

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : FLIGHT CONTROL MECH FMEA NO 02-2B -A01-LV-10 REV: 12/04/87

ASSEMBLY : TVC ACTUATOR

P/N RI : MC621-0015

P/N VENDOR: MCOG

QUANTITY : 6

: ONE PER ACTUATOR

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

CRIT. FUNC: 1

CRIT. HDW: 1

PREPARED BY:

DES N LEVERT
REL C NELSON
QE M SAVALA

REDUNDANCY SCREEN: A-N/A B-N/A C-N/A

APPROVED BY: APPROVED BY (NASA):
DESIGN *Nate Levert* SSM *Charles Smith*
REL *John J. ...* 1/7/88
QE *M Savala*

ITEM:

LOCK VALVE

FUNCTION:

HYDRAULICALLY LOCKS THE ACTUATOR PISTON AT ITS LAST COMMANDED POSITION WHEN SYSTEM PRESSURE GOES TO A PREDETERMINED LEVEL.

FAILURE MODE:

FAILS IN UNLOCKED MODE

CAUSE(S):

JAMMED SPOOL, BROKEN SPRING

EFFECT(S) ON:

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

(A) LOSS OF LOCKING CAPABILITY.

(B) LOSS OF ONE ENGINE POSITION CONTROL.

(C,D) POSSIBLE LOSS OF MISSION, CREW/VEHICLE. POSSIBLE ENGINE COLLISION AND INTERFERENCE WITH BODY FLAP FUNCTION.

DISPOSITION & RATIONALE

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

(A) DESIGN

SPOOL AND SLEEVE ARE 440C MATERIAL, HARDENED AND LAPPED FOR A MATCHED SET. SPOOL IS GROOVED TO CLEAR SILTING.

(B) TEST

QUALIFICATION-5,000 CYCLES FROM LOCK POSITION AT 600-900 PSIG TO UNLOCK POSITION WITH LESS THAN 2,000 PSIG.

ACCEPTANCE-VERIFICATION THAT LOCK VALVE TRANSFERS TO LOCKED POSITION AT 600-900 PSIG WITH DECREASING PRESSURE.

OMRSD-TVC ACTUATOR LOCKING VALVE INTEGRITY CHECK, PERFORMED PRIOR TO EACH MISSION.

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(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIAL CERTIFICATIONS ARE VERIFIED. SPECIAL MATERIAL REQUIREMENTS ARE IDENTIFIED IN CERTIFICATIONS. SPRING MATERIAL IS VERIFIED BY SAMPLE TESTING. SPRING CHARACTERISTICS ARE VERIFIED TO COMPLY WITH DESIGN REQUIREMENTS.

NOE

PIECE PARTS EVALUATED BY SELECTED PENETRANT, MAGNETIC PARTICLE, ULTRASONIC, AND RADIOGRAPHIC INSPECTIONS.

SPECIAL PROCESSES

CRITICAL/CLOSE TOLERANCE DIMENSIONS AND FINISHES ARE 100 PERCENT INSPECTED FOLLOWING MACHINING.

CONTAMINATION CONTROL

ASSEMBLY AREA CLEANLINESS IS VERIFIED BY CONTAMINATION CONTROL PLAN. COMPONENTS ARE PRECLEANED PRIOR TO ASSEMBLY. PARTS AND TOOLS/AIDS ARE CLEANED PRIOR TO ASSEMBLY. END ITEM FLUID SAMPLE IS VERIFIED PRIOR TO ACTUATOR DELIVERY.

TESTING

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