

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - HYDRAULICS FMEA NO 05-6G -2072 -2 REV:02/19/88

ASSEMBLY : APT LCA 1, 2, AND 3

P/N RI : MC477-0264-0002

P/N VENDOR:

QUANTITY : 3
: THREE

CRIT. FUNC: 1R

CRIT. HDW: 3

VEHICLE 102 103 104

EFFECTIVITY: X X X

PHASE(S): PL LO X OO DO X LS

PREPARED BY:

DES

REL

QE

J HERMAN

T KIMURA

J COURSEN

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

APPROVED BY:

DES

REL

QE

APPROVED BY (NASA):

SSM

REL

QE

J. J. Jenkins 3/2/88
J. J. Jenkins 3/4/88
EPD&C REL J. J. Jenkins 3/3/88
EPD&C SSM W. S. Schaefer 3-4-88

ITEM:

CONTROLLER, HYBRID DRIVER, HDC TYPE 4 - MPS/TVC HYDRAULIC ISOLATION VALVE 1, 2, AND 3 CONTROL RETURN

FUNCTION:

PROVIDES THE RETURN PATH SWITCHING FEATURE FOR THE OPENING AND CLOSING SOLENOID COIL CIRCUITS FOR THE MPS/TVC HYDRAULIC ISOLATION VALVES 1, 2, AND 3, WHEN COMMANDED. 54V76A121AR(J11-r), 55V76A122AR(J11-M), 56V76123AR(J11-H)

FAILURE MODE:

INADVERTENT OUTPUT, CONDUCTS PREMATURELY

CAUSE(S):

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

EFFECT(S) ON:

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

(A) LOSS OF REDUNDANCY

(B) LOSS OF INTERFACE REDUNDANCY. FIRST FAILURE - NO EFFECT. A SECOND DRIVER IN THE CIRCUIT "HIGH SIDE" MUST ALSO OPERATE BEFORE AN ERRONEOUS ISOLATION VALVE "CLOSE" CONDITION WOULD OCCUR - LOSS OF ONE OF TWO HYDRAULIC SUPPLIES TO AN AFFECTED THRUST VECTOR CONTROL ACTUATOR, LOSS OF ONE ENGINE THROTTLE CONTROL, AND LOSS OF ONE OF THREE ET UMBILICAL RETRACT ACTUATORS FOR EACH UMBILICAL PLATE.

(C,D) FIRST FAILURE - NO EFFECT

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(E) POSSIBLE LOSS OF CREW/VEHICLE AFTER THREE FAILURES: THIS FAILURE, PLUS FAILURE OF THE HDC TYPE 3 "CLOSE" DRIVER DURING MAX Q THROTTLE DOWN, PLUS LOSS OF A SECOND HYDRAULIC SYSTEM DURING MAX Q THROTTLE DOWN. THIS WOULD RESULT IN TWO ENGINES LOCKED UP AT LOW THRUST LEVEL, PLUS LOSS OF GIMBALING FOR ONE ENGINE (REQUIRES ENGINE SHUTDOWN) (CRITICALITY 1). ALSO RESULTS IN LOSS OF TWO ET UMBILICAL RETRACT ACTUATORS PER PLATE (CRITICALITY 1).

SCREEN B FAILS BECAUSE FAILURE IS NOT FLIGHT DETECTABLE UNTIL SECOND FAILURE OCCURS (HDC TYPE 3 DRIVER FAILS ON).

DISPOSITION & RATIONALE:

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

(A-D) DISPOSITION AND RATIONALE

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

(B) GROUND TURNAROUND TEST

VESAQC.031, "MPS/TVC HYD ISOL VLV ELECT DRVR VERIF" (PERFORMED PRIOR TO EACH FLIGHT). VERIFY DRIVERS ARE NOT FAILED ON.

(E) OPERATIONAL USE

NONE