

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - P/L RETENTION FMEA NO 05-6IE -2003 -2 REV:06/26/88

ASSEMBLY : M-MCA 1 AND 3 CRIT. FUNC: 1R
 P/N RI : MC455-0135-0001 CRIT. HDW: 2
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 60 EFFECTIVITY: X X X
 : SIXTY, 30/M-MCA-1 AND 30/ PHASE(S): PL LO OO DO X LS
 : M-MCA-3

REUNDANCY SCREEN: A-PASS B-PASS C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES C ODEGARD DES C. Odegard 7-7-88 R. Bussan SSM 7/12/88
 REL H YEW REL J. Kenna REL [Signature]
 QE J COURSEN QE Sum Coursen 7-8-88 QE [Signature]

EPD&C [Signature] 7/14/88
 EPD&C REL [Signature] 7/20/88

ITEM:
 HYBRID RELAY, PAYLOAD RETENTION LATCH/RELEASE CONTROL

FUNCTION:
 RELAY CONDUCTS 3 PHASE POWER TO THE ACTUATOR DRIVE MOTOR FOR LATCHING OR
 RELEASING THE PAYLOAD. 40V76A117K13,17,24,25,27,29,34,36-39,41,46-53,55-
 65,73,74,77, 40V76A119K5,17,19,21,31-36,43-48,55-58,67-70,73,75,79-82

FAILURE MODE: INADVERTENT OUTPUT (FAILS ON, FAILS TO DE-ENERGIZE)

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

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

(A) FIRST FAILURE - CONTINUOUS UNCOMMANDED DRIVE TO ONE OF TWO ACTUATOR
 DRIVE MOTORS WHEN THREE PHASE AC POWER IS ON. WHEN LATCH IS COMMANDED TO
 DRIVE IN THE OPPOSITE DIRECTION, THE AC CIRCUIT BREAKER AT THE ASSOCIATED
 SYSTEM WILL TRIP AND LATCH WILL OPERATE ON A SINGLE MOTOR AT INCREASED
 OPERATING TIME.

(B) FIRST FAILURE - NONE

(C) FIRST FAILURE - NO EFFECT. SECOND FAILURE (FAILURE OF REDUNDANT
 SYSTEM) - POSSIBLE LOSS OF MISSION DUE TO LOSS OF CAPABILITY TO DRIVE
 LATCHES.

(D) FIRST FAILURE - NO EFFECT. SECOND FAILURE (FAILURE OF REDUNDANT
 SYSTEM) - FAILURE OF RELEASE RELAY WOULD CAUSE THE PAYLOAD TO BE LEFT
 UNSECURED RESULTING IN VEHICLE DAMAGE AND POSSIBLE LOSS OF CREW/VEHICLE
 UPON RE-ENTRY.

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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. 1 - HYBRID RELAY

(B) GROUND TURNAROUND TEST

VERIFY THAT HYBRID RELAYS OPERATE PROPERLY AS THEY ARE TURNED ON/OFF THROUGHOUT ALL LATCHES WITH THE FOLLOWING POWER ON: MAIN A AND B, LOGIC POWER, AB1,BC1 AND AC BUS. TEST INCLUDES VISUAL AND AUDIO CHECK THAT NO BINDING/JAMMING OF LATCH OCCURS DURING LATCH AND RELEASE PROCESS. CHECK THAT NO OTHER "LATCHED" OR "RELEASED" INDICATOR LIGHT CHANGES.

(E) OPERATIONAL USE

THE CIRCUIT BREAKER OF THE ASSOCIATED MOTOR CAN BE PULLED AND THE LATCH CAN BE DRIVEN WITH REDUNDANT MOTOR IN DESIRED DIRECTION AT INCREASED OPERATING TIME. IF SECOND FAILURE OCCURS DURING LATCH/RELEASE PROCESS FOR LIGHTWEIGHT OR MIDDLEWEIGHT LONGERON LATCHES, AN EVA CAN BE PERFORMED TO MANUALLY DRIVE THE LATCHES.