

CEL
EMU CRITICAL ITEMS LIST

12/24/93 SUPERSEDES 12/24/91

ANALYST:

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NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
FAN SWITCH, ITEM 366 ----- BV771007-3 (1)	2/M	366FMD4: Short circuit from fan power input to case. CAUSE: Contamination, faulty wiring.	EMU ITEM: A conductive path between fan power (SCU or battery) and ground. OPE INTERFACE: The fan power would short to case and there would be excessive current draw. If LV, vehicle power supply would shut down. If EVA, direct short across battery would cause return trace in BCM to fuse open. MISSION: Terminate EVA. CREW/VEHICLE: None for single failure. Possible loss of crewman with Loss of SOP.	A. Design - Switching mechanism and contacts encased in a hermetically sealed case backfilled with dry nitrogen. The stationary contacts are a part of the external lugs. No interconnecting wiring to short out. The lead wires (M22759/12) are soldered to the external switch terminals per MHB5300.4 (3A-1). This area is then potted with styccast to provide strain relief for the leads. The wire bundle is designed to withstand a pull force of 8 lbs. without damage or degradation. B. Test - Component Acceptance Test - Vendor acceptance tests include 500 actuation cycles, contact resistance, insulation resistance, and dielectric withstanding voltage tests. In-Process Test - Switch operation and continuity are verified during in-process tests during BCM Item 350 assembly. PDA Test - Proper operation is verified during BCM PDA which includes continuity, functional tests, and operating force. The switch is vibrated and exposed to thermal cycles during PDA as part of the BCM. Certification Test - This item completed the 15 year structural vibration and shock cert requirement during 10/83. The item is cycle certified by similarity to the Item 368 switch. The Item 368 switch has completed 127,000 cycles during 6/85 which is 31 times the cycle cert requirement of 4,146 cycles. EC42806-599-7 added a lead to the fan switch for the redesigned BCM. This created the -2 switch configuration Switch certification was not affected. C. Inspection - The external lead wires are inspected for damage as part of source inspection for the part and again during assembly of the BCM. To preclude failure due to internal contamination, the switches are assembled by the vendor in a Class 100,000

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	2/1R	356PNO4:		<p>clean room. The switches are flushed internally using chloroethane B6 and Genealove D to remove contaminants prior to case welding. After welding the switches are vacuum baked and back filled with GN2 to a pressure of 3-5 psig and sealed.</p> <p>Leak checks are performed during subsequent processing to verify seal integrity. Two x-ray inspections are performed, prior to run-in cycling and after vibration, to verify absence of weld splatter and loose pieces, and to verify contact alignment.</p> <p>D. Failure History - None.</p> <p>E. Ground Turnaround - Switch operation is verified per FEMU-R-001, V1103-02 Baseline Data.</p> <p>F. Operational Use - Crew Response - PreEVA: troubleshoot problem, if no success, consider third EMU if available. Otherwise, EMU no go for EVA. EVA/PostEVA: Open helmet purge valve, terminate EVA. Training - Standard training covers this failure mode. Operational Considerations - EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Flight rules define go/no go criteria related to EMU ventilation flow. Real Time Data System allows ground monitoring of EMU systems.</p>