TABLE OF CONTENTS

1- DESCRIPTION

This section contains a series of tests that allow determination of the proper *x-y-z*-gradient. Specific symptoms of this type of problem are images that display upside down, left-right reversed, offset scans that move in the opposite directions from those annotated on the images, or some combination of all of these problems. Run this series of tests in the order described to prevent confusing results. Once the correct polarities are established, the Signa system will make properly oriented head and body scans with any imaging data base.

For a ***TwinSpeed*** scanner these tests should be repeated separately for each gradient mode, **WHOLE-BODY** and **ZOOM.**

2- SOFTWARE CONFIGURATION CHECK

2-1 Description

The system configuration values for the *Setting on the x-, y-, and z-gradient to obtain 1 gauss/cm* (also known as cfxfull, cfyfull, and cfzfull, respectively) should be either all positive, or all negative, depending on which direction the magnetic field is ramped-up. If the magnet was ramped with the B_0 field going into the magnet (usual case for 1.0T and 1.5T systems), the cfxfull, cfyfull, and cfzfull values in the configuration file must be positive in order for the geometry to come out right.

2-2 Procedure

1. On the Service Desktop, click on **[Utilities]**, then **[Config File Manager]**, and **[Start]**.

2. On the *Config File Manager* main screen, select **[Gradient Config File]**. For ***TwinSpeed***, select **[Gradient Config.WHOLE File].**

3. Verify that all three gradient values are the same sign (all positive or all negative). (Use the **<Delete>** key to edit text; the **<Backspace>** key does not work.)

4. When finished editing values, click the **[Quit]** button to exit application.

5. Click **[Yes]** in the dialog box question, "*Really Quit?*"

6. For ***TwinSpeed***, repeat 2 to 5 for **[Gradient Config.ZOOM File].**

7. Next, a Save dialog box appears for each configuration file that has changed. To save changes click the **[Save]** button. To not save changes click the **[Do Not Save]** button.

3- X/Y/Z GRADIENT POLARITY CHECK

3-1 Description

Reversal of the polarity of a single gradient causes the right/left or top/bottom reversal of the images from two axes, and reversal of the offsets for one axis. Incorrect polarity of all of the gradients causes the images from all planes to be upside down and backward, and causes the system to scan offset images in the opposite direction from those commanded for all axes.

Note

The values mentioned in this procedure are related to the physical x, y, and z gradient amplifiers, respectively. The values for setting x-, y-, and z-gradient to obtain 1 gauss/cm, respectfully, are in the system configuration file.

3-2 Tools Required

- DQA-III Phantom, 2131027-2

WARNING!

POISON HAZARD! THE PHANTOM CONTAINS NICKEL, A SUSPECT CARCINOGEN. DO NOT INGEST. DISPOSE OF AS A HAZARDOUS WASTE ACCORDING TO STATE AND FEDERAL REGULATIONS.

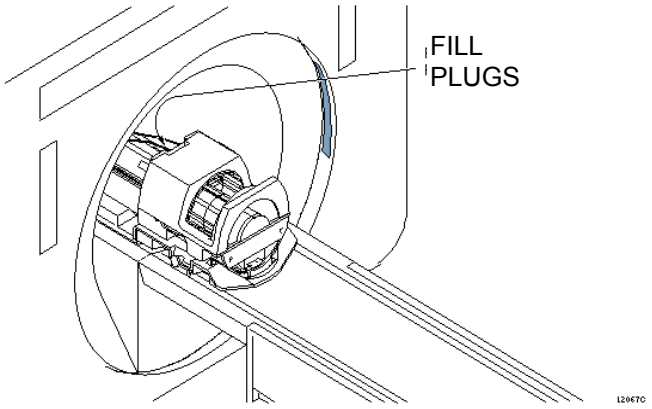
3-3 Procedure

1. At the operator workspace, select the **[SCAN]** icon.

2. Click on **[New Pt]** to enable setting of a new landmark.

3. Enter the following:
   Id: **geservice <ENTER>**
   Name: **gradient polarity <ENTER>**
   Weight (Lb.): **111 <ENTER>**

4. Place the DQA-III phantom in the head coil. Position it with the fill plugs up, and toward rear of magnet (see Illustration 3-1).

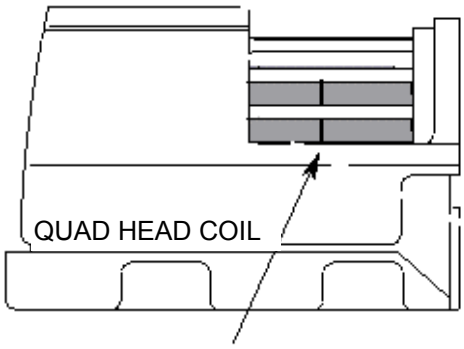


DQA-III PHANTOM POSITIONING
ILLUSTRATION 3-1

5. Landmark in the sagittal and axial planes (DQA-III coronal plane is not at isocenter). See Illustration 3-2 for positioning the phantom in the quad head coil.

6. At front enclosure on scanner, press LANDMARK, then MOVE TO SCAN.

Postion DQA-III Phantom in the Head Coil.



Landmark the DQA-III Phantom on the Landmark Line.

LANDMARKING DQA-III PHANTOM
ILLUSTRATION 3-2

*The following three steps are **proprietary** and only available for GE use, and to sites with a valid Advanced Service Package Limited License. The non-proprietary procedure is listed after these steps.*

7. Set Patient Protocols to **Service**.

8. In the Protocol field, Type **o.38.1** (o=Other, 38=protocol number, 1=series number) and **<Enter>**.
   OR
   Click on "Other" and select protocol **38** and series **1** from the menu.

9. Click on **[Accept]** to load the protocol.

***Non-proprietary** procedure:*
At the Operator Workspace, prepare the system for a “Geometry Verification, Coronal” scan using the scan protocol (**o.38.1**) shown in the "Service Protocols" procedure located on the service methods CD-ROM.

10. Click on **[Save Series]**.

11. Click on **[Scan]** (system auto prescans first).

12. On the scan desktop, click on **[Autoview]**. When the image displays, verify that the *CS* appears in the upper right-hand corner (see Illustration 3-3).

Note

Top/bottom reversal is caused by improper *z*-gradient polarity (wires crossed between output of Gradient Amplifier and input of Gradient Coil). Left/right reversal is caused by improper *y*-gradient polarity.

13. At the Operator Workspace, click on **[New Series]**.

*The following two steps are **proprietary** and only available for GE use, and to sites with a valid Advanced Service Package Limited License. The non-proprietary procedure is listed after these steps.*

14. In the Protocol field, Type **o.38.2** (o=Other, 38=protocol number, 2=series number) and **<Enter>**.
    OR
    Click on "Other" and select protocol **38** and series **2** from the menu.
    OR
    Select the **Service** protocol corresponding to Geometry Verification under “Other”

15. Click on **[Accept]** to load the protocol.

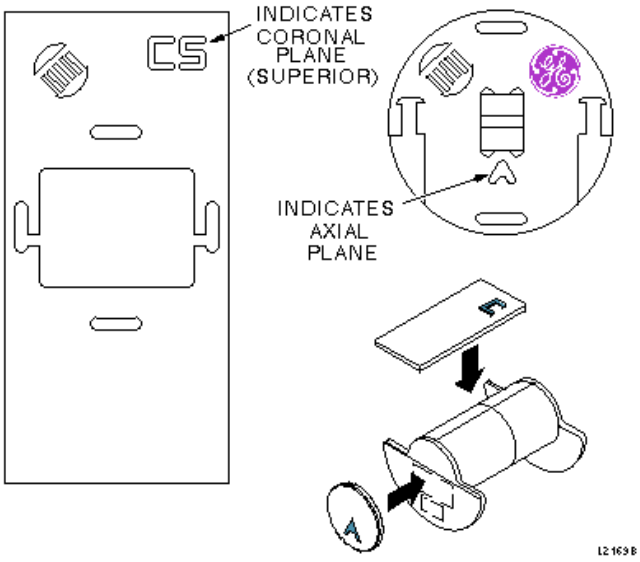
***Non-proprietary** procedure:*
At the Operator Workspace, prepare the system for a “Geometry Verification, Axial” scan using the scan protocol selected, or as shown in the "Service Protocols" procedure located on the service methods CD-ROM.

For ***TwinSpeed***, select GradMode=**WHOLE**.

16. Click on **[Save Series]**.

17. In the RX MANAGER window, click on **[Prepare to Scan]**.

18. Click on **[Scan]** (system Auto Prescans first).



DQA-III PHANTOM GEOMETRY
ILLUSTRATION 3-3

19. When the axial image displays, verify that the ***A*** appears in the lower-middle of the image. The image should have the GE logo in the upper right-hand corner (see Illustration 3-3).

Note

Left/right reversal is caused by incorrect polarity of the ***X*** gradient. Top/bottom reversal is caused by improper ***Y*** gradient polarity.

20. Repeat 15 to 18 for “Geometry Verification, Coronal”

21. When the coronal image displays, verify that the ***CS*** appears in the upper right–hand corner of the image (see Illustration 3-3).

Note

Left/right reversal is caused by incorrect polarity of the ***X*** gradient. Top/bottom reversal is caused by improper ***Z*** gradient polarity.

22. For ***TwinSpeed***, repeat 15 to 21 for GradMode=**ZOOM**.

23. In the RX MANAGER window, click on **[End Exam]** to exit.

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
0	June 15, 1998	M. Keber	Initial version converted from Toolbook to Microsoft Word.
1	June 22, 1998	M. Keber	Updated for Release CV1 Config File Manager tool.
2	Nov 2, 1998	M. Keber	Removed Release 8.1 references; added Release 8.2.5 references.
3	Feb. 16, 1999	K. Keshena	Updated per engineering bay validation.
4	May 20, 1999	S.M.Atladottir	Updated Procedure Reference for New GUI
5	Oct 12, 1999	G. Boerner	Updates per 8.3 validation.
6	Feb 27, 2000	G. Boerner	Updates per SPR MRIge56065 (Landmarking).
7	July 26, 2001	J.Gerber	Updated for TwinSpeed scanner for 9.0 release.