

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE**  
**NUMBER: 05-6BA-2588-IM -X**

**SUBSYSTEM NAME: EPD&C - LANDING GEAR CONTROL**

**REVISION: 7**

**08/22/00**

**PART DATA**

	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
LRU	: FWD PCA 1	VO70-763320
SRU	: RELAY, LATCHING	MC455-0128-0001

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
 RELAY, LATCHING, LANDING GEAR ARM CONTROL CIRCUIT (4P2P)

**REFERENCE DESIGNATORS:** 81V76A22K6  
 81V76A22K7

**QUANTITY OF LIKE ITEMS: 2**  
 TWO

**FUNCTION:**

TWO ARM RELAYS ALONG WITH THE DOWN RELAY ENABLE THE CIRCUIT FOR ENERGIZING THE LANDING GEAR EXTEND VALVE 1. THE ASSOCIATED LANDING GEAR DOWN RELAY, WHEN COMMANDED, COMPLETES THE SERIES CIRCUIT AND ALLOWS FOR PROTECTION AGAINST PREMATURE FAILURES. REDUNDANCY IS PROVIDED FOR LANDING GEAR OPERATION.

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

**NUMBER: 05-6BA-2588-IM- 02**

**REVISION#: 6 09/22/00**

**SUBSYSTEM NAME: EPD&C - LANDING GEAR CONTROL**

**LRU: FWD PCA 1**

**CRITICALITY OF THIS FAILURE MODE: 1R3**

**ITEM NAME: RELAY, LATCHING, K6 AND K7**

**FAILURE MODE:**

CLOSED, PREMATURELY CLOSES (TO SET POSITION), SHORTS CONTACT-TO-CONTACT (TO SET POSITION)

**MISSION PHASE: LS LANDING/SAFING**

**VEHICLE/PAYLOAD/KIT EFFECTIVITY:**

103 DISCOVERY  
104 ATLANTIS  
EFFECTIVE FOR PRE LANDING GEAR MOD -  
(K6 RELAY NOT CHG'D TO DOWN FUNCTION)

**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)

FAILS "B" SCREEN BECAUSE RELAY SINGLE CONTACT STATUS CANNOT BE MONITORED IN FLIGHT.

C)

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:**

FIRST FAILURE - NO EFFECT

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

FIRST FAILURE - NO EFFECT

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**(C) MISSION:**  
FIRST FAILURE - NO EFFECT

**(D) CREW, VEHICLE, AND ELEMENT(S):**  
FIRST FAILURE - NO EFFECT

**(E) FUNCTIONAL CRITICALITY EFFECTS:**  
SHORTS CONTACT-TO-CONTACT (TO SET POSITION); CRITICALITY 1R3, PFP

- POSSIBLE LOSS OF CREW/VEHICLE DUE TO THE FOLLOWING SCENARIO:
- 1., 2. K6 (ARM) RELAY AND K7 (ARM) RELAY SHORTS CONTACT-TO-CONTACT (TO SET POSITION).
  3. K8 (DOWN) RELAY FAILS CLOSED. PREMATURE EXTENSION OF LANDING GEARS OCCURS. THIS MAY OCCUR AT A TIME WHEN THERE IS A LIGHT VEHICLE, STRONG HEAD WIND AND LOW ENERGY WHICH COULD LAND VEHICLE SHORT OF RUNWAY AND MAY CAUSE VEHICLE DAMAGE RESULTING IN POSSIBLE LOSS OF CREW/VEHICLE.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**  
REFER TO APPENDIX C, ITEM NO. 3 - LATCHING RELAY

**(B) TEST:**  
REFER TO APPENDIX C, ITEM NO. 3 - LATCHING RELAY

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

**(C) INSPECTION:**  
REFER TO APPENDIX C, ITEM NO. 3 - LATCHING RELAY

**(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 PRACA DATABASE.

**(E) OPERATIONAL USE:**  
SHORTS CONTACT-TO-CONTACT (TO SET POSITION); CRITICALITY 1R3, PFP

1. NONE.

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- APPROVALS -

S & R ENGINEERING	:	M. D. DUMETZ / G. T. TATE	: <i>M. Dumetz</i>
S & R ENGINEERING ITM	:	P. A. STENGER	: <i>P.A. Stenger 9/29/00</i>
DESIGN ENGINEERING	:	J. L. PECK	: <i>J.L. Peck 9/27/00</i>
EPD&C SUBSYSTEM MANAGER	:	R. L. PHAN	: <i>R. Phan 9/28/00</i>
SR&QA	:		: <i>K. H. ... 9/27/00</i>
NASA DCE	:		: <i>L.P. ... for J. Morris 28 Sep 00</i>
MOD	:		: <i>J. ...</i>
USA SAM	:		: <i>J. ...</i>
USA ORBITER ELEMENT	:		: <i>J. ...</i>

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S & R ENGINEERING	:	M. D. DUMETZ / G. T. TATE	: <i>M. Dumetz</i>
S & R ENGINEERING ITM	:	P. A. STENGER	: <i>P.A. Stenger 9/22/00</i>
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SR&QA	:		: <i>[Signature] 9/22/00</i>
NASA DCE	:		: <i>[Signature] 9/22/00</i>
MOD	:		: <i>[Signature] for J. Norris 9/25/00</i>
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EPD&C SUBSYSTEM MANAGER	:	R. L. PHAN	: <i>R. Phan 9/28/00</i>
SR&QA	:		: <i>[Signature] 10/7/00</i>
NASA DCE	:		: <i>[Signature] for S. Norris 10/5/00</i>
MOD	:		: <i>[Signature]</i>
USA SAM	:		: <i>[Signature]</i>
USA ORBITER ELEMENT	:		: <i>[Signature] 10/3/00</i>