RF Technical Note

Replacing the 40/50-kV High Voltage EMI Power Supply in the Linac Modulators

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This Note outlines the steps involved to replace the 40/50-kV High Voltage EMI Power Supply (PS) in the Linac Modulators. This is a general procedure that will be adequate for most situations.

At least two qualified members of RF Group must be present during performance of this work.

NOTE 1: This work involves electrical safety.

NOTE 2: Two qualified members of the RF Group must be present while performing the work.

NOTE 3: Refer to Safety Procedure # 121-00030 (1110-00082) "Lockout/Tagout Procedure for the Linac Modulator Systems"

NOTE 4: File an APS Work Request and have it approved and signed by a responsible engineer before beginning this work.

Procedure:

1. Have the Work Request approved; keep a paper copy with you.

2. Obtain permission to start this work from the Ops.

3. Shut the modulator completely OFF including the klystron and thyratron filament power supplies.

4. LOTO the modulator (refer to **Safety Procedure # 121-00030 (1110-00082) - Lockout/Tagout Procedure for the Linac Modulator Systems**) (Fig. 1 through 5).

Figure 1. Open and LOTO Fused Disconnect (FD) switch L#:MO1.

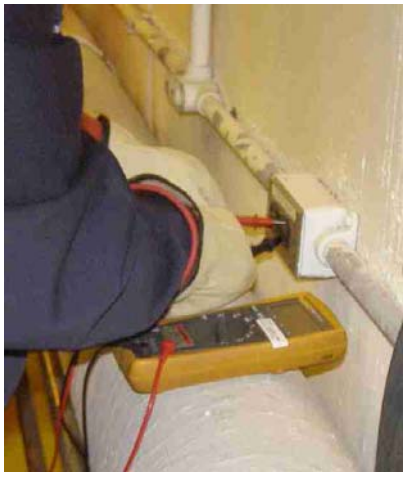

Figure 2. Check operation of the Fluke volt meter do not turn the meter off or change its scale.

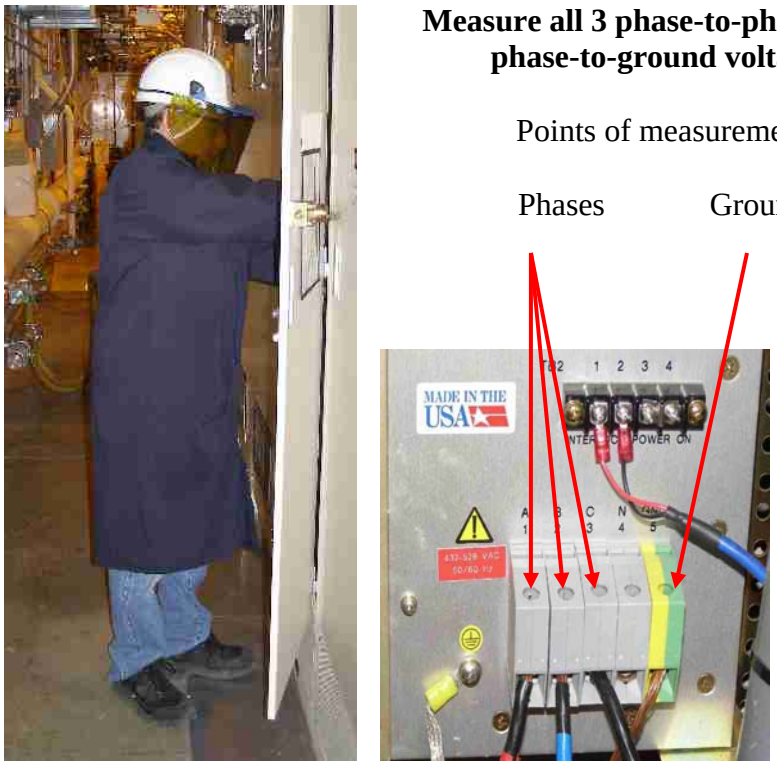

Figure 3. Verify absence of 480 V in the EMI supply power connector.

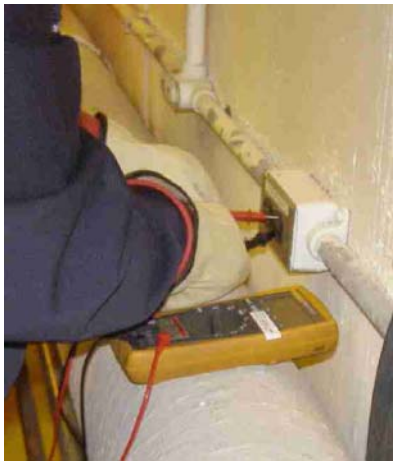

Figure 4. Check operation of the Fluke volt meter again.

Figure 5. Open PFN doors. Touch all open HV parts of the PFN with the grounding rod. Leave the grounding hook in the designated grounding ring. Close PFN doors.

5. Shut off (supply first!) the power supply (PS) cooling water system (Fig. 6).

Figure 6. EMI PS Cooling water system control panel.

6. Drain the PS water lines using the plugs located on the lower left side of the High Voltage rack wall outside the rack (Fig. 7). Restore the plugs.

Figure 7. EMI water drain plugs.

7. Disconnect water connections from the PS (Fig. 8).

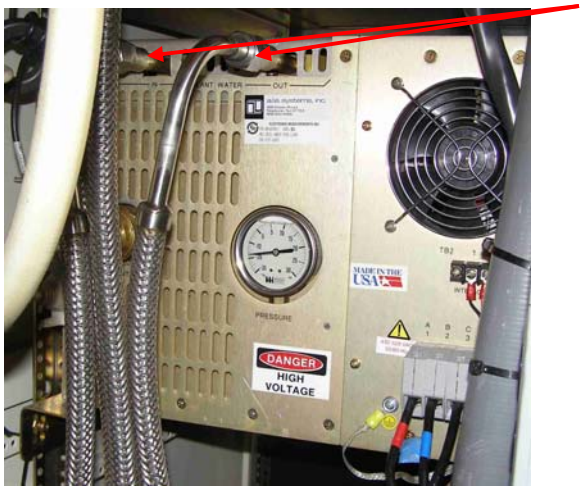

Figure 8. EMI power supply water connectors.

8. Install bypass between return and supply water pipes disconnected from the PS.

9. Disconnect all cables from the rear panel connectors of the PS that is to be replaced Touch a grounded metal surface by the end of the cable in order to make sure the cable is completely discharged. (Fig. 9).

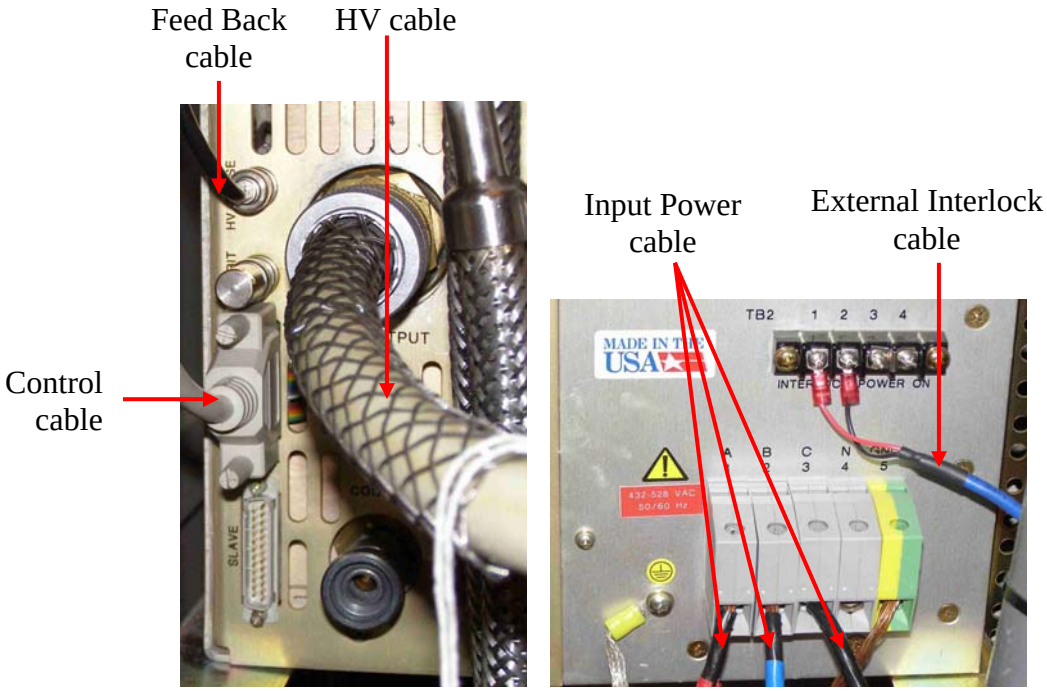

Figure 9. EMI power supply cables.

NOTE 5: **<u>If another PS is not to be installed before C.O.B. of the day when first PS was removed, isolate and LOTO the 480 VAC input cable</u>.**

10. Using the lift truck, pull the PS from the rack (see Fig. 10).

Figure 10. Pulling the old EMI PS from the rack.

11. Using the lift truck, place another PS into the rack (Fig. 11).

Figure 11. Putting new EMI PS into the rack.

12. Connect the Input Power, Control, Feed Back, External Interlock, and HV cables to the PS connectors and terminal blocks (regrease the HV connector!) (Fig. 9).

NOTE 6: Be careful with the PS external interlock cable, since the cable is a part of the radiation safety device.

13. Remove the bypass installed return and supply water pipes disconnected from the PS.

14. Reconnect the PS water connections. Turn the water valves ON (return first!). Observe the water connections and plugs for possible leaks.

15. Verify that the water flow is at the proper value (2.1-2.5 GPM).

16. Unlock the 480 VAC switch and turn the modulator ON.

NOTE 7: Modulator ACIS validation is required before the work may be considered complete. Contact the MCR and request ACIS validation of the PS. Perform validation with 300-500 V on the PFN.

17. After validation is completed, bring the modulator and klystron to required voltage and RF power. Resume the Linac operation.

18. Record serial numbers of both removed and installed PSs in the Log book.

19. Completion of the work must be verified and signed of by the responsible engineer.