

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AFT-RCS FMEA NO 05-6KA-2253E -1 REV:11/03/87

ASSEMBLY : AFT MCA 3 CRIT. FUNC: 1R  
 P/N RI : JANTXVLN4246 CRIT. HDW: 3  
 P/N VENDOR: VEHICLE 102 103 104  
 QUANTITY : 8 EFFECTIVITY: X X X  
 : EIGHT PHASE(S): PL X LO X OO X DO X LS X  
 :

PREPARED BY: DES D SOVEREIGN APPROVED BY: REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS  
 REL J BEEKMAN DES *R. Beeman* APPROVED BY (NASA):  
 QE *no/initials* REL *REL 11-16-87* SSM *[Signature]*  
 QE *[Signature]* QE *[Signature]*  
 EPD&C sub Sovereign J. Beeman  
 na 2. C. 3. 5. 6. 7.

ITEM:

BLOCKING DIODE (1 AMP) - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER TANK ISOLATION VALVES 1/2 CONTROL CIRCUITS (MANUAL OPEN/CLOSE INHIBIT).

FUNCTION:

PROVIDES BLOCKING BETWEEN DUAL STIMULI (FROM MANUAL SWITCH OPEN CIRCUIT AND CLOSE LIMIT SWITCHES) TO HYBRID RELAY INHIBIT LOGIC INPUTS FOR THE CONTROL OF 3 PHASE AC VOLTAGE TO THE FUEL AND OXIDIZER TANK ISOLATION VALVE 1/2 DRIVE MOTORS.

OV-102 - 56V76A116A1CR19, 20, 87, 88, 91, 92. 56V76A116A2CR63, 64.  
 OV-103 & SUBS - 56V76A116A1CR60, 61, 101, 102, 105, 106. 56V76A116A2CR52.  
 56V76A116A3CR50.

FAILURE MODE:

OPEN, FAILS TO CONDUCT, HIGH RESISTANCE

CAUSE(S):

THERMAL STRESS, MECHANICAL SHOCK, VIBRATION

EFFECT(S) ON:

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

(A) LOSS OR DEGRADATION OF ABILITY TO ENERGIZE THE AFFECTED VALVE DRIVE INHIBIT LOGIC CIRCUITRY.

(B) THE AFFECTED LOGIC INPUT (MANUAL SWITCH) CANNOT COMMAND THE FUNCTION TO INHIBIT ONE OF TWO SERIES RELAYS IN THE VALVE CLOSE CIRCUITRY. NO EFFECT - THE SECOND RELAY WILL PRECLUDE CONTINUOUS MOTOR POWER. REQUIRES ADDITIONAL FAILURES BEFORE HAZARDOUS CONDITION IS CREATED.

(C, D) NO EFFECT.

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(E) FUNCTIONAL CRITICALITY EFFECT - VALVE WILL CHATTER OFF THE OPEN STOP. POSSIBLE LOSS OF CREW/VEHICLE DUE TO VALVE CONTINUOUS POWER IN CONJUNCTION WITH A BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES 3 OTHER FAILURE (DIODE SHORT, SECOND RELAY FAILS ON, AND BELLOWS LEAK) BEFORE EFFECT IS MANIFESTED. A BELLOWS LEAK IS UNDETECTABLE EXCEPT BY PERFORMING A SNIFF CHECK OF THE VALVE'S ACTUATOR ON THE GROUND.

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE A

(A-D) FOR DISPOSITION AND RATIONALE REFER TO APPENDIX F, ITEM NO. 3 - DIODE.

(B) GROUND TURNAROUND TEST

COMPONENT CHECKED OUT EVERY FLIGHT DURING GROUND TURNAROUND. THE TESTING CONSISTS OF CYCLING VALVE MANUAL SWITCHES AND/OR SENDING GENERAL PURPOSE COMPUTER (GPC) COMMANDS TO CYCLE VALVES OR HEATERS WHILE MONITORING VEHICLE INSTRUMENTATION TO DETERMINE IF COMPONENTS HAVE FAILED.

(E) OPERATIONAL USE

NO ACTION FOR FIRST FAILURE - NOT DETECTABLE. IF CONTINUOUS POWER SITUATION EXISTS, REMOVE POWER FROM RELAY BY PLACING MANUAL SWITCH IN GPC POSITION.