

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE
NUMBER: 05-6ED-2128-X**

SUBSYSTEM NAME: EPD&C - ET UMBILICAL DOORS

REVISION: 5 08/24/93

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: AFT MCA-1	V070-765410
LRU	: AFT MCA-2	V070-765420
LRU	: AFT MCA-3	V070-765430
LRU	: AFT MCA-3	V070-765600
LRU	: AFT MCA-2	V070-765620
LRU	: AFT MCA-1	V070-765630
SRU	: RELAY, HYBRID	MC455-0135-0001
SRU	: RELAY, HYBRID	MC455-0135-0002

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
RELAY, HYBRID, 4 POLE, NON-LATCH, CENTERLINE LATCHES - DEPLOY CIRCUITS

REFERENCE DESIGNATORS: 54V76A114K5
54V76A114K6
54V76A114K10
54V76A114K11
55V76A115K17
55V76A115K18
56V76A116K5
56V76A116K6

QUANTITY OF LIKE ITEMS: 8
EIGHT

FUNCTION:
TWO HYBRID RELAYS ARE USED IN SERIES TO CONNECT THREE-PHASE AC POWER TO EACH CENTERLINE LATCH ACTUATOR DRIVE FOR DEPLOY OPERATIONS.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL FAILURE MODE
NUMBER: 05-6ED-2128-03**

SUBSYSTEM NAME: EPD&C - ET UMBILICAL DOORS
LRU : AFT MCA-1
ITEM NAME: RELAY, HYBRID
REVISION# 5 **08/24/93 R**
CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
SHORTS CONTACT-TO-CONTACT (PHASE "B" OR PHASE "C")

MISSION PHASE:
DO DE-ORBIT

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

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

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) PASS
 B) FAIL
 C) PASS

PASS/FAIL RATIONALE:
A)
B)
FAILS SCREEN "B" BECAUSE HYBRID RELAY SHORTS END-TO-END IS NOT READILY
DETECTABLE INFLIGHT.
C)

- FAILURE EFFECTS -

- (A) SUBSYSTEM:**
FIRST FAILURE - NO EFFECT
- (B) INTERFACING SUBSYSTEM(S):**
FIRST FAILURE - NO EFFECT
- (C) MISSION:**
FIRST FAILURE - NO EFFECT
- (D) CREW, VEHICLE, AND ELEMENT(S):**
FIRST FAILURE - NO EFFECT

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL FAILURE MODE
NUMBER: 05-6ED-2126-03**

(E) FUNCTIONAL CRITICALITY EFFECTS:

- 1) HYBRID RELAY SHORTS CONTACT-TO-CONTACT (PHASE "B" OR PHASE "C")
- 2) SERIAL HYBRID RELAY SHORTS CONTACT-TO-CONTACT ON SIMILAR PHASE RESULTING IN LOSS OF ASSOCIATED MOTOR
- 3) LOSS OF REDUNDANT MOTOR

AFTER SECOND FAILURE (HYBRID RELAY SHORTS CONTACT-TO-CONTACT ON SIMILAR PHASE), A PHASE-TO-PHASE SHORT OCCURS WHEN THE STOW COMMAND IS GIVEN CAUSING AC CIRCUIT BREAKER TO TRIP RESULTING IN LOSS OF AC POWER TO ALL DOOR AND LATCH FUNCTIONS OF ASSOCIATED MOTOR CONTROLLER ASSEMBLY. CENTERLINE LATCH CANNOT BE STOWED (UNLATCHED) AFTER THIRD FAILURE (LOSS OF REDUNDANT MOTOR) WHICH PRECLUDES DOOR CLOSURE. POSSIBLE LOSS OF CREW/VEHICLE DUE TO DAMAGE CAUSED BY THERMAL EFFECTS IF ET DOOR CANNOT BE CLOSED FOR SAFE ENTRY.

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

(B) TEST:

REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

GROUND TURNAROUND TEST

NONE

(C) INSPECTION:

REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

(D) FAILURE HISTORY:

REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

(E) OPERATIONAL USE:

NONE

- APPROVALS -

EDITORIALLY APPROVED
EDITORIALLY APPROVED
TECHNICAL APPROVAL

: RI
: JSC
: VIA CR

(Signature) 8/24/93
:S50279L