

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2251 -3 REV:11/19/87

ASSEMBLY :AFT PCA-2 CRIT. FUNC: 1R  
P/N RI :JANTX1N1204RA CRIT. HDW: 2  
P/N VENDOR: VEHICLE 102 103 104  
QUANTITY :2 EFFECTIVITY: X X X  
:TWO PHASE(S): PL LO X OO DO LS  
:1 PER LH2/LO2 FEED DISCONNECT VALVE

REDUNDANCY SCREEN: A-PASS B-PASS C-PASS  
PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
DES JWB J BROWN DES RVB EPDC SSM of O'Quinn's rel. w/ C. S. Tapp  
REL JF DEFENSOR REL M. Ch. Hore 12-5-87 MPS SSM [Signature]  
QE Dm D MASAI QE [Signature] 12/9/87 EPDC REL [Signature] for Mr. Peterson  
MPS REL [Signature] QE [Signature]

ITEM:  
DIODE, CROSSOVER (12 AMP), LH2/LO2 17-INCH FEEDLINE DISCONNECT VALVE,  
CLOSE SOLENOID POWER.

FUNCTION:  
PREVENTS INADVERTENT MDM COMMAND OR PREMATURE HDC I OUTPUT FROM ACTUATING  
CLOSE SOLENOID PREMATURELY. DIODE ISOLATES REDUNDANT POWER BUSES WHICH  
ENERGIZE THE CLOSE SOLENOID FOR THE LH2/LO2 TANK FEED DISCONNECT VALVE.  
ISOLATES REDUNDANT POWER BETWEEN RPC OUTPUTS. 55V76A132A3CR5, A2CR13.

FAILURE MODE:  
SHORTS TO GROUND

CAUSE(S):  
PIECE PART MECHANICAL FAILURE, MECHANICAL SHOCK, THERMAL SHOCK, VIBRATION

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

(A) LOSS OF POWER TO CLOSE SOLENOID - BOTH RPCs WILL TRIP. SERIES RPC  
WILL TRIP DUE TO THE LOAD TERMINAL DIRECTLY CONNECTING TO GROUND;  
PARALLEL RPC WILL TRIP DUE TO THE LOAD TERMINAL CONNECTING TO GROUND  
THROUGH THE HDC III REVERSE BIAS DIODE.

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(B,C,D) POSSIBLE LOSS OF CREW/VEHICLE AFTER THE SECOND FAILURE (DURING ET/ORBITER UMBILICAL RETRACTION, BACKUP MECHANICAL LINKAGE FAILS, PREVENTING FLAPPER CLOSURE) RESULTING IN INABILITY TO CLOSE THE FEED DISCONNECT VALVE PRIOR TO UMBILICAL RETRACTION. FOR NOMINAL, ATO, AND AOA MISSIONS ET SEPARATION IS DELAYED FOR SIX MINUTES TO VENT RESIDUAL PROPELLANT THROUGH FAILED DISCONNECT. THIS IS TO PREVENT ORBITER/ET RECONTACT DUE TO PROPULSIVE VENTING AT SEPARATION. POSSIBLE TILE AND DOOR DAMAGE AT THE ORBITER/ET UMBILICAL AREA DUE TO CRYO IMPACT. FOR RTLS, TAL, AND MISSIONS WHERE OMS BURN CANNOT BE DELAYED ET STRUCTURAL SEPARATION IS INITIATED IMMEDIATELY AND ORBITER/ET RECONTACT IS LIKELY. ALSO RESULTS IN LOSS OF HELIUM SUPPLY DURING MANIFOLD REPRESS CAUSING POSSIBLE LOSS OF CRITICAL AFT COMPARTMENT ENTRY PURGE.

DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE:

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

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION, V41ABO.1500, 1600 EVERY FLIGHT

(E) OPERATIONAL USE

FOR NOMINAL MISSIONS, CREW WILL PERFORM MANUAL ET STRUCTURAL SEPARATION AFTER SIX MINUTE DELAY PERIOD. FOR RTLS, VEHICLE SOFTWARE PERFORMS ET STRUCTURAL SEPARATION AFTER A SIX SECOND (MAXIMUM) DELAY. FOR TAL OR MISSIONS WHERE OMS BURN CANNOT BE DELAYED CREW WILL MANUALLY INITIATE ET STRUCTURAL SEPARATION WITHOUT DELAY.

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