

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
In-line cable voltage regulator (ILCVR) , I-801 ----- 0801-112983 (1)	2/2	801FM01 Open circuit of ILCVR Open wiring, damaged LEMO plug connector, defective VR or capacitor.	END ITEM: Loss of electrical power to thermofoil heaters. GFE INTERFACE: Loss of active heating in glove fingertip area. MISSION: Terminate EVA. CREW/VEHICLE: None. TIME TO EFFECT /ACTIONS: Minutes. TIME AVAILABLE: N/A TIME REQUIRED: N/A REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	A. Design - The ILCVR consists of two (2) Lemo connectors, a stainless steel block and a cable assembly. The cable assembly is constructed of insulated 24 ga. soft copper wire which complies with MIL-C-27500. The cable assembly is attached to the block via screws at the voltage regulator (VR) tabs. Heat shrink on the cable assembly is polyolefin and is used as an insulator and strain relief. Hysol EA934NA epoxy resin is used to pot the VR's, capacitors, and a portion of the cable assembly to provide for thermal transfer of heat from the VR's to the block and for strain relief of the wires. The ILCVR contains two (2) Texas Instruments uA78M09C fixed-voltage integrated circuit VR's. Output regulation is between 8.5 and 9.2 VDC with an input voltage of 11.0 to 35.0 VDC. Each of these regulators can deliver up to 700 mA of output current under load. The VR manufacturer recommends that each VR operates over the virtual junction temperature range of 0 degrees C to 125 degrees C. The VR environment will not go outside this range. The ILCVR contains two (2) 1.0 uF (P/N M39014/2-1419) capacitors manufactured by ABX Corp. The capacitors are used to stabilize the output voltage of the VR and for elimination of noise. One VR and one capacitor is used on each glove circuit. The capacitors are rated for 50 VDC over the nominal output voltage of 8.5 to 9.2 VDC. The connectors are LEMO series K connectors which are environmental connectors with triple wall construction to provide water and dust resistance. The LEMO connectors utilize a "QuickLok" feature that assures connection when the lock is engaged. The locking mechanism is protected by a rugged outer shell, eliminating accidental disconnections and damage to the locking mechanism, cable, or contacts. The connectors have a contact arrangement of five pins and are mechanically keyed with an alignment key on the shell which prevents errors in alignment. The contact terminations are crimps, performed per NHB 5300.4 3(H) by NASA certified technicians. A crafted metal collet type strain relief is provided to secure the cable around its circumference preventing accidental damage to the connection if the cable is stressed. In addition, a shrink tubing strain relief is placed over the end of the LEMO connector at the junction of the cable to the connector to provide additional strain relief. The connectors meet the electrical requirements for both voltage and current derating per MIL-STD-975. B. Test - Acceptance: See Inspection. Certification: The requirements of significance and accompanying certification rationale for the ILCVR are documented in ILC EM 01-0008 and HS EMUM1-0597. C. Inspection - A 168 hour burn-in test will be performed on the VR's with a 12.0 (+/- 0.5) VDC input while monitoring the output to verify it is between 8.5 - 9.2 VDC prior to assembly. VR's that were previously delivered and didn't have the burn-in will be accepted as is based on rationale documented in Hamilton-Sundstrand EMUM1-

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0658 . The VR's and capacitors undergo 100% visual inspection when received. In addition, each VR received will be powered up and tested in order to segregate out those units on the high end of the manufacturer's tolerance. Next, the selected VR's will be powered at 14.0 volts under a load of 55 +/- 5 ohms for a duration of no less than 10 minutes with output voltages logged to determine that the parts are functioning as expected. Once the selected VR's are installed in the cable assembly, the cable connections will be checked for continuity and the lines that are not connected to the regulators will be checked for insulation resistance. After that check, the VR's and capacitors will be powered up under load (55 +/- 5 ohms) to determine that the units are still functioning as expected. Prior to delivery, after final assembly is complete, the unit will be checked again for continuity, and insulation breakdown. The ILCVR will then undergo a power up test at 14.0 VDC loaded with 55 +/- 5 ohms for at least 30 minutes at room ambient pressure and temperature. Six thermal cycle / environmental stress screening test will be performed for each of the ILCVR assembly that has the burn-in test. For those ILCVR units that were flown per type "A" TPS will be acceptable without these thermal cycles and the rationale will be documented in the Hamilton-Sundstrand EMUM1-0658. The connectors undergo 100% visual inspection when received from vendor. Crimp joints are visually inspected by Government Quality Assurance Inspectors when fabricated.

D. Failure History -

J-EMU-800--001 (7/11/00)

Pin (#4) recessed in connector. Found during inspection of EMU Power Harness connectors prior to fitcheck with the Rechargeable EVA Battery Assembly (REBA). Improper use of extraction tool during intended pin removal at assembly caused anomaly. Proper use of extraction tool not contained in NASA-STD-8739.4 or CTSD/ ILC fabrication procedures. CTSD procedures revised (ref. EPSP-0-288 PD # 190-00H). ILC work instructions revised (ref. EC 002-251, 002-252, 002-253). YTN issued to screen inventory.

E. Ground Turnaround -

ILCVR will be checked for continuity and electrical function per USA EMU processing and support procedure for voltage regulator P528/EPSP-0-33

F. Operational Use -

1. Crew Response -

Pre-EVA/Post EVA: Troubleshoot problem. If no success, terminate EVA.

EVA: If loss of fingertip heating occurs in one glove, turn off power to the glove, terminate EVA. If loss of fingertip heating occurs in both gloves, turn off power from battery, terminate EVA.

2. Special Training -

None.

3. Operational Considerations -

Not Applicable.

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-801 IN-LINE CABLE VOLTAGE REGULATOR
CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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 SYSTEMS SAFETY REVIEW PANEL REVIEW
 FOR THE
 I-801 IN-LINE CABLE VOLTAGE REGULATOR
 CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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