

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - FWD-RCS FMEA NO 05-6KF-2212 -2 REV: 11/03/87

ASSEMBLY : FWD LCA 3 CRIT. FUNC: 1R  
 P/N RI : MC477-0261-0002 CRIT. HDW: 3  
 P/N VENDOR: VEHICLE 102 103 104  
 QUANTITY : 1 EFFECTIVITY: X X X  
 : ONE PHASE(S): PL X LO X OO X DO X LS X  
 :

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS  
 PREPARED BY: DES D SOVEREIGN APPROVED BY: DES D.S. Quinn APPROVED BY (NASA):  
 REL J BEEKMAN REL M. J. Quinn SSM [Signature]  
 QE [Signature] REL [Signature] QE [Signature]

ITEM:  
 HYBRID DRIVER CONTROLLER (HDC) TYPE I - FORWARD RCS FUEL AND OXIDIZER MANIFOLD 5 ISOLATION VALVES ("CLOSE" COMMANDS).

FUNCTION:  
 UPON COMMAND FROM EITHER THE GENERAL PURPOSE COMPUTER (GPC) OR MANUAL SWITCHES, THE DRIVER CONDUCTS SENDING A STIMULUS TO THE RELATED REMOTE POWER CONTROLLER TO ENERGIZE THE "CLOSE" SOLENOID COILS OF THE FORWARD RCS FUEL AND OXIDIZER MANIFOLD 5 ISOLATION VALVES. 83V76A18AR(J4-71).

FAILURE MODE:  
 INADVERTENT OUTPUT, SHORTS, CONDUCTS PREMATURELY.

CAUSE(S) :  
 CONTAMINATION, PIECE PART FAILURE, MECHANICAL AND THERMAL SHOCK, VIBRATION.

EFFECT(S) ON:  
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE  
 (A) THE ASSOCIATED REMOTE POWER CONTROLLER IS ENABLED TO CONDUCT.  
 (B) NO EFFECT - REQUIRES ADDITIONAL FAILURES BEFORE SOLENOID CIRCUIT CAN BE ENERGIZED CONTINUOUSLY.  
 (C,D) NO EFFECT.  
 (E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO VALVE OVERHEATING AND PROPELLANT DECOMPOSITION BY CONTINUOUS SOLENOID COIL POWERING LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES TWO OTHER FAILURES (TYPE III "CLOSE" DRIVER ON, TYPE IV OPEN/CLOSE DRIVE ON) BEFORE EFFECT IS MANIFESTED. THE FAILURE STRING COULD BE UNDETECTABLE AFTER THE FIRST FAILURE DUE TO LACK OF MEASUREMENT INDICATIONS FOR THE TYPE III AND TYPE IV HYBRID DRIVERS.

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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 B, ITEM NO. 1 - HYBRID DRIVER.

(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

NO ACTION FOR FIRST FAILURE - NOT DETECTABLE. IF CONTINUOUS POWER SITUATION EXISTS, REMOVE POWER FROM GROUND DRIVER BY PULLING CIRCUIT BREAKER. CIRCUIT BREAKER WILL BE RESET WHEN THE VALVE IS TO BE MOVED.