

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AFT-RCS FMEA NO 05-6KA-2028 -2 REV: 11/03/87

ASSEMBLY : PANEL 07	ABORT,	CRIT. FUNC: 1R
P/N RI : ME452-0102-7206	RTLS, TAL	CRIT. HDW: 3
P/N VENDOR:	VEHICLE 102 103 104	
QUANTITY : 2	EFFECTIVITY: X X X	
: TWO	PHASE(S): PL X LO X OO X DO X LS X	
:		

PREPARED BY:	D SOVEREIGN	APPROVED BY:	J. S. B. B...	REDUNDANCY SCREEN: A-PASS B-PASS C-PASS	APPROVED BY (NASA):
DES	J BEEKMAN	DES		SSM	
REL		REL	11-14-87	REL	
QE		QE		QE	

ITEM:  
TOGGLE SWITCH (2P3T) HERMETIC SEAL - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER TANK ISOLATION VALVE 1/2 (MANUAL COMMAND).

FUNCTION:  
PROVIDES THE CREW WITH THE CAPABILITY TO SELECT "GPC" (GENERAL PURPOSE COMPUTER) OR MANUAL (OPEN, CLOSE) CONTROL OF THE FUEL AND OXIDIZER TANK ISOLATION VALVES 1/2. UNIQUE TO INTACT ABORT. 33V73A7S16, S19.

FAILURE MODE:  
INADVERTENT OPERATION, SHORT, INADVERTENTLY CLOSSES (ONE CONTACT SET).

CAUSE(S):  
CONTAMINATION, 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 CIRCUIT.
  - (B) LOSS OF ABILITY TO CLOSE OR OPEN ONE PROPELLANT TANK ISOLATION VALVE 1/2. LOSS OF TANK ISOLATION CAPABILITY.
  - (C) POSSIBLE MISSION MODIFICATION OR EARLY MISSION TERMINATION.
  - (D) NO EFFECT FOR NOMINAL MISSION - CRITICALITY INCREASED TO 1/1 DURING RTLS AND TAL ABORT. MEASUREMENTS UTILIZED BY MCA OPTIMIZATION SOFTWARE IN "LANDING HEAVY" CONDITION. WILL ALSO RESULT IN CONTROL PROBLEMS DURING ENTRY. RESULTS IN LOSS OF 12 AFT RCS THRUSTERS BEING USED DURING THE OMS DUMP.
  - (E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE CREW/VEHICLE LOSS DUE TO INABILITY TO PERFORM EXTERNAL TANK SEPARATION OR ENTRY CONTROL RESULTING FROM LOSS OF PROPELLANT THROUGH A LEAKY THRUSTER. REQUIRES 2 OTHER FAILURES (MANIFOLD VALVE FAILED OPEN, THRUSTER LEAK).

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UBSYSTEM :EPD&C - APT-RCS

FMEA NO 05-6KA-2028 -2

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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

IF VALVE IS FAILED OPEN, DO NOT CROSSFEED OR INTERCONNECT TO AFFECTED  
POD. LOSS OF INTERCONNECT CAPABILITY MAY RESULT IN MISSION MODIFICATION  
OR EARLY MISSION TERMINATION. IF VALVE IS FAILED CLOSED, RCS CROSSFEED  
CAN BE USED TO SUPPLY PROPELLANT TO AFFECTED LEGS.