FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 02-6-A07 -X

SUBSYSTEM NAME: HYDRAULICS

REVISION: 1 07/24/98

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: VALVE, CHECK CRISSAIR	ME284-0434

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
VALVE, CHECK, SSME RETURN LINE

REFERENCE DESIGNATORS: 50V58CV1
50V58CV2
50V58CV3

QUANTITY OF LIKE ITEMS: 3
ONE IN EACH ENGINE HYDRAULIC POWER SYSTEM RETURN LINE

FUNCTION:
PREVENTS BACK FLOW AND RAPID LOSS OF FLUID FROM THE RESERVOIR IN THE EVENT OF RETURN LINE RUPTURE UPSTREAM OF VALVE.

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LRU: VALVE, CHECK
ITEM NAME: VALVE, CHECK

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
FAILS OPEN. INTERNAL REVERSE FLOW

MISSION PHASE:
LO LIFT-OFF
DO DE-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:
102 COLUMBIA
103 DISCOVERY
104 ATLANTIS
105 ENDEAVOUR

CAUSE:
DAMAGED SEAT/POPPET, CONTAMINATION, BROKEN SPRING

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN
A) FAIL
B) N/A
C) PASS

PASS/FAIL RATIONALE:
A)
NO PRESSURE TRANSDUCER EXISTS UPSTREAM OF CHECK VALVE, SO CHECK VALVE FAILING OPEN IS NOT GROUND DETECTABLE.

B)
"B" SCREEN IS "N/A" SINCE CHECK VALVE IS A STANDBY REDUNDANT SYSTEM.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
FIRST FAILURE - NONE; LOSS OF ONE HYDRAULIC SYSTEM WITH THIS FAILURE AND RUPTURED HYDRAULIC LINE.

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(B) INTERFACING SUBSYSTEM(S):
SAME AS (A)

(C) MISSION:
NONE

(D) CREW, VEHICLE, AND ELEMENT(S):
NONE

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW/VEHICLE WITH THREE FAILURES: THIS FAILURE, RUPTURED RETURN LINE, AND LOSS OF SECOND HYDRAULIC SYSTEM.

-DISPOSITION RATIONALE-

(A) DESIGN:
VALVE IS DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF MIL-V-25675, GENERAL REQUIREMENTS FOR CHECK VALVE, MINIATURE, HYDRAULIC, AIRCRAFT AND MISSILE. HYDRAULIC SYSTEM FILTRATION IS 5 MICRONS AND CLEARANCES WITHIN THE CHECK VALVE ARE IN EXCESS OF 100 MICRONS.

(B) TEST:
QUALIFICATION:

- RANDOM VIBRATION - WITH 5 GPM FLUID FLOW PERFORM VIBRATION TEST FOR 48 MINUTES IN EACH AXIS (LEVEL A) REPEAT FOR 12.5 HOURS IN EACH AXIS (LEVEL B). PASS/FAIL CRITERIA: UNIT MUST PASS SUBSEQUENT LEAKAGE, CHECKING TIME, AND CRACKING TEST.

ACCEPTANCE:

- EXAMINATION OF PRODUCT - WEIGHT, WORKMANSHIP, FINISH, DIMENSIONS, AND CONSTRUCTION.
- PROOF PRESSURE - TESTED AT 4,500 PSIG IN BOTH DIRECTIONS. PASS/FAIL CRITERIA: NO INTERNAL OR EXTERNAL LEAKAGE.
- LEAKAGE TEST - TESTED IN HORIZONTAL AND VERTICAL POSITION AT VARIOUS PRESSURES. PASS/FAIL CRITERIA: 1.5 CC/M MAXIMUM AT 5 PSIG. 0 LEAKAGE AT OTHER PRESSURES.

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- CHECKING TIME TEST - WITH VALVE IN VERTICAL POSITION, UNSEAT POPPET TO FULL OPEN AND ALLOW TO CHECK. THEN DROP HEAD PRESSURE FROM 5 TO 1 PSIG. PASS/FAIL CRITERIA 1 5 SECONDS OR LESS AFTER RELEASE OF POPPET TO FLOW CESSATION.
- VALVE CLEANLINESS TEST - LEVEL 190 PER MAO110-301.

GROUND TURNAROUND TEST
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:
RECEIVING INSPECTION
RECEIVING INSPECTION VERIFIES MATERIAL AND PROCESSES CERTIFICATION.

CONTAMINATION CONTROL
CLEANLINESS CONTROLS AT CRISSAIR ARE PER NAS1638 AS IMPOSED BY THE BUYER. WHEN THE HARDWARE IS DELIVERED, CONTAMINATION IS CLOSELY CONTROLLED PER MAO110-301 LEVEL 190 THE HARDWARE IS VAPOR DEGREASED AND ULTRASONICALLY CLEANED PRIOR TO INSTALLATION.

CRITICAL PROCESSES
PASSIVATION AND HEAT TREATING ARE VERIFIED BY INSPECTION.

NDE
PENETRANT INSPECTION OF POPPET IS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
MANUFACTURING/ASSEMBLY PROCESSES ARE VERIFIED BY INSPECTION.

TESTING
ATP (PROOF, LEAKAGE, CRACKING PRESSURE, EXAMINATION OF PRODUCT) IS VERIFIED BY RI INSPECTION.

HANDLING/PACKAGING
HARDWARE SHIPMENT IS IN A HEAT SEALED POLETHYLENE BAG INSIDE A SHIPPING BOX.

(D) FAILURE HISTORY:
CURRENT DATA ON TEST FAILURES FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATA BASE

(E) OPERATIONAL USE:
NONE

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- APPROVALS -

EDITORIALLY APPROVED	. BNA	J. Kamura 7-30-98
TECHNICAL APPROVAL	: VIA APPROVAL FORM	95-CIL-009_02-6