

SERVICE MANUAL

GE Signa HDe 1.5T
HD Quad Extremity Coil

GE Catalog Part Number: M3335ME

1.0 SCOPE

This is a service manual for HD Quad Extremity Coil for 1.5T

2.0 APPLICABLE DOCUMENTATION

5147225-4 HD Quad Extremity Operator Manual

3.0 1.5T HD2 QUAD EXTREMITY COIL IMAGING OPTION: 5147225

3.1 SHIPPING LIST

Table 1: Shipping list for 5147225

GEHC part #	Description	Quantity	Box #
5147225-2	1.5T HD Quad Extremity Coil Assembly	1	1
5147225-3	1.5T HD Quad Extremity Phantom	1	1
5147225-4	HD Quad Extremity Operator Manual	1	1
5147225-5	1.5T HD Quad Extremity phantom MSDS	1	1
5147225-7	HD Quad Extremity Phantom Positioner	1	1
2357819-3	Knee pad	1	1
2357819-4	Leg/Foot support pad	1	1
2357819-5	Foot support pad	1	1
2357819-6	Toe pad	1	1

4.0 1.5T HDX QUAD EXTREMITY COIL FRU: 5147225-2

4.1 SHIPPING LIST

Table 2: Shipping list for 5147225-2

GEMS part #	Description	Quantity
5147225-2	1.5T HD Quad Extremity Coil Assembly	1

5.0

SNR TEST

5.1 TOOLS REQUIRED

Table 3: Tools required

Description	GE Part #	Qty
1.5T HD Quad Extremity Phantom	5147225-3	1
HD Quad Extremity Phantom Positioner	5147225-7	1

5.2 DATA COLLECTION

1. From the Scan Desktop, start new scan by selecting [New Pt]; set Patient ID to “geservice” and Patient Weight to “111” pounds. Click [Patient Position] to open protocols window.
2. Remove all other surface coils from the cradle. Place the coil on the cradle as illustrated in Figure 1. The coil should be positioned such that its cables exit towards the magnet. Remove any pads from the coil. Set the phantom positioner into the coil as seen in Figure 1.



Figure 1: Coil and Phantom Positioner setup

3. Center the coil within the baseplate and place the phantom in the phantom positioner as shown in Figure 2.

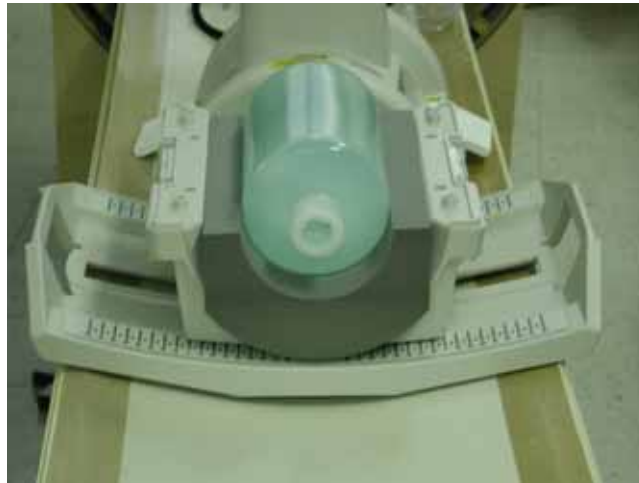


Figure 2: Phantom positioning

4. Attach the anterior portion of the coil. The coil should be centered on the baseplate.
5. Landmark the coil at the landmark indicator on the coil.
6. Advance the coil to scan position, ensuring cable does not get snagged.
7. At the console, set the protocols per the Signal section from Table 4: Signal and Noise Scan protocols.
8. Click [Save Series] to download the protocols, then click [Prepare to Scan].
9. Run [Auto Prescan]. Take note of the R1, R2 and TG values.
10. Run [Scan]

Table 4: Signal and Noise Scan protocols

Protocol	Signal	Noise
<i>Patient Exam Information</i>		
Patient ID	geservice	geservice
Patient Name	HD T/R QUAD EXTREMITY	HD T/R QUAD EXTREMITY
Patient Weight	111 lbs. (50 kg)	111 lbs. (50 kg)
<i>Patient Position</i>		
Patient Position	Supine	Supine
Patient Entry	Feet First	Feet First
Coil	QUADKNEE	QUADKNEE
Series Description	Signal	Noise
<i>Imaging Parameters</i>		
Plane	Axial	Axial
Mode	2D	2D
Pulse Seq	FSE-XL	GRE
Imaging Options	Fast (or None)	None
PSD Name	<i>Leave Blank</i>	<i>Leave Blank</i>
Protocol	<i>Leave Blank</i>	<i>Leave Blank</i>
<i>Scan Timing</i>		
# of Echoes	1	1
TE	17.0	Min Full
TR	500.0	34
Echo Train Length	4	N/A
Bandwidth	15.63	15.63
<i>Additional Parameters</i>		
Flip Angle	N/A	1
<i>Acquisition Timing</i>		
Freq	256	256
Phase	256	256
NEX	1.00	1.00
Phase FOV	1.00	1.00
Freq DIR	R/L	R/L
Auto Center Freq	Peak	Peak
Autoshim	On	On
Phase Correct	On	N/A
Contrast	Off	Off
# of Reps B4 Pause	0	N/A
<i>Scanning Range</i>		
FOV	20	20
Slice Thickness	3.0	3.0
Spacing	1.5	1.5
S/I Start	0.0	0.0
R/L Center	0.0	0.0
A/P Center	0.0	0.0
S/I End	0.0	0.0
# Slices	1	1
Table Delta	0.00	0.00

11. The signal scan must be run prior to the noise scan as the same R1, R2 and TG values must be used for both the signal and noise scans. Do not run an Auto Prescan prior to the noise scan as the values will be changed.
12. Copy the signal scan series. Use [Copy Series] (highlight signal series and click right mouse button) and [Paste Series] in RX Manager.
13. Click [View Edit] and set the protocols per the Noise section from Table 4: Signal and Noise Scan protocols.
14. Click [Save Series] and click [Download].
15. Open [Display CVs] menu under [Research Operations]. Set the “rhformat” and “do_noise” CVs to “1”.
16. Run [Manual Prescan], and do not make any changes. Verify that R1, R2, TG and Bandwidth have not changed from the previously completed signal scan, and click [Done].
17. Run [Scan].

5.3 DATA ANALYSIS

1. A circular Region of Interest (ROI) should be used for the signal measurements, and a rectangular ROI should be used for the noise measurements. The actual ROIs should be similar in shape and size to those in Figure 3 and Figure 4 below.

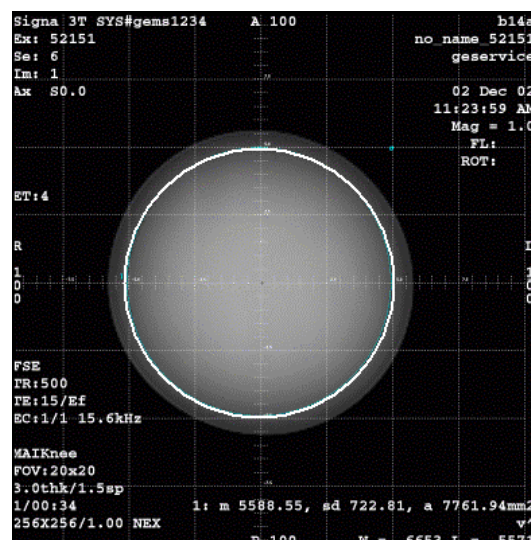


Figure 3: Example Signal ROI

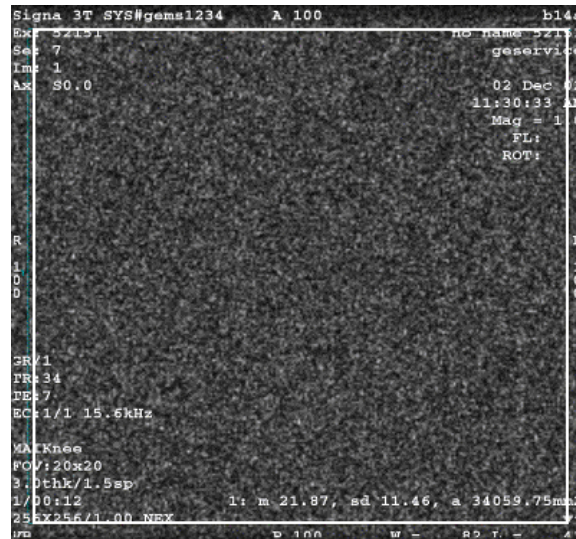


Figure 4: Example Noise ROI

2. ROIs in both signal and noise images can be measured directly in the image browser. Click the user interface button [MEASURE], select the circular or rectangular shape, and adjust its size appropriately. Mean, standard deviation, and area of the ROI will appear in the lower right corner of the image.
3. For the signal measurement, choose a 10 cm diameter circular ROI. This should be approximately a 5600 mm². For the noise measurement, choose a 19 cm rectangular ROI. This should be approximately 34000 mm².
4. Record the values for mean of the signal, standard deviation of the noise, and calculated SNR in Table 5.
5. Individual receiver SNR is defined as the mean of data within the signal ROI divided by the standard deviation of data within the noise ROI.

$$SNR = \frac{\text{Mean of Signal within ROI}}{\text{Std. Deviation of Noise within ROI}}$$

Table 5: SNR Calculation

Mean Signal	Std. Dev. Noise	SNR

6.0 DHR CONTENT

The Certificates of Compliance for the coil is to be retained for the DHR.

The results of the SNR measurement are to be retained for the DHR in the following format:

Coil	SNR measured	LSL	Result
HD T/R Quad Extremity		TBD	pass/fail