

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - OMS FMEA NO 05-6L -2026 -2 REV:10/30/87

ASSEMBLY : PANEL 08 CRIT. FUNC: 1R
 P/N RI : ME452-0102-7106 CRIT. HDW: 2
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 4 EFFECTIVITY: X X X
 : FOUR PHASE(S): PL LO X OO X DO X LS
 : (ONE PER VALVE PAIR)

REDUNDANCY SCREEN: A-PASS B-PASS C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES D SOVEREIGN DES D. E. [Signature] SSM John Harris for 14
 REL F DEFENSOR REL J. [Signature] 11-12-82 REL [Signature] 12-2-87
 QE J COURSEN QE [Signature] QE [Signature]
 EACC 5000 [Signature] for U.S. Staff

ITEM:

SWITCH, TOGGLE, SINGLE POLE, THREE POSITIONS (OPEN, GPC, CLOSE), LEFT AND RIGHT OMS - HELIUM AND VAPOR ISOLATION VALVE MANUAL CONTROL.

FUNCTION:

PROVIDES THE CREW THE CAPABILITY TO OVERRIDE GENERAL PURPOSE COMPUTER (GPC) CONTROL OF THE HELIUM AND VAPOR ISOLATION VALVES BY OPENING OR CLOSING THE VALVES MANUALLY THROUGH THE PANEL SWITCH OPERATION. 33V73A8S12, 13, 14, 15.

FAILURE MODE:

PREMATURE TRANSFER TO CLOSE, INADVERTENT TRANSFER TO CLOSE, CONTACT-TO-CONTACT SHORT ("CLOSE" CONTACTS).

CAUSE(S):

CONTAMINATION, MECHANICAL SHOCK, VIBRATION, PIECE PART STRUCTURAL FAILURE.

EFFECT(S) ON:

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

(A) INADVERTENT TRANSFER OF SWITCH TO "CLOSE" POSITION OVERRIDES GENERAL PURPOSE COMPUTER (GPC) CONTROL OF THE HELIUM AND VAPOR ISOLATION VALVES. THIS FAILURE CAUSES ONE OF THE TWO PARALLEL SETS OF HELIUM ISOLATION VALVE TO CLOSE.

(B) ASSOCIATED HELIUM ISOLATION VALVE CLOSSES. FIRST FAILURE HAS NO EFFECT SINCE THE PARALLEL HELIUM ISOLATION VALVE CAN COMPLETE THE FUNCTION.

(C,D) FIRST FAILURE HAS NO EFFECT.

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(E) POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF CONTROL OF ELECTRICAL POWER NECESSARY FOR THE MANUAL CONTROL OF HELIUM AND VAPOR ISOLATION VALVES. REQUIRES ONE OTHER FAILURE (PARALLEL HELIUM ISOLATION VALVE FAILED CLOSE) BEFORE THE EFFECT IS MANIFESTED. FAILED CLOSED CONDITION OF THE HELIUM ISOLATION VALVES REDUNDANT FLOW PATH WOULD RESULT IN INABILITY TO UTILIZE OR DEplete PROPELLANT WITH RESULTANT INABILITY TO DEORBIT OR MAINTAIN SAFE CENTER OF GRAVITY FOR VEHICLE.

DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH.

(B) GROUND TURNAROUND TEST

V43CAO.070 - REDUNDANT CIRCUIT VERIFICATION (PERIODIC) - CRB/POD; PERFORMED FOR FIRST FLIGHT AND AT FIVE FLIGHT INTERVALS OR FOR LRU RETEST PER FIGURE V43Z00.000 OR FOR ORBITER DISRUPTED COPPER PATHS. FUNCTIONAL CHECKOUT OF HELIUM/VAPOR ISOLATION VALVE CONTROL CIRCUITS PER FIGURE V43CAO.070-1.

V43CAO.072 - REDUNDANT CIRCUIT VERIFICATION; PERFORMED EACH FLIGHT (AFTER FIRST FLIGHT). FUNCTIONAL CHECKOUT OF HELIUM/VAPOR ISOLATION VALVE CONTROL CIRCUITS PER FIGURE V43CAO.070-1.

(E) OPERATIONAL USE

USE REDUNDANT FLOW PATH. IF REDUNDANT PATH FAILS, UTILIZE PROPELLANT CONSERVATION AND BALLASTING TECHNIQUES AS REQUIRED TO MAINTAIN DEORBIT CAPABILITY AND SAFE CENTER OF GRAVITY.