

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : FLIGHT CONTROL MECH FMEA NO 02-2B -A01-CV-17 REV: 12/04/87

ASSEMBLY : TVC ACTUATOR
 P/N RI : MC621-0015
 P/N VENDOR: MOOG
 QUANTITY : 6
 : ONE PER ACTUATOR

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

CRIT. FUNC: 1R
 CRIT. HDW: 2

PREPARED BY: N LEVERT
 DES C NELSON
 REL M SAVALA
 QE

REDUNDANCY SCREEN: A-FAIL B-FAIL C-PASS
 APPROVED BY: DES *[Signature]* REL *[Signature]* QE *[Signature]*
 APPROVED BY (NASA): SSM *[Signature]* REL *[Signature]* 1/7/88
 QE *[Signature]*

ITEM:
 CHECK VALVE

FUNCTION:
 PREVENTS MOVEMENT OF ACTUATOR PISTON DURING ACTUATOR HYDRAULIC SELECTION.

FAILURE MODE:
 FAILS OPEN

CAUSE(S):
 CONTAMINATION, JAMMED

EFFECT(S) ON:
 (A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE
 (A,B,C,D) NONE

(E) FUNCTIONAL CRITICALITY EFFECTS-POSSIBLE LOSS OF MISSION, CREW/VEHICLE AFTER TWO FAILURES: CHECK VALVE FAILED OPEN AND LOSS OF PRIMARY HYDRAULIC SYSTEM WITH HIGH HINGE MOMENTS MAY CAUSE ENGINE COLLISION. LOSS OF FUNCTION CAN RESULT IN LOSS OF VEHICLE CONTROL. "A" AND "B" SCREEN FAIL SINCE THE CHECK VALVE IS NORMALLY OPEN AND A FAILURE CANNOT BE DETECTED WHEN THE HYDRAULIC SUBSYSTEM IS POWERED DOWN.

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

(A) DESIGN
 COMPONENT IS PROTECTED BY SYSTEM FILTRATION OF 5 MICRON FILTER AND CLEARANCES WITHIN THE CHECK VALVE ARE IN EXCESS OF 100 MICRONS. INTERNAL PARTS OF THE CHECK VALVE ARE IDENTICAL IN MATERIALS, FORM, FIT AND FUNCTION TO THE SHUTTLE QUALIFIED ROCKWELL CHECK VALVES, ME284-0434, WHICH ARE USED THROUGHOUT THE HYDRAULIC SUBSYSTEM.

(B) TEST
 QUALIFICATION-THE CHECK VALVE IS CYCLED 20,000 TIMES DURING ENDURANCE TESTING, IN CONJUNCTION WITH SWITCHING VALVE COMPONENT TEST.

ACCEPTANCE-SWITCHING VALVE/ACTUATOR PERFORMANCE TESTS VERIFY THAT THE CHECK VALVE MEETS OPERATIONAL REQUIREMENTS. FLUID FROM ACTUATOR IS VERIFIED TO MEET CLEANLINESS LEVEL 190 PER MA0110-301.

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OMRSD-THERE IS NO TEST AVAILABLE. HYDRAULIC FLUID SAMPLES ARE TAKEN AFTER EVERY FLIGHT AND VERIFIED TO BE WITHIN SPECIFIED CLEANLINESS LEVELS.

(C) INSPECTION

RECEIVING INSPECTION

MATERIAL CERTIFICATIONS ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

LEVEL 190 PER MA0110-301 IS VERIFIED TO BE IN COMPLIANCE DURING ASSEMBLY AND TEST. FLUID SAMPLE VERIFIED PRIOR TO SHIPMENT.

ASSEMBLY/INSTALLATION

CRITICAL CHARACTERISTICS/DIMENSIONS VERIFIED BY INSPECTION. INSTALLATION PERFORMED IN CLEAN ROOM ENVIRONMENT. ENVIRONMENT IS VERIFIED PER MOOG CONTAMINATION CONTROL PLAN.

TESTING

CHECK VALVE FLOW IS VERIFIED AT THE COMPONENT LEVEL PRIOR TO INSTALLATION AND DURING ATP. ROCKWELL DESIGN AND QUALITY PERSONNEL, WITH NASA PARTICIPATION, CONDUCT A DETAILED ACCEPTANCE REVIEW OF THE HARDWARE AT THE VENDOR'S FACILITY, PRIOR TO THE SHIPMENT OF EACH END ITEM COVERED BY CONTROL PLAN. ATP VERIFICATION IS MIP FOR RI QA REPRESENTATIVE.

(D) FAILURE HISTORY

THERE IS NO HISTORY OF FAILURE FOR THIS FAILURE MODE.

(E) OPERATIONAL USE

NONE