

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AFT-RCS

FMEA NO 05-6KA-2132 -2

REV: 11/03/87

ASSEMBLY : AFT MCA 1,3  
 P/N RI : MC455-0135-0001  
 P/N VENDOR:  
 QUANTITY : 16  
 : SIXTEEN  
 :

	VEHICLE	102	103	104
EFFECTIVITY:		X	X	X
PHASE(S):	PL	X	LO	X
			OO	X
				DO
				X
				LS
				X

CRIT. FUNC: 1R  
 CRIT. HDW: 3

PREPARED BY:  
 DES D SOVEREIGN  
 REL J BEEKMAN  
 QE

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS  
 APPROVED BY:  
 DES D. J. R. Beeman  
 REL John C. Hare 11/14/87  
 QE Bill J. ... 11/17/87

APPROVED BY (NASA):  
 SSM [Signature]  
 REL [Signature]  
 QE [Signature]

ITEM:

HYBRID RELAY (4 POLE) NON-LATCHING - LEFT AND RIGHT AFT RCS FUEL AND OXIDIZER CROSSFEED ISOLATION VALVE 1/2 AND 3/4/5 CIRCUITS (CLOSE RELAYS).

FUNCTION:

UPON COMMAND FROM THE GENERAL PURPOSE COMPUTER (GPC) (THROUGH FLIGHT MULTIPLEXER-DEMULTEPLEXERS (MDM)) OR THE CREW (THROUGH PANEL SWITCHES), THE HYBRID RELAY CONTACTS CONNECT THE PROPER AC PHASE VOLTAGE TO THE ASSOCIATED FUEL AND OXIDIZER CROSSFEED ISOLATION VALVES 1/2 AND 3/4/5 MOTOR CLOSE CIRCUITS OF THE LEFT OR RIGHT AFT RCS.

54V76A114K33, 34, 37, 38, 69, 70, 71, 72. 56V76A116K42, 44, 48, 49, 50, 52, 56, 57.

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 CLOSE RELAY CLOSE.

(B) NO EFFECT - VALVE DRIVES REQUIRE CLOSURE OF TWO SETS OF RELAY CONTACTS IN SERIES BEFORE THE DRIVE IS ENERGIZED.

(C,D) NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECT - POSSIBLE LOSS OF CREW/VEHICLE DUE TO CONTINUOUS MOTOR OPERATION IN CONJUNCTION WITH A POSSIBLE BELLOWS LEAK LEADING TO VALVE RUPTURE AND PROPELLANT RELEASE. REQUIRES 2 OTHER FAILURES (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.

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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

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).