

Grumman Corporation

CRITICAL ITEMS LIST

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GRUMMAN

ASSEMBLY NOMECLATURE: MANIPULATOR FOOT RESTRAINT

PREPARED BY: L. HAHN & F. PERAZZO

REPORT NO: FMS 87 8 8

REVISION: A

DATE: 17 MAY 1988

ASSEMBLY PART NO: NED 3040100

FMEA REF	REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
02	A	Vertical Stanchion Horizontal Indexing Mechanism QTY (1) Dwg C95-116-1	2/2	02 - Latch jammed in notch of indexing mechanism due to contamination or galling; latch cannot be withdrawn from detent notch due to breaking of release cable	<u>END ITEM</u> Stanchion cannot be rotated. If failure occurs in position other than aligned with slew latch, vertical stanchion cannot be stowed. <u>GEE INTERFACE</u> None, since MFR will be jettisoned. <u>MISSION</u> Loss of MFR; unable to accomplish subsequent mission objectives. <u>CREW/VEHICLE</u> None	<u>A. Design</u> Materials per tables 1 & 2 of MSFC-SPEC-522A are certified for traceability/quality. Anodic hardcoating per mil-A-8625C on aluminum interfaces with relative motion minimizes galling and wear. Contamination caused by corrosion by-products eliminated by extensive use of thermal control coating and solid (Moly di-sulfide) lubricant coating. Release cable worst case loads are extremely small compared to the ultimate strength of the cable which is sized for ease of manufacture and for resistance to handling damage.

ENGINEERING PRODUCT CONTROL

Grumman Corporation

CRITICAL ITEMS LIST

GRUMMAN

ASSY NOMENCLATURE: MANIPULATOR FOOT RESTRAINT

PREPARED BY: L. HAHN & F. PERAZZO

REPORT NO: PMS 10118

ASSEMBLY PART NO: DED 3040110

REVISION: A/B

DATE: 6 JULY 1988

FMEA REF REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
D2 A	Vertical Stanchion Horizontal Indexing Mechanism QTY (N) Dwg C35-114-1	2/2	D2 - Latch jammed in notch of indexing mechanism due to contamination or gall- ing; latch cannot be withdrawn from detent notch due to breaking of release cable	<u>END ITEM</u> Stanchion cannot be rotated. If failure occurs in position other than aligned with stow latch, vertical stanchion cannot be stowed. <u>CREW INTERFACE</u> None, since MFR will be jettisoned. <u>MISSION</u> Loss of MFR; unable to accomplish subsequent mission objectives. <u>CREW/VEHICLE</u> None	<u>D. TEST HISTORY</u> 1. Acceptance test per procedure 300-10101 at Grumman (7/7/83) before and after all tests. ATP includes functional tests of all operating functions and a general visual inspection. 2. Stillness test per procedure 300-10101 at Grumman (7/7/83). Demonstrated stanchion end play less than 5 inch for five pound load in any direction and deflection less than 3 inches lateral and 7 inches longitudinal for 1 hundred pound load. 3. Vibration and shock test per procedure 300-10101 at Grumman (7/7/83). Demonstrated ability to withstand design loads without structural failure with no significant resonance. Several screws required the application of loctite. 4. APC/MFR ultimate load tests per STS 83-0944 at Rockwell (8/83). Loads applied in 14 steps, each comprising 10% of final load no yield was observed at the ultimate load of 1.4 x final. 5. Thermal vacuum test at JSC (7/25/84). MFR was operated at ambient temperature, plus 224 F and -137 F (average lowest achievable chamber temp) at an average vacuum of .0008 torr. 6. Center of gravity test at JSC (12/2/84). 7. Moment of inertia swing test at JSC (7/8/85). <u>C. INSPECTION</u> 1. NAVPRO inspects all production end items at completion of final assembly. 2. Anodic hard coated aluminum parts inspected for compliance to MIL-A-8625 C by DCAS. Certificate of compliance on file at Grumman Bethpage. 3. Thermal Control Coating process is controlled by inspection, post process, cure, post coating and cure, and sample testing for coating thickness, coating adhesion, and milliequivalent absorption. <u>D. FAILURE HISTORY</u> None (per PRACA database). The MFR has been successfully utilized on two missions, STS 51-L, 51A, 51L, and 61C. <u>E. TURNAROUND</u> Inspection per 528/PJA-05001/MC 10 DEC 1987 includes a functional test of all MFR operating functions and a general visual inspection. <u>F. OPERATIONAL USE</u> 1. Operational Effect of Failure: MFR could not be restored & possibly could not be used on a second EVA if had to be jettisoned. MFR could still be used for EVA but a slight increase the length of the EVA. 2. Crew Action: none 3. Crew Training: none 4. Mission Constraints: none 5. In Flight Checkoff: Crew will visually verify stanchion operation at time of use.

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EX-100-100
PROCESSING