

12/24/91 SUPERSEDES 01/02/90

ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
ELECTRICAL SIGNALS HARNESS, ITEM 152 ----- SV789152-2 (1)	2/18	<p>ISSUES: Electrical short or open in discrete lines from DCN to CWS.</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: No signal to CWS for the state of eight discrete signals. Battery power on, feeder valve on, fan on, O2 actuator positions.</p> <p>GFE INTERFACE: CWS would get erroneous discrete signal and possible erroneous warning message.</p> <p>MISSION: None for first failure.</p> <p>CREW/VEHICLE: None for single failure. Fan switch discrete is worst case effect. Possible crew loss for a second failure (low vent flow) because crew would not be alerted to CO2 buildup in helmet.</p>	<p>A. Design - The following design considerations have been incorporated to prevent an open or short in the discrete lines (the applicable cable/connector interfaces are strain relieved by a molded rubber strain relief boot to reduce the chance of wire fatigue during use. The conductors are banded within a woven copper strand sheath which causes them to act together and share any loading placed on it. A woven Kevlar sheath is assembled over the shielded cables to provide protection from abrasion and impact. The conductors are hand potted within the adapter ring to prevent their chaffing against the metal adapter ring. Each connector/adapter ring interface is locked in place to prevent rotation by a mechanical lock and an adhesive lock. Wire crimping is per SSKM009 (based on MSFC-Spec-9-1A).</p> <p>B. Test - Component Acceptance Test - The 152 harness is subjected to acceptance testing per AT-EMU-152 prior to final acceptance testing. This testing includes the following tests which insure there are no workmanship problems which would cause an electrical short to ground or an open circuit in the discrete lines. 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 could 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 H8/10 level microphone lines are functionally checked during PLSS PDA Testing per SSM-60-010, text 6.0, to insure there are no shorts to shield ground or opens which affect the performance of the PLSS.</p> <p>Certifications: This item has completed the structural vibration and shock certification requirements during RQAS. Engineering change 42886-527-2 (added connector pull test) has been incorporated and certified since this configuration.</p>

12/24/91 SUPERSEDES 01/02/90

ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/1A	152FMD4:		

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 that 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 conductors.

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 Failures:

J-EMU-152-001 (8-17-80)

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. This handling caused the wire to break.

Corrective Action:

EC 62803-285 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 Vred and ground. The short was due to improper assembly and testing by the vendor.

EIL
EMU CRITICAL ITEMS LIST

12/24/91 SUPERSEDES D1/02/90

ANALYST:

Page: 3
Date: 12/13/91

NAME P/N QTY	CRSF	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	Z/W	152FND4		<p>Corrective Actions: The vendor's assembly and test procedures were revised. 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. Corrective Action: EC 42846-527-2 was issued to create the SV759152-2 harness configuration by adding a connector pull test to the acceptance testing requirements.</p> <p>E. Ground Turnaround - Tested per FEMU-R-001, Transducer and DCM Gauge Calibration Check.</p> <p>F. Operational Use - Crew Response - PreEVA: trouble shoot problem, consider third EMU if available. If status list valid, EMU is go for EVA, otherwise terminate EVA prep. EVA: If status list valid, EMU is go to continue EVA. Training - EV crew is trained to recognize the symptoms of high CO2. 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 CMC. Real Time Data System allows ground monitoring of EMU systems.</p>