

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE

NUMBER: MB-1MR-BM006-X

SUBSYSTEM NAME: MECHANICAL - EDS

REVISION: 2 9/1/95

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: GUIDE RING ASSEMBLY NPO-ENERGIA	33U.6271.011-05 33U.6271.011-05
SRU	: ASSEMBLY, CAPTURE LATCH NPO-ENERGIA	33U.6322.025 33U.6322.025

PART DATA**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CAPTURE LATCH ASSEMBLY****REFERENCE DESIGNATORS:**

QUANTITY OF LIKE ITEMS: 3
THREE (ONE PER GUIDE PEDAL)

FUNCTION:

THREE ACTIVE (CAPTURE) LATCHES, ONE ON EACH GUIDE PEDAL OF THE ORBITER DOCKING RING, PROVIDES POSITIVE CAPTURE TO THREE PASSIVE (BODY MOUNTED) LATCHES LOCATED ON THE MIR DOCKING MECHANISM. CAPTURE LATCH ROLLER MECHANISMS MOVE ASIDE DURING CLOSING CONTACT WITH THEIR OPPOSING BODY MOUNTED LATCHES AND ARE SPRING DRIVEN TO LOCK AFTER PASSING THE THREE PASSIVE BODY LATCHES (LUGS). TWO ROLLER MECHANISMS LOCATED ON EACH CAPTURE LATCH ASSEMBLY PROVIDE A REDUNDANT MEANS OF CAPTURE.

UPON RECEIPT OF A "CLOSE CAPTURE LATCH" COMMAND, POWER IS APPLIED THROUGH REDUNDANT "LATCH MOTOR OPEN" SENSOR CONTACT SETS TO A SINGLE ACTUATOR MOTOR TO EXTEND BOTH ROLLERS OF ONE CAPTURE LATCH ASSEMBLY. A "LATCH INDICATION CLOSED" SENSOR ON EACH ACTUATOR SENSES THE CLOSED POSITION OF THE LATCH AND SENDS REDUNDANT SIGNALS TO THE DOCKING CONTROL PANEL VIA THE DSCU TO ILLUMINATE THE "LATCHES CLOSED" LIGHT WHEN ALL THREE CAPTURE LATCHES ARE CLOSED.

UPON RECEIPT OF AN "OPEN CAPTURE LATCH" COMMAND (FOLLOWING COMPLETION OF THE DOCKING PROCESS), POWER IS APPLIED THROUGH REDUNDANT "LATCH MOTOR CLOSED" SENSOR CONTACT SETS TO A SINGLE ACTUATOR MOTOR TO RETRACT BOTH ROLLERS OF THE CAPTURE LATCH ASSEMBLY FOR UNDOCKING OF THE MIR AND ORBITER. A "LATCH INDICATION OPEN" SENSOR LOCATED ON EACH CAPTURE LATCH ACTUATOR SENSES THE OPEN POSITION OF THE LATCH AND SENDS REDUNDANT SIGNALS TO THE DSCU TO ILLUMINATE THE "LATCHES OPEN" INDICATOR LIGHT ON THE DOCKING CONTROL PANEL AND COMMAND RING TO RETRACT WHEN THE SENSOR ON ALL THREE CAPTURE LATCH ACTUATORS IS CLOSED.

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THE THIRD CONTACT SET OF EACH "LATCH INDICATION OPEN" AND "LATCH INDICATION CLOSED" SENSOR IS UTILIZED FOR GROUND MONITORING OF CAPTURE LATCH POSITION. CAPTURE LATCH "INITIAL POSITION" IS ALSO DOWNLINKED FOR GROUND MONITORING.

IN THE EVENT A CAPTURE LATCH FAILS TO OPEN, THE MANUAL LATCH/UNBLOCKING DEVICE CONTAINED BEHIND THE CAPTURE LATCH ASSEMBLY WILL PROVIDE MANUAL RELEASE OF THE LATCH. A BUTTON ON EACH SIDE OF THE DEVICE, WHEN DEPRESSED SIMULTANEOUSLY, WILL RELEASE LATCH CONTROL BY THE LATCH ACTUATOR, THUS ALLOWING BOTH CAPTURE LATCH ROLLERS TO RETRACT TO THEIR OPEN POSITION.

SERVICE IN BETWEEN FLIGHT AND MAINTENANCE CONTROL:
VISUAL INSPECTION, SERVICEABILITY CONTROL, DOCKING WITH CALIBRATING DOCKING MECHANISM.

MAINTAINABILITY
REPAIR METHOD - REPLACEMENT.

REFERENCE DOCUMENTS: 33U.6322.025
33U.6271.011-05

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REVISION# 2 5/1/96

SUBSYSTEM NAME: MECHANICAL - EDS
 LRU: GUIDE RING ASSEMBLY
 ITEM NAME: ASSEMBLY, CAPTURE LATCH

CRITICALITY OF THIS
 FAILURE MODE: 2/2

FAILURE MODE:
 INADVERTENTLY OPENS (BOTH ROLLERS)

MISSION PHASE:
 OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:
 MANUAL LATCH/UNBLOCKING DEVICE INADVERTENTLY RELEASES - COMPLETE SPRING FAILURE DUE TO MECHANICAL/THERMAL SHOCK OR MANUFACTURE/MATERIAL DEFECT ACCOMPANIED WITH VIBRATION

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? N/A

REDUNDANCY SCREEN A) N/A
 B) N/A
 C) N/A

PASS/FAIL RATIONALE:

A)
 N/A

B)
 N/A

C)
 N/A

METHOD OF FAULT DETECTION:
 VISUAL OBSERVATION - CREW COULD VISUALLY OBSERVE ONE OR MORE OPEN CAPTURE LATCHES DURING CAPTURE, ATTENUATION, AND RING RETRACTION. AN OPEN MANUAL LATCH/UNBLOCKING DEVICE HANDLE CAN BE VISUALLY DETECTED DURING IVA. INSTRUMENTATION - FAILURE WOULD BE DETECTABLE BY EVALUATION OF TELEMETRY DATA. A SWITCH LOCATED UNDER THE MANUAL LATCH/UNBLOCKING DEVICE LEVER SENSES THE POSITION OF THIS LEVER AND DOWNLINKS POSITION DATA TO GROUND PERSONNEL.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

AFFECTED CAPTURE LATCH ASSEMBLY WILL NOT BE IN IT'S CLOSED POSITION. LOSS OF CAPABILITY TO LATCH AFFECTED CAPTURE LATCH ASSEMBLY ON ORBITER



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DOCKING MECHANISM TO OPPOSING BODY MOUNTED LATCH ON MIR DOCKING MECHANISM. ALTHOUGH IT MAY BE POSSIBLE TO CAPTURE AND RETRACT THE DOCKING RING WITH ONLY TWO CLOSED CAPTURE LATCHES, MATING OF THE TWO DOCKING MECHANISMS FOR CLOSING STRUCTURAL HOOKS WOULD BE IMPAIRED. IF TWO CAPTURE LATCHES INADVERTENTLY OPEN DURING RING ATTENUATION, FOLLOWING CAPTURE, UNCONTROLLED CLOSING PARAMETERS COULD OCCUR.

(B) INTERFACING SUBSYSTEM(S):

POTENTIAL DAMAGE TO ORBITER STRUCTURE IF ORBITER/MIR COLLIDE DUE TO FAILURE OF TWO CAPTURE LATCHES DURING RING ATTENUATION.

(C) MISSION:

WORST CASE, LOSS OF DOCKING CAPABILITIES RESULTING IN LOSS MISSION OBJECTIVES FOLLOWING AN INADVERTENT OPENING OF A SINGLE CAPTURE LATCH.

(D) CREW, VEHICLE, AND ELEMENT(S):

NO EFFECT FIRST FAILURE. POTENTIAL FOR COLLISION BETWEEN BOTH VEHICLES IF SECOND CAPTURE LATCH INADVERTENTLY OPENS DURING ATTENUATION.

(E) FUNCTIONAL CRITICALITY EFFECTS:

FIRST CAPTURE LATCH FAILURE - WORST CASE, IF FAILURE OCCURS PRIOR TO CAPTURE OR DURING RING RETRACTION, DOCKING WOULD BE IMPAIRED RESULTING IN LOSS OF MISSION OBJECTIVES. - CRITICALITY 2/2 CONDITION.
SECOND CAPTURE LATCH FAILURE - WORST CASE, IF FAILURE OCCURS DURING RING ATTENUATION, A POTENTIAL COLLISION BETWEEN ORBITER AND MIR EXISTS.

DESIGN CRITICALITY (PRIOR TO DOWNGRADE, DESCRIBED IN (F)): 1R2

(F) RATIONALE FOR CRITICALITY DOWNGRADE:

THIRD FAILURE (INABILITY TO FIRE RCS) - CREW IS UNABLE TO STOP A POTENTIAL COLLISION BETWEEN ORBITER AND MIR. WORST CASE, DAMAGE RESULTING FROM COLLISION COULD RESULT IN LOSS OF CREW AND VEHICLE. - CRITICALITY 1R3. THERE ARE NO WORKAROUNDS TO AN INADVERTENT OPENING OF A SINGLE CAPTURE LATCH PRIOR TO CAPTURE OR DURING RING RETRACTION. AS SUCH, THE CRITICALITY OF THIS FAILURE MODE IS ASSIGNED A 2/2 BASED ON THE INABILITY TO PERFORM DOCKING.

-DISPOSITION RATIONALE-

(A) DESIGN:

AN INADVERTENT RELEASE OF THE MANUAL LATCH/UNBLOCKING DEVICE IS CONSIDERED VERY REMOTE. THE DESIGN ALLOWS VERY LITTLE CLEARANCE BETWEEN THE SPRING HOUSING AND THE SPRING ITSELF AND AS SUCH, THE SPRING IS NOT FREE TO MOVE Laterally IN THE EVENT OF FRACTURES. IN ADDITION, IF A COMPLETE SPRING FAILURE, RESULTING IN LOSS OF TENSION, OCCURS THE OUTER BUTTONS LOCATED AT OPPOSITE SIDES OF THE HANDLE WILL REMAIN INTACT. ADDITIONAL VIBRATION WOULD BE REQUIRED FOR THESE BUTTONS TO RETRACT THUS ALLOWING THE HANDLE TO POP OUT. POSITION OF MANUAL LATCH/UNBLOCKING DEVICE HANDLE IS SENSED AND DOWNLINKED FOR GROUND MONITORING. INADVERTENT OPENING OF A CAPTURE LATCH WOULD MOST LIKELY OCCUR AS THE RESULT OF AN ELECTRICAL FAILURE AND NOT A MECHANICAL ONE.



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(B) TEST:**DOCKING MECHANISM ACCEPTANCE TESTS:**

1. INSPECTION SERVICEABILITY TEST - PROPER OPENING OF CAPTURE LATCHES VERIFIED DURING CAPTURE LATCH FUNCTIONING PERFORMANCE TEST. INDIVIDUAL REDUNDANT ROLLERS ARE EXTENDED AND ALL THREE CAPTURE LATCHES ARE OPENED.
2. DOCKING MECHANISM CHECKOUT (STATIC) TEST - FOLLOWING CAPTURE FORCE IS APPLIED IN THE DIRECTION OF RING EXTENSION TO VERIFY CAPTURE LATCHES HAVE NOT BEEN RELEASED FROM THE BODY LATCHES OF THE SIMULATOR. WITH CAPTURE LATCHES ENGAGED THE RING IS RETRACTED TO ALLOW LOAD LIMITING CLUTCH TO OPERATE FOR 10 SECONDS AND THE CAPTURE LATCHES ARE VERIFIED TO REMAIN LATCHED.
3. VIBRORESISTENT TEST - APDS SUBJECTED TO THE FOLLOWING VIBRATION LEVELS FOR 2 MINUTES PER AXIS:

FREQUENCY (HZ)	SPECTORAL DENSITY ACCELERATION
FROM 20 TO 80	INCREASING 3DB OCTAVE TO 0.04G ² /HZ
FROM 80 TO 350	PERMANENT 0.04G ² /HZ
FROM 350 TO 2000	DECREASING 3DB OCTAVE WITH 0.04G ² /HZ

SUBSEQUENT TO THIS TEST AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE AND AN INSPECTION SERVICEABILITY TEST IS CONDUCTED AS DESCRIBED IN ATP TEST #1 ABOVE. A RELEASED MANUAL LATCH/UNBLOCKING DEVICE WOULD BE DETECTED DURING TEST AND/OR INSPECTION.

4. THERMO VACUUM TEST - DOCKING OF THE MECHANISM IS THERMALLY CYCLED, UNDER LOAD CONDITIONS, FROM +20°C TO -50/-55°C TO +50/+55°C TO +20°C IN A VACUUM AT 10⁻⁴ TO 10⁻⁵ TORR. DWELL AT EACH TEMPERATURE AND BETWEEN OPERATIONS AT EACH TEMPERATURE IS A MINIMUM OF 60 MINUTES AFTER STABILIZATION. OPERATIONS INCLUDES PERFORMING DOCKING/CAPTURE WHICH IS ACCOMPLISHED AT A SPEED OF 0.15M/SEC BETWEEN THE SIMULATOR AND MOVEABLE PLATFORM (CONTAINING THE DOCKING MECHANISM). DURING DOCKING AN INADVERTENT OPEN CAPTURE LATCH WOULD BE DETECTED SINCE AN OPEN CAPTURE LATCH WILL NOT LATCH TO ITS OPPOSING BODY LATCH ON THE SIMULATOR. PROPER OPERATION OF CAPTURE LATCHES IS VERIFIED FOR A TEMPERATURE RANGE OF -50°C/-55°C TO 50°C/55°C.

5. CONTROLLED DOCKING TEST - CONTROLLED DOCKING IS PERFORMED UNDER LOAD CONDITIONS. CAPTURE LATCHES ARE NORMALLY CLOSED DURING DOCKING. A PULL TEST OF ASSEMBLIES WITH THE DOCKING MECHANISM ASSEMBLY IS PERFORMED DURING THIS TEST. THESE TESTS WILL DETECT AN INADVERTENT OPENING OF THE CAPTURE LATCHES.

DOCKING MECHANISM QUALIFICATION TESTS:

1. OPERATIONAL CAPABILITY TEST - AN EXTEND/RETRACT MECHANISM LIMIT LOAD TEST, EXTEND/RETRACT MECHANISM ULTIMATE LOAD TEST, AND CAPTURE AND BODY LATCH LOAD TEST ARE CONDUCTED TO VERIFY THAT THE CAPTURE LATCHES DO NOT INADVERTENTLY OPEN AS FOLLOWS:

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A. EXT/RET MECHANISM LIMIT LOAD TEST - WITH CAPTURE LATCHES ENGAGED TO DOCKING SIMULATOR, SIMULATOR IS RAISED TO APPLY 2100 +/- 100 KGF LOAD IN THE EXTEND DIRECTION. FOLLOWING TEST AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE.

B. EXT/RET MECHANISM ULTIMATE LOAD TEST - WITH CAPTURE LATCHES ENGAGED TO DOCKING SIMULATOR, SIMULATOR IS RAISED TO APPLY 3000 +/- 100 KGF LOAD IN THE EXTEND DIRECTION.

C. CAPTURE AND BODY LATCH LOAD TEST - WITH CAPTURE LATCHES ENGAGED TO THE BODY MOUNTED LATCHES OF THE PASSIVE SYSTEM. A BENDING MOMENT OF 500 KGF-M IS APPLIED TO THE DOCKING MECHANISM. THE MOMENT IS REMOVED AND REPEATED WITH A 700 KGF-M MOMENT.

2. SHOCK AND SAWTOOTH LOADING STRENGTH TEST - DOCKING MECHANISM IS SUBJECTED TO 20G TERMINAL SAWTOOTH SHOCK PULSES IN EACH AXIS, 3 PULSES IN EACH DIRECTION FOR A TOTAL OF 6 PULSES/AXIS. SUBSEQUENT TO THIS TEST AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE AT WHICH TIME A RELEASED MANUAL LATCH/UNBLOCKING DEVICE WOULD BE DETECTED. AN OPERATION CAPABILITY TEST IS PERFORMED FOLLOWING THIS TEST, AS DEFINED IN QTP TEST #1 ABOVE, TO VERIFY THAT CAPTURE LATCHES DO NOT INADVERTENTLY OPEN.

3. TRANSPORTABILITY STRENGTH TEST - SHIPPING LOADS ARE SIMULATED ON A VIBRATING TABLE TO VERIFY THAT THE DOCKING MECHANISM WILL NOT BE DAMAGED DURING SHIPMENT. THIS TEST IS CONDUCTED UNDER THE CONDITIONS CONTAINED IN THE FOLLOWING TABLE.

VIBRATION ACCELER DIRECTION	VIBRATION ACCELER AMPLITUDE	FREQUENCY SUBBAND, HZ					TOTAL TEST DURATION	
		5-7	7-15	15-30	30-40	40-60	HR	MIN
		TEST DURATION, MIN						
ALONG X-AXIS	1.4 1.2	-- 76	4 93	-- 32	-- 81	-- 39	-- 5	4 7
ALONG Y-AXIS	1.1 1.0	-- 13	4 18	-- 7	-- 10	-- 7	--	4 53
ALONG Z-AXIS	1.1 1.0	-- 32	4 40	-- 18	-- 26	-- 16	-- 2	4 10

SUBSEQUENT TO THIS TEST AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE AT WHICH TIME A RELEASED MANUAL LATCH/UNBLOCKING DEVICE WOULD BE DETECTED. AN OPERATION CAPABILITY TEST IS PERFORMED FOLLOWING THIS TEST, AS DEFINED IN QTP TEST #1 ABOVE, TO VERIFY THAT CAPTURE LATCHES DO NOT INADVERTENTLY OPEN.

4. VIBRATION STRENGTH TEST - APDS SUBJECTED TO THE FOLLOWING VIBRATION LEVELS IN EACH AXIS FOR A 400 SECOND DURATION.

FREQUENCY (HZ)	SPECTORAL DENSITY ACCELERATION
FROM 20 TO 80	INCREASING, 3DB OCTAVE TO $0.067G^2/Hz$
FROM 80 TO 350	CONSTANT $0.067G^2/Hz$
FROM 350 TO 2000	DECREASING 3DB OCTAVE WITH $0.067G^2/Hz$

SUBSEQUENT TO THIS TEST AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE AT WHICH TIME A RELEASED MANUAL LATCH/UNBLOCKING DEVICE WOULD BE DETECTED. AN OPERATION CAPABILITY

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TEST IS PERFORMED FOLLOWING THIS TEST, AS DEFINED IN QTP TEST #1 ABOVE, TO VERIFY THAT CAPTURE LATCHES DO NOT INADVERTENTLY OPEN.

5. COLD AND HEAT RESISTANCE TEST - DOCKING OF THE MECHANISM IS THERMALLY CYCLED FROM +20°C TO -50/-55°C TO +50/+55°C TO +20°C IN A VACUUM AT 10^{-4} TO 10^{-5} TORR DWELL AT EACH TEMPERATURE AND BETWEEN OPERATIONS AT EACH TEMPERATURE IS A MINIMUM OF 60 MINUTES AFTER STABILIZATION. DURING EACH DOCKING, AS SHOWN IN THE FOLLOWING TABLE, INADVERTENT OPENING OF CAPTURE LATCHES WOULD BE DETECTED.

SEQ NO.	DOCKING RATE, M/S	SIMULATOR ROTATIONAL ANGLE		TEMP °C	VOLTAGE VOLTS	PRESS INTEGRITY CHECKOUT
		PITCH	ROLL			
1	0.10	0°	0°	25 +/-10	23	YES
2	0.10	0°	4°	25 +/-10	34	NO
3	0.12	4°	4°	25 +/-10	27	NO
4*	---	---	---	+60+/-5	---	YES
4	0.10	4°	0°	+50+/-5	27	YES
5*	---	---	---	-(60+/-5)	---	YES
5	0.10	4°	0°	-(30+/-5)	27	YES
6*	---	---	---	+60+/-5	---	YES
6	0.12	0°	4°	+50+/-5	23	YES
7*	---	---	---	-(60+/-5)	---	YES
7	0.10	0°	4°	-(30 +/-5)	23	YES
8*	---	---	---	+60+/-5	---	YES
8	0.12	4°	4°	50 +/-5	34	YES
9*	---	---	---	-(60+/-5)	---	YES
9	0.12	4°	4°	-(30 +/-5)	34	YES
10*	---	---	---	+60+/-5	---	YES
10	0.10	4°	0°	+50+/-5	27	YES
11*	---	---	---	-(60+/-5)	---	YES
11	0.10	0°	4°	-(30 +/-5)	27	YES
12*	---	---	---	+60+/-5	---	YES
12*	0.10	0°	4°	+50+/-5	27	YES
13*	---	---	---	-(60+/-5)	---	YES
13*	0.12	4°	4°	-(30 +/-5)	27	YES
14*	---	---	---	+60+/-5	---	YES
14*	0.12	4°	4°	+50+/-5	27	YES
15*	0.12	4°	4°	+25+/-10	23	YES

*MC821-0087-2001, -4001, & -5001 ONLY

SUBSEQUENT TO THIS TEST AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE AT WHICH TIME A RELEASED MANUAL LATCH/UNBLOCKING DEVICE WOULD BE DETECTED. AN OPERATION CAPABILITY TEST IS PERFORMED FOLLOWING THIS TEST, AS DEFINED IN QTP TEST #1 ABOVE, TO VERIFY THAT CAPTURE LATCHES DO NOT INADVERTENTLY OPEN.

6. APDS SERVICEABILITY TEST IN A SIX-DEGREE-OF-FREEDOM DYNAMIC TEST - THE SIX-DEGREE-OF-FREEDOM DYNAMIC TEST VERIFIES APDS DOCKING AND UNDOCKING OPERATIONS UNDER CLOSE-TO-FULL-SCALE CONDITIONS. STATIC MOTION OF ENTITIES IS SIMULATED UNDER SPECIFIC INERTIAL AND



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GEOMETRICAL PARAMETERS FOR VARIOUS INITIAL CONDITIONS FOR MIR/SHUTTLE DOCKING. A TOTAL OF 20 DOCKINGS IS PERFORMED. SUBSEQUENT TO THIS TEST AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE AT WHICH TIME A RELEASED MANUAL LATCH/UNBLOCKING DEVICE WOULD BE DETECTED. AN OPERATION CAPABILITY TEST IS PERFORMED FOLLOWING THIS TEST, AS DEFINED IN QTP TEST #1 ABOVE, TO VERIFY THAT CAPTURE LATCHES DO NOT INADVERTENTLY OPEN.

7. TARGET SERVICE LIFE TEST - TESTS ARE PERFORMED TO VERIFY PROPER DOCKING AND UNDOCKING OPERATIONS OVER ITS LIFE OF 100 DOCKINGS. PROPER OPENING OF THE CAPTURE LATCHES IS VERIFIED DURING 100 DOCKING AND UNMATING CYCLES. SUBSEQUENT TO THIS TEST AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE AT WHICH TIME A RELEASED MANUAL LATCH/UNBLOCKING DEVICE WOULD BE DETECTED. AN OPERATION CAPABILITY TEST IS PERFORMED FOLLOWING THIS TEST, AS DEFINED IN QTP TEST #1 ABOVE, TO VERIFY THAT CAPTURE LATCHES DO NOT INADVERTENTLY OPEN.

8. CONTROL DISASSEMBLY - UPON COMPLETION OF ALL QUAL TESTING THE DOCKING MECHANISM IS DISMANTLED AND CAPTURE LATCH ASSEMBLIES ARE CHECKED FOR EVIDENCE OF WEAR OR FAILURE.

OMRSD - TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:

RECEIVING INSPECTION

COMPONENTS ARE SUBJECTED TO A 100% RECEIVING INSPECTION PRIOR TO INSTALLATION.

CONTAMINATION CONTROL

CORROSION PROTECTION PROVISIONS AND CONTAMINATION CONTROL VERIFIED BY INSPECTION. CHECK OF ROOM CLEANLINESS; PARTS WASHING AND OTHER OPERATIONS OF THE TECHNOLOGICAL PROCESS WHICH PROVIDES CLEANLINESS ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES

ANODIZING, HEAT TREATING, SOLDERING, CHEMICAL PLATING, AND CURING VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

TORQUE, ADJUSTMENTS AND TOLERANCES ACCORDING TO TECHNICAL REQUIREMENTS OF THE DRAWINGS ARE VERIFIED BY INSPECTION.

TESTING

ATP/QTP/OMRSD TESTING VERIFIED BY INSPECTION.

HANDLING/PACKAGING

HANDLING/PACKAGING PROCEDURES AND REQUIREMENT FOR SHIPMENT VERIFIED BY INSPECTION.

(D) FAILURE HISTORY:



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DATA ON TEST FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING OF DDS DOCKING MECHANISMS CAN BE FOUND IN PRACA DATA BASE.

(E) OPERATIONAL USE:

CREW COULD OPEN REMAINING CAPTURE LATCH AND INITIATE UNDOCKING PROCEDURES TO AVOID COLLISION IF BOTH CAPTURE LATCHES INADVERTENTLY OPEN DURING ATTENUATION. THERE IS NO CORRECTIVE ACTION IF A SINGLE CAPTURE LATCH INADVERTENTLY OPENS PRIOR TO CAPTURE OR DURING RING RETRACTION.

- APPROVALS -

DESIGN ENGINEER :
DESIGN MANAGER :
NASA SS/MA :
NASA SUBSYSTEM MANAGER :

M. NIKOLAYEVA
A. SOUBCHEV

[Handwritten signatures and initials over approval lines]



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