

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - MANIP DEPLY CNTL FMEA NO 05-61B-2001 -2 REV:10/26/88

ASSEMBLY : PNL 88A2 (V082-730150)	CRIT. FUNC:	1
P/N RI : ME452-0102-7203	CRIT. HDW:	1
F/N VENDOR:	VEHICLE	102 103 104
QUANTITY : 1	EFFECTIVITY:	X X X
: ONE	PHASE(S):	PL LO OO X DO X LS

PREPARED BY:	B SEARS	APPROVED BY:	DES	REL	QE	REDUNDANCY SCREEN:	A-	B-	C-	APPROVED BY (NASA):
DES	H VEW	DES	REL	REL	QE		SM			11/9/88
REL	J COURSEN	REL	REL	REL	QE					11-8-88
QE		QE	QE	QE	QE					11/10/88

ITEM: TOGGLE SWITCH (2P2P), RMS STOW/DEPLOY

EPD&C SSM *[Signature]* 11-8-88
 EPD&C REL *[Signature]* 11/10/88

FUNCTION: PROVIDES POWER AND CONTROL FOR STOW/DEPLOY OPERATION OF THE MANIPULATOR POSITIONING MECHANISM (MPM) TO ALLOW RMS TO DEPLOY/RETRIEVE PAYLOAD AND PROPER CLOSURE OF THE PAYLOAD BAY DOORS. 36V73A8A2S5.

FAILURE MODE: FAILS CLOSED (SHORTS CONTACT-TO-CONTACT, POLE-TO-POLE)

CAUSE(S): PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY

EFFECT(S) ON:

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

(A) POSSIBLE MPM MOVEMENT IF SWITCH FAILS CLOSED TO STOW POSITION DURING RMS OPERATION AS : (1) MID MCA LOGIC POWER MNA, MNB AND MNC MAY BE ON DURING RMS OPERATION AND (2) PAYLOAD BAY MECH POWER MAY BE ON FOR PAYLOAD RETENTION LATCH OPERATION OR OTHER PAYLOAD BAY OPERATIONS WHILE RMS IS IN OPERATION. THIS ALLOWS A SINGLE POINT SWITCH FAILURE RESULTING IN UNCOMMANDED MPM MOVEMENT.

(B) SWITCH FAILURE TO STOW POSITION DURING RMS OPERATION WITH PAYLOAD BAY MECH POWER PRESENT COULD CAUSE MPM MOVEMENT AND POSSIBLE VEHICLE STRUCTURAL DAMAGE. SWITCH FAILURE TO DEPLOY POSITION AFTER MPM DEPLOYMENT COULD CAUSE LOSS OF CAPABILITY TO STOW THE MPM RESULTING IN POTENTIAL INTERFERENCE WITH PAYLOAD BAY DOOR CLOSURE AND COULD REQUIRE MPM JETTISON OR EVA TO RESTOW THE MPM/RMS.

(C) POSSIBLE LOSS OF MISSION IF SWITCH FAILS TO STOW POSITION PRIOR TO MPM DEPLOYMENT CAUSING BLOCKAGE OF PAYLOAD DEPLOYMENT/RETRIEVAL ENVELOPE AND INABILITY TO OPERATE RMS.

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(D) POSSIBLE LOSS OF CREW/VEHICLE IF VEHICLE STRUCTURAL DAMAGE OCCURS DUE TO AN UNCOMMANDED MPM MOVEMENT DURING RMS OPERATION WITH PAYLOAD BAY MECH POWER PRESENT.

DISPOSITION & RATIONALE:

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

(A-D) DISPOSITION AND RATIONALE

REFER TO APPENDIX A, ITEM 1 - TOGGLE SWITCH

(B) GROUND TURNAROUND TEST

VERIFY MPM OPERATION BY PERFORMING DEPLOY/STOW CONTROL REDUNDANCY TESTS FOR SYSTEM 1 AND 2. TESTS ARE PERFORMED FOR EVERY FLIGHT WITH MPM/MRL/RMS AND LRU REPLACEMENT.

(E) OPERATIONAL USE

STS OPERATIONAL FLIGHT RULE PDRS 12-23 PREVENTS UNCOMMANDED MPM MOTION BY INTERRUPTING THREE PHASE AC POWER TO THE MPM ACTUATOR WHENEVER MANIPULATOR ARM IS UNRESTRAINED. FOLLOWING SWITCH FAILURE, AN IFM PROCEDURE WILL BE IMPLEMENTED BEFORE AN EVA IS CONSIDERED. ALSO, CREW IS TRAINED AND EVA TOOLS AND PROCEDURES HAVE BEEN DEVELOPED AND VALIDATED TO PERFORM MANUAL MPM STOW AND DEPLOY.