

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - OMS

FMEA NO 05-6L -2259 -1

REV: 10/30/87

ASSEMBLY : AFT MCA 1,2,3

P/N RI : JANTXV1N4246

P/N VENDOR:

QUANTITY : 16

: SIXTEEN

: (TWO PER VALVE)

CRIT. FUNC: 1R

CRIT. HDW: 3

VEHICLE 102 103 104

EFFECTIVITY: X X X

PHASE(S): PL X LO X OO X DO X LS X

PREPARED BY:

DES D SOVEREIGN

REL F DEFENSOR

QE J COURSEN

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

APPROVED BY: *D.S. R. Bunn* APPROVED BY (NASA):

DES *D.S. R. Bunn* SSM *John Terry*

REL *D.S. R. Bunn* REL *John Terry*

QE *D.S. R. Bunn* QE *John Terry*

EPD&C OMS for w.e. stagg

ITEM:

DIODE, BLOCKING (1AMP), OMS LEFT AND RIGHT, FUEL AND OXIDIZER CROSSFEED ISOLATION VALVE A AND B RELAY "CLOSE" INHIBIT CONTROL CIRCUITS. ("CLOSE" LIMIT SWITCH INHIBIT DIODE).

FUNCTION:

PROVIDES INHIBIT INPUT FROM THE "CLOSE" LIMIT SWITCH TO THE "CLOSE" HYBRID RELAY AND PROVIDES BLOCKING FROM THE "OPEN" MANUAL SWITCH TO THE "CLOSE" LIMIT SWITCH FOR THE CONTROL OF THREE PHASE AC MOTOR THAT ACTUATES THE OMS LEFT AND RIGHT FUEL AND CROSSFEED ISOLATION VALVE A AND B. FOR OV-102; VALVE A; RIGHT - 56V76A116A2CR2, 39, 66, 91. LEFT - 54V76A115A1CR6, 42, 99, 100. VALVE B; RIGHT - 55V76A115A2CR2, 5, 6, 36. LEFT - 55V76A115A1CR31, 32, 33, 34. FOR OV-103 AND SUBSEQUENT; VALVE A; RIGHT - 56V76A116A2CR6, 7, 69, 76. LEFT - 54V76A114A1CR45, 73, 113, 114. VALVE B; RIGHT - 55V76A115A1CR46, 66, 75, 76. LEFT - 55V76A115A1CR6, 7, 8, 9.

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

(A) FIRST FAILURE HAS NO EFFECT.

(B) FIRST FAILURE HAS NO EFFECT. ASSOCIATED AC MOTOR VALVE DRIVE "CLOSE" CIRCUIT REQUIRES CLOSURE OF TWO SETS OF RELAY CONTACTS IN SERIES BEFORE THE DRIVE IS ENERGIZED. A SECOND SIMILAR FAILURE WOULD CONTINUOUSLY ENERGIZE THE ASSOCIATED "CLOSE" CIRCUIT VALVE DRIVE. THERMAL SWITCH IN VALVE WILL INTERRUPT POWER ON A CYCLIC BASIS.

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(C,D) NO EFFECT FIRST FAILURE.

(E) POSSIBLE LOSS OF CREW/VEHICLE DUE TO CONTINUOUS MOTOR OPERATION IN CONJUNCTION WITH A BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. DECOMPOSITION AND POTENTIAL FOR IGNITION EXISTS. REQUIRES TWO OTHER FAILURES (INHIBIT DIODE OF THE SERIES RELAY FAILS OPEN, BELLOWS LEAK) BEFORE THE EFFECT IS MANIFESTED. FAILURE IS 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 LRU 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 COMPUTER (GPC) POSITION.