

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
 NUMBER: 05-6ED-2131-X

I. 3. 1

SUBSYSTEM NAME: EPD&C - ET UMBILICAL DOORS

REVISION : 2 08/06/90

	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, LEFT AND RIGHT ORBITER/EXTERNAL
 (ORB/ET) TANK DOOR CLOSE LATCH - LATCH CIRCUIT

REFERENCE DESIGNATORS: 54V76A114K17
 : 54V76A114K18
 : 55V76A115K13
 : 55V76A115K14
 : 55V76A115K57
 : 56V76A115K59
 : 56V76A116K12
 : 56V76A116K13

QUANTITY OF LIKE ITEMS: 8
 EIGHT

FUNCTION:
 THE HYBRID RELAYS ARE USED IN SERIES TO CONNECT 3-PHASE AC POWER TO EACH
 ET/ORB LEFT AND RIGHT DOOR CLOSE LATCH ACTUATOR DRIVE.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - ET UMBIL DOORS FMEA NO 05-6ED-2131 -2 REV:02/19/88

ASSEMBLY : APT MCA 1, 2, AND 3	CRIT. FUNC: 1R
P/N RI : MC455-0135-0001	CRIT. HDW: 2
P/N VENDOR:	VEHICLE 102 103 104
QUANTITY : 8	EFFECTIVITY: X X X
: EIGHT	PHASE(S): PL LO X CO DO LS X

PREPARED BY:	REDUNDANCY SCREEN: A-PASS B-PASS C-PASS	APPROVED BY:	APPROVED BY (NASA):
DES T BANHIDY	DES <i>S.B. D.V. Bunn</i>	SSM <i>J.C. [unclear] 3/14/88</i>	REL <i>[unclear]</i>
REL H YEW	REL <i>[unclear] 2-26-88</i>	QE <i>[unclear]</i>	EPDC SSM <i>[unclear] for the study</i>
QE W HIGGINS	QE <i>[unclear] M.B.</i>	EPDC REL <i>[unclear] 3/1/88</i>	

ITEM:
RELAY, HYBRID, 4 POLE, NON-LATCH, LEFT AND RIGHT ORBITER/EXTERNAL TANK (ORB/ET) DOOR CLOSE LATCH - LATCH CIRCUIT

FUNCTION:
THE HYBRID RELAYS ARE USED IN SERIES TO CONNECT 3-PHASE AC POWER TO EACH ORB/ET LEFT AND RIGHT DOOR CLOSE LATCH ACTUATOR DRIVE FOR THE LATCHING OPERATION. 54V76A114K17, K18; 55V76A115K13, K14, K57, K59; 56V76A116K12, K13

FAILURE MODE:
INADVERTENT OPERATION, INADVERTENTLY TRANSFERS, FAILS CLOSED

USE(S):
CONTAMINATION, PIECE PART FAILURE, VIBRATION, THERMAL STRESS, MECHANICAL SHOCK, PROCESSING ANOMALY

EFFECT(S) ON:
(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
(A,B) FIRST FAILURE - NO EFFECT. REQUIRES FAILURE OF THE OTHER RELAY IN SERIES WITH THE FIRST FAILURE TO INADVERTENTLY PROVIDE POWER TO MOTOR.
(C,D) SECOND FAILURE OF THE OTHER RELAY IN SERIES WILL INADVERTENTLY DRIVE LATCHES. POSSIBLE LOSS OF CREW/VEHICLE THROUGH PREMATURE OPERATION OF THE CLOSE LATCH ACTUATOR AND PREVENTION OF COMPLETE ET DOOR CLOSURE, RESULTING IN STRUCTURAL DAMAGE CAUSED BY THERMAL EFFECTS DURING RE-ENTRY.

DISPOSITION & RATIONALE:
(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE
(A-D) FOR DISPOSITION AND RATIONALE, REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - ET UMBIL DOORS PMAA NO 05-6ED-2131 -2 REV:02/19/88

(B) GROUND TURNAROUND TEST

VERIFY HYBRID RELAY FUNCTION THAT CONNECTS AC BUSES TO RIGHT/LEFT CLOSE LATCH ACTUATOR DRIVE BY PERFORMING UNLOCK LATCH FUNCTIONAL : VERIFYING INITIAL MCA STATUS, SENDING THE RELEASE/LATCH COMMAND BY SOFTWARE OR SWITCH CYCLE AS APPROPRIATE, VERIFYING SWITCH SCAN, AND MONITORING AC CURRENTS AND OPERATING TIME. TOTAL OPERATING TIME WITH TWO MOTORS IS 6 SEC(MAX). TESTS ARE PERFORMED EVERY FLIGHT AND FOR LRU REPLACEMENT.

(E) OPERATIONAL USE

NONE