

CIL  
EMU CRITICAL ITEMS LIST

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ANALYST:

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NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
CAUTION AND WARNING SYSTEM SWITCH, ITEM 368 ----- SV767792-2 (1)	2/2	368FMDG: Switch jams in the status display position or status display contacts weld.  CAUSE: Contact weld by arcing or a failure of the hermetic seal and exposure to vacuum; jamming; shorting due to contamination.	END ITEM: Loss of CWS display capability.  OPE INTERFACE: First message would be displayed, however, no new status messages could be called up. Display would turn off after 20 seconds. New fault warning messages would still be displayed until acknowledged.  MISSION: Terminate EVA. Loss of use of one EMU.  CREW/VEHICLE: None.	A. Design - Switch mechanism and contacts squeezed in a hermetically sealed case backfilled with dry nitrogen. The switch is designed to withstand a toggle force of 25 lbs. without degradation in subsequent performance. Contact is accomplished through a roller-type contact. This keeps switch forces to a minimum. The toggle/case interface is accomplished through a welded bottom which keeps switching forces to a minimum.  B. Test - Testing - Component Acceptance Test - Vendor acceptance tests include 500 actuation cycles, contact resistance, and dielectric withstanding voltage tests.  In-Process Test - Switch operation and continuity are verified during four separate in-process tests during DCN Item 350 assembly.  PDA Test - Proper operation is verified during DCN PDA which includes continuity, functional tests, and operating torque. The switch is vibrated and exposed to thermal cycles during PDA as part of the DCN.  Certification Test - The item completed the 15 year structural vibration and shock cert requirement during 16/83. The item was cycle certified by completing 127,000 cycles during 8/85. No Class I Engineering changes have been issued since this configuration was certified.  C. Inspection - To preclude failure due to internal contamination, the switches are assembled by the vendor in a Class 100,000 clean room. The switches are flushed internally using chloroform 80 and Genesive D to remove contaminants prior to case welding. After welding, the switches are vacuum baked and backfilled with GN2 to a pressure of 3-5 psig and sealed. Leak checks are performed during subsequent processing to verify seal integrity. X-ray inspections are performed, prior to run-in cycling and after vibration, to

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	2/2	368FM04:		verify absence of weld splatter and loose pieces, and to verify contact alignment.

D. Failure History -  
None.

E. Ground Turnaround -  
Tested per FEMU-2-001, Transducer and DCN Sage Calibration Check.

F. Operational Use -  
 Crew Response - PreEVA: If detected during EMU checkout or programmed leak check, discontinue use of EMU. Use third EMU if available.  
 EVA: When detected during periodic status check, troubleshoot using RTDS. Terminate EVA.  
 Training - Standard EMU 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 CNS. Real Time Data System allows ground monitoring of EMU systems.