

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AFT-RCS FMEA NO 05-6KA-2128A -2 REV:11/03/87

ASSEMBLY : AFT MCA 1,2,3 CRIT. FUNC: 1R
 P/N RI : MC455-0135-0001 CRIT. HDW: 2
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 8 EFFECTIVITY: X X X
 : EIGHT PHASE(S): PL X LC X OO X DO X LS X
 :

PREPARED BY: DES D SOVEREIGN APPROVED BY: REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS
 REL J BECKMAN DES *[Signature]* APPROVED BY (NASA):
 QE P.P. *[Signature]* REL *[Signature]* SSM *[Signature]*
[Signature] *[Signature]* *[Signature]*
[Signature] *[Signature]* *[Signature]*

ITEM:
 HYBRID RELAY - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER MANIFOLD 1,2,3, AND 4 ISOLATION VALVE DRIVER POWER "OPEN" RELAY.

FUNCTION:
 UPON RECEIVING THE PROPER STIMULI (FROM THE GENERAL PURPOSE COMPUTER (GPC) OR MANUAL SWITCHES), THE HYBRID RELAYS OPERATE TO ENERGIZE THREE PHASE AC DRIVE MOTORS TO OPEN THE FUEL AND OXIDIZER MANIFOLDS 1,2,3 AND 4 ISOLATION VALVES.
 54V76A114K22,24. 55V76A115K22,23. 56V76A116K13,20,22,24.

FAILURE MODE:
 INADVERTENT OPERATION, INADVERTENTLY TRANSFERS

CAUSE(S):
 PIECE PART STRUCTURAL FAILURE, VIBRATION, MECHANICAL SHOCK.

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
 (A) THE ASSOCIATED VALVE DRIVE CIRCUIT IS ENERGIZED CONTINUOUSLY.
 (B) CONTINUOUS "OPEN" POWER WILL BE APPLIED TO THE VALVE DRIVE MOTOR. VALVE WILL BE MAINTAINED IN THE "OPEN" POSITION.
 (C,D) NO EFFECT.
 (E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO CONTINUOUS MOTOR OPERATION IN CONJUNCTION WITH A BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES ONE OTHER FAILURE (BELLOWS LEAK) BEFORE AN EFFECT IS MANIFESTED. A BELLOWS LEAK IS UNDETECTABLE EXCEPT BY PERFORMING A SNIFF CHECK OF THE VALVE'S ACTUATOR ON THE GROUND.

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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 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 GENERAL PURPOSE
COMPUTER (GPC) COMMANDS TO CYCLE VALVES OR HEATERS WHILE MONITORING
VEHICLE INSTRUMENTATION TO DETERMINE IF COMPONENTS HAVE FAILED.

(E) OPERATIONAL USE

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).