

CIL
EMU CRITICAL ITEMS LIST

12/26/91 SUPERSEDES 01/02/90

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ANALYST:

| NAME P/N QTY | CR11 | FAILURE MODE & CAUSES | FAILURE EFFECT | RATIONALE FOR ACCEPTANCE |
|---|------|--|---|--|
| ELECTRICAL SIGNALS HARNESS, ITEM 152 ----- SV780152-2 (1) | 2/2 | <p>152FH00: Electrical short or open from battery voltage sense (+) line to ground.</p> <p>CAUSE: Cable chafing against connector shell or shield. Improper connector strain relief. Faulty connection between the connector and the lead wires.</p> | <p>END ITEM: Short or open from battery voltage sense (+) line to ground. Indication of low (zero) battery voltage.</p> <p>GPE INTERFACE: (BATT VDC LOW) (BATT VDC XH.N) Warning message issued.</p> <p>MISSION: False warning that battery has failed. Terminate EVA.</p> <p>CREW/VEHICLE: None.</p> | <p>A. Design - Each connector/cable interface is strain relieved by potting the conductors in place. A rubber backshell is soldered over the connector/cable interface. Each connector/adaptor ring interface is laced in place to prevent rotation by a mechanical lock and an adhesive lock. #24 AWG teflon coated wire provides the required insulation resistance and resistance to breakage. The conductors are bundled within a woven copper shield over braided with Nomex outer sheath. These cause the cable to act together and share any loading and resist any damage from abrasion and impact. Wire crimping is per SWST409 (based on MSFC-Spec-0-1A).</p> <p>B. Test - Component acceptance test - The 152 harness is subjected to acceptance testing per EM-EMM-PS2 prior to final acceptance testing. This testing includes the following tests which insures there are no workmanship problems which would cause an electrical short to ground or an open circuit in the battery voltage sense line. The insulation resistance and dielectric strength between each conductor and the shield ground is measured to insure there are no shorts. Each connector/cable interface is pull tested (10 pounds) to detect any workmanship problems which would cause a short circuit. Continuity testing of each conductor is performed after pull testing to insure there were no open circuits.</p> <p>PDA Test - The battery voltage sense line is functionally checked during PLSS PDA testing per SEMU-60-010, test 46.0 to insure there are no shorts to shield ground or opens which affect the performance of the PLSS.</p> <p>Certification Test - This item has completed the structural vibration and shock certification requirements during 10/83. Engineering change 42806-527-2 (added a connector pull test) has been incorporated and certified since this configuration was certified.</p> |

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|--------------------|------|-----------------------------|----------------|--------------------------|
| | 2/2 | 152#HDB; | | |

C. Inspection -
To insure there are no workmanship problems which would cause a short or open circuit in the harness conductors, the following inspections are performed.

Harness cables and conductors are visually inspected prior to assembly to insure there are no defects which could cause a short to ground or an open circuit due to defects in the cable insulation.

Connector wiring is inspected before and after potting to insure there is no conductor damage and the conductors are properly strain relieved and properly dressed to prevent conductor shorting to the adapter ring or an open circuit.

Insulation resistance and dielectric strength are measured between each conductor and shield ground to insure there are no shorts prior to and after potting of the connectors.

Contact crimp samples are made prior to the start of contact crimping and at the conclusion of crimping and subjected to a pull test to insure the crimping tools are operating properly. This insures there will not be any high resistance problems at the conductor.

D. Failure History -
None for this failure mode. Related failure:
J-EMU-152-0001 (6-17-80)

An open circuit in the hard line comm. line was found during functional testing. The failure was determined to be caused by the pulling and twisting the harness was normally exposed to during installation on the PLSS.

16fa handling caused the wire to break. EC 42803-285 revised cable lengths and improved cable flexibility.

H-EMU-152-A001 (7-9-84)
During PLSS Acceptance Testing, all sensor outputs read full scale. A short circuit in the harness was found between Vref and ground. The short was due to improper assembly and testing by the vendor. The vendor's assembly and test procedures were revised.

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| NAME P/N QTY | CRII | FACURE MODE & CAUSES | FAILURE EFFECT | RATIONALE FOR ACCEPTANCE |
|--------------------|------|----------------------------|----------------|---|
| | 2/2 | 152PH00: | | <p>J-EMU-152-002 (4-11-85) During a pre-flight communications check, it was not possible to transmit through the right microphone on the CCA. The failure was caused by a short circuit between the right microphone power line and the cable grounding shield. The insulation on the power line has been damaged prior to the cable assembly. EC 42806-527-2 was issued to create the SV789192-2 harness configuration by adding a connector pull test to the acceptance testing requirements.</p> <p>E. Ground Forwarded - Ground turnround tested per FEMU-R-001, EMU Performance Chamber Run, BCM display.</p> <p>F. Operational Use - Crew Response - PreEVA: When OMB data confirm improper battery lead, troubleshoot problem. Swap EMU battery using verified good spare(s). Consider third EMU if available. Continue EVA prep. EVA: if comm is available and fan RPM's are nominal, continue EVA. Training - Standard training covers this failure mode. Operational Considerations - EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Real Time Data System allows ground monitoring of EMU systems. Flight rules define go/no go criteria related to EMU battery voltage sensor.</p> |