SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - FWD-RCS  FMEA NO 05-6KF-2224 -2  REV:11/03/87

ASSEMBLY :FWD LCA 3
P/N RI :MC477-0264-0002
P/N VENDOR:
QUANTITY :1
:ONE
:

CRIT. FUNC: 1R
CRIT. HDW: 3

| VEHICLE EFFECTIVITY: | 102 | 103 | 104 |
|---|---|---|---|
| | X | X | X |

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
REL J BEEKMAN
QE

APPROVED BY:
DES
REL
QE

APPROVED BY (NASA):
SSM
REL
QE

ITEM:
HYBRID DRIVER CONTROLLER (HDC) TYPE IV - FORWARD RCS FUEL AND OXIDIZER MANIFOLD 5 ISOLATION VALVE "OPEN/CLOSE" POWER GROUND CIRCUITS.

FUNCTION:
UPON COMMAND FROM THE MANUAL SWITCH OR GENERAL PURPOSE COMPUTER (GPC) INITIATED SIGNALS, THE DRIVER CONDUCTS AND COMPLETES THE CIRCUIT TO GROUND FOR BOTH THE "OPEN" AND "CLOSE" SOLENOID COILS, IN CONJUNCTION WITH OTHER SERIES ELEMENTS. 83V76A18AR(J5-G).

FAILURE MODE:
INADVERTENT OUTPUT, SHORT, INADVERTENTLY CONDUCTS

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

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

(A) DEGRADATION OF REDUNDANCY AGAINST AN INADVERTENT SOLENOID COIL POWERING.

(B) NO EFFECT - OTHER SERIES ELEMENTS MUST BE CONDUCTING BEFORE THE VALV SOLENOID COIL IS ENERGIZED TO CHANGE THE VALVE POSITION.

(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 2 OTHER FAILURES (TYPE I "OPEN" DRIVER ON, TYPE III "OPEN" DRIVER ON). 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.