

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE**  
**NUMBER: 05-6-2757 -X**

**SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL**  
**REVISION: 0 05/03/88**

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**PART DATA**

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	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
LRU	: MID MCA-4	V070-764500
LRU	: MID MCA-4	V070-764640
SRU	: RELAY, GENERAL PURPOSE	MC455-0129-0001

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
RELAY, GENERAL PURPOSE, 4 POLE - MID MCA 4 THREE-PHASE PLBM AC BUS 3

**REFERENCE DESIGNATORS:** 40V76A120K30  
40V78A120K42

**QUANTITY OF LIKE ITEMS:** 2  
TWO

**FUNCTION:**  
UPON CREW INITIATED SWITCH COMMANDS, THE CONTACTS OF TWO SERIES RELAYS CONNECT MID MOTOR CONTROL ASSEMBLY #4 AC BUS AC3 (PHASE A, B, AND C) TO PAYLOAD BAY MECHANICAL (PLBM) AC BUS 3 FOR FREON RADIATOR DEPLOY/ LATCH AND REMOTE MANIPULATOR DEPLOY/LATCH MOTORS.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2757 -2 REV:05/03/88

ASSEMBLY :M-MCA-4	CRIT.FUNC: 1R
P/N RI :MC455-0129-0001	CRIT. HDW: 2
P/N VENDOR:	VEHICLE 102 103 104
QUANTITY :2	EFFECTIVITY: X X X
:TWO	PHASE(S): PL LO OO X DO X LS

PREPARED BY:	APPROVED BY:	REDUNDANCY SCREEN: A-PASS B-PASS C-PASS
DES R PHILLIPS	DES <i>W. C. Steg</i>	APPROVED BY (NASA):
REL M HOVE	REL <i>M. J. Hov</i> 5/6/88	SSM <i>W. C. Steg</i> 5/6/88
QE J COURSEN	QE <i>J. J. Lounsbury</i> 5/6/88	REL DIS <i>W. C. Steg</i> 5/6/88

ITEM:  
RELAY, GENERAL PURPOSE, 4 POLE - MID MCA 4 THREE-PHASE PLBM AC BUS 3

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FAILURE MODE:  
SHORTS TO GROUND (CONTACT), SHORT POLE-TO-POLE

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

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

(A) LOSS OF MID MOTOR CONTROL ASSEMBLY #4 THREE-PHASE AC BUS 3 DUE TO TRIPPING OF CB13 ON PANEL MA73C. RESULTS IN LOSS OF PLBM AC BUS 3 AND PLBD AC BUS 3.

(B) LOSS OF REDUNDANCY FOR FUNCTIONS POWERED BY AC BUS 3 IN MID MOTOR CONTROL ASSEMBLY #4. ALL CRITICAL FUNCTIONS HAVE REDUNDANT-MOTORS POWERED FROM A DIFFERENT AC BUS IN A DIFFERENT MID MOTOR CONTROL ASSEMBLY.

(C) POSSIBLE EARLY MISSION TERMINATION WITH LOSS OF REDUNDANCY FOR CLOSING PAYLOAD BAY DOORS.

(D) FIRST FAILURE - NO EFFECT.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2757 -2 REV:05/03/88

EFFECT(S) ON (CONTINUED):

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

(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER SECOND FAILURE (LOSS OF  
REDUNDANT MOTOR OR POWER/CONTROL CIRCUIT) DUE TO INABILITY TO CLOSE  
PAYLOAD BAY DOORS (RESULTING IN AERODYNAMIC STRUCTURAL DAMAGE DURING  
ENTRY) AND/OR TO OPEN VENT DOORS DURING DESCENT (DOOR FAILED CLOSED  
RESULTS IN VEHICLE STRUCTURAL DAMAGE DUE TO PRESSURE DIFFERENTIALS).  
LEFT AND RIGHT VENT DOORS ARE NOT CONSIDERED TO BE REDUNDANT TO EACH  
OTHER. "B" SCREEN PASSES SINCE THE FAILURE CAN BE DETECTED BY CREW  
MONITORING MECHANISM OPERATION TIMES.

DISPOSITION & RATIONALE:

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

A,B,C,D) DISPOSITION AND RATIONALE

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

B) GROUND TURNAROUND TEST

VERIFY MCA OPERATIONAL STATUS INDICATORS ARE "ON" (ALL MOTOR CONTROL  
RELAYS RESET) DURING NO OPERATION OF THE AC MOTOR MECHANISMS. TEST IS  
PERFORMED FOR ALL FLIGHTS.

E) OPERATIONAL USE

CONSIDERATION WILL BE GIVEN TO STOWING MECHANISMS WITH THE LOSS OF  
REDUNDANCY. LOSS OF REDUNDANT PAYLOAD BAY DOOR CLOSE CAPABILITY  
INVOKES A MINIMUM DURATION FLIGHT. FOR LOSS OF REDUNDANT VENT DOOR  
OPEN CAPABILITY, OPEN VENT DOORS PRIOR TO ENTRY. "