

SHL FILE CRITICAL ITEMS LIST - BITER

SUBSYSTEM : EPD&C - ADP DEPLOY & HTR FMEA NO 05-6EE-2012 -2 REV:05/11/90

ASSEMBLY : F-PCA-1,2,3 CRIT. FUNC: 1R
 P/N RI : JANTX1N188R CRIT. HDW: 3
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 12 EFFECTIVITY: X X X
 : TWELVE PHASE(S): PL LO CO DO X LS X

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES J KRAGER DES J. M. GUTIERREZ 6-5-90 SSM R. Balaban 7/11
 REL T KIMURA REL M. Kimura 6-5-90 REL J. Kimura 6-5-90
 QE E GUTIERREZ QE G. Gutierrez 6-5-90 QE J. Gutierrez 6-5-90
 EPDC - E 2 D Card Ver 1 - 6-5-90
 EPDC SSM Transfer to 5-11-90

ITEM:
 DIODE (35 AMP), STUD MOUNT - AIR DATA PROBE (ADP), LEFT AND RIGHT SENSOR HEATER POWER CIRCUIT

FUNCTION:
 PROVIDES ISOLATION BETWEEN REDUNDANT POWER CIRCUITS TO HEATERS FOR THE LEFT AND RIGHT AIR DATA SENSOR ASSEMBLIES. 81V76A22CR18, 19, 20; 82V76A23CR25, 26, 27, 42, 43, 44; 83V76A24CR16, 17, 18

FAILURE MODE:
 SHORT (END TO END)

CAUSE(S):
 STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY

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

(A,B) FIRST FAILURE - LOSS OF ISOLATION BETWEEN THE TWO PARALLEL POWER SOURCES FOR ONE OF THE THREE HEATERS FOR THE LEFT OR RIGHT AIR DATA SENSOR ASSEMBLY.

(C,D) NO EFFECT - FIRST FAILURE

(E) REQUIRES FOUR OTHER FAILURES (RELAY CONTACT SHORTS TO GROUND, TWO DIODES SHORT (END TO END) (RESULTING IN LOSS OF THREE HEATERS FOR ONE ADP), LOSS OF OTHER ADP) FOR POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF CAPABILITY TO OBTAIN AIR PRESSURE DATA REQUIRED FOR SAFE DESCENT. PROPEL LIMIT SWITCH INDICATIONS WITH ERRONEOUS DATA TO ADP CAN CAUSE A SIDE-TO-SIDE DILEMMA AND THE SOFTWARE DOWNMODES TO USING DEFAULT GAINS.

FIRST FAILURE IS NOT DETECTABLE IN FLIGHT SINCE THE FAIL SHORT MODE OF THIS DIODE DOES NOT AFFECT THE FUNCTIONAL OPERATION OF THE HEATERS UNLESS THERE ARE ADDITIONAL ASSOCIATED FAILURES.

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DISPOSITION & RATIONALE:

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

(A-D) FOR DISPOSITION AND RATIONALE

REFER TO APPENDIX F, ITEM NO. 1 - DIODE, POWER - STUD MOUNTED

(B) TEST

GROUND TURNAROUND TEST -

"RH ADP HEATER FUNCT VERIF - SYS 1", TESTS CONTROL AND CURRENT DRAW OF RIGHT HAND ADP HEATER SYSTEM 1 AND THAT THE 35 AMP DIODES OF ADP HEATER SYSTEM 2 ARE NOT SHORTED (END TO END).

"RH ADP HEATER FUNCT VERIF - SYS 2", TESTS CONTROL AND CURRENT DRAW OF RIGHT HAND ADP HEATER SYSTEM 2 AND THAT THE 35 AMP DIODES OF ADP HEATER SYSTEM 1 ARE NOT SHORTED (END TO END).

"LH ADP HEATER FUNCT VERIF - SYS 1", TESTS CONTROL AND CURRENT DRAW OF LEFT HAND ADP HEATER SYSTEM 1 AND THAT THE 35 AMP DIODES OF ADP HEATER SYSTEM 2 ARE NOT SHORTED (END TO END).

"LH ADP HEATER FUNCT VERIF - SYSTEM 2", TESTS CONTROL AND CURRENT DRAW OF LEFT HAND ADP HEATER SYSTEM 2 AND THAT THE 35 AMP DIODES OF ADP HEATER SYSTEM 2 ARE NOT SHORTED (END TO END).

TESTS LISTED ABOVE ARE TO BE PERFORMED FOR THE NEXT FLIGHT FOR ALL VEHICLES AND INTERVALS OF TEN FLIGHTS THEREAFTER OR AFTER REPAIR REPLACEMENT WITH PROBE DEPLOYED AND ASSOCIATED SWITCHES IN THE PROPER POSITIONS.

(E) OPERATIONAL USE

THE PROBE FAILURE CAUSES A SIDE-TO-SIDE DILEMMA AND THE SOFTWARE DOWNMODES TO USING DEFAULT GAINS. THE CREW MUST MAINTAIN PITCH ATTITUDE WITHIN THETA LIMITS DISPLAYED ON CRT. CRT DISPLAYS ALPHA, MACH, AND ALTITUDE FROM EACH ADTA TO THE CREW. IF THE NAV DERIVED ALPHA, MACH, AND ALTITUDE DISPLAYED ON DEDICATED DISPLAYS (AMI, AVVI) ARE CORRECT, THE CREW CAN COMPARE THE ADTA DATA WITH THE NAV DERIVED DATA TO RESOLVE THE DILEMMA.