

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2053 -2 REV:11/19/87

ASSEMBLY : AFT LCA-2 CRIT. FUNC: 1R
 P/N RI : MC477-0263-0002 CRIT. HDW: 3
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 2 EFFECTIVITY: X X X
 : TWO PHASE(S): PL X LO X OO DO LS
 : 2 PER LO2 INBOARD FILL/DRAIN VALVE

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <i>JTB</i> J BROWN	DES <i>[Signature]</i>	EPDC SSM <i>[Signature]</i>
REL <i>[Signature]</i> F DEFENSOR	REL <i>[Signature]</i> 11-5-87	MPS SSM <i>[Signature]</i>
QE D MASAI	QE <i>[Signature]</i>	EPDC REL <i>[Signature]</i>
		MPS REL <i>[Signature]</i>
		QE <i>[Signature]</i>

ITEM:

CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LO2 INBOARD FILL AND DRAIN VALVE CONTROL POWER, OPEN SOLENOID.

FUNCTION:

CONDUCTS MAIN BUS POWER TO THE OPEN SOLENOID FOR THE LO2 INBOARD FILL/DRAIN VALVE. THE TWO HDCs ARE IN SERIES. 56V76A122AR-J3(60).

FAILURE MODE:

INADVERTENT OUTPUT, CONDUCTS PREMATURELY.

CAUSE(S):

PIECE PART SHOCK. FAILURE, MECHANICAL SHOCK, VIBRATION, THERMAL SHOCK.

EFFECT(S) ON:

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

(A) DEGRADATION OF REDUNDANCY AGAINST PREMATURE POWER TO THE OPEN SOLENOID.

(B,C,D) NO EFFECT - FIRST FAILURE.

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(E) POSSIBLE LOSS OF CREW AND VEHICLE AFTER THIRD FAILURE (SECOND FAILURE - SERIES HDC CONDUCTS PREMATURELY, BISTABLE FEATURE MAINTAINS FILL/DRAIN VALVE IN CLOSE POSITION. THIRD FAILURE - PREMATURE DEACTUATION OF CLOSE SOLENOID) RESULTING IN PREMATURE OPENING OF FILL/DRAIN VALVE. POTENTIAL WATER HAMMER EFFECT OF APPROXIMATELY 700 PSIG (AT 1-G). LO2 FILL/DRAIN LINE IS ONLY CERTIFIED TO WITHSTAND FLIGHT LOADS WHILE EMPTY. FAILURE RESULTS IN POSSIBLE RUPTURE OF THE LO2 FILL LINE, AFT OVERPRESS, AND FIRE/EXPLOSIVE HAZARD. POSSIBLE LOSS OF CRITICAL ADJACENT FUNCTIONS DUE TO CRYO EXPOSURE. DISPLACED GAS MAY ENTER ONE OR MORE SSMEs. POSSIBLE SHUTDOWN OF ONE OR MORE SSMEs. FAILS B SCREEN DUE TO SERIES CIRCUIT CONFIGURATION.

DISPOSITION & RATIONALE:

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

(A-D) DISPOSITION AND RATIONALE:

REFER TO APPENDIX B, ITEM NUMBER 1 - HYBRID DRIVER CONTROLLER.

(B) GROUND TURNAROUND TEST

MDM COMMAND REDUNDANCY, V41AEO.071A, E EVERY FLIGHT

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.

05-6J-84