

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - ATCS/FES FMEA NO 05-SWE-2001 -1 REV:06/10/88

ASSEMBLY : PANEL L1A2 CRIT. FUNC: 2  
P/N RI : ME452-0093-5031 CRIT. HDW: 2  
P/N VENDOR: VEHICLE 102 103 104  
QUANTITY : 1 (ONE) EFFECTIVITY: X X X  
: PHASE(S): PL LO OO X DO LS  
:

REUNDANCY SCREEN: A- B- C-  
PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
DES J BROWN DES R. V. Brown SSM Bill Kittering  
REL M HOVE REL Missy Clayton 6-21-88 REL OPB David D. Blum 4/28/88  
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SSM 7/1/88  
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ITEM:  
SWITCH, ROTARY. TOPPING DUCT HEATERS.

FUNCTION:  
ACTIVATES FES CONTROL CIRCUITRY FOR DUCT HEATERS IN THE TOPPING EVAPORATOR. 31V73A1A2S39.

FAILURE MODE:  
AILS OPEN, FAILS CLOSED IN THE "OFF" POSITION, SHORT-TO-CASE (GROUND).

CAUSE(S):  
PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY

EFFECT(S) ON:  
(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE  
(A) LOSS OF TOPPING DUCT HEATERS  
(B) LOSS OF TOPPING EVAPORATOR  
(C) MINIMUM DURATION FLIGHT FOR LOSS OF TOPPING EVAPORATOR AND POSSIBLE LOSS OF MISSION OBJECTIVES, A CRITICALITY 202 CONDITION.  
(D) NO EFFECT.  
(E) FUNCTIONAL CRITICALITY EFFECT - LOSS OF ALL ORBITER COOLING CAN CAUSE LOSS OF CREW/VEHICLE, A CRITICALITY 1R3 (P,P,P) CONDITION WITH THE FOLLOWING SCENARIO: (1) WITH LOSS OF TOPPING EVAPORATOR, ONE ADDITIONAL FAILURE CAN SHUT DOWN THE FES - LOSS OF THE HIGH-LOAD EVAPORATOR. (2) FOR SAFE RETURN TWO OF THE THREE ORBITER COOLING SYSTEMS - FES, ABS, AND COLD-SOAKED RADIATORS - ARE REQUIRED. WITH LOSS OF THE FES, FAILURE OF EITHER OF THE OTHER TWO SYSTEMS WOULD CAUSE LOSS OF CREW/VEHICLE.

DISPOSITION & RATIONALE:  
\ ) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE  
(A-D) DISPOSITION AND RATIONALE  
REFER TO APPENDIX A, ITEM NO. 2 - ROTARY SWITCH.

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(B) GROUND TURNAROUND TEST

SELECT EACH POSITION OF THIS DUCT HEATER CONTROL SWITCH AND VERIFY TEMPERATURE INCREASE FOR EACH TEMPERATURE MEASUREMENT. TEST IS PERFORMED FOR EVERY FLIGHT.

(E) OPERATIONAL USE

ACTIVATE SECONDARY FES CONTROLLER FOR HI LOAD EVAPORATOR AT ENTRY.