

FSL  
Critical Item List

Assembly Name/Part Number: Torque Multiplier/10155-20-19-01  
 Reference: CII 100113  
 Prepared By: C. Harlan Approved By: R. Wilby  
 Superseding Data: 9/88 Date: 1/89 Rev: A

NAME SPIN QRT	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
Knob 180159- 20299-01 Item 5.6 00g	1/1	5.4800: Physical jamming or binding of knob.  CAUSE: Contamination or foreign material between knob and upper housing or around captive screw. Broken ratchet or ratchet teeth. Loose housing screws. Thermal expansion.	IVA  LNO ITEM: Unable to turn knob.  EFE INTERFACE: Unable to loosen latch bolts.  MISSION: Unable to Jettison Payload. Terminate EVA.  CREW/VEHICLE: Loss of crew & vehicle.	A. DESIGN: Tight tolerances and close fit between knob and upper housing, ring seat and captive screw reduces the possibility of foreign material entering the knob assembly. The torque multiplier has a VC level cleanliness requirement during both the assembly and acceptance operations which is further protection from contamination.  The knob ratchet is fabricated from Custom 455, Condition A, heat treated to H1008 per MIL-H-6875 and passivated per QQ-P-33 specifications. The ratchet teeth are fabricated from 15-5 PH stainless steel and heat treated to H1075 condition. They are also passivated per QQ-P-33 specifications. High strength materials and heat treated conditions preclude wear and breakage.  The possibility of loose housing screws in the torque multiplier assembly is precluded in design by adherence to standard engineering torque requirements for screw installation and the use of thread locking adhesive. The housing screws are installed using Loctite 1242, medium strength, and torqued to 25 in/lbs to assure that they remain in place.  The shelf life of Loctite is carefully monitored to eliminate unacceptable deterioration.

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Critical Items List

Assembly Name/Part Number: Torque Multiplier/19159-20259 (1)  
 Reference: EIL 380M1  
 Prepared By: C. Hartman  
 Superceding Date: 7/88  
 Approved By: H. Wilkey  
 Date: 1/89 Rev: A

NAME P/N DIV	QTY	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
Knob 19159- 20259 (1) Item 5.8 Dwr	1/1	5.8E/M/2 Physical sewing or binding of knob.		<p>B. ILSI: Component Acceptance Test - None</p> <p>PBA Test - The following tests are conducted at the Torque Multiplier Assembly level in accordance with ILC Document 10107-70490: 1. Functional test to verify proper operation of knob.</p> <p>Certification Test - The Torque Multiplier was tested to 57AD requirements of eight cycles and exhibited no evidence of damage. It was certified for the worst case PSA Storage temperature range of -200 degrees F to +350 degrees F.</p> <p>C. INSPECTION: Components and material manufactured to ILC requirements of an approved supplier are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the materials received are as identified in the procurement documents, that no damage has occurred during shipment and that supplier certification has been received which provides traceability information.</p>

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**ELI**  
Critical Items List

Assembly Name/Part Number: Torque Multiplier (10159-20259) M1  
 Reference: ELI 1A0001  
 Prepared By: C. Harrison Approved by: M. Wilkey  
 Superseding Date: 9/88 Date: 1/89 Rev: A

NAME IP/N IDN	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
10159- 20259 of class 5.1 None	1/1	5.0FROZ Physical jamming or bending of Inob.		<p>The following NPP's are performed during the Torque Multiplier Assembly manufacturing process to assure the failure causes are precluded from the fabricated item:</p> <ol style="list-style-type: none"> <li>1. Inspection of all components for damage or material degradation.</li> <li>2. The issuance of Loctite is controlled by inspection.</li> <li>3. Verification that Loctite shall fall in within specification.</li> <li>4. Helms of Loctite application and torque of captive screw.</li> <li>5. Verification of cleanliness to VC level.</li> <li>6. Verification of proper lubrication.</li> </ol> <p>During PDA, the following inspection points are performed at the Torque Multiplier Assembly level in accordance with ILC Document 10107-7059A.</p> <ol style="list-style-type: none"> <li>1. Inspection to drawing and documentation.</li> <li>2. Inspection for damage or material degradation.</li> <li>3. Verification of successful completion of functional test.</li> <li>4. Verification of cleanliness to VC level.</li> </ol> <p>B. FAILURE HISTORY None</p>

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Assembly Name/Part Number: Torque Multiplier/4159 20259 A1  
Reference: (IL 160M1)  
Prepared By: E. Maitman      Approved By: W. Wilkey  
Superseding Dates: None      Date: 1/89 Rev: A

MMML P/P/N IDY	CRIT	FAILURE MODE S CAUSES	FAILURE EFFECT	RATIONALE FOR ACFT/ISSUES
1600 10159 10209 of Item 5.4 100	1/1	5.4102 Physical jamming or binding of teeth.		<p>E. GROUND TURNAROUND During ground turnaround, in accordance with ILE Document 10107-70712, the Torque Multiplier Assembly is disassembled, cleaned, lubricated, reassembled and tested for proper operation. It is then cleaned to VC level.</p> <p>F. OPERATIONAL USE:</p> <ol style="list-style-type: none"><li>1. Crew Response Pre/Post EVA - N/A EVA - Transport Torque Multiplier to crew compartment, disassembly and clean. (Requires additional EVA.)</li><li>2. Training Crew Briefing.</li><li>3. Operational Considerations Catastrophic failure. Possible loss of crew/vehicle.</li></ol>

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