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GE Medical Systems

Technical Publications

**Direction 2252520
Revision 0**

Signa® Gradient Isolation Kit Installation

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Operating Documentation

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.

Call Traffic and Transportation, Milwaukee, WI (414) 785-5052/8*323-5052 immediately after damage is found. At this time be ready to supply name of carrier, delivery date, consignee name, freight or express bill number, item damaged and extent of damage.

Complete instructions regarding claim procedure are found in Section "S" of the Policy & Procedure Bulletins.

3/12/92



Systems

GE Medical

U.S.A.

GE Medical Systems: Telex 3797371
P.O. Box 414, Milwaukee, Wisconsin 53201

(Asia, Pacific, Latin America, North America)

GE Medical Systems – Europe: Telex 2611794
Shortlands, Hammersmith, London W6 8BX U.K.

WARNING

- 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.

AVERTISSEMENT

- CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.
- SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.
- NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE 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

- DIESES KUNDENDIENST-HANDBUCH 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, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.
- WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.

AVISO

- ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS
- SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEMS SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.
- 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 O DE OTRA NATURALEZA.

ATENÇÃO

- ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.
- SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEMS, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.
- NÃO TENHA TENTADO REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.
- O NÃO CUMPRIMENTO DESTA AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.

AVVERTENZA

- IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.
- SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEMS RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.
- SI PROCEDA ALLA MANUTENZIONE DELL'APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.
- NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL'ADDETTO ALLA MANUTENZIONE, ALL'UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.

警告

- ・ このサービスマニュアルには英語版しかありません。
- ・ GEMS以外で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下さい。
- ・ 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。

注意:

- 本维修手册仅存有英文本。
- 非 GEMS 公司的维修员要求非英文本的维修手册时，客户需自行负责翻译。
- 未详细阅读和完全了解本手册之前，不得进行维修。
- 忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害。

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1- LIST OF EQUIPMENT & PARTS

Item #	Description	Quantity	Part Number
1.	Gradient Isolation Kit Instructions	1	2252520
2.	CRM Isolation Upgrade Install Kit (Rcat# R4391JB)	1	2247493
	<u>Kit Contents:</u>		
	Support Mounting	1	2240708
	Spacer Shim 1.5 mm THK	2	2238908
	Spacer Shim 2.4 mm THK	6	2238908-2
	Spacer Shim 16 mm THK	1	2238908-3
	Rubber Isolation Pad	2	2241176
	Screw Set Screw 10 mm 20 mm Grub	2	2251294
	CRM Isolation Upgrade Install Kit	1	2247493IDW
	Spacer Shim 10 mm THK	1	2238908-4
	CRM Rear Support Mounting	1	2246675
	Endbell Plate Mounting Spacer	1	2235604
	Bostik "Never-Seeze" Anti-seeze compound	1	46-294151P8
	Screw set screw 10 mm 25 mm Grub	1	2251295
OR			
	BRM Isolation Upgrade Install Kit (Rcat# R4391JA)	1	2242380
	<u>Kit Contents:</u>		
	Support Mounting	2	2240708
	Spacer 16 mm	1	2238907
	Spacer Shim 1.5mm Thk	2	2238908
	Spacer Shim 2.4 mm Thk	6	2238908-2
	Spacer Shim 16 mm Thk	1	2238908-3
	Rubber Isolation Pad	2	2241176
	Spacer 28 mm	1	2238907-2
	Screw Cheese Head 10 mm 20 mm Nylon	1	2209823-3
	Screw Cheese Head 10 mm 25 mm Nylon	2	2209823-4
	Screw Cheese Head 10 mm 35 mm Nylon	1	2209823-5
	LCC/CX Mag Install parts List	1	2242380IDW
	Bostik "Never-Seeze" Anti-seeze compound	1	46-294151P8
3.	Coil Lift Tool Kit for Gradient Isolation Kit	1	2261179
	<u>Kit contents:</u>		
	Magnet Interface Bracket, Right	1	2256832
	Magnet Interface Bracket, Left	1	2256833
	Gradient Coil Interface Bracket	2	2256834
	Bolt	2	2256835
	Hex Head Cap Screw 35 mm M10x1.5 A2—70 Stainless Steel	4	2109866-22
	Hex Head Cap Screw 100 mm M10x1.5 A2-70 Stainless Steel	8	2109866-27
	Metric Standard Flat Washers M10 A2 Stainless Steel	12	2109878-4
4.	Open Foam Caulking Strip - .500" THK	2	2179397-3

Additional Required Items (Field Supplied)

1. Poron Seal, for air cover	1	2185175
2. Poron Seal,	4	2181231
3. Poron Seal	8	2181231-2
4. Blue Loctite # 242	1	46-170684p2
5. Alcohol	1	Field Supplied
6. Ty-wraps	5	Field Supplied

2- PRE-REQUISITE PROCEDURES

“As installed” performance data of system should be available prior to any hardware changes.

- Full SPT
- White Pixel/Spike Noise

Signa Horizon Enclosure

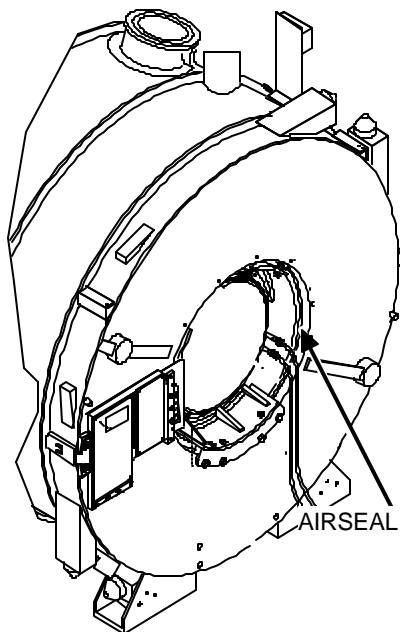
1. Rear Enclosure Cover Removal
2. Front Enclosure Cover Removal
3. Patient Comfort Module Removal
4. Bridge and Cradle Removal
5. Rear Pedestal Removal

Signa MR/i & CV/i WideOpen Enclosure

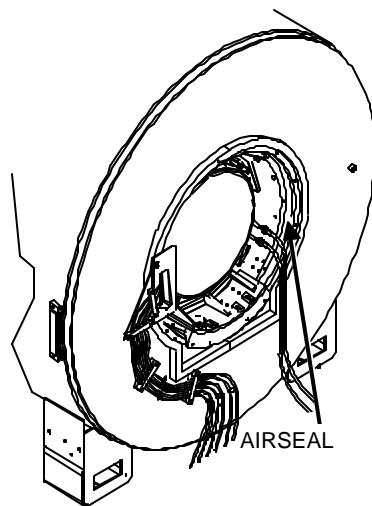
1. Top, Bottom Trim , & Side Arc Cover Removal
2. Rear Pedestal Cover Removal
3. Bridge and Cradle Removal
4. Rear Pedestal Removal
5. Rear Endbell Removal
6. Front Endbell Removal

3- INSTALLATION OF (FRONT) PATIENT END SUPPORT BRACKET

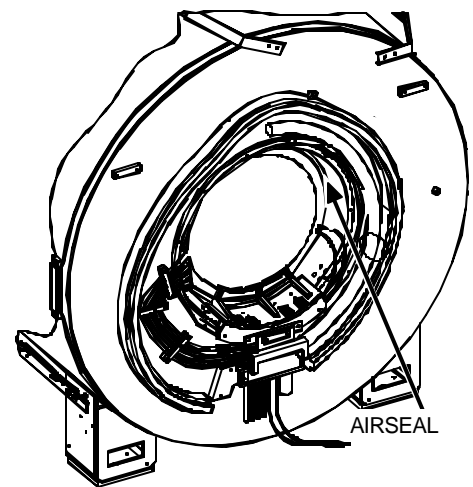
1. Remove air seal from the BRM/BRM-D/CRM. See Illustration 3-1.



CX MAGNET



**LCC MAGNET
REMOVE AIRSEAL
ILLUSTRATION 3-1**



WIDEOPEN ENCLOSURE

2. Remove the Terminal Block or cable bracket located on the rear flange of the magnet. See Illustration 3-2. (The Terminal Block is not used with the BRM-D and MR/i & CV/i WideOpen systems)



REMOVE TERMINAL BLOCK

ILLUSTRATION 3-2

3. Loosen and remove the BRM/BRM-D/CRM radial support blocks and support brackets from both ends (2 per end) of the BRM/BRM-D/CRM Assembly. Tool to use: 24 mm Non-Magnetic socket and ratchet.
4. Add alignment marks to show the installed vertical and lateral alignment of each end of the gradient with respect to the cryostat.
5. Remove the top bolts and fiber washers from the gradient coil.
6. Remove 4 (four) M10 bolts between aluminum support brackets on the patient end and service end of the magnet (8 bolts total). Do not lift coil with any of the 8 bolts in place.
7. Remove lower left and right threaded studs to allow for proper fit of the magnet interface brackets.

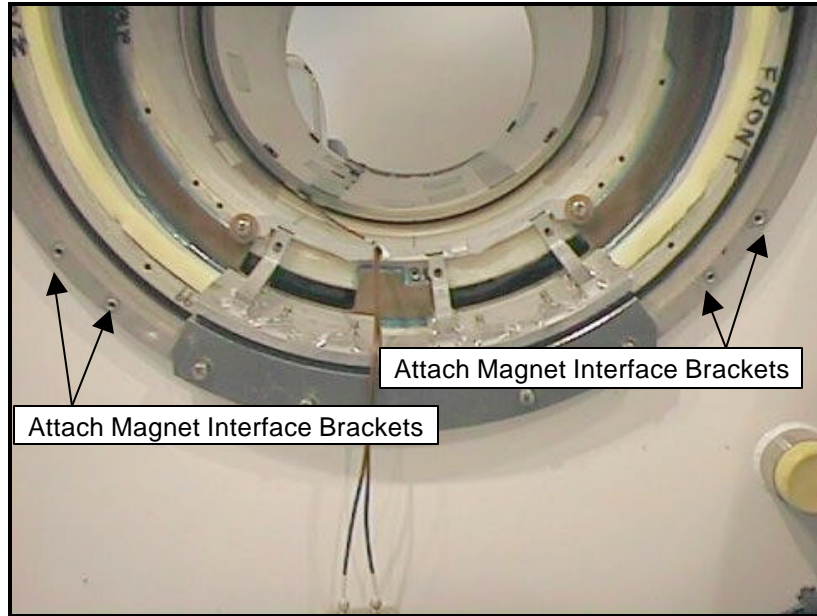


Property Damage! To avoid damage to the Magnet USE ANTI-SEEZE on the screws attaching the magnet interface brackets. The screws are made of Stainless Steel, which may cause the threads to gall and may result in cutting the magnet interface brackets off of the end flange.

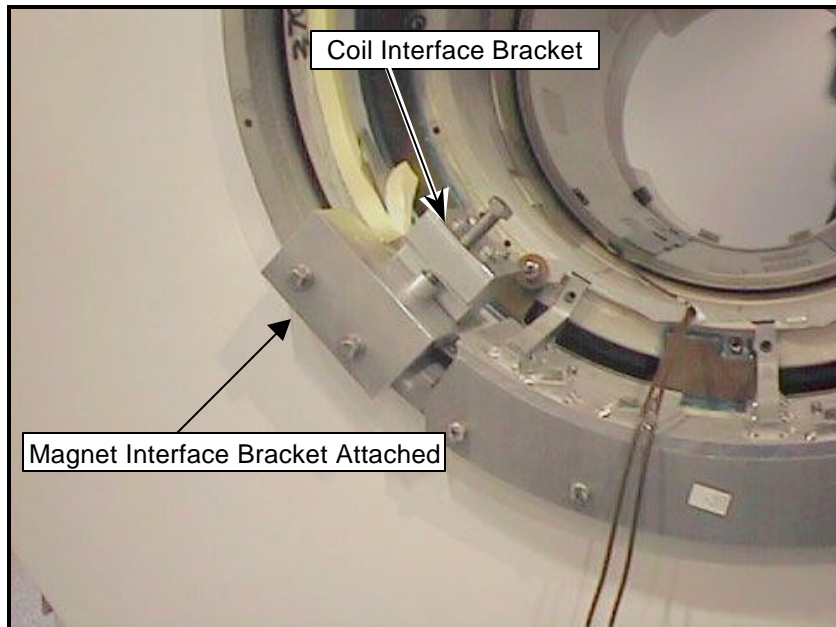
Note

Make sure the correct orientation is used when attaching the magnet interface brackets. For the CRM the side with the short ledge is attached on the gradient coil as marked on the bracket.

- 8. Install the left and right magnet interface brackets on the end flange using the 4 – 35 mm screws. See Illustration 3-3 and Illustration 3-4.



PLACEMENT OF MAGNET INTERFACE BRACKETS
ILLUSTRATION 3-3



MAGNET INTERFACE BRACKETS ATTACHED ON BRM
ILLUSTRATION 3-4

- 9. Insert the bolts into the Coil Interface Brackets. See Illustration 3-5.



BOLT PLACED IN COIL INTERFACE BRACKET

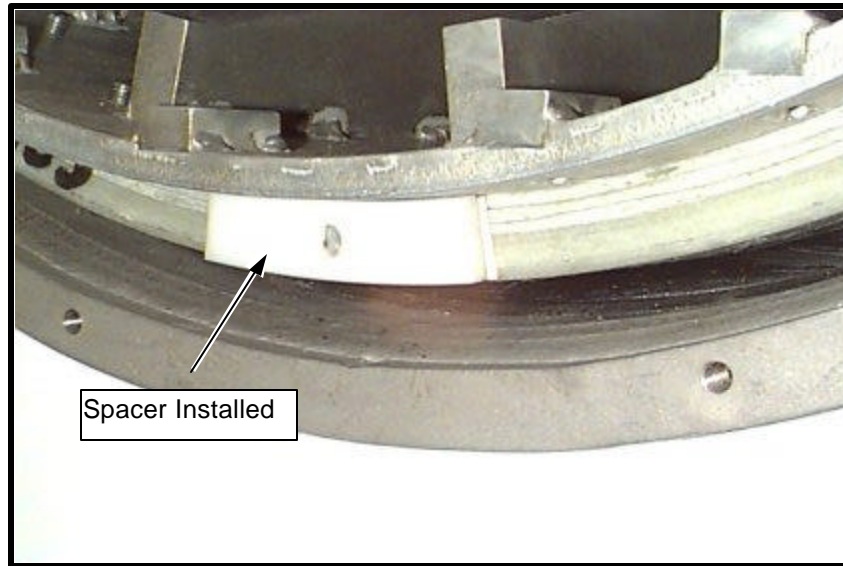
ILLUSTRATION 3-5

10. Remove poron seal gray pads from coil to expose the 4 bolt holes (8 holes total).
11. Attach both of the Coil Interface Brackets on the gradient coil using the 8–100 mm screws. See Illustration 3-4.



Property Damage! Failure of components of lift tool, gradient coil or cryostat may result if gradient coil is lifted after excessive resistance is encountered. Do not attempt to drive gradient coil into cryostat.

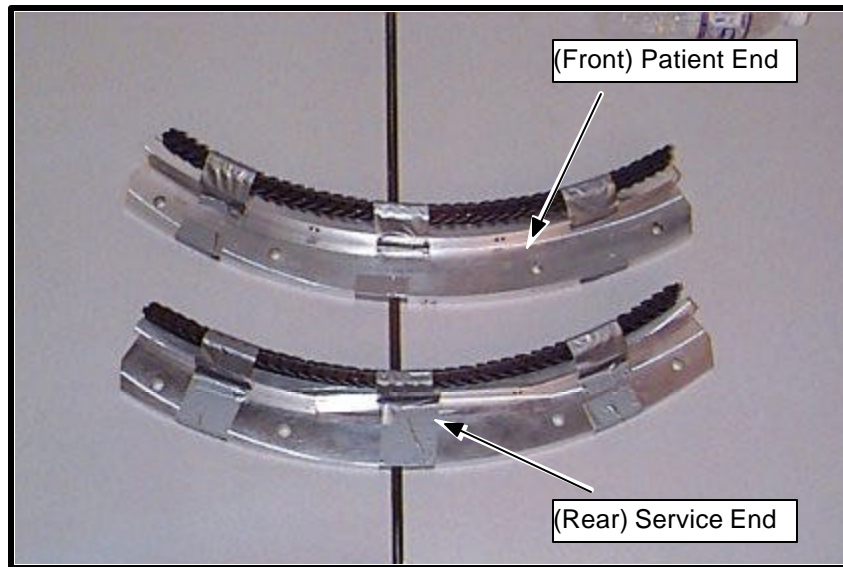
12. Lift patient end of the gradient by tightening the bolt in the Coil Interface Bracket until the aluminum support brackets separate by at least 4 mm (1/8 inch).
13. Remove lower support bracket from the patient end of the cryostat.
14. Install the fixed spacer (P/N 2238908-4 10 mm for CRM, P/N 2238907-2 28 mm for BRM) as shown in Illustration 3-6. Use the M10x25 nylon cheese head screws for BRM and CRM. Screw head must be either level or inside the spacer hole. See Illustration 3-6.
15. Install rubber pads on brackets.



GRADIENT COIL LIFTED
ILLUSTRATION 3-6

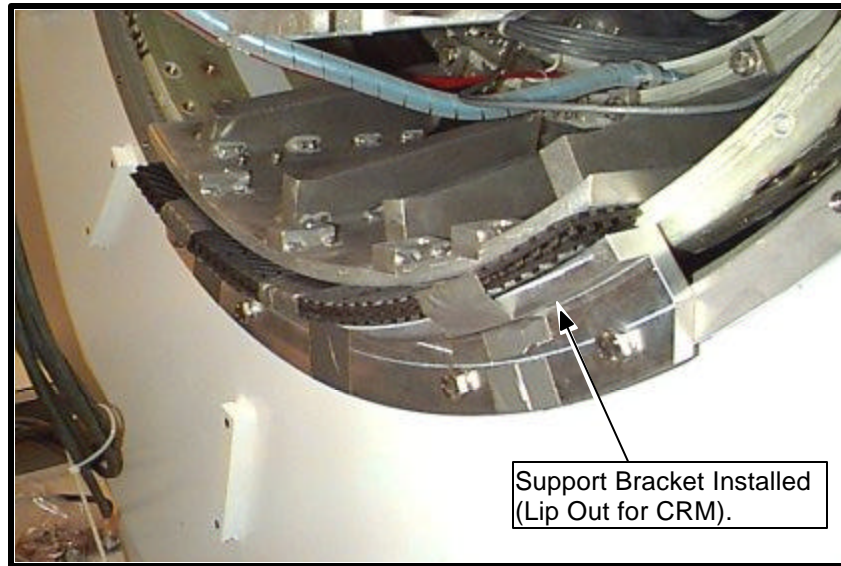
Note

Do not use duct tape to install rubber pads. Duct tape was only used in picture to show rubber pads on brackets.



SUPPORT BRACKETS
ILLUSTRATION 3-7

16. Install (front) patient end bracket. Use #242 blue loctite on the 4 M10 screws and secure to the end flange. See Illustration 3-7.
- For CRM: bracket is installed with lip facing out. See Illustration 3-8
 - For BRM: bracket is installed with lip under the existing bracket.



SUPPORT BRACKET INSTALLED
ILLUSTRATION 3-8

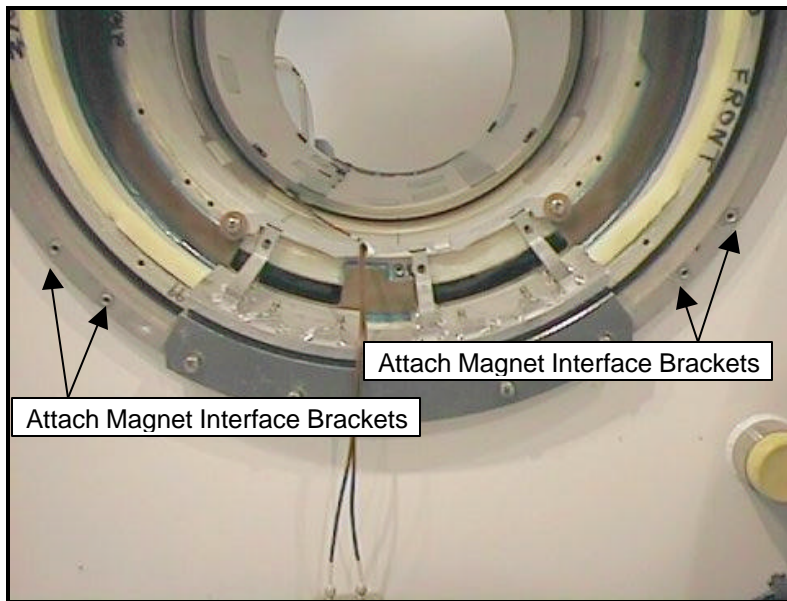
17. Lower patient end of gradient until weight is totally supported by new brackets.
18. Check alignment marks to verify that the gradient alignment was not altered, if altered, lift and adjust vertically to restore to original alignment
19. Remove Coil Interface Brackets and Right/Left Magnet Interface Brackets.

4- INSTALLATION OF (REAR) SERVICE END SUPPORT BRACKET

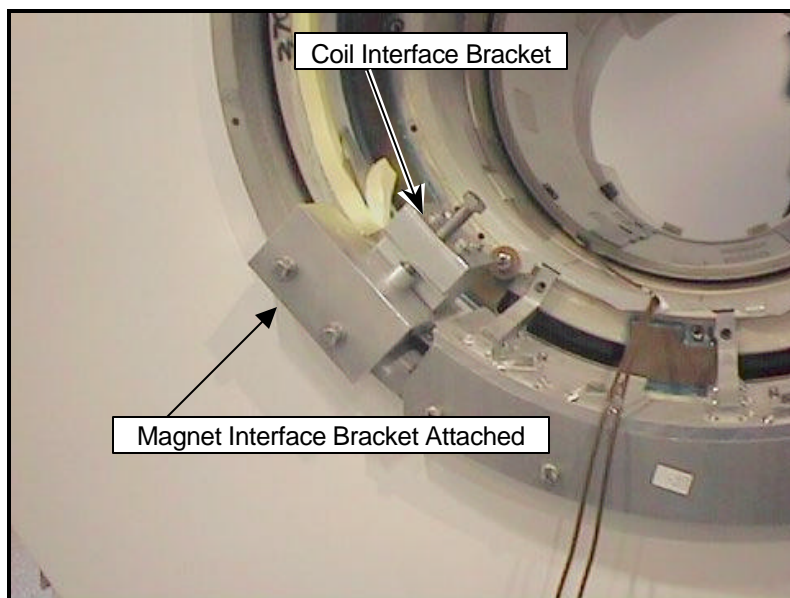


Property Damage! To avoid damage to the Magnet USE ANTI-SEEZE on the screws attaching the magnet interface brackets. The screws are made of Stainless Steel, which may cause the threads to gall and may result in cutting the magnet interface brackets off of the end flange.

1. Install the left and right magnet interface brackets on the end flange using the 4 – 35 mm screws. See Illustration 4-1 and Illustration 4-2.



PLACEMENT OF MAGNET INTERFACE BRACKETS
ILLUSTRATION 4-1



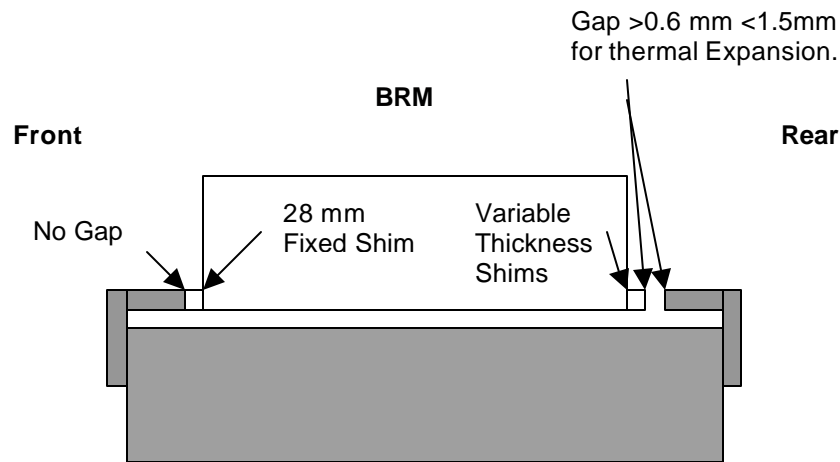
MAGNET INTERFACE BRACKETS ATTACHED ON BRM
ILLUSTRATION 4-2

2. Insert the bolts into the Coil Interface Brackets. See Illustration 4-3.



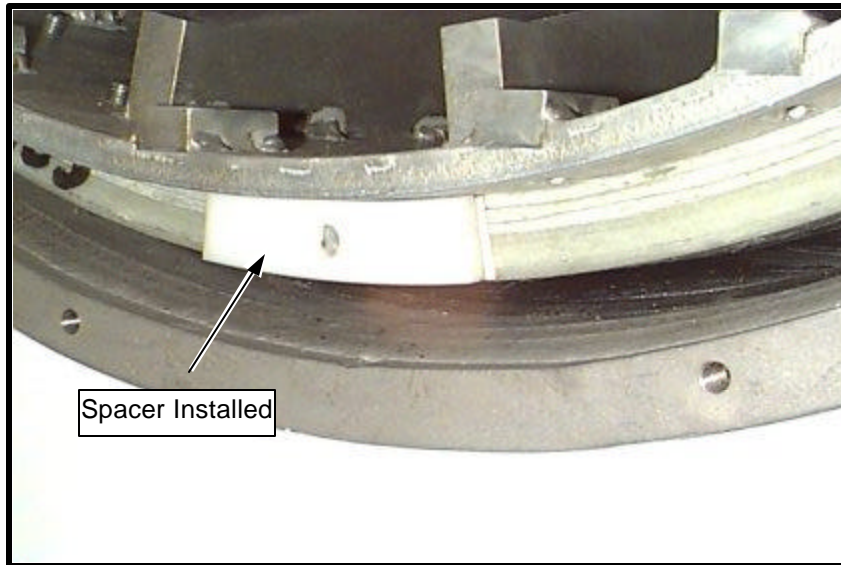
BOLT PLACED IN COIL INTERFACE BRACKET
ILLUSTRATION 4-3

3. Remove the rear bottom RF Coil adjusting blocks to insure proper fit of the Coil Interface Bracket.
4. Attach the Coil Interface Bracket on the gradient coil using the 8 – 100 mm screws on both the right and left magnet interface brackets. See Illustration 4-3.
5. Lift service end of the gradient by tightening the bolt in the Coil Interface Bracket until the aluminum support brackets separate by at least 4 mm (1/8 inch).
6. Remove lower support bracket from the service end of the cryostat.
7. Select a shim combination so the gap between the outermost shim and the support bracket is not more than 1.5mm and not less than 0.6mm. See Illustration 4-4.

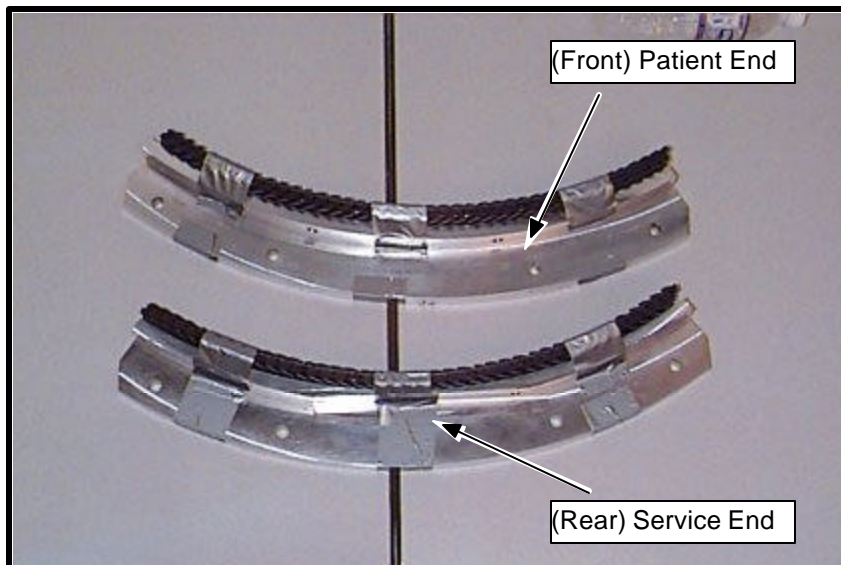


GRADIENT PLACEMENT
ILLUSTRATION 4-4

- 8. Install the fixed spacer (the 16 mm [P/N 2238907] spacer and shims are required for the BRM) as shown in Illustration 4-5. Use the M10x25 nylon cheese head screws for BRM and CRM. Screw head must be either level or inside the spacer hole.



GRADIENT COIL LIFTED
ILLUSTRATION 4-5



SUPPORT BRACKETS
ILLUSTRATION 4-6

9. Install (rear) service end bracket. Use #242 blue loctite on the 4 –M10 screws and secure to the end flange.
 - For CRM: bracket is installed with lip facing out. See Illustration 4-7
 - For BRM: bracket is installed with lip under the existing bracket.



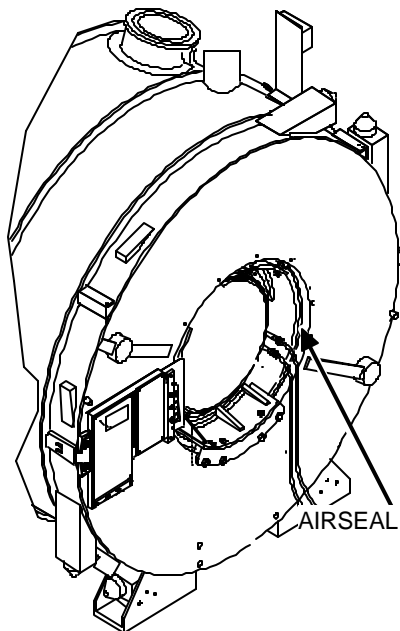
SUPPORT BRACKET INSTALLED

ILLUSTRATION 4-7

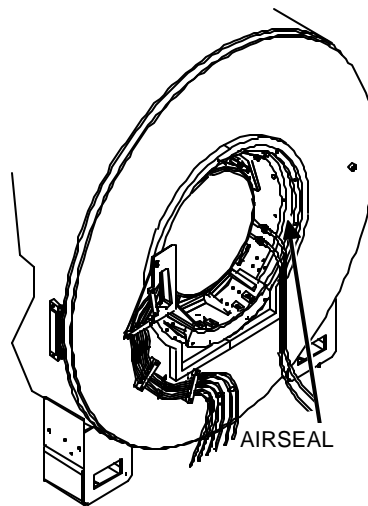
10. Lower service end of gradient until weight is totally supported by new brackets. See Illustration 4-4.
11. Check alignment marks to verify that the gradient alignment was not altered, if altered, lift and adjust vertically to restore to original alignment.
12. Remove Coil Interface Brackets and Right/Left Magnet interface brackets.

5- SYSTEM RESTORATION

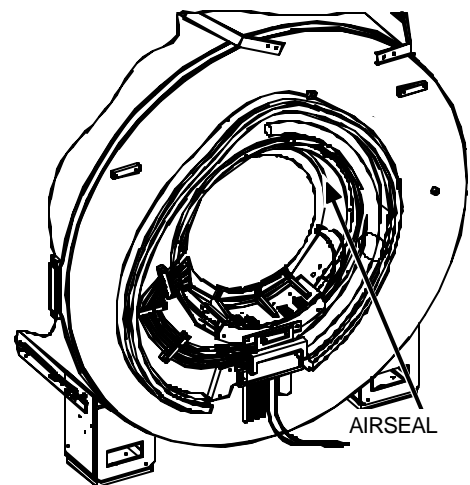
1. Replace the rear bottom RF Coil adjusting blocks.
2. Replace the 4 (four) M10 screws between aluminum support brackets on the patient end and service end of the magnet.
3. Replace the poron seal gray pads to cover the 8 bolt holes where the Coil Interface Bracket was installed.
4. Replace the top bolts and fiber washers from the gradient coil.
5. Replace the BRM/BRM-D/CRM radial support blocks and support BRM/BRM-D/CRM Assembly.
6. Replace the Terminal Block or cable bracket located on the rear flange of the magnet. (The Terminal Block is not used with the BRM-D and MR/i & CV/i WideOpen systems.)
7. Replace Open Foam Caulking Strip (2179397-3) and all Air Seals. See Illustration 5-1.
8. Confirm Gradient cooling air is not leaking.



CX MAGNET



**LCC MAGNET
REPLACE AIRSEAL
ILLUSTRATION 5-1**



WIDEPEN ENCLOSURE

9. Replace or restore the following:

Signa Horizon Enclosure

- A. Rear Enclosure Cover Replacement
- B. Front Enclosure Cover Replacement
- C. Patient Comfort Module Replacement
- D. Bridge and Cradle Replacement
- E. Rear Pedestal Replacement

Signa MR/i & CV/i WideOpen Enclosure

- A. Top, Bottom Trim , & Side Arc Cover Replacement
- B. Rear Pedestal Cover Replacement
- C. Bridge and Cradle Replacement
- D. Rear Pedestal Replacement
- E. Rear Endbell Replacement
- F. Front Endbell Replacement

10. Perform Full Spt.

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
A	November 30, 1999	K. Keshena	Preliminary Release
B	December 10, 1999	K. Keshena	Revised per inputs from design engineer and field engineer inputs.
0	December 20, 1999	K. Keshena	Initial Release

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