6.7 VOLT CONVERTER
POWER REMOVAL AND RESTORATION
NO. 2 ELECTRONIC SWITCHING SYSTEM

1. GENERAL

1.01 This section provides procedures necessary for removal and restoration of power to the 6.7 volt dc-to-dc converter used in the No. 2 Electronic Switching System (ESS). The power removal and restoration procedures allow maintenance and tests to be performed on the converter per Section 161-293-301.

1.02 This section is reissued to revise and clarify the power removal and restoration procedure. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The No. 2 ESS control complex has two 6.7 volt power plants. Each power plant supplies a separate control unit (CU), part of the maintenance center frame, and teletypewriter circuitry and consists of a 6.7 volt dc-to-dc converter and power control circuitry. The converter uses silicon-controlled rectifiers to invert the −48 volt direct current to high frequency alternating current. The alternating current is stepped down, rectified, filtered, and appears as regulated 6.7 volt power on output buses in the plant. The control circuitry, consisting of contactors, wire spring relays, distribution fuses, and timing circuits, connects and removes the +6.7, +24, and −48 volt loads located in the various equipment frames in the CU. The power is removed in descending order of voltage and restored in ascending order to protect the semiconductors from damage caused by higher voltages being on while lower voltages are off.

1.04 Refer to Section 161-293-301 for the operating methods of the 6.7 volt dc-to-dc converter, J87298.

1.05 Refer to Section 232-106-301 for method of operation of the No. 2 ESS maintenance center frame control and display panel.

1.06 Reference to the input and output message manuals (IM- and OM-2H200) should be made to interpret teletypewriter input and output messages relating to these tests.

2. METHOD OF OPERATION

2.01 An interlock is provided which does not allow power to be removed from the 6.7 volt converter by simply operating the CONV OFF key since the CU power must be sequenced off and on. The power to the 6.7 volt converter can only be removed and restored as specified in the following procedure.

STEP	ACTION	VERIFICATION
Power Removal		
1	At MC MODE controls— Ensure that ONLINE INTERRUPT key and OFFLINE STOP key are released.	
2	At POWER CONTROL section of MC— Ensure that CONTROL UNIT SWITCH INHIBIT switch and TEST MODE REVERSAL ENABLE	

STEP	ACTION	VERIFICATION
	switch are in the OFF position and TEST MODE REVERSAL ENABLE key is released.	
3	Before removing power from the 6.7 volt converter, ensure that the CU associated with the converter is in the off-line mode. CU 0—converter 0 CU 1—converter 1	
4a	If power is to be removed from converter 0, notify remote TTY stations associated with channels 2, 4, and 6 that the channels will be out of service.	
5b	If power is to be removed from converter 1, notify the remote TTY stations associated with channels 3, 5, and 7 that the channels will be out of service.	
6	At TTY, type in: M CU:RMV!	At SYSTEM STATUS section of MC— OUT OF SERVICE lamp of off-line CU lighted. At TTY— System response is: OK
7	At SYSTEM STATUS section of MC— Operate LOCK CU_ ACTIVE key associated with on-line CU.	At SYSTEM STATUS section of MC— LOCK CU_ ACTIVE lamp lighted.
8	At POWER CONTROL section of MC— Operate OFFLINE CONTROL UNIT key.	At POWER CONTROL section of MC— OFFLINE CONTROL UNIT key lighted. SEQUENCE FAILURE BUS A lamp will light momentarily when CU 0 power is removed, or SEQUENCE FAILURE BUS B lamp will light momentarily when CU 1 power is removed. At control panel of 6.7 converter— SEQUENCE FAIL lamp at converter 0 lights momentarily when CU 0 power is removed, or SEQUENCE FAIL lamp at converter 1 lights momentarily when CU 1 power is removed.
9	At TTY, type in: M MC:RMV!	At SYSTEM STATUS section of MC— MC OUT OF SERVICE lamp lighted. At TTY— System response is: OK.
10	At POWER CONTROL section of MC— Operate MAINTENANCE CENTER CIRCUIT key.	MC power removed. At POWER CONTROL section of MC— MAINTENANCE CENTER CIRCUIT lamp lighted.

STEP	ACTION	VERIFICATION
11a	At TTY— Remove TTY channels 2, 4, and 6 from service by typing in: M TT:RMV:a! a = Channel to be removed from service. ***Note:*** Repeat input message for each TTY channel to be removed from service.	At TTY— System response: Output message index MR TT SI printed for each channel removed from service.
12a	If channel 1 is out of service— Type in: M TT RST:1!	System response: MR TT DGN 1 ATP IS if restored and output message index MR TT SI.
13a	Type in: M TT:RMV:O!	At TTY— System response: Output message index MR TT SI printed for channel removed from service.
14b	At TTY— Remove TTY channels 3, 5, and 7 from service by typing in: M TT:RMV:a! a = Channel to be removed from service. ***Note:*** Repeat input message for each TTY channel to be removed from service.	At TTY— System response: Output message index MR TT SI printed for each channel removed from service.
15b	If TTY channel 0 is out of service, type in: M TT:RST:0!	System response: MR TT DGN 0 ATP IS if restored and output message index MR TT SI.
16b	Type in: M TT:RMV:1!	At TTY— System response: Output message index MR TT SI printed for channel removed from service.
17	At TTY control panel— Operate DATA SET DISCONNECT keys (if not already operated) for the TTY channels removed from service in Step 11a or 14b.	At TTY control panel— Lamps of the operated keys lighted.
18	Operate TELETYPEWRITER DISCONNECT keys (if not already operated) for the TTY channels removed from service in Steps 11a of 14b.	Lamps of the operated keys lighted.
19	Operate POWER OFF TTY CONTROL TA (BUS A) key if power is to be removed from converter 0, or operate TB (BUS B) key if power is to be removed from converter 1.	TA and TR1 ON or TB lamp lighted.

STEP	ACTION	VERIFICATION
20	At 6.7 volt converter— Operate CONV OFF key.	Converter CONV OFF, CLR TEST, FUSE VOLT, VOLT SHD, and PWR OFF lamps lighted.
21	Operate ALM OFF key.	ALM OFF lamp lighted.
22	Maintenance or tests may be performed on the 6.7 volt converter per Section 161-293-301.	
Power Restoral		
23c	If not already released— Release CONV OFF key.	CONV OFF, FUSE VOLT, VOLT SHD and PWR OFF lamps extinguished.
24	Operate CLR TEST key.	CLR TEST lamp extinguished.
25	Release ALM OFF key.	ALM OFF lamp extinguished.
26	At TTY control panel— Release TA or TB key which was operated in Step 19.	TA or TB lamp extinguished.
27d	If TB key was released in Step 26— Operate RST key.	TR1 ON lamp extinguished.
28	Release DATA SET DISCONNECT keys which were operated in Step 17.	Lamps of the operated keys extinguished.
29	Release TELETYPEWRITER DISCONNECT keys which were operated in Step 18.	Lamps of the operated keys extinguished.
30	At TTY— Restore TTY channels which were removed from service in Step 11a (and TTY channel 0) or Step 14b (and TTY channel 1) by typing in: M TT:RST:a! a = TTY channel to be restored to service. ***Note:*** Repeat input message for each TTY channel to be restored to service.	System response: MR TT DGN a ATP IS and output message index MR TT SI for each channel restored to service.
31	At POWER CONTROL selection of MC— Release MAINTENANCE CENTER CIRCUIT key.	At POWER CONTROL section of MC— MAINTENANCE CENTER CIRCUIT lamp extinguished.
32	Ensure that SEQUENCE FAILURE lamp (BUS A or BUS B) is not lighted.	
33	At the control panel of the 6.7 volt converter associated with BUS A or BUS B—	

STEP	ACTION	VERIFICATION
	Ensure that SEQUENCE FAIL lamp is not lighted.	
34	At MC MODE controls— Depress NORMAL key.	At MC MODE controls— NORMAL lamp lighted.
35	At POWER CONTROL section of MC— Release OFFLINE CONTROL UNIT key.	OFFLINE CONTROL UNIT lamp extinguished. BUS A lamp will light momentarily when CU 0 power is restored, or BUS B lamp will light when CU 1 power is restored.
36	At TTY type in: M CU:DGN!	System response: MR CU DGN b c ATP dd eeeeeee Diagnostics were run on off-line CU and all tests passed (ATP).
37	At SYSTEM STATUS section of MC— Release LOCK CU_ ACTIVE key associated with on-line CU.	At SYSTEM STATUS section of MC— LOCK CU_ ACTIVE lamp extinguished.
38	At TTY type in: M MC:RST!	Diagnostics were run on off-line CU and all tests passed (ATP); MC restored to service and CUs were put in sync. System response: OK.