

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AUXILIARY PWR FMEA NO 05-6N -2014A -2 REV: 10/07/91

ASSEMBLY : APT LCA 1,2,3 CRIT. FUNC: 1F  
P/N RI : MC477-0264-0002 CRIT. HDW: 3  
P/N VENDOR: VEHICLE 102 103 104 10  
QUANTITY : 6 EFFECTIVITY: X X X )  
: SIX PHASE(S): PL X LO OO X DO LS X  
:

REDUNDANCY SCREEN: A-PASS B-FAIL C-PAS

PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
DES T NGUYEN DES S.M. Lindell 10-15-91 SSM J.W. Brown 1-24  
REL T KIMURA REL Memo Cl. Date 10-16-91 REL 10/16/91  
QE W R HIGGINS QE 10-17-91 QE Ko [Signature] 11/11  
EPD&C REL [Signature]  
EPD&C SSM [Signature]

ITEM:  
CONTROLLER, HYBRID DRIVER, HDC TYPE 4 - AUXILIARY POWER UNIT (APU) FUEL TANK 1, 2, AND 3 ISOLATION VALVE CONTROL

FUNCTION:  
SERIES GROUND DRIVER IN EACH APU FUEL TANK 1, 2, AND 3 ISOLATION VALVE CONTROL CIRCUITS WHICH PROVIDE OPERATIONAL PROTECTION AGAINST SINGLE FAILURES THAT COULD ENERGIZE A VALVE DURING PERIODS OF APU NONOPERATION  
54V76A121AR(J6-a), (J6-HH);  
55V76A122AR(J6-a), (J6-b);  
56V76A123AR(J6-a), (J6-b)

FAILURE MODE:  
INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF"

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

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

(A) DEGRADATION OF REDUNDANCY AGAINST INADVERTENT ENERGIZING OF FUEL TANK ISOLATION VALVE SOLENOID.

(B) NO EFFECT - FIRST FAILURE. REDUNDANT SERIES DRIVERS WILL PRECLUDE INADVERTENT ENERGIZING OF THE ASSOCIATED VALVE SOLENOID. A THIRD SIMILAR FAILURE IN THE SAME CIRCUIT COULD ALLOW SOLENOID ENERGIZING AND OVERHEATING ON ORBIT WHEN APU FLOW COOLING IS ABSENT.

(C,D) NO EFFECT - FIRST FAILURE.

(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER TWO OTHER FAILURES (HDC-3 POWER DRIVERS FAILED "ON") DUE TO FUEL (HYDRAZINE) DECOMPOSITION AND VALVE/LINE RUPTURE. *series*

FIRST FAILURE NOT DETECTABLE IN FLIGHT SINCE THE OUTPUT OF THE SERIES GROUND DRIVERS IS NOT MONITORED.

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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 B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

(B) TEST

GROUND TURNAROUND TEST - FUEL ISOLATION VALVE CIRCUIT CHECK WITHOUT BUS DROPS PERFORMED DURING ORBITER MAINTENANCE DOWN PERIOD (OMDP), NOT TO EXCEED 10 FLIGHT INTERVALS.

(E) OPERATIONAL USE

NONE (THE CONTROL LOGIC CIRCUIT BREAKER WILL NOT CORRECT - A FAILED ON DRIVER).