

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2183 -1 REV:05/16/88

ASSEMBLY :PANEL 013 CRIT.FUNC: 1R
 P/N RI :JANTX1N1204RA CRIT. HOW: 2
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY :3 EFFECTIVITY: X X X
 :THREE, 1/EACH MN DC BUS PHASE(S): PL X LO X OO X DO X LS X
 :CONT CIRCUIT A, B & C

REDUNDANCY SCREEN: A-PASS B-N/A C-PASS

PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES R PHILLIPS DES *R.V. Brown* SSM *W.D. Stapp 8/5/88*
 REL M HOVE REL *Te. Mead C. Hays 7-22-88* REL *W.D. Stapp 8/5/88*
 QE J COURSEN QE *J. Cameron 7-25-88* QE *J. Cameron 7-25-88*

ITEM:

DIODE, ISOLATION, 12 AMP - MAIN DC BUS CONTROL POWER ISOLATION - FUEL CELL AND MAIN DC BUS TIE

FUNCTION:

ISOLATES POWER SOURCE MAIN DC BUS B (C, A) FROM ESSENTIAL BUS 1BC (2CA, 3AB) WHICH REDUNDANTLY SUPPLY CONTROL VOLTAGE TO THE MAIN DC BUS CONTROL FOR CONNECTING/DISCONNECTING FUEL CELL 1 (2, 3) TO MAIN DC BUS A (B, C) AND THE MAIN DC BUS A (B, C) TO THE TIE BUS. 33V73A13CR1, 3, 5

FAILURE MODE:

FAILS OPEN, FAILS TO CONDUCT, SHORTS TO GROUND

CAUSE(S):

STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY EFFECT:

(A) LOSS OF REDUNDANT POWER TO ASSOCIATED FUEL CELL/MAIN DC BUS CONTROL CIRCUITS.

(B,C,D) NO EFFECT - FIRST FAILURE.

(E) SECOND FAILURE (LOSS OF AN ASSOCIATED ESSENTIAL BUS) - POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO "SAFE" A FUEL CELL. LOSS OF THE ASSOCIATED ESSENTIAL BUS RESULTS IN LOSS OF THE ASSOCIATED FUEL CELL COOLANT PUMP AS WELL AS CONTROL OF THAT FUEL CELL'S REACTANT VALVES. THIS NECESSITATES REMOVAL OF ALL LOAD FROM THE FUEL CELL IN ORDER TO RENDER IT SAFE. INABILITY TO REMOVE THE BUS LOAD FROM THE FUEL CELL UNDER THESE CIRCUMSTANCES, WILL RESULT IN FUEL CELL OVERHEATING WITH SUBSEQUENT RUPTURE AND/OR EXPLOSION/FIRE. "B" SCREEN IS N/A DUE TO STANDBY REDUNDANCY.

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DISPOSITION & RATIONALE:

(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE:

A,B,C,D) DISPOSITION AND RATIONALE

REFER TO APPENDIX F, ITEM NO. 2 - DIODE, POWER - STUD MOUNTED

B) GROUND TURNAROUND TEST

VERIFY INTEGRITY OF DIODE BY OPENING ESSENTIAL BUS CIRCUIT BREAKER, AND VERIFY BACKUP MAIN BUS CIRCUIT BREAKER IS CLOSED. CYCLE BUS TIE SWITCH AND MONITOR STIMULI AND MEASUREMENTS FOR PROPER OPERATION. TEST IS PERFORMED FOR ALL FLIGHTS.

E) OPERATIONAL USE

NONE