

CIL
EMU CRITICAL ITEMS LIST

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12/24/91 SUPERSTORES D1/02/91

ANALYST:

NAME P/N QTY	DRIF	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
FAN/SEPARATOR/ PUMP/MOTOR ASSEMBLY, ITEM 123 S1787894-8 (1)	2/2	123FM09: Increase in power consumption. CAUSE: Internal contamination, increase in bearing drag.	EMD ITEM: Continuous power to the windings. GPE INTERFACE: Increase in battery power consumption. MISSION: Terminate EVA when CMS warning message displayed. CREW/VEHICLE: None.	A. Design - Bearing preload has no cyclic load & stroke is limited. Rear bearing has slinger to keep moisture out of rear bearing. Rotating assembly is dynamically balanced, maximum force unbalance of 180 micro ounce inches and a max moment unbalance of 150 micro ounce inches. Semiconductor failure is minimized through the use of high reliability components. Established reliability capacitors (level S) 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-E-19500 and receive the burn-in of JANTRY level parts per the applicable methods, 1030, 1039 and 1040, of MIL-STD-750. The electronic components are operating within the the power derating requirements of SVMS 7806. The printed circuit boards are fiberglass/epoxy per MIL-P-13949 Type G7 or polyimide per MIL-P-13949 type G1 and manufactured per MSFC-STD-134. Parts mounting and soldering is per MSFC-STD-136 and NH8580.4 (3A-1). The board assemblies are hard mounted to the motor case to provide a thermal transfer path between the board heatlinks and the case to direct heat away from the electronic components. The board assemblies are also conformal coated per MIL-A-16846 Dow Corning RTV 3140 for environmental protection. All wiring used in the motor is H22759/11 (teflon insulated). Soldering is per NH85300.6 (3A-1) and wire crimping is per SVMS4909 (based on MSFC-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 - The item is performance tested in the EVA and IVA modes. For the various set conditions in the EVA mode, the motor current shall be 2.6 amps max. for the various set conditions in the IVA mode, the motor current shall be 4.7 amps max. The item is tested for max. current draw during start-up. The max start-up current shall be 8 amps within the first five seconds of start up. The item is then subjected to a burn-in cycle test where it must operate for 24 hours. It is cycled 3 times at 3 hours IVA

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ANALYSIS:

WAVE P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/2	123FN09:		<p>and 5 hours EYA conditions, as per above.</p> <p>POA Test - The item is performance tested in the IVA mode and the PRESS mode. For the various set conditions in the IVA mode, the motor current shall be 6.5 amps max and in the PRESS mode conditions, 4.7 amps maximum.</p> <p>Certification Test - The item completed 10,000 hours of operation and 2400 on/off cycles exceeding the 15 year certification requirement 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: 42806-342-350 (Change Power Consumption requirement more amps), 42806-406 (Incorporate Nitronic 60 Retaining Nut), 42806-426 (Seal cup change to assure a good weld), 42806-418 (Water pump changes to IOM inspection in areas susceptible to contamination and move break edges and deburring operations to close R&R</p> <p>C. Inspection - 5V787993-C1002 bearing preload fixture used during assembly and testing of the motor until the water pump is assembled is installed is designed to add the design preload to the bearings and to limit axial play to design spec. The spring retainer used with the preload tool is predimensioned and matched to the specific motor housing it is to be used on. The spring retainer and shim used to set pump dimensions relative to the specific motor housing it will be installed on are dimensioned ground then inspected. Proper grounding of these dimensions insures proper axial play and correct bearing preload. The relative assembly is blanced at 50% of spec allowable at the F/P/S level of assembly. After the flight bearings are assembled to the rotor shaft, a RIP'd operation is included to check perpendicularity of both bearings to the line bore. Also, a RIP'd inspection performed to verify shaft runout is within spec. A post vibration test check RIP'd is performed to verify bearing squareness relative to the line bore.</p>

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