

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - OMS

FMEA NO 05-6L -2256A -1

REV: 10/30/87

ASSEMBLY : AFT MCA 1,3  
 P/N RI : JANTXVIN4246  
 P/N VENDOR:  
 QUANTITY : 16  
 : SIXTEEN  
 : (TWO PER VALVE)

VEHICLE	102	103	104
EFFECTIVITY:	X	X	X
PHASE(S):	PL X	LO X	OO X
	DO X	LS X	

CRIT. FUNC: 1R  
 CRIT. HDW: 3

PREPARED BY:  
 DES D SOVEREIGN  
 REL F DEFENSOR  
 QE J COURSEN

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS  
 APPROVED BY: APPROVED BY (NASA):  
 DES DE R. B... SSM John Mac...  
 REL ... REL ...  
 QE ... QE ...

*EPD&C SSM Approval for u.c. Stage*

ITEM:

DIODE, BLOCKING (LAMP), OMS LEFT AND RIGHT, FUEL AND OXIDIZER TANK ISOLATION VALVE A AND B RELAY "OPEN" INHIBIT CONTROL CIRCUITS. ("CLOSE" MANUAL SWITCH INHIBIT DIODE).

FUNCTION:

PROVIDES INHIBIT INPUT FROM "CLOSE" MANUAL SWITCH TO THE "OPEN" HYBRID RELAY AND PROVIDES BLOCKING FROM THE "OPEN" LIMIT SWITCH TO THE "CLOSE" MANUAL SWITCH FOR THE CONTROL OF THREE PHASE AC MOTOR THAT ACTIVATES THE OMS LEFT AND RIGHT, FUEL AND OXIDIZER TANK ISOLATION VALVE A AND B. FOR OV-102: VALVE A; RIGHT - 54V76A114A1CR36, 37, 110, 112; LEFT - 54V76A114A1CR38, 39, 59, 60. VALVE B; RIGHT - 56V76A116A2CR33, 34, 54, 59. LEFT - 56V76A11A2CR21, 22, 37, 38. FOR OV-103 AND SUBSEQUENT: VALVE A; RIGHT - 54V76A114A1CR40, 41, A2CR34, 49. 54V76A114A3CR42, 43, 71, 72. VALVE B; RIGHT - 56V76A116A2CR33, 34, A3CR32, 44. LEFT - 56V76A116A3CR11, 12, 26, 27.

FAILURE MODE:

OPENS, FAILS TO CONDUCT, HIGH RESISTANCE. (COCKPIT SWITCH IN THE "CLOSE" POSITION.)

CAUSE(S):

CONTAMINATION, THERMAL STRESS, MECHANICAL SHOCK, VIBRATION.

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY

(A) DISABLES "OPEN" INHIBIT SIGNAL OF "CLOSE" MANUAL SWITCH.

(B) NO EFFECT.

(C) NO EFFECT.

(D) NO EFFECT.

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(E) POSSIBLE LOSS OF CREW/ VEHICLE DUE TO CHATTERING ACTION OF THE ASSOCIATED AC MOTOR VALVE ABOUT ITS "CLOSE" POSITION BECAUSE OF THE CYCLIC OPENING AND CLOSING OF THE "CLOSE" CONTACTS OF THE LIMIT SWITCH. CYCLIC ENERGIZING OF AC MOTOR VALVE DRIVE IN CONJUNCTION WITH BELLOW LEAK MAY LEAD TO POSSIBLE DETONATION CONDITION. REQUIRES TWO OTHER FAILURES ("CLOSE" RELAY INHIBIT DIODE FROM MANUAL "OPEN" SWITCH FAILS SHORT, BELLOW LEAK) BEFORE THE EFFECT IS MANIFESTED. FAILURE IS NOT DETECTABLE IN FLIGHT DUE TO LACK OF MONITORING MEASUREMENTS. BELLOW LEAK NOT DETECTABLE IN FLIGHT.

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

V43CAO.070 - REDUNDANT CIRCUIT VERIFICATION (PERIODIC) - ORB/POD; PERFORMED FOR FIRST FLIGHT AND AT FIVE FLIGHT INTERVALS OR FOR LRU RETEST PER FIGURE V43Z00.000 OR FOR ORBITER DISRUPTED COPPER PATHS. FUNCTIONAL CHECKOUT OF HEATER CONTROL CIRCUITS PER FIGURE V43CAO.070-6.

V43CAO.072 - REDUNDANT CIRCUIT VERIFICATION; PERFORMED EACH FLIGHT (AFTER FIRST FLIGHT). FUNCTIONAL CHECKOUT OF AC MOTOR VALVE CONTROL CIRCUITS PER FIGURE V43CAO.070-2.

V43CBO.165 - AC MOTOR VALVE ACTUATOR SNIFF CHECK; PERFORMED EACH FLIGHT. ALL AC MOTOR VALVE ACTUATORS CHECKED FOR PRESENCE OF PROPELLANT VAPORS.

V43CFO.010 - PROPELLANT SERVICING TO FLIGHT LOAD; PERFORMED EACH FLIGHT. ALL AC MOTOR VALVES CYCLED DURING LOADING OPERATION.

(E) OPERATIONAL USE

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