FIELD SERVICE PROCEDURE
SHOULDER COIL M1085 AN

DOCUMENT # 87305-T-117

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SERVICE PROCEDURE FOR SHOULDER COIL M1085 AN

1.0 Tools and Equipment

- Decoupling test phantom [P/N#46-287399P1].
- Battery-powered DVM. Beckwith 3030 or equivalent [P/N#46-194427P49].
- Vector impedance meter [PN#46-255836P40].

2.0 Scanner Verification

2.1 Scanner head and body modes of operation must be separately verified prior to surface coil verification. Set up decoupling test phantom [P/N#46-287399P1] at magnet isocenter of head coil and then body coil using the following protocol with auto prescan. Align test phantom with its long axis parallel to the magnet axis. If auto prescan fails, attempt verification using manual prescan.

SCAN PRESCRIPTION

[NEW STUDY]

PATIENT STUDY PARAMETERS

ID:	TEST
Patient Weight	100 lbs. Monitor SAR? Y
	[NEXT PAGE] twice

PATIENT POSITION

Patient Entry	[Head First]
Patient Position	[Supine]
Coil Type	[Head, Body Coil]
Axial/Sag. Landmark	[Sternal Notch]
	[NEXT PAGE]

IMAGING PARAMETERS

Image Mode	[Single Scan]
Scan Plane	[Sagittal]
Pulse Sequence	[Multiple Echo]
Imaging Options	[None]
Graphic Prescription	[No]
Enter PSD Filename;	[NEXT PAGE]

SCAN TIMING

Number of Echoes	[1]
Echo Time (TE)	[20 msec]
Rep Time (TR)	[500 msec]
	[NEXT PAGE]

SCANNING RANGE

Field of View	[24 cm]
Scan Thickness	[5 mm]
Scan Location:	(S/I) 0
FOV Center:	(R/L) R0 (A/P) A0
	[NEXT PAGE]

ACQUISITION TIME

Acq. Matrix	[256 x 128]
Imaging Time	[1 Nex 1:11]
Frequency Direction	[S/I]
Table Delta:	0
REVIEW PAGE	[NEXT PAGE]
SCAN OPERATIONS	[NEXT PAGE]

3.0 Surface Coil Verification

3.1 If the images obtained in 2.0 are acceptable, connect the surface coil BNC cable to quarter wave cable [PN#46-251710G7] in RF Cable Kit [PN#46-287402G1] and connect the free end to the surface coil input BNC port. (NOTE: If the scanner has a linear head coil, the single BNC fitting is the surface coil port. In Signa 3.2 with quadrature head coil, connect only to the surface coil interface box). Set up the scanner with the following protocol and perform the scan using the decoupling test phantom [P/N#46-287399P1]. See Figure 1 for proper placement of decoupling phantom with respect to surface coil.

3.2 If scan can be executed, inspect image at window width 250 and window level 1100.

3.3 If prescan ends abnormally, or the surface coil images show hot spots, light and dark bands, or gross distortion as shown in Figure 2, the transmit decoupling network is suspect. Follow procedure in Sec. 4 and 5 for repair.

3.4 If no image is obtained, suspect a broken cable, shorted PIN diode or failed component in the coil. Follow procedure in Sec. 4 and 5 for repair.

3.5 If the image is present, but appears excessively noisy, an intermittant connection, or a bad component in the tuning or matching network is suspected. Follow service procedure in Sec. 4 and 5 for repair or return to vendor for service/-replacement. Defective coil return form **must** accompany all returned coils.

NOTE

COIL WARRANTY IS VOIDED IF REPAIRS OTHER THAN CABLE, DIODE, OR BNC CONNECTION REPLACEMENT ARE MADE.

SCAN PRESCRIPTION

[NEW STUDY]

PATIENT STUDY PARAMETERS

ID:	TEST
Patient Weight	100 lbs. Monitor SAR? Y
	[NEXT PAGE] twice

PATIENT POSITION

Patient Entry	[Head First]
Patient Position	[Supine]
Coil Type	[Surface Coil]
Axial/Sag. Landmark	[Sternal Notch]
	[NEXT PAGE]

IMAGING PARAMETERS

Image Mode	[Single Scan]
Scan Plane	[Sagittal]
Pulse Sequence	[Multiple Echo]
Imaging Options	[None]
Graphic Prescription	[No]
Enter PSD Filename;	[NEXT PAGE]

SCAN TIMING

Number of Echoes	[4]
Echo Time (TE)	[20, 40, 60, 80 msec]
Rep Time (TR)	[1000 msec]
	[NEXT PAGE]

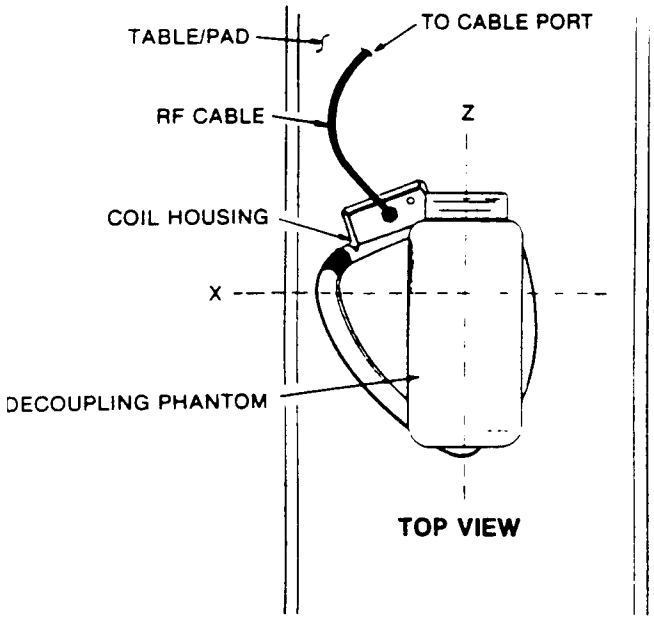
SCANNING RANGE

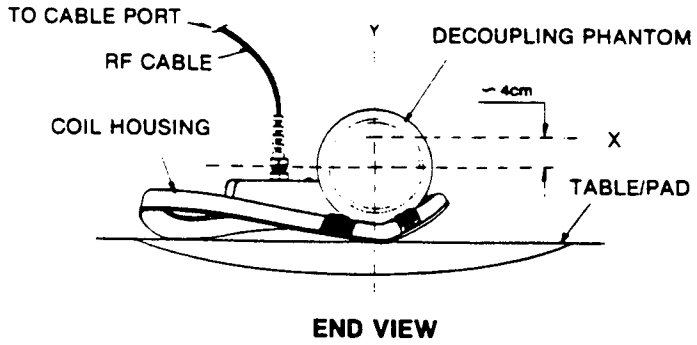
Field of View	[24 cm]
Scan Thickness	[5 mm]
Scan Location:	(S/I) SO
FOV Center:	(R/L) RO (A/P) AO
	[NEXT PAGE]

ACQUISITION TIME

Acq. Matrix	[256 x 128]
Imaging Time	[1 Nex 2:22]
Frequency Direction	[S/I]
Table Delta:	0
REVIEW PAGE	[NEXT PAGE]
SCAN OPERATIONS	[NEXT PAGE]

FIGURE 1
TEST LOCATION OF DECOUPLING PHANTOM AND SURFACE COIL





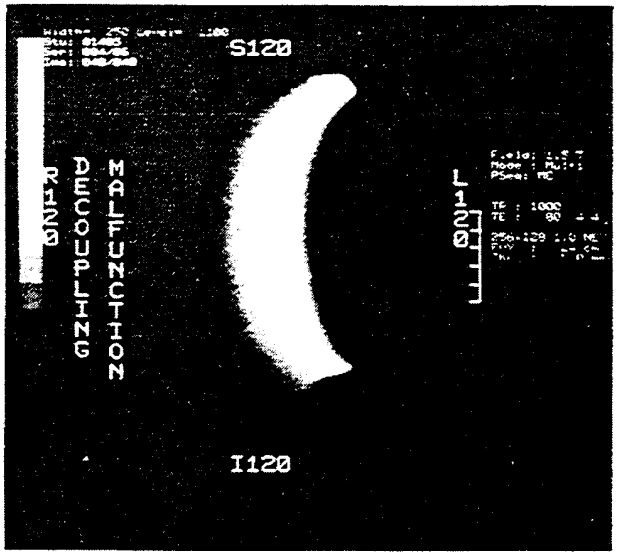


Figure 2
Unsuccessful Decoupling

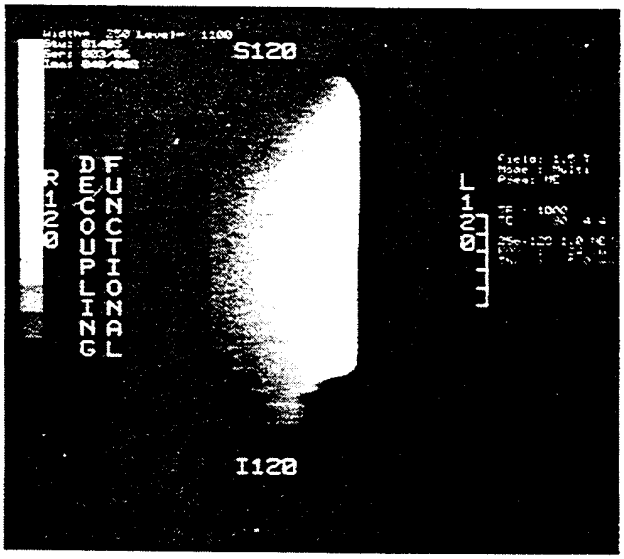


Figure 3
Successful Decoupling

4.0 Troubleshooting Procedures

4.1 Measure coil impedance at the BNC cable connector with a vector impedance meter. The coil measurements should be made away from any magnet fields with the coil placed on a human subject to ensure that it is properly loaded. Impedance should measure 45 to 70 ohms with phase angle of −05 to +25 degrees. The coil can be tested in free space by measuring with a VIM at the cable and suspending coil at arm's length by the velcro straps. The impedance magnitude should be 10 to 25 ohms, and the phase angle should be +50 to +80 degrees if the coil is working properly.

4.2 Gently tap the coil at various locations while measuring input impedance at the BNC connector. No intermittent operation should be observed.

4.3 Measure across the BNC connector with a battery powered DVM (Beckman 3030 or equivalent) so that the positive lead is applied to the center conductor and the negative lead to the shield. Put the meter in diode test mode. If the PIN diode is functioning in circuit, the meter will read about 0.5 volts. If the diode is shorted, the meter will read 0 volts. An open diode will read over-range. Reverse DVM leads to coil and check diode reverse bias condition. A good pin diode should reflect meter over range readings. Follow procedure Sec. 5.2 for replacement of the diode.

4.4 Inspect the cable for signs of damage. If insulation is cut or cable is damaged in any way it should be replaced per procedure in Sec. 5. Inspect BNC connector for signs of damage. If damaged or suspected of intermittent connection it should be replaced. Follow procedure Sec. 5.4 for replacement of the BNC connector.

5.0 SERVICE PROCEDURES

5.1 Service Kit Contents

N/A for this coil.

5.2 Replacement of Cable/ PCB Assembly

- Reference Figure 4 and 5 for this procedure.
- Remove the nylon screws from the access cover on the coil (Fig. 5)
- Remove the access cover.
- Remove the strain relief flexible extender from the strain relief collet.
- Carefully cut cable with wire cutters approximately ¼"away from Input/Decoupling PCB (ID/PC Board) within coil housing.
- Remove the cable and rubber retainer from the strain relief collet. Keep the rubber retainer and strain relief flexible extender for re-use with a replacement cable.
- Use a sharp knife or pick to scrape away the conformal coating from the two soldered connections which join the cable assembly to the ID/PC Board.
- Apply a 25 Watt soldering iron to the cable connections. The conformal coating will recede and start to flake.
  NOTE: Take care not to melt the solder around adjacent components on the decoupling board or burn the coil housing.

- Remove the cable stub and clean off this residue.
- Prepare the ½ wavelength cable assembly by pretinning the connections. (Refer to Figure 4) **NOTE:**Reuse the strain relief flexible extender and rubber retainer.
- Solder the cable connections to the ID/PC Board per Figure 5. Remove any excess flux by scraping. DO NOT USE SOLVENTS.
- Install the access cover assembly and access cover gasket. The cover should fit securely. Do not over tighten the nylon screws.
- Test the coil per section 3 and section 4.

5.3 Replacement of PIN-diode

- Reference Figure 5 for this procedure.
- Obtain replacement UM9415 pin diode P/N#46-221735P1.
- Remove the service access cover.
- With a sharp knife or pick, cut away the conformal coating around the diode body.
- Carefully cut the diode leads at the diode body, using sharp wire cutters.
- When the diode is removed, clean the pads of the diode leads, excess solder, and conformal coat by scraping and retinning. DO NOT USE SOLVENTS; USE A 25 WATT IRON.
- Prepare the replacement 9415 PIN-diode by pretinning and cutting the leads.
- Position the diode in the cut out slot. Refer to Figure 5 for proper orientation of the anode.
- Apply enough solder to flow around the leads.
- Install the service access cover and access cover gasket. The access cover should fit securely. Do not over tighten the nylon screws.
- Test the coil per Section 3 and Section 4.

5.4 BNC Connector Placement

- Obtain replacement BNC connector P/N#46-271494P1.
- Cut off defective BNC connector leaving sufficient cable length for proper coil operation. Multiple connector replacement can be performed as long as sufficient cable length for proper coil operation is maintained. (Min. 55inch length)
- Prepare cable for BNC connector by stripping adequate amount of insulation from outer shield and center conductor. See Figure 4.
- Crimp BNC connector in place using 46-255841 crimp tool and 46-255841 P100 insert.
- Test coil per Section 3 and 4.

Figure 4
CABLE ASSEMBLY

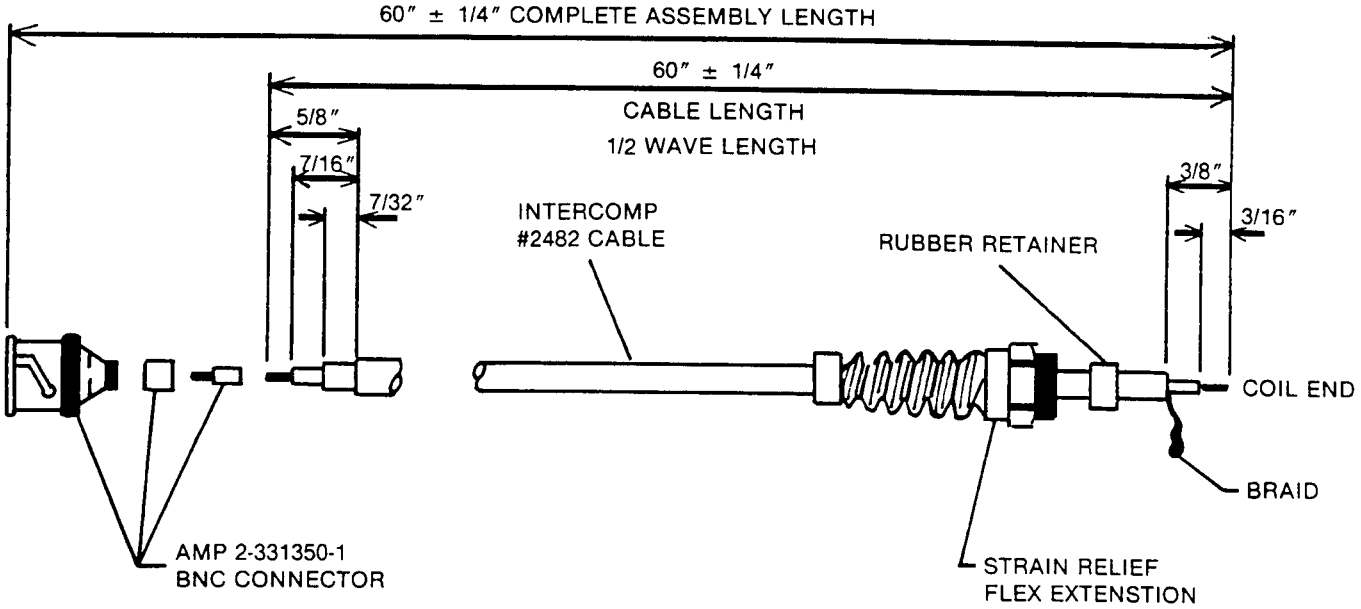
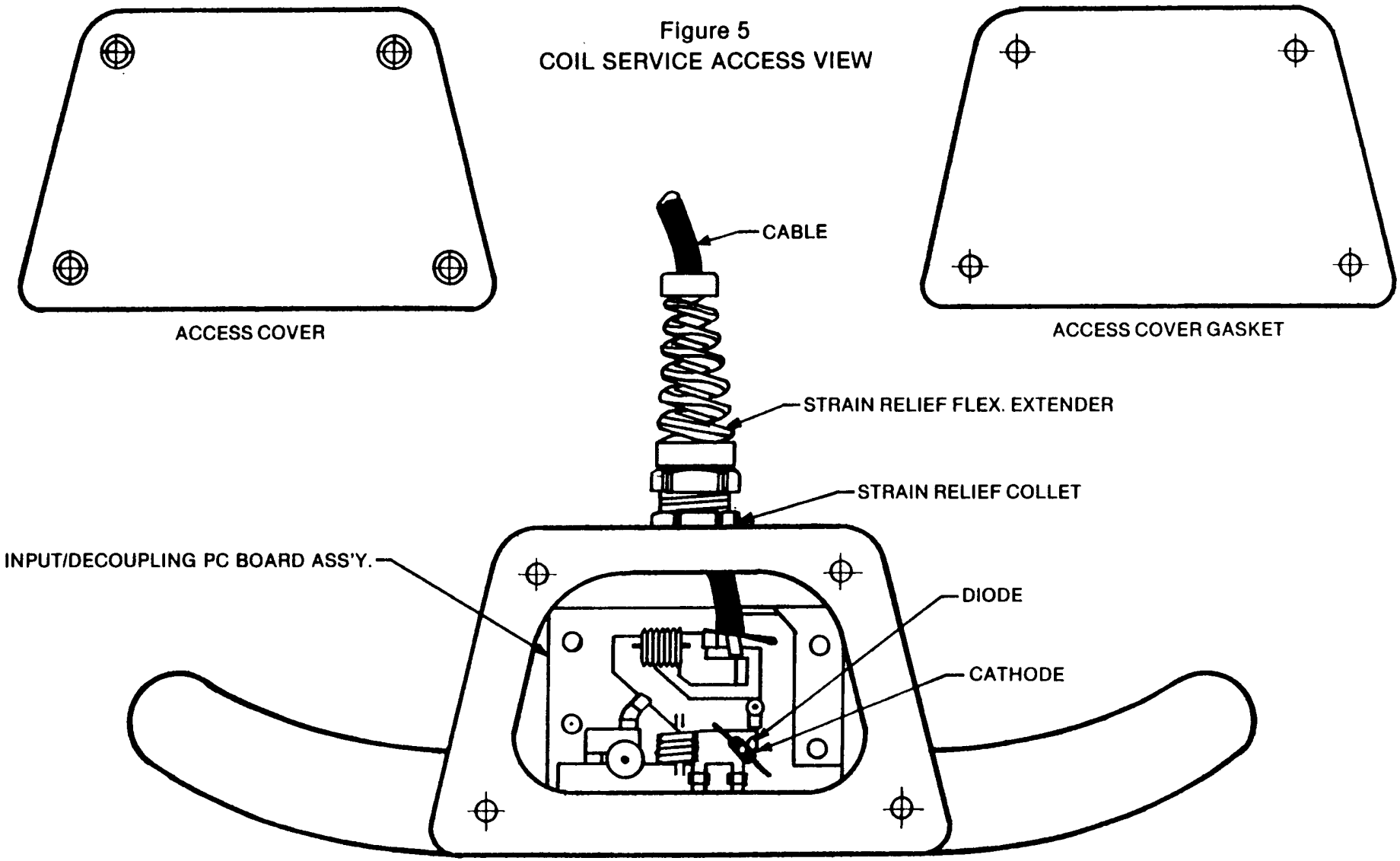


Figure 5
COIL SERVICE ACCESS VIEW



DEFECTIVE COIL RETURN FORM

NOTE

To allow for proper assessment of defective returned coils, this form must be completely filled out and accompany all returned coils. Include films or prints of any image quality related complaints with a description of scan protocol used.

DATE:
SITE NAME:
SITE ADDRESS:
SERVICE ENGINEER:
COIL SERIAL NUMBER:
DATE COIL INSTALLED:
DESCRIPTION OF COIL PROBLEM:

ELECTRICAL CHECKS

VECTOR METER CHECKS - COIL LOADED WITH HUMAN SUBJECT IN FREE SPACE
MAGNITUDE
PHASE

VECTOR METER CHECKS - COIL UNLOADED IN FREE SPACE
MAGNITUDE
PHASE

PIN DIODE TEST
DIODE DROP FORWARD BIAS
DIODE DROP REVERSE BIAS