FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-6ED-2027-X

SUBSYSTEM NAME: EPD&C - ET UMBILICAL DOORS
REVISION : 4 05/21/91

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	PANEL R2	V070-730277
SRU	:	SWITCH, TOGGLE	ME452-0102-7401

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE, HERMETICALLY SEALED, 4P2P - LEFT AND RIGHT ORBITER EXTERNAL TANK (ORB/ET) UMBILICAL DOOR CENTERLINE LATCHES

REFERENCE DESIGNATORS: 32V73A2548

QUANTITY OF LIKE ITEMS: 1
ONE

FUNCTION:
PROVIDES THE CREW WITH THE CAPABILITY TO REMOTELY STOW THE CENTERLINE LATCHES OF THE LEFT AND RIGHT ORB/ET UMBILICAL DOORS. IN THE "GND" POSITION, THE SWITCH HAS NO OUTPUT. THE LATCHES ROTATE AND STOW WITHIN THE VEHICLE MOLD LINE WHEN THE SWITCH IS IN "STOW" POSITION.

1409

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6ED-2027-03

REVISION# 2 08/06/90 R

SUBSYSTEM: EPD&C - ET UMBILICAL DOORS
LRU :PANEL R2 CRITICALITY OF THIS
ITEM NAME: SWITCH, TOGGLE FAILURE MODE:1R2

■ FAILURE MODE:
FAILS OPEN, SHORT-TO-CASE (GROUND)

MISSION PHASE:
DO DE-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
: 103 DISCOVERY
: 104 ATLANTIS

■ CAUSE:
PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, 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:
FIRST FAILURE - LOSS OF MANUAL MODE OPERATION

■ (B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT

■ (C) MISSION:
FIRST FAILURE - NO EFFECT

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

■ (E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW/VEHICLE AFTER SECOND FAILURE (LOSS OF GPC MODE) DUE TO STRUCTURAL DAMAGE CAUSED BY THERMAL EFFECTS IF CENTERLINE LATCH IS NOT STOWED RESULTING IN INABILITY TO CLOSE AND LATCH DOORS PRIOR TO RE-ENTRY.

- DISPOSITION RATIONALE -

■ (A) DESIGN:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

■ (B) TEST:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

GROUND TURNAROUND TEST
VERIFY SWITCH FUNCTION THAT STOWS THE CENTERLINE LATCHES OF THE RIGHT/LEFT ET DOORS BY: VERIFYING INITIAL MCA STATUS, SENDING THE CENTERLINE LATCH/RELEASE COMMAND BY SOFTWARE OR SWITCH CYCLE AS APPROPRIATE, VERIFY SWITCH SCAN, AND MONITORING THREE PHASE AC CURRENTS AND OPERATING TIME. TOTAL OPERATING TIMES ARE 6 SEC (MAX) FOR TWO MOTORS AND 12 SEC (MAX) FOR SINGLE MOTOR. TESTS ARE PERFORMED INFLIGHT FOR DUAL MOTOR OPERATION, EVERY FLIGHT FOR SINGLE MOTOR OPERATION, AND LRU RETEST PER TABLE V56Z00.000.

■ (C) INSPECTION:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

(D) FAILURE HISTORY:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

(E) OPERATIONAL USE:
AFTER FIRST FAILURE, THE CREW WILL PERFORM THE CENTERLINE LATCH STOWING SUBSEQUENT DOOR CLOSURE AND LATCHING WITH THE GPC SOFTWARE THROUGH A KEYBOARD ITEM ENTRY.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE 1411
NUMBER: 05-6ED-2027-03

- APPROVALS -

RELIABILITY ENGINEERING	T. AI	
DESIGN ENGINEERING	J. KRAGER	
QUALITY ENGINEERING	W. R. HIGGINS	
NASA RELIABILITY		
NASA SUBSYSTEM MANAGER		R. M. Ballentine 10/25/90
NASA EPD&C RELIABILITY		
NASA QUALITY ASSURANCE		9/24/90
NASA EPD&C SUBSYS MGR		