

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - BRAKE/ANTI SKID FMEA NO 05-6BB-2096 -3 REV:03/21/89

ASSEMBLY : FWD PCA-1, 2	CRIT. FUNC: 1R
P/N RI : MC455-0129-0001	CRIT. HDW: 2
P/N VENDOR:	VEHICLE 102 103 104
QUANTITY : SIX	EFFECTIVITY: X X X
: THREE PER CONTROL BOX	PHASE(S): FL LO OO DC X LS
: SIX PER VEHICLE	

PREPARED BY:	REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS	APPROVED BY (NASA):
DES J HERMAN	DES <u>[Signature]</u>	SSM <u>Rudolf Balceron 3/30/89</u>
REL H YEW	REL <u>[Signature]</u>	REL <u>[Signature] 3/30/89</u>
QE W HIGGINS	QE <u>[Signature]</u>	QE <u>[Signature]</u>
		EPDC SSM <u>[Signature]</u>
		EPDC REL <u>[Signature]</u>

ITEM:

RELAY, GENERAL PURPOSE (4P2P) BRAKE SUB-BUS/WEIGHT-ON-WHEELS CIRCUIT POWER. 81V76A22-K9, K12, K13. 82V76A23-K11, K16, K17.

FUNCTION:

PROVIDES THE CAPABILITY TO INHIBIT THE APPLICATION OF BRAKES PRIOR TO WEIGHT-ON-WHEELS BEING SENSED.

FAILURE MODE:

FAILS TO CONDUCT, OPENS, SHORTS TO GROUND. (INDICATES FALSE LANDING GEAR WEIGHT-ON-WHEELS)

CAUSE(S):

VIBRATION, MECHANICAL SHOCK, PIECE PART FAILURE, CONTAMINATION, THERMAL STRESS, PROCESSING ANOMALY

EFFECT(S) ON:

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

(A) FIRST FAILURE - CONTINUOUS WEIGHT ON WHEELS SIGNAL TO BRAKE/SKID CONTROL BOX ASSOCIATED WITH FAILURE.

(B) FIRST FAILURE - FIFTY PERCENT OF BRAKING CAPABILITY IS ENABLED PRIOR TO WEIGHT ON WHEELS.

(C,D) FIRST FAILURE - LOSS OF EITHER RELAY IN THIS MODE WOULD REQUIRE PILOT TO MANUALLY CONTROL THE TIMING OF BRAKE APPLICATION. SECOND FAILURE (UNCOMMANDED BRAKE PRESSURE BEFORE MAIN WHEELS TOUCHDOWN) COULD BLOW A TIRE RESULTING IN POSSIBLE LOSS OF CREW/VEHICLE.

FAILS "B" SCREEN BECAUSE RELAY STATUS IS NOT DETECTABLE IN FLIGHT.

DISPOSITION & RATIONALE:

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

A-D) DISPOSITION AND RATIONALE

REFER TO APPENDIX C, ITEM NO. 2 - GENERAL PURPOSE RELAY.

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(B) GROUND TURNAROUND TEST

VERIFY RELAY CAPABILITY TO INHIBIT THE APPLICATION OF BRAKES PRIOR TO WEIGHT-ON-WHEELS BEING SENSSED BY PERFORMING VERIFICATION OF INBOARD AND OUTBOARD BRAKES 1, 2, 3 AND 4 FOR BOXES A AND B WHEN COMMANDER OR PILOT BRAKE PEDAL IS FULLY DEPRESSED. TESTS ARE PERFORMED FOR EVERY FLIGHT AND LRU REPLACEMENT.

(E) OPERATIONAL USE

AFTER SECOND FAILURE WHERE BRAKE PRESSURE IS GREATER THAN 180 psi, TIME PERMITTING, CREW CAN CLOSE HYDRAULIC LANDING GEAR ISOLATION VALVES (SYSTEM 1 AND 3 OR SYSTEM 2 AND 3). THIS ACTION ISOLATES HYDRAULIC PRESSURE FROM THE BRAKES. AFTER NOSE GEAR TOUCHDOWN, SOFTWARE COMMANDS HYDRAULIC ISOLATION VALVE #3 OPEN THEREBY RECOVERING FULL BRAKING FOR ROLLOUT.