

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - OMS FMEA NO 05-6L -2260B -2 REV: 10/30/87

ASSEMBLY : AFT MCA 1,2,3 CRIT. FUNC: 1R
 P/N RI : JANTXV1N4246 CRIT. HDW: 3
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 16 EFFECTIVITY: X X X
 : SIXTEEN PHASE(S): PL X LO X OO X DO X LS X
 : (TWO PER VALVE)

REUNDANCY SCREEN: A-PASS B-FAIL C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES D SOVEREIGN DES *D.S. R. B...* SSM *John Thomas...*
 REL F DEFENSOR REL *Paul M...* REL *...*
 QE J COURSEN QE *...* QE *...*
EPD&C SSM Approved for use stage

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

FUNCTION:
 PROVIDES INHIBIT INPUT FROM THE "OPEN" MANUAL SWITCH TO THE "CLOSE" HYBRID RELAY AND PROVIDES BLOCKING FROM THE "CLOSE" LIMIT SWITCH TO THE "OPEN" MANUAL SWITCH FOR THE CONTROL OF THREE PHASE AC MOTOR THAT ACTUATES THE OMS LEFT AND RIGHT FUEL AND OXIDIZER CROSSFEED ISOLATION VALVE A AND B. FOR OV-102 - VALVE A; RIGHT - 56V76A116A2CR16, 29, 80, 85; LEFT - 54V76A114A1CR20, 31, 85, 86. VALVE B; RIGHT - 55V76A115A2CR14, 17, 18, 25; LEFT - 55V76A115A1CR25, 26, 27, 28. FOR OV-103 AND SUBSEQUENT: VALVE A; RIGHT - 56V76A116A2CR15, 16, 70, 75; LEFT - 54V76A114A1CR62, 67, 98, 99. VALVE B; RIGHT - 55V76A115A1CR57, 61, 82, 83; LEFT - 55V76A115A1CR14, 15, 16, 17.

FAILURE MODE:
 SHORTS, INTERNAL SHORT, LOW BACK RESISTANCE.
 (COCKPIT SWITCH IN THE "OPEN" 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) LOSS OF ISOLATION BETWEEN MANUAL "OPEN" SWITCH AND "CLOSE" LIMIT SWITCH FOR "CLOSE" RELAY INHIBIT CIRCUIT.
 (B) NO EFFECT.
 (C) NO EFFECT.
 (D) NO EFFECT.

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(E) POSSIBLE LOSS OF CREW/VEHICLE DUE TO CHATTERING OF AC MOTOR VALVE ABOUT THE "OPEN" POSITION OF THE VALVE DUE TO THE CYCLIC OPENING AND CLOSING OF THE "OPEN" CONTACTS OF THE LIMIT SWITCH. CYCLIC ENERGIZING OF MOTOR VALVE DRIVE IN CONJUNCTION WITH BELLOWS LEAK MAY LEAD TO POSSIBLE DETONATION CONDITION, RESULTING IN VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES TWO OTHER FAILURES ("OPEN" RELAY INHIBIT DIODE OF MANUAL "CLOSE" SWITCH FAILS SHORT, BELLOWS LEAK) BEFORE THE EFFECT IS MANIFESTED. FAILURE NOT READILY DETECTABLE IN FLIGHT DUE TO LACK OF MONITORING MEASUREMENTS. BELLOWS 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 LRC RETEST PER FIGURE V43Z00.000 OR FOR ORBITER DISRUPTED COPPER PATHS. FUNCTIONAL CHECKOUT OF AC MOTOR VALVE CONTROL CIRCUITS PER FIGURE V43CAO.070-2.

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.

(E) OPERATIONAL USE

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