

## FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE

NUMBER: M5-6MB-2208-G -X

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC

REVISION: 9 09/09/92

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 PART DATA
 

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	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	: MID PCA 1	V070-764400
LRU	: MID PCA 2	V070-764430
SRU	: CONTROLLER, HYBRID DRIVER	MC477-0263-0002

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## EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

CONTROLLER, HYBRID DRIVER (HDC), TYPE III - H2 MANIFOLD 1 AND 2 ISOLATION VALVES, CLOSE POSITION

REFERENCE DESIGNATORS: 40V76A25AR21  
 40V76A25AR22  
 40V76A26AR21  
 40V76A26AR22

QUANTITY OF LIKE ITEMS: 4  
 FOUR, TWO PER MANIFOLD VALVE CIRCUIT

## FUNCTION:

CONTROLS POWER TO CLOSE H2 MANIFOLD 1 AND 2 ISOLATION VALVES. CONTROL CIRCUITRY IS INDEPENDENT FOR EACH MANIFOLD.

**FAILURE MODES EFFECTS ANALYSIS FMEA – CIL FAILURE MODE**

NUMBER: M5-6MB-2208-G- 02

REVISION#: 10 08/09/96

SUBSYSTEM NAME: ELECTRICAL POWER GENERATION - CRYO, GENERIC

LRU: MID PCA 1

CRITICALITY OF THIS

ITEM NAME: CONTROLLER, HYBRID DRIVER

FAILURE MODE: 2R3

**FAILURE MODE:**

INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF"

MISSION PHASE: 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)

SCREEN "B" FAILS BECAUSE THE SERIES DRIVER CONFIGURATION MASKS THE FAILED "ON" FAILURE MODE OF THE AFFECTED HDC.

C)

**- FAILURE EFFECTS -****(A) SUBSYSTEM:**

LOSS OF ABILITY TO MANUALLY OPEN THE AFFECTED H2 MANIFOLD VALVE WITH THE PANEL SWITCH.

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**(B) INTERFACING SUBSYSTEM(S):**

SAME AS (A)

**(C) MISSION:**

NO EFFECT - FIRST FAILURE. POSSIBLE MISSION TERMINATION AFTER THE SECOND FAILURE OF THE ASSOCIATED HDC DUE TO THE H2 MANIFOLD VALVE FAILING CLOSED RESULTING IN ONE TANK BEING ISOLATED TO A SINGLE FUEL CELL AND THE HYDROGEN IN THAT TANK CONSUMED.

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

NO EFFECT - FIRST FAILURE

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

POSSIBLE EARLY MISSION TERMINATION DUE TO THE FOLLOWING SCENARIO: 1) FIRST SERIES HDC FAILS "ON", AND 2) SECOND SERIES HDC FAILS "ON" - AFFECTED H2 MANIFOLD VALVE FAILS CLOSED RESULTING IN ONE TANK BEING ISOLATED TO A SINGLE FUEL CELL. MISSION TERMINATED WHEN THE HYDROGEN IN THAT TANK IS CONSUMED.

**DESIGN CRITICALITY (PRIOR TO DOWNGRADE, DESCRIBED IN (F)): 1R3**

**(F) RATIONALE FOR CRITICALITY DOWNGRADE:**

MANIFOLD OVER PRESSURE DUE TO TRAPPED CRYOGENIC FLUID IS NOT CREDIBLE THEREFORE, WORSE FUNCTIONAL EFFECT IS LOSS OF MISSION.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER

**(B) TEST:**

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER

CIRCUIT IS FUNCTIONALLY VERIFIED IN FLIGHT. PERFORM GROUND TURNAROUND TEST WHEN VALID VERIFICATION IS UNOBTAINABLE IN FLIGHT OR AFTER LRU REPLACEMENT.

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NUMBER: M5-6MB-2208-G-02

(E) OPERATIONAL USE:  
NO CREW ACTION AFTER FIRST FAILURE.

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- APPROVALS -

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EDITORIALLY APPROVED : RI  
EDITORIALLY APPROVED : JSC  
TECHNICAL APPROVAL : VIA JSC

: *Wayne J. Jensen 8/12/96*  
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