

SHUTTLE CRITICAL ITEMS 1.000 - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2397 -2 REV:04/25/88

ASSEMBLY : MID PCA-1	CRIT. FUNC: 1R
P/N RI : JANTX1N1204RA	CRIT. HDW: 3
P/N VENDOR:	VEHICLE 102 103 104
QUANTITY : 2	EFFECTIVITY: X X X
: TWO	PHASE(S): PL X LO X OO DO LS
:	

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <i>WJ BROWN</i>	DES <i>R. Bessner</i>	EPDC SSM <i>Conradal, [unclear] for w.c. Stagg</i>
REL F DEFENSOR <i>gd</i>	REL <i>Michael Chilton 5-6-88</i>	MPS SSM <i>[unclear] 5-17-88</i>
QE <i>gc for D MASAI</i>	QE <i>L.A. Conner 5-6-88</i>	EPDC REL <i>[unclear] 5/13/88</i>
		MPS REL <i>[unclear] 5/13/88</i>
		QE <i>[unclear]</i>

ITEM:
DIODE, BLOCKING (12 AMP), LH2/LO2 RELIEF SHUTOFF VALVE CLOSE SOLENOID, (LV 24, 25) RPC A OUTPUT.

FUNCTION:
ISOLATES REDUNDANT MAIN BUS POWER TO CLOSE SOLENOID. LOCATED AT RPC A OUTPUT AHEAD OF CLOSE COMMAND B HDC. 40V76A25A2CR6, A2CR11.

FAILURE MODE:
SHORT (END TO END).

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

(A) LOSS OF MAIN BUS ISOLATION. DEGRADATION OF REDUNDANCY AGAINST INADVERTENT DEACTUATION OF CLOSE SOLENOID.

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

SHUTTLE CRITICAL ITEMS LIST - ORBITER

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(E) 1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE.
TIME FRAME - PRELAUNCH AND ASCENT.

1) DIODE SHORTS.

2) FAILURE OF MAIN BUS TO SERIES RPC TRIPS PARALLEL RPC (BY WAY OF
HDC REVERSE BIAS DIODE) CAUSING LO2/LH2 RELIEF SHUTOFF VALVE (PV7/8)
TO OPEN. FEEDLINE RELIEF VALVE (RV5/6) WILL PREVENT OVERBOARD
LEAKAGE OF LO2/LH2 (RELIEF VALVE CRACK PRESSURE IS ABOVE NOMINAL
SYSTEM OPERATING PRESSURE).

3) RELIEF VALVE (RV5/6) FAILS TO REMAIN CLOSED.

LO2/LH2 WILL DUMP OVERBOARD RESULTING IN LOSS OF PROPELLANT AND POSSIBLE
PREMATURE ENGINE SHUTDOWN. FIRE/EXPLOSION HAZARD EXTERIOR TO THE
VEHICLE. POSSIBLE VIOLATION OF ET MINIMUM STRUCTURAL REQUIREMENTS DUE TO
REDUCED ULLAGE PRESSURE. POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN BECAUSE NO INSTRUMENTATION IS AVAILABLE TO DETECT FAILURE.

DISPOSITION & RATIONALE:

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

(A-D) DISPOSITION AND RATIONALE:

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

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION V41AB0.070 K, V41AB0.080 K EVERY
FLIGHT.

(E) OPERATIONAL USE

FLIGHT: NO CREW ACTION CAN BE TAKEN.

GROUND: OMI S1003/S1004 (LO2/LH2 SYSTEM) SEQUENCE TITLED "EMERGENCY
PROCEDURE FOR MAJOR LEAK OR FIRE . . ." CONTAINS SAFING SEQUENCE OF
EVENTS FOR MAJOR LEAKS IN THE PROPELLANT SYSTEMS.