

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - FWD-RCS FMEA NO 05-6KF-2254 -1 REV: 11/03/87

ASSEMBLY : FWD MCA 1 CRIT. FUNC: 1R
 P/N RI : JANTXV1N4246 CRIT. HDW: 2
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 4 EFFECTIVITY: X X X
 : FOUR PHASE(S): PL X LO X OO X DO X LS X
 :

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA)
 DES D SOVEREIGN DES *D.S. R. Bump* SSM
 REL J BEEKMAN REL *M. J. ... 11-14-87* REL *...*
 QE *...* QE *...*
 EPD&C 544 *...*
 Feb 10 1988

ITEM:
 BLOCKING DIODE - FORWARD RCS FUEL AND OXIDIZER TANK ISOLATION VALVES -
 3/4/5 CONTROL CIRCUITS (LIMIT SWITCH).

FUNCTION:
 PROVIDES BLOCKING BETWEEN DUAL STIMULI (FROM VALVE LIMIT SWITCHES AND
 MANUAL SWITCHES) TO HYBRID RELAY LOGIC INHIBIT INPUTS FOR THE CONTROL OF
 3 PHASE AC VOLTAGE TO THE FUEL AND OXIDIZER TANK ISOLATION VALVE 3/4/5
 DRIVE MOTORS. 81V76A111A1CR2, 4, 24, 25.

FAILURE MODE:
 OPEN, FAILS TO CONDUCT, HIGH RESISTANCE.

CAUSE(S):
 THERMAL STRESS, MECHANICAL SHOCK, VIBRATION.

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
 (A) THE ASSOCIATED VALVE DRIVE CIRCUIT IS ENERGIZED CONTINUOUSLY IN THE
 SELECTED (OPEN OR CLOSE) MANUAL SWITCH POSITION.
 (B) "OPEN" SIDE - CONTINUOUS POWER WILL BE APPLIED TO THE AFFECTED
 ISOLATION VALVE COIL. "CLOSE" SIDE - NO EFFECT, REQUIRES SECOND RELAY
 TO BE ENERGIZED BEFORE CONTINUOUS POWER IS APPLIED TO VALVE COIL.
 (D) NO EFFECT FIRST FAILURE - NEXT FAILURE COULD RESULT IN A HAZARDOUS
 CONDITION.
 (E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO
 VALVE CONTINUOUS POWER IN CONJUNCTION WITH A BELLOWS LEAK LEADING TO
 VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES 1 OTHER FAILURE (BELLOWS
 LEAK) BEFORE EFFECT IS MANIFESTED. A BELLOWS LEAK IS UNDETECTABLE
 EXCEPT BY PERFORMING A SNIFF CHECK OF THE VALVE'S ACTUATOR ON THE GROUND

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DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE REFER TO APPENDIX F, ITEM NO. 3 - DIODE.

(B) GROUND TURNAROUND TEST

COMPONENT CHECKED OUT EVERY FLIGHT DURING GROUND TURNAROUND. THE TESTING CONSISTS OF CYCLING VALVE MANUAL SWITCHES AND/OR SENDING GENERAL PURPOSE COMPUTER (GPC) COMMANDS TO CYCLE VALVES OR HEATERS WHILE MONITORING VEHICLE INSTRUMENTATION TO DETERMINE IF COMPONENTS HAVE FAILED.

(E) OPERATIONAL USE

REMOVE POWER FROM RELAY BY PLACING MANUAL SWITCH IN GPC (GENERAL PURPOSE COMPUTER) POSITION.