

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - ADP DEPLOY & HTR FMEA NO 05-6EE-2012 -1 REV:12/12/88

ASSEMBLY : F-PCA-1,2,3
P/N RI : JANTRN1188R
P/N VENDOR :
QUANTITY : 12
: TWELVE

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

PREPARED BY:

DES J KRAGER
REL T KIMURA
QE E GUTIERREZ

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

APPROVED BY: APPROVED BY (NASA):

DES *[Signature]* SSM *[Signature]*

REL *[Signature]* REL *[Signature]*

QE *[Signature]* QE *[Signature]*

ITEM:

DIODE (35 AMP), STD 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; 83V76A24CR15, 17, 18

FAILURE MODE:

OPEN, FAILS TO CONDUCT, SHORT TO STRUCTURE (GROUND)

CAUSE(S):

STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY (CONTAMINATION APPLIES ONLY TO SHORT TO STRUCTURE FAILURE MODE)

EFFECT(S) ON:

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

(A,B) FIRST FAILURE - LOSS OF REDUNDANT POWER CIRCUIT FOR ONE OF THREE HEATERS FOR THE LEFT OR RIGHT AIR DATA SENSOR ASSEMBLY.

(C,D) NO EFFECT - FIRST FAILURE

(E) REQUIRES FOUR OTHER FAILURES (HDC TYPE 2 FAILS TO CONDUCT, SECOND DIODE FAILS OPEN OR SHORTS TO STRUCTURE, THIRD DIODE FAILS OPEN OR SHORTS TO STRUCTURE RESULTING IN LOSS OF THREE HEATERS FOR ONE ADP CAUSING THE ICING OF THE ADP AIR PORTS, LOSS OF THE OTHER ADP RESULTING IN LOSING THE CAPABILITY TO OBTAIN AIR PRESSURE DATA FROM THE PROBES) FOR POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF CAPABILITY TO OBTAIN AIR PRESSURE DATA REQUIRED FOR SAFE DESCENT. SECOND FAILURE (HDC TYPE 2 FAILS TO CONDUCT) RESULTS IN LOSS OF ONE OF THREE HEATER ELEMENTS (MAST, T-O, OR ALPHA) AND LOSS OF REDUNDANT POWER SOURCES FOR THE REMAINING TWO HEATERS FOR ONE ADP.

SHUTTLE CRITICAL ITEMS LIST - CREITER

SUBSYSTEM : EPD&C - ADP DEPLOY & MTR FMEA NO 05-6EE-2012 -1 REV:12/12/99

PROPER 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 DURING GROUND TURNAROUND SINCE NO TEST HAS YET BEEN INCORPORATED TO DETECT THE LOSS OF ONE HEATER.

FIRST FAILURE IS NOT DETECTABLE DURING FLIGHT SINCE NO CURRENT LIMITS HAVE BEEN SPECIFIED TO DETECT OUT OF TOLERANCE CONDITIONS WHEN LOSS OF ONE HEATER OCCURS.

THE APPLICABLE MEASUREMENT PROVIDES AN INDICATION OF THE CURRENT DRAW FOR THE SUMMED TOTAL OF THE THREE HEATERS FOR EACH ACP AND DOES NOT PROVIDE THE STATUS OF INDIVIDUAL HEATERS.

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) GROUND TURNAROUND TEST
NONE

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.