

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

NUMBER: DS-6MA-2254 -X

SUBSYSTEM NAME: EPD&amp;C - ELEC PWR GENERATION: FUEL CELL (04-1A)

REVISION: 0 03/30/89

## PART DATA

PART NAME	PART NUMBER
VENDOR NAME	VENDOR NUMBER
LRU : MID PCA 1	V070-764400
LRU : MID PCA 2	V070-764430
LRU : MID PCA 3	V070-764450
SRU : DIODE	JANTXV1N5551

## EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

DIODE, BLOCKING (3 AMP), FUEL CELL NO. 1, 2 AND 3 CONTROL POWER

REFERENCE DESIGNATORS: 40V76A25A1CR47  
 40V76A25A1CR48  
 40V76A26A1CR47  
 40V76A26A1CR48  
 40V76A27A1CR23  
 40V76V27A1CR24

QUANTITY OF LIKE ITEMS: 6  
 SIX, TWO IN SERIES PER  
 EA - FC CONTROL

## FUNCTION:

PROVIDES CONTROL POWER FROM ESS BUS TO FUEL CELL POWER PLANT (FCP)  
 ELECTRONIC CONTROL UNIT (ECU) AND ADDITIONAL VOLTAGE DROP FOR  
 COMPATIBILITY WITH ASSOCIATED FCP CONTROLS.

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

**NUMBER: 05-6MA-2254- 01**

**REVISION#: 0 04/16/96**

**SUBSYSTEM NAME: EPD&C - ELEC PWR GENERATION:FUEL CELL (04-1A)**

**LRU: MID PCA 1, 2 & 3**

**CRITICALITY OF THIS**

**ITEM NAME: DIODE**

**FAILURE MODE: 1R2**

**FAILURE MODE:**

OPEN, FAILS TO CONDUCT

**MISSION PHASE: LO LIFT-OFF**

<b>VEHICLE/PAYLOAD/KIT EFFECTIVITY:</b>	102	COLUMBIA
	103	DISCOVERY
	104	ATLANTIS
	105	ENDEAVOUR

**CAUSE:**

STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY

**CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO**

**REDUNDANCY SCREEN**

- A) PASS
- B) PASS
- C) PASS

**PASS/FAIL RATIONALE:**

A)

B)

C)

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:**

LOSS OF ASSOCIATED FUEL CELL CONTROL POWER

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

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LOSS OF POWER TO COOLANT PUMP AND H2 PUMP LEADING TO FCP OVER-HEATING/  
FLOODING AND OUTPUT VOLTAGE DEGRADATION. TIME CRITICAL

**(C) MISSION:**

NO EFFECT. MINIMUM DURATION FLIGHT. LOSS OF FUEL CELL REDUNDANCY  
(CAPABILITY EXISTS FOR SAFE RETURN ON ONE OF THREE FCP).

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

FIRST FCP LOSS NO EFFECT - SECOND FCP SHUTDOWN DURING ASCENT LOSES  
CRITICAL FUNCTIONS AND MAY RESULT IN CREW/VEHICLE LOSS. FAILURE TO REMOVE  
LOAD FROM AFFECTED FCP WITHIN 9 MINUTES MAY RESULT IN OVERTEMP AND  
SUBSEQUENT EXTERNAL REACTANT LEAKAGE, CAUSING POSSIBLE LOSS OF VEHICLE/  
CREW.

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

FIRST FCP LOSS NO EFFECT - SECOND FCP SHUTDOWN DURING ASCENT LOSES  
CRITICAL FUNCTIONS AND MAY RESULT IN CREW/VEHICLE LOSS. FAILURE TO REMOVE  
LOAD FROM AFFECTED FCP WITHIN 9 MINUTES MAY RESULT IN OVERTEMP AND SUB-  
SEQUENT EXTERNAL REACTANT LEAKAGE, CAUSING POSSIBLE LOSS OF  
VEHICLE/CREW.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**

REFER TO APPENDIX F, ITEM NO. 4 - DIODE

**(B) TEST:**

GROUND TURNAROUND TEST  
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH  
OMRSD.

**(C) INSPECTION:**

REFER TO APPENDIX F, ITEM NO. 4 - DIODE

**(D) FAILURE HISTORY:**

CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND  
OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE  
FOUND IN THE PRACTICE DATA BASE. THE FAILURE HISTORY DATA PROVIDED IN  
APPENDIX F IS NO LONGER BEING KEPT UP-TO-DATE.

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(E) OPERATIONAL USE:

CREW ACTION REQUIRED TO SHUTDOWN AFFECTED FCP DURING FLIGHT. ONBOARD PROCEDURES MANAGE POWER FOR LOSS OF ONE FCP.

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- APPROVALS -

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PRODUCT ASSURANCE ENGR	: J. NGUYEN	<u>J. Nguyen</u>
DESIGN ENGINEERING	: T. D. NGUYEN	<u>T. D. Nguyen</u>
EDITORIALLY APPROVED	: JSC	<u>J. Stenger</u>
TECHNICAL APPROVAL	: VIA APPROVAL FORM :	96-CIL-012_05-6MA