

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

CRITICALITY OF THIS
 FAILURE MODE: 2R3

FAILURE MODE:

ONE CAPTURE LATCH INDICATION "CLOSED" SENSOR CONTACT SET FAILS OPEN

MISSION PHASE:

OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:CONTAMINATION, STRUCTURAL FAILURE DUE TO MECHANICAL/THERMAL SHOCK OR
 MANUFACTURE/MATERIAL DEFECT

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

REDUNDANCY SCREEN A) PASS
 B) PASS
 C) FAIL

PASS/FAIL RATIONALE:

A)

B)

C)

FAILS REDUNDANCY SCREEN "C" SINCE AN OPEN/LOOSE CONNECTOR CAN RESULT IN
 LOSS OF ALL INDICATION SIGNALS.**METHOD OF FAULT DETECTION:**VISUAL OBSERVATION.- LOSS OF "LATCHES CLOSED" INDICATION WHEN REQUIRED. IF
 FAILURE OF SENSOR DOES NOT AFFECT THIRD CONTACT SET GROUND PERSONNEL
 CAN DETERMINE "CLOSED" POSITION OF CAPTURE LATCHES THROUGH TELEMETRY
 DATA.

MASTER MEAS. LIST NUMBERS: V53X0754E

- FAILURE EFFECTS -**(A) SUBSYSTEM:**FIRST CONTACT SET FAILS OPEN - LOSS OF "LATCHES CLOSED" SIGNAL TO DSCU
 FROM A SINGLE CONTACT SET. SECOND CONTACT SET FAILS OPEN - LOSS OF
 ASSOCIATED "LATCHES CLOSED" INDICATION ON THE DOCKING CONTROL PANEL.
 THIRD CONTACT SET FAILS OPEN - LOSS OF BOTH IN-FLIGHT AND GROUND
 MONITORING OF CAPTURE LATCH CLOSED POSITION.RSC
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(B) INTERFACING SUBSYSTEM(S):

NO EFFECT ON INTERFACING ORBITER SUBSYSTEMS.

(C) MISSION:

NO EFFECT UNTIL ALL CAPTURE LATCH INDICATIONS ARE LOST, AT WHICH TIME CREW DECISION TO ABORT DOCKING WOULD RESULT IN LOSS OF MISSION OBJECTIVES.

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

NO EFFECT ON CREW AND VEHICLE.

(E) FUNCTIONAL CRITICALITY EFFECTS:

FIRST CONTACT SET FAILURE - NO EFFECT.

SECOND CONTACT SET FAILURE - LOSS OF 'LATCHES CLOSED' INDICATION ON THE DOCKING CONTROL PANEL.

THIRD CONTACT SET FAILURE - LOSS OF IN-FLIGHT AND GROUND CAPABILITY TO DETERMINE ALL CAPTURE LATCHES CLOSED POSITION.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): 2RS**(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:**

FOURTH FAILURE (LOSS OF WORKAROUND - CAPTURE LATCH DRIVE INDICATION) - IF FOURTH FAILURE OCCURS PRIOR TO DOCKING THE CREW WOULD NOT BE 100% CERTAIN THAT THE CAPTURE LATCHES ARE IN THEIR CLOSED POSITIONS. WORST CASE, CREW ACTION TO ABORT DOCKING WOULD RESULT IN LOSS OF MISSION OBJECTIVES.

-DISPOSITION RATIONALE-

(A) DESIGN:

SENSOR CONTAINS THREE CONTACT SETS TWO OF WHICH WOULD HAVE TO FAIL TO LOSE THE 'LATCHES CLOSED' INDICATION ON THE DOCKING CONTROL PANEL. THE THIRD CONTACT SET PROVIDES FOR TELEMETRY DATA. CAPTURE LATCH ASSEMBLY IS COMPLETELY ENCASED TO PREVENT INTRODUCING CONTAMINATION THAT COULD CAUSE A FAILED OPEN CONDITION ON ALL THREE CONTACT SETS.

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

1. ELECTRICAL SCHEMATIC CHECKOUT - CONTACT RESISTANCE ON EACH PIN OF THE CONNECTOR WHICH IS ELECTRICALLY TIED TO EACH CAPTURE LATCH INDICATION 'CLOSED' SENSOR IS CHECKED. THIS TEST VERIFIES CONTINUITY THROUGH THIS SENSOR.
2. INSULATION ELECTRICAL RESISTANCE TEST - THE INSULATION RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION CHECKOUT OF EACH PIN OF EACH CAPTURE LATCH ACTUATOR CONNECTOR TO THE APDA HOUSING WILL VERIFY THAT THE CAPTURE LATCH ACTUATOR MOTOR/INDICATION CIRCUIT IS NOT ELECTRICALLY SHORTED TO GROUND. THE INDICATION 'CLOSED' SENSOR IS LOCATED IN THE ACTUATOR INDICATION CIRCUIT.
3. INSPECTION SERVICEABILITY TEST - CAPTURE LATCHES ARE CYCLED OPEN AND CLOSED DURING CAPTURE LATCH FUNCTIONING PERFORMANCE TEST. A FAILED OPEN INDICATION 'CLOSED' SENSOR WOULD BE DETECTED AT THE

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TIME THE CAPTURE LATCHES ARE CLOSED THROUGH THE LOSS OF 'LATCHES CLOSED' INDICATION.

4. 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 ELECTRICAL CIRCUIT TEST, AN INSULATION RESISTANCE TEST, AND CAPTURE LATCH PERFORMANCE TEST ARE PERFORMED AS DEFINED IN ATP TESTS #1, #2, AND #3 ABOVE.

5. DOCKING MECHANISM CHECKOUT (STATIC) TEST - VERIFICATION OF 'LATCHES CLOSED' INDICATION IS PERFORMED DURING CLOSING OF CAPTURE LATCHES IS VERIFIED. CAPTURE LATCHES ARE CLOSED PER STEP 11 OF INSTRUCTION 33U.6201.008-06 PM-3. A FAILED OPEN CONDITION ON AN INDICATION 'CLOSED' SENSOR WOULD BE DETECTED AT THAT TIME.

6. 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). PROPER CLOSING OF CAPTURE LATCHES AND ASSOCIATED INDICATIONS (CLOSED SENSOR) ARE VERIFIED FOR A TEMPERATURE RANGE OF -50°C/-55°C TO 50°C/55°C.

7. CONTROLLED DOCKING TEST - CONTROLLED DOCKING IS PERFORMED UNDER LOAD CONDITIONS. CAPTURE LATCHES ARE VERIFIED CLOSED PRIOR TO CAPTURE. A FAILED OPEN CONDITION ON AN INDICATION 'CLOSED' SENSOR WOULD BE DETECTED AT THAT TIME.

DOCKING MECHANISM QUALIFICATION TESTS:

1. ELECTRICAL CIRCUIT TEST - CONTACT RESISTANCE ON EACH PIN OF THE CONNECTOR WHICH IS ELECTRICALLY TIED TO EACH CAPTURE LATCH INDICATION 'CLOSED' SENSOR IS CHECKED. THIS TEST VERIFIES CONTINUITY THROUGH THIS SENSOR.

2. INSULATION ELECTRICAL RESISTANCE TEST - THE INSULATION RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION CHECKOUT OF EACH PIN OF EACH CAPTURE LATCH ACTUATOR CONNECTOR TO THE APDA HOUSING WILL VERIFY THAT THE CAPTURE LATCH ACTUATOR MOTOR/INDICATION CIRCUIT IS NOT ELECTRICALLY SHORTED TO GROUND. THE INDICATION 'CLOSED' SENSOR IS LOCATED IN THE ACTUATOR INDICATION CIRCUIT.



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3. OPERATIONAL CAPABILITY TEST - OPERATION OF CAPTURE LATCHES AND ASSOCIATED "CLOSED LATCHES" INDICATION IS VERIFIED DURING THE OPERATIONAL CAPABILITY CHECK.

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; AND AN ELECTRICAL CIRCUIT CHECK TEST, INSULATION RESISTANCE TEST, AND OPERATIONAL CAPABILITY TEST ARE PERFORMED, AS DEFINED IN QTP TESTS #1, #2, AND #3 ABOVE, TO VERIFY PROPER CAPTURE "CLOSED LATCHES" INDICATION.

5. 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
ALONG X-AXIS	1.4	-	4	-	-	-	-	4
	1.2	76	93	32	61	39	5	7
ALONG Y-AXIS	1.1	-	4	-	-	-	-	4
	1.0	13	16	7	10	7	-	53
ALONG Z-AXIS	1.1	-	4	-	-	-	-	4
	1.0	32	40	16	26	16	2	10

SUBSEQUENT TO THIS TEST AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE; AND AN ELECTRICAL CIRCUIT CHECK TEST, INSULATION RESISTANCE TEST, AND OPERATIONAL CAPABILITY TEST ARE PERFORMED, AS DEFINED IN QTP TESTS #1, #2, AND #3 ABOVE, TO VERIFY PROPER CAPTURE "CLOSED LATCHES" INDICATION.

6. 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. AFTER COMPLETION AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE; AND AN ELECTRICAL CIRCUIT CHECK TEST, INSULATION RESISTANCE TEST, AND AN OPERATIONAL CAPABILITY TEST ARE CONDUCTED, AS DEFINED PREVIOUSLY IN QTP TESTS #1, #2, & #3, TO VERIFY PROPER CAPTURE "CLOSED LATCHES" INDICATION.

7. 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 GEOMETRICAL PARAMETERS FOR VARIOUS INITIAL CONDITIONS FOR

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MIR/SHUTTLE DOCKING. A TOTAL OF 20 DOCKINGS IS PERFORMED. CLOSING OF CAPTURE LATCHES IS VERIFIED PRIOR TO EACH DOCKING. SUBSEQUENT TO THIS TEST AN ENGINEERING INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE; AND AN ELECTRICAL CIRCUIT CHECK TEST, INSULATION RESISTANCE TEST, AND AN OPERATIONAL CAPABILITY TEST ARE CONDUCTED, AS DEFINED PREVIOUSLY IN QTP TESTS #1, #2, & #3, TO VERIFY PROPER CAPTURE "CLOSED LATCHES" INDICATION.

8. 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. PRIOR TO EACH DOCKING, AS SHOWN IN THE FOLLOWING TABLE, CAPTURE LATCH CLOSING IS VERIFIED.

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°	+80+/-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

AFTER COMPLETION AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE; AND AN ELECTRICAL CIRCUIT CHECK TEST, INSULATION RESISTANCE TEST, AND AN OPERATIONAL CAPABILITY TEST ARE CONDUCTED.

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AS DEFINED PREVIOUSLY IN QTP TESTS #1, #2, & #3, TO VERIFY PROPER CAPTURE 'CLOSED LATCHES' INDICATION.

9. TARGET SERVICE LIFE TEST - TESTS ARE PERFORMED TO VERIFY PROPER DOCKING AND UNDOCKING OPERATIONS OVER ITS LIFE OF 100 DOCKINGS. PROPER CLOSING OF THE CAPTURE LATCHES IS VERIFIED PRIOR TO 100 DOCKING AND UNMATING CYCLES (FOR MC621-0087-1001/3001 UNITS ONLY). FOR MC621-0087-2001, -4001, & -5001 UNITS PROPER OPERATION VERIFIED DURING 388 CYCLES (44 VACUUM/LOAD CYCLES, 16 LOAD CYCLES, & 324 NO-LOAD CYCLES). AFTER COMPLETION AN INSPECTION IS PERFORMED TO IDENTIFY BROKEN OR LOOSE HARDWARE; AND AN ELECTRICAL CIRCUIT CHECK TEST, INSULATION RESISTANCE TEST, AND AN OPERATIONAL CAPABILITY TEST ARE CONDUCTED, AS DEFINED PREVIOUSLY IN QTP TESTS #1, #2, & #3, TO VERIFY PROPER CAPTURE 'CLOSED LATCHES' INDICATION.

10. 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:

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



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(E) OPERATIONAL USE:
NONE

- APPROVALS -

DESIGN ENGINEER
DESIGN MANAGER
NASA SS/MA
NASA SUBSYSTEM MANAGER

M. NIKOLAYEVA
A. SOUBCHEV

[Handwritten signatures and initials over horizontal lines]



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