

PAGE: 1

PRINT DATE: 01/13/94

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE
NUMBER: 05-6N-2013-X**

SUBSYSTEM NAME: EPD&C - AUXILIARY POWER UNIT

REVISION: 2 01/13/94

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: PANEL R2	V070-730277
SRU	: SWITCH, TOGGLE	ME452-0102-7463

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE, 4 POLE 2 POSITION - AUXILIARY POWER UNIT (APU) FUEL TANK ISOLATION VALVE CONTROL

REFERENCE DESIGNATORS: 32V73A2S35
32V73A2S36
32V73A2S37

QUANTITY OF LIKE ITEMS: 3
THREE

FUNCTION:
PROVIDES THE CAPABILITY FOR THE CREW TO REMOTELY CONTROL THE POSITION (OPEN/CLOSE) OF TWO PARALLEL REDUNDANT APU TANK ISOLATION VALVES FOR EACH OF THE THREE AUXILIARY POWER UNITS (APU'S).

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - AUXILIARY PWR FMEA NO 05-6N -2013 -4 REV:12/21/87

ASSEMBLY : PANEL R2				CRIT. FUNC:	1R
P/N RI : ME452-0102-7463				CRIT. HDW:	3
P/N VENDOR:		VEHICLE	102	103	104
QUANTITY : 3		EFFECTIVITY:	X	X	X
: THREE		PHASE(S):	PL X	LO X	OO X
:			DO X	LS X	

PREPARED BY:		REDUNDANCY SCREEN:	A-PASS	B-FAIL	C-PASS
DES	A BAIZ	APPROVED BY:	APPROVED BY (NASA):		
REL	T KIMURA	DES	SSM		
QE	J T COURSEN	REL	REL		
		QE	QE		

EPD&C SSM

ITEM:

SWITCH, TOGGLE, 4 POLE 2 POSITION - AUXILIARY POWER UNIT (APU) FUEL TANK ISOLATION VALVE CONTROL

FUNCTION:

PROVIDES THE CAPABILITY FOR THE CREW TO REMOTELY CONTROL THE POSITION (OPEN/CLOSE) OF TWO PARALLEL REDUNDANT APU TANK ISOLATION VALVES FOR EACH OF THE THREE AUXILIARY POWER UNITS (APU'S). 32V73A2S35, S36, AND S37

FAILURE MODE:

CONTACT-TO-CONTACT SHORT, POLE-TO-POLE SHORT

CAUSE(S):

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

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY:

(A) PROVIDES ONE OF THE TWO LOGIC SIGNALS REQUIRED TO TURN ON THE UPSTREAM HDC TYPE 3 DRIVER TO THE TANK ISOLATION VALVE SOLENOID.

(B) NO EFFECT - FIRST FAILURE. REDUNDANT SERIES DRIVERS WILL PRECLUDE INADVERTENT ENERGIZING OF THE ASSOCIATED VALVE SOLENOID. A THIRD FAILURE IN THE SAME CIRCUIT COULD ALLOW SOLENOID ENERGIZING AND OVERHEATING ON ORBIT WHEN APU FLOW COOLING IS ABSENT.

(C,D) NO EFFECT - FIRST FAILURE. THIRD SIMILAR FAILURE IN SAME VALVE CIRCUIT COULD CAUSE MISSION, CREW/VEHICLE LOSS UNLESS CREW TAKES ACTION BY OPENING CIRCUIT BREAKER.

(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THREE OTHER FAILURES (HDC TYPE 3 POWER DRIVER FAILED ON, HDC TYPE 4 GROUND DRIVER FAILED ON, AND THE INABILITY TO MECHANICALLY OPEN A CIRCUIT BREAKER) DUE TO FUEL (HYDRAZINE) DECOMPOSITION AND VALVE/LINE RUPTURE.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - AUXILIARY PWR FMEA NO 05-6N -2013 -4 REV:11/21/87

FIRST FAILURE OF THIS TOGGLE SWITCH MAY NOT BE DETECTABLE IN FLIGHT SINCE THE OPERATIONAL STATUS OF MOST OF THE SWITCH CONTACTS ARE NOT MONITORED WITH SWITCH SCANS.

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE:

(A-D) DISPOSITION AND RATIONALE

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

(B) GROUND TURNAROUND TEST

FUEL ISOLATION VALVE CIRCUIT CHECK WITHOUT BUS DROPS PERFORMED EVERY FLOW

(E) OPERATIONAL USE

REMOVE POWER VIA CIRCUIT BREAKERS BASED ON TEMPERATURE INDICATIONS.