

CRITICAL ITEMS LIST

ASSY NOMENCLATURE: EVA WINCH

SYSTEM: 4.1, 4.2 AND 4.3

ASSY P/N: SED 33101570

SUBSYSTEM: 5.3

PAGE 31 OF 72

FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRITY	FAILURE MODE AND CAUSE	FAILURE EFFECT OR	RATIONALE FOR ACCEPTANCE
REF	REV				END ITEM	
3H		EVA WINCH, (2) SED 33101570	Z/R	<p>Mode: Gears break</p> <p>Cause: • Material failure</p>	<p>1. Unable to cradle RMS or payload which prevents closing payload bay doors.</p> <p>2. Unable to close payload bay doors.</p> <p>Redundancy -</p> <p>1. RMS jettison system.</p> <p>2. Second EVA winch.</p>	<p>1. <u>Design Features to Minimize Failure Mode.</u></p> <ul style="list-style-type: none"> a. Safety factor of 1.4 b. Safety margin of 1.5. c. High strength stainless steel construction d. Tolerances used on parts to minimize binding caused by temperature extremes and to allow for dry film lubrication. <p>2. <u>Test or Analysis to Detect Failure Mode.</u></p> <p><u>Acceptance</u></p> <p>Functional Test -- Complete functional testing to assure that the controls operate smoothly and that the rope can be extended and retracted.</p> <p><u>Certification</u></p> <ul style="list-style-type: none"> a. Qualification test consists of: working load test with 200lb and 600lb static loads, verification of smooth operation with static loads applied, verification that a max force (during one-hand operation) of approximately 50 lbs is exerted during ratcheting with the crank grip in the 90° position b. Stress analysis to certify this tool for 584 lb working load with 1.4 safety factor. c. Thermal qualification testing certify this tool for a temperature environment of 200°F to +350°F for 160 hours. <p><u>Turnaround</u></p> <ul style="list-style-type: none"> a. Complete functional testing will be performed once a year, or after each mission use to assure that the controls operate smoothly and that the rope can be extended and retracted b. Replace Kevlar rope after each mission use c. Inspect Kevlar rope for fraying or other damage once a year

S40207 M
 ATTACHMENT 1 -
 Page 76 of 116

CRS-31

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PAGE 32 OF 72

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REF	REV					
3H		EVA WINCH, (2) SED 33101570 (Continued)	2/1R	<p>Mode: Gears break</p> <p>Cause: Material failure</p> <p>Redundancy -</p> <p>1. RMS jettison system</p> <p>2. Second EVA winch.</p>	<p>1. Unable to cradle RMS or payload which prevents closing payload bay doors.</p> <p>2. Unable to close payload bay doors.</p>	<p>3. Inspection.</p> <p><u>Manufacturing</u> (Completed)</p> <p>a. Verify the as-built configuration.</p> <p>b. Accomplish NDE on piece parts prior to assembly</p> <p>c. Verify certificate of compliance for materials.</p> <p>d. Clean and apply lubrication according to drawing requirements.</p> <p><u>Turnaround</u></p> <p>a. During cleaning and reapplication of dry film lubrication, inspect gears for potential damage, surface contamination, and clean according to PS2891A-05001</p> <p>b. Verify completion of functional test for reacceptance</p> <p>4. Failure History.</p> <p>JH0004 - A deterioration of the control handle positioning springs that correctly position the spool pawl. New springs and spring guides have been fabricated and installed on all winch assemblies, with the exception of S/N 1001, the qualification unit. All units fitted with the new spring guide assemblies were functionally tested by reeling out 5 feet of rope, retracting by automatic reel in and ratchet handle, and verifying ratchet out feature. Reference TPS 28720018.</p> <p>5. Operational Use.</p> <p>a. <u>Operational Effect of Failure</u> The winch cannot be used if the gears break</p> <p>b. <u>Crew Action</u> The PRD can be used to close the PIBD and cradle the RMS</p> <p>c. <u>Crew Training</u> This crew action will be incorporated into the EVA crew training flow</p> <p>d. <u>Mission Constraint</u> None identified</p> <p>e. <u>In-flight Checkout</u> No in-flight checkout of the winch will take place before its use during EVA</p>

PREPARED BY P. F. Anger

SUPERSUCCESSOR

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DATE 9/28/88

S40207 M
 ATTACHMENT 1
 PAGE 77 OF 116

CRS-32