

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MAIN PROP. FMEA NO 05-6J -2037 -5 REV: 11/19/87

ASSEMBLY : D & C PANEL R4  
P/N RI : ME452-0102-7257  
P/N VENDOR:  
QUANTITY : 1  
: ONE  
: 1 PER LO2 INBOARD FILL/DRAIN VALVE

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

CRIT. FUNC: 1R  
CRIT. HOW: 3

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

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <u>JWB</u> J BROWN	DES <u>[Signature]</u>	EPDC SSM <u>[Signature]</u>
REL <u>J F</u> DEFENSOR	REL <u>[Signature]</u> 12-5-87	MPS SSM <u>[Signature]</u>
QE <u>DM D</u> MASAI	QE <u>[Signature]</u>	EPDC REL <u>[Signature]</u>
		MPS REL <u>[Signature]</u>
		QE <u>[Signature]</u>

ITEM:

SWITCH, TOGGLE (2 POLES, 3 POSITIONS, LEVER LOCKED), LO2 INBOARD FILL/DRAIN VALVE CONTROL.

FUNCTION:

PROVIDES MANUAL CONTROL OF THE LO2 INBOARD FILL AND DRAIN VALVE (PV13).  
32V73A457

FAILURE MODE:

SHORTS TO GROUND

CAUSE(S):

PIECE PART STRUCTURAL FAILURE, CONTAMINATION, MECHANICAL SHOCK, VIBRATION, THERMAL STRESS

EFFECT(S) ON:

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

(A) TOGGLE SWITCH CLOSE CONTACT SHORTS TO GROUND. DEGRADATION OF REDUNDANCY AGAINST PREMATURE DEACTUATION OF THE CLOSE SOLENOID.

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

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(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THIRD FAILURE (SECOND FAILURE - THE CLOSE SWITCH BLOCKING DIODE SHORTS, GROUNDING THE CLOSE COMMAND AND CAUSING THE PREMATURE DEACTUATION OF THE CLOSE SOLENOID, BISTABLE FEATURE WILL MAINTAIN FILL/DRAIN VALVE IN CLOSE POSITION. THIRD FAILURE - PREMATURE ACTUATION OF OPEN SOLENOID) RESULTING IN PREMATURE OPENING OF FILL/DRAIN VALVE. POTENTIAL WATER HAMMER EFFECT OF APPROXIMATELY 700 PSI (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 BECAUSE NO INSTRUMENTATION IS AVAILABLE TO DETECT FAILURE WHILE SWITCH IS IN NOMINAL ASCENT POSITION.

DISPOSITION & RATIONALE:

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

(A-D) DISPOSITION AND RATIONALE

REFER TO APPENDIX A, ITEM NUMBER 1 - TOGGLE SWITCH.

(B) GROUND TURNAROUND TEST

MDM COMMAND/COPPER PATH VERIFICATION, V41ABO.101D, F EVERY FLIGHT

(E) OPERATIONAL USE

NO CREW ACTION CAN BE TAKEN.

05-6J-60