| NAME P/N QTY | CRIT | FAILURE MODE & CAUSES | FAILURE EFFECT | RATIONALE FOR ACCEPTANCE |
|---|---|---|---|---|
| | | 330FM08 | | |
| COMMON MULTIPLE CONNECTOR, ITEM 330<br>---<br>SV778872-26<br>(1) | 2/2 | Electrical open, vehicle power line.<br><br>Loose or broken terminal or connection. | END ITEM:<br>Loss of ability to power the EMU with vehicle power.<br><br>GFE INTERFACE:<br>No vehicle power to power EMU. IVA activity on battery will consume battery charges.<br><br>MISSION:<br>Loss of use of one EMU.<br><br>CREW/VEHICLE:<br>None.<br><br>TIME TO EFFECT /ACTIONS:<br>Seconds.<br><br>TIME AVAILABLE:<br>N/A<br><br>TIME REQUIRED:<br>N/A<br><br>REDUNDANCY SCREENS:<br>A-N/A<br>B-N/A<br>C-N/A | A. Design -<br>The housing for the electrical connector and the connector housing are designed to provide a floating position for the connector. This in turn accomodates mating tolerances to minimize the force and properly align connector pins during mating. The connector back and electrical leads are physically isolated from other EMU hardware by a metal cover. The leads are bundled together and laced to minimize strain at the connections.<br><br>B. Test -<br>Component Acceptance:<br>A continuity test is run on each of the electrical pins in the multiple connector per AT-E-385. Continuity is measured from the J1 connector to the P1 connector and must not exceed 0.120 ohm except for the J1-16 to P2-15 line which must be 0.250 ohm maximum.<br><br>PDA Test -<br>A continuity test is performed per SEMU-60-015 in which each of the wires attached to the multiple connector electrical connector is continuity tested for a maximum resistance of 1.0 ohm.<br><br>Certification Test -<br>Certified for a useful life of 15 years.<br><br>C. Inspection -<br>A continuity test is performed at the SV774161 External Harness Assembly level to verify no open circuits exist.<br><br>D. Failure History -<br>J-EMU-000-005 (5-21-81) -<br>No DCM display or Pressure Gauge light indication with SCU attached and Power Mode Switch in Vehicle Position. Visual inspection of SCU/DCM connectors showed sheet metal shrouds surrounding J-1 electrical connector and connecting pins were damaged enough to prevent proper mating and electrical continuity. EC's 42803-425 and 42803-498 processed to create new config. multiple connectors which incorporate floating DCM electrical connectors to prevent damage during mating.<br><br>J-EMU-330-002 (5-21-81) -<br>Resistance between connector pins J3-35 and J3-36 was 7.45K ohms. Spec:less than one ohm. Failure caused by improper assembly, resulting in a non-mated condition. All DCM's radiographically inspected for this condition; assembly procedures modified.<br><br>J-EMU-300--011 (10/6/93) - At conclusion of EVA #23 of the 25-EVA test series, all power was lost to the EMU after the power mode switch was moved from BATT to SCU. Cause of power dropout could not be isolated. No corrective action taken.<br><br>J-EMU-300-A004 (03/03/97) - During STS-83 ETA power functional test, DCM 3006 would not run on SCU power when power was present at SCU/DCM interface. Failure caused by P2 harness loose terminal lugs at L101 inductor. Electrical lugs are clamped between terminal nut and inductor's fiberglass top surface. Loose due to material creep of epoxy bonding, or epoxy fiberglass inductor top. EC 182135- |

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|---|---|---|---|---|
| | | 330FM08 | | |

104 issued to incorporate double nut config., which will sandwich electrical lugs between metallic nuts and washers and eliminate creep.

B-EMU-300-A012 (03/07/97) - Field inspection (based on RDR J-EMU-300-A004 failure) found loose wires at L101 inductor connector. Corrective action tracked by RDR # J-EMU-300-A004.

B-EMU-300-A013 (03/20/97) - Field inspection (based on RDR J-EMU-300-A004 failure) found loose wires at L101 inductor connector. Corrective action tracked by RDR # J-EMU-300-A004.

B-EMU-300-A014 (05/14/97) - Field inspection (based on RDR J-EMU-300-A004 failure) found loose wires at L101 inductor connector. Corrective action tracked by RDR # J-EMU-300-A004.

B-EMU-300-A015 (05/15/97) - Field inspection (based on RDR J-EMU-300-A004 failure) found loose wires at L101 inductor connector. Corrective action tracked by RDR # J-EMU-300-A004.

B-EMU-300-A016 (05/15/97) - Field inspection (based on RDR J-EMU-300-A004 failure) found loose wires at L101 inductor connector. Corrective action tracked by RDR # J-EMU-300-A004.

B-EMU-300-A017 (05/15/97) - Field inspection (based on RDR J-EMU-300-A004 failure) found loose wires at L101 inductor connector. Corrective action tracked by RDR # J-EMU-300-A004.

B-EMU-330-F001 (12/24/99) - During STS-103 on orbit, prior to airlock repress at the end of EVA#3, the airlock power supply (ALPS) would not power EMU-3 with the SCU connected. Inspection found two pins bent on DCM side connector.
Most probable root cause of bent pins was inadvertent contact with SCU multiple connector during airlock process. Wording of EVA checklist modified to ensure DCM cover remains in place as long as possible to minimize contact risk.

E. Ground Turnaround -
Tested for non-EET processing per FEMU-R-001, V1103.02 Orbiter Checkout. FEMU-R-001 Para 8.2 EMU Preflight KSC Checkout for EET processing.

F. Operational Use -
Crew Response -
Pre/PostEVA: Troubleshoot problem, if no success continue EVA operations. Deactivate airlock power supply, operate EMU on battery power, perform battery swap as required. 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 SCU power.

EXTRAVEHICULAR MOBILITY UNIT

SYSTEMS SAFETY REVIEW PANEL REVIEW

FOR THE

I-330 COMMON MULTIPLE CONNECTOR

CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

Prepared by: _____ 5/22/02
HS - Project Engineering

Approved by: _____ 6/26/02
NASA – ~~SSA~~/SSM
455

_____
HS - Reliability

_____
NASA – EMU/SSM

_____
HS - Engineering Manager

_____ 6/26/02
NASA - S &MA

_____ 6/27/02
NASA - MOD

_____ 7/1/02
NASA - Crew

_____ 7-1-02
NASA - Program Manager for Brian Johnson