

TABLE OF CONTENTS

1- OVERVIEW	2
1-1 Tools Required	2
2- SAGITTAL SCAN	2
3- CORONAL SCAN	3
4- FFD IMAGE ANALYSIS	6
APPENDIX A - DATA SHEETS	8
REVISION HISTORY	10

1- OVERVIEW

A Full Field Distortion (FFD) phantom is scanned at the maximum FOV in the sagittal and coronal planes at the center of the scanner bore. The resultant images display a matrix of 50 mm x 50 mm squares from which the field linearity is measured. Body scans are used for all scan sequences.

For **TwinSpeed**, the test should be repeated separately for each Gradient mode.

1-1 Tools Required

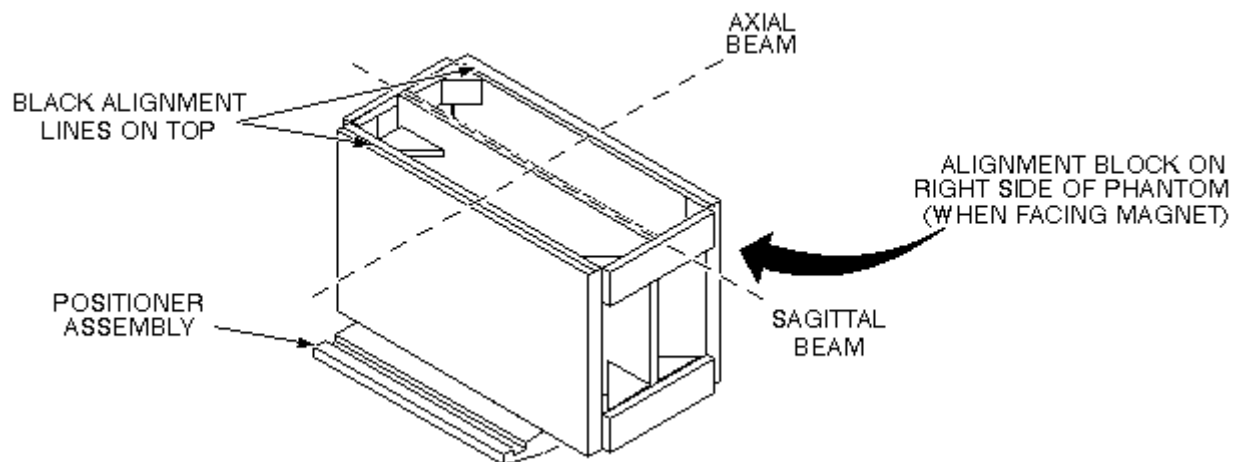
- FFD Phantom, 46-258582G1
- Phantom Positioner Assembly, 46-258709G1

2- SAGITTAL SCAN



Equipment damage possibility. Completely remove the Quad Head Coil from the cradle before performing any body scans. Failure to do so may damage the head coil T/R network.

1. Remove the Quad head coil from the cradle.
2. Place the FFD phantom on the positioner assembly and center it on the table with plates oriented vertically (black alignment line on top) and the alignment block on the right side of the phantom (as you face the magnet). The side of the phantom with the alignment lines should face up. Landmark (axial) on the middle vertical tube of the center plate.
3. At the keypad on the front magnet enclosure, press LANDMARK and MOVE TO SCAN. See Illustration 2-1 .



SAGITTAL FFD PHANTOM POSITIONING
ILLUSTRATION 2-1

4. At the operator workspace, prepare the system for a Full Field Distortion (sagittal) scan using the *Service Protocols* procedure located on the service methods CD-ROM, or for the alternate proprietary procedure, see below.

This alternate proprietary procedure is available for GE use, and to sites with a valid Advanced Service Package Limited License.

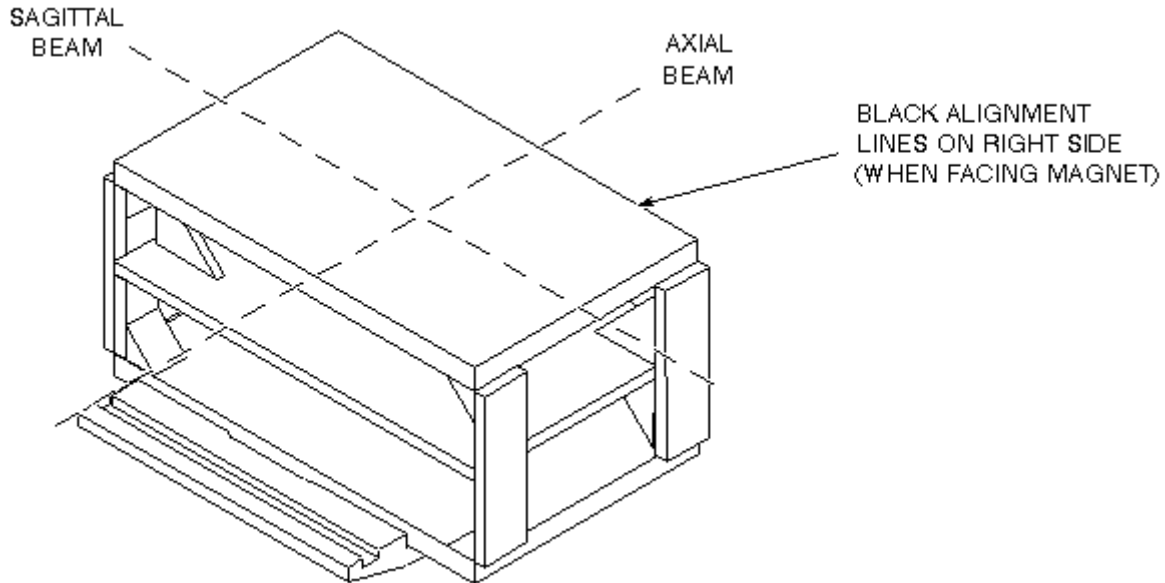
- a. Click on **[New Pt]**, and enter
Id: **geservice**
Name: **ffd**
Weight (lb): **111**
Set Patient Protocols to **Service**.
 - b. In the Protocol field, type **o.28.1** (o=Other, 1=series number) to load the sagittal protocol.
 - c. For **TwinSpeed**, select the **GradMode**.
 - d. **[Save Series]**, then **[Prepare to Scan]**.
5. Click on **[Autoview]**, just below the Autoview image display screen. Your images will be automatically displayed.
 6. Click on **[Scan]** (system runs Auto Prescan first).
 7. For analysis, see Section 4- *FFD Image Analysis*.

3- CORONAL SCAN



Equipment damage possibility. Completely remove the Quad Head Coil from the cradle before performing any body scans. Failure to do so may damage the head coil T/R network.

1. Remove the quad head coil from the cradle.
2. Place the FFD phantom (with the alignment block facing down) on the holder for a coronal scan, and align with the alignment beams as shown in Illustration 3-1. Landmark (axial) on the center of the phantom.



CORONAL FFD PHANTOM POSITIONING
ILLUSTRATION 3-1

3. At the keypad on the front magnet enclosure, press LANDMARK and MOVE TO SCAN.
4. At the operator workspace, prepare the system for a Full Field Distortion (coronal localizer) scan using the *Service Protocols* procedure on the service methods CD-ROM, or, for the alternate proprietary procedure, see below.

This alternate proprietary procedure is available for GE use, and to sites with a valid Advanced Service Package Limited License.

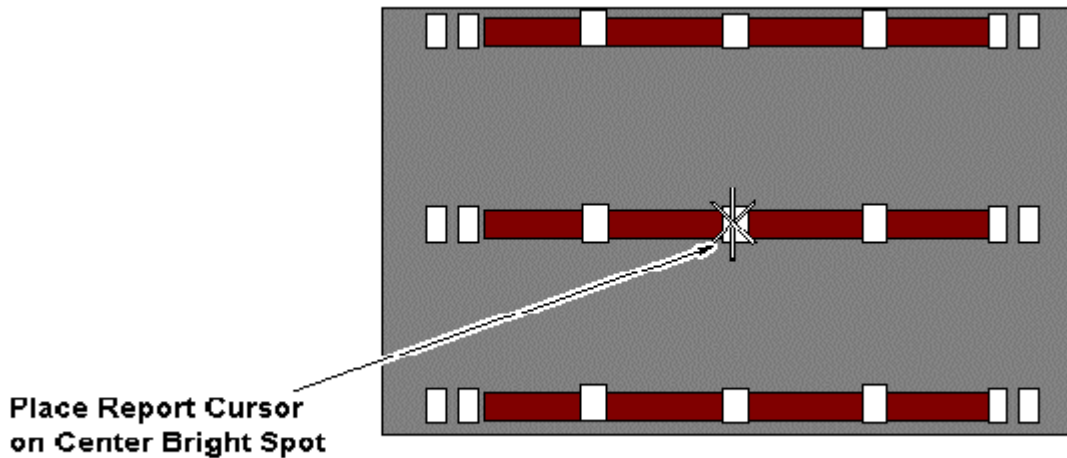
- a. Click on **[New Pt]**, and enter
Id: **geservice**
Name: **ffd**
Weight (lb.): **111**
Set Patient Protocols to **Service**.
- b. In the Protocol field, type **o.28.2** (o=Other, 2=series number) to load the axial localizer protocol.
- c. For **TwinSpeed**, select the **GradMode**.
- d. **[Save Series]**, then **[Prepare to Scan]**.

Note

This localizer scan is required to determine the A/P location for scanning the center plate of the FFD phantom.

5. Click on **[Autoview]**, just below the Autoview image display screen. Your images will be automatically displayed.
6. Click on **[Scan]** (system runs Auto Prescan first).

- Using Autoviewer, display the image of the localizer scan (see Illustration 3-2).



AXIAL LOCALIZER DISPLAY
ILLUSTRATION 3-2

- Select **[Report Cursor]** in the Autoview window. Place the cursor on the center bright spot of the axial localizer display. The cursor position should lie within the center plate.
- Check for skewing of the phantom in relation to the horizontal plane. If skewing is present, reposition the phantom and rescan.
- Record the A/P location (e.g., A14 mm) with the cursor centered on the center plate. This location will be used when you perform the coronal FFD scan.
- At the operator workspace, prepare the system for a Full Field Distortion (coronal) scan using the *Service Protocols* procedure located on the service methods CD-ROM, or, for the alternate proprietary procedure, see below.

This alternate proprietary procedure is available for GE use, and to sites with a valid Advanced Service Package Limited License.

- (If you have not all ready done so:)

Click on **[New Pt]**

Id: **geservice**

Name: **ffd**

Weight (Lb): **111**

Set Patient Protocols to **Service**.

- In the Protocol field, type **o.28.3** (o=Other, 3=series number) to load the coronal protocol.
- For **TwinSpeed**, select the **GradMode**.

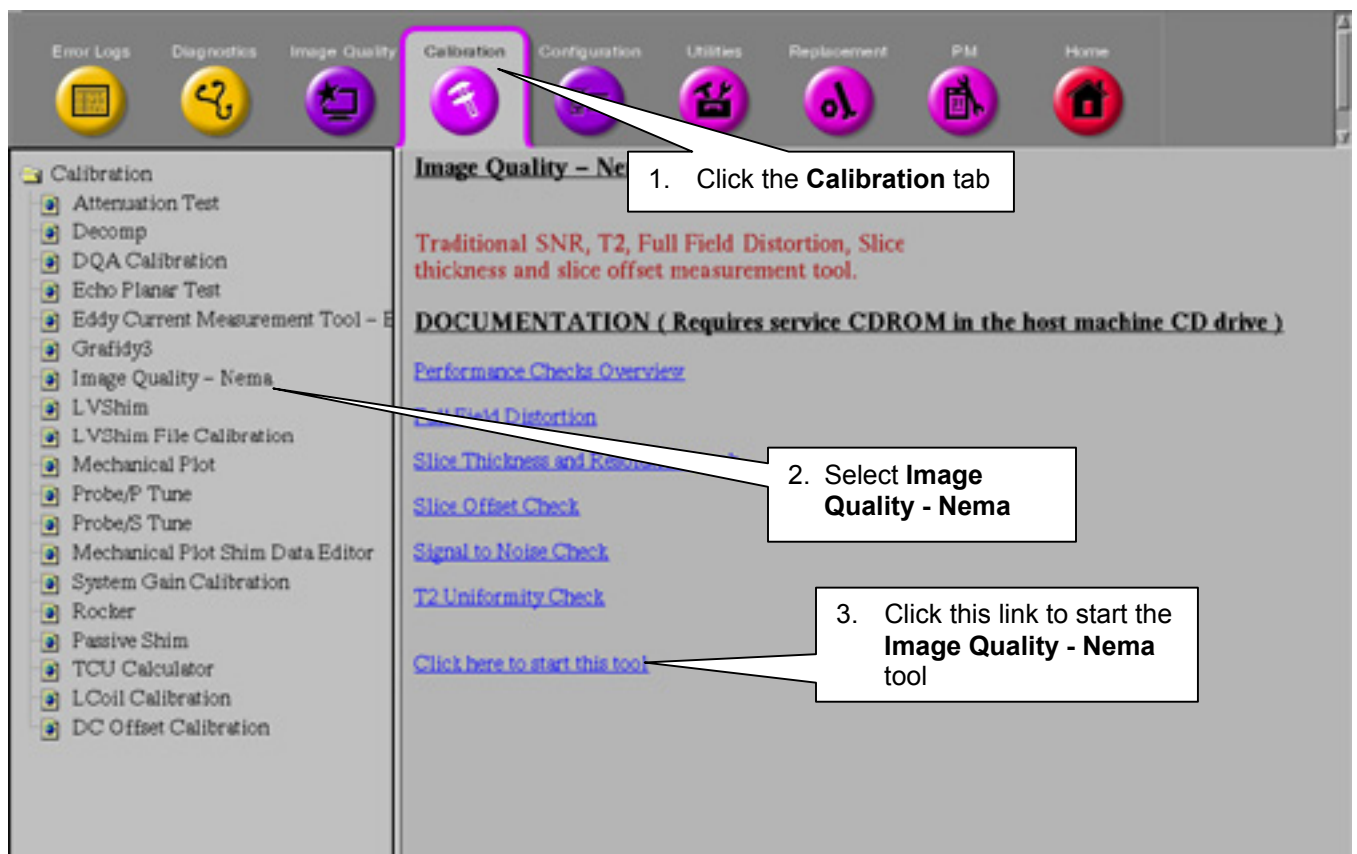
- d. Enter **A/P Start** and **End** (location) values in the Scanning Range area, as the same value determined from the localizer scan (e.g., A14 mm). Only one decimal place is allowed for the entered value.
- e. [**Save Series**], then [**Prepare to Scan**].

12. Click on [**Scan**] (system runs Auto Prescan first).

You are now ready to analyze the image.

4- FFD IMAGE ANALYSIS

- 1. To run the Image Quality Analysis – NEMA tool from the Service Desktop, follow the instructions on Illustration 4-1, below.



STARTING THE IMAGE QUALITY - NEMA TOOL FROM THE SERVICE BROWSER
ILLUSTRATION 4-1

- 2. For **TwinSpeed**, highlight the same **GradMode** that was used with the sagittal and coronal scans, then click on **OK**.
- 3. A **NEMA Image Quality** window will appear on the desktop. Type **5<Enter>** for Full Field Distortion Check. See Screen 4-2.

```
<<<  NEMA Image Quality Analysis  >>>

1. Signal to Noise Check
2. Slice Offset Checks
3. Slice Thickness/Resolution Check
4. T2 Uniformity Check
5. Full Field Distortion Check
6. Exit NEMA Test

Select Test:  5<Enter>
```

NEMA IMAGE QUALITY ANALYSIS MENU
ILLUSTRATION 4-2

- 4. Select the sagittal exam, series, and image numbers for the image to be analyzed.
- 5. Analysis then begins. The final values are displayed on the screen (see Illustration 4-3).

```
*****
Saggital Full Field Distortion

Horizontal Points          Length (mm)   Distortion (%)
Superior    15 cm         xxx.xxx      x.xxx
S/I         0 cm          xxx.xxx      x.xxx
Inferior   15 cm         xxx.xxx      x.xxx

Vertical Points           Length (mm)   Distortion (%)
Anterior    15 cm         xxx.xxx      x.xxx
A/P         0 cm          xxx.xxx      x.xxx
Posterior  15 cm         xxx.xxx      x.xxx

Superior to Inferior Coil Symmetry : x.xxx
*****
```

FFD ANALYSIS REPORT SCREEN
ILLUSTRATION 4-3

- 6. Record the Lengths, Percent Distortions, and Superior to Inferior Coil Symmetry in the Appendix A Data Sheet. For **TwinSpeed**, identify the GradMode used.
- 7. Repeat steps 3 through 6 for the coronal image analysis.
- 8. Store all completed data sheets in *Direction 15403, Signa Advantage/ Horizon Data, System tab*, or on floppy disk for future reference.
- 9. When the analysis is finished, type **6** and press **<Enter>** to exit NEMA Image Quality Menu and close window.

APPENDIX A - DATA SHEETS

Use this data sheet for BRM-based systems or for *TwinSpeed*, GradMode=**WHOLE**

SAGITTAL DATA			
EXAM/SERIES/IMAGE _____/_____/_____	LENGTH (mm)	DISTORTION (%)	ACCEPTANCE SPECIFICATIONS
HORIZONTAL POINTS			
Superior 15 cm			± 3.0%
S/I 0 cm			± 1.5%
Inferior 15 cm			± 3.0%
VERTICAL POINTS			
Anterior 15 cm			± 3.0%
A/P 0 cm			± 1.5%
Posterior 10 cm			± 3.0%
SUPERIOR TO INFERIOR COIL SYMMETRY			± 3.0%
CORONAL DATA			
EXAM/SERIES/IMAGE _____/_____/_____	LENGTH (mm)	DISTORTION (%)	ACCEPTANCE SPECIFICATIONS
HORIZONTAL POINTS			
Superior 15 cm			± 3.0%
S/I 0 cm			± 1.5%
Inferior 15 cm			± 3.0%
VERTICAL POINTS			
Right 15cm			± 3.0%
R/L 0cm			± 1.5%
Left 15cm			± 3.0%
SUPERIOR TO INFERIOR COIL SYMMETRY			± 3.0%

For *TwinSpeed*, GradMode=**ZOOM**

SAGITTAL DATA			
EXAM/SERIES/IMAGE ____/____/____	LENGTH (mm)	DISTORTION (%)	ACCEPTANCE SPECIFICATIONS
HORIZONTAL POINTS			
Superior 15 cm			± 3.0%
S/I 0 cm			± 1.5%
Inferior 15 cm			± 3.0%
VERTICAL POINTS			
Anterior 15 cm			± 3.0%
A/P 0 cm			± 1.5%
Posterior 10 cm			± 3.0%
SUPERIOR TO INFERIOR COIL SYMMETRY			± 3.0%
CORONAL DATA			
EXAM/SERIES/IMAGE ____/____/____	LENGTH (mm)	DISTORTION (%)	ACCEPTANCE SPECIFICATIONS
HORIZONTAL POINTS			
Superior 15 cm			± 3.0%
S/I 0 cm			± 1.5%
Inferior 15 cm			± 3.0%
VERTICAL POINTS			
Right 15cm			± 3.0%
R/L 0cm			± 1.5%
Left 15cm			± 3.0%
SUPERIOR TO INFERIOR COIL SYMMETRY			± 3.0%

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
0	Aug 21	R Hawthorne	Initial conversion to Word
1	Nov 16, 1998	M. Keber	Removed obsolete 8.1 information, added data sheet, misc. style guide cleanup.
2	Feb. 16, 1999	K. Keshena	Updated per engineering bay validation.
3	Oct 19, 2000	M. Jones	Sec 2- , step 2: changed "external block" to "alignment block". Sec 3- , step 2: changed "vertical middle tube of center plate" to "center of phantom"; step 8: added "in Autoview window"; step 11c: changed "Start/End Loc" to "A/P Start and End" and added "in Scanning Range area".
4	August 27, 2001	J. Gerber	Updated for TwinSpeed scanners with 9.0 software release.
5	Sept. 11, 2001	J. Wolak	Added verbiage for BRM scanners to Data Sheet 1
6	Jan. 28, 2003	C. MacDonald	Minor edits per Don Thomé.