

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
FAN/SEPARATOR/ PUMP/MOTOR ASSEMBLY, ITER 123 SV787994-3 (1)	2/2	123FM08: Motor overspeed. CAUSE: Loss of speed control due to electronics failure.	END ITEM: Increase in motor speed. GPE INTERFACE: Increase in power consumption. MISSION: Termination of EVA. CREW/VEHICLE: None.	A. Design - The worst case condition of motor overspeed is loss of speed control during EVA, followed by unloading of the fan due to clogging in the vent loop. Under these conditions, the fan speed could increase to 23,588 RPM. The motor critical speed is calculated to be greater than 27,000 RPM. The trim pots are bonded (Hysol) after the adjustments are made to prevent drifting. Semiconductor failure is minimized through the use of high reliability components. Established reliability capacitors (level B) and resistors (level R) are used and are qualified to the requirements of their respective MIL specs and thermal shocked per condition B of MIL-STD-202 Method 107. The transistors and diodes are qualified to the requirements of MIL-S-19500 and receive the burn in of JANITV level parts per the applicable methods, 103B, 103P and 1040, of MIL-STD-750. The electronic components are operating within the power derating requirements of RNS 7804. The printed circuit boards are fiberglass/epoxy per MIL-P-13949 type GF or polyimide per MIL-P-13949 type G1 and manufactured per NSC-STG-156 and MHS300.4 (3A-1). The board assemblies are hard mounted to the motor case to provide a thermal transfer path between the board heatsinks and the case to direct heat away from the electronic components. The board assemblies are also conformal coated per MIL-A-66146 Dow Corning RTV 3140 for environmental protection. All wiring used in the motor is M22759/11 (teflon insulated). Soldering is per MHS300.4 (3A-1) and wire crimping is per SVNS 4909 (based on NSC-SPEC-Q-1A). All wires are strain relieved. Electrical connectors are environmentally sealed to prevent damage due to contamination and humidity. The Hall sensors are hermetically sealed to prevent damage due to contamination, humidity and pressure fluctuations. B. Test - Component Acceptance Test - AI-E-123-2 Integrity of the motor speed control is verified during EVA performance testing. The item is set to the following conditions: motor voltage 15.45-15.55 VDC, fan inlet pressure is 3.89 to 3.95 psia at a flow of 6.37 to 6.57 ACFM and a temp of 100-106 degrees F. The pump inlet pressure is 30 psia at 251-276 pph @20 and 60-89 degrees F. The speed of the motor has to be approximately 19,500 RPM. A failure of the speed control would be detected with the

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	2/2	123FH00:		<p>Inability of the motor to maintain approximately 19,300 RPM. The item is then subjected to a burnin cycle test where it must operate for 26 hours. It is cycled 3 times at 3 hours IVA and 5 hours EVA conditions. The item is performance tested again in the EVA mode as per above.</p> <p>PDA Test per SEMU-60-810 - No testing done to detect motor overspeed. The test done per A1-E-123-2 does not directly address motor overspeed, but if the speed control failed and the motor went overspeed (over 19,000 RPM) it would be detected during this test by the rfg operator.</p> <p>Certification Test - The item completed 40,000 hours of operation and 8400 on/off cycles exceeding the 15 year certification requirements by more than a factor of three. The 15 year structural vibration, electrical vibration and design shock was completed 12/84. The following engineering changes have been incorporated and certified since this configuration was certified: 42888-342-35 (change power consumption Requirement - more amps), 42886-406 (incorporate Mitronic 6B Retaining Nut), 42806-424 (Seal Cup change to assure a good weld), 42806-818 (Motor Pump changes 14M inspection in areas susceptible to contamination, more break edges and deburring operations to close RDR J-EMU-123-D10, 42806-934 (change bearing limited life requirements.</p> <p>C. Inspection - Motor speed is set to 19,300 +/- 100 RPM via potentiometer R301 on the inner board assembly during initial motor build up when boards are first wired together. Motor circuitry is cycled 5 times when out of speed control and then checked for spec RPM (19,300 +/- 300 RPM) when speed control circuitry is reinvoked. R301 pot is bonded to prevent drift (NIP). Motor speed is rechecked after boards are fully wired (first performance), after boards are stacked to housing (second performance) after electronics cover is assembled (third performance) and at final performance testing after all assembly and vibration testing is completed.</p> <p>B. Failure History - None.</p>