

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2251 -1 REV:11/04/87

ASSEMBLY : AFT PCA-2 CRIT. FUNC: 1R
 P/N RI : JANTXIN1204RA CRIT. HDW: 3
 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-FAIL C-PASS

PREPARED BY:	DES	J BROWN	APPROVED BY:	DES	<i>[Signature]</i>	APPROVED BY (NASA):	EPDC SSM	<i>[Signature]</i>
REL	F DEFENSOR	REL	<i>[Signature]</i>	12-3-87	EPDC REL	<i>[Signature]</i>	MPS REL	<i>[Signature]</i>
QE	D MASAI	QE	<i>[Signature]</i>	11/5/87	MPS REL	<i>[Signature]</i>	QE	<i>[Signature]</i>

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. 55V76A132A2CR13, A3CR5.

FAILURE MODE:

OPEN, FAILS OPEN, FAILS TO CONDUCT

CAUSE(S):

PIECE PART MECHANICAL FAILURE, CONTAMINATION, MECHANICAL SHOCK, VIBRATION, THERMAL STRESS.

EFFECT(S) ON:

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

(A) LOSS OF ONE OF TWO POWER PATHS TO ONE OF TWO HDCs FOR CLOSE SOLENOID OF DISCONNECT VALVE.

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

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(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THIRD FAILURE (SECOND FAILURE - LOSS OF CLOSE COMMAND B OR HDC I OUTPUT CAUSING LOSS OF POWER TO CLOSE SOLENOID. THIRD 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 RTL, 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. FAILS B SCREEN BECAUSE REDUNDANT POWER PATH MASKS FAILURE.

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 - DIODE, POWER-STUD MOUNTED.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION, V4LABO.1500, 1600 EVERY FLIGHT

(E) OPERATIONAL USE

FOR NOMINAL MISSIONS, CREW WILL PERFORM MANUAL ET STRUCTURAL SEPARATION AFTER SIX MINUTE DELAY PERIOD. FOR RTL, 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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