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1- OVERVIEW

Note

Before performing the Electrical Isocenter Calibration for the first time, verify the proper default value is in the system configuration file:

8900 - Signa Ovation magnet

The electrical isocenter is the point where the *x*, *y*, and *z* gradients are nulled. It is very important that this point be accurately located in order to pass the image quality tests.
The procedure uses the DQA-III phantom and the Daily Quality tool for analyzing the data. The Daily Quality tool analyzes the new DQA-III image, and determines the optimal *z* direction offset that is needed to center the landmark at the *z* isocenter. The tool optionally updates the isoVector-Z value contained in the system configuration file (`MRconfig.cfg`). If you choose to update the system configuration file, you must reset the TPS.

Note

Only the Z axis is aligned with this procedure. This procedure, however, may be used to check accuracy in any of the three orthogonal axes.

When the configuration file is updated, perform another scan to verify that the calibration is complete.

2- INITIAL CONDITIONS

- Signa software operational
- First image obtained
- Alignment lights have been physically aligned
- Table calibrated per “Longitudinal Drive System” calibration procedure

Note

The longitudinal drive calibration must be performed before doing the electrical isocenter calibration. Failure to follow this sequence will prevent the electrical isocenter calibration procedure from working.

3- SETUP

3-1 Tools Required

- DQA Phantom

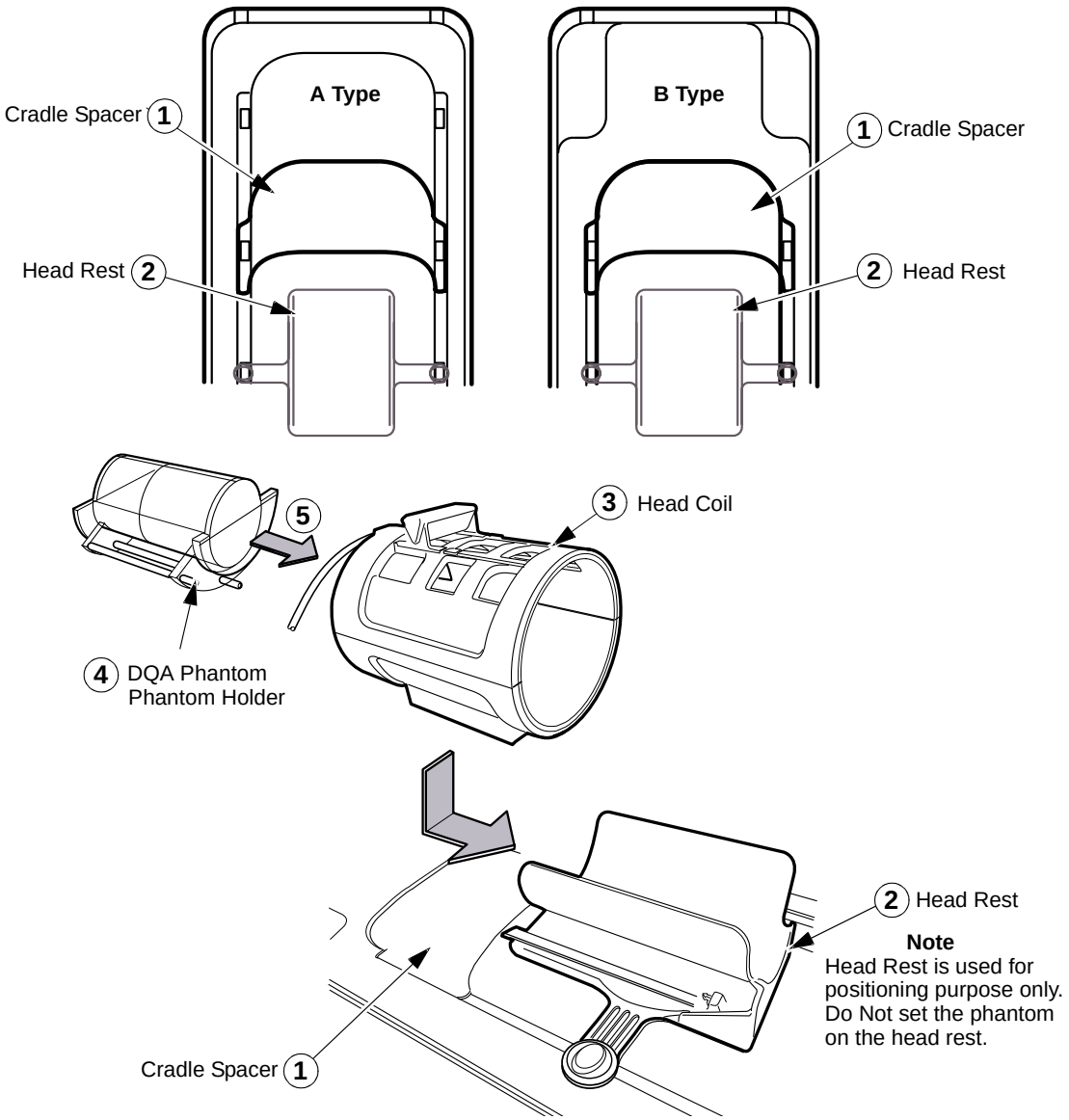
POISON HAZARD! THE PHANTOM CONTAINS NICKEL, A SUSPECT CARCINOGEN. DO NOT INGEST. DISPOSE OF AS A HAZARDOUS WASTE ACCORDING TO STATE AND FEDERAL REGULATIONS.

3-2 Isocenter-Z Scan Procedure

1. Click on **[New Pt]**, and enter:
   Id: **geservice**
   Name: **isocenter cal**
   Weight (Lb.): **111**

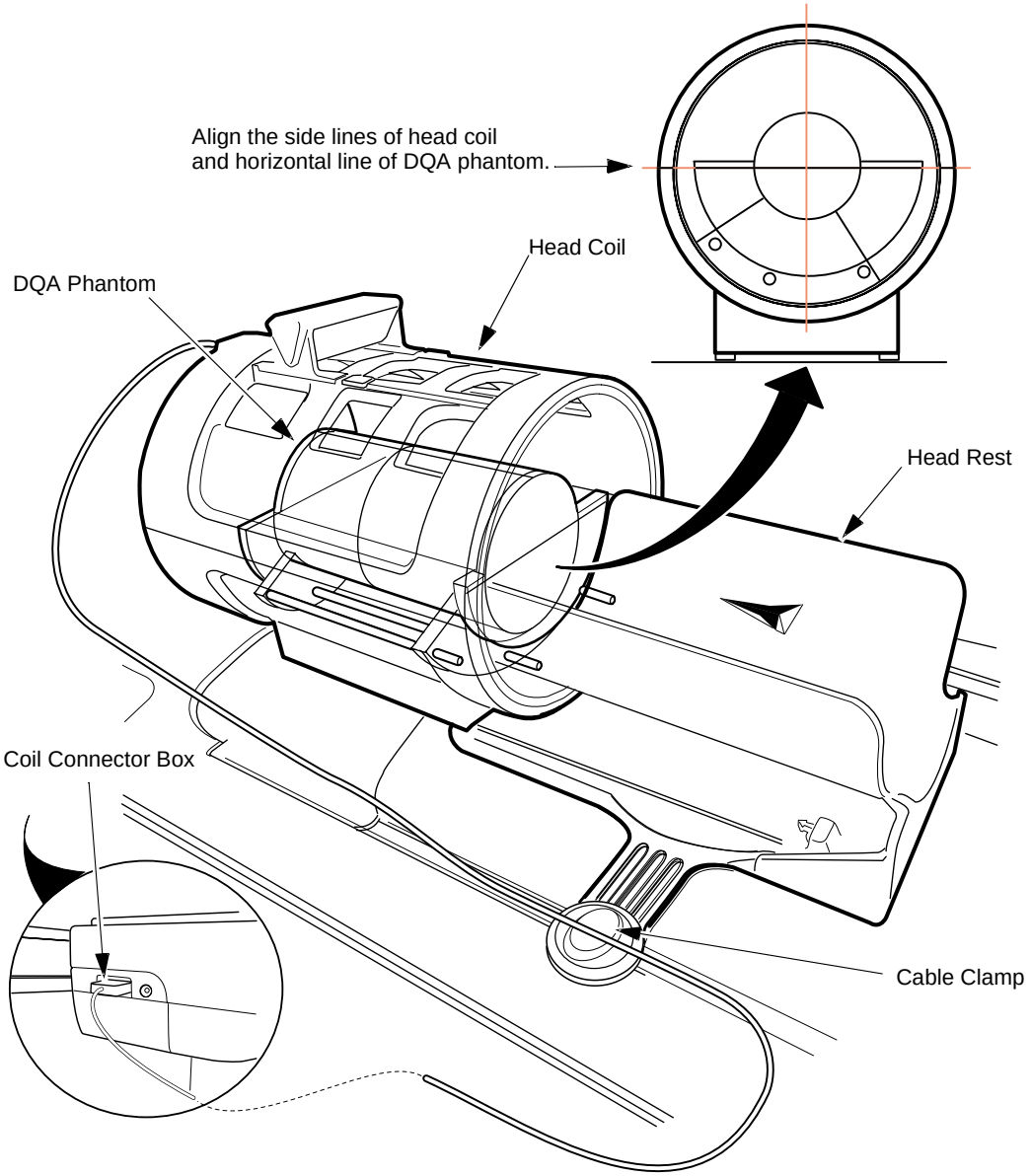
2. Set cradle spacer to cradle.
3. Set head rest onto cradle.
4. Set head coil to head rest.
   (Head Rest is used for positioning purpose only. Do Not set the phantom on the head coil.)
5. Set DQA phantom to phantom holder.
6. Insert DQA phantom and phantom holder into head coil.

NOTE:There are two type of table as following illustration.



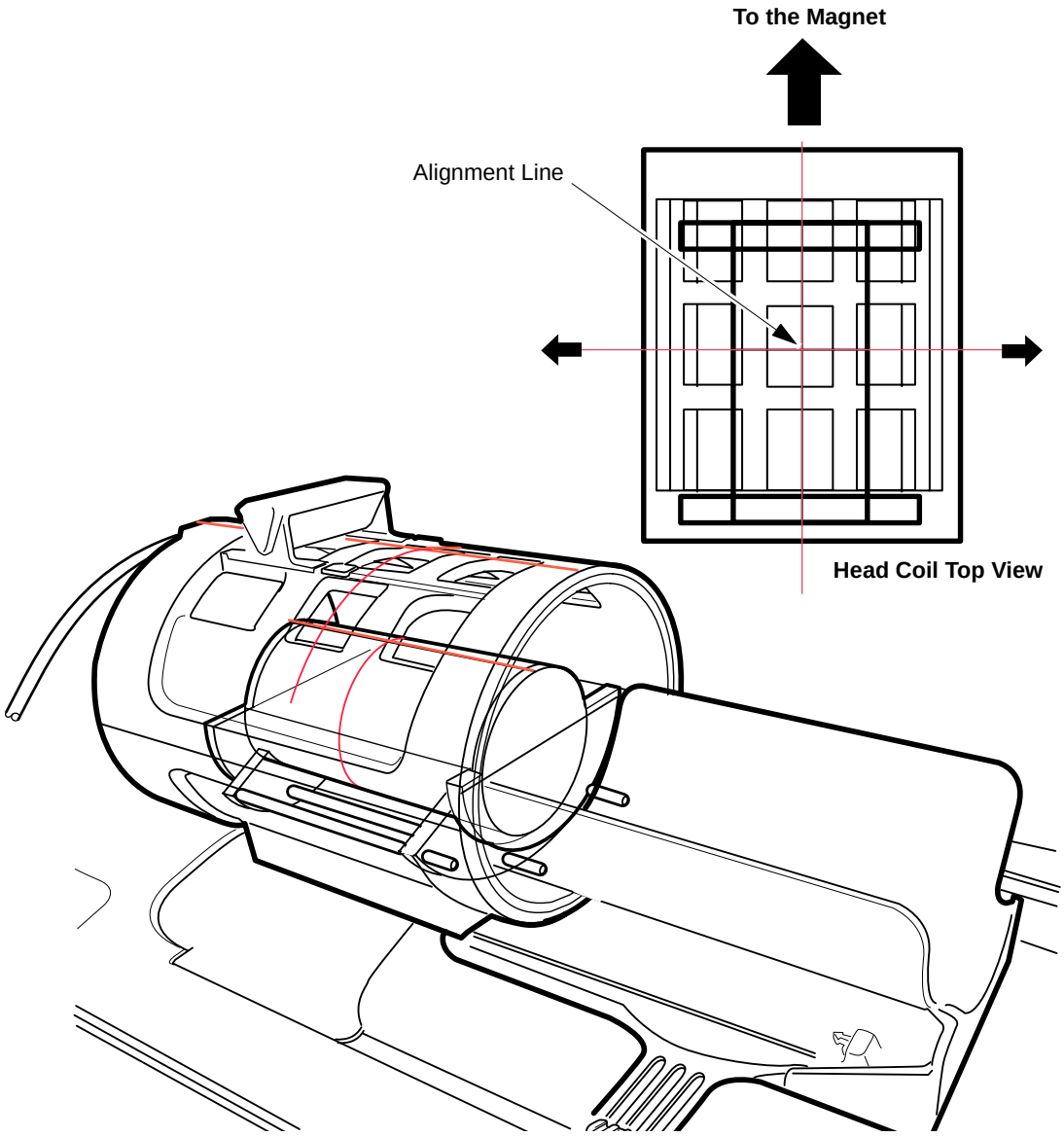
HEAD COIL POSITIONING
ILLUSTRATION 3-1

7. Align the side lines of head coil and horizontal line of DQA phantom.
8. Connect the coil connector box to table connector port.
9. Attach the coil cable to cable clamp of head rest.



HEAD COIL POSITIONING
ILLUSTRATION 3-2

10. Advance the cradle to the position where the A-light beam hits the center of coil.
11. Align the head coil and DQA phantom center position to laser center.
12. Landmark in the sagital and axial planes.
13. Move the cradle to the scan center.



HEAD COIL POSITIONING
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.*

14. Set Patient Protocols to Service.
15. In the Protocol field, Type **o.14.4** (o=Other, 14=dqa, 4=dqa isoz cal) and **<Enter>**.

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

Note

Do not rotate or skew phantom in head coil. This will cause errors in the analysis of Z isocenter. Landmark errors can also cause errors in the analysis.

17. At the operator work space, prepare the system to 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. Set Patient Protocols to **Service**.
    b. In the Protocol field, type **o.11.1** (o=Other, 1=series number).
    c. **[Save Series]**, then **[Prepare to Scan]** (in RX Manager window).

18. Select **[Scan]** (system auto prescans first).

19. Check the geometry of the axial image. Ensure that images are not rotated nor skewed. If they are, reposition the phantom and rescan.

4- ISOCENTER-Z IMAGE ANALYSIS

Note

The Daily Quality tool analyzes the DQA image to determine if the image is skewed in the x direction (x-y planes). Analysis performed on an image with a few degrees of skew will give an accurate isocenter location. If the image is skewed more than a few degrees, it will still be analyzed, but the adjust values for isoVector-Z may be inaccurate. In this case, the phantom should be repositioned and another scan performed.

1. Select **[Cal/Checks],** from the Service Desktop Manager. Click **[DQA Calibration]**, and, then click **[Start]**. Continue as shown:

OUTPUT/PROMPTS	INPUTS/COMMENTS
`**********************************************` `**  Welcome to Automated DQA calibration tool  **` `**********************************************` `!! Please perform [Phantom Position] test scan !!` `Press Return when <Proper Phantom Position>` `is obtained .....`	Look at the DQA phantom image on the image monitor. Be sure it is not skewed more than a few degrees. When the phantom is properly positioned, press **<ENTER>**.
`Press Return when the desired scan(s) is` `completed [Y]: .....` `Accessing information from last run number...` `Last Exam is:` `  ==================================` `  Exam   number:  50022` `  Series number:      1` `  Series Description:  dqa isoz cal` `  Image  number:      1` `==================================` `Accept the Default: (Y,N) [Y] : .....`	**<ENTER>**
*If **n** was entered for "*Accept the Default:"*, the following is displayed:* `Please enter image key manually.` `   Enter Exam   Number [50000] : .....` `   Enter Series Number [1] : .....` `   Enter image  Number [1] : .....` `Accessing image, please wait ......`	If the correct image data set is displayed, type **y <ENTER>**. If not, type **n <ENTER>**. Enter correct Exam number. Enter correct Series number. Enter correct Image number.

4- ISOCENTER-Z IMAGE ANALYSIS (continued)

OUTPUT/PROMPTS	INPUTS/COMMENTS
If the software does not recognize the "Exam Description", the following is displayed: `!!! Unknown Exam Description !!!` `Please enter test mode manually.` `==========` `== dqa iso z cal analysis in progress ==` `==========` *If the phantom is skewed too much, the following is displayed:* `Attention: specified text position is out of viewport bounds <----------`	If this is displayed, verify the phantom is not skewed, then rescan before re-running this tool.
If the scan prescription is incorrect for Isocenter Calibration, the following is displayed: `Wrong imaging parameters for Isocenter Calibration`	Verify the scan prescription is correct and the correct image data set was selected.
If Isocenter Calibration is OK, the following appears: `********** Calibration results **********` `< IsoCenter calibrated, no adjustment required.>` `**********` *If Isocenter Calibration needs adjustment, the following appears:* `********** Calibration results **********` `IsoVectorZ adjustment required` `--------- 7 (.1mm) ---------` `<Old IsoVectorZ = 12510> - <New IsoVectorZ =12517>` `Update IsoVectorZ in MRconfig.cfg (Y,N) : .....`	Type **y <ENTER>** to update the MRconfig.cfg file. **Note:** Reset TPS needed if **yes** (on Service Desktop). Continue with step 2.
`**********` `Would you like to perform another calibration (Y,N) [Y] : .....`	Type **y<ENTER>** or **n<ENTER>**, as appropriate (**N** if you updated Mrconfig.cfg).
`**********` `*Thank you for using Automated DQA calibration Tool *` `**********` `DQA_CAL Exiting!` `Press [ENTER] to quit --> .....`	Press **<ENTER>** key.

4- ISOCENTER-Z IMAGE ANALYSIS (continued)

2. If IsoVectorZ value is updated in `MRconfig.cfg`:
   - Press **[BACK TO ALIGN]** at the keypad on the front magnet enclosure.
   - Wait for table to return to Landmark.
   - Reset the TPS.
   - Update the appropriate configuration data sheet with the final isoVector-Z value.
   - Verify the electrical isocenter calibration alignment by performing Section 3-2, Isocenter-Z Scan Procedure, again.

5- ISOCENTER REPEATABILITY

After the isocenter has been successfully located using the DQA Calibration tool, the cradle position will be moved (without changing the landmark) and repositioned back to isocenter. Another scan will be executed and analyzed with the DQA Calibration Tool. Repeatable isocenter positioning should produce the status "`No adjustment required.`" If not, perform the Longitudinal Drive System calibration procedure.

1. After the scan analysis indicates "`No adjustment required`", press FAST OUT to move the phantom/head coil out to somewhere near the alignment light landmark position. Then use MOVE TO SCAN to return the phantom to isocenter.

2. At the Operator Workspace, click on **[Scan]** (system auto prescans first).

3. After scan is complete, proceed to Section 4, Isocenter-Z Image Analysis. Repeatable isocenter positioning should produce the status "`No adjustment required.`" If not, perform the Longitudinal Drive System calibration procedure, then re-run the Electrical Isocenter calibration procedure.

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
0	Jan 26, 2001	Y. Masumo	Initial Release
1	May 15, 2001	Y. Masumo	Phantom Setting was updated
2	Oct 18, 2001	Y. Masumo	Page 5: Added the purpose of Head Rest.
3	Jun 17, 2002	Y. Masumo	Page 7: Corrected Protocol Number.