TO: ALL HOLDERS OF THRUST REVERSER LOCKOUT ACTUATOR ASSEMBLY OVERHAUL MANUAL, 78-32-04

REVISION NO. 1, DATED JUL 1/03

HIGHLIGHTS

DESCRIPTION OF CHANGE	TOPICS AFFECTED												
	D&O	D/Assy	Cleaning	Insp/Chk	Repair	Assy	F/C	Test	T/Shooting	S/Tools	Storage	IPL	L/Overhaul
Changed figure references		X		X	X	X	X	X	X				
Added clarifications and updated callouts. Deleted procedures which can be done by standard industry practices	X	X	X	X	X	X	X	X	X	X	X	X	
Updated vendor data												X	

THRUST REVERSER LOCKOUT ACTUATOR ASSEMBLY

78-32-04

BOEING P/N 65-37988-11

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 30054-1	Aug 15/67
		PRR 30349-1	Aug 15/67

LIST OF EFFECTIVE PAGES

* Indicates pages revised, added or deleted in latest revision
F Indicates foldout pages - print one side only

	PAGE	DATE	PAGE	DATE	PAGE	DATE
78-32-04						
	T-1	Nov 10/70				
	T-2	BLANK				
*	LEP-1	Jul 1/03				
	LEP-2	BLANK				
*	T/C-1	Jul 1/03				
	T/C-2	BLANK				
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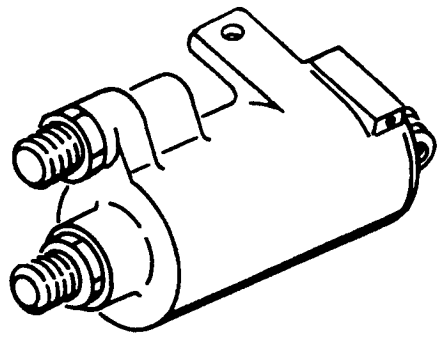
THRUST REVERSER LOCKOUT ACTUATOR ASSEMBLY



Thrust Reverser Lockout Actuator Assembly
Figure 1

1. DESCRIPTION AND OPERATION

A. Description

(1) The thrust reverser lockout actuator assembly includes a spring-loaded actuating piston enclosed by a cylinder and a gland.

(2) The cylinder has two ports for connection to pneumatic lines and the piston has a piston ring for air leakage control.

B. Operation

(1) This unit is installed in the reverse thrust pneumatic line upstream of the thrust reverser actuators.

(2) The lockout actuator assembly keeps the thrust reverser mechanically locked in the forward thrust position until reverse thrust is selected.

(3) When reverse thrust is selected in the cockpit, the lockout actuator is pneumatically operated to unlock the reverser system and to send air to the thrust reverser actuators. After forward thrust is selected again and the deflector doors are completely closed, the piston is spring activated to lock the reverser actuators in the forward thrust position.

C. Leading Particulars (Approximate)

Length (approximate) -- 7 inches
Weight -- 3 pounds
Operating medium -- Air pressure opposing a spring force
Leakage test pressure -- 100 psi
Stroke -- 0.84 inches
Port size -- 3/4 - 16 UNF - 3B thread for 1/2 inch OD tube

2. DISASSEMBLY (Fig. 4)

A. Before disassembly do the predisassembly test given in par. 8.B.(1).

B. Remove lockwire and spring pins (1) from cylinder (2).

CAUTION: SPRING (4) WILL HAVE A LOAD OF APPROXIMATELY 11 POUNDS.

C. Remove gland (3), spring (4) and piston (5) from cylinder.

D. Remove piston ring (6) from the piston.

E. Remove flareless unions (7) and gaskets (8).

3. CLEANING

A. Clean all parts by standard industry practices and the instructions in SOPM 20-30-03.

4. INSPECTION/CHECK (Fig. 4)

A. Visually examine all parts for defects. Do the penetrant check if the visual check finds possible defects. Refer to Fits and Clearances (Fig. 2) for design dimensions and wear limits.

B Penetrant examine (SOPM 20-30-02) cylinder (2), gland (3) and piston (5).

C. Spring (4) Check

(1) At room temperature, extend the spring to 1.60 inches. The load must be 9.5-10.5 pounds. Extend the spring to 2.60 inches. The load must be 4.75-5.25 pounds. Free length is approximately 0.86 inch.

(2) Compress the spring to solid length (0.82 inch). There must be no permanent set.

(3) If the spring has defects which could decrease spring life, replace the spring.

D. Piston Ring (6) Check

(1) Ring width, top to bottom: 0.09 inch minimum

(2) Step tang width, top to bottom: 0.04 inch minimum

(3) Step tang end gap, measured with piston ring installed in cylinder (2): 0.07 inch minimum

(4) Install the piston ring in cylinder (2), or a 2.00-inch diameter gage, and hold near a light. A minimum of 60% of OD of the ring must be tight against the ID, with no light seen between ID and OD.

(5) Replace the piston ring if it is not within the above limits.

5. REPAIR (Fig. 4)

A. Repair

(1) Repair small defects by standard industry practices. Refer to Fits and Clearances (Fig. 2) for design dimensions and wear limits.

(2) Piston (5) (Fig. 1A)

(a) Machine as required, within repair limits, to remove defects.

(b) Build up the piston head diameter with chrome plate and grind to design dimensions and finish.

(c) Build up the piston rod diameter with silver plate to design dimensions and finish.

(d) Refinish other surfaces as indicated.

(3) Cylinder (2) (Fig. 1B)

(a) Machine as required, within repair limits, to remove defects.

(b) Build up with chrome plate.

(c) Grind to design dimensions and finish.

B. Refinish

NOTE: Refer to SOPM 20-30-02 for stripping of protective finishes. Refer to SOPM 20-40-01 for explanation of F and SRF finish codes.

(1) Cylinder (2) -- See Fig. 1B.

(2) Gland (3) -- No finish. Material: Al-Ni-Bronze.

(3) Spring (4) -- No finish. Material: Nickel alloy.

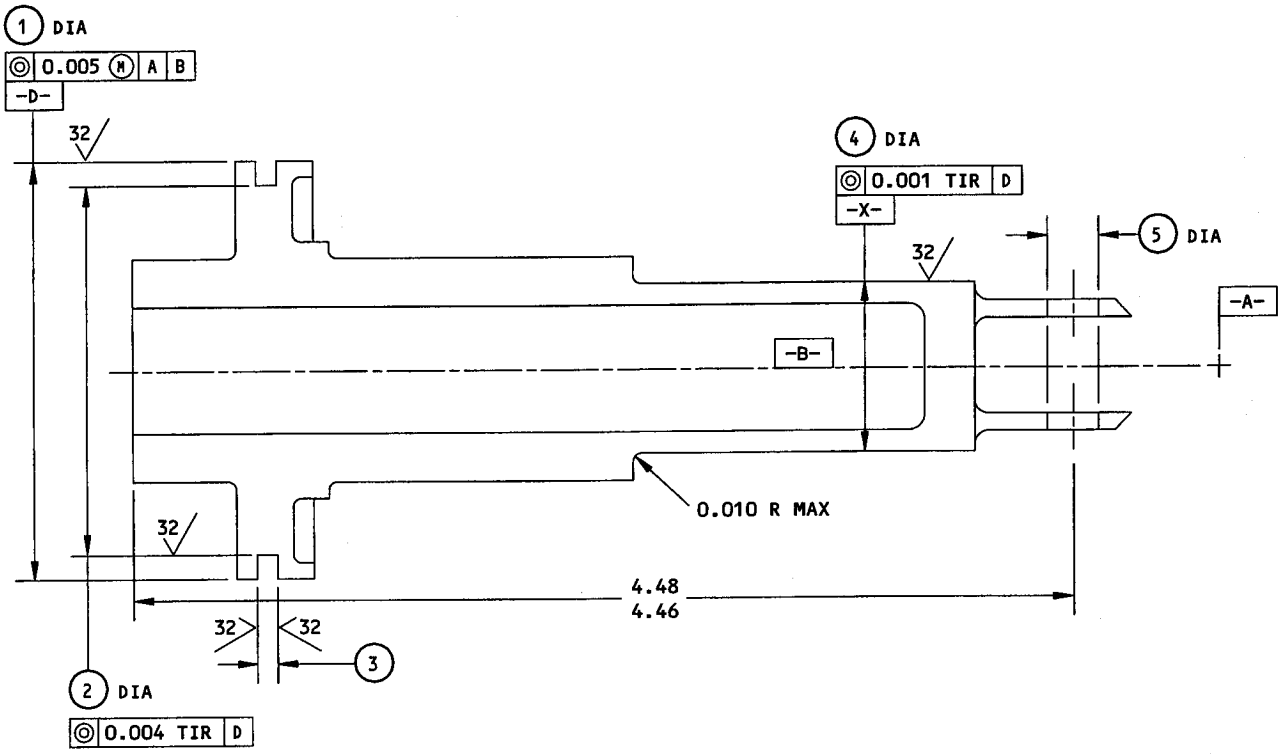
(4) Piston (5) -- See Fig. 1A.

C. Replacement

(1) Replace gaskets (8) at each overhaul.

(2) Replace any parts damaged beyond repair.

(3) Replace gland (3) if wear is more than the limits of Fig. 2.



	1	2	3	4	5
DESIGN DIM	1.987 1.985	1.750 1.747	0.096 0.095	0.8109 0.8097	0.254 0.250
REPAIR LIMIT	1.960 <1>	---	---	0.8050 <2>	---

REFINISH

CHROME PLATE (F-15.43, WHICH REPLACES F-14.89) DIA -X-.

SILVER PLATE (F-1.901) DIA -D- BUT NOT IN GROOVE.

PASSIVATE (F-17.25, WHICH REPLACES F-17.09) OTHER SURFACES.

REPAIR

REF <1> <2>

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: 321 OR 347 CRES

DIMENSIONS ARE AFTER PLATING

ALL DIMENSIONS ARE IN INCHES

<1> LIMIT FOR CHROME PLATE BUILDUP (SOPM 20-42-03) AND GRIND TO DESIGN DIMENSIONS AND FINISH (SOPM 20-10-04)

<2> LIMIT FOR SILVER PLATE BUILDUP (SOPM 20-42-06)

PISTON (5)

Piston Repair and Refinish
Figure 1A

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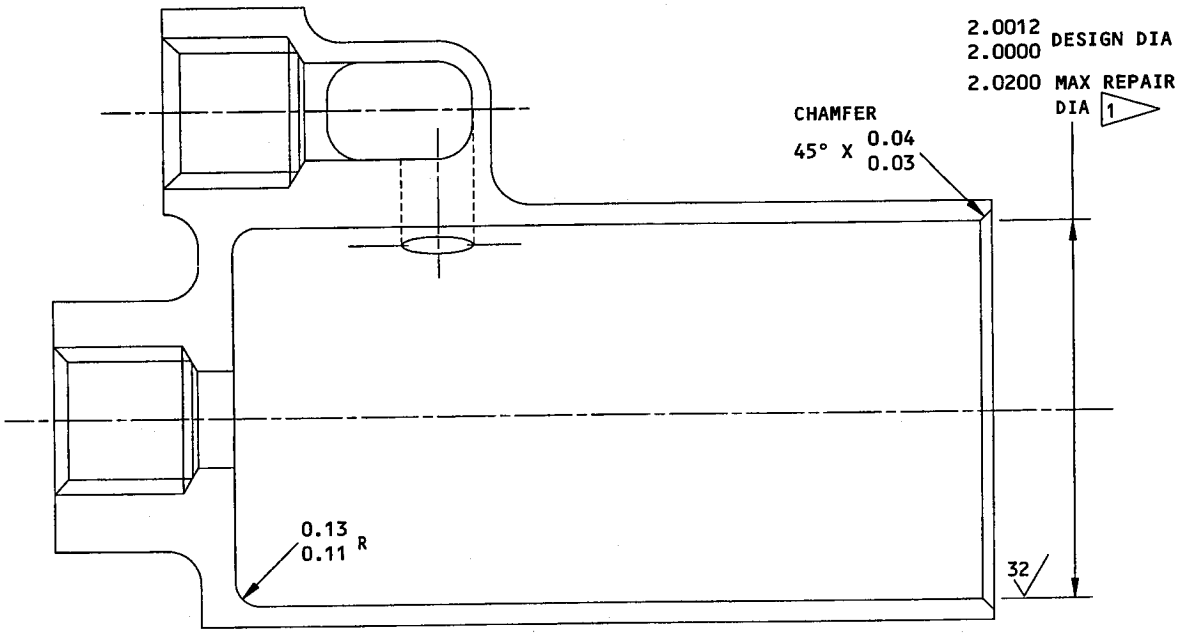

REFINISH

CHROME PLATE (F-15.43, WHICH REPLACES F-14.89) THE BORE.

NO FINISH ON OTHER SURFACES

REPAIR

REF 1

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: 17-4PH CRES, 180-200 KSI

ALL DIMENSIONS ARE IN INCHES

1 LIMIT FOR CHROME PLATE BUILDUP (SOPM 20-42-03) AND GRIND TO DESIGN DIMENSIONS AND FINISH

CYLINDER (2)

Cylinder Repair and Refinish
Figure 1B

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6. ASSEMBLY (Fig. 4)

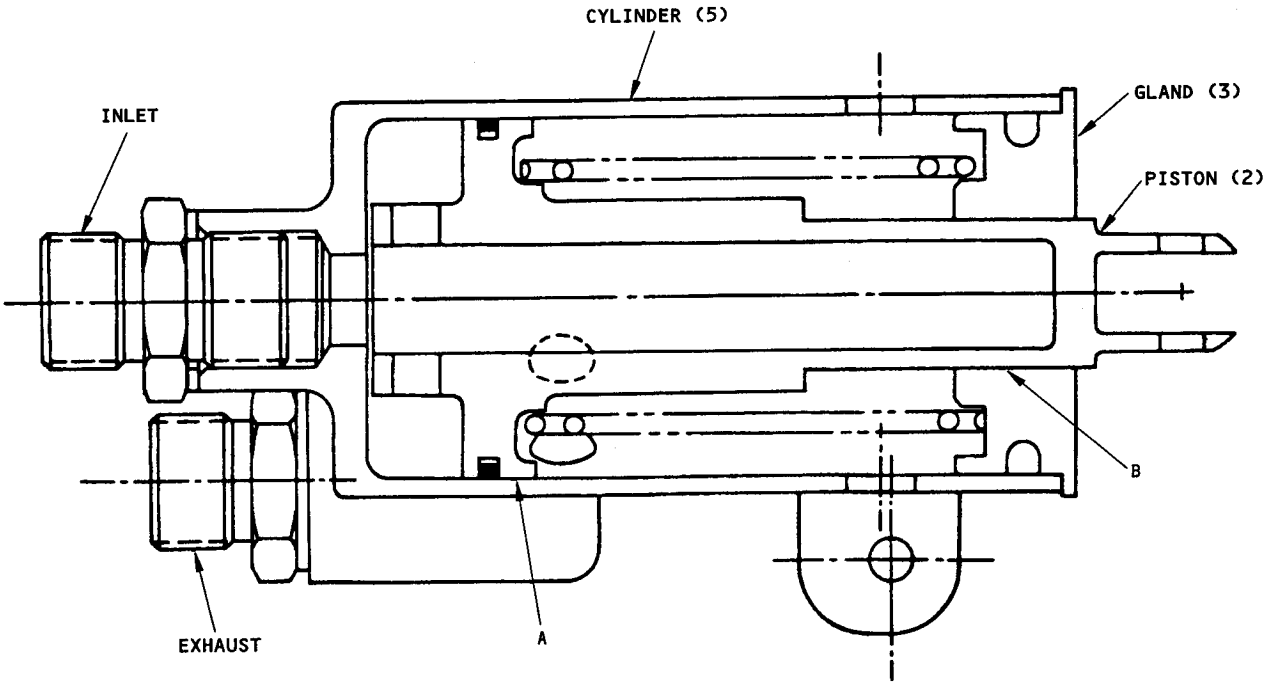
A. Install gaskets (8) and flareless unions (7) in cylinder (2).

B. Install piston ring (6) on piston (5) and install this in the cylinder. Be sure to install the two parts of the piston ring with the splits 180 degrees apart.

C. Put spring (4) over the piston rod, followed by gland (3).

D. Push in on the gland, and compress the spring. Then install spring pins (1) and lockwire.

7. FITS AND CLEARANCES



		DESIGN LIMITS				SERVICE WEAR LIMITS		
REF. LETTER FIG. 2	MATING INDEX NO. FIG. 4	DIMENSION (INCHES)		ASSEMBLY CLEARANCE (INCHES)		DIMENSION LIMITS (INCHES)		MAXIMUM ALLOWABLE CLEARANCE (INCH)
		MIN	MAX	MIN	MAX	MIN	MAX	
A	ID 2 OD 5	2.0000 1.9850	2.0012 1.9870	0.0130	0.0162	1.9704	2.0158	0.0454
B	ID 3 OD 5	0.8125 0.8097	0.8135 0.8109	0.0016	0.0138	0.8070	0.8162	0.0092

Fits and Clearances
Figure 2

8. TESTING

A. Test Equipment

(1) A pneumatic source to supply 100 psi and to measure leakage rates from 0 to 6 cubic feet per minute

(2) Tubes, fittings and gaskets to connect the pneumatic source to the unit

(3) Spring scale

B Predisassembly Test

(1) Before you disassemble the unit, do the Operational Tests, par. 8.C. If the piston moves freely, if the total leakage is 6 standard cubic feet of air per minute or less, and if the force to move the piston from the extended to the retracted position (0.84 inch stroke) is not more than 20 pounds, the unit can be kept in service.

C. Operational Test

(1) Binding and seizing test

(a) With both ports vented, manually operate the piston over its full stroke. The piston must move freely.

(b) Turn the piston in 90 degree increments and do this test again three more times.

(2) Friction test

(a) With both ports vented and the actuator in the horizontal position, the force to move the piston through its full stroke must not be more than 16 pounds.

(b) With the piston in the compressed position, release the load. Make sure the piston goes to its fully extended position without any external force.

(3) Leakage test

(a) With the piston in the fully extended position, and with the outlet port capped, apply 100 psi air pressure at the inlet port. Total leakage must not be more than 3 standard cubic feet of air per minute.

TEST LIMITS	
Test Phase	Limit
Predisassembly - 100 psi at the inlet port. Outlet port capped.	6 cfm maximum total leakage
Predisassembly - both ports vented	20 pound maximum force to move piston over its full stroke
Operational - 100 psi at inlet port. Outlet port capped.	3 cfm maximum total leakage
Operational - both ports vented	16 pound maximum force to move piston over its full stroke

Test Limits
Figure 3

9. TROUBLE SHOOTING (Fig. 4)

Trouble	Possible Cause	Correction
A. Too much leakage	Piston (5) and/or cylinder (2) worn	Repair or replace as necessary
	Defective gaskets (8) or ring (6)	Replace defective part
B. Movement of piston (5) is not free	Unwanted matter	Disassemble, clean, reassemble and test
	Defects on mating surfaces of piston (5) and cylinder (2) or defective ring (6)	Disassemble and examine
C. Piston (5) will not extend by spring action	Spring (4) defective or unwanted matter	Replace defective spring, clean, assemble and test

10. STORAGE INSTRUCTIONS

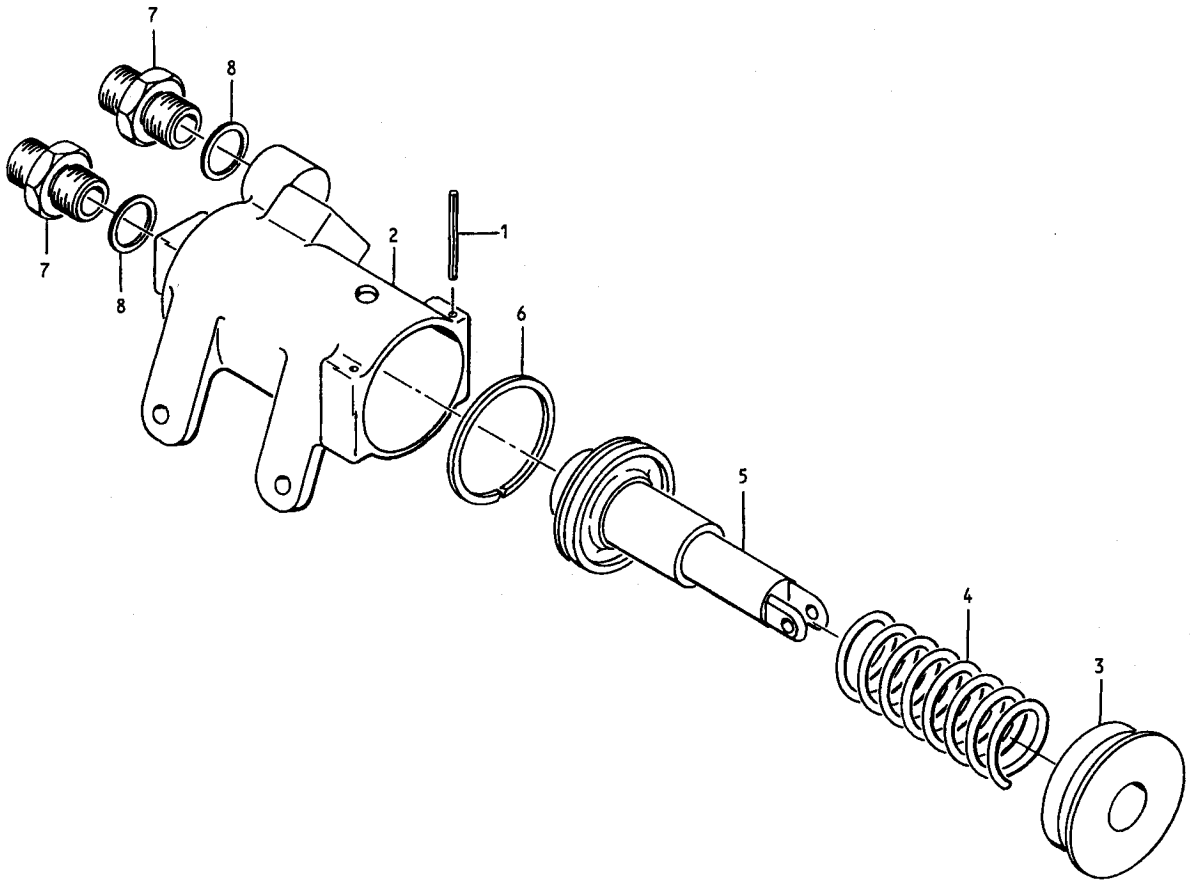
A. Put caps on the ports.

B. Give protection to the unit and put it away by standard industry practices and the instructions in SOPM 20-44-02 and SOPM 20-70-01.

11. SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

A. Pneumatic source to supply 100 psi and to measure leakage rates up to 6 cubic feet per minute.

12. ILLUSTRATED PARTS LIST



Thrust Reverser Lockout Actuator Assembly
Figure 4

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FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
4-	65-37988-11		ACTUATOR ASSY, THRUST REVERSER LOCKOUT		RF
1	MS16562-240		. PIN, SPRING		2
2	65-37975-1		. CYLINDER		1
3	69-29846-2		. GLAND		1
4	69-29845-2		. SPRING		1
5	65-37976-3		. PISTON		1
6	ABA5185		. RING, PISTON, V71687 (OPT)		1
6	AIR5185		. RING, PISTON, V71687		1
7	MS21902-8S		. UNION		2
8	AN901-8C		. GASKET		2

VENDORS

V71687 DOVER, INC., 2540 CENTENNIAL BLVD., JEFFERSONVILLE, INDIANA 47130