

CRITICAL ITEMS LIST

ASSY NOMENCLATURE: RMS IFM D&C KIT

SYSTEM: REMOTE MANIPULATOR SYSTEM

REVISION: B

ASSY P/N: SED33103306-304

SUBSYSTEM: RMS IFM D&C KIT

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FMEA		NAME, QTY & DRAWING REF DESIGNATION	CMTY/ REDUND SCREENS	FAILURE MODE AND CAUSE	FAILURE EFFECT ON ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
5090	B	DIRECT DRIVE COMMAND SIGNAL CIRCUIT, QTY. 1 (SET OF RESISTORS (R1, R3), ZENER DIODES (D1, D2), AND CAPACITOR (C1)) SWE33103307	I/1 A - N/A B - N/A C - N/A	Mode: Zener diode D2 fails open, fails to conduct. Cause: • structural failure • mechanical stress • vibration • electrical stress • resistor R1 fails short	Joints will drive in positive direction for both positive and negative direction commands. <u>Worst Case</u> Unexpected motion. Wrong joint direction. Crew action required	<p>1. DESIGN The part is a glass encased, silicon zener diode, type 1ANTX (N753A, manufactured by Motorola and qualified to MIL-S-19500. Resistor R1 is a fixed, wire wound, established reliability part, type RWR 8957500FR, manufactured by Dale and qualified to MIL-R-39007</p> <p>2. TEST a. QUALIFICATION/CERTIFICATION.</p> <p>(1) The zener diode is qualified to MIL-S-19500/127 by Motorola. The resistor is qualified to MIL-R-39007 by Dale.</p> <p>(2) The zener diode and resistor, while installed in the RMS IFM D&C kit, have been subjected to the following qualification environmental tests: Vibration: X, Y, and Z axes - duration 15 min /axis Spectrum: 20 to 80 Hz + 3 db/Oct 80 to 350 Hz 0.067 g²/Hz 350 to 2000 Hz -3 db/Oct. Shock: 20 g sawtooth pulse, 11 ms duration, 3 axes (6 directions)</p> <p>b. ACCEPTANCE. The zener diode and resistor, while installed in the RMS IFM D&C kit, have been subjected to the following acceptance environmental tests: Vibration: X, Y, and Z axes - duration 3 min /axis. Spectrum: 20 to 80 Hz + 3 db/Oct. 80 to 350 Hz 0.04 g²/Hz 350 to 2000 Hz -3 db/Oct Shock: 20 g sawtooth pulse, 11 ms duration, 3 axes (6 directions)</p> <p>c. TURNAROUND. The RMS IFM D&C kit is visually inspected for damage between missions and will be functionally tested before every mission to assure readiness for use.</p>

PREPARED BY: J. P. Grisham

SUPERSEDING DATE: 10/89

APPROVED BY: R. E. Moore

DATE: 9/90

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ASSY NOMENCLATURE: RMS IFM D&C KIT

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FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRITY/ REDUND SCREENS	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
5090	B	DIRECT DRIVE COMMAND SIGNAL CIRCUIT, QTY. 1 (SET OF RESISTORS (R1, R3), ZENER DIODES (D1, D2), AND CAPACITOR (C1)) SIE33103307	I/1 A - N/A B - N/A C - N/A	Mode: Zener diode D2 fails open, fails to conduct Cause: • structural failure • mechanical stress • vibration • electrical stress • resistor R1 fails short	Joints will drive in positive direction for both positive and negative direction commands. <u>Worst Case</u> Unexpected motion. Wrong joint direction. Crew action required	<p>3. <u>INSPECTION.</u></p> <p>a. The zener diodes are inspected during manufacture to the requirements of MIL-S-19500. The resistors are inspected during manufacture to the requirements of MIL-R-39007.</p> <p>b. Receiving inspection verifies: (1) that the zener diodes and resistors received are as identified in the procurement documents, (2) that no physical damage has occurred to the zener diodes or resistors during shipment, (3) that the receiving documents provide adequate traceability information, and (4) acceptance test data identify acceptable parts.</p> <p>c. Parts are inspected throughout manufacture and assembly as appropriate to the manufacturing stage completed. These inspections include: (1) component mounting to the front panel of the kit, (2) soldering components, (3) wire routing, (4) stress relief of wires, etc.</p> <p>d. A test readiness review, which includes verification of test personnel, test documents, test equipment calibration/validation status, and hardware configuration, is convened by the Quality Assurance and Engineering Division in conjunction with the Engineering Directorate and Reliability and Maintainability Division.</p> <p>e. Acceptance Test Procedure (ATP) is observed and verified per procedure.</p> <p>4. <u>FAILURE HISTORY.</u></p> <p>There have been no failures associated with this failure mode on the RMS IFM D&C kit program. NSTS Program part failure history indicates no reported failures for this device. A review of GIDEP prior military part failure history reveals that no uncorrected generic issues exist.</p> <p>5. <u>OPERATIONAL EFFECTS.</u></p> <p>Joint does not respond properly to commands. Joint will drive in the positive direction when a negative direction command is given. Joint will drive in the positive direction when a positive direction command is given.</p> <p>6. <u>CREW ACTION.</u></p> <p>Remove command. Select backup mode.</p>

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FMEA		NAME, QTY & DRAWING REF DESIGNATION	CMT'Y/ REDUND SCREENS	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
5090	B	DIRECT DRIVE COMMAND SIGNAL CIRCUIT, QTY. 1 (SET OF RESISTORS (R1, R3), ZENER DIODES (D1, D2), AND CAPACITOR (C1)) SIE33103307	1/1 A - N/A B - N/A C - N/A	<p>Mode: Zener diode D2 fails open, fails to conduct.</p> <p>Cause: <ul style="list-style-type: none"> • structural failure • mechanical stress • vibration • electrical stress • resistor R1 fails short </p>	<p>Joints will drive in positive direction for both positive and negative direction commands.</p> <p><u>Work Case</u> Unexpected motion. Wrong joint direction. Crew action required</p>	<p>7. CREW TRAINING. The crew will be trained to always observe whether the arm is responding properly to commands. If it is not, the command will be removed.</p> <p>8. MISSION CONSTRAINT. The crew must be able to detect whether the arm is responding properly to commands via window and/or CCTV views during all arm operations.</p>

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