

NAME P/N QTY	CRT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
ELECTRICAL POWER HARNESS, ITEM 151 ----- SK789151-4 (1)	2/M	151FM04: Electrical short in Fan Switch Line.  CAUSE: Cable chaffing against connector shell or shield. Improper connector strain relief.	END ITEM: Short circuit across battery.  DIE INTERFACE: Loss of power to PLSS (no fan, no communications). Current meter shunt will fuse open.  MISSION: Loss of one EMU, Terminate EVA.  CREW/VEHICLE: None for single failure. Possible crew loss with loss of EOP.	A. Design - Short circuits in any of the circuits in the Item 151 harness are minimized by the following: Conductors are hard potted in Scepter 2651 in the area that they interface with the metal backshell to minimize their movement and chance of shorting to the backshell. The conductors are strain relieved at the connector/harness interface with a molded rubber backshell. This minimizes the effects of cable tension on the individual conductors. Conductors are sheathed within a woven Kevlar outer layer. This holds the cables together to share any loading. #22 and #24 AWG Teflon jacketed wires provide electrical and mechanical properties which help prevent breakage. Each connector/adaptor ring interface is locked in place to prevent rotation by a combined mechanical and adhesive lock.  B. Test - Component Acceptance: The harness is acceptance tested per the following tests of AT-EMU-151 to insure there are no workmanship problems which could cause short circuits. Pull Test - This test subjects each connector/harness interface to a specific pull test (9 pounds) designed to exceed any stress encountered in actual use. The insulation resistance between each conductor and the ground circuit is measured during the test to insure there is no shorting. The test is followed by a continuity check of each conductor path to insure there are no open circuits.  POA: The fan switch lines are checked during the Performance portion of PLSS POA testing per para. 46.8 of SEMU-80-010.  Certification: This item has completed the 15 year structural vibration and shock certification requirements during 10/83. Engineering Changes 42804-527-2 (insulation resistance check during Pull test) and 52804-865 (remove crimp splices) have been incorporated and certified by test since this configuration was certified.  C. Inspection - During harness manufacturing, the following inspections are

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	2/1A	151F004:		<p>performed to insure there are no short circuits. Visual inspection of conductors prior to potting operations to insure there are no damaged conductors and that the conductors are routed properly.</p> <p>Visual inspection of the harness prior to and after rubber boot molding process to insure there are no damaged conductors which could cause a short circuit.</p> <p>In-process electrical checkouts of the harness before and after potting and molding to insure there are no short circuits.</p> <p>Visual inspection of the conductors prior to application of the outer sheath to insure there are no damaged conductors that could cause a short circuit.</p>

g. Failure History -

The following A09's were issued for Item 15t due to short circuits:

H-EMU-151-0803 (8-27-84)

The harness failed electric Acceptance testing.

Investigation determined the cause of the failure to be an intermittent short circuit between the warning tone line and the P3 connector body. This was due to improper strain relief of the wire which allowed it to come in contact with the connector adapter ring. The wire insulation was broken when the rubber backshell was molded to the connector. Class I EC 42806-827-2 created the SV789153-3 harness configuration by adding a connector pull test requirement to the acceptance test requirements. Class I EC 42806-865 created the SV789153-4 harness configuration by eliminating the two splices in the P9 connector, to prevent them from shorting to case.

J-EMU-151-804 (6/12/85) -

S-EMU-151-805 (6/12/85) -

Both failures occurred during an ETA Airlock Power supply functional test. The failures were caused by a short circuit between the EVC power/battery sense (+) line and case ground (connector body). The failure caused the power return line in the DCN to fuse open. The failure investigation found that a crimp splice within the molded backshell was not sufficiently covered by shrink tubing. The exposed portion of the crimp was allowed to come in contact with the connector body.

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	2/1N	IS17M04:		<p>E. Ground Turnaround - Tested per FEMU-R-001, Water Servicing, Leakage, and Gas Removal.</p> <p>F. Operational Use - Crew Response - PreEVA: Trouble sheet problem. Consider third EMU if available. If no success terminate EVA prep. EVA: When CMS data confirms improper battery load, open helmet purge valve, deactivate fan and water switches. Terminate 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 ventilation.</p>

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