TO: ALL HOLDERS OF MAIN LANDING ALTERNATE EXTEND ACTUATOR ASSEMBLY COMPONENT MAINTENANCE MANUAL 32-35-84.

REVISION NO. 3 DATED JUL 01/03

HIGHLIGHTS

Pages which have been added or revised are outlined below together with the highlights of the revision. Remove and insert the affected pages as listed and enter Revision No. and date to the Record of Revision Sheet.

CHAPTER/SECTION AND PAGE NO.	DESCRIPTION OF CHANGE
DESCRIPTION & OPERATION 1 103 302 701-703	Added clarification and updated callouts.
101-102 301 701 901	Added test fixture A32121-1.

BOEING

COMPONENT
MAINTENANCE MANUAL

MAIN LANDING GEAR ALTERNATE EXTEND ACTUATOR ASSEMBLY

PART NUMBERS 257T4662-1

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

K10197

REVISION RECORD

- Retain this record in front of manual. On receipt of revision, insert revised pages in the manual, and enter revision number, date inserted and initial.

REVISION NUMBER	REVISION DATE	DATE FILED	BY	REVISION NUMBER	REVISION DATE	DATE FILED	BY

TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL

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*[1] Special instructions not required. Use standard industry practices.

INTRODUCTION

The instructions in this manual provide the information necessary to perform maintenance functions ranging from simple checks and replacement to complete shop-type repair.

This manual is divided into separate sections:

1. Title Page
2. Record of Revisions
3. Temporary Revision & Service Bulletin Record
4. List of Effective Pages
5. Table of Contents
6. Introduction
7. Procedures & IPL Sections

Refer to the Table of Contents for the page location of applicable sections.

The beginning of the REPAIR section includes a list of the separate repairs, a list of applicable standard Boeing practices, and an explanation of the True Position Dimensioning symbols used.

An explanation of the use of the Illustrated Parts List is provided in the Introduction to that section.

All weights and measurements used in the manual are in English units, unless otherwise stated. When metric equivalents are given they will be in parentheses following the English units.

Design changes, optional parts, configuration differences and Service Bulletin modifications create alternate part numbers. These are identified in the Illustrated Parts List (IPL) by adding an alphabetical character to the basic item number. The resulting item number is called an alpha-variant. Throughout the manual, IPL basic item number references also apply to alpha-variants unless otherwise indicated.

Verification:

MAIN LANDING GEAR ALTERNATE EXTEND ACTUARTOR ASSEMBLY

DESCRIPTION AND OPERATION

1. Description

A. The MLG alternate extend actuator assembly includes a CRES piston, a CRES piston end, a CRES bolt-spring retainer and a titanium spring in a CRES barrel.

2. Operation

A. Hydraulic pressure from the alternate extend pump extends the piston in the actuator and unlatches the uplock during the alternate extend operation. A spring inside the barrel returns the piston to the retract position.

3. Leading Particulars (Approximate)

A. Length -- 17.00 inches (retracted)

B. Diameter -- 2.20 inches

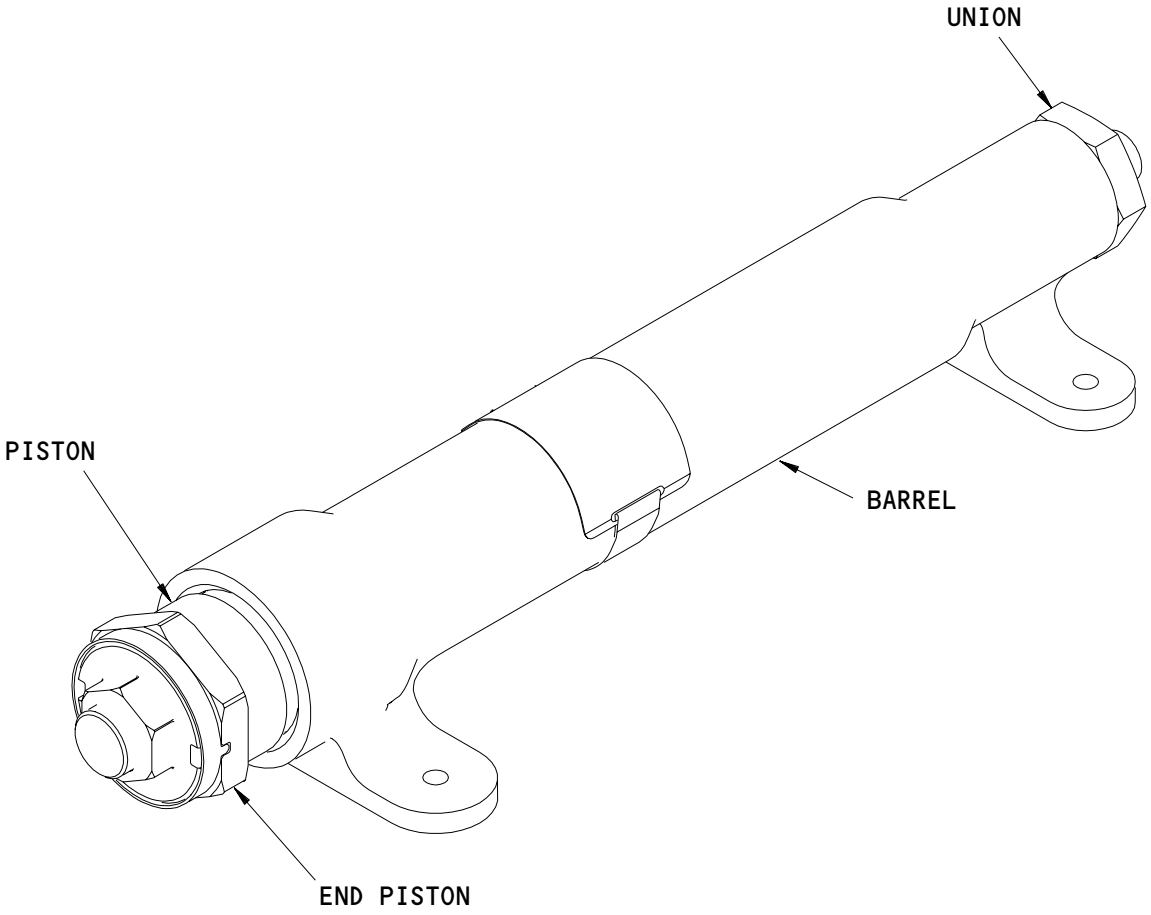
C. Stroke -- 1.70-1.98 inches

D. Weight -- 6.90 pounds (dry) and 7.40 pounds (wet)

E. Operating Medium -- Hydraulic fluid BMS 3-11

F. Operating Pressure -- 2000-2500 psi

G. Proof pressure -- 3500-4500 psi



Main Landing Gear Alternate Extend Actuator Assembly
Figure 1

K10056

TESTING AND FAULT ISOLATION

1. General

   A. This procedure contains the data necessary to do a test of the actuator after an overhaul or for fault isolation.

      (1) Actuator Assembly Test:

         (a) External Leakage

         (b) Friction

         (c) Proof Pressure

      (2) Fault Isolation

   B. Refer to the Standard Overhaul Practices Manual (SOPM) for details of the SOPM subjects identified in this procedure.

   C. Refer to IPL Fig. 1 for item numbers.

2. Actuator Assembly Test

   A. Special Tools and Equipment

      NOTE: Equivalent equipment can be used.

      (1) Holding Fixture -- A32121-1 equipment

   B. Special Tools and Equipment

      NOTE: Equivalent equipment can be used.

      (1) Hydraulic test stand with following requirements:

         (a) Can operate with BMS 3-11 hydraulic fluid.

         (b) Can operate in a range of 0 - 4800 psi.

         (c) The fluid must be continuously filtered by filter no larger than 15 micron absolute.

         (d) Can provide actuation control and measurement during the tests.

         (e) The hydraulic fluid temparature to be 60 -120°F.

C. Consumable Material

(1) D00183 Fluid, Hydraulic Fluid BMS 3-11 (SOPM 20-60-03)

D. Reference

(1) SOPM 20-60-03, Lubricant

E. Prepare for Test

(1) Install the actuator in the fixture.

(2) Fill the actuator with hydraulic fluid.

NOTE: The actuator will be continuously full of BMS 3-11 hydraulic fluid for each Test.

(3) Connect the hydraulic test stand line to the end of port of actuator.

(4) Bleed all of the air from the actuator.

(5) When the piston is fully retracted, measure the dimension "A" (Fig. 701). Make sure it is 3.2350 - 3.3350 inches.

F. Procedure

WARNING: DO NOT APPLY AIR PRESSURE TO THE PORTS. THIS CAN CAUSE DAMAGE TO THE UNIT OR INJURY TO YOU.

(1) Do external leakage test:

(a) Clean around the dynamic rod seal to observe leakage.

(b) Operate the actuator for a minimum of 25 complete no load cycles.

1) Fully retract the actuator.

2) Apply 2000-2500 psi hydraulic pressure to extend the actuator. Let the piston come against the stop at the end of the stroke.

3) Decrease the pressure to 40-60 psi to retract the actuator. Let the piston come against the stop at the end of the stroke.

4) Do steps 1 - 3 again for 25 full cycles.

5) After 25 cycles, do a visual check for leakage around the seals:

a) Recommended leakage is zero.

b) The leakage limit for the static seal is zero.

c) The allowable leakage limit for the rod seal is 1 drop.

(c) Apply 2-5 psi hydraulic pressure to the actuator for a minimum of 2 minutes. There must be no external leakage.

(2) Do a friction test:

(a) Retract the actuator rod fully.

(b) Slowly increase the hydraulic pressure until the piston rod starts to move. The piston rod must extend fully, with a smooth and continuous motion, at maximum pressure 255 psi.

(3) When piston rod is in fully extended position, measure the dimension "A" (Fig. 701). Make sure it is 5.0350 - 5.2150 inches.

(a) Slowly decrease the applied pressure until the piston rod begins to move. The piston rod must retract fully, with a smooth and continuous motion, at minimum parssure of 100 psi.

(4) Do a proof pressure test:

(a) Retract the actuator rod fully.

CAUTION: DO NOT EXTEND OR RETRACT THE PISTON AT PROOF PRESSURE (4500-4600 PSI).

(b) Slowly increase the hydraulic pressure to fully extend the actuator.

(c) Increase the pressure to 4500 - 4600 psi and hold for a minimum of 30 seconds.

(d) Make sure there is no sign of external leakage or permanent damage to the actuator.

(5) Remove the actuator from the test fixture.

(6) Fill the actuator with approximately 1 ounce of hydraulic fluid and install the shipping caps.

3. Fault Isolation

TROUBLE	PROBABLE CAUSE	CORRECTION
External leakage	Defective packing seal (65) between union (70) and barrel (95)	Remove union (70) and replace packing (65).
	Piston end (5) is not fully torqued	Torque the piston end to 1000 pound-inches.
	Defective packing seal (20) between piston end (5) and piston (75)	Remove piston end (5) and replace packing seal (20).
Leakage at piston rod	Defective packing seal (85)	Remove piston (75) and replace packing seal (85).
Extend/Retract motion not smooth	Defective spring (45) piston (75), guide (40) or ring retainer (30)	Disassemble and examine parts. Replace as necessary.
	Defective packing seal (85) or scraper (80)	Disassemble and replace seals as necessary.

Fault Isolation Chart
Table 101

DISASSEMBLY

1. General

   A. This procedure contains the data necessary to disassemble the actuator assembly

   B. Disassemble this component sufficiently to isolate the defects, do the necessary repairs, and put the component back to a serviceable condition.

   C. Refer to IPL Fig. 1 for item numbers.

2. Actuator Disassembly

   A. Special Tools and Equipment

      NOTE: Equivalent tools can be used.

      (1) Holding Fixture -- A32121-1

   B. Part Replacement

      NOTE: These parts are recommended for replacement. Replacement of other parts can be by in-service experience.

      (1) Scraper (80)

      (2) Packings (20, 65)

      (3) Backup rings (15, 90)

   C. Procedure

      (1) Drain hydraulic fluid from the actuator.

      (2) Remove the union (70) and the packing (65).

      (3) Bend the flange of the cuplock washer (10) from the slot of the piston end (5).

      (4) Remove the piston end (5).

      (5) Remove the packing ring (20) and backup rings (15).

(6) Hold the spring retainer bolt (85) through the open end of the piston and unscrew the nut (60) with a deep socket wrentch.

(7) Remove piston (75), bolt (25), spring (45), guide (40), ring retainer (30) washer (35), bushing (50), scraper (80), backup rings (90), and ring seal (85). Make a note of the number of washers (35) removed from each end of the spring, to help during assembly.

(8) Remove the barrel assembly (70) from the fixture.

CHECK

1. General

   A. This procedure contains the data necessary to find defects in the material specified parts.

   B. Refer to FITS AND CLEARANCES for the design dimension and wear limits.

   C. Refer to the Standard Overhaul Practices Manual (SOPM) for the SOPM chapters identified in this procedure.

   D. Refer to IPL Fig. 1 for item numbers.

2. Check

   A. References

      (1) SOPM 20-20-01, Magnetic Particle Inspection

      (2) SOPM 20-20-02, Penetrant Methods of Inspection

   B. Procedure

      (1) Use standard industry procedures to do a visual check of all the parts for defects. Do the penetrant or magnetic particle check if the visual check shows possible damage or if you suspect possible damage on the parts listed below:

      (2) Do a class B magnetic particle check (SOPM 20-20-01) of these parts:

         (a) Barrel (95)

         (b) Piston (75)

         (c) Bolt-spring retainer (25)

         (d) Piston End (5)

      (3) Do a check of the spring (45)

         (a) Measure the load with the spring compressed to 8.10 inches.

            1) The minimum check load for the spring of wire diameter 0.254 wire shall be 215 pounds.

2) The minimum check load for the spring of wire diameter 0.265 wire shall be 250 pounds.

NOTE: There are optinal spring/washer combinations allowed for this actuator. The springs differs by wire gauge, load, and maximum free length.

(b) Compress the spring to the height 6.30 inches.

1) The maximum check load for the spring of wire diameter 0.254 shall be 510 lbs.

2) The maximum check load for the spring of wire diameter 0.265 will be 600 lbs.

(c) The maximum free length

1) The maximum free length of the spring of wire diameter of 0.254 shall be 9.90 inches.

2) The maximum free length of the spring of wire diameter of 0.254 shall be 9.97 inches.

3) Maximum solid height is 6.20 inches.

4) The spring will compress to the solid height without permanent damage.

REPAIR - GENERAL

1. General

A. Instructions for repair, refinish, and replacement of the specified subassembly parts are included in each REPAIR when applicable:

PART NUMBER	NAME	REPAIR
---	REFINISH OF OTHER PARTS	1-1 (NOT USED)
257T4663-1	BARREL	2-1
257T4665-1	PISTON	3-1
257T4667-1	BOLT-SPRING	4-1
257T4670-1	GUIDE-SPRING	5-1
257T4667-1	MARKER	6-1

2. Dimensioning Symbols

A. Standard True Position Dimensioning Symbols used in the applicable repair procedures are shown in Fig. 601.

—	STRAIGHTNESS
▱	FLATNESS
⊥	PERPENDICULARITY (OR SQUARENESS)
//	PARALLELISM
○	ROUNDNESS
⌭	CYLINDRICITY
⌒	PROFILE OF A LINE
⌓	PROFILE OF A SURFACE
◎	CONCENTRICITY
⌯	SYMMETRY
∠	ANGULARITY
↗	RUNOUT
↗↗	TOTAL RUNOUT
⌴	COUNTERBORE OR SPOTFACE
⌵	COUNTERSINK
⌖	THEORETICAL EXACT POSITION OF A FEATURE (TRUE POSITION)
∅	DIAMETER
S ∅	SPHERICAL DIAMETER
R	RADIUS
SR	SPHERICAL RADIUS
()	REFERENCE
BASIC (BSC) OR [DIM]	A THEORETICALLY EXACT DIMENSION USED TO DESCRIBE SIZE, SHAPE OR LOCATION OF A FEATURE. FROM THIS FEATURE PERMISSIBLE VARIATIONS ARE ESTABLISHED BY TOLERANCES ON OTHER DIMENSIONS OR NOTES.
[-A-]	DATUM
Ⓜ	MAXIMUM MATERIAL CONDITION (MMC)
Ⓛ	LEAST MATERIAL CONDITION (LMC)
Ⓢ	REGARDLESS OF FEATURE SIZE (RFS)
Ⓟ	PROJECTED TOLERANCE ZONE
FIM	FULL INDICATOR MOVEMENT

EXAMPLES

— | 0.002	STRAIGHT WITHIN 0.002
⊥ | 0.002 | B	PERPENDICULAR TO DATUM B WITHIN 0.002
// | 0.002 | A	PARALLEL TO DATUM A WITHIN 0.002
○ | 0.002	ROUND WITHIN 0.002
⌭ | 0.010	CYLINDRICAL SURFACE MUST LIE BETWEEN TWO CONCENTRIC CYLINDERS, ONE OF WHICH HAS A RADIUS 0.010 INCH GREATER THAN THE OTHER
⌒ | 0.006 | A	EACH LINE ELEMENT OF THE SURFACE AT ANY CROSS SECTION MUST LIE BETWEEN TWO PROFILE BOUNDARIES 0.006 INCH APART RELATIVE TO DATUM A
⌓ | 0.020 | A	SURFACES MUST LIE WITHIN PARALLEL BOUNDARIES 0.020 INCH APART AND EQUALLY DISPOSED ABOUT TRUE PROFILE
◎ | ∅ 0.0005 | C	CONCENTRIC TO DATUM C WITHIN 0.0005 DIAMETER
⌯ | 0.010 | A	SYMMETRICAL WITH DATUM A WITHIN 0.010
∠ | 0.005 | A	ANGULAR TOLERANCE 0.005 WITH DATUM A
⌖ | ∅ 0.002 Ⓢ | B	LOCATED AT TRUE POSITION WITHIN 0.002 DIA RELATIVE TO DATUM B, REGARDLESS OF FEATURE SIZE
⊥ | ∅ 0.010 Ⓜ | A 0.510 Ⓟ	AXIS IS TOTALLY WITHIN A CYLINDER OF 0.010 INCH DIAMETER, PERPENDICULAR TO DATUM A, AND EXTENDING 0.510 INCH ABOVE DATUM A, MAXIMUM MATERIAL CONDITION
[2.000] OR 2.000 BSC	THEORETICALLY EXACT DIMENSION IS 2.000

True Position Dimensioning Symbols
Figure 601

K10496

BARREL REPAIR 2-1

257T4663-1

1. General

A. This repair gives the data that is necessary to repair and refinish the barrel (95).

B. Refer to the Standard Overhaul Practices Manual (SOPM) for the standard practices shown in the repair.

C. Refer to the REPAIR - GENERAL (32-35-84/601, REPAIR - GENERAL) for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Fig. 1 for item numbers.

E. General repair details:

(1) Material: 15-5 PH CRES AMS 5659, 180-200 KSI

2. Barrel Bore Repair

A. References

(1) SOPM 20-10-02, Machining of Alloy Steels

(2) SOPM 20-10-03, Shot Peening

(3) SOPM 20-20-01, Magnetic Particle Inspection

(4) SOPM 20-42-03, Hard Chrome Plating

(5) SOPM 20-42-09, Electrodeposited Nickel Plating

B. Procedure

(1) Machine the barrel (95) bore as necessary, to remove defects, cracks, and/or corrosion up to the limit shown in Fig. 601.

(2) Break all sharp edges.

(3) Do a magnetic particle check as shown in SOPM 20-20-01.

(4) Shot peen, chrome plate (F-15.34) and grind the bore to original design dimensions and finish shown in Fig. 601. Chrome plate thickness after grinding must be 0.003-0.010 inch.

(5) If necessary, nickel plate as shown in SOPM 20-42-09. The maximum nickle plate thickness is 0.015. Be sure that the chrome plating thickness on top of the nickel plating is 0.003-0.005 inch after final grind.

3. Barrel Refinish

A. References

(1) 32-35-84/601, REPAIR-GENERAL

(2) SOPM 20-30-02, Stripping of Protective Finishes

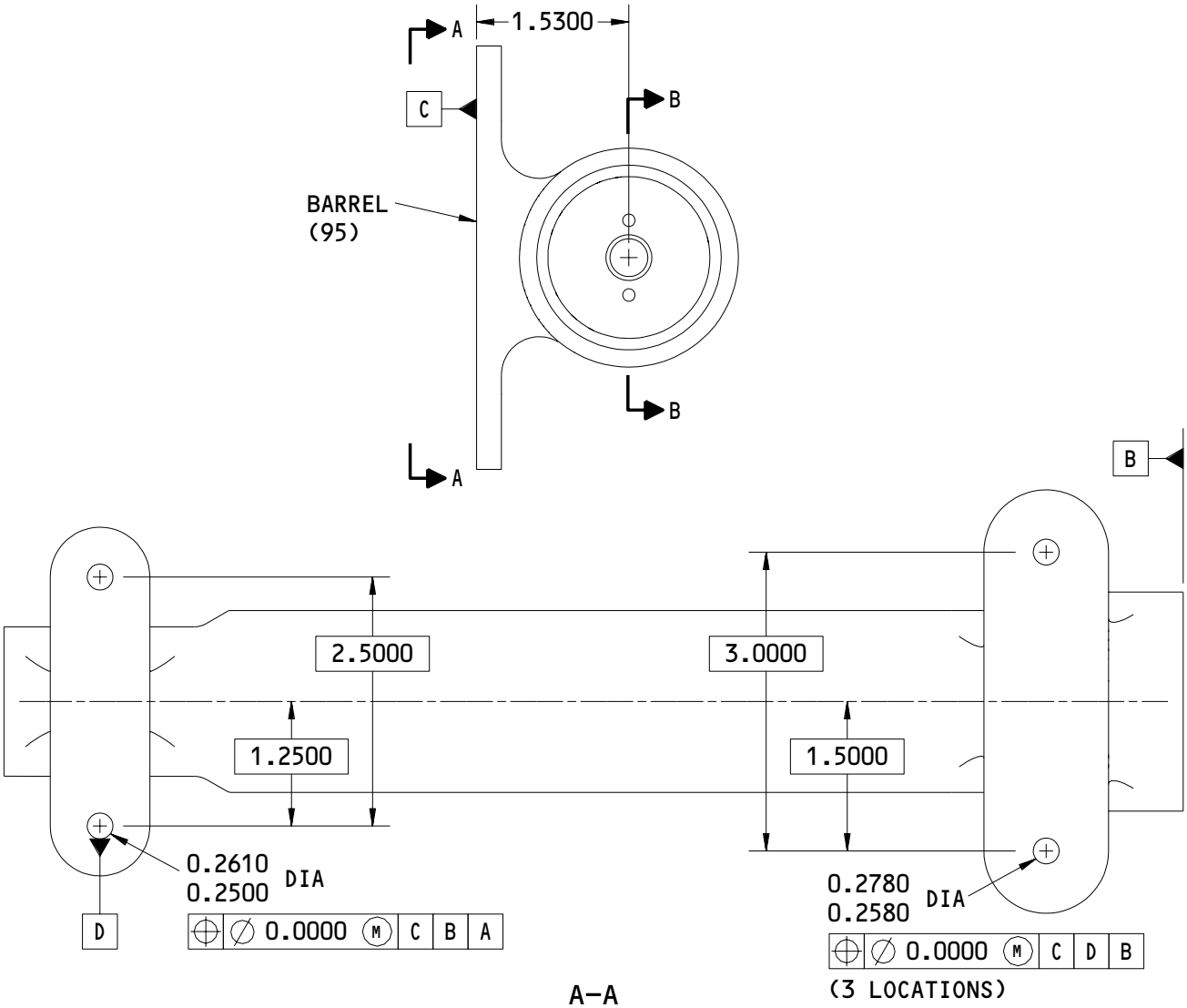
(3) SOPM 20-30-03, General Cleaning Procedures

(4) SOPM 20-41-01, Decoding of Boeing Finish Codes

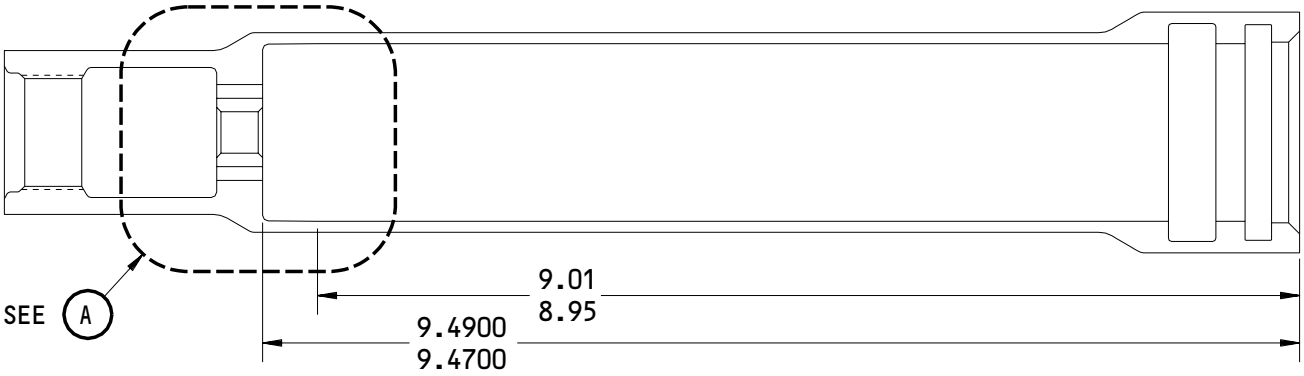
B. Procedure (Fig. 601)

(1) Put a finish on the barrel (95).

(a) Prepare the surface and passivate (17.25).

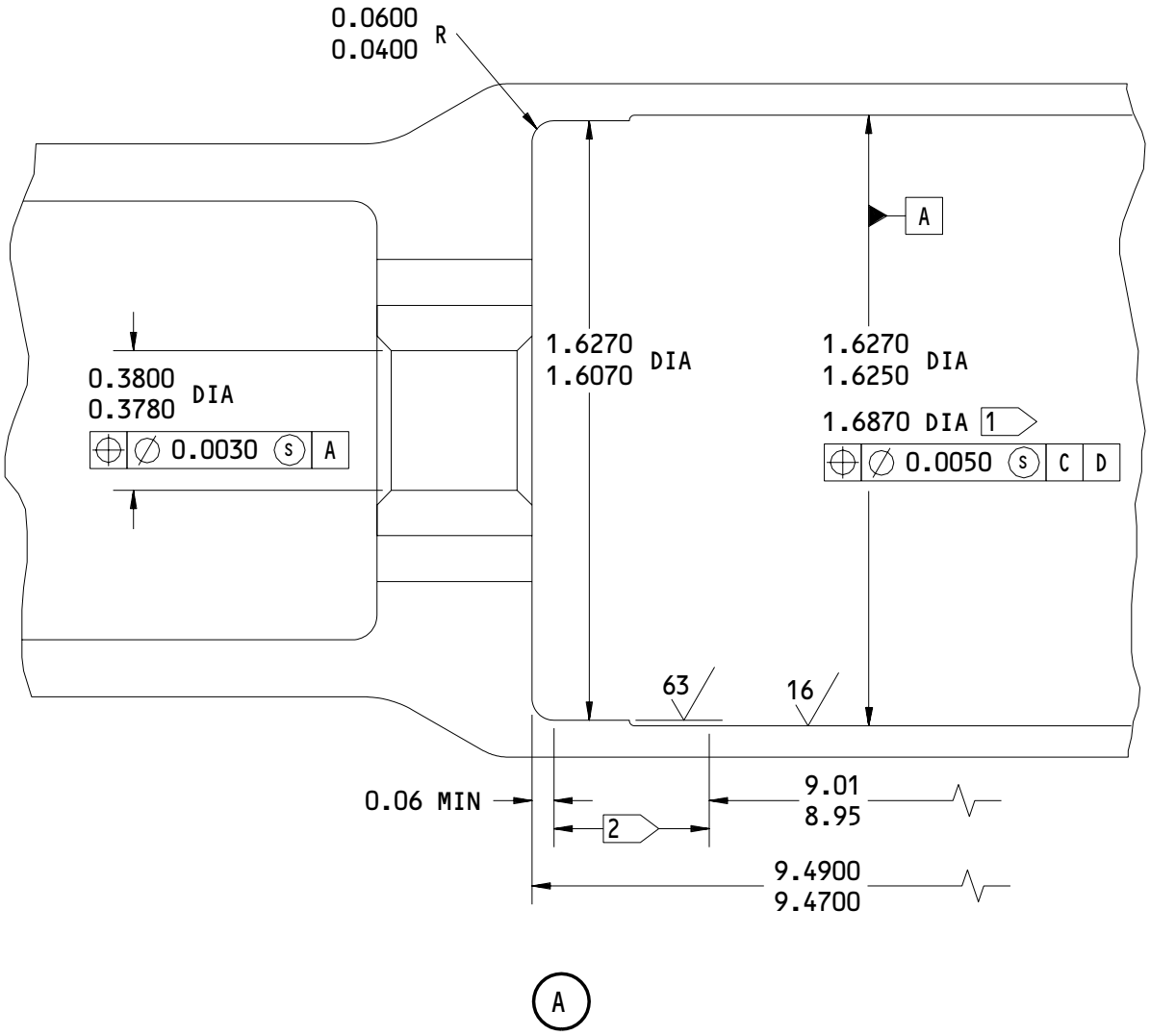


A–A



B–B

257T4663-1
Barrel Repair
Figure 601 (Sheet 1)



1 REPAIR LIMIT

2 MACHINE MISMATCH 0.015. REFER TO BAC5300 TO BLEND SMOOTH

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

257T4663-1
Barrel Repair
Figure 601 (Sheet 2)

K21960

PISTON - REPAIR 3-1

257T4664-1

1. General

A. This repair gives the data that is necessary to repair and refinish the piston (75).

B. Refer to the Standard Overhaul Practices Manual (SOPM) for standard practices shown in the repair.

C. Refer to the REPAIR - GENERAL (32-35-84/601, REPAIR - GENERAL) for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Fig. 1 for item numbers.

E. General repair details:

(1)	Material:	15-5 PH CRES AMS 5659, 180-200 KSI
(2)	Shot peen:	170 - 460 shot size 0.010A -0.017 Intensity Coverage 2.0 Overspray is not permitted

2. Piston Outer Diameter Repair

A. References

(1) SOPM 20-10-02, Machining of Alloy Steels

(2) SOPM 20-10-03, Shot Peening

(3) SOPM 20-20-01, Magnetic Particle Inspection

(4) SOPM 20-42-03, Hard Chrome Plating

(5) SOPM 20-42-09, Electrodeposited Nickel Plating

B. Procedure

(1) Grind the outer diameter of piston (75) as necessary, to remove defects, cracks, and/or corrosion up to the limit shown in Fig. 601.

(2) Break all sharp edges.

(3) Do a magnetic particle check as shown in SOPM 20-20-01.

(4) Shot peen, chrome plate (F-15.34) and regrind outside diameter to original design limits and finish as shown in Fig. 601. Chrome plate thickness after grinding must be 0.003-0.010 inch.

(5) If necessary, nickel plate as shown in SOPM 20-42-09. The maximum nickle plate thickness is 0.015 inch. Be sure that the chrome plating thickness on top of the nickel plating is 0.003-0.005 inch after final grind.

3. Piston Inner Diameter Repair

A. References

(1) SOPM 20-10-02, Machining of Alloy Steels

(2) SOPM 20-10-03, Shot Peening

(3) SOPM 20-20-01, Magnetic Particle Inspection

(4) SOPM 20-42-03, Hard Chrome Plating

(5) SOPM 20-42-09, Electrodeposited Nickel Plating

B. Procedure

(1) Machine the inner diameter of piston (75) as necessary, to remove defects, cracks, and/or corrosion up to the limit shown in Fig. 601.

(2) Break all sharp edges.

(3) Do a magnetic particle check as shown in SOPM 20-20-01.

(4) Shot peen, chrome plate (F-15.34) and grind the inner diameter of piston to the original design limits and finish and as shown in fig. 601. Chrome plate thickness after grinding must be 0.003-0.010 inch.

(5) If necessary, nickel plate as shown in SOPM 20-42-09. Be sure that the chrome plating thickness on top of the nickel plating is 0.003-0.005 inch after final grind.

4. Piston Refinish

A. References

(1) 32-35-84/601, REPAIR-GENERAL

(2) SOPM 20-10-03, Shot Peening

(3) SOPM 20-30-02, Stripping of Protective Finishes

(4) SOPM 20-30-03, General Cleaning Procedures

(5) SOPM 20-41-01, Decoding Table For Boeing Finish Codes

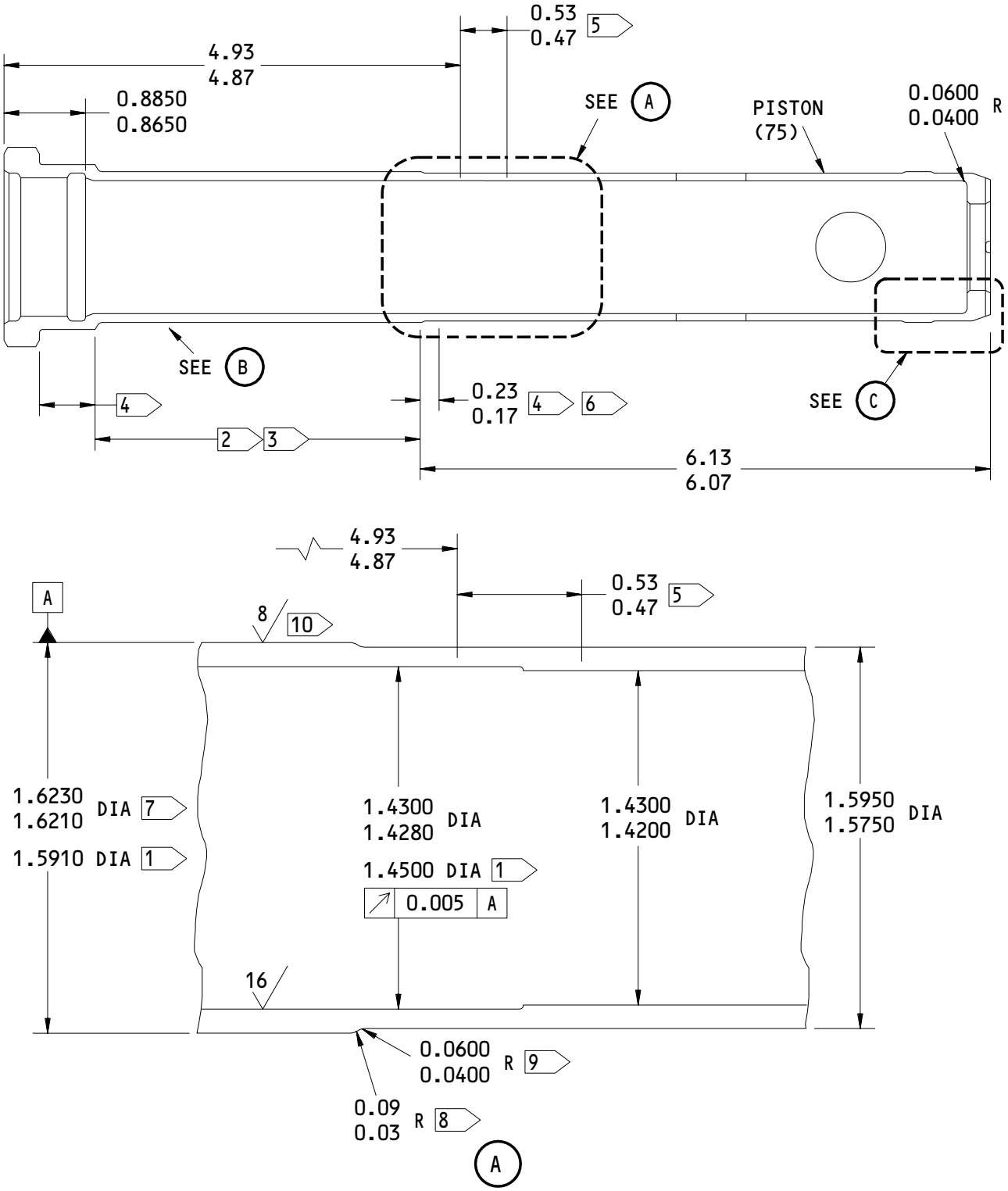
(6) SOPM 20-42-02, Hard Chrome plating

B. Procedure (Fig. 601)

(1) Put a finish on the piston (75) over the indicated area.

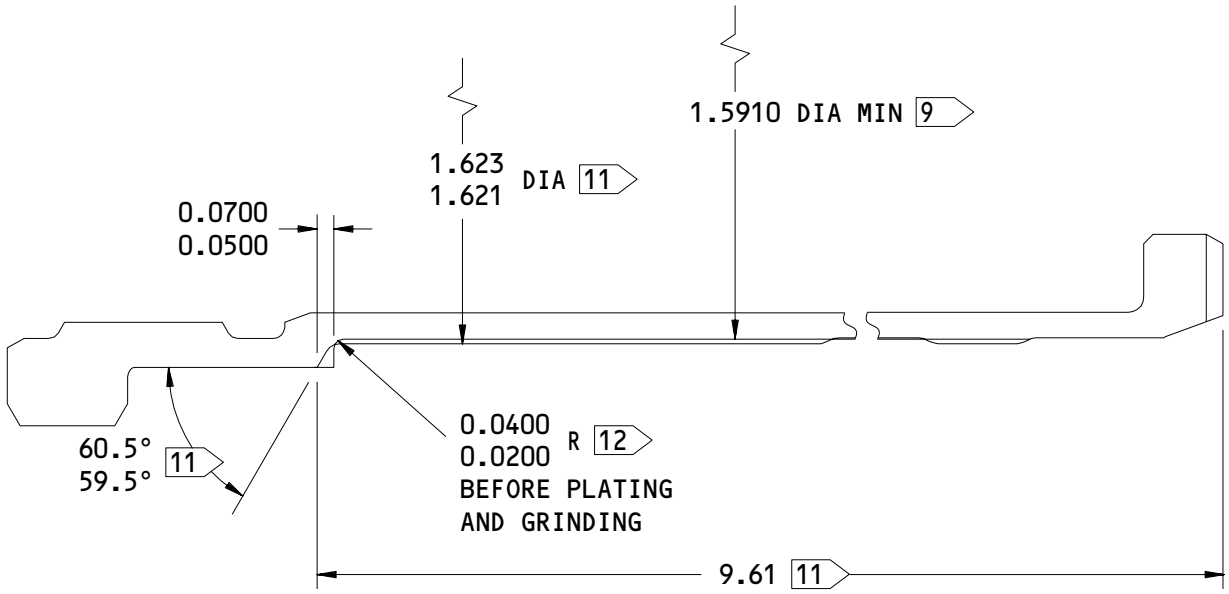
(a) Chrome plate (F-15.34) and grind as shown in Fig. 601.

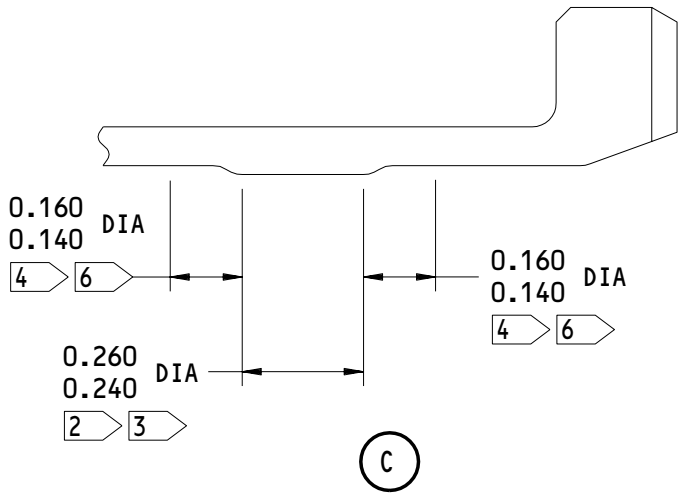
1) Obey the flagnotes 1 to 10.



257T4664-1
Piston Repair
Figure 601 (Sheet 1)

K10408





257T4664-1
Piston Repair
Figure 601 (Sheet 2)

L44412

1 > REPAIR LIMIT

2 > SHOT PEEN THIS SURFACE. SHOT SIZE 170-450; INTENSITY 0.010A, 0.015A; COVERAGE 2.0

3 > AFTER SHOT PEENING, CHROME PLATE THESE SURFACES, REFER TO F-15.34. AFTER GRINDING, PLATING THICKNESS IS 0.003 TO 0.010

4 > SHOT PEEN RUNOUT THIS AREA

5 > MACHINE MISMATCH 0.015. REFER TO BAC5300 TO BLEND SMOOTH

6 > CHROME PLATE RUNOUT THIS AREA

7 > AFTER PLATING AND GRINDING, THE DIAMETER IS 1.6230-1.6210

8 > BEFORE SHOT PEEN. AFTER PLATING AND GRINDING, BLEND EDGE SMOOTH

9 > BEFORE PLATING AND GRINDING

10 > SURFACE FINISH CAN BE 8-12 MICROINCHES

11 > AFTER PLATING AND GRINDING

12 > THIS RADIUS TO BE 0.040 TO 0.060 AFTER PLATING AND GRINDING

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

257T4664-1
Piston Repair
Figure 601 (Sheet 3)

K41232

BOLT-SPRING - REPAIR 4-1

257T4667-1

1. General

A. This repair gives the data that is necessary to repair and refinish the bolt-spring retainer (25).

B. Refer to the Standard Overhaul Practices Manual (SOPM) for standard practices shown in the repair.

C. Refer to the REPAIR - GENERAL (32-35-84/601, REPAIR - GENERAL) for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Fig. 1 for item numbers.

E. General repair details:

(1) Material: 13-8 MO CRES AMS 5659, 200-220 KSI

(2) Shot peen: 170 - 550 shot size
0.004A -0.013A Intensity
Coverage 2.0
Overspray permitted (except thread area)

2. Bolt-Spring Repair

A. References

(1) SOPM 20-10-02, Machining of Alloy Steels

(2) SOPM 20-10-03, Shot Peening

(3) SOPM 20-20-01, Magnetic Particle Inspection

(4) SOPM 20-42-03, Hard Chrome Plating

(5) SOPM 20-42-09, Electrodeposited Nickel Plating

B. Procedure

(1) Grind the outer diameter of bolt-spring retainer (25) as necessary, to remove defects, cracks, and/or corrosion up to the limit shown in Fig. 601.

(2) Break all sharp edges.

(3) Do a magnetic particle check as shown in SOPM 20-20-01.

(4) Shot peen, chrome plate (F-15.34) and regrind outside diameter of bolt-spring retainer to original design limits and finish as shown in finish Fig. 601. Chrome plate thickness after grinding must be 0.003-0.010 inch.

3. Bolt-Spring Retainer Refinish

A. References

(1) 32-35-84/601, REPAIR-GENERAL

(2) SOPM 20-10-03, Shot Peening

(3) SOPM 20-30-02, Stripping of Protective Finishes

(4) 20-30-03, General Cleaning Procedures

(5) SOPM 20-41-01, Decoding Table For Boeing Finish Codes

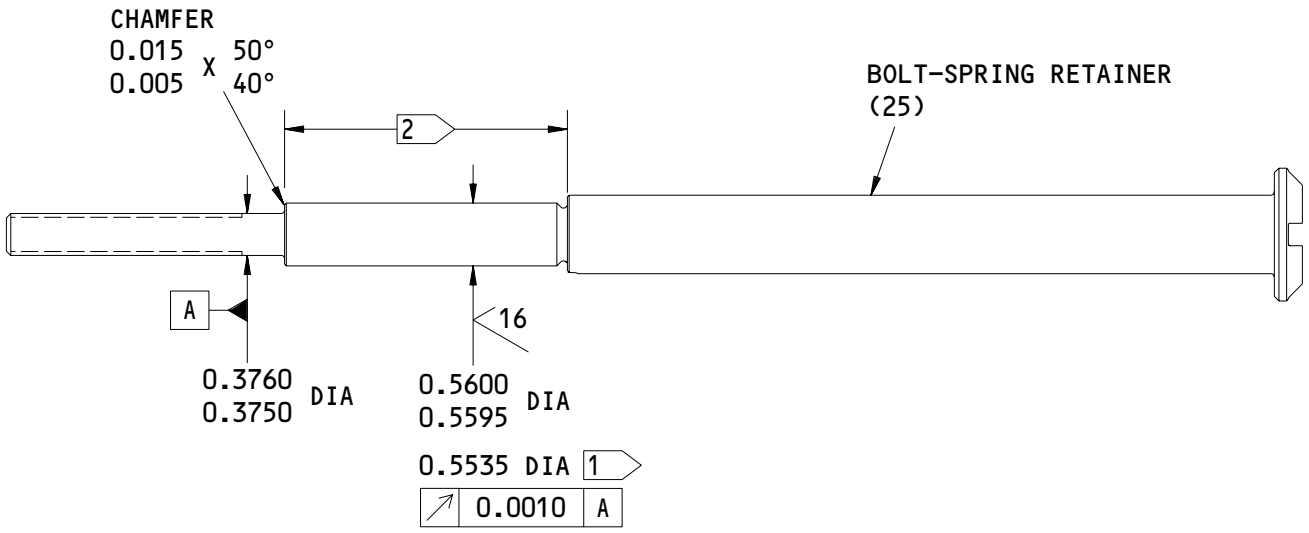
(6) SOPM 20-42-02, Hard Chrome plating

B. Procedure (Fig. 601)

(1) Put a finish on the bolt-spring retainer (25) over the indicated area.

(a) Chrome plate (F-15.34) and grind as shown in Fig. 601.

1) Obey the flagnotes 1 and 2.



1 REPAIR LIMIT PRIOR TO CHROME PLATING

2 SHOT PEEN THIS AREA. SHOT SIZE 170-550, INTENSITY 0.007A-0.013A, COVERAGE 2.0 OVERSPRAY PERMITTED. EXCEPT DO NOT SHOT PEEN THREAD

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

257T4667-1
Bolt-Spring Repair
Figure 601

K10450

NAMEPLATE INSTALLATION - REPAIR 5-1

BAC27TLG25

1. General

A. This repair has instructions for the replacement of the nameplate (105) and the strap (100).

B. Refer to the Standard Overhaul Practices Manual (SOPM) for the standard practices shown in the repair.

C. Refer to IPL Fig. 1 for the item numbers.

2. Nameplate Replacement (Fig. 601)

A. General

(1) Use the strap only one time.

B. Consumabale Materials

(1) A00323 Adhesive -- Type 54 (SOPM 20-60-04)

C. References

(1) SOPM 20-60-04, Miscellaneous Materials

D. Procedure

(1) Prepare the nameplate:

NOTE: Make sure the serial number and the part number are steel-stamped on the nameplate.

(a) Bend the nameplate in to a smooth arc parallel to the strap slot. Make sure the radius is slightly smaller than barrel radius.

(b) Make a small bend in the nameplate corners toward to the mounting surface.

(2) Attach the nameplate to the barrel:

(a) Install the strap through End '1' of the nameplate.

(b) Bend 0.25-0.30 inch of strap through the nameplate as shown in Fig. 1.

(c) Bond the strap and the nameplate to the barrel assembly with type 54 adhesive:

1) Apply a layer of type 54 adhesive to the bottom of the strap and the nameplate.

2) Hold the nameplate on the barrel.

3) Install the strap through End '2' of the nameplate.

4) Pull the strap tight.

NOTE: Make sure the strap and the nameplate are tight against the barrel.

5) Bend the strap back over the End 2 of the nameplate.

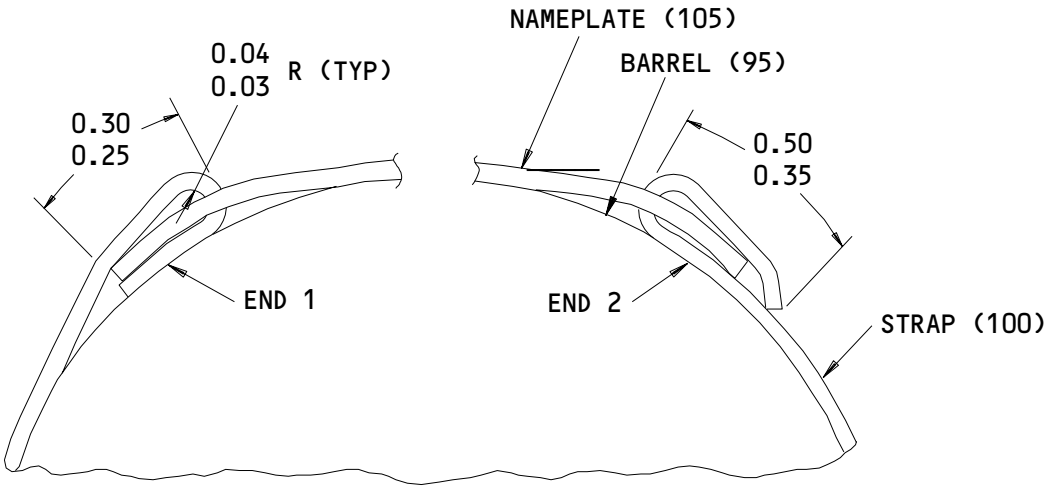
NOTE: Keep the strap tight.

6) Fill all of the areas between the strap and the barrel with the adhesive.

(d) Cut the strap 0.35-0.50 from the nameplate slot.

(e) Bend the strap end down with a slot-nosed hammer.

(3) Seal the edges of the nameplate and strap with type 54 adhesive.



ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

Nameplate Installation
Figure 601

ASSEMBLY

1. General

   A. This procedure contains the data necessary to assemble the actuator assembly.

   B. Refer to the Standard Overhaul Practices Manual (SOPM) for the SOPM subjects identified in this procedure.

   C. Refer to IPL Fig. 1 for item numbers.

2. Actuator Assembly

   A. Special Tools and Equipment

      NOTE: Equivalent tools can be used.

      (1) Holding Fixture -- A32121-1

   B. Consumable Materials

      NOTE: Equivalent equipment can be used.

      (1) D00183 Fluid, Hydraulic -- BMS 3-11 (SOPM 20-60-03)

   C. References

      (1) 32-35-84/101, Testing and Fault Isolation

      (2) SOPM 32-35-84/601, REPAIR 5-1, Nameplate Installation

      (3) SOPM 20-44-02, Temporary Protective Coatings

      (4) SOPM 20-50-02, Installation of Safetying Devices

      (5) SOPM 20-60-02, Finishing Materials

(6) SOPM 20-60-03, Lubricants

D. Procedure (Fig. 701)

(1) Assemble guide (40), ring retainer (30), washers (35), spring (45), and bushing (50) on the bolt (25).

NOTE: Install the same quantity of washers on each end of the spring if you used the old spring. If a replacement spring has wire diameter 0.265 inch, install only one washer on each end of the spring.

(2) Install assembled bolt (25) with guide (40), ring retainer (30), washers (35), spring (45), and bushing (50) into the piston (75).

(3) Lubricate the backup ring (90) and the scraper (80) with hydraulic fluid. Install the scraper (80), seal (85), and backup ring (90) in the barrel.

(4) Install the piston assembly in the barrel (95), hold bolt (25) and tighten spring retainer nut (60) to 250-300 pound-inches.

(5) Lurbricate the backup ring (15) and the packings (20) with hydraulic fluid. Install the backup ring (15) and the packing (20) on the piston end (25).

(6) Install piston end (5) in the piston (75) and tighten it to 1000 pound-inches.

(a) Bend the flange of the cuplock washer (10) fully into the slot of the piston end (5).

(b) Install the packing (65) on the union (70).

(c) Install the union (70) in the hydraulic port of barrel (95).

(7) If necessary, install the nameplate and the strap (32-35-84/601, REPAIR 5-1).

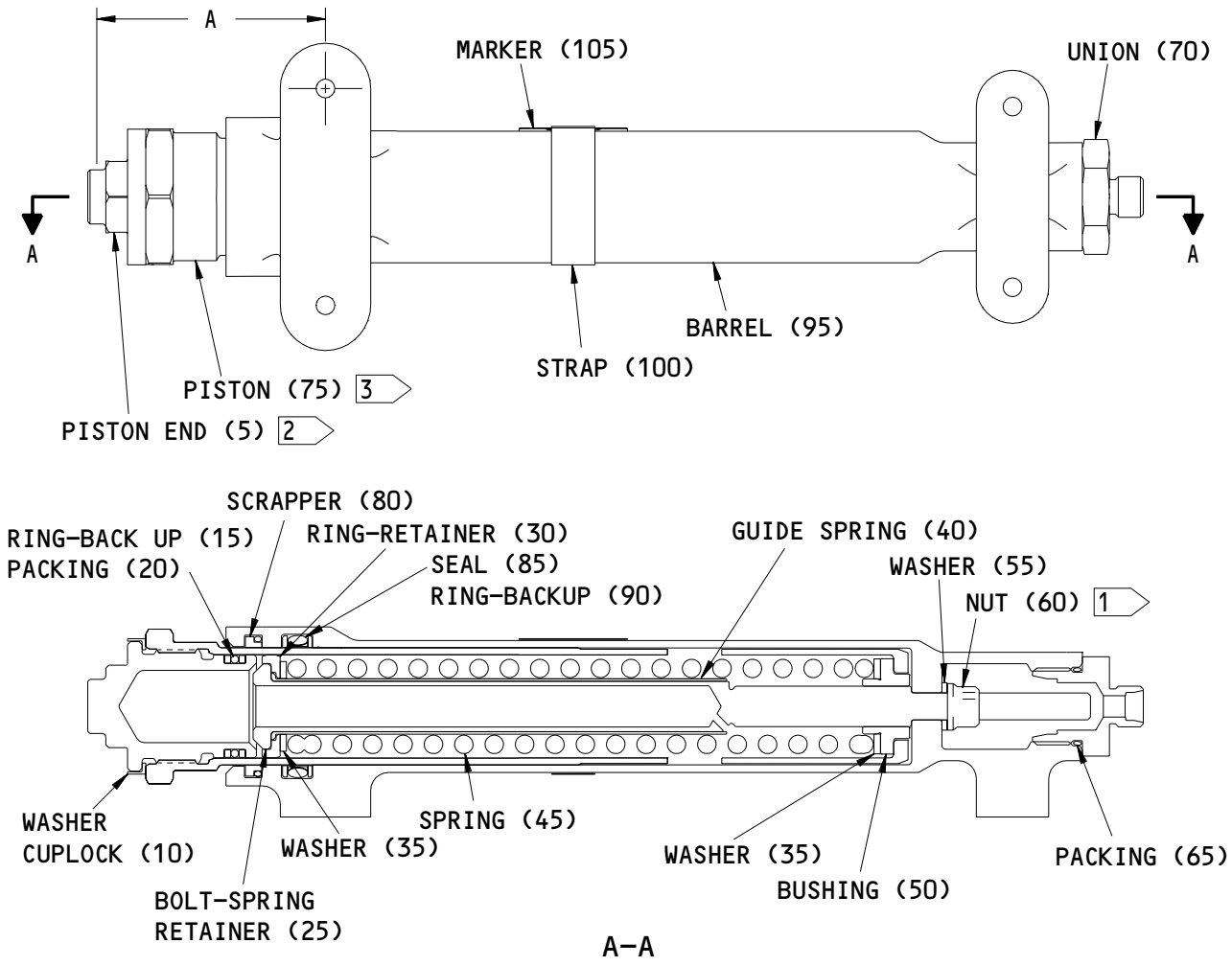
(8) Do the test as shown in TESTING AND FAULT ISOLATION (32-35-84/101).

E. Storage

(1) Partially fill the unit with hydraulic fluid.

(2) Seal the port with BMS 3-11 resistant plug or cap.

(3) Give protection to the unit and put it away by standard industry practices and the data contained in SOPM 20-44-02.



A-A

1 TORQUE SPRING RETAINER NUT TO 250-300 INCH-POUNDS

2 TORQUE PISTON END TO 1000 INCH-POUNDS

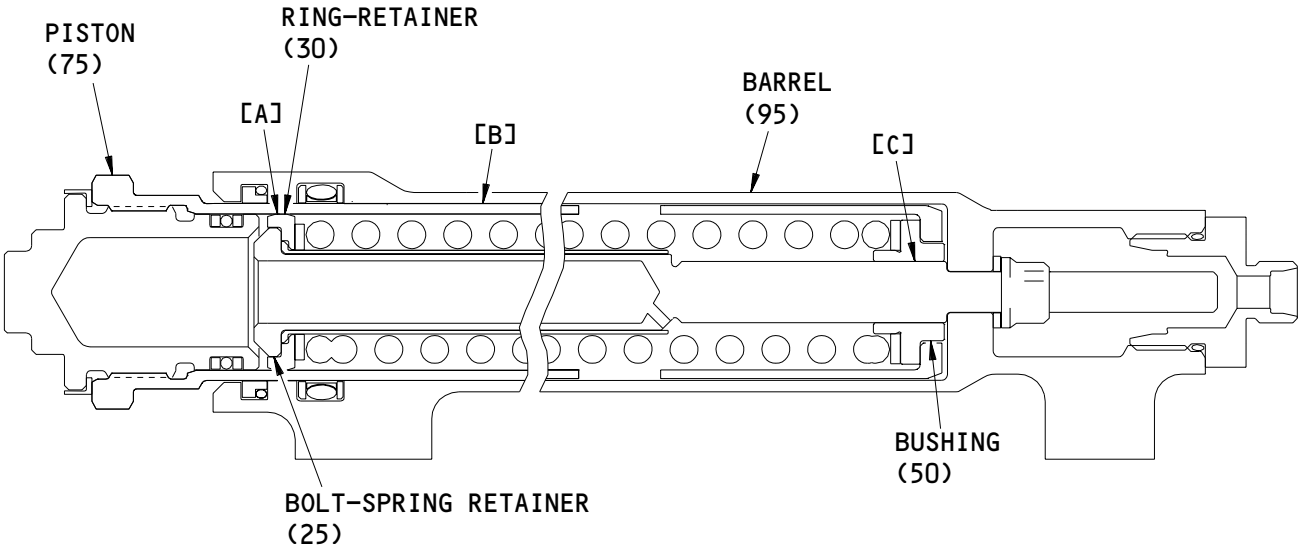
3 AFTER TORQUING USE PUNCH OR SWAGING TOOL TO LOCALLY BREAK FLANGE OF CUP WASHER INTO SLOTS OF PISTON END. ASSURE THAT BREAKS ARE COMPLETE

ITEM NUMBERS REFER TO IPL FIG. 1

Actuator Assembly Details
Figure 701

K10473

FITS AND CLEARANCES



REF LETTER	REF IPL FIG. 1, MATING ITEM NO.	DESIGN DIMENSION*				SERVICE WEAR LIMIT*		
		DIMENSION		ASSEMBLY CLEARANCE		DIMENSION		MAXIMUM CLEARANCE
		MIN	MAX	MIN	MAX	MIN	MAX	
[A]	ID 75	1.4280	1.4300	0.0030	0.0100		1.4330	
	OD 30	1.4200	1.4250			1.4000		
[B]	ID 95	1.6250	1.6270	0.0020	0.0060		1.6315	
	OD 75	1.6210	1.6230			1.6195		
[C]	ID 50	0.5605	0.5610	0.0005	0.0015		0.5616	
	OD 25	0.5595	0.5600			0.5590		

* ALL DIMENSIONS ARE IN INCHES

Fits and Clearances
Figure 801

K10490

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

1. General

   A. This is a list of the special tools, fixtures, and equipment used in this manual.

   B. Equivalent alternatives can be used.

      (1) A32121-1 -- Holding Fixture

ILLUSTRATED PARTS LIST

1. This section lists and illustrates replaceable or repairable component parts. The Illustrated Parts Catalog contains a complete explanation of the Boeing part numbering system.

2. Indentures show parts relationships as follows:

    Assembly
      Detail Parts for Assembly
      Subassembly
      Attaching Parts for Subassembly
        Detail Parts for Subassembly

    Detail Installation Parts (Included only if installation parts may be returned to shop as part of assembly)

3. One use code letter (A, B, C, etc.) is assigned in the EFF CODE column for each variation of top assembly. All listed parts are used on all top assemblies except when limitations are shown by use code letter opposite individual part entries.

4. Letter suffixes (alpha-variants) are added to item numbers for optional parts, Service Bulletin modification parts, configuration differences (Except left- and right-hand parts), product improvement parts, and parts added between two sequential item numbers. The alpha-variant is not shown on illustrations when appearance and location of all variants of the part is the same.

5. Service Bulletin modifications are shown by the notations PRE SB XXXX and POST SB XXXX.

    A. When a new top assembly part number is assigned by Service Bulletin, the notations appear at the top assembly level only. The configuration differences at detail part level are then shown by use code letter.

    B. When the top assembly part number is not changed by the Service Bulletin, the notations appear at the detail part level.

6. Parts Interchangeability

Optional (OPT)	The parts are optional to and interchangeable with other parts having the same item number.
Supersedes, Superseded By (SUPSDS, SUPSD BY)	The part supersedes and is not interchangeable with the original part.
Replaces, Replaced By (REPLS, REPLD BY)	The part replaces and is interchangeable with, or is an alternate to, the original part.

VENDORS

02107 FLOUROCARBON CO OHIO DIV
DOVER, OHIO 44622
CANCELLED NO REPLACEMENT

06710 LAMSON AND SESSIONS CO THE VALLEY-TODECO
12975 BRADLEY AVENUE
SYLMAR, CALIFORNIA 91342-3830

07128 TETRAFLUOR INC
2051 EAST MAPLE AVENUE
EL SEGUNDO, CALIFORNIA 90245-5009

11815 CHERRY AEROSPACE FASTENERS DIV OF TEXTRON
1224 EAST WARNER AVENUE PO BOX 2157
SANTA ANA, CALIFORNIA 92707-0157

15653 KAYNAR TECHNOLOGY KAYNAR DIV
800 SOUTH STATE COLLEGE BLVD PO BOX 3001
FULLERTON, CALIFORNIA 92634-3001

26303 GREENE TWEED IND INC ADVANTEC DIV
7101 PATTERSON DRIVE PO BOX 5037
GARDEN GROVE, CALIFORNIA 92645-5037

26879 CORONADO MFG INC
11069 PENROSE AVENUE
SUN VALLEY, CALIFORNIA 90352-2722

27238 BRISTOL INDUSTRIES
630 EAST LAMBERT ROAD PO BOX 630
BREA, CALIFORNIA 92621-4119

56878 SPS TECHNOLOGIES INC AEROSPACE AND INDUSTRIAL PRODUCTS DIV
HIGHLAND AVENUE
JENKINTOWN, PENNSYLVANIA 19046

62554 SIMMONDS MECAERO FASTENERS INC
1734 SEQUOIA AVENUE
ORANGE, CALIFORNIA 92668

72962 HARVARD INDUSTRIES INC
3 WERNER WAY SUITE 210
LEBANON, NEW JERSEY 08833

VENDORS

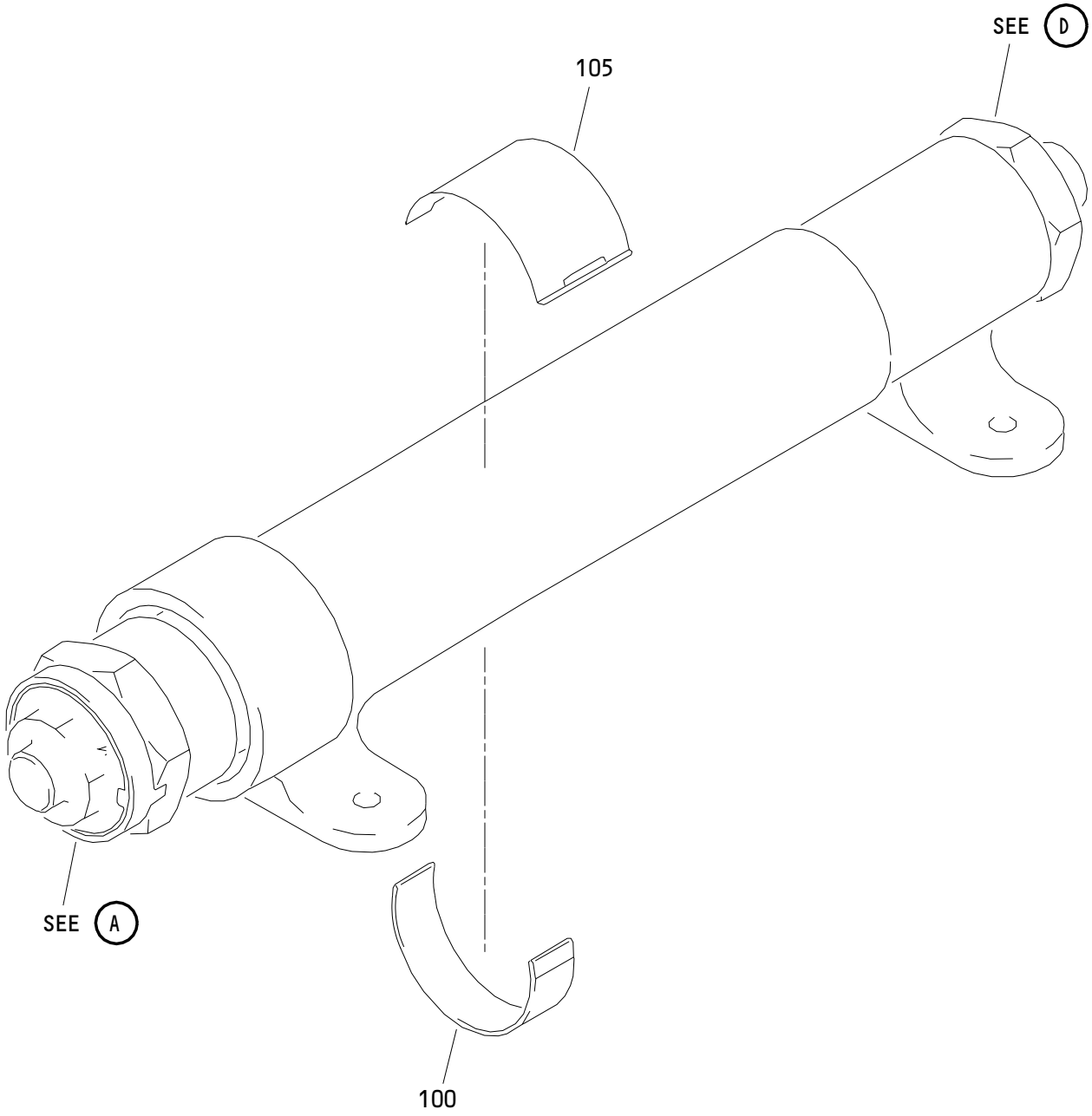
94878 RAYBESTOS-MANHATTAN INC PACIFIC COAST DIV
FULLERTON, CALIFORNIA 92631
BUSINESS DISCONTINUED

97820 BUSAK AND SHAMBAN INC BEARING DIV
711 MITCHELL ROAD PO BOX 665
NEWBURY PARK, CALIFORNIA 91320-2214

97928 DEUTSCH FASTENER CORP
3969 PARAMONT BOULEVARD
LAKEWOOD, CALIFORNIA 90712-4193

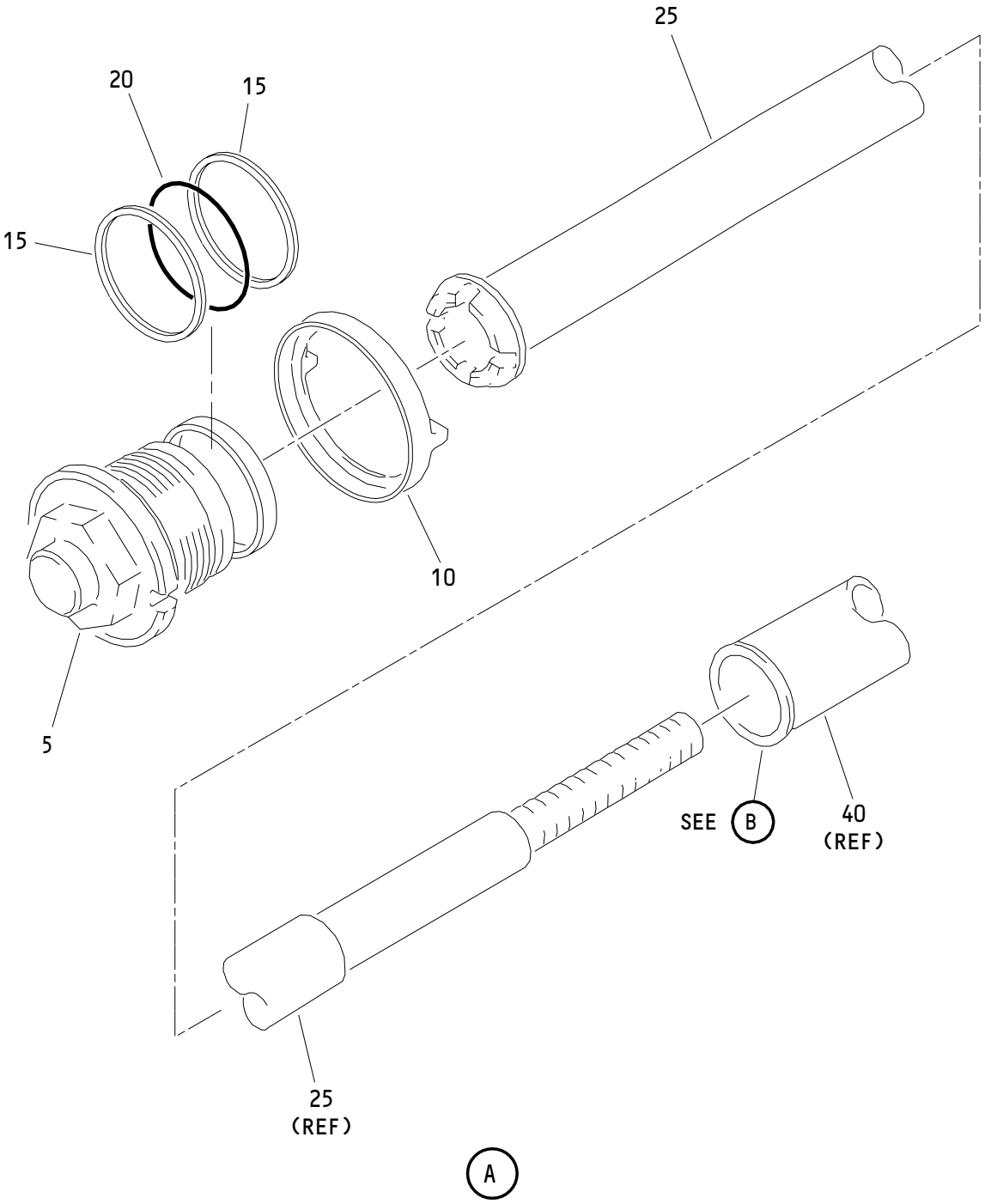
PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
BACN10HR6CS		1	60	1
BACR12BM217		1	15	2
BACR17E12-6		1	70	1
BACW10BP122PTU		1	35	AR
BACW10BP6PTU		1	55	1
BAC27TLG25		1	105	1
BH003026CS		1	60	1
BH00303-6		1	60	1
BH003036		1	60	1
BMNN10HR6CS		1	60	1
BMN10HRCPD3-6		1	60	1
BMN5024CPD3-6		1	60	1
BMN5024CPD36		1	60	1
BGS70M326AT99		1	90	2
CR59066CS		1	60	1
CR5908		1	60	1
C11236-217B		1	15	2
H39953		1	60	1
H39953-6		1	60	1
H966CS		1	60	1
NAS1611-217A		1	20	1
NAS1612-12A		1	65	1
RMLH226CS		1	60	1
RMR12BM217		1	15	2
RP55WM326AT99EP		1	85	1
SL705096		1	60	1
SL7059C624		1	60	1
STF800-217		1	15	2
S30294-217-1		1	15	2
S30855-326H99		1	85A	1
S32925-718H99		1	80A	1
S33157-326-99		1	90A	2
TF450-217A		1	15	2
VAL280096CS		1	60	1
WE250B718AT99EP		1	80	1
109LH9031-6		1	60	1
109LH90316		1	60	1
2100-217		1	15	2
257T4662-1		1	1A	RF
257T4663-1		1	95	1

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
257T4664-1		1	75	1
257T4665-1		1	5	1
257T4666-2		1	45	1
257T4666-1		1	45A	1
257T4667-1		1	25	1
257T4668-1		1	50	1
257T4669-1		1	10	1
257T4670-1		1	40	1
257T4671-1		1	30	1
273T0050-4		1	100	1
67832AS6		1	60	1
67832AS624		1	60	1
678326CS		1	60	1



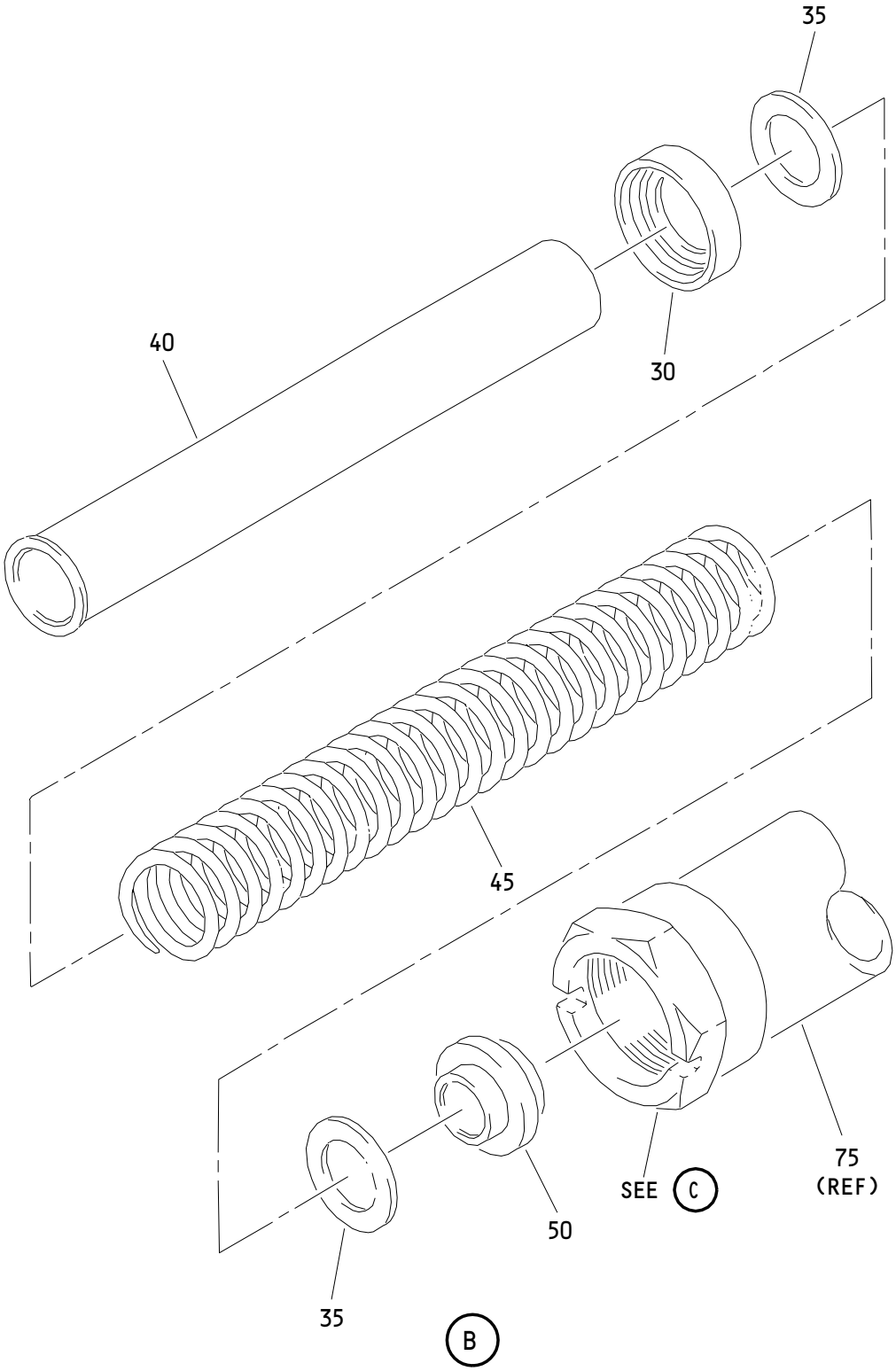
Main Landing Gear Alternate Extend Actuator Assembly
Figure 1 (Sheet 1)

K10528



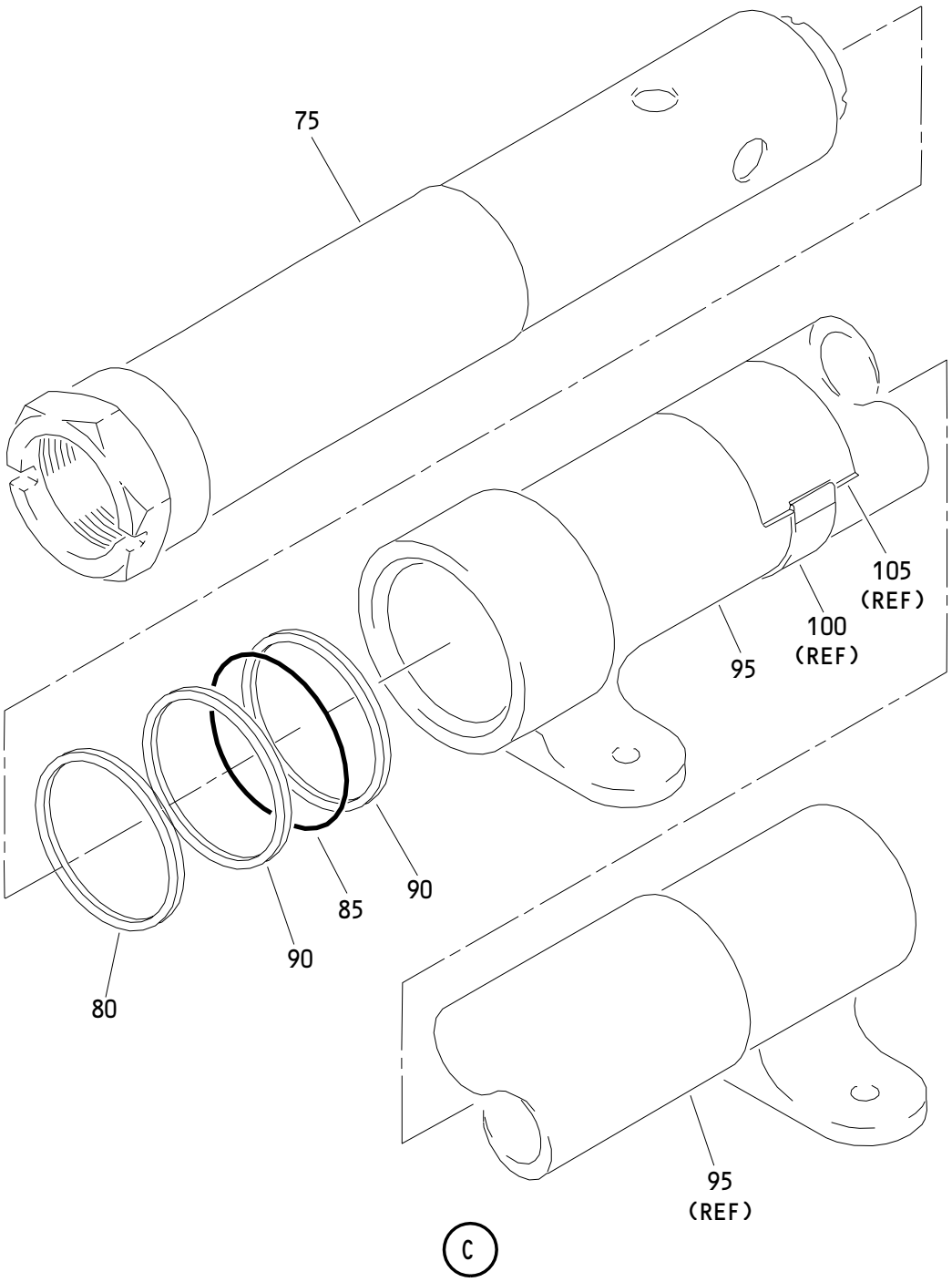
Main Landing Gear Alternate Extend Actuator Assembly
Figure 1 (Sheet 2)

K10539



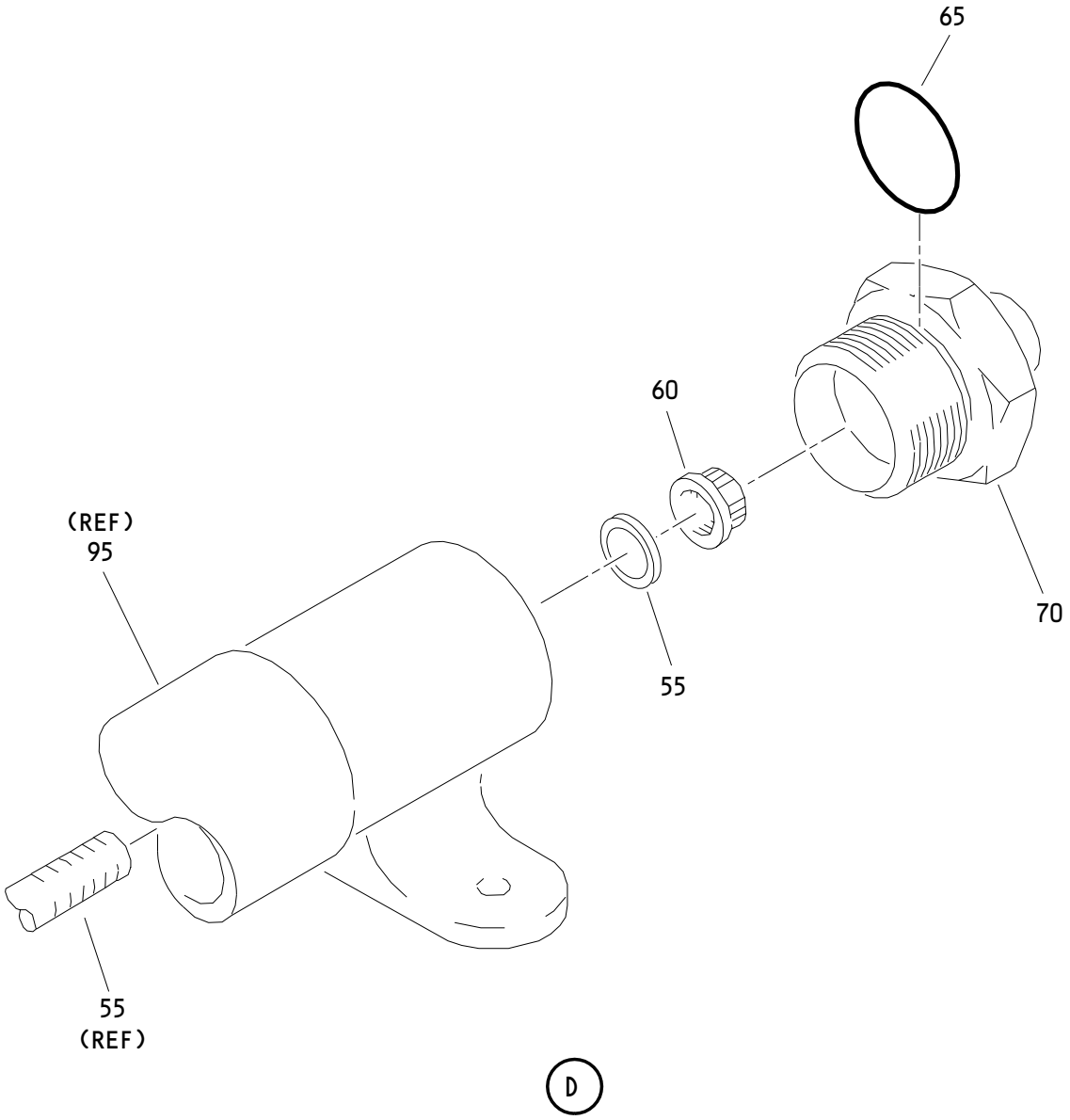
Main Landing Gear Alternate Extend Actuator Assembly
Figure 1 (Sheet 3)

K10546



Main Landing Gear Alternate Extend Actuator Assembly
Figure 1 (Sheet 4)

K10563



Main Landing Gear Alternate Extend Actuator Assembly
Figure 1 (Sheet 5)

K10567

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
1A	257T4662-1		ACTUATOR ASSY-ALTERNATE EXTEND MLG		RF
5	257T4665-1		.END-PISTON		1
10	257T4669-1		.WASHER-CUPLOCK		1
15	C11236-217B		.RING-BACKUP (V26879) (SPEC BACR12BM217) (OPT RMR12BM217 (V94878)) (OPT STF800-217 (V02107)) (OPT S30294-217-1 (V97820)) (OPT TF450-217A (V07128)) (OPT 2100-217 (V26303))		2
20	NAS1611-217A		.PACKING		1
25	257T4667-1		.BOLT-SPRING		1
30	257T4671-1		.RING-RETAINER		1
35	BACW10BP122PTU		.WASHER		AR
40	257T4670-1		.GUIDE-SPRING		1
45	257T4666-2		.SPRING (OPT TO ITEM 45A)		1
45	257T4666-1		.SPRING		1
50	257T4668-1		.BUSHING		1
55	BACW10BP6PTU		.WASHER		1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-60	H39953-6		.NUT- (V15653) (SPEC BACN10HR6CS) (OPT 109LH9031-6 (V72962)) (OPT 67832AS624 (V56878)) (OPT BMN5024CPD3-6 (V97928)) (OPT BH00303-6 (V27238)) (OPT SL7059C624 (V11815)) (OPT BH003036 (V27238)) (OPT BMN5024CPD36 (V97928)) (OPT CR5908 (V62554)) (OPT H39953 (V15653)) (OPT SL705096 (V11815)) (OPT 109LH90316 (V72962)) (OPT 67832AS6 (V56878)) (OPT BH003026CS (V27238)) (OPT BMNN10HR6CS (V97928)) (OPT CR59066CS (V62554)) (OPT H966CS (V15653)) (OPT RMLH226CS (V72962)) (OPT VAL280096CS (V06710)) (OPT 678326CS (V56878)) (OPT BMN10HRCPD3-6 (V97928))		1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
65	NAS1612-12A		.PACKING		1
70	BACR17E12-6		.UNION		1
75	257T4664-1		.PISTON		1
80	WE25OB718AT99EP		.SCRAPER (97820) (OPT ITEM 80A)		1
-80A	S32925-718H99		.SCRAPER (97820) (OPT ITEM 80)		1
85	RP55WM326AT99EP		.SEAL (97820) (OPT ITEM 85A)		1
-85A	S30855-326H99		.SEAL (97820) (OPT ITEM 85)		1
90	BGS7OM326AT99		.RING-BACKUP (97820) (OPT ITEM 90A)		2
-90A	S33157-326-99		.RING-BACKUP (97820) (OPT ITEM 90)		2
95	257T4663-1		.BARREL		1
100	273T0050-4		.STRAP		1
105	BAC27TLG25		.MARKER		1

- Item Not Illustrated