

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AFT-RCS

FMEA NO 05-6KA-2127 -2

REV: 11/03/87

ASSEMBLY : AFT MCA 1,2  
 P/N RI : MC455-0135-0001  
 P/N VENDOR:  
 QUANTITY : 8  
 : EIGHT  
 :

	VEHICLE	102	103	104
CRIT. FUNC:				1R
CRIT. HDW:				2
EFFECTIVITY:	X	X	X	
PHASE(S):	PL X	LO X	OO X	DO X LS X

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

PREPARED BY:  
 DES D SOVEREIGN  
 REL J BEEKMAN  
 QE

APPROVED BY:  
 DES D. S. R. Beuer  
 REL John P. Star 11-14-87  
 QE [Signature]  
 APPROVED BY (NASA):  
 SSM [Signature]  
 REL [Signature]  
 QE [Signature]  
 End of case [Signature]

ITEM:

HYBRID RELAY - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER TANK ISOLATION VALVES 3/4/5 A AND B DRIVER POWER "CLOSE" RELAY.

FUNCTION:

UPON RECEIVING THE PROPER STIMULI (FROM EITHER THE GENERAL PURPOSE COMPUTER (GPC) OR THE CREW), THE HYBRID RELAYS OPERATE TO ENERGIZE TANK ISOLATION VALVES 3/4/5 A AND B. UNIQUE TO INTACT ABORT.  
 54V76A114K25,27,29,31. 55V76A115K25,26,27,31.

FAILURE MODE:

INADVERTENT OPERATION, INADVERTENTLY TRANSFERS.

CAUSE(S):

PIECE PART FAILURE, VIBRATION, MECHANICAL SHOCK.

EFFECT(S) ON:

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

- (A) AC CONTACTS OF ONE HYBRID RELAY CLOSE.
- (B) "CLOSE" RELAY, NO EFFECT - A SECOND, PARALLEL VALVE WILL CONTINUE TO SUPPLY THE 3/4/5 A AND B MANIFOLD WITH THE ASSOCIATED PROPELLANT. THE AFFECTED VALVE DRIVE CIRCUIT IS ENERGIZED CONTINUOUSLY. NO EFFECT UNLESS A BELLOWS LEAK OCCURS IN CONJUNCTION WITH CONTINUOUS POWER.
- (C) NO EFFECT.
- (D) NO EFFECT FIRST FAILURE - POSSIBLE LOSS OF CREW/VEHICLE AFTER A BELLOWS LEAK OCCURS IN THE SAME VALVE.

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(E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO CONTINUOUS DRIVE MOTOR OPERATION IN CONJUNCTION WITH A BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES ONE OTHER FAILURE (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. ALSO, POSSIBLE LOSS OF CREW/VEHICLE DUE TO THE INABILITY TO PERFORM EXTERNAL TANK SEPARATION OR ENTRY CONTROL DUE TO FAILED CLOSED VALVE IN CONJUNCTION WITH OTHER FAILURES.

DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY.

(B) GROUND TURNAROUND TEST

COMPONENT CHECKED OUT EVERY FLIGHT DURING GROUND TURNAROUND. THE TESTING CONSISTS OF CYCLING VALVE MANUAL SWITCHES AND/OR SENDING 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. 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).