

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - FWD-RCS

FMEA NO 05-6KF-2211 -2

REV: 11/03/87

ASSEMBLY : FWD LCA 3  
 P/N RI : MC477-0261-0002  
 P/N VENDOR:  
 QUANTITY : 1  
 : ONE  
 :

|              |      |      |                |
|--------------|------|------|----------------|
| VEHICLE      | 102  | 103  | 104            |
| EFFECTIVITY: | X    | X    | X              |
| PHASE(S):    | PL X | LO X | OC X DO X LS X |

CRIT. FUNC: 1R  
 CRIT. HDW: 3

PREPARED BY:  
 DES D SOVEREIGN  
 REL J BEEKMAN  
 QE

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS  
 APPROVED BY:  
 DES D.S. R. Breen  
 REL M. J. ... 11-16-87  
 QE ...

APPROVED BY (NASA):  
 SSM  
 REL ...  
 QE ...  
 EPD&C SSM ...  
 Frank C. ...

ITEM:

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

FUNCTION:

UPON COMMAND FROM THE ASSOCIATED SOURCE (GENERAL PURPOSE COMPUTER (GPC) OR MANUAL SWITCH), THE SELECTED DRIVER CONDUCTS, SENDING A STIMULUS TO A RELATED REMOTE POWER CONTROLLER TO ENERGIZE THROUGH A SERIES HYBRID DRIVER THE "OPEN" SOLENOID COILS OF THE FORWARD RCS FUEL AND OXIDIZER MANIFOLD 5 ISOLATION VALVES. 83V76A18AR(J4-51).

FAILURE MODE:

INADVERTENT OUTPUT, SHORTS, CONDUCTS PREMATURELY.

CAUSE(S):

CONTAMINATION, PIECE PART SHOCK, VIBRATION. FAILURE, MECHANICAL AND THERMAL

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 - OTHER COMPONENTS IN THE SOLENOID CIRCUIT MUST CONDUCT BEFORE THE CIRCUIT IS ENERGIZED AND VALVE FAILS OPEN.

(C, D) NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO VALVE OVER-HEATING AND PROPELLANT DECOMPOSITION BY CONTINUOUS SOLENOID COIL POWERING LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES 2 OTHER FAILURES (TYPE III "OPEN" DRIVER CN, TYPE IV "OPEN/CLOSE" DRIVER 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.