

PAGE: 1

PRINT DATE: 06/08/90

S05Q250L
ATTACHMENT -
Page 1 of 152

FAILURE MODES EFFECTS ANALYSIS (FMEA) — CRITICAL HARDWARE

NUMBER: MO-AA1-410-X

SUBSYSTEM NAME: STABILIZED PAYLOAD DEPLOYMENT SYSTEM

REVISION : 2 06/08/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
ASSEM :	MID MCA-1	V070-764610
ASSEM :	MID MCA-2	V070-764620
ASSEM :	MID MCA-3	V070-764630
ASSEM :	MID MCA-4	V070-764640
SRU :	RELAY, HYBRID	MC455-0135-0001
SRU :	RELAY, HYBRID	MC455-0135-0002

PART DATA

REFERENCE DESIGNATORS: 40V76A117 - K13
: 40V76A117 - K41
: 40V76A117 - K49
: 40V76A117 - K61
: 40V76A118 - K8
: 40V76A119 - K33
: 40V76A119 - K45
: 40V76A119 - K46
: 40V76A119 - K58
: 40V76A120 - K54

QUANTITY OF LIKE ITEMS: 10

FUNCTION:

PROVIDES CONTROL OF AC POWER APPLICATION TO DRIVE MOTOR FOR THE PEDESTAL DEPLOY FUNCTION. K13, K49, AND K54 FOR SYSTEM 1/PRIMARY PEDESTAL. K8, K33 AND K58 FOR SYSTEM 2/PRIMARY PEDESTAL. K41, K61, K45 AND K46 PERFORM THE SAME FUNCTION FOR SECONDARY PEDESTAL.

PAGE: 7

PRINT DATE: 06/08/90

5050250L
ATTACHMENT
Page 5 of 152

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AAI-410-04

REVISION# 2 06/08/90
SUBSYSTEM: STABILIZED PAYLOAD DEPLOYMENT SYSTEM
ITEM NAME: RELAY, HYBRID
CRITICALITY OF THIS FAILURE MODE: 1R3

- FAILURE MODE:
SHORTED. ANY TWO OR MORE SETS OF CONTACTS.

MISSION PHASE:
00 ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
: 103 DISCOVERY
: 104 ATLANTIS
: 105 ENDEAVOUR

CAUSE:
PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL
SHOCK, THERMAL STRESS, PROCESSING ANOMALY

- CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO
-

REDUNDANCY SCREEN A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:

- A)
PRELAUNCH CHECKOUT.
 - B)
TWO OR MORE PHASES WILL CAUSE MOTOR TO DRIVE. CANNOT CONFIRM RELAY
FAILURE.
 - C)
PHYSICAL AND ELECTRICAL ISOLATION OF REDUNDANT ELEMENTS.
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-

- FAILURE EFFECTS -

- (A) SUBSYSTEM:
TWO OR MORE AC POWER PHASES WILL BE CONTINUOUSLY APPLIED TO ONE
PEDESTAL DRIVE MOTOR. WHENEVER THREE PHASE AC POWER IS PRESENT.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA1-410-04

- (B) INTERFACING SUBSYSTEM(S):
IF UNDETECTED MOTOR WILL DRIVE AGAINST STOPS, OVERHEAT, AND FAIL. MOTOR DRIVE FOR THE SELECTED FUNCTION WOULD BE AT HALF SPEED. IF THE RELAY FOR OPPOSITE MOTOR ROTATION IS ACTIVATED CIRCUIT BREAKER WILL TRIP.
- (C) MISSION:
FIRST FAILURE - NO EFFECT.
- (D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT. FIRST FAILURE
- (E) FUNCTIONAL CRITICALITY EFFECTS:
LOSS OF ALL RELAYS IN THIS MODE WILL FAIL BOTH MOTORS AND REQUIRE A TRANSFER TO THE SECONDARY PEDESTAL. LOSS OF SECONDARY DRIVE CAPABILITY RESULTING IN PAYLOAD IN MID DEPLOYMENT WOULD CAUSE INABILITY TO CLOSE PAYLOAD BAY DOORS. RESULTING IN POSSIBLE LOSS OF CREW AND VEHICLE.

- DISPOSITION RATIONALE -

- (A) DESIGN:
REFER TO APPENDIX C, ITEM 1.
- (B) TEST:
REFER TO APPENDIX C, ITEM 1.

OMRSD: GROUND TURNAROUND;
FREQUENCY OF CHECKOUT IS MISSION DEPENDENT. 3-PHASE MOTOR CIRCUITS,
VERIFY PROPER PHASE ROTATION AND MOTOR PHASE VOLTAGE.
S0790A.250-A, -B, -C
S0790A.260-A, -B, -C
S0790A.270-A, -B, -C
S0790A.280-A, -B, -C
- (C) INSPECTION:
REFER TO APPENDIX C, ITEM 1.
- (D) FAILURE HISTORY:
REFER TO APPENDIX C, ITEM 1.
- (E) OPERATIONAL USE:
NONE

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA1-410-04

- APPROVALS -

RELIABILITY ENGINEERING:	W. R. MARLOWE	<i>W.P. Reynolds 6/24/90</i>
DESIGN ENGINEERING :	T. TAUFER	<i>T. Tauffer 6/24/90</i>
QUALITY ENGINEERING :	M. F. Mergen	<i>C.D. Ballinger for 9/24/90</i>
NASA RELIABILITY :		<i>G.E. [Signature] 9/17/90</i>
NASA SUBSYSTEM MANAGER :		<i>[Signature] 5/25/90</i>
NASA EPD&C RELIABILITY :		<i>M.S. Dewain for J. Woodard 9/19/90</i>
NASA QUALITY ASSURANCE :		<i>[Signature] 9/18/90</i>
NASA EPD&C SUBSYS MGR :		<i>J.R. [Signature] for F. Harris 9/20/90</i>