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1- OVERVIEW

Slice offset is determined by performing a multiscan sequence on the Head Axial Slice Analysis Phantom, and imaging between the slice thickness plates. There are two ramps inside the phantom that extend between the three plates. The ramps originate at the center of the center plate and rise at an angle of 63.4°. The offset between the image slices is calculated by measuring the length of the ramp image.

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

1-1 Tools Required

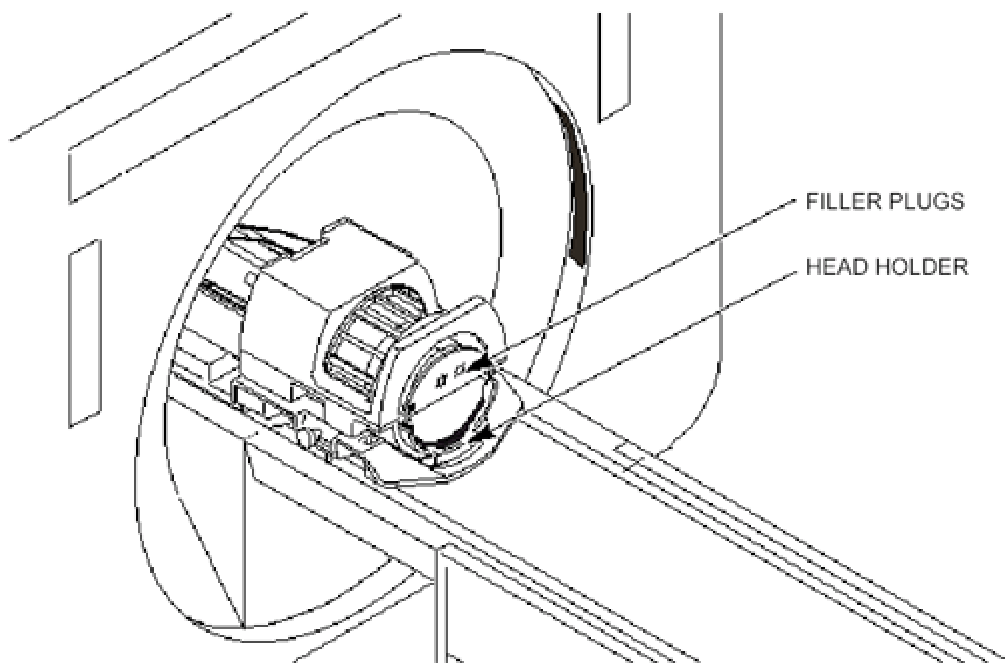
Note

It is important that the correct Head Axial Slice Analysis Phantom, 46-287379G1, is used in this procedure. Other Head Axial Slice Analysis Phantoms will not give the correct results.

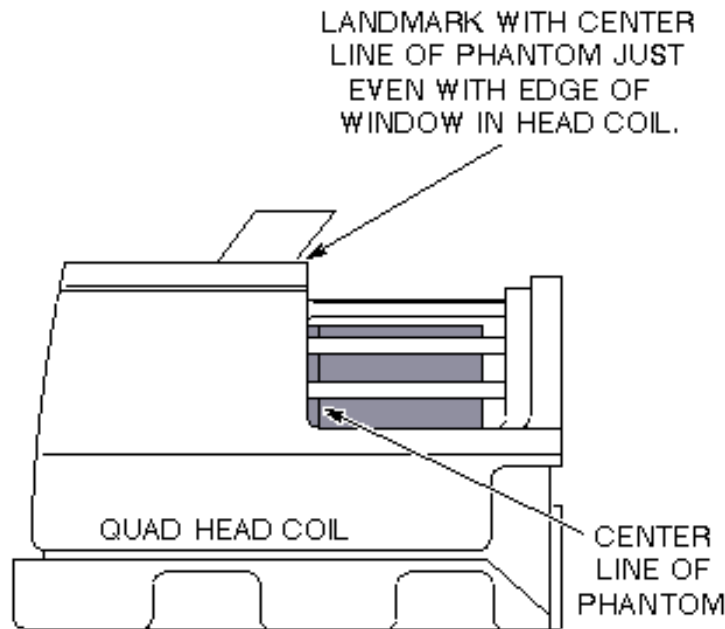
- Head Axial Slice Analysis Phantom, 46-287379G1

2- 2D SCANS

1. Place the phantom in the head coil on top of the head holder. Position the filler plugs (resolution end of phantom) toward the foot-end of table. See Illustration 2-1. Landmark the phantom on the center plate (see Illustration 2-2 for landmarking phantom). Press MOVE TO SCAN.



AXIAL SLICE ANALYSIS PHANTOM POSITIONING
ILLUSTRATION 2-1



LANDMARKING PHANTOM IN HEAD COIL
ILLUSTRATION 2-2

2. At the operator workspace, select the Scan icon in the desktop control panel, if you have not already done so.
3. Click on **[Autoview]**, just below the Autoview image display screen; your images will be automatically displayed.
4. At the operator workspace, prepare the system for a **Slice Offset Series 1** 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]**
Id: **geservice**
Name: **slice offset**
Weight (lb): **111**
Set Patient Protocols to **Service**.
- b. In the Protocol field, type o.15.1 (o=Other, 1=series number) to load the protocol.
- c. For **TwinSpeed**, select the **GradMode**.
- d. Click on **[Save Series]**, then **[Prepare to Scan]**.
5. Press MOVE TO SCAN button on the operator workspace, then click on **[Scan]** (system Auto Prescans first).

6. After scan #1 is complete, click on **[New Series]**. Prepare scan #2 (**Slice Offset Series 2** scan, 2D -50mm Table Delta) 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. (If you have not all ready done so:)
Click on **[New Pt]**
Id: **geservice**
Name: **slice offset**
Weight (lb): **111**
Set Patient Protocols to **Service**.
 - b. In the Protocol field, type **o.15.2** (o=Other, 2=series number) to load the protocol.
 - c. For **TwinSpeed**, select the **GradMode**.
 - d. Click on **[Save Series]**, then **[Prepare to Scan]**.
7. Press the MOVE TO SCAN button on the operator workspace, then click on **[Scan]** (system Auto Prescans first).
 8. For analysis, refer to section 4.

3- 3D SCANS

1. After Scan #2 is complete, click on **[New Series]**. Prepare Scan #3 (**Slice Offset Series 3** scan, 3D GRE Localizer) 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. (If you have not all ready done so:)
Click on **[New Pt]**
Id: **geservice**
Name: **slice offset**
Weight (lb): **111**
Set Patient Protocols to **Service**.
 - b. In the Protocol field, type **o.15.3** (o=Other, 3=series number) to load the protocol.
 - c. For **TwinSpeed**, select the **GradMode**.
 - d. Click on **[Save Series]**, then **[Prepare to Scan]**.
2. Press the MOVE TO SCAN button on the operator workspace, then click on **[Scan]** (system Auto Prescans first).

- After Scan #3 is complete, click on **[New Series]**. Prepare Scan #4 (**Slice Offset Series 4** scan, 3D GRE 50mm Table Delta) 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.

- In the Protocol field, type **o.15.4** (o=Other, 4=series number) to load the protocol for 50 mm.
- For **TwinSpeed**, select the **GradMode**.
- Make sure that the No. of Scan Locations = **60**.
 - Click on the image in the **[Graphic Rx]** window.
 - A slab box cursor appears on the image. Position the cursor over the center bar of the image (see Illustration 3-1), then click on **[Accept]**, **[Save Series]**. Then **[Prepare to Scan]**.



CUSOR PLACEMENT FOR PRESCRIBING SLICE OFFSET 3D SCAN
ILLUSTRATION 3-1

- Press the MOVE TO SCAN button at the operator workspace, then click on **[Scan]** (system Auto Prescans first).

5. After Scan #4 is complete, click on **[New Series]**. Prepare Scan #5 (**Slice Offset Series 5** scan, 3D GRE -50mm Table Delta) 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. In the Protocol field, type **o.15.5** (o=Other, 5=series number) to load the protocol for - 50 mm.
 - b. For TwinSpeed, select the **GradMode**.
 - c. Click on **[Save Series]**, then **[Prepare to Scan]**.
6. Press MOVE TO SCAN button at the operator work space, then click on **[Scan]** (system Auto Prescans first).
 7. For analysis, refer to section 4.

Note

Image annotation is relative to original landmark; images are always annotated "I 50", "S 50" for all offset image pairs.

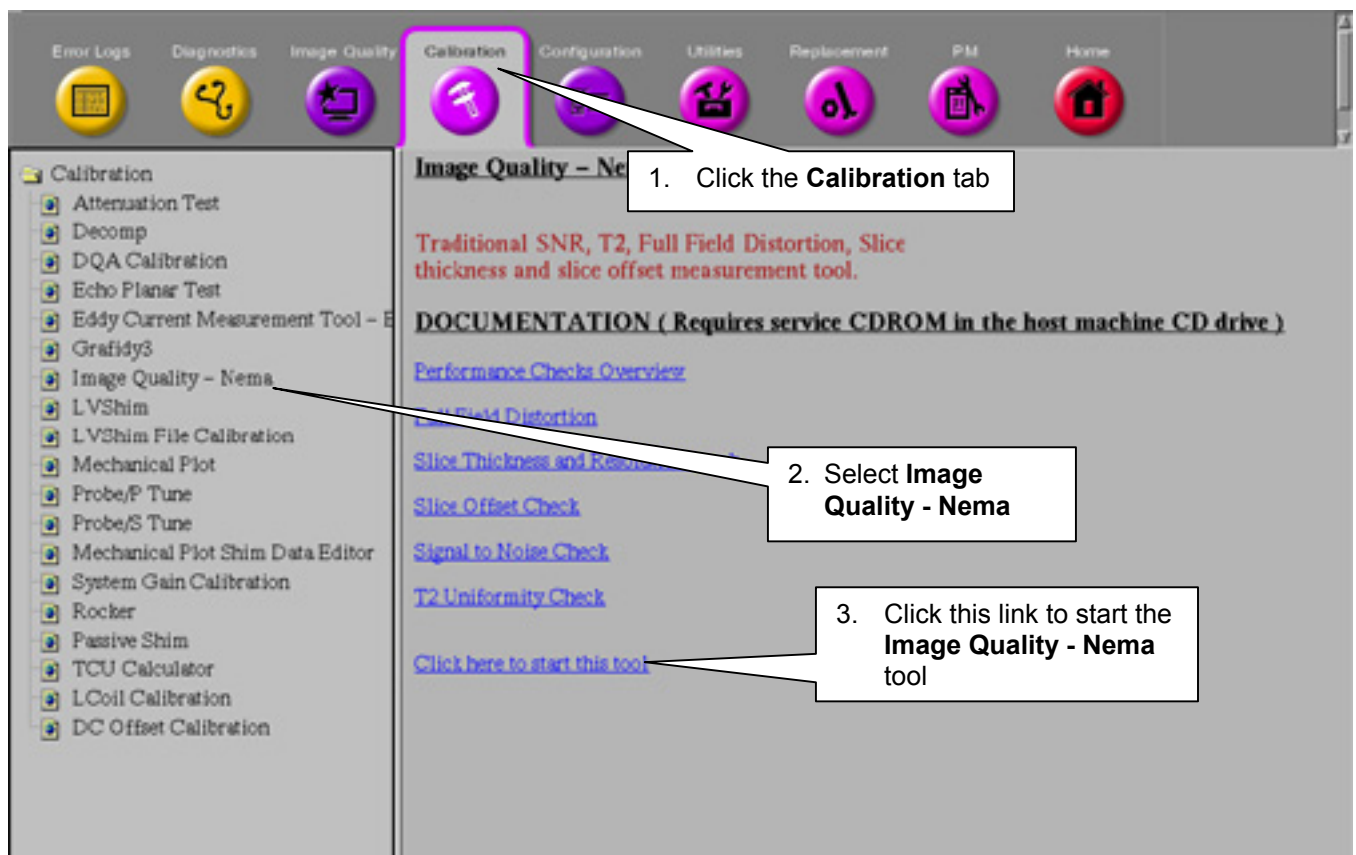
4- SLICE OFFSET IMAGE ANALYSIS

4-1 Description

The Slice Offset tool estimates slice offset for axial, coronal, and sagittal scans, where slice offset is defined as the center of an imaged slice, relative to a landmark, a landmark plus an offset or another slice. The tool uses two images for estimation and the analysis consists of estimating the center-to-center distance between the two slices that correspond to the images.

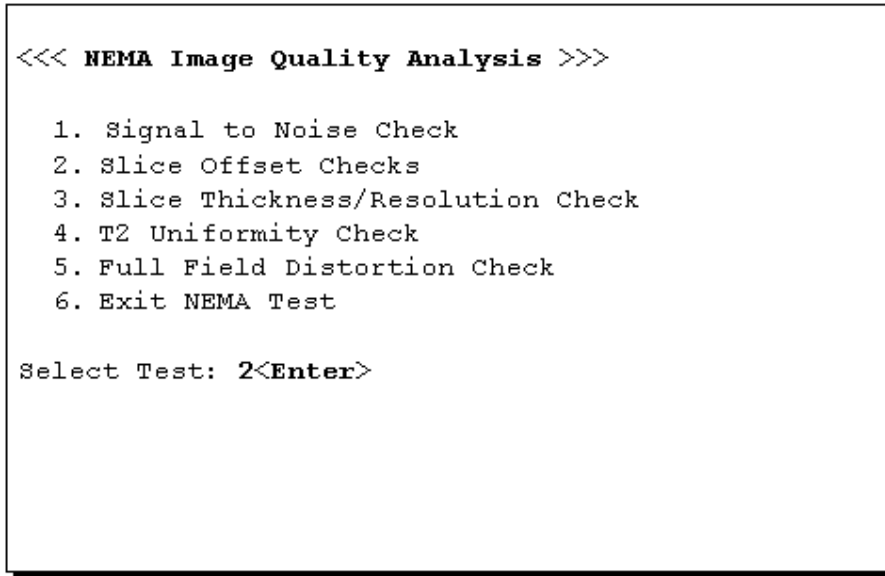
4-2 Procedure

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 sections 2 and 3 above, then click on **[OK]**.
3. A **NEMA Image Quality** window appears on the desktop. Type **2 <Enter>** for Slice Offset Checks. See Illustration 4-2.



NEMA IMAGE QUALITY MENU
ILLUSTRATION 4-2

4. Enter the first image exam, series, and image numbers.

Note

Select the slices nearest I = 50 mm and S = 50 mm when performing the analysis on the 3D scan images.

5. Enter the second image series and image numbers. The second image Exam Number should be the same as the first image.

Note

Select the slices nearest I = 50 mm and S = 50 mm when performing the analysis on the 3D scan images.

6. Analysis then begins. The final values are displayed on the screen, as shown in Illustration 4-3.

```
*****  
* Head Slice Offset *  
* 0 - S 100 Offset (mm) : 000.0000 *  
*****  
  
<<< 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:
```

SLICE OFFSET RESULTS SCREEN
ILLUSTRATION 4-3

7. Record the Measured Offset in Data Sheet 1, *Head Slice Offset Data*. For **TwinSpeed**, identify the GradMode used.
8. Repeat steps 3 through 7 above for analysis of the remaining images.
9. Store all completed data sheets in *Direction 15403, Signa Advantage / Horizon Data, System tab*, or on floppy disk for future reference.
10. Type **6** and press **<Enter>** to exit the NEMA Image Quality Analysis Menu.

5- DATA SHEETS

Data Sheet 1: Head Slice Offset Data

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

AXIAL SCANS				
STUDY/SERIES/IMAGES	TABLE DELTA	SLICE OFFSET	MEASURED OFFSET (mm)	ACCEPTANCE SPECIFICATIONS
	50 mm	0 to S100 OFFSET (Scan # 1)	mm	100 ± 4 mm
	-50 mm	0 to I100 OFFSET (Scan # 2)	mm	100 ± 4 mm
3D SCANS				
STUDY/SERIES/IMAGES	TABLE DELTA	SLICE OFFSET (See note)	MEASURED OFFSET (mm)	ACCEPTANCE SPECIFICATIONS
	50 mm	0 to S100 OFFSET (Scan # 4)	mm	99 ± 4 mm
	- 50 mm	0 to I100 OFFSET (Scan # 5)	mm	99 ± 4 mm
Note: Analyze slices nearest to I50 and S50.				

For *TwinSpeed*, GradMode=ZOOM

AXIAL SCANS				
STUDY/SERIES/IMAGES	TABLE DELTA	SLICE OFFSET	MEASURED OFFSET (mm)	ACCEPTANCE SPECIFICATIONS
	50 mm	0 to S100 OFFSET (Scan # 1)	mm	100 ± 4 mm
	-50 mm	0 to I100 OFFSET (Scan # 2)	mm	100 ± 4 mm
3D SCANS				
STUDY/SERIES/IMAGES	TABLE DELTA	SLICE OFFSET (See note)	MEASURED OFFSET (mm)	ACCEPTANCE SPECIFICATIONS
	50 mm	0 to S100 OFFSET (Scan # 4)	mm	99 ± 4 mm
	- 50 mm	0 to I100 OFFSET (Scan # 5)	mm	99 ± 4 mm
Note: Analyze slices nearest to I50 and S50.				

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
0	July 28, 1998	M. Whitlow	Initial conversion from Toolbook to Word.
1	Nov 16, 1998	M. Keber	Removed obsolete 8.1 information; misc. style guide cleanup.
2	Feb. 16, 1999	K. Keshena	Updated per engineering bay validation.
3	August 28, 2001	J. Gerber	Updated for TwinSpeed scanners with Release 9.0.
4	Sept. 11, 2001	J. Wolak	Added verbiage for BRM systems to data sheet
5	Jan. 28, 2003	C. MacDonald	Minor edits, reformatting