

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP.

FMEA NO 05-6J -2142 -2
ABORT: RTLS, TAL.

REV:06/16/88

ASSEMBLY : APT PCA 1, 2, 3
P/N RI : MC477-0261-0002
P/N VENDOR:
QUANTITY : 6
: SIX
:

VEHICLE	102	103	104
EFFECTIVITY:	X	X	X
PHASE(S):	PL	LO X OO	DO L5

CRIT. FUNC: 1R
CRIT. HDW: 2

PREPARED BY:	APPROVED BY:	REDUNDANCY SCREEN: A-PASS B-PASS C-PASS
DES <u>J BROWN</u>	DES <u>[Signature]</u>	APPROVED BY (NASA):
REL <u>DEFENSOR</u>	REL <u>[Signature] 6/27/88</u>	EPDC SSM <u>[Signature]</u>
QE <u>D D MASAI</u>	QE <u>[Signature] 6/27/88</u>	MPS SSM <u>[Signature]</u>
		EPDC REL <u>[Signature] 7/1/88</u>
		MPS REL <u>[Signature]</u>
		QE <u>[Signature] 6/27/88</u>

ITEM:

CONTROLLER, HYBRID DRIVER (HDC) TYPE I, HELIUM INTERCONNECT IN VALVES (LV59, 61, 63) CONTROL CIRCUIT.

FUNCTION:

CONDUCTS CONTROL SIGNAL TO RPC TO POWER THE HELIUM INTERCONNECT IN VALVE SOLENOIDS. 40V76A25AR50, 51. 40V76A26AR41, 42. 40V76A27AR31, 32.

FAILURE MODE:

INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF".

CAUSE(S):

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

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY

(A) INADVERTENT "IN OPEN" COMMAND TO HELIUM INTERCONNECT IN SOLENOID.

(B) INABILITY TO DEACTUATE HELIUM INTERCONNECT IN VALVE.

DURING MAINSTAGE, WITH THE CONSTANT ENGINE HELIUM PURGE, THE HIGHER PNEUMATIC SUPPLY PRESSURE WILL EQUALIZE WITH THE LOWER ASSOCIATED ENGINE SUPPLY.

(C,D) NO EFFECT - FIRST FAILURE.

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- (E) IR/2, 1 SUCCESS PATH AFTER FIRST FAILURE.
- 1) RUPTURE OF INTERCONNECT LINE BETWEEN "IN" CHECK VALVE AND SOLENOID VALVE.
 - 2) HDC FAILS "ON" RESULTING IN OPENING OF HELIUM INTERCONNECT IN VALVE.

DURING ASCENT, PNEUMATIC SUPPLY WILL BE LOST. ESCAPING HELIUM MAY OVERPRESSURIZE THE AFT COMPARTMENT.

DURING ENTRY, VENT DOORS ARE CLOSED TO PREVENT INGESTION OF RCS AND APU GASES. RUPTURE DURING THE TIME PERIOD THAT THE VENT DOORS ARE CLOSED MAY RESULT IN OVERPRESSURIZATION OF THE AFT COMPARTMENT. VENT DOORS ARE OPENED WHEN VEHICLE VELOCITY DROPS BELOW 2400 FT/SEC. POSSIBLE LOSS OF CREW/VEHICLE.

CRITICALITY 1/1 FOR RTLS AND TAL ABORTS DUE TO LACK OF AFT COMPARTMENT PURGE DURING ENTRY. ASSUMES ABORT CAUSED BY UNISOLATABLE ENGINE HELIUM SYSTEM LEAK RESULTING IN PREMATURE ENGINE SHUTDOWN - HELIUM FROM OTHER TWO ENGINES WILL BE LOST WHEN VEHICLE SOFTWARE OPENS INTERCONNECT "OUT" VALVES AT MECO +20 SECONDS. POSSIBLE LOSS OF CREW/VEHICLE.

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A-D) FOR DISPOSITION AND RATIONALE:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

(B) GROUND TURNAROUND TEST

HE INTCN VLVS COMPLETE CMD VERIF, V41AAO.020A, V41AAO.04A, V41AAO.060A EVERY FLIGHT.

(E) OPERATIONAL USE

HELIUM BOTTLE PRESSURE IS ON DEDICATED DISPLAY IN THE COCKPIT. PRIOR TO MECO, THE LEFT ENGINE LOW PRESSURE GHe CROSSOVER VALVE (LV10) CAN BE OPENED.

EFFECTIVE FOR OI-8D SOFTWARE, CR 893978 "MPS SYSTEM FDA AND DISPLAY - BFS" ADDS PNEUMATIC TANK, REGULATOR, AND ACCUMULATOR PRESSURE TO THE S/M ALERT FDA SYSTEM AND ADDS THE 3 MEASUREMENTS TO THE BFS SYSTEM SUMMARY DISPLAY. THIS ALLOWS THE FLIGHT CREW TO RESPOND TO A PNEUMATIC HELIUM SYSTEM LEAK INDEPENDENT OF GROUND CONTROL.