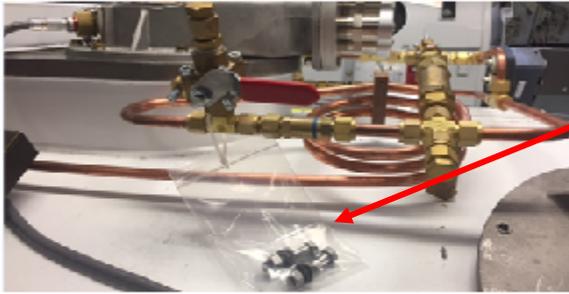
Access Cut-Outs, Crate/Pallet Configuration



Capped Ports

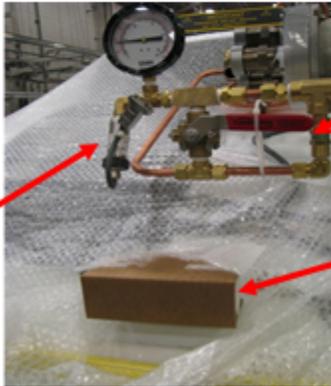


Capped ports typical for all styles of magnets  
(1.5T System Shown)



Hardware/plug in bag  
Secured to plumbing  
on 555227 Plumbing  
Assembly

Pigtail secure to transducer



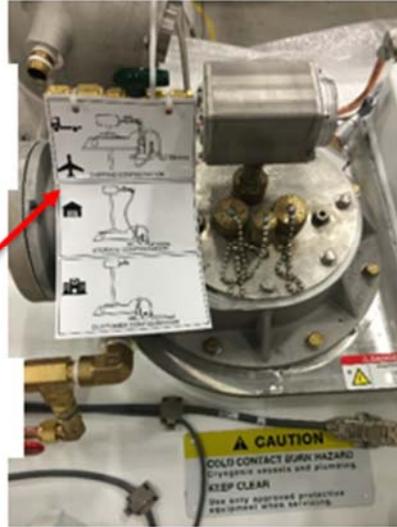
V2 Valve Tied

Cardboard box over electrical box

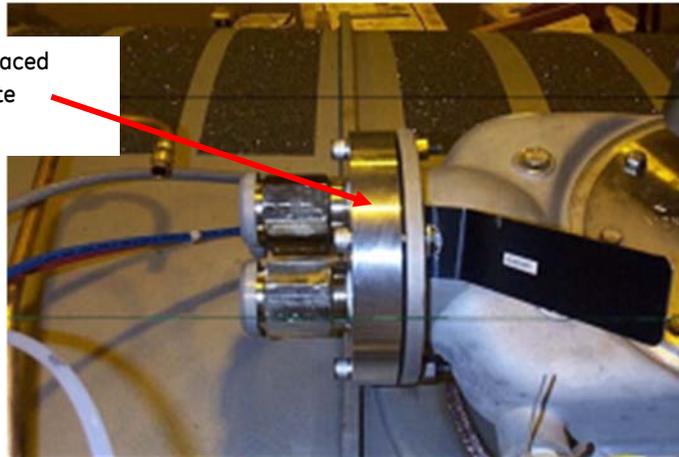


For Units shipped  
with a shim lead  
present

Shipping hose and  
placard



Vent Adapter replaced  
with Blanking Plate  
Assembly



**Magnet System Checks (by GE Service) - Physical Inspection**

- 8.1.1. Locate the Pre-Delivery Information Package shipped with the magnet. It contains the Bill of Material for the magnet system delivered. Check that all boxes indicated are present.
- 8.1.2. Check the contents of each box against its packing list when the boxes are brought into the MR site.
- 8.1.3. Inspect the magnet for physical damage and icing/condensation on the body. If no problem is found, unload the magnet.
  - a. Report any damage found in conformance with the Damage In Transportation in the front of this manual.
  - b. Report all problems found to the regional Magnet & Cryogenics (MAC) Team Leader.

NOTE: Because of the higher boil-off and helium gas flow through the Vertical Penetration on all shipments, some frost on the Vertical Penetration may be normal during periods when the Coldhead has been shut off.

- 8.1.4. If icing or condensation is present on the exterior or the bore of the magnet, check the liquid helium level before unloading. Refer to the Set-Up and Calibration chapter's Magnet Monitor Installation subsection in manual
  - 5495019, Magnet & Cryogen Manual for Actively Shimmed Magnets (1.5T R Series, 3.0T W, WB Series) or
  - 5495018, Magnet & Cryogen Manual for Passively Shimmed Magnets (1.5T HM, RD Series, 3.0T UA Series)

NOTE: If the magnet has been sitting for a period of time with the Coldhead inoperative, the magnet may be depleted of cryogen. Contact the logistics or field service team for further directions.

## Chapter 9 VibroAcoustic Damping Mat Placement

### 9. VibroAcoustic Damping Mat Placement



HEAVY OBJECT

EACH SURFACE MOUNTED VIBROACOUSTIC DAMPING MAT WEIGHS ~250 POUNDS (~105 kg). LIFTING MATS ALONE WITHOUT ASSISTANCE CAN RESULT IN PERSONAL INJURY. DO NOT LIFT/MOVE MATS WITHOUT MECHANICAL ASSISTANCE.



Tasks in this section are to be performed by riggers, not by GE Service Personnel. The Surface Mounted VibroAcoustic Damping Mats must be installed on the floor before moving the magnet into the magnet room.

**NOTE:** The VibroAcoustic Damping Mat may arrive in a cold state preventing compression. The VibroAcoustic Damping Mat should be placed in the magnet room prior to moving magnet to MR suite to allow for temperature stabilization. If the magnet exceeds the installation height specification, allow the magnet to settle on the VibroAcoustic Damping Mat for 24 hours, then remeasure the magnet height.

Verify that markings are present on the magnet room floor where VibroAcoustic Damping Mats will be located if the site is getting the VibroAcoustic Damping Option A or the SV VibroAcoustic Kit. Markings should be in accordance to the specifications stated in the appropriate Pre-Installation manual.

For Magnet footprint please refer to Appendix.

### VibroMat Configuration Summary

Magnet Type	Vibro Mat	Seismic Mount Available	Section
1.5T R (non-SV) 3.0T W, WB	M1060MA	Yes	9.1
1.5T HM 3.0T UA	M7000VM	Yes	9.1
1.5T HM 3.0T UA	M7000VA	No	9.2
1.5T R (SV only) 1.5T RD	M50002LP	Yes	9.3

- 9.1. Seismic Mounted VibroAcoustic Damping Mat Placement For 1.5T R, Non SV Series Product, 1.5T HM Series Magnet, 3.0T W, WB Series Magnet and 3.0T UA Series Magnet
  - 9.1.1. Remove any debris from the magnet room floor where the Mats will be positioned.
  - 9.1.2. Verify that there are no RF seams under the VibroAcoustic Damping Mats.
  - 9.1.3. Vibromat configuration usage:
    - a. The M1060MA (used in 1.5T R Non SV Series Product and 3.0T W and WB Series Magnets) VibroAcoustic Damping Mats consist of two identical plates,
    - b. The M7000VM (used in 1.5T HM and 3.0T UA Magnets) VibroAcoustic Damping Mat consist of two identical plates.
  - 9.1.4. Place VibroAcoustic Damping Mats as shown in the following illustrations.
  - 9.1.5. The VibroAcoustic mats and the magnet can be centered in the magnet room based on the magnet geometric iso-center or the 8" quench vent location. Dimensions are shown in the following illustrations.
    - a. Ensure there is adequate distance between the service side of the magnet and the magnet room wall as specified in the Pre-Installation Manual.
    - b. All points on the service side of the magnet must be equidistant from the wall.

<b>VibroAcoustic Damping Mat Kit (M1060MA)                      for 1.5T R, Non SV Series Product,                      3.0T W, WB Series Magnet For                      use in both Seismic and Non Seismic Applications</b>		
Quantity	Part Number	Description
1 Pair	5122574	VibroAcoustic Damping Mat
4	5476688	3 in. x 3 in. (76.8 mm x 76.8 mm) Aluminum Washers*
4	5477278	0.75-10 x 4 in. Stainless Steel Studs*
4	46-260943P6	0.75-10 Stainless Steel Nuts*
4	46-252635P14	WASHER, PLAIN, .75 X .100 THK, Stainless Steel Flat Washers*
4	5394873	Sleeve, for M20 Seismic Anchor

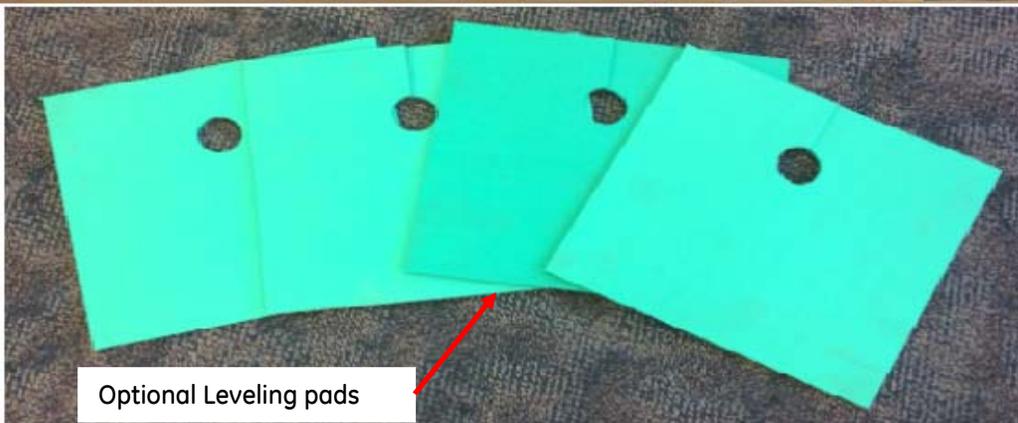
\* For anchoring the magnet to Surface Mounted VibroAcoustic Damping Mats, refer to Magnet Leveling, Foot Shimming and Bolt Down.



3x3 Washer, SS Stud, SS Nut and flat washer – shown in location on mat for illustration only – will need to be positioned inside magnet foot to secure magnet foot to mat.

VibroAcoustic Damping Mat Kit (M7000VM) for 1.5T HM Series Magnet and 3.0T UA Series Magnet		
Quantity	Part Number	Description
2	5479742	VibroAcoustic Damping Mat
4	5473596	Leveling Pad
4	5476688	3 in. x 3 in. (76.8 mm x 76.8 mm) Aluminum Washers*
4	5477278	0.75-10 x 4 in. Stainless Steel Studs*
4	46-260943P6	0.75-10 Stainless Steel Nuts*
4	46-252635P14	WASHER, PLAIN, .75 X .100 THK, Stainless Steel Flat Washers*
4	5394873	Sleeve, for M20 Seismic Anchor

\* For anchoring the magnet to Surface Mounted VibroAcoustic Damping Mats, refer to Magnet Leveling, Foot Shimming and Bolt Down.



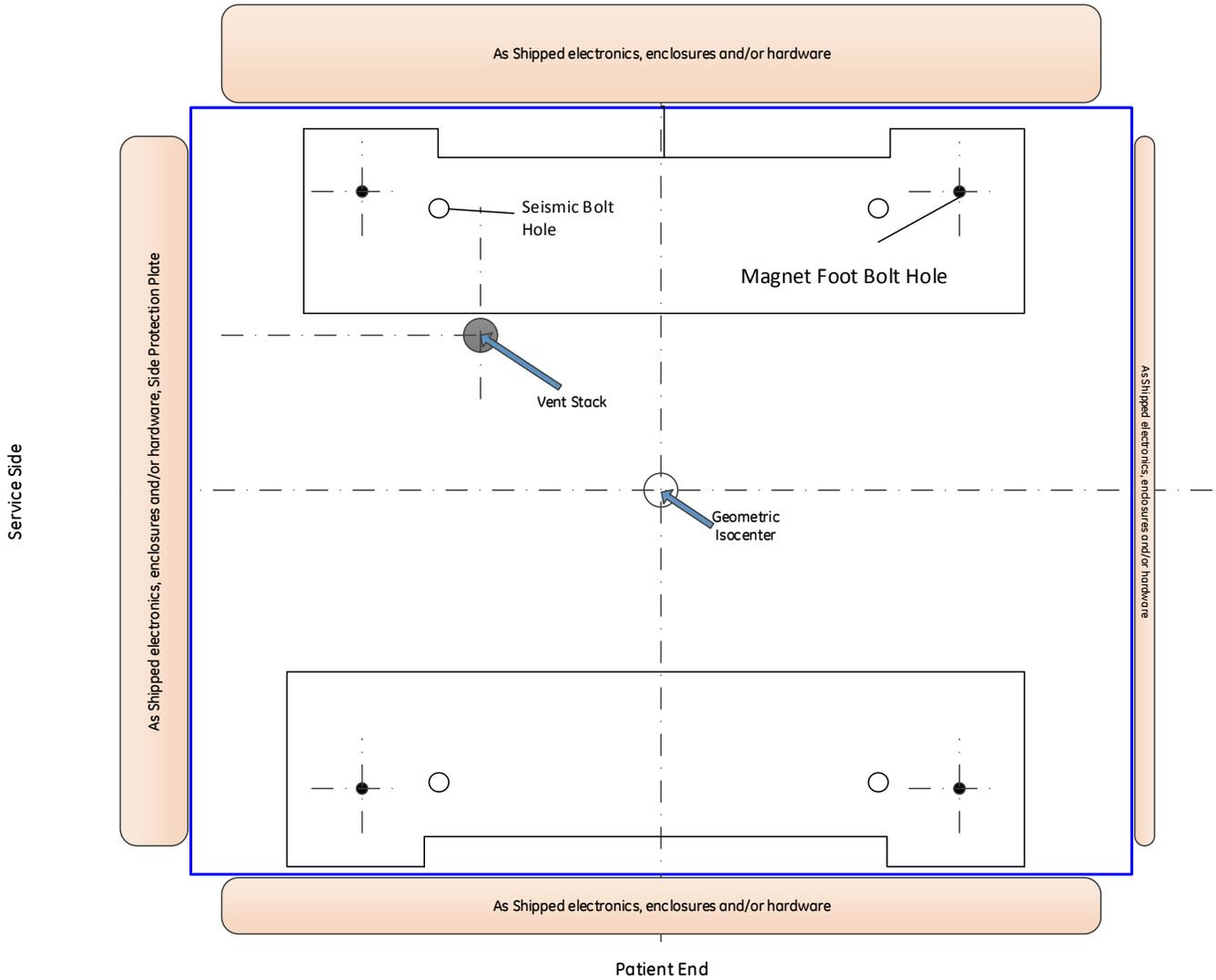
The green pad is optional but should have all 4 used if possible:

- Allows for and fills small gaps between the bottom of the foot and the contact surface of the floor when these are not the same plane.
- Helps to self-level the magnet.
- Adds additional isolation between foot and plate.

Note this will raise the magnet centerline by approximately 3mm. Centerline of the magnet when installed any pad should be between 1064mm and 1076mm (as always, verify this to PIM requirement)

### VibroAcoustic Mat Placement for Seismic Applications

Service End



9.2. Non Seismic VibroAcoustic Damping Mat Kit Placement (M7000VA)

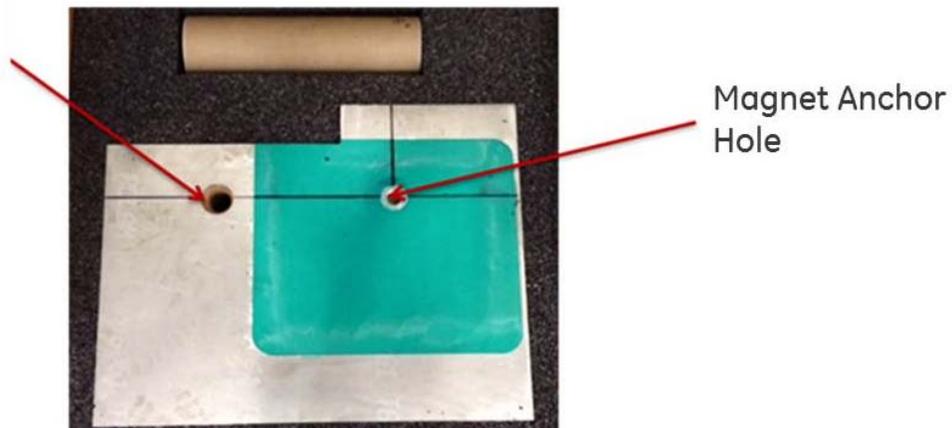
Note: The VibroAcoustic Damping Mat may arrive in a cold state preventing compression. The VibroAcoustic Damping Mat should be placed in the magnet room prior to moving magnet to MR suite to allow for temperature stabilization. If the magnet exceeds the installation height specification, allow the magnet to settle on the VibroAcoustic Damping Mat for 24 hours (this allows the magnet to settle on the foam), then measure the magnet height again.

VibroAcoustic Damping Mat Kit (M7000VA)		
Quantity	Part Number	Description
2	5543152	Ergonomic Vibromat Right Front/Left Rear
2	5543152-2	Ergonomic Vibromat Left Front/ Right Rear
4	5476688	3 in. x 3 in. (76.8 mm x 76.8 mm) Aluminum Washers*
4	5477278	0.75-10 x 4 in. Stainless Steel Studs*
4	46-260943P6	0.75-10 Stainless Steel Nuts*
4	46-252635P14	WASHER, PLAIN, .75 X .100 THK, Stainless Steel Flat Washers*
4	5394873	Sleeve, for M20 Seismic Anchor

\* For anchoring the magnet to Surface Mounted VibroAcoustic Damping Mats, refer to Magnet Leveling, Foot Shimming and Bolt Down.

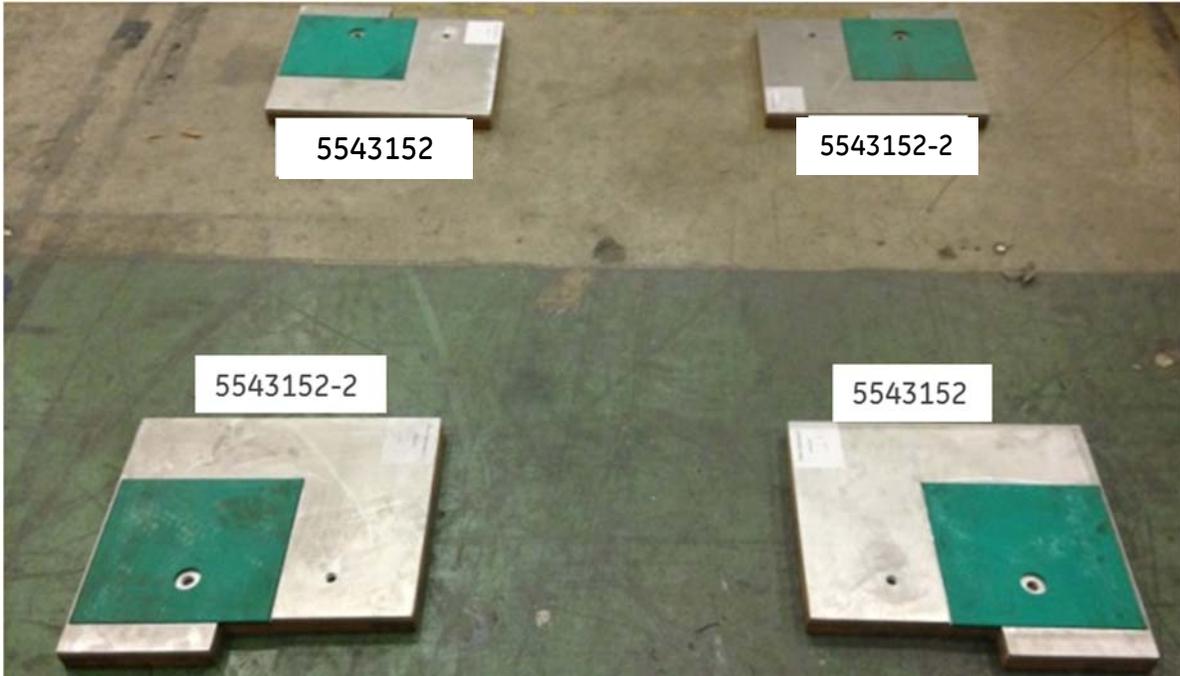
9.2.1. Verify that the VibroAcoustic Kit contains the parts listed in table above. Note: there are 2 cardboard tubes that contain hardware and the pads come stacked on each other. Count the pads and tubes to ensure you have all the parts. A pad and hardware tube can be seen below.

Hole not used

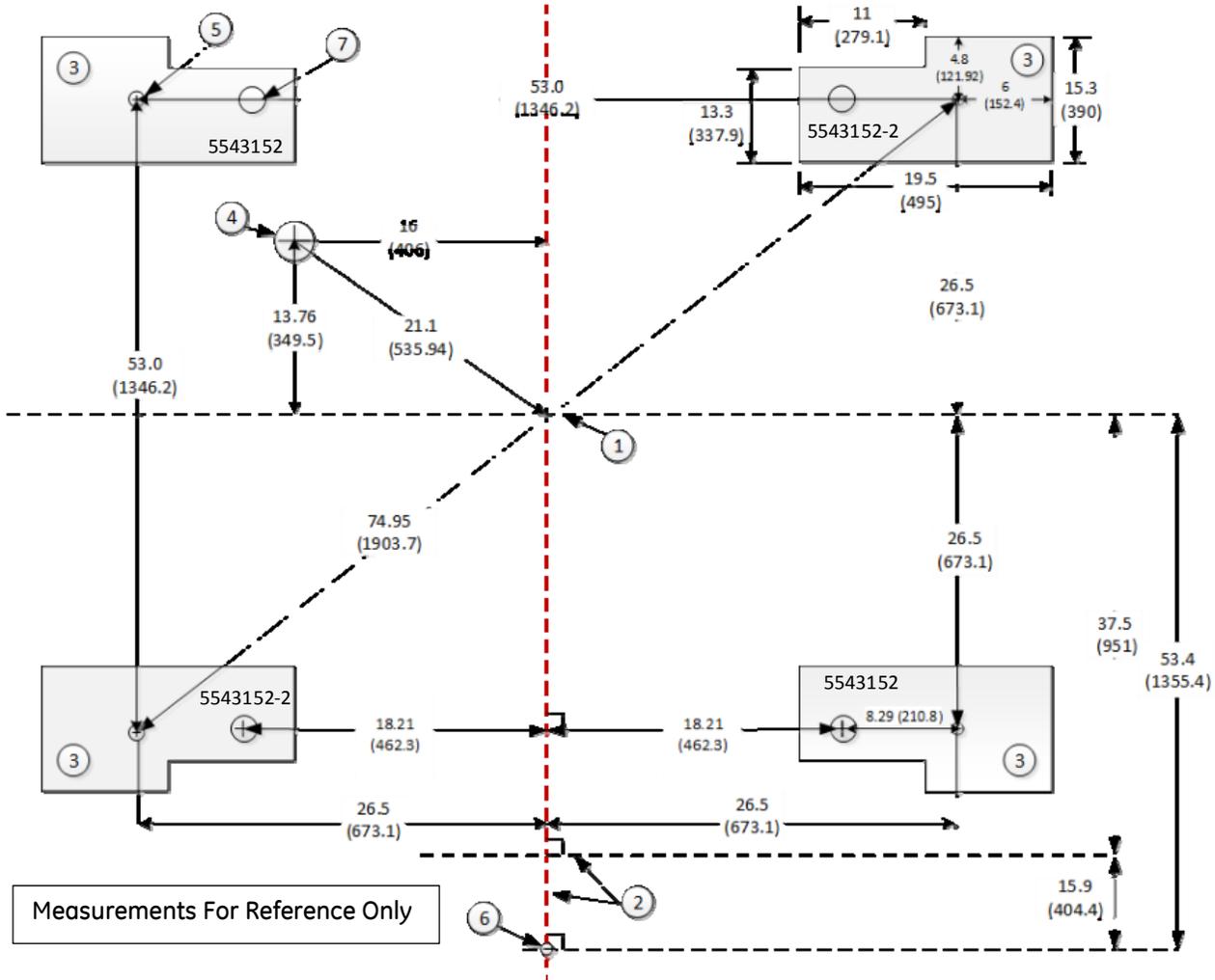


Note: the VibroAcoustic Damping Mat Kit consists of four plates (two sets of two plates).

- 9.2.2. Remove any debris from the magnet room floor where the Mats will be positioned.
- 9.2.3. Verify that there are no RF seams in the location selected for the VibroAcoustic Mats – the mats cannot be on any seams.
- 9.2.4. Identify the magnet geometric center based upon vent stack location as shown in Magnet Footprint as shown below.
- 9.2.5. Place the VibroAcoustic Mats beneath the magnet feet spaced as shown in the Magnet Footprint shown in figures below. Or can be pre-installed to the magnet foot before placing the magnet on the floor.

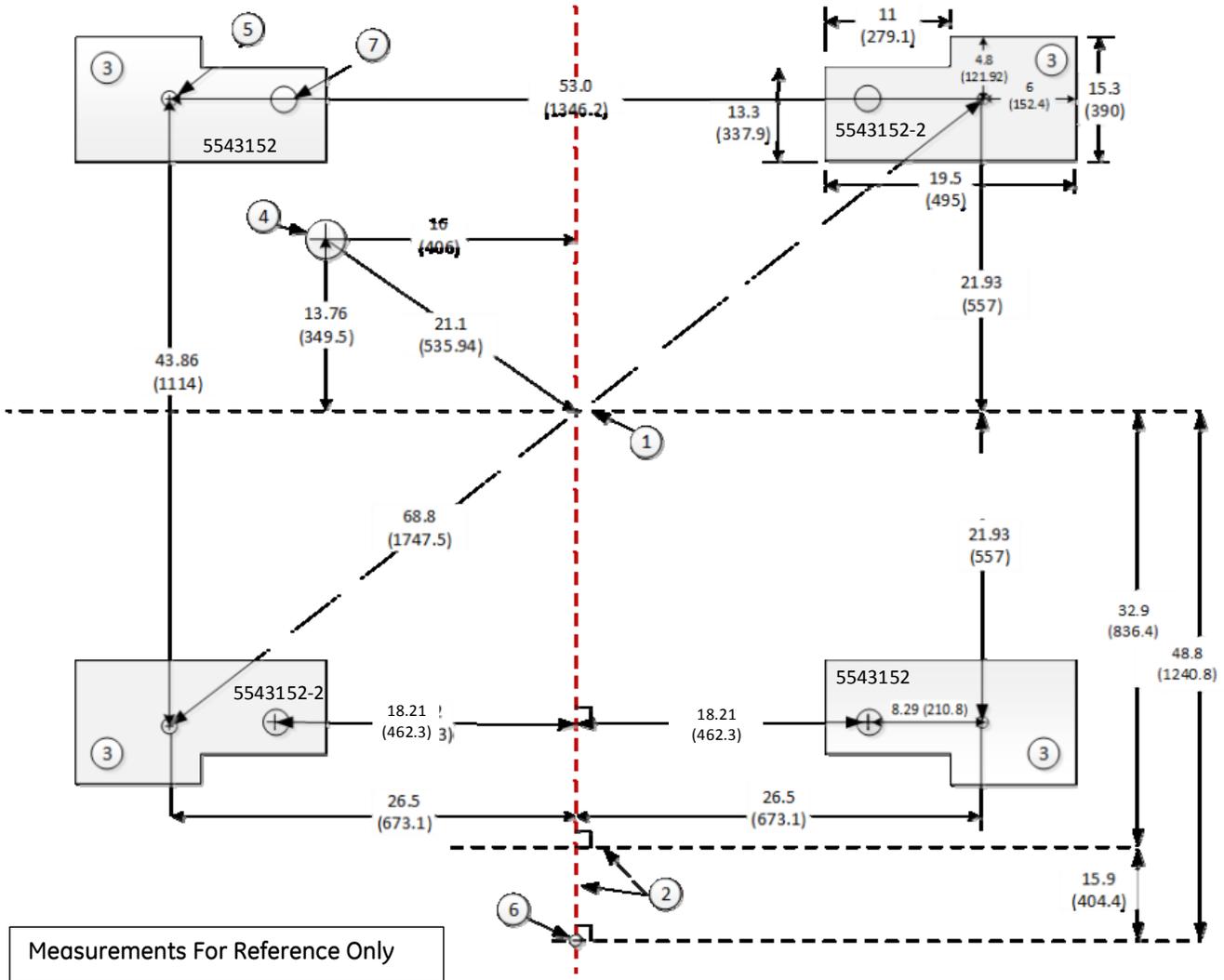


Ergo Pad Placement (M7000VA) For UA Series Magnets



All Dimensions are inches; bracketed dimensions in millimeters	
VibroAcoustic Mat weight: 17lbs (8 kg) each.	
1	Magnet Isocenter
2	Magnet alignment Line (Center Line and Magnet Front Cable Tray)
3	VibroAcoustic Mats
4	8" Quench Vent
5	Magnet Anchoring Holes
6	Dock Bolt
7	Seismic Anchor Hole (Currently not Used)

Ergo Pad Placement (M7000VA) For HM Series Magnets



All Dimensions are inches; bracketed dimensions in millimeters	
VibroAcoustic Mat weight: 17lbs (8 kg) each.	
1	Magnet Isocenter
2	Magnet alignment Line (Center Line and Magnet Front Cable Tray)
3	VibroAcoustic Mats
4	8" Quench Vent
5	Magnet Anchoring Holes
6	Dock Bolt
7	Seismic Anchor Hole (Currently not Used)

- 9.2.6. Position mat with the aluminum plate with green rubber dampener facing up against the magnet foot and the dampener (orange/brown elastomer) facing down against the floor.
- 9.2.7. Verify that the stud is centered in the magnet foot hole. Ensure magnet foot is fully located on green leveling pad of mat.
- 9.2.8. Place a 3x3 washer, flat washer, and nut on the stud. Tighten nut to finger tight plus ½ turn.



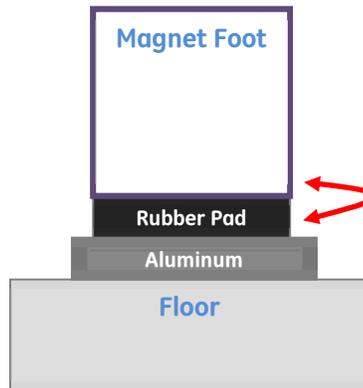
The magnet foot on the Vibromat pad with the washers and nut on the stud.

- 9.3. Seismic and Non Seismic Mounted SV VibroAcoustic (RD Series Magnet) Damping Mat Placement (M50002LP)
  - 9.3.1. The SV VibroAcoustic Damping Mats must be installed on the floor before moving the magnet into the magnet room.
  - 9.3.2. Verify that the SV VibroAcoustic Kit contains the parts listed below.

<b>1.5T RD, R SV Series VibroAcoustic Damping Mat Kit (M50002LP)</b>		
Quantity	Part Number	Description
2	5420414	Vibro Pad
2	5420414-2	Vibro Pad

- 9.3.3. Remove any debris from the magnet room floor where the Mats will be positioned.
- 9.3.4. Verify that there are no RF seams under the SV VibroAcoustic Mats.
- 9.3.5. The SV VibroAcoustic Kit consists of two sets of two identical plates. Identify the magnet geometric center based upon vent stack location as shown in Magnet Footprint, R and RD Series Magnet, as shown in Appendix.
- 9.3.6. Place the SV VibroAcoustic Mats beneath the magnet feet spaced as shown in Magnet Footprint, R Series Magnet.
- 9.3.7. Position mat with the aluminum plate down against the floor and the dampener (rubber) up against the magnet foot as shown below.
- 9.3.8. Align seismic anchor hole of mat with seismic anchor hole of magnet foot.

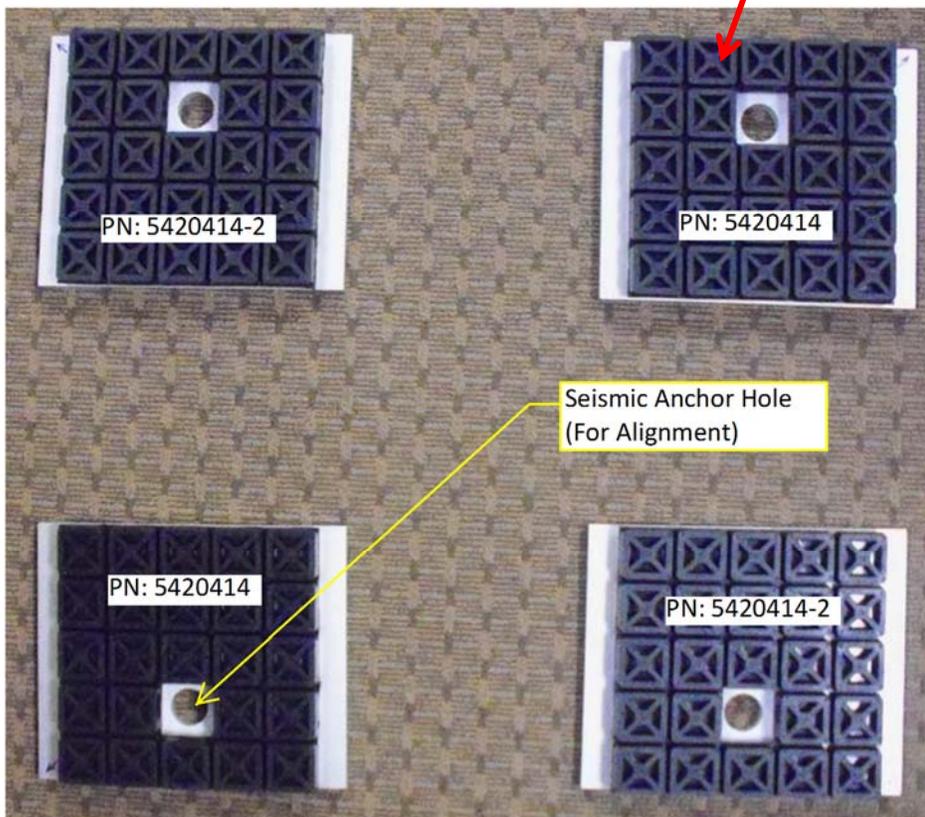
Placement of SV  
VibroAcoustic Mat



Note:  
Rubber pad MUST be installed facing  
UPWARDS against the magnet foot

SV VibroAcoustic Mats

MAGNET REAR (SERVICE)



MAGNET FRONT (PATIENT)

## Chapter 10 Moving Magnet to MR Suite

### 10. Moving Magnet to MR Suite



**POTENTIAL ASPHYXIATION HAZARD**

LOSS OF MAGNET VACUUM WILL RESULT IN THE RAPID EXPULSION OF HELIUM GAS, WHICH CAN CAUSE ASPHYXIATION IN ENCLOSED AREAS. MAKE SURE HOSPITAL PERSONNEL ARE AWARE OF THIS SITUATION PRIOR TO MAGNET BEING MOVED WITHIN THE ENCLOSED AREAS.

USE EXTREME CAUTION TO AVOID CONTACT OR DAMAGE TO THE VACUUM VESSEL DURING MAGNET TRANSIT OR SITING.



**POTENTIAL INJURY HAZARD**

MOVING THE MAGNET IMPROPERLY WILL CAUSE PERSONAL INJURY OR MAGNET DAMAGE.

REFER TO MAGNET UNLOADING AND MOVEMENT BEFORE MOVING THE MAGNET USING A FORKLIFT OR CRANE.



- Tasks in this section are to be performed by Riggers, NOT by GE Service Personnel

- To prevent magnet damage do NOT apply any force to the magnet's enclosures.

- Any floor anchors that are used to move the magnet must NOT penetrate the RF Shield.

- Magnet and dock installation and placement are critical to image quality and hardware reliability. Magnet must be installed level with the isocenter to the specifications listed in the Magnet Leveling, Foot Shimming and Bolt-Down Chapter.



If the height of the magnet prohibits it from entering a low ceiling area:

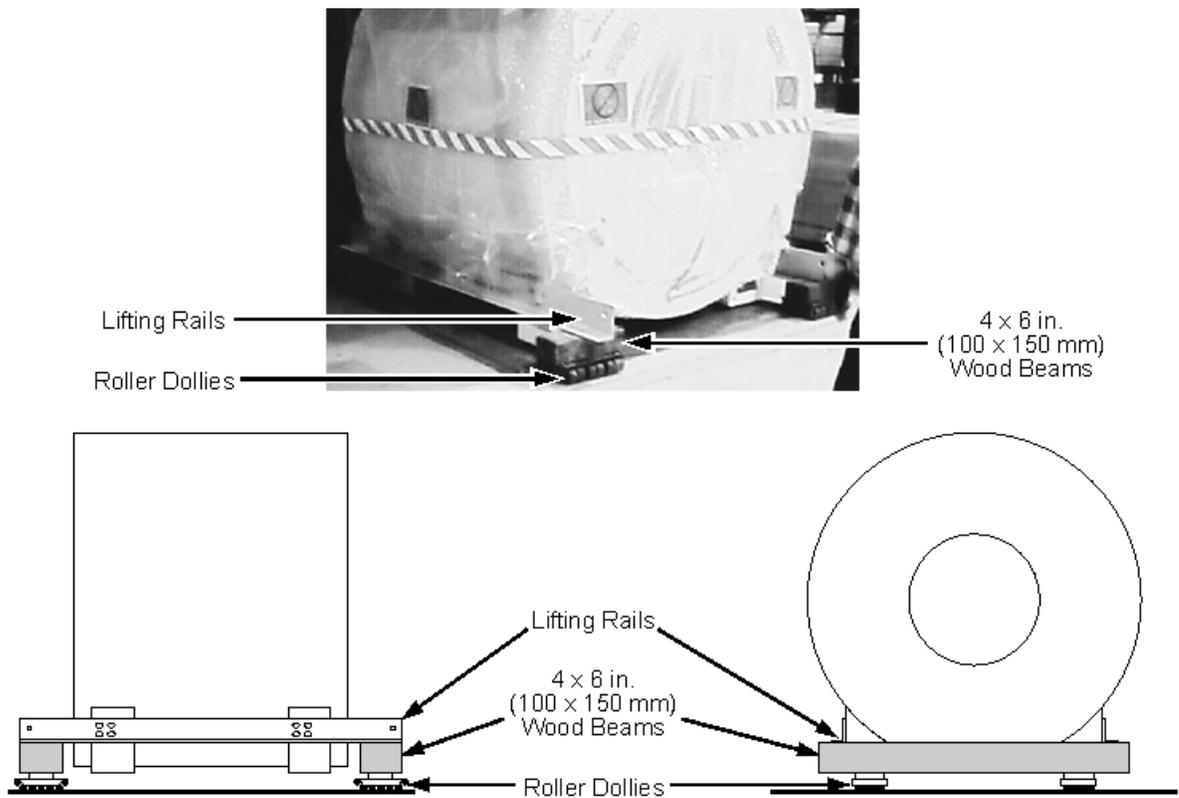
- For non-DV systems (HDx, etc.), the 1 in. aluminum spacer plate can be removed from each magnet foot. Refer to Removing Aluminum Spacers instruction below.

- For DV-based systems (MR750, MR450, MR450w, etc.), the 1 in. aluminum spacer plates must remain on the magnet feet during movement to protect the Bridge Vibration Bracket. Contact the Install Base Leader at GEHC Florence for further instruction.

10.1. Moving the Magnet, Overview

Once the magnet is moved to the building using a crane or forklift (covered in Magnet Unloading and Movement), it needs to be moved to the Magnet Room. Roller dollies in the arrangement shown below are recommended for moving the magnet inside a building. Place steel floor plates along the magnet delivery route when using roller dollies. (Rigger must take actions necessary to ensure that walls, floors, etc. along the transportation route/path are be protected from potential damage.) There are many methods to help move the magnet, including the use of a motorized tow vehicle, a come-along, or a chain jack. Any cables, chains, or straps used must be attached to the orange lifting rails. Ensure that movements are completed in a smooth controlled manner.

**Magnet on Roller Dollies**



10.2. Moving the Magnet, Preparation

- 10.2.1. Verify magnet front-rear orientation is relative to the Magnet Room's front and rear.
- 10.2.2. Check all clearances along the route the magnet will move to the Magnet Room. Compare those clearances with the appropriate illustration below.
- 10.2.3. Compare the dimensions of the magnet on the moving fixtures being used with the clearances measured along the magnet delivery route. The height can be reduced by putting the moving fixtures directly under the lifting rails.
- 10.2.4. To remove the aluminum spacers from each magnet foot, proceed as follows:
  - a. Locate a  $\frac{3}{4}$  in. (M19) wrench.
  - b. Remove the two  $\frac{3}{8}$  in. hex-head bolts that secure the 1 in. (25 mm) aluminum spacer to each foot.
  - c. Remove and store the aluminum spacers on site.



Clearance Dimensions, Magnet As-Shipped Condition

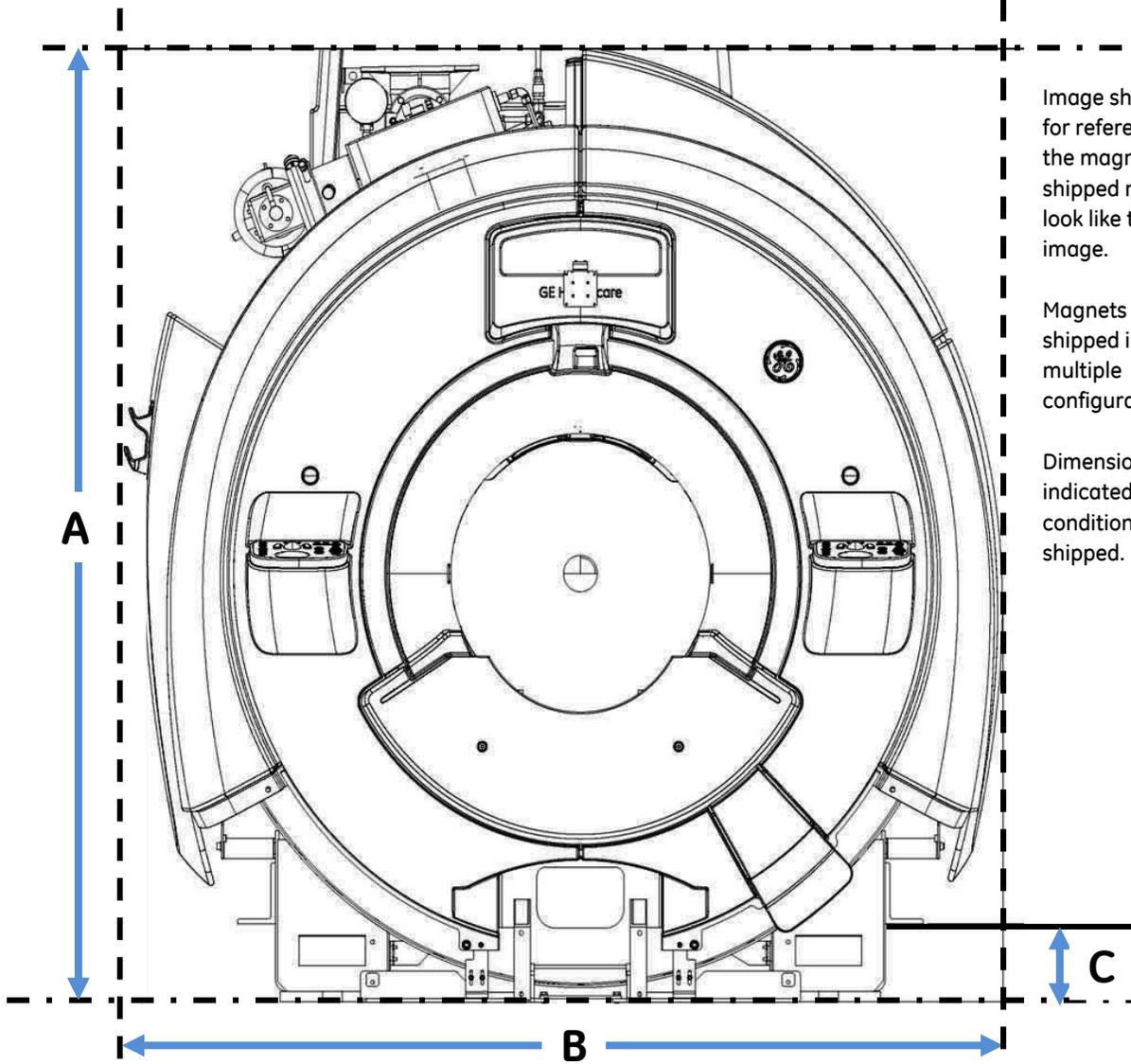


Image shown is for reference – the magnet shipped may not look like this image.

Magnets are shipped in multiple configurations.

Dimensions indicated are for condition as shipped.

Dimension	1.5T R, RD Series	1.5T HM Series	3.0T W, WB Series	3.0T UA Series
A	93.83 inch (2,383 mm)	93.66 inch (2,379 mm)	93.50 inch (2,375 mm)	93.25 inch (2,369 mm)
B	93.31 inch (2,370 mm)	91.89 inch (2,334 mm)	91.65 inch (2,328 mm)	92.24 inch (2,343 mm)
C	7.60 inch (193.04 mm)	7.60 inch (193.04mm)	7.60 inch (193.04mm)	7.60 inch (193.04mm)

*Dimensions referenced are worst case scenarios based upon IDW & data obtained in 2012.*

Clearance Dimensions, Magnet As-Shipped Condition

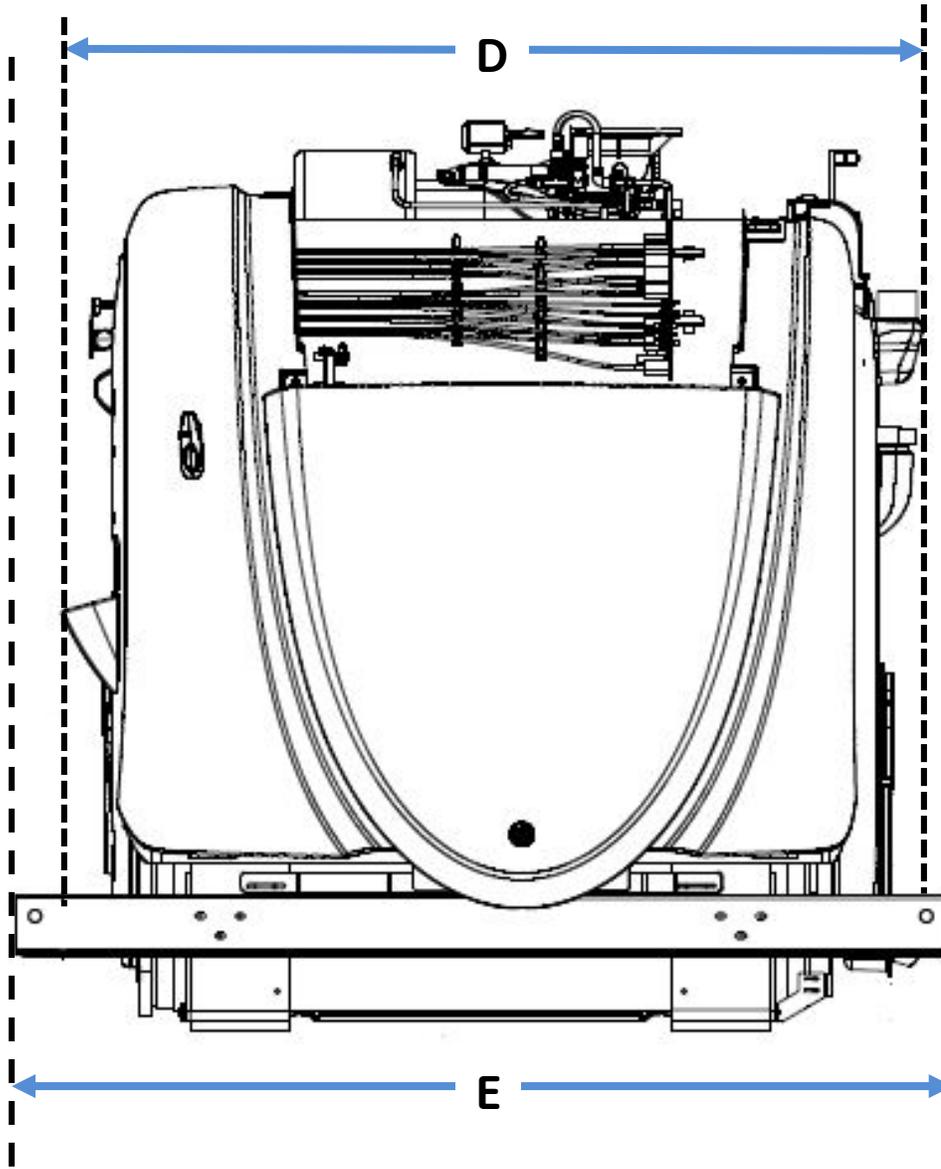


Image shown is for reference - the magnet shipped may not look like this image.

Magnets are shipped in multiple configurations.

Dimensions indicated are for condition as shipped.

Dimension	1.5T R, RD Series	1.5T HM Series	3.0T W, WB Series	3.0T UA Series
D	88.62 inch (2,251 mm)	76.30 inch (1,938 mm)	91.81 inch (2,332 mm)	83.46 inch (2,120 mm)
E	94 inch (2,388 mm)	94 inch (2,388 mm)	94 inch (2,388 mm)	94 inch (2,388 mm)

*Dimensions referenced are worst case scenarios based upon IDW & data obtained in 2012.*



**CAUTION**

POTENTIAL PERSONAL INJURY  
 UNEVEN JACKING OF THE MAGNET'S CORNERS COULD RESULT IN THE MAGNET SHIFTING ON THE JACKS, WHICH MAY LEAD TO PERSONAL INJURY OR MAGNET DAMAGE.  
 KEEP THE MAGNET LEVEL AT ALL TIMES DURING ANY JACKING OPERATION.



**NOTICE**

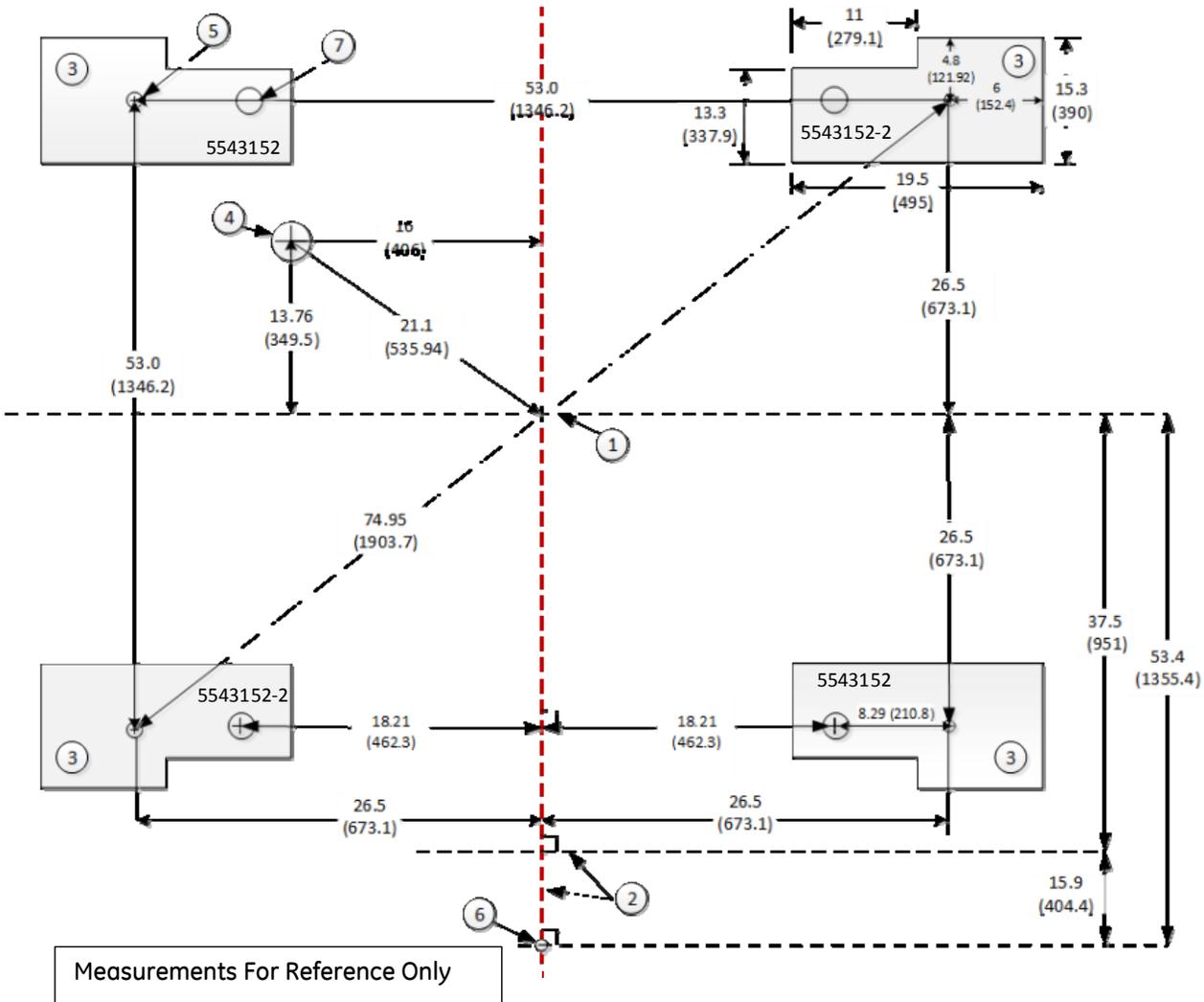
Do not apply any loads to any enclosure cover parts, nor allow straps/cables/chains to scrape enclosure cover parts.

- 10.3. Moving the Magnet into MR Suite
  - 10.3.1. If raising the magnet is required, use jacks placed entirely under the lifting rails.
  - 10.3.2. Avoid tilting or rotating the magnet while moving into the MR suite.
  - 10.3.3. Place steel floor plates as needed to protect floors. Rigger must take actions necessary to ensure that walls, floors, etc. along the transportation route/path are be protected from potential damage.
  - 10.3.4. Move the magnet to the Magnet Room. (If using a motorized tow vehicle, attach cables, chains or straps to the magnet's lifting rails with shackles.)
- 10.4. Moving the Magnet inside MR Suite
  - 10.4.1. Cover the Magnet Room floor using steel plates (shown below) from the Magnet Room entrance to the magnet's final position.
  - 10.4.2. Move the magnet to align the holes in the magnet feet to the anchor holes in the VibroAcoustic Damping Mats or the magnet anchors or the seismic anchor holes in the SV VibroAcoustic Mats.
  - 10.4.3. If VibroAcoustic Damping Mats or the SV VibroAcoustic mats are used, remove the 1 in. aluminum spacer from the four magnet feet (process described above). (For units with NO VibroAcoustic Mats, the 1 in. aluminum spacer should remain on the magnet feet.)
  - 10.4.4. Verify that the four holes, one per each magnet foot, align (centered  $\pm 0.125$  in. or  $\pm 3$  mm) over the anchor stud holes in VibroAcoustic Damping Mats or the magnet anchors or over the seismic anchor holes in the SV VibroAcoustic Mats.

10.5. Alignment

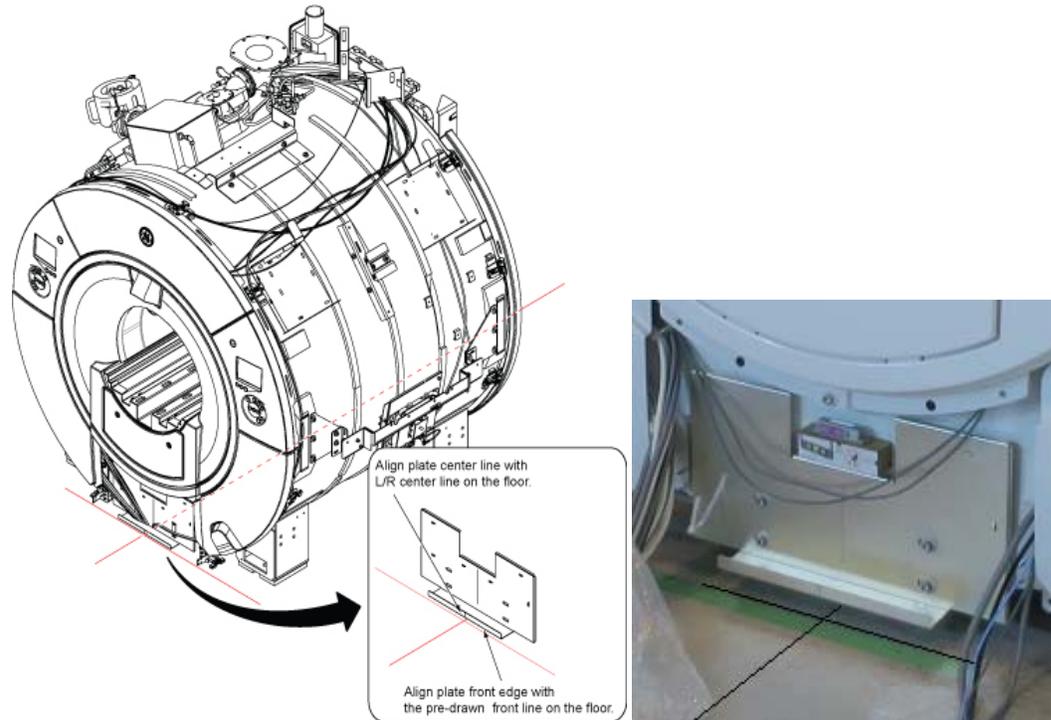
10.5.1. The Signa Pioneer 3.0T and has brackets installed to assist in aligning the magnet.

10.5.2. Check Alignment line on Magnet room. The line specification is shown in Illustration below.

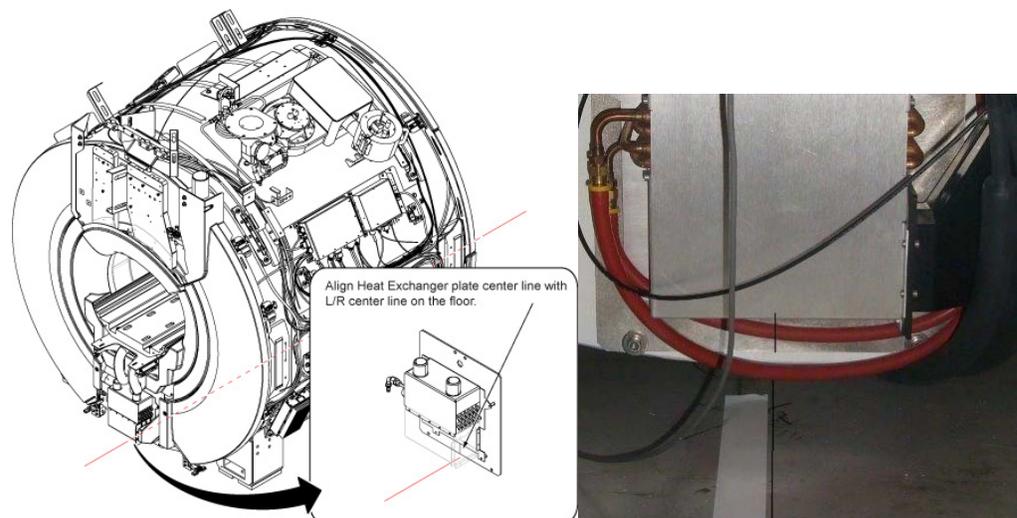


All Dimensions are inches; bracketed dimensions in millimeters	
VibroAcoustic Mat weight: 17lbs (8 kg) each.	
1	Magnet Isocenter
2	Magnet alignment Line (Center Line and Magnet Front Cable Tray)
3	VibroAcoustic Mats
4	8" Quench Vent
5	Magnet Anchoring Holes
6	Dock Bolt
7	Seismic Anchor Hole (Currently not Used)

10.5.3. Front cable tray center is aligned to front alignment line  $\pm 3$ mm. Refer to illustration below.



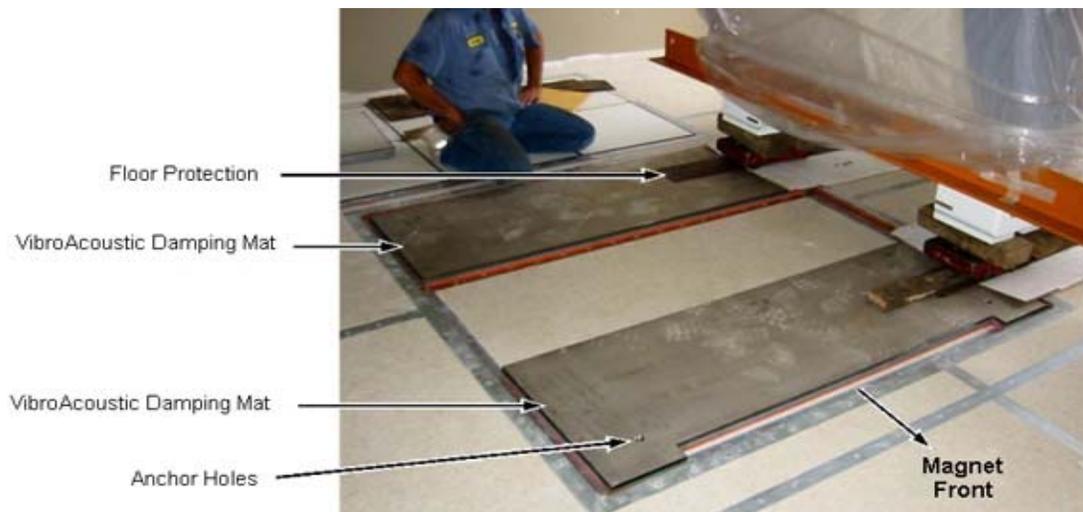
10.5.4. Rear center is aligned to center line  $\pm 3$ mm. Refer to Illustration below. Note that only the front of the magnet is aligned both laterally and axially. The rear of the magnet is aligned only in the lateral direction.



10.5.5. Ensure the front is aligned to the center line on the front of the magnet and the rear is aligned to the rear center line. Refer to illustrations above. Note that only the front of the magnet is aligned both laterally and axially. The rear of the magnet is aligned only in the lateral direction.

- 10.6. Lowering the Magnet into Position
  - 10.6.1. Jack the magnet up sufficiently at the two lifting rails (four corners), and remove the moving fixtures.
  - 10.6.2. Slowly lower the magnet onto the Magnet Room floor/spacers/ VibroAcoustic Damping Mats.
  - 10.6.3. Release pressure simultaneously in both jacks on one end of the magnet until that end is 1 to 2 in. (25 to 50 mm) lower than the opposite end.
  - 10.6.4. Simultaneously lower both jacks on the other end 1 to 2 in. (25 to 50 mm). Repeat lowering the magnet end to end until all feet are on the floor, correctly located on the anchor holes.

**Moving Magnet onto Surface Mounted VibroAcoustic Damping Mats for Non-SV Series Magnets**



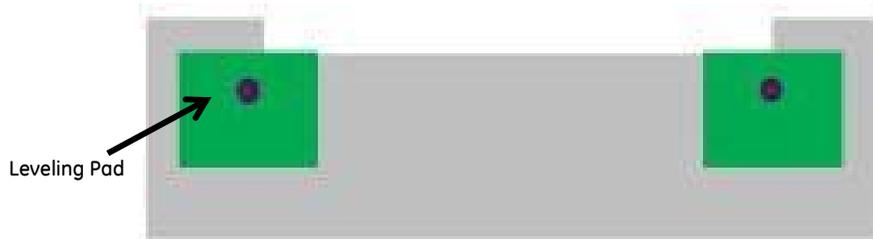
*R (Non-SV) Series Magnet Shown as example*

**Magnet Installed on Surface Mounted VibroAcoustic Damping Mats for R Series with Non SV Option Products**



**Moving Magnet onto Seismic Mounted VibroAcoustic Damping Mats for UA and HM Series Magnets**

*In case of UA or HM magnets the process is similar as mentioned above except there is a layer of 6 mm mat underneath each foot embedded in the steel plate.*



## Chapter 11 Magnet Leveling, Foot Shimming & Bolt-Down

### 11. Magnet Leveling, Foot Shimming & Bolt-Down

Magnet and dock installation and placement are critical to image quality and hardware reliability. Magnet must be installed level with iso-center to specifications listed in Section Measuring Magnet Height.

Equipment & Tools		
Quantity	Part Number	Description
1	N/A	1-foot (305 mm) Bubble Level in good condition; no sharp edges, corners, dents, bumps, cracks or loose bubble vials.
1	N/A	3-foot (1000 mm) Bubble Level in good condition; no sharp edges, corners, dents, bumps, cracks or loose bubble vials.
1	N/A	Tape Measure
1	N/A	Hammer
1	N/A	Wood Driving Block
1	N/A	Torque Wrench
1	46-260888G4	Magnet Leveling Kit (contents detailed in Table Below)
1	M1060MA or	VibroAcoustic Damping Option A
	M7000VM or	750w VibroAcoustic Damping Kit
	M50002LP	SV VibroAcoustic Damping Kit
	M7000VA	Ergo Pad Damping Kit

Magnet Leveling Kit, 46-260888G4		
Quantity	Part Number	Description
12	2213945	Leveling Shim, 0.062 in. (1.57 mm) thick
8	2213945-2	Leveling Shim, 0.020 in. (0.51 mm) thick
24	2180016	Contact Shim, 6.00 x 6.00 x 0.20 in thick (152 x 152 x 0.51mm)
16	2180016-2	Contact Shim, 6.00 x 6.00 x 0.32 in thick (152 x 152 x 0.81mm)
8	2180016-3	Contact Shim, 6.00 x 6.00 x 0.40 in thick (152 x 152 x 1.0 mm)
4	2180016-4	Contact Shim, 6.00 x 6.00 x 0.63 in thick (152 x 152 x 1.6mm)

11.1. Adding Leveling Shims

11.1.1. Use a jack to raise the low magnet foot. Jacking the lift rail is covered in Moving Magnet to MR Suite.

11.1.2. Insert the appropriate thickness of aluminum shim plates under the low magnet foot. Shims should be placed on the solid surface supporting the magnet weight as follows:

- 1.5T R Series , Non SV Product – on the stainless steel surface of the VibroAcoustic Mat, under the magnet foot,
- 1.5T R Series Magnet with SV option and RD Magnets - on the floor, under the SV VibroAcoustic Mat’s aluminum plate,
- 1.5T HM Series Magnet - Between Magnet foot and green Leveling Pad
- 3.0T W, WB Series Magnet - on the stainless steel surface of the VibroAcoustic Mat, under the magnet foot,
- 3.0T UA Series Magnet – Between Magnet foot and green Leveling Pad.

Magnet	1.5T R Series Magnets with SV option and RD Magnets	1.5T R Series , Non SV Products	1.5T HM Series Magnets	3.0T W, WB Series Magnet	3.0T UA Series Magnet
VibroAcoustic Mat (VM) MCAT	M50002LP	M1060MA	M7000VA or M7000VM for seismic regions	M1060MA	M7000VA or M7000VM for seismic regions
Leveling Shim Placement	On Floor, Beneath VM Aluminum Plate	Between Magnet Foot and VM Steel Plate	Between Magnet foot and green Leveling Pad	Between Magnet Foot and VM Steel Plate	Between Magnet foot and green Leveling Pad
Magnet to VibroAcoustic Mat Anchor	Anchoring Not Required	Center Stud	Center Stud	Center Stud	Center Stud
Remove 1-inch Al Spacer from each Foot?	Yes, before final positioning in MR Suite				
Floor Anchoring	Refer to Preinstallation Manual. ONLY required if the MR Suite is in a seismic zone.				

*(For units with NO VibroAcoustic Mats, the 1 in. aluminum spacer should remain on the magnet feet and this type of unit will be anchored to the scanning room floor.)*

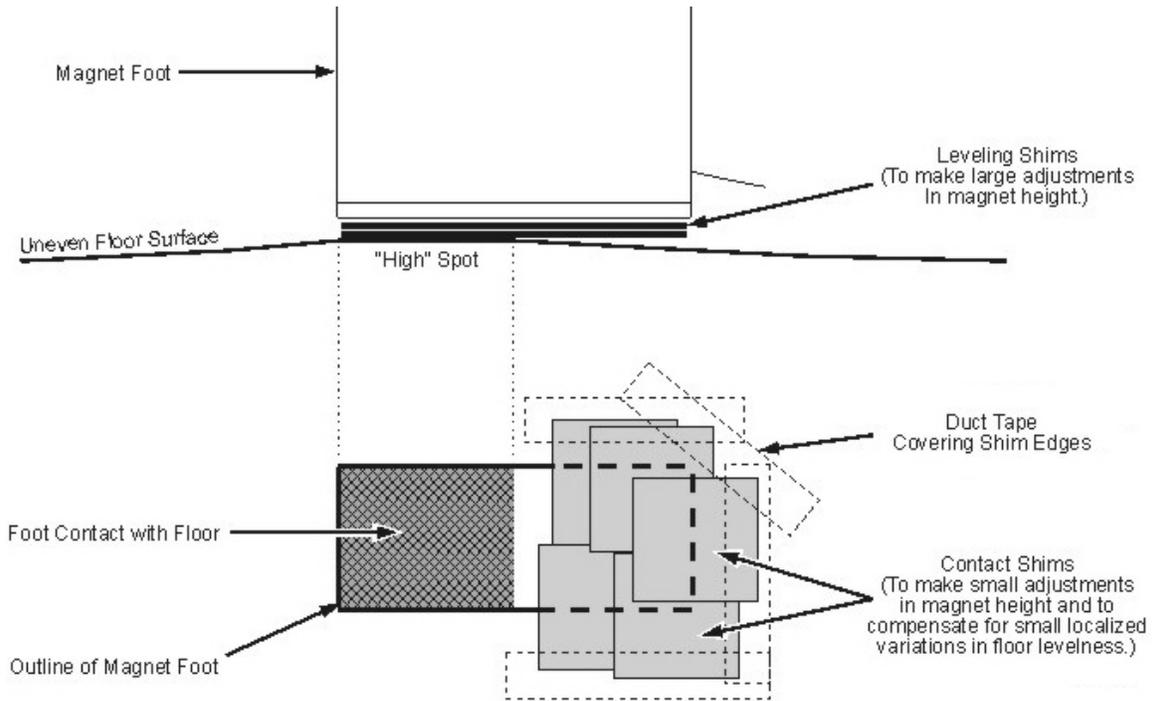
11.1.3. Recheck Left to Right levelness to conform to Left to Right leveling section.

11.1.4. Recheck magnet height to conform to Magnet Height section.

11.1.5. Recheck Front to Back levelness to conform to Front to Back leveling section.

11.1.6. Repeat Steps process until the front of the magnet is level (Left to Right and Front to Back) and within the correct height specification.

**Typical Shim Arrangement for Gap Fill**  
(refer to table above for actual shim placement location for magnet type)



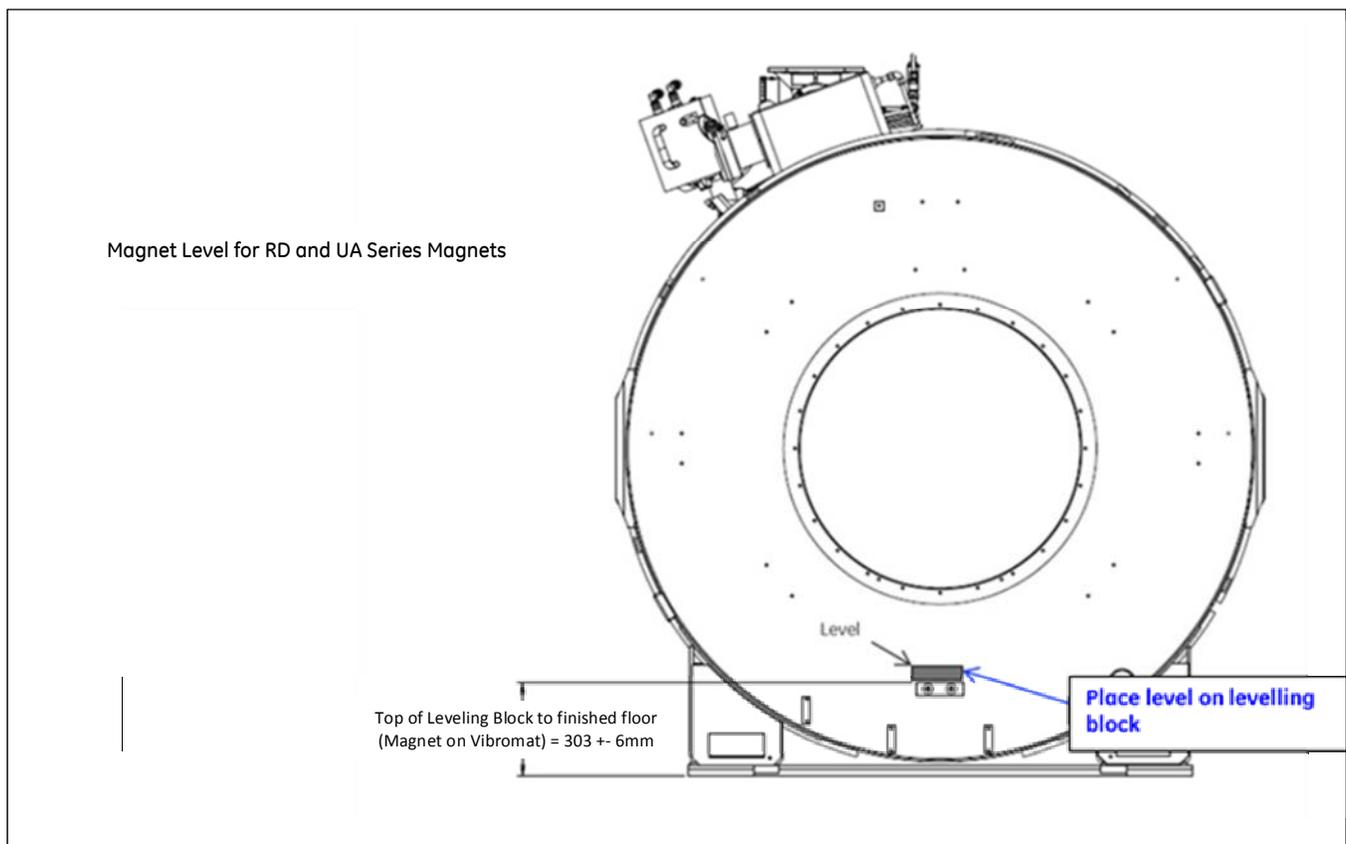
11.2. Magnet Leveling: 1.5T HM, RD Series Magnets and 3.0T UA Series Magnets

11.2.1. Left to Right Leveling

- a. The magnet height measurement must be taken from the leveling block.
- b. Hold a longer than 305mm (1 ft.) Bubble level across the leveling block. Adjust the magnet until the level's bubble fits centrally within the level lines.
- c. Add leveling shims under each magnet foot according to the Adding Leveling Shims section to achieve the correct Left to Right level.

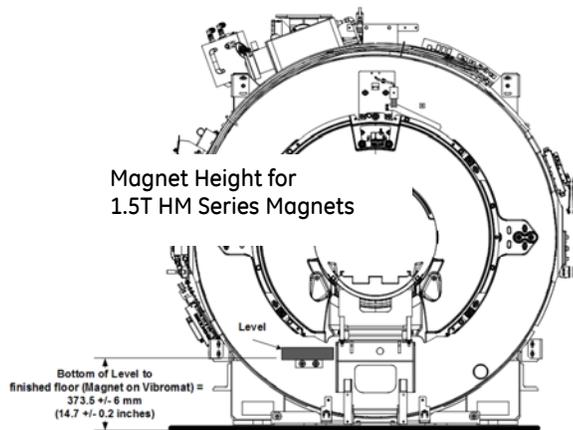
11.2.2. Magnet Height

- a. 3.0 UA Series Magnets (Pioneer, SIGNA PET/MR, Discovery 750W, SIGNA Architect) and RD Magnets
  - 1. With the level on the top of the leveling block, measure the vertical distance from the bottom of the level to the finished floor. The final installation specification measurement is  $303 \pm 6\text{mm}$ .
  - 2. Add leveling shims under each magnet foot according to the Adding Leveling Shims section to achieve the correct height.



b. 1.5T HM Series Magnets

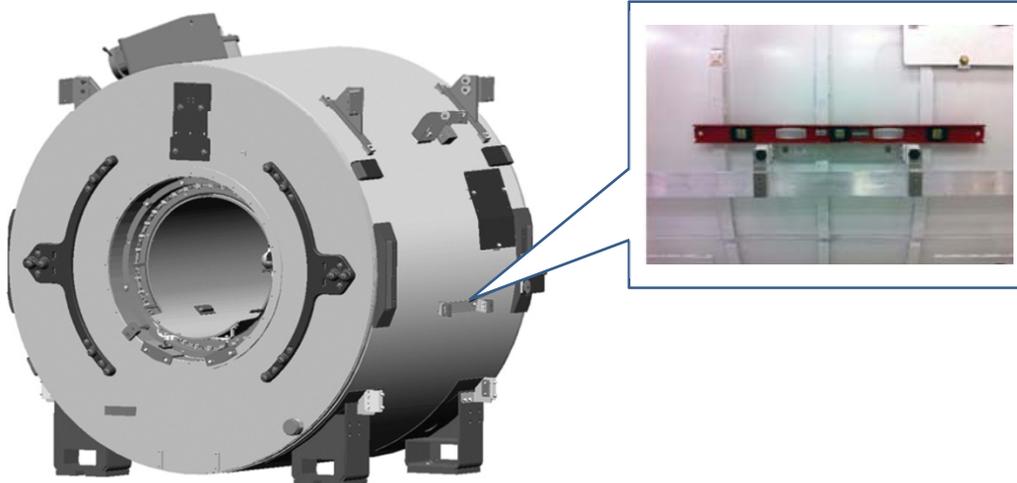
1. With the level on top of the leveling block, measure the vertical distance from the bottom of the level to the finished floor. The final installation specification measurement is  $373.5 \pm 6\text{mm}$
2. Add leveling shims under each magnet foot according to the Adding Leveling Shims section to achieve the correct height.



11.2.3. Front to Back Leveling

- a. 3.0T UA Series Magnets (SIGNA PET/MR, Discovery 750W, SIGNA Architect, RD magnets)
  - 1. Place a Bubble level across the magnet side cover bracket. Ensure the level is placed evenly on the bracket.
  - 2. Adjust the magnet until the level's bubble fits centrally within the level lines.
  - 3. Add leveling shims under each magnet foot according to the Adding Leveling Shims section to achieve the correct Left to Right level.

**Magnet Leveling, Front to Back for 3.0T UA Series Magnets**



b. 1.5T HM Series Magnets

- 1. Position a 3 ft. (1000 mm) Bubble level at the top of the RF coil. Make sure the entire length of the level is on the RF coil.
- 2. Adjust the magnet until the level's bubble fits centrally within the level lines.
- 3. Add leveling shims under each magnet foot according to the Adding Leveling Shims section to achieve the correct Left to Right level.

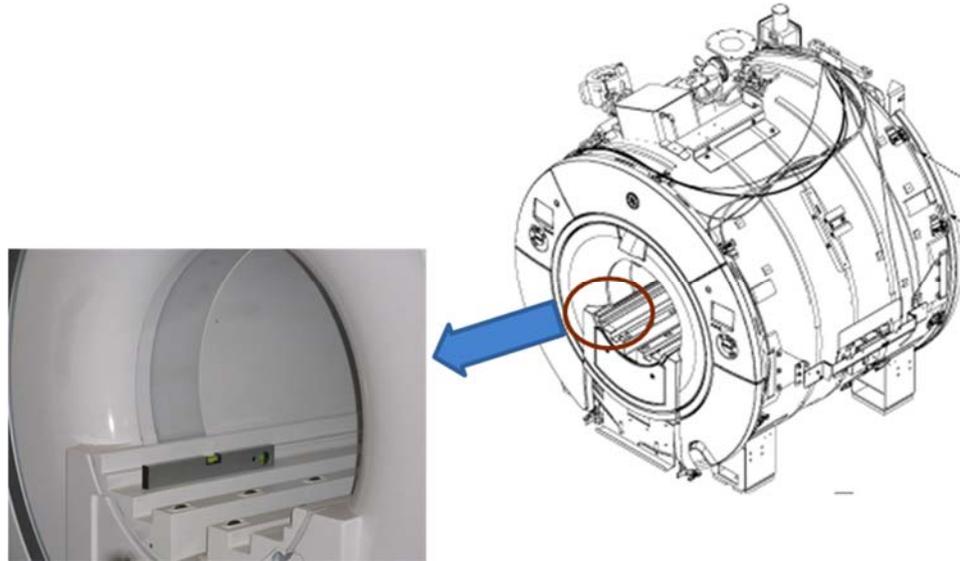
**Magnet Leveling,  
Front to Back for  
1.5T HM Series  
Magnets**



c. 3.0T UA Series Magnets (Signa Pioneer), 1.5T RD Series Magnets

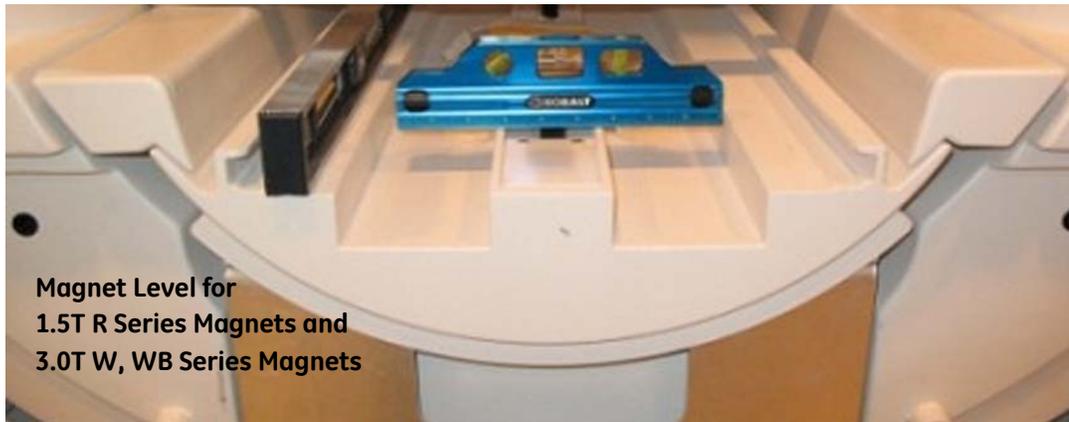
- 1. The magnet front-back level measurement must be taken from the top of the front bridge. Refer to the illustration 2.
- 2. Hold a greater than 305 mm bubble level across the top of the front bridge.
- 3. Adjust the magnet until the level's bubble fits centrally within the level lines.

**Magnet Leveling, Front to Back for 3.0T UA Series Magnets (Signa Pioneer)**



- 11.2.4. Repeat Steps process until the front of the magnet is level (Left to Right and Front to Back) and within the correct height specification.

- 11.3. Magnet Leveling: 1.5T R Series Magnets and 3.0T W, WB Series Magnets Magnet Leveling
  - 11.3.1. Left to Right Leveling
    - a. The magnet level measurement must be taken from the bridge.
    - b. Hold a < 1 ft (305mm) Bubble level across the flats of the patient bridge. Adjust the magnet until the level's bubble fits centrally within the level lines.
    - c. Add leveling shims under each magnet foot according to the Adding Leveling Shims section to achieve the correct Left to Right level.

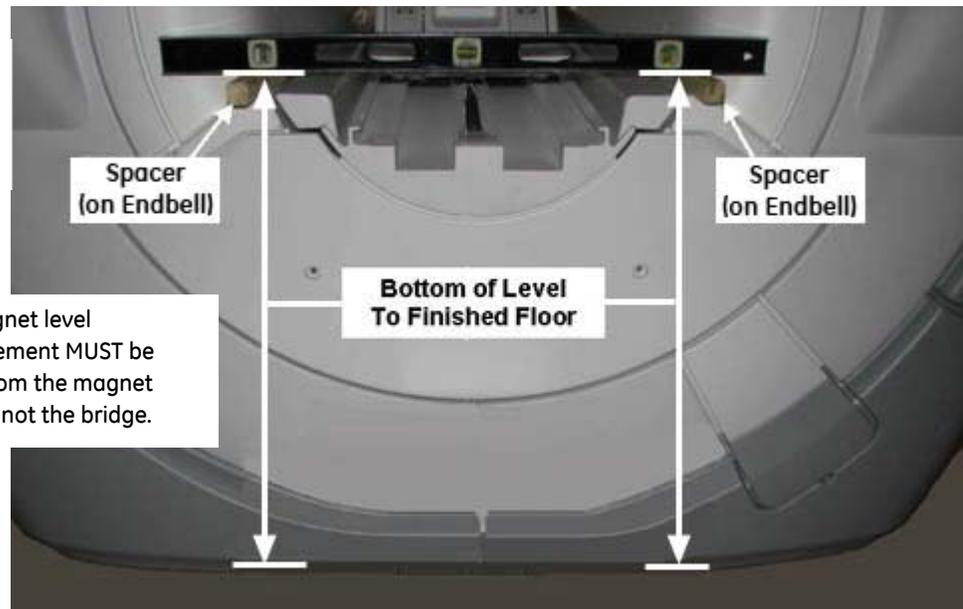


11.3.2. Magnet Height

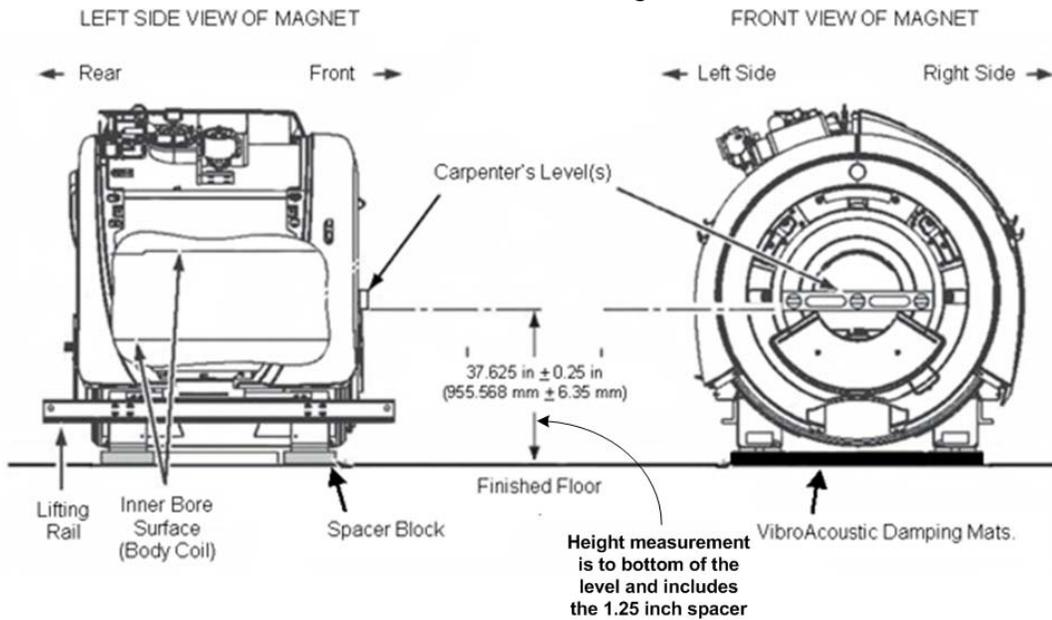
- a. The magnet height measurement must be taken from the magnet endbell (not the bridge) to the finished floor.
- b. Place a spacer of the same size between the level and magnet endbell from left to right. The illustration below shows two wood blocks as spacers that are both 1.25 inch (33 mm) high.
- c. Measure the vertical distance from the bottom of the Bubble level to the finished floor. The final installation specification measurement for 1.5T R Series Magnets and W, WB Series Magnets should be 37.625 in.  $\pm$  0.25 in. (955.675 mm  $\pm$  6.35 mm), this includes the height of the spacer mentioned above.
- d. Add leveling shims under each magnet foot according to the Adding Leveling Shims section to achieve the correct height.

**Magnet Height for  
1.5T R Series Magnets  
and 3.0T W, WB Series  
Magnets**

The magnet level measurement MUST be taken from the magnet endbell, not the bridge.



**Measuring Magnet Height and Checking Magnet Level for non MR450w/Artist and non MR750w/Architect Magnets**



**11.3.3. Front to Back Leveling**

- a. Position a 3 ft. (1000 mm) Bubble level at the top of the RF coil. Make sure the entire length of the level is on the RF coil.
- b. Adjust the magnet until the level's bubble fits centrally within the level lines.
- c. Add leveling shims under each magnet foot according to the Adding Leveling Shims section to achieve the correct Left to Right level.

**Magnet Leveling, Front to Back for 1.5T R Series Magnets and 3.0T W, WB Series Magnets**



- 11.3.4. Repeat Steps process until the front of the magnet is level (Left to Right and Front to Back) and within the correct height specification.



**CAUTION**

POTENTIAL PERSONAL INJURY  
CONTACT SHIMS HAVE SHARP EDGES THAT CAN CAUSE PERSONAL INJURY. ALWAYS TAPE SHIM EDGES TO THE FLOOR SURFACE.



**NOTICE**

- The magnet MUST be connected to the helium exhaust gas vent as soon as possible but within 24 hours.
- Complete contact between the bottom of the magnet feet and the floor or VibroAcoustic mat is important to minimize magnet motion/vibration, which can cause image problems.



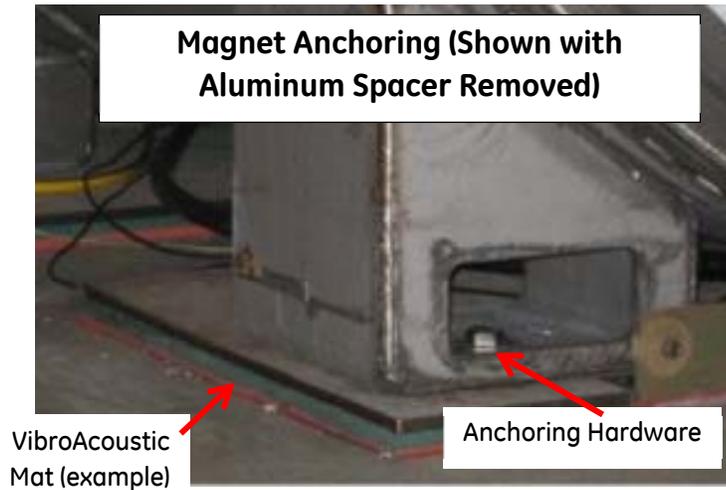
**NOTICE**

Immediately continue with the Conversion to Operating Configuration and Exhaust Gas Vent Connection subsections of the Set-Up and Calibration chapter in the appropriate manual:

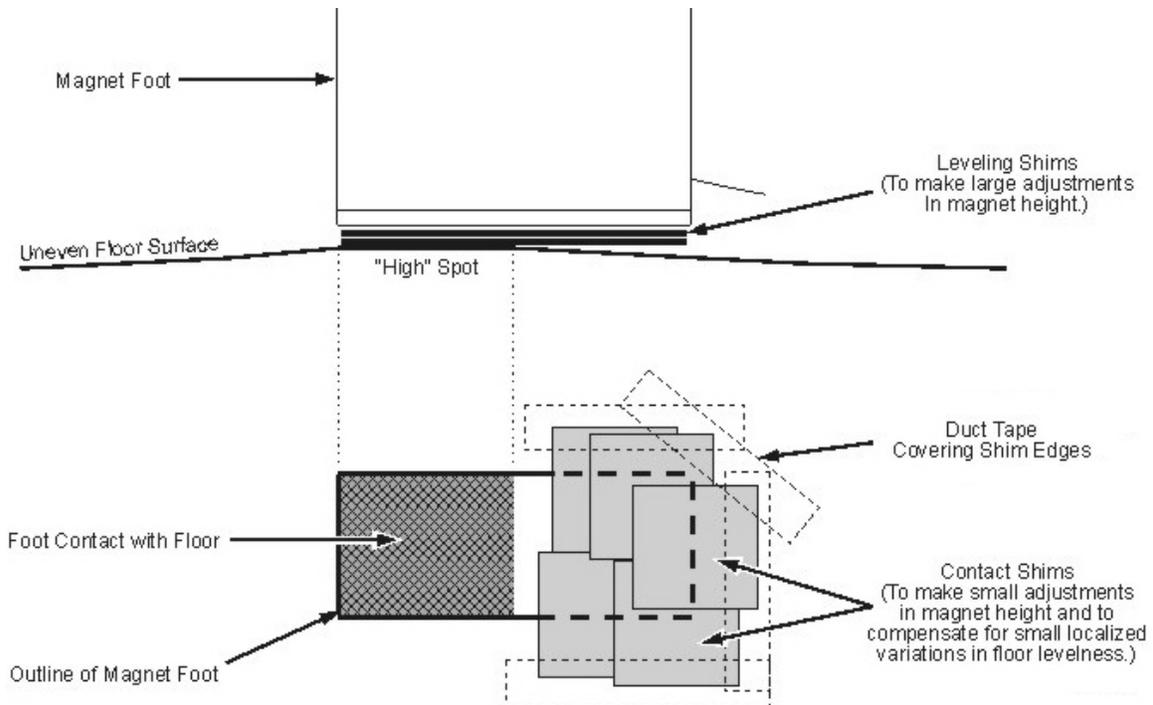
- 5495019, Magnet & Cryogen Manual for Actively Shimmed Magnets (1.5T R Series, 3.0T W, WB Series) or
- 5495018, Magnet & Cryogen Manual for Passively Shimmed Magnets (1.5T HM, RD Series, 3.0T UA Series)

The above noted documents are available through the support documentation library at [gehealthcare.com](http://gehealthcare.com) or through your GE Healthcare Field Service Representative.

- 11.4. Magnet Anchoring
  - 11.4.1. After leveling is completed, anchor the magnet to the floor or VibroAcoustic mat. Anchoring is not performed when using the SV VibroAcoustic Kit. If a seismic anchor is being used, refer to the appropriate Preinstallation Manual for the magnet style being installed.
  - 11.4.2. Anchoring hardware;
    - 5477278, 0.75-10 x 4 in. Stainless Steel Studs
    - 46-252635P14, WASHER, PLAIN, .75 X .100 THK, Stainless Steel Flat Washers
    - 5476688, 3 in. x 3 in. (76.8 mm x 76.8 mm) Aluminum Washers
    - 46-260943P6, 0.75-10 Stainless Steel Nuts
  - 11.4.3. Make sure all fasteners are properly tightened (finger tight plus ½-turn).
  - 11.4.4. Trim off excess shim material.
  - 11.4.5. Tape shim edges to the floor surface.

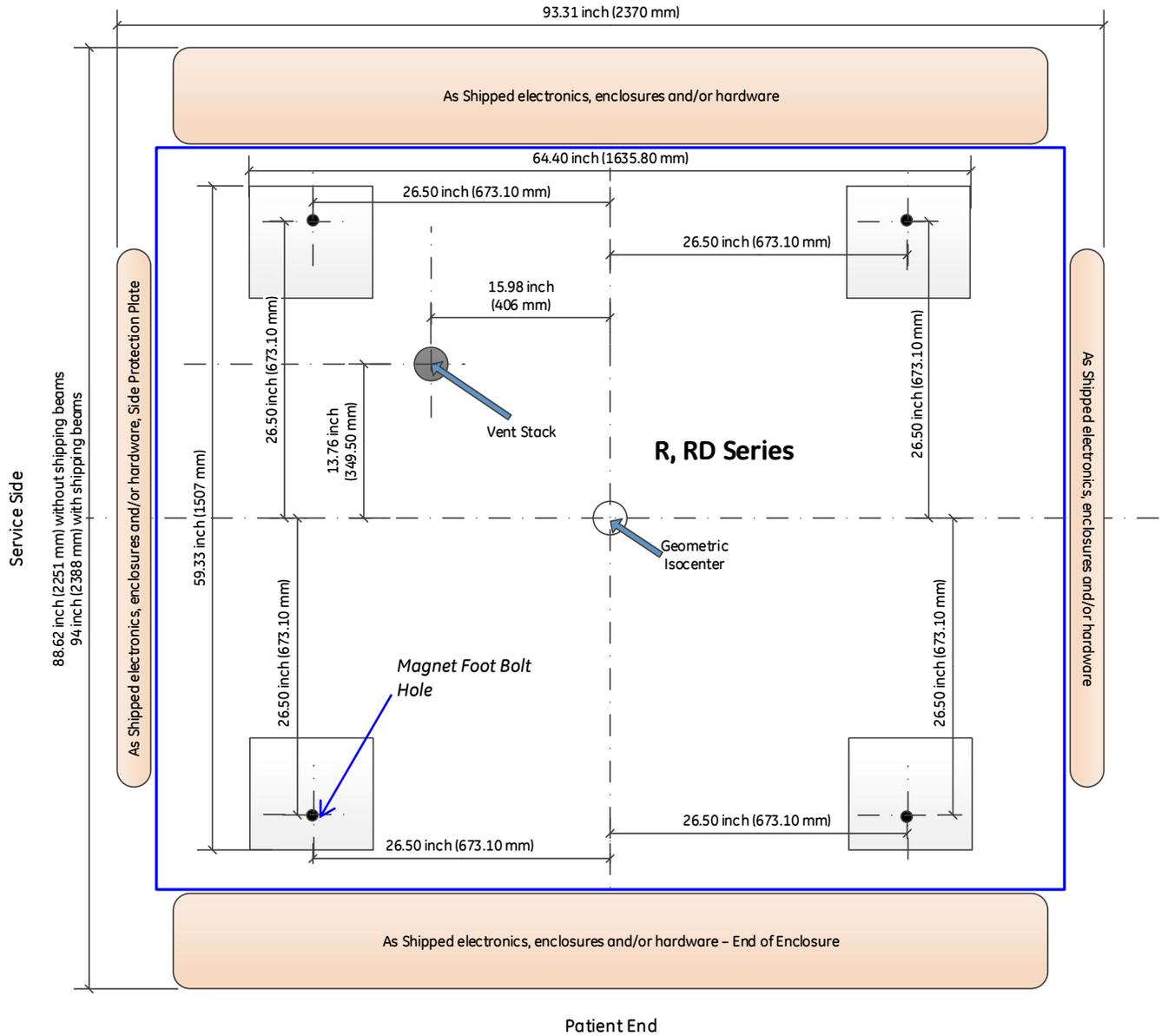


**Typical Shim Arrangement for Gap Fill**  
(refer to "Adding Leveling Shims" for actual shim placement location for magnet type)

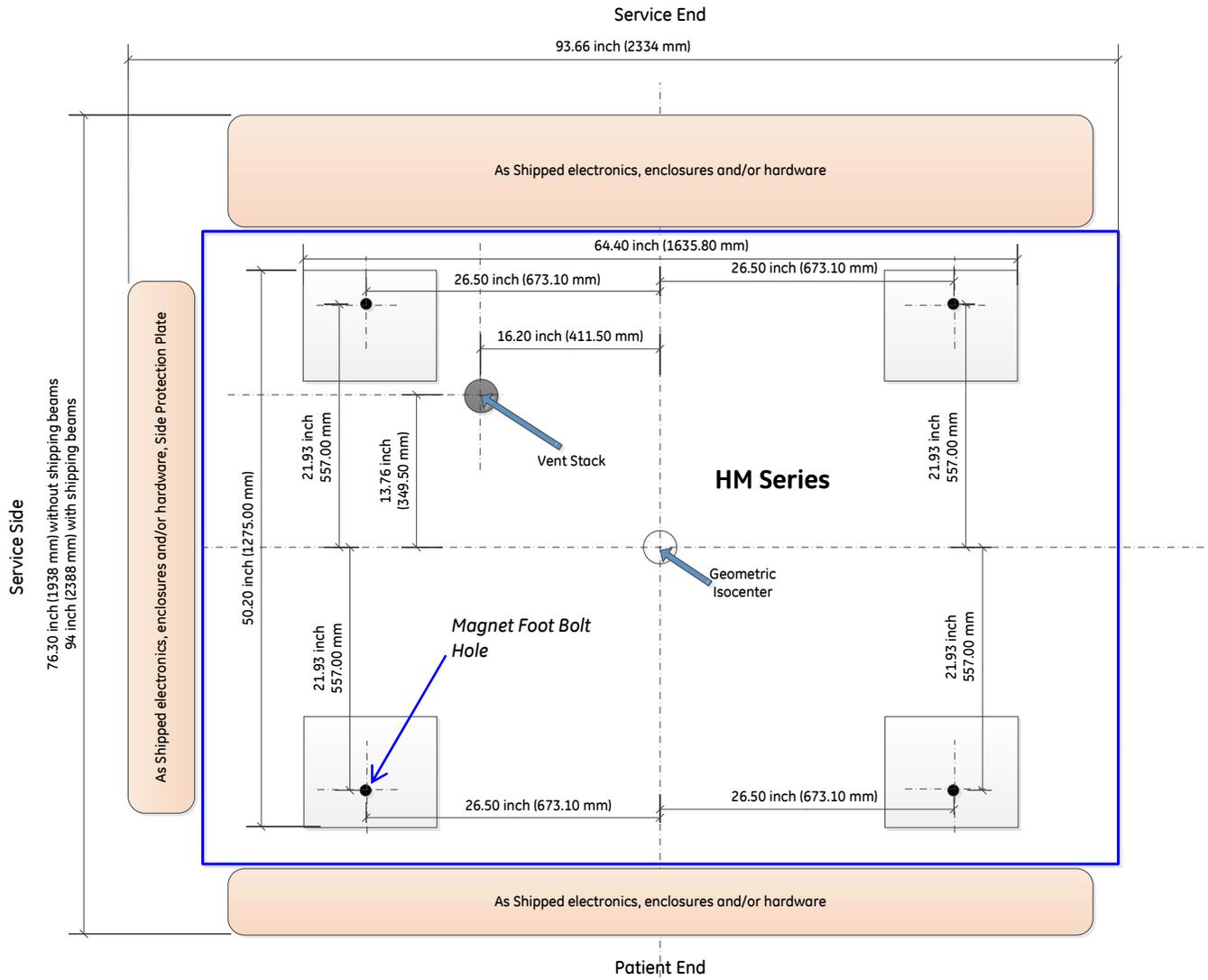


Appendix

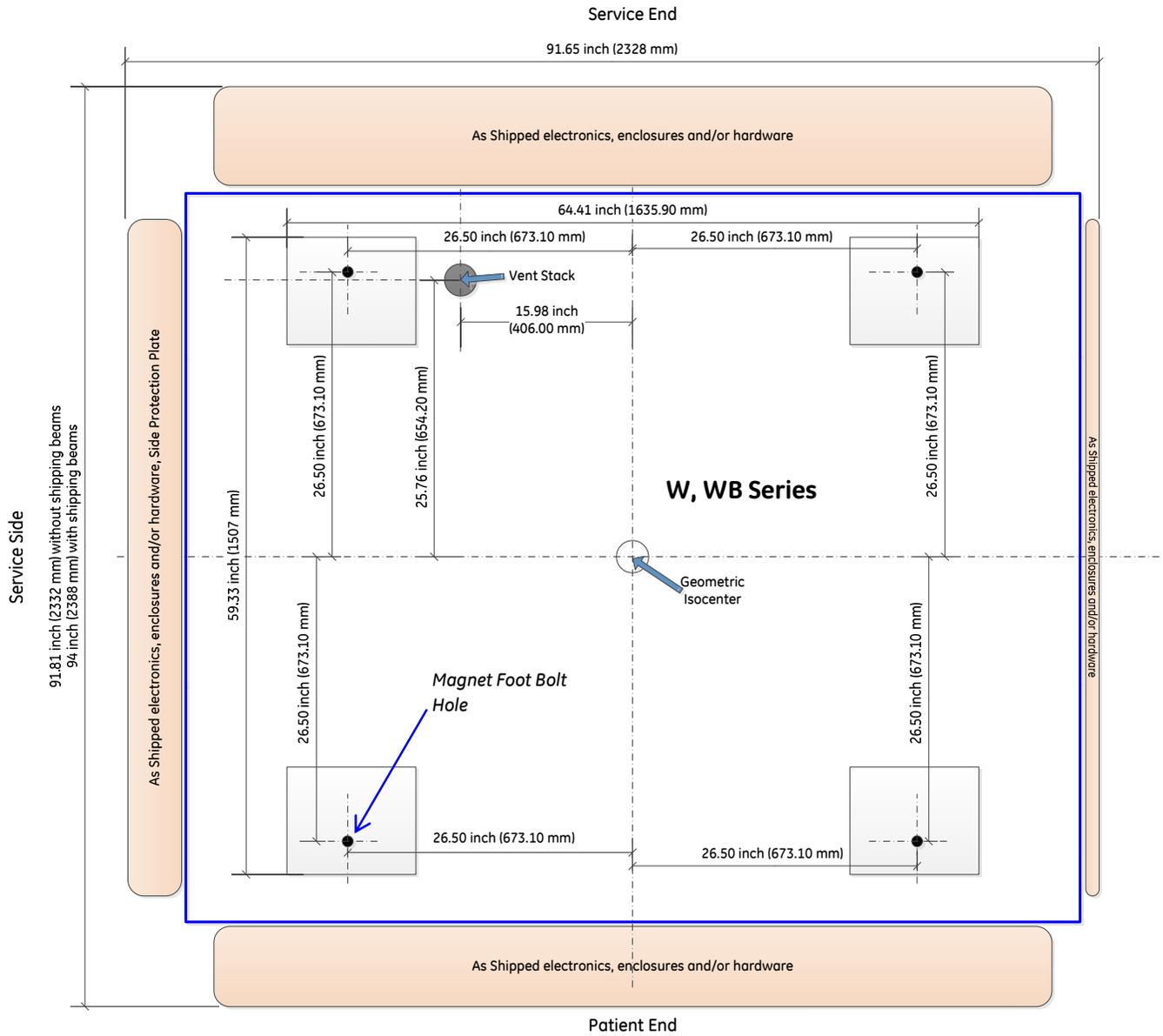
Magnet Footprint - R, RD Series Magnet



Magnet Footprint - HM Series Magnet



Magnet Footprint – W, WB Series Magnet





**Vibromat Wall Chart**

Vibromat	GEHC Product Names					Magnet (FLO)		
						SN	Type	Bore
M1060MA (Seismic and non-seismic)	Signa HDx (1.5T)	Signa HDi (1.5T)	Signa HDe (1.5T)	Signa HDxT (1.5T)	Discovery MR450 1.5T	R	LCC (1.5T)	60
M1060MA (Seismic and non-seismic)	Signa HDxt (3.0T)	Discovery MR750 3.0T				WB and W	G3 (3.0T)	60
M50002LP (Seismic and non-seismic)	Optima MR360 1.5T	Brivo MR355 1.5T	Optima MR360 Advance 1.5T (16 BEAT)	Brivo MR355 Inspire 1.5T (16 BEAT)		R	LCC (1.5T)	60
M50002LP (Seismic and non-seismic)	SIGNA Creator 1.5T (Mulan)	SIGNA Explorer 1.5T (Mulan)	Optima MR360 1.5T (SV)	Brivo MR355 1.5T (SV)		R	LCC (1.5T)	60
M50002LP (Seismic and non-seismic)	SIGNA Voyager (1.5T Kizuna)					RD	LCC- W (1.5T)	70
M7000VA (non-seismic sites)	Optima MR450w 1.5T	Optima MR450w 1.5T (with GEM)	SIGNA Artist 1.5T			HM	DVw (1.5T)	70
M7000VA (non-seismic sites)	Discovery™ MR750w 3.0T	SIGNA PET/MR (3.0T)	Signa Pioneer (3.0T Kizuna)	SIGNA Architect 3.0T		UA	3TLC (3.0T)	70
M7000VM (Seismic sites)	Optima MR450w 1.5T	Optima MR450w 1.5T (with GEM)	SIGNA Artist 1.5T			HM	DVw (1.5T)	70
M7000VM (Seismic sites)	Discovery™ MR750w 3.0T	SIGNA PET/MR (3.0T)	Signa Pioneer (3.0T Kizuna)	SIGNA Architect 3.0T		UA	3TLC (3.0T)	70

### Revision History

Revision History						
REV	Affected Page(s)	Description of Content Changed	Reason for Change or Change Control Number	Author	Effective date of Document	Periodic review date
06	As noted within Summary Table	As noted within Change Summary Table	As noted within Change Summary Table	Nick Logan	My Workshop Release	Does not Apply to Service Manuals
Yes	No	NA	Enter Validation Information or Rationale if "NO" or "NA" for Validation or Training			
<input checked="" type="checkbox"/>	<input type="checkbox"/>		Typo or Format Change	As noted within Summary Table.		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Regulatory Filing			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Validation	As noted within Summary Table.		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Training	No change to techniques.		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Communication	Upon MWS Release.		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Labeling, (list)	Magnet Handling Manual, manuals are considered labeling by FDA.		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Other Documents, (list)			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Other (describe)			

#### Change Summary Table for Revision 6

Description of Content Changed	Reason for Change or Change Control Number	Affected Page(s) or Sections
Changed RB to RD	Typo	Chapter 4
Changed Signa to SIGNA	Typo	Appendix VibroMat Wall Chart
Measurements on HM Ergo Pad Placement Chart were incorrect was 74.96 (1903.7) correct values at 68.8 (1747.5)	Typo	Page 47
Removed "The VibroAcoustic Damping Mat Kit must be installed on the floor before moving the magnet into the magnet room."	Clarification	9.2.1
Added "Or can be pre-installed to the magnet foot before placing the magnet on the floor"	Clarification	9.2.5
Added part numbers to the vibropads in the dimension images	Clarification	9.2.5 Image, 10.5.2 Image
Added "/brown elastomer"	Clarification	9.2.6
Removed "Pending, Ramp"	Clarification	7
Removed "(which may take place on-site or off-site)", added part about delays and leaving magnet in shipping configuration	Clarification	7
Updated the picture and text to reflect the new plumbing that we are shipping 5555227	VRF#20150025	8.1

Description of Content Changed	Reason for Change or Change Control Number	Affected Page(s) or Sections
Updated image to reflect both styles of instrumentation boxes and added a closer picture of the pressure transducer connection.	Clarification	7.2.2
Added section 7.3 Magnet Monitoring connections at warehouse	Clarification	7.3
Added Section 7.5 Magnet Monitoring at Warehouse	Clarification	7.5
Updated pictures to reflect F50 compressor	Clarification	7.1.3, 7.1.4
Removed ", Onsite" from title	Clarification	7.1
Added SIGNA Architect 3.0T	eNPI #023468	11.2.2.a, 11.2.3.a, 11.3.2.d, Vibromat Wall Chart
Added SIGNA Artist 1.5T	eNPI #023468	11.3.2.d, Vibromat Wall Chart
Changed "shown above" to "as shown in Appendix"	Clarification	9.3.5
Moved RD magnets to outside the parenthesis as it is not a UA magnet	Clarification	11.2.2.a
Added "this includes the spacer mentioned above."	Clarification	11.3.2.c
Added "Ensure that movements are completed in a smooth controlled manner."	Clarification	10.1