

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - OMS FMEA NO 05-6L -2256 -1 REV: 03/14/86

ASSEMBLY : AFT MCA 1,3 CRIT. FUNC: 1R  
P/N RI : JANTXVIN4246 CRIT. HDW: 2  
P/N VENDOR: VEHICLE 102 103 104  
QUANTITY : 16 EFFECTIVITY: X X X  
: SIXTEEN PHASE(S): PL X LO X CO X DO X LS X  
: (TWO PER VALVE)

REDUNDANCY SCREEN: A-PASS B-FAIL C-PAS:  
PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
DES D SOVEREIGN DES *D.S. R. Brown* SSM *John L. ...*  
REL F DEFENSOR REL *...*  
QE J COURSEN QE *...*

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

FUNCTION:  
PROVIDES INHIBIT INPUT FROM THE "OPEN" LIMIT SWITCH TO THE "OPEN" HYBRID RELAY AND PROVIDES BLOCKING FROM THE "CLOSE" MANUAL SWITCH TO THE "OPEN" LIMIT SWITCH FOR THE CONTROL OF THREE PHASE AC MOTOR THAT ACTUATES THE OMS LEFT AND RIGHT, FUEL AND OXIDIZER TANK ISOLATION VALVE A AND B. FOR OV-102 - VALVE A: RIGHT - 54V76A114A1CR47, 48, 98, 114. LEFT - 49, 57, 73, 74. VALVE B: RIGHT - 56V76A116A2CR43, 44, 50, 73. LEFT - 7, 8, 44, 48. FOR OV-103 AND SUBSEQUENT; VALVE A: RIGHT - 54V76A114A1CR52, 5A2CR21, 55. LEFT - 54V76A114A1CR54, 55, 77, 78. VALVE B: RIGHT - 56V76A116A2CR19, 20, A3CR19, 48. LEFT - 56V76A116A3CR4, 5, 14, 15.

FAILURE MODE:  
OPENS, FAILS TO CONDUCT, HIGH RESISTANCE.  
(COCKPIT SWITCH IN THE "OPEN" SWITCH.)

CAUSE(S):  
CONTAMINATION, THERMAL STRESS, MECHANICAL SHOCK, VIBRATION.

EFFECT(S) ON:  
(A) SUBSYSTEM CRITICALITY (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONALITY  
(A) LOSS OF INHIBIT SIGNAL TO THE "OPEN" HYBRID RELAY CAUSING THE ASSOCIATED AC MOTOR VALVE DRIVE "OPEN" CIRCUIT TO BE CONTINUOUSLY ENERGIZED.  
(B) CONTINUOUS POWER IS APPLIED TO THE ASSOCIATED AC DRIVE MOTOR RESULTING IN INCREASED HEATING BUT MAINTAINING THE ASSOCIATED TANK ISOLATION VALVE IN ITS NORMAL POSITION. THERMAL SWITCHES IN VALVE WILL INTERRUPT POWER ON A CYCLIC BASIS.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - OMS

FMEA NO 05-6L -2256 -1

REV:03/14/8

(C,D) FIRST FAILURE HAS NO EFFECT.

(E) POSSIBLE LOSS OF CREW/VEHICLE DUE TO CONTINUOUS POWER APPLIED TO AC MOTOR VALVE IN CONJUNCTION WITH A BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE, A POSSIBLE DETONATION CONDITION REQUIRES ONE OTHER FAILURE (BELLOWS LEAK) BEFORE THE EFFECT IS MANIFESTED. FAILURE IS NOT DETECTABLE IN FLIGHT DUE TO LACK OF MONITORING MEASUREMENTS. BELLOWS FAILURE 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/PC PERFORMED FOR FIRST FLIGHT AND AT FIVE FLIGHT INTERVALS OR FOR 1 RETEST PER FIGURE V43200.000 OR FOR ORBITER DISRUPTED COPPER PATH 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.

V43CBC.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.

05-6L-72