

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ACTUATION MECH-KU-BAND PYRO FMEA NO P2-4H-R105-1 REV:08/25/88

ASSEMBLY :KU-BAND ANTENNA JETTISON MECH	CRIT. FUNC:	1R
P/N RI :SKD26100105-301	CRIT. HDW:	2
P/N VENDOR:	VEHICLE	102 103 104
QUANTITY :4	EFFECTIVITY:	X X X
:FOUR	PHASE(S):	PL LO OO X DO LS
:TWO IN THE GUILLOTINE		
:TWO IN THE RELEASE NUT		

REDUNDANCY SCREEN: A-N/A B-N/A C-PASS

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
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ITEM:

PRESSURE CARTRIDGE, KU-BAND ANTENNA EMERGENCY JETTISON MECHANISM (2 EACH CARTRIDGES IN THE GUILLOTINE AND RELEASE NUT)

FUNCTION:

PROVIDES PRESSURE OUTPUT FROM EITHER OR BOTH (REDUNDANT) CARTRIDGES TO ACTIVATE THE RELEASE NUT; TO RELEASE AND JETTISON THE ANTENNA, IF IT CANNOT BE PROPERLY STOWED. PROVIDES PRESSURE FROM EITHER OR BOTH (REDUNDANT) CARTRIDGES TO ACTIVATE THE GUILLOTINE ASSEMBLY; TO SEVER THE ELECTRICAL UMBILICAL AND RELEASE THE ANTENNA, IF IT CANNOT PROPERLY BE STOWED.

FAILURE MODE:

FAILS TO FUNCTION OR LOW PRESSURE OUTPUT

CAUSE(S):

LOSS OF DUAL ELECTRICAL SIGNALS/NASA STANDARD INITIATOR (NSI) (REF. APPENDIX I), CONTAMINATION OF PYRO MIX, IMPROPER LOADING OF PYRO MIX, STRUCTURAL FAILURE OF CARTRIDGE BODY, HANDLING DAMAGE

EFFECT(S) ON:

(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE

(A) LOSS OF REDUNDANCY.

(B,C,D) POSSIBLE INABILITY TO CLOSE THE PAYLOAD DOORS IF A FAILED/JAMMED ANTENNA CANNOT BE JETTISONED OR SECURED, AFTER A DUAL CARTRIDGE FAILURE OF EITHER THE RELEASE NUT OR THE GUILLOTINE ASSEMBLY. POSSIBLE LOSS OF CREW/VEHICLE IF THE ANTENNA CANNOT BE JETTISONED OR STOWED AND PREVENTS COMPLETE CLOSURE OF THE PAYLOAD BAY DOORS (PRIOR TO DE-ORBIT/RE-ENTRY), UNLESS EVA IS PERFORMED TO MANUALLY CUT THE ELECTRICAL UMBILICAL (FOR A GUILLOTINE FAILURE, ONLY). (RELEASE NUT ASSEMBLY IS INACCESSIBLE).

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DISPOSITION & RATIONALE:

(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE

(A) DESIGN

BOTH, THE RELEASE NUT AND THE GUILLOTINE USE TWO (REDUNDANT) CARTRIDGES; OF WHICH, ONLY A SINGLE 85% LOADED PRESSURE CARTRIDGE IS NEED TO ACTIVATE EITHER.

(B) TEST

QUALIFICATION TESTS: SALT FOG, THERMAL CYCLING, PRESSURE-CYCLING, SHOCK, TRANSIENT AND RANDOM VIBRATION, HIGH +160 DEG F/LOW -130 DEG F/ AMBIENT FIRINGS, SINGLE 85% CARTRIDGE, DUAL 130% CARTRIDGES, 8 FOOT DROP TEST; REF (CR) 44-325-0025. QTR (OEA, INC.) 2889-10-400, 2889-10-300.

ACCEPTANCE TESTS: CARTRIDGE BODY TENSILE TEST COUPONS, HELIUM LEAK TEST, INTERNAL PROOF PRESSURE, EXAMINATION OF PRODUCT, N-RAY, X-RAY, EXPLOSIVE CHARGE WEIGHT MEASURED (PRE- AND POST-ASSEMBLY). ATP (OEA, INC.) #2889-7-400.

SYSTEM TESTS: RANDOM VIBRATION, THERMAL CYCLING, AMBIENT FIRING (1) (CR) 44-544901-001.

PYRO VERIFICATION TESTS: SAMPLE LOT FIRING YEARLY AT KSC UNTIL AGE LIFE EXPIRES.

OMRSD: GROUND TURNAROUND INCLUDES PYRO INITIATOR CONTROLLER (PIC) RESISTANCE TEST (POST-HOOKUP), PIC GO/NO-GO RESISTANCE TEST (PRE-HOOKUP), POWER-OFF STRAY VOLTAGE CHECK, POWER-ON STRAY VOLTAGE CHECK, NSI ELECTRICAL VERIFICATION, AND KU-BAND JETTISON VERIFICATION.

(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIAL IS VERIFIED BY RECEIVING INSPECTION TO ASSURE SPECIFIED SHUTTLE REQUIREMENTS ARE SATISFIED.

CONTAMINATION CONTROL

CONTAMINATION CONTROL AND CORROSION PROTECTION PROCESSES AND STORAGE ENVIRONMENTS ARE MONITORED AND VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

PARTS ARE X-RAYED AND N-RAYED TO VERIFY CORRECT ASSEMBLY AND PRESENCE OF ALL DETAIL PARTS AND EXPLOSIVES. VISUAL INSPECTION, IDENTIFICATION PERFORMED, AND PARTS PROTECTION VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

X-RAYS AND N-RAYS ARE REVIEWED BY VENDOR, DCAS, NASA QUALITY, AND ENGINEERING.

CRITICAL PROCESSES

SELECTED MANUFACTURING/ASSEMBLY STEPS ARE IDENTIFIED BY NASA QUALITY ASSURANCE AND VERIFIED BY GOVERNMENT INSPECTION AS MANDATORY INSPECTION POINTS (MIPS). ALL MANUFACTURING PROCESSES, SUCH AS WELDING, PLATING, HEAT TREATING, PASSIVATION, AND ANODIZING ARE VERIFIED BY INSPECTION.

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HANDLING/PACKAGING

HANDLING/PACKAGING REQUIREMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NONE.

(E) OPERATIONAL USE

WORKAROUND IS AVAILABLE FOR FAILURE OF THE GUILLOTINE ASSEMBLY ONLY.
PRIOR TO DE-ORBIT/RE-ENTRY, IF TIME PERMITS, AN EVA PROCEDURE COULD BE
PERFORMED TO MANUALLY SEVER THE UMBILICAL. THE RELEASE NUT ASSEMBLY IS
INACCESSIBLE.