

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AFT-RCS FMEA NO 05-6KA-2039 -2 REV: 11/03/87

ASSEMBLY : PANEL 07 CRIT. FUNC: 1R  
 P/N RI : ME452-0102-7206 CRIT. HDW: 3  
 P/N VENDOR: VEHICLE 102 103 104  
 QUANTITY : 4 EFFECTIVITY: X X X  
 :FOUR PHASE(S): FL X LO X OO X DO X LS X  
 :

REUNDANCY SCREEN: A-PASS B-FAIL C-PASS  
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
 DES D SOVEREIGN DES P.S. Quinn SSM [Signature]  
 REL J BEERMAN REL Michael Clinton 11-18-87 REL [Signature]  
 QE QE [Signature] QE [Signature]  
 EPD&C SSM [Signature]  
 FOR USE 5/14/87

ITEM:  
 TOGGLE SWITCH (2P3T) - LEFT AND RIGHT AFT RCS CROSSFEED VALVE 1/2 AND 3/4/5.

FUNCTION:  
 PROVIDES THE CREW THE CAPABILITY TO CHOOSE GENERAL PURPOSE COMPUTER (GPC) CONTROL OF THE LEFT AND RIGHT AFT RCS CROSSFEED VALVES 1/2 AND 3/4/5 OR TO "OPEN" OR "CLOSE" THE VALVES MANUALLY THROUGH THE PANEL SWITCH OPERATION. 33V73A7S32, S33, S34, S35.

FAILURE MODE:  
 INADVERTENT OPERATION, SHORTS, INADVERTENTLY CLOSES (ONE OR TWO CONTACT SETS).

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

EFFECT(S) ON:  
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE  
 (A) FUNCTION DEGRADATION - OVERRIDES EXISTING GPC COMMAND (IF DIFFERENT) AND ENERGIZES RELATED CIRCUIT RELAYS.  
 (B) CLOSE CONTACTS - VALVE DRIVE IS NOT ENERGIZED SINCE TWO UNRELATED RELAYS (OPERATED FROM DIFFERENT SWITCH POLES) MUST CLOSE. OPEN CONTACTS - RELATED VALVE WILL OPEN, CONNECTING CROSSFEED LINE AND MANIFOLD LINES.  
 (C) POSSIBLE MISSION MODIFICATION OR EARLY MISSION TERMINATION.  
 (D) NO EFFECT.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - AFT-RCS

FMEA NO 05-6KA-2039 -2

REV:11/03/87

(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 2 OTHER FAILURE (SECOND CLOSE RELAY FAILS ON, 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-D) FOR DISPOSITION AND RATIONALE REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

(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 - MAY NOT BE DETECTABLE. IF CONTINUOUS POWER SITUATION EXISTS, REMOVE POWER TO RELAY BY PULLING APPROPRIATE CIRCUIT BREAKERS. CIRCUIT BREAKERS WILL BE RESET WHEN VALVES ARE TO BE MOVED AND DURING TIME CRITICAL RECONFIGURATION RESPONSE PERIODS (E.G. ENTRY).