

FAILURE MODES EFFECTS ANALYSIS (FMEA) — CRITICAL HARDWARE

NUMBER: 05-6AB-2126-X

SUBSYSTEM NAME: EPD&C - ACTUATOR, VENT DOORS

REVISION : 2 07/20/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	FWD MCA-1	V070-763600
LRU :	FWD MCA-2	V070-763620
LRU :	FWD MCA-3	V070-763630
SRU :	RELAY, HYBRID	MC455-0135-0001

PART DATA

- EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
RELAY, HYBRID, FOUR POLE, NON-LATCH, RIGHT AND LEFT FORWARD VENT DOORS 1 AND 2, "CLOSE/PURGE" CONTROL
- REFERENCE DESIGNATORS:
 - : 81V76A111K19
 - : 81V76A111K20
 - : 82V76A112K21
 - : 82V76A112K22
 - : 82V76A112K25
 - : 82V76A112K26
 - : 83V76A113K21
 - : 83V76A113K22
- QUANTITY OF LIKE ITEMS: 8
EIGHT (FOUR PER SIDE)
- FUNCTION:
UPON RECEIVING A STIMULUS FROM ASSOCIATED HYBRID DRIVERS OR BY DIRECT COMMAND FROM A FLIGHT MDN, CONTACT SETS OF TWO HYBRID RELAYS IN SERIES CONNECT 3 PHASE AC VOLTAGE TO MOTORS TO OPERATE THE LEFT AND RIGHT FORWARD VENT DOORS 1 AND 2 TO THE CLOSED OR PURGE POSITION.

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

REVISION# 2 07/20/90 R

SUBSYSTEM: EPD&C - ACTUATOR, VENT DOORS
 LRU : FWD MCA-1
 ITEM NAME: RELAY, HYBRID

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 RELAY SHORTS CONTACT-TO-CONTACT IS NOT READILY
 DETECTABLE INFLIGHT.
- C)

- FAILURE EFFECTS -

- (A) SUBSYSTEM:
 FIRST FAILURE - NO EFFECT
- (B) INTERFACING SUBSYSTEM(S):
 FIRST FAILURE - NO EFFECT

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- (C) MISSION:
FIRST FAILURE - NO EFFECT
- (D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE - NO EFFECT
- (E) FUNCTIONAL CRITICALITY EFFECTS:
 1. HYBRID RELAY SHORTS CONTACT TO CONTACT (EITHER PHASE "B" OR PHASE "C")
 2. SERIAL HYBRID RELAY SHORTS CONTACT-TO-CONTACT ON SIMILAR PHASE
 3. LOSS OF REDUNDANT MOTOR
 4. REDUNDANT DOOR FAILS CLOSED

AFTER THE SECOND FAILURE, PHASE-TO-PHASE SHORT WOULD OCCUR WHEN OPEN COMMAND IS PRESENT CAUSING AC CIRCUIT BREAKER TO TRIP WHICH RESULTS IN LOSS OF ABILITY TO OPEN VENT DOOR VIA ASSOCIATED MOTOR. POSSIBLE LOSS OF CREW/VEHICLE DUE TO INABILITY TO PROVIDE SUFFICIENT VENTING IF BOTH VENT DOORS FAIL CLOSED RESULTING IN STRUCTURAL OVERLOAD DURING 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
NO QMRSD TEST AVAILABLE
- (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

