

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 05-6WD-4090 -X**

SUBSYSTEM NAME: EPD&C - ATCS/FCL

REVISION: 0 12/02/97

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	: PANEL L2A1	V070-730273
SRU	:CAPACITOR, 0.15 MF	M83421/01-5177

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

CAPACITOR 0.075MF, ISOLATION VALVE MOTOR PORT (OR STARBOARD), FREON LOOP BYPASS VALVE CONTROL. (NOTE:0.075 MF CAPACITOR IS MADE UP OF TWO SERIES 0.15 MF CAPACITORS)

REFERENCE DESIGNATORS: TB1A1C1,C2,
TB1A2C1,C2,
TB2A1C1,C2,
TB2A2C1,C2

QUANTITY OF LIKE ITEMS: 8

EIGHT
TWO SERIES PAIRS FOR EACH MOTOR FOR STARBOARD AND PORT ISOLATION VALVES.

FUNCTION:
CAPACITORS PROVIDE PROPER PHASE FOR REVERSING MOTORS.

FAILURE MODES EFFECTS ANALYSIS FMEA - CIL FAILURE MODE

NUMBER: 05-6WD-4090-02

REVISION#: 0 12/02/97

SUBSYSTEM NAME: EPD&C - ATCS/FCL

LRU: TB1

ITEM NAME: CAPACITOR, 0.15 MF

CRITICALITY OF THIS

FAILURE MODE: 1R3

FAILURE MODE:

FAILS SHORT (END-TO-END)

MISSION PHASE:

LO LIFT-OFF
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:

102 COLUMBIA
103 DISCOVERY
104 ATLANTIS
105 ENDEAVOUR

CAUSE:

PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN

A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:

A)

B)

CANNOT ISOLATE THE FAIL SHORT OF THIS CAPACITOR WITHOUT USING INTRUSIVE PROCEDURES.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

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NONE FIRST FAILURE, WILL DEGRADE PERFORMANCE OF ONE OF TWO REDUNDANT ISOLATION VALVE MOTORS.

(B) INTERFACING SUBSYSTEM(S):

NONE FIRST FAILURE.

(C) MISSION:

PROBABLE LOSS OF MISSION AFTER 3 FAILURES: (1) ONE OF TWO 0.15 MF CAPACITORS MOTOR ONE STARBOARD ISOLATION VALVE (OR ONE OF TWO 0.15 MF CAPACITORS MOTOR ONE PORT ISOLATION VALVE) FAIL SHORT, (2) ONE OF TWO 0.15 MF CAPACITORS MOTOR TWO STARBOARD ISOLATION VALVE (OR ONE OF TWO 0.15 MF CAPACITORS MOTOR TWO PORT ISOLATION VALVE) FAILS SHORT WILL CAUSING LOSS OF BOTH ISOLATION MOTORS FOR ONE COOLANT LOOP, AND (3) EXTERNAL LEAK RADIATOR ARRAY STARBOARD (OR PORT) CAUSES LOSS OF ONE COOLANT LOOP.

(D) CREW, VEHICLE, AND ELEMENT(S):

POSSIBLE LOSS OF CREW/VEHICLE AFTER 4 FAILURES: (1) ONE OF TWO 0.15MF CAPACITORS MOTOR ONE STARBOARD ISOLATION VALVE (OR CAPACITOR MOTOR ONE PORT ISOLATION VALVE) FAIL SHORT, (2) ONE OF TWO 0.15MF CAPACITORS MOTOR TWO STARBOARD ISOLATION VALVE (OR CAPACITOR MOTOR TWO PORT ISOLATION VALVE) FAIL SHORT, (3) EXTERNAL LEAK RADIATOR ARRAY STARBOARD (OR PORT) CAUSES TOTAL LOSS OF ONE COOLANT LOOP AND (4) LOSS OF REDUNDANT COOLANT LOOP CAUSES TOTAL LOSS OF ALL VEHICLE COOLING.

(E) FUNCTIONAL CRITICALITY EFFECTS:

PROBABLE LOSS OF MISSION AFTER 3 FAILURES: (1) ONE OF TWO 0.15 MF CAPACITORS MOTOR ONE STARBOARD ISOLATION VALVE (OR ONE OF TWO 0.15 MF CAPACITORS MOTOR ONE PORT ISOLATION VALVE) FAILS SHORT, (2) ONE OF TWO 0.15 MF CAPACITORS REDUNDANT MOTOR TWO STARBOARD ISOLATION VALVE (OR ONE OF TWO 0.15 MF CAPACITORS REDUNDANT MOTOR TWO PORT ISOLATION VALVE) FAIL SHORT OPEN CAUSING LOSS OF BOTH MOTORS FOR ISOLATION VALVE FOR ONE COOLANT LOOP AND LOSS OF ASSOCIATED ISOLATION VALVE, AND (3) EXTERNAL LEAK RADIATOR ARRAY STARBOARD (OR PORT) CAUSING TOTAL LOSS OF ONE COOLANT LOOP SINCE RADIATOR ISOLATION CANNOT WORK WITHOUT MOTORS.

POSSIBLE LOSS OF CREW/VEHICLE AFTER 4 FAILURES: (1) ONE OF TWO 0.15 MF CAPACITORS MOTOR ONE STARBOARD ISOLATION VALVE (OR ONE OF TWO 0.15 MF CAPACITORS MOTOR ONE PORT ISOLATION VALVE) FAILS SHORT, (2) ONE OF TWO 0.15 MF CAPACITORS FOR REDUNDANT MOTOR TWO STARBOARD ISOLATION VALVE (OR ONE OF TWO 0.15 MF CAPACITORS FOR REDUNDANT MOTOR TWO PORT ISOLATION VALVE) FAIL SHORT CAUSING LOSS OF BOTH MOTORS FOR ISOLATION VALVE FOR ONE COOLANT LOOP AND LOSS OF ASSOCIATED ISOLATION VALVE, AND (3) EXTERNAL LEAK RADIATOR ARRAY STARBOARD (OR PORT) CAUSING TOTAL LOSS OF ONE COOLANT LOOP SINCE FREON COOLANT IS LOST FOR ASSOCIATED COOLANT LOOP BECAUSE RADIATOR ISOLATION CANNOT WORK WITHOUT MOTORS, AND (4) LOSS OF REDUNDANT COOLANT LOOP CAUSES LOSS OF ALL VEHICLE COOLING.

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-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX C, ITEM #1 - HYBRID RELAY.

(B) TEST:

REFER TO APPENDIX C, ITEM #1 - HYBRID RELAY.

GROUND TURNAROUND TEST

TOGGLE SWITCH IS VERIFIED PRIOR TO EACH FLIGHT.

(C) INSPECTION:

REFER TO APPENDIX C, ITEM #1 - HYBRID RELAY.

(D) FAILURE HISTORY:

REFER TO APPENDIX C, ITEM #1 - HYBRID RELAY.

(E) OPERATIONAL USE:

NONE.

- APPROVALS -

SS & PAE MANAGER

: D. F. MIKULA

SS & PAE ENGINEER

: K. E. RYAN

EPD&C ATC

: D. SOVEREIGN

BNA SSM

: R. L. PHAN

JSC MOD

JSC RDE

USA/Orhiter

*D. F. Mikula**K. E. Ryan**D. Sovereign**R. L. Phan**Janette Cerna*

11-24-98

Suparna Saha 1-4-99*1/19/99*