

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE
NUMBER: 05-6-2660 -X

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL
REVISION: 1 11/16/97

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	: PANEL F6A8 (PRE-MEDS)	V070-730259
LRU	: PANEL F6A4 (MEDS CONFIGURATION)	V070-730735
SRU	: SWITCH, ROTARY	ME452-0093-5230

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, ROTARY - ABORT MODE SELECT

REFERENCE DESIGNATORS: 34V73A6A8S1 (PRE-MEDS)
 34V73A6A4S6 (MEDS CONFIGURATION)

QUANTITY OF LIKE ITEMS: 1
ONE

FUNCTION:

UNIQUE TO INTACT ABORT, ROTARY ABORT MODE SELECT SWITCH IS USED TO SELECT AN ABORT MODE USING COMMAND VOLTAGES WHICH ARE ROUTED FROM THE PUSHBUTTON ABORT INITIATE SWITCH IN SERIES. TWO OF THREE POLES (FOURTH POLE IS NOT CONNECTED) ARE REQUIRED TO INITIATE ABORT FUNCTION. THE PUSHBUTTON AND ROTARY SWITCHES ARE USED TO INITIATE RTLS, TAL, AND ATO ABORTS.

THIS SWITCH IS ALSO USED IN CONJUNCTION WITH THE ABORT INITIATE PUSHBUTTON SWITCH TO ENGAGE "BAILOUT" SOFTWARE DURING CONTINGENCY ABORTS BY PLACING THE ROTARY SWITCH IN THE "ATO" POSITION AND DEPRESSING THE PUSHBUTTON SWITCH. THIS IS THE ONLY METHOD OF ENGAGING THE "BAILOUT" SOFTWARE AND IS ACCEPTED ONLY IN ORBITER SOFTWARE MODES 305 (APPROACH AND LANDING) AND 603 (GRTLS APPROACH AND LANDING).

FAILURE MODES EFFECTS ANALYSIS FMEA - CIL FAILURE MODE

NUMBER: 05-6-2660-01

REVISION#: 2 07/26/99

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL

LRU: PANEL F6A8 (PRE-MEDS), F6A4 (MEDS)

CRITICALITY OF THIS

ITEM NAME: SWITCH, ROTARY

FAILURE MODE: 1R2

FAILURE MODE:

FAILS OPEN (JAMS IN "OFF" POSITION), BROKEN STOP OR SHAFT WITH DETENT FEEL REMAINING

MISSION PHASE: LO LIFT-OFF
DO DE-ORBITVEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
103 DISCOVERY
104 ATLANTIS
105 ENDEAVOUR**CAUSE:**

PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? YESAOA ABORT ONCE AROUND
RTL S RETURN TO LAUNCH SITE
TAL TRANS-ATLANTIC LANDINGREDUNDANCY SCREEN A) PASS
B) FAIL
C) PASS**PASS/FAIL RATIONALE:**

A)

B)

FAILS "B" SCREEN BECAUSE TIME FOR CORRECTIVE ACTION EXCEEDS TIME TO EFFECT.

C)

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

LOSS OF ABORT MODE SELECT CAPABILITY VIA ROTARY/PUSHBUTTON SWITCHES.

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(B) INTERFACING SUBSYSTEM(S):

LOSS OF ABORT MODE SELECT CAPABILITY THROUGH THE SWITCH. ALSO, LOSS OF ABILITY TO ENGAGE "BAILOUT" SOFTWARE DURING CONTINGENCY ABORT CONDITIONS.

**(C) MISSION:
NO EFFECT**

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

CRIT 1R2 FOR EMERGENCY DEORBITS. AFTER FIRST FAILURE (WHICH CAUSES THE EMERGENCY SITUATION), POSSIBLE LOSS OF COMMANDER DUE TO INABILITY TO PERFORM EMERGENCY FUNCTION ("BAILOUT" SOFTWARE ENGAGE) AND PROVIDE HIMSELF WITH A STABLE FLYING CONDITION FROM WHICH TO EGRESS WHEN INSUFFICIENT VEHICLE ENERGY IS AVAILABLE TO REACH PLANNED RUNWAY. CRIT 1/1 FOR RTLS, TAL, AND AOA ABORTS.

ALSO, POSSIBLE LOSS OF CREW/VEHICLE VIA THE FOLLOWING SCENARIO:

(1) FAILURE OF THE ROTARY SWITCH IN THE OPEN (OFF) CONDITION, AND (2,3) LOSS OF CAPABILITY TO INITIATE ANY ABORT MODE VIA EITHER OF TWO KEYBOARD UNITS, RESULTING IN THE LOSS OF CAPABILITY TO EFFECT A SAFE ORBITER LANDING UNDER ASCENT ABORT CONDITIONS.

IN THE PRECEDING SCENARIO, THE ROTARY SWITCH FAILURE IS FUNCTIONAL CRITICALITY "1R" AND HARDWARE CRITICALITY "3" RATHER THAN THE 1R2 CRITICALITY WHICH IS ASSIGNED DUE TO THE EMERGENCY BAILOUT FUNCTION.

(E) FUNCTIONAL CRITICALITY EFFECTS:

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX A, ITEM NO. 2 - ROTARY SWITCH

(B) TEST:

REFER TO APPENDIX A, ITEM NO. 2 - ROTARY SWITCH

GROUND TURNAROUND TEST

ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

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(C) INSPECTION:
REFER TO APPENDIX A, ITEM NO. 2 - ROTARY SWITCH

(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:
THE ROTARY ABORT SWITCH IN CONJUNCTION WITH THE ABORT PUSHBUTTON SWITCH IS PRIME FOR SELECTING RTLS, ATO, AND TAL ABORTS AND IS THE ONLY MEANS OF ENGAGING THE "BAILOUT" MODE. ALL ABORT MODES EXCEPT "BAILOUT" CAN BE SELECTED VIA THE KEYBOARD.

- APPROVALS -

EDITORIALLY APPROVED	: BNA	: <u>J. Kamura 7-26-99</u>
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 96-CIL-025_05-6