

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE
NUMBER: 05-6-2754 -X**

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

PART DATA

| | PART NAME | PART NUMBER |
|-----|--------------------------|----------------------|
| | VENDOR NAME | VENDOR NUMBER |
| LRU | : MID MCA-3 | V070-764550 |
| LRU | : MID MCA-3 | V070-764630 |
| SRU | : RELAY, GENERAL PURPOSE | MC455-0129-0001 |

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
RELAY, GENERAL PURPOSE, 4 POLE - MID MCA 3 THREE-PHASE PLBM AC BUS 1

REFERENCE DESIGNATORS: 40V76A119K7
40V76A119K9

QUANTITY OF LIKE ITEMS: 2
TWO

FUNCTION:
UPON CREW INITIATED SWITCH COMMANDS, THE CONTACTS OF TWO SERIES RELAYS CONNECT MID MOTOR CONTROL ASSEMBLY #3 AC BUS AC1 (PHASE A, B, AND C) TO PAYLOAD BAY MECHANICAL (PLBM) AC BUS 1 FOR FREON RADIATOR DEPLOY/ LATCH AND REMOTE MANIPULATOR LATCH MOTORS.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2754 -2 REV:05/03/88

| | | | | |
|-------------------------|--------------|-----|-----|---------------|
| ASSEMBLY :M-MCA-2 | | | | CRIT.FUNC: 1R |
| P/N RI :MC495-0129-0001 | | | | 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: | | REDUNDANCY SCREEN: A-PASS B-PASS C-PASS | |
| DES R PHILLIPS | APPROVED BY: | APPROVED BY (NASA): | |
| REL M HOVE | DES <i>R. Burns</i> | SSM <i>J.C. Stang 5/12/88</i> | |
| QE J COURSEN | REL <i>Madison C. Clayton 5-6-88</i> | REL <i>Wendell Woodard 5/16/88</i> | |
| | QE <i>J. Courson 5/6/88</i> | QE <i>J. Courson 5/6/88</i> | |

ITEM:

RELAY, GENERAL PURPOSE, 4 POLE - MID MCA 3 THREE-PHASE PLBM AC BUS 1

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FAILURE MODE:

SHORTS TO GROUND (CONTACT), SHORTS 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 #3 THREE-PHASE AC BUS 1 DUE TO TRIPPING OF CB3 ON PANEL MA73C. RESULTS IN LOSS OF PLBM AC BUS 1 AND PLBD AC BUS 1.

(B) LOSS OF REDUNDANCY FOR FUNCTIONS POWERED BY AC BUS 1 IN MID MOTOR CONTROL ASSEMBLY #3. 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 LATCHING PAYLOAD BAY DOORS.

(D) FIRST FAILURE - NO EFFECT.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2754 -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 LATCH
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 REDUNDANCY FOR CLOSING CENTERLINE PLEO LATCHES
INVOKES A MINIMUM DURATION FLIGHT. FOR LOSS OF REDUNDANT VENT DOOR
OPEN CAPABILITY, OPEN VENT DOORS PRIOR TO ENTRY.