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SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 05-6J-2062-X

SUBSYSTEM NAME: EPD&C - MAIN PROPULSION (03-1)

REVISION : 1 02/05/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ LRU :	MID PCA 1	V070-764400
■ LRU :	MID PCA 3	V070-764450
■ SRU :	CONTROLLER, HYBRID DRIVER	MC477-0263-0002

■ EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LH2 RELIEF SHUTOFF VALVE CLOSE SOLENOID.

■ REFERENCE DESIGNATORS: 40V76A27AR29
: 40V76A25AR48

■ QUANTITY OF LIKE ITEMS: 2
TWO

■ FUNCTION:
CONDUCTS POWER TO CLOSE SOLENOID IN EACH REDUNDANT CIRCUIT FOR LH2 RELIEF SHUTOFF VALVE. HDC IS IN SERIES WITH A DIODE AND A RPC IN EACH CIRCUIT.

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 05-6J-2062-02

REVISION# 1 02/05/90

SUBSYSTEM: EPD&C - MAIN PROPULSION (03-1)
LRU :MID PCA 1 & 3 CRITICALITY OF THIS
ITEM NAME: CONTROLLER, HYBRID DRIVER FAILURE MODE:1R3

FAILURE MODE:
INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF"

MISSION PHASE:
LO LIFT-OFF

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

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 B SCREEN DUE TO SERIES CIRCUIT CONFIGURATION.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY AGAINST PREMATURE ACTUATION OF CLOSE SOLENOID.

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT - FIRST FAILURE. SERIES RPC PREVENTS INADVERTENT POWER TO LH2 RELIEF SHUTOFF VALVE CLOSE SOLENOID.

(C) MISSION:
NO EFFECT - FIRST FAILURE.

■ (D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT - FIRST FAILURE.

■ (E) FUNCTIONAL CRITICALITY EFFECTS:
1R/3, 2 SUCCESS PATHS AFTER FIRST FAILURE. TIME FRAME - ASCENT.
1) HOC FAILS "ON".
2) SERIES RPC FAILS "ON" CAUSING LOSS OF CAPABILITY TO OPEN LH2 RELIEF SHUTOFF VALVE (PV8).
3) ONE OF THE TWO RTLS DUMP VALVES (PV17, 18) FAILS TO OPEN/REMAIN OPEN FROM MECO + 10 TO MECO + 90 SECONDS.

RESULTS IN LACK OF RELIEF/LH2 CAPABILITY PRIOR TO DUMP, POSSIBLE RUPTURE OF THE LH2 MANIFOLD CAUSING LEAKAGE INTO AFT COMPARTMENT, OVERPRESSURIZATION, AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF ADJACENT CRITICAL COMPONENTS DUE TO CRYOGENIC EXPOSURE.

POSSIBLE LOSS OF CREW/VEHICLE.

- DISPOSITION RATIONALE -

■ (A) DESIGN:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

■ (B) TEST:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

GROUND TURNAROUND TEST
COMPLETE ELECTRICAL VERIFICATION V41AB0.080I, EVERY FLIGHT.

■ (C) INSPECTION:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

■ (D) FAILURE HISTORY:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

■ (E) OPERATIONAL USE:
LH2 MANIFOLD PRESSURE IS ON CAUTION AND WARNING.
POST MECO/PRE DUMP: START MPS PROPELLANT DUMP AS SOON AS POSSIBLE.
POST DUMP: OPEN THE LH2 FILL/DRAIN VALVES.

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 05-6J-2062-02

- APPROVALS -

RELIABILITY ENGINEER	:S. TRUJILLO	: 2-8-90
RELIABILITY SUPERVISOR	:M.L. HOVE	:
DESIGN ENGINEER	:J.L. PECK	:
DESIGN SUPERVISOR	:T.J. TAUFER	: 2-9-90
QUALITY ENGINEER	:D. MASAI	:
QUALITY SUPERVISOR	:J.T. COURSEN	: 2-9-90
NASA RELIABILITY	:	: 3/2/90
NASA SUBSYSTEM MANAGER	:	: 3/2/90
NASA EPD&C RELIABILITY	:	: 3/2/90
NASA QUALITY ASSURANCE	:	: 2/20/90
NASA EPD&C SUBSYS MGR	:	: for F. Blair 3/6/90