

Grumman Corporation

## CRITICAL ITEMS LIST

GRUMMAN

ASST NOMENCLATURE: MANIPULATOR FOOT RESTRAINT

PREPARED BY: L. HAHN &amp; F. PERAZZO

REPORT NO: FMS 87-88

REVISION: A

ASSEMBLY PART NO: SED ID10168

DATE: 17 MAY 1988

FMEA REF	REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
E2	A	Vertical Stanchion Tilt Adjustment  QTY (1)  Dwg C95-116-3	2/2	E2 - Latch jammed in notch of inclining mechanism due to contamination, jamming or release cable breaking	<u>END ITEM</u> Vertical stanchion will be locked in one tilt position; loss of tilt angle adjustment capability  <u>GFE 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.

 EXPORT  
 PROHIBITED

Grumman Corporation

## CRITICAL ITEMS LIST

GRUMMAN

ASSY MEMORANDUM: MANIPULATOR FOOT RESTRAINT

PREPARED BY: L. HAHN &amp; F. PERAZZO

REPORT NO: RUS 87-9

REVISION: A-3

ASSEMBLY PART NO: B5D 20-1004

DATE: 5 JULY 1988

FMEA REF REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
E2 A	Vertical Stanchion TR Adjustment  QTY (1)  Dwg C95-118-3	2/2	E2 - Latch jammed in notch of latching mechanism due to contamination, jamming or release cable breaking	<b>END ITEM</b> Vertical stanchion will be locked in one tilt position; loss of tilt angle adjustment capability  <b>GEE INTERFACE</b> None, since MFR will be jettisoned  <b>MISSION</b> Loss of MFR; unable to accomplish subsequent mission objectives  <b>CREW/VEHICLE</b> None	<b>B. TEST HISTORY</b> 1. Acceptance test per procedure 380-94 01 at Grumman (17703) before and after adjust. ATP includes functional test of all operating functions and a general visual inspection. 2. Stiffness test per procedure 380-901.01 at Grumman (17703). Demonstrated stanchion end play less than .5 inch in six pound load in any direction and deflection less than 3 inches lateral and 2 inches longitudinal for 1000 pound loads. 3. Vibration and shock test per procedure 380-901.01 at Grumman (17703). Demonstrated ability to withstand design levels without structural failure with no significant resonance. Several screws required the application of torque. 4. APC/MFR ultimate load tests per STS 1-0544 at Rockwell (903). Loads applied in 16 steps, each comprising 10% of final load; no yield was observed at the ultimate load of 14,100 lbs. 5. Thermal vacuum test at JSC (172904). MFR was operated at ambient temperature, plus 224 F and -137 F (average longest achievable chamber temp) at an average vacuum of .0008 torr. 6. Center of gravity test at JSC (122004). 7. Moment of inertia swing test at JSC (18405).  <b>C. INSPECTION</b> 1. NAVPRO inspects all production and items at completion of final assembly. 2. Anodic hardcoated aluminum parts inspected for compliance to MIL-A-8625 C by DCAS. Certificates of compliance on file at Grumman Bethpage. 3. Thermal Control Coating process is controlled by inspections, post prime, cure, post coating and cure, and sample testing for coating thickness, coating adhesion, and coefficient of absorption.  <b>D. FAILURE HISTORY</b> None per PRACA database; The MFR has been successfully utilized on five missions, STS 14, 15, 51A, 51L, and 51C.  <b>E. TURNAROUND</b> Inspection per 520077A-05004 APC 10 DEC 1987 includes a functional test of all MFR operating functions and a general visual inspection.  <b>F. OPERATIONAL USE</b> 1. Operational Effect of Failure - MFR could not be restored; it possibly could not be used on a second EVA if it had to be jettisoned; MFR could not be used for EVA but it might increase the length of the EVA. 2. Crew Action - Crew could attempt to release jam or disassemble latch using generic tools available. 3. Crew Training - Trained on generic tools available. 4. Mission Constraints - none. 5. In Flight Checkout - Crew will usually verify if operation at time of use.

MFR - 18

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