TO: ALL HOLDERS OF MAIN LANDING GEAR DRAG BRACE DOWNLOCK ACTUATOR ASSEMBLY
COMPONENT MAINTENANCE MANUAL 32-32-35

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 on the Record of Revision Sheet.

CHAPTER/SECTION AND PAGE NO.	DESCRIPTION OF CHANGE
106	Added clarifications and updated callouts.
901	Added tool callouts.

COMPONENT
MAINTENANCE MANUAL

MAIN LANDING GEAR
DRAG BRACE DOWN LOCK ACTUATOR ASSEMBLY

PART NUMBER 273T6351-1

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

K16196

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 are not necessary. Use standard industry procedures.

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 DRAG BRACE DOWN LOCK ACTUATOR ASSEMBLY

DESCRIPTION AND OPERATION

1. Description

A. The main gear drag brace down lock actuator assembly has a CRES barrel, a piston rod, a bearing attached to the barrel, and a rod end.

2. Operation

A. The actuator retracts, which unlocks the drag brace from the over center position, when the hydraulic pressure is applied. The drag brace is held in the over center position with springs. When the main landing gear is down and locked, the actuator is not pressurized, which decreases the load on the jury strut.

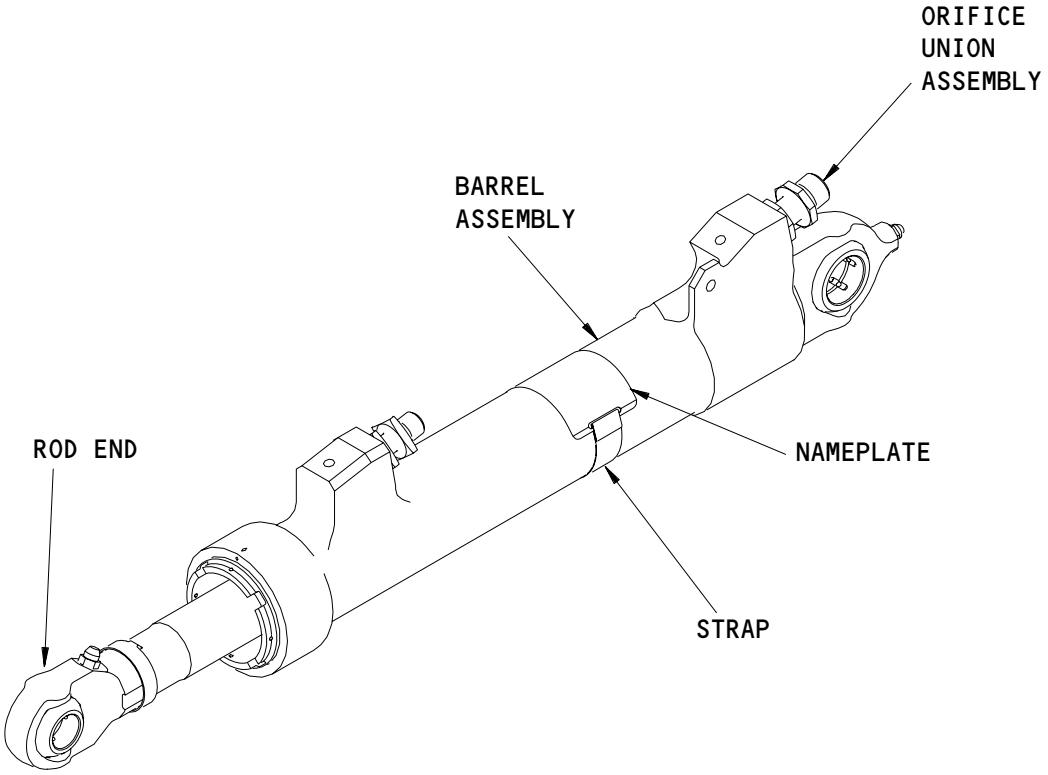
3. Leading Particulars (Approximate)

A. Length -- 27 inches (extended)
-- 18 inches (retracted)

B. Width -- 3 inches

C. Height -- 5 inches

D. Weight -- 9 pounds



Main Landing Gear – Drag Brace Downlock Actuator Assembly
Figure 1

K29916

TESTING AND FAULT ISOLATION

1. General

   A. This procedure contains the data necessary to do a test of the actuator assembly after an overhaul or for fault isolation. There are three parts:

      (1) Actuator Assembly Test

         (a) External leakage

         (b) Internal leakage

         (c) Friction

         (d) Extend rate

         (e) Retract rate

         (f) Proof Pressure

      (2) Fault Isolation

      (3) Fault Correction

   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 Test

   A. Special Tools and Equipment

      NOTE: Equivalent equipment can be used.

      (1) Holding Fixture -- A32121 equipment

B. Standard Tools and Equipment

NOTE: Equivalent equipment can be used.

(1) A hydraulic test stand with these requirements:

(a) Can operate with BMS 3-11 Type 4 hydraulic fluid.

(b) Can operate in a range of 0-4700 psi.

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

(d) The fluid temperature to be 60-120°F.

(e) Sufficient valves to change the direction of the hydraulic fluid flow.

C. Consumable Material

(1) D00183 Fluid, Hydraulic -- BMS 3-11, Type 4 (SOPM 20-60-03)

D. References

(1) 32-32-35/301, Disassembly

(2) 32-32-35/701, Assembly

(3) SOPM 20-60-03, Lubricants

E. Prepare for Test

(1) Install the actuator in the holding fixture.

(2) Attach the hydraulic test stand lines to the ports.

(3) Fill the actuator with hydraulic fluid.

NOTE: The actuator will stay full of BMS 3-11 hydraulic fluid for each test.

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

F. Procedure

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

(1) Do an external leakage test:

(a) Clean around the dynamic rod seal to permit leak detection.

(b) Operate the actuator for 25 full cycles at a rate of 5 cycles per minute (CPM):

1) Fully retract the actuator.

2) Apply the minimum hydraulic pressure to the extend port that is necessary to move the piston.

3) Increase the pressure to 3000-3200 psi when the actuator stops at the end of the piston travel.

4) Remove the pressure from the retract port.

5) Do steps 1-4 for 25 full cycles.

(c) After 25 cycles, do a visual check for leakage around the dynamic rod seal:

1) Recommended leakage is zero.

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

3) The leakage limit for static seals is zero.

(2) Do an internal leakage test:

(a) Fully retract the actuator.

(b) Remove the hydraulic line from the extend port.

(c) Apply 3000-3200 psi to the retract port for a minimum of one minute.

(d) Do a visual check for leakage from the open extend port:

1) Recommended leakage is zero.

2) The leakage limit is 5cc per minute.

(e) Remove the pressure from the retract port.

(f) Attach the hydraulic line to the extend port.

(g) Fully extend the actuator.

(h) Remove the hydraulic line from the retract port.

(i) Apply 3000-3200 psi to the extend port for a minimum of one minute.

(j) Do a visual check for leakage from the open retract port.

1) Recommended leakage is zero.

2) The leakage limit is 5cc per minute.

(k) Remove the pressure from the extend port.

(l) Attach the hydraulic line to the retract port.

(3) Do a friction test:

(a) Fully retract the actuator.

(b) Apply no pressure to the retract port.

(c) With no load applied to the actuator, slowly increase the pressure to 100 psi maximum at the extend port:

1) The actuator must extend fully with a smooth, continuous movement.

(d) Remove the pressure applied to the extend port.

(e) Make sure the actuator is fully extended.

(f) Apply no pressure to the extend port.

(g) With no load applied to the actuator, slowly increase the pressure to 100 psi maximum at retract port:

1) The actuator must extend fully with a smooth, continuous movement.

(h) Remove the pressure applied to the retract port.

(4) Do an extend rate test:

(a) Fully retract the actuator.

(b) Apply 490-510 psig to the extend port and 40-60 psig to the retract port:

1) Keep a record of the time that is necessary to get the full travel from the fully retracted to the fully extended position.

a) The time that is necessary to fully extend the actuator must be 5.7-7.3 seconds.

(c) Remove the pressure from the extend port.

(5) Do a retract rate test:

(a) Fully extend the actuator.

(b) Apply 490-510 psig to the retract port and 40-60 psig pressure to the extend port:

1) Keep a record of the time that is necessary to get the full travel from the fully extended to the fully retracted position.

a) The time that is necessary to fully retract the actuator must be 3.6-5.0 seconds.

(c) Remove the pressure from the retract port.

(6) Do a proof pressure test:

(a) Fully retract the actuator.

(b) Apply no pressure to the extend port.

CAUTION: DO NOT EXTEND OR RETRACT THE PISTON AT PROOF PRESSURE (4500-4700 PSI).

(c) Apply 4500-4700 psi pressure to the retract port for a minimum of 30 seconds.

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

(e) Remove the pressure from the retract port.

(f) Fully extend the actuator.

(g) Apply no pressure to the retract port.

(h) Apply 4500-4700 psi pressure to the extend port for a minimum of 30 seconds.

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

(j) Remove the pressure from the extend port.

(7) Remove the actuator from the holding fixture.

(8) Fill the unit with hydraulic fluid and install the shipping caps.

3. Fault Isolation

TROUBLE	PROBABLE CAUSE	CORRECTION
External leakage, Internal leakage	Seals (30, 35A, 20A, 25A), packings (45)	Replace parts as necessary.
Leakage around unions	Packings (80A, 90A)	Replace parts as necessary.
Velocity out of limits, or not smooth	Piston rod (50), barrel (115), bushing (15), rod seal gland (40), union assemblies (75, 85), seals (10, 20A, 25A, 45)	Replace parts as necessary.
	Unwanted matter in the cylinder	Disassemble and clean parts.

4. Fault Correction

A. Procedure

(1) Drain hydraulic fluid from unit.

(2) Replacement of the scraper (10), the seal (20A), the packing (25A).

(a) Extend the actuator.

(b) Remove the lockwire. Unscrew rod gland nut (5) from barrel (115). Remove the piston rod (50) from the barrel (115).

(c) Unscrew rod end (60) from piston rod (50). Remove the rod end and the lockwasher (55) from the piston rod (50).

(d) Pull out the scraper (10), the rod seal gland (40), the foot seal (20A) and the bushing (15) with the packing (25A), the backup rings (30) and the packing (35A).

(e) Replace parts as necessary.

(f) Install the rod seal gland (40), the seal (20A), the bushing (15), the scraper (10) on the piston rod (50). Install the nut (5), the lockwasher (55) and the rod end (60) on the piston rod (50). Push the piston rod (50) into the barrel (115).

(g) Install the nut (5) in the barrel (115) and install the lockwire. Do the test again to see if the problem was corrected.

(3) Replacement of the piston seal (45).

(a) Do steps 4.A.(2)(a) and (b) above.

(b) Replace the defective piston seal (45).

(c) Install the piston rod (50) in the barrel (115).

(d) Do step 4.A.(2)(g) above.

(4) Replacement of packings (80A, 90A).

(a) Remove the union (75) or the union assembly (85) as applicable.

(b) Remove the defective packing (80A or 90A).

(c) Install the union (75) or the union assembly (85).

(5) Replacement of the piston rod (50) or the barrel (115).

(a) Completely disassemble the unit (32-32-35/301). Replace defective parts.

(b) Assemble the unit (32-32-35/701). Do the test again.

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

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

2. Actuator Disassembly

   A. Special Tools

      NOTE: Equivalent equipment can be used.

      (1) Holding Fixture -- A32121 equipment

      (2) Rod End Adapters -- A32120-5, -3

      (3) Crowfoot Wrench -- A32120-15

   B. Part Replacement

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

      (1) Scraper (10)

      (2) Packings and O-rings (25A, 35A, 80A, 90A)

      (3) Backup rings (30)

      (4) Piston seal (45)

      (5) Foot seal (20A)

(6) Lockwasher (55)

(7) Strap (120)

C. Procedure

(1) Install the actuator assembly in the holding fixture.

(2) Remove the piston rod (50) and the attached items from the barrel (115):

(a) Remove the lockwire from the gland nut (5) and the barrel (115).

(b) With the crowfoot wrench, loosen the gland nut (5) until the rod seal gland (40), the bushing (15), and the piston rod (50) can move out of the barrel (115).

(3) Bend the flanges of the lockwasher (55) to release the rod end (60).

(4) Remove the rod end (60) from the piston rod (50).

(5) Remove the gland nut (5), the rod seal gland (40), and the bushing (15) from the piston rod (50).

(6) Remove the scraper (10) from the rod seal gland (40).

(7) Remove the foot seal (20A), the packings (25A, 35A), and the backup rings (30) from the rod seal gland (40).

(8) Remove the piston seal (45) from the piston rod (50).

(9) Remove the strap (120) and the nameplate (125) from the barrel (115).

(10) Remove the union (75) and the union assembly (85) from the barrel (115).

CAUTION: THE HALVES OF BEARINGS (65, 95) ARE A MATCHED SET AND MUST BE KEPT TOGETHER. DO NOT MIX THE BEARING SETS.

D. Remove bearings (65, 95) from rod end (60) and barrel (115).

CHECK

1. General

   A. This procedure contains the data necessary to find defects in the 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 subjects 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.

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

         (a) Rod End (60)

         (b) Piston Rod (50)

         (c) Barrel (115)

      (3) Do a penetrant check (SOPM 20-20-02) of this part:

         (a) Rod Gland Nut (5)

(b) Piston Rod Bushing (15)

(c) Rod Seal Gland (40)

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
273T6352	PISTON ROD	2-1
273T6353	ROD END	3-1
273T6354	BARREL ASSEMBLY	4-1, 4-2
BAC27TLG17	NAMEPLATE	5-1

2. Dimensioning Symbols

A. Standard True Position Dimensioning Symbols used in applicable repair procedures are shown in SOPM 20-00-00.

REFINISH OF OTHER PARTS - REPAIR 1-1

1. General

   A. This repair gives the data that is necessary to refinish the parts not given in the specified repairs.

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

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

2. Refinish of Other Parts

   A. General

      (1) Instructions for the repair of the parts shown in Table 601 are for the repair of the initial finish.

   B. Consumable Materials

      NOTE: Equivalent material can be used.

      (1) D00566 Lubricant -- BMS 3-8, Type 8 (SOPM 20-60-03)

   C. References

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

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

      (3) SOPM 20-41-01, Decoding Table for Boeing Finish Codes

      (4) SOPM 20-50-08, Application of Bonded Solid Film Lubricants

(5) SOPM 20-60-03, Lubricants

D. Procedure

IPL FIG. & ITEM	MATERIAL	FINISH
IPL Fig. 1		
Rod gland nut (5)	Ti-6Al-4V Alloy	Apply phosphate fluoride coating (F-14.881). Apply BMS 3-8 solid film lubricant (F-19.10) to the threads.
Bushing (15)	Al-Ni-Bronze AMS 4640	No finish (F-25.01).
Lockwasher (55)	304 CRES	Passivate (F-17.25).
Bearings (65, 95)	Al-Ni-Bronze	No finish (F-25.01).
Strap (120)	302 or 304 CRES	Passivate (F-17.25, which replaces F-17.09).
Rod seal gland (40)	Al-Ni-Bronze	No finish (F-25.01).

Refinish Details
Table 601

PISTON ROD - REPAIR 2-1

273T6352-1

1. General

A. This repair gives the data that is necessary to repair and refinish the piston rod (50).

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

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

D. General repair details:

(1) Shot peen: 0.017-0.046 shot size, 0.005-0.010A2 intensity, coverage 2.0

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

2. Piston Rod Repair

A. References

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

(2) SOPM 20-10-04, Grinding of Chrome Plated Parts

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

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

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

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

B. Procedure (Fig. 601)

(1) Machine as necessary, within repair limits, to remove defects.

(2) Break all sharp edges before you shot peen.

(3) Do a magnetic particle check as shown in SOPM 20-20-01, Class B before you shot peen.

(4) Shot peen the machine surface as shown in SOPM 20-10-03,intensity 0.007A, coverage 2.0.

(a) Obey the flagnotes 2, 3, and 8.

(5) Chrome plate (F-15.34) the area to 0.0030-0.0150 inches after grinding.

(a) Obey the flagnotes 6 and 7 in Fig. 601.

(6) If it is necessary, to meet chrome plate thickness requirements, nickel plate (F-15.33) the area before you chrome plate.

(a) You must keep 0.0030-0.0050 inches of chrome plate on top of the nickel plate, after grinding the chrome plate.

(7) Finish grind the piston rod (50) (SOPM 20-10-04) to design dimensions.

3. Piston Rod Refinish

A. References

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

(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 piston rod (50):

(a) Shot peen the machine surface as shown in SOPM 20-10-03.

1) Obey the flagnotes 2, 3, and 8.

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

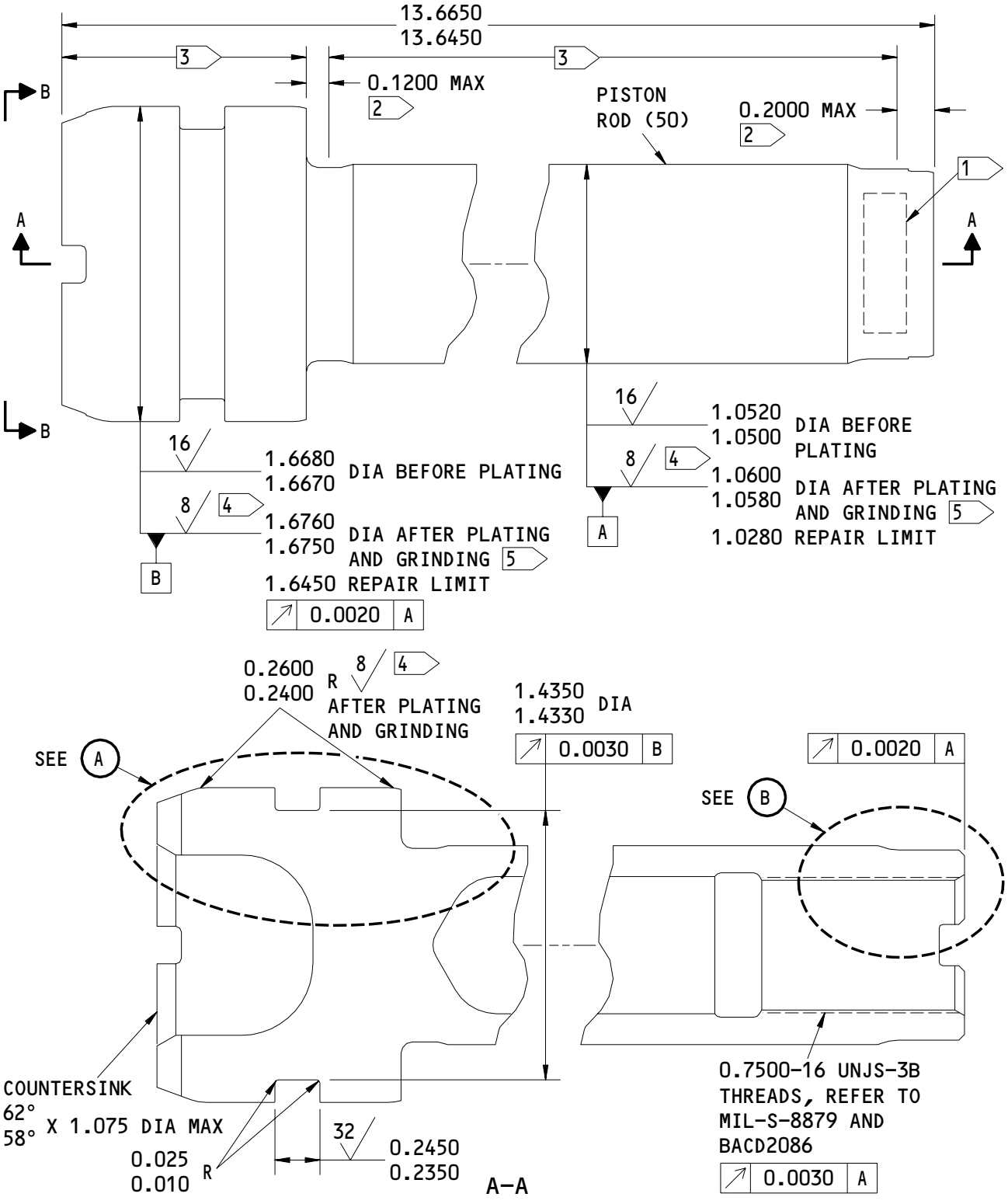
1) Final chrome plate thickness to be 0.003-0.005 inches.

2) Obey the flagnotes 5, 6 and 7 in Fig. 601.

(c) Glass blast or aluminum oxide blast (SOPM 20-30-03).

1) Do not blast the seal groove and the internal areas.

(d) Passivate (F-17.25).



273T6352-1
Piston Rod Repair
Figure 601 (Sheet 1)

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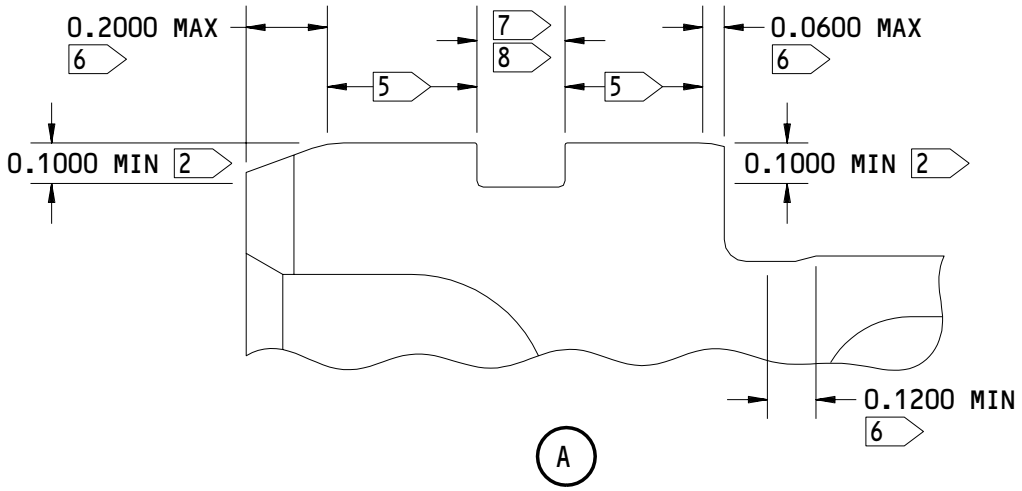
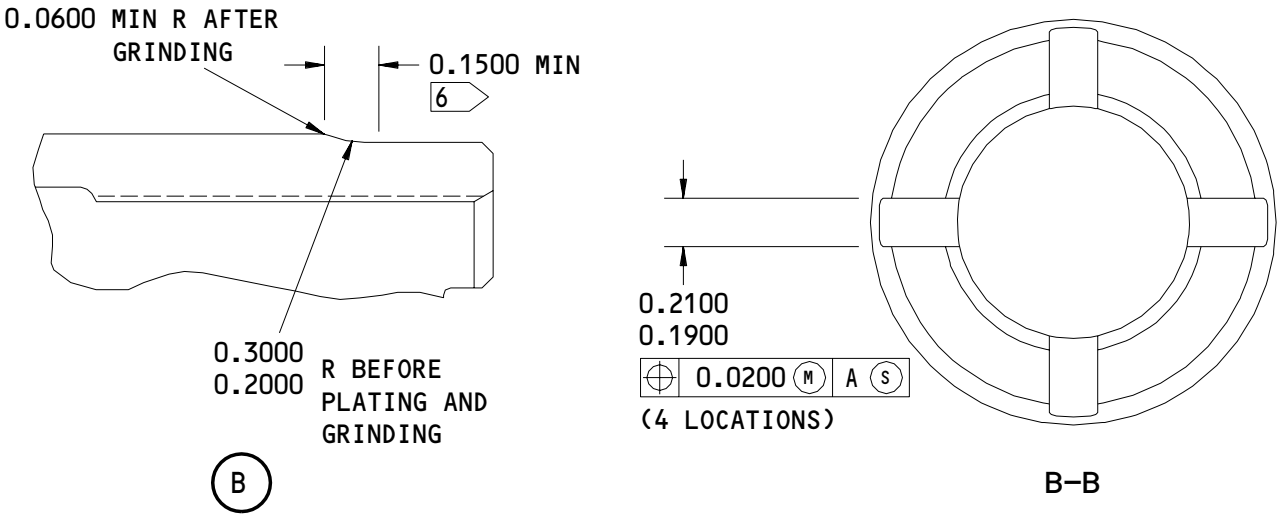




1 > PART MARK THIS AREA AS SHOWN IN SOPM 20-50-10

2 > SHOT PEEN RUNOUT AREA

3 > SHOT PEEN THIS AREA

4 > SURFACE FINISH CAN BE 8 TO 16 MICROINCHES

5 > AFTER SHOT PEENING, APPLY CHROME PLATE (F-15.34) TO THE SURFACES SHOWN. CHROME PLATE THICKNESS AFTER ALL FINISHING OPERATIONS IS 0.003-0.005 INCHES

6 > CHROME PLATE RUNOUT AREA

7 > NO CHROME PLATE ON THIS AREA

8 > NO SHOT PEEN IN THE SEAL GROOVE

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T6352-1
Piston Rod Repair
Figure 601 (Sheet 2)

K16482

ROD END - REPAIR 3-1

273T6353-1

1. General

A. This repair gives the data that is necessary to repair and refinish the rod end (60).

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

C. General repair details:

(1) Shot Peen: 170-460 shot size, 0.005-0.010A2 intensity, coverage 2.0

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

2. Rod End Repair

A. References

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

(2) SOPM 20-10-04, Grinding of Chrome Plated Parts

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

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

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

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

B. Procedure (Fig. 601)

(1) Machine as necessary, within repair limits, to remove defects.

(2) Break all sharp edges before you shot peen.

(3) Do a magnetic particle check as shown in SOPM 20-20-01, Class B before you shot peen.

(4) Shot peen the machine surface as shown in SOPM 20-10-03 , intensity 0.007A, coverage 2.0.

(a) Obey the flagnote 2 in Fig. 601.

(5) Chrome plate (F-15.34) the area to 0.0030-0.0150 inches after grinding.

(6) If it is necessary, to meet chrome plate thickness requirements, nickel plate (F-15.33) the area before you chrome plate.

(a) You must keep 0.0030-0.0050 inches of chrome plate on top of the nickel plate, after grinding the chrome plate.

(7) Finish grind the rod end (60) (SOPM 20-10-04) to design dimensions.

3. Rod End Refinish

A. References

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

(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 rod end (60):

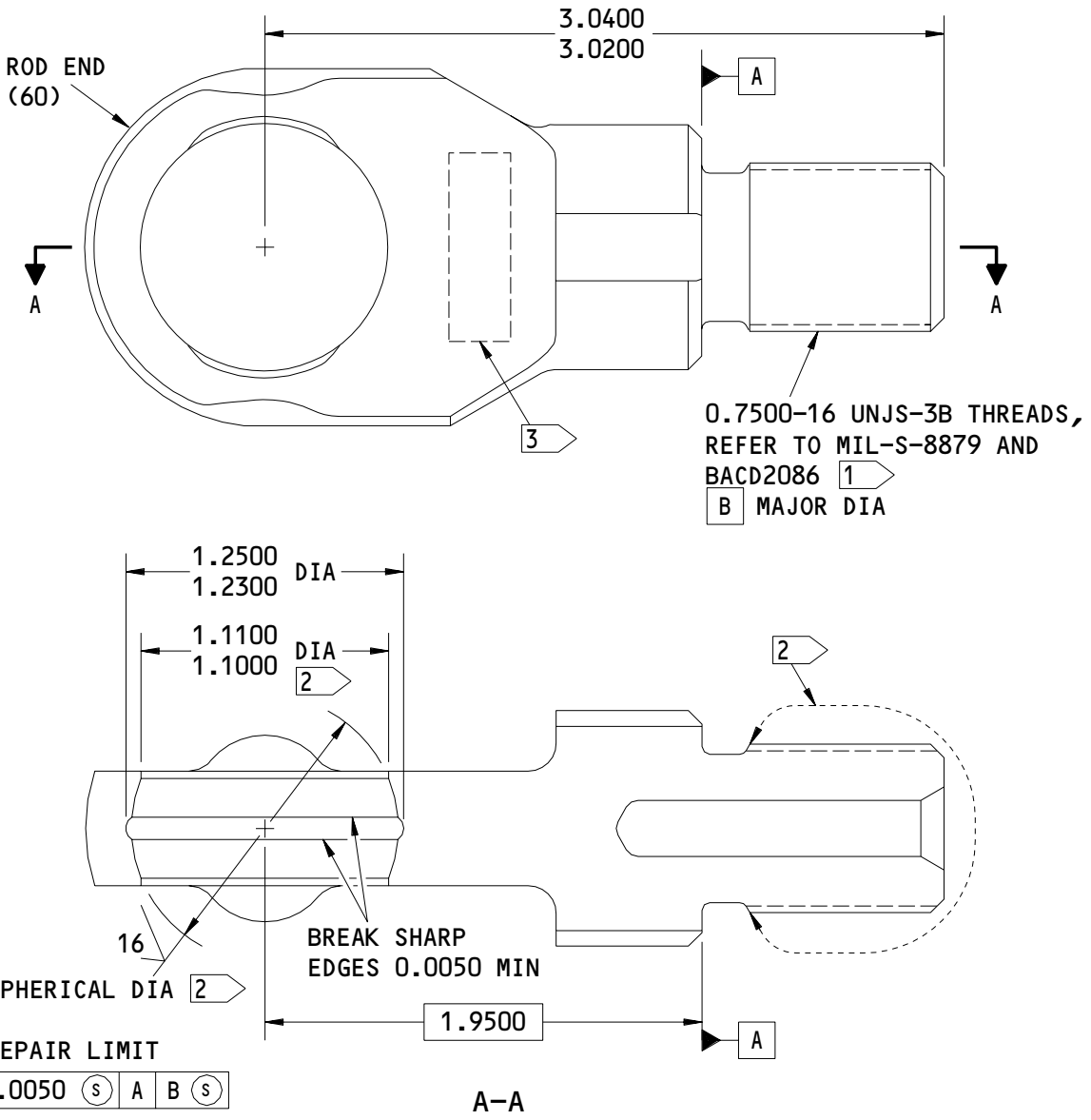
(a) Glass blast or aluminum oxide blast (SOPM 20-30-03).

1) Do not blast the threads or internal surfaces.

(b) Passivate (F-17.25).

(c) Apply BMS 3-8 solid film lubricant (F-19.10) to the area shown.

1) Obey the flagnote 1 in Fig. 601.



1 APPLY BMS 3-8 SOLID FILM LUBRICANT (F-19.10). APPLY ON ALL THE THREADS.

2 NO SHOT PEEN IS PERMITTED IN THIS AREA. THE SHOT PEEN RUNOUT TO NON-SHOT PEEN AREA IS 0.06 INCH MAX

3 PART MARK THIS AREA AS SHOWN IN SOPM 20-50-10

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T6353-1
Rod End Repair
Figure 601

K16594

BARREL ASSEMBLY - REPAIR 4-1

273T6354-1

1. General

   A. This repair gives the data that is necessary to replace the plug (105) and the pin (110) on the barrel assembly (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 item numbers.

2. Plug and Pin Replacement

   A. Consumable Materials

      (1) C00501 Clear Coat -- Type 41 (SOPM 20-60-02)

      (2) A00589 Sealant -- BMS 5-26 (SOPM 20-60-04)

   B. References

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

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

      (3) SOPM 20-50-04, Installation of Permanent Pins and Plugs in Drill Passages

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

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

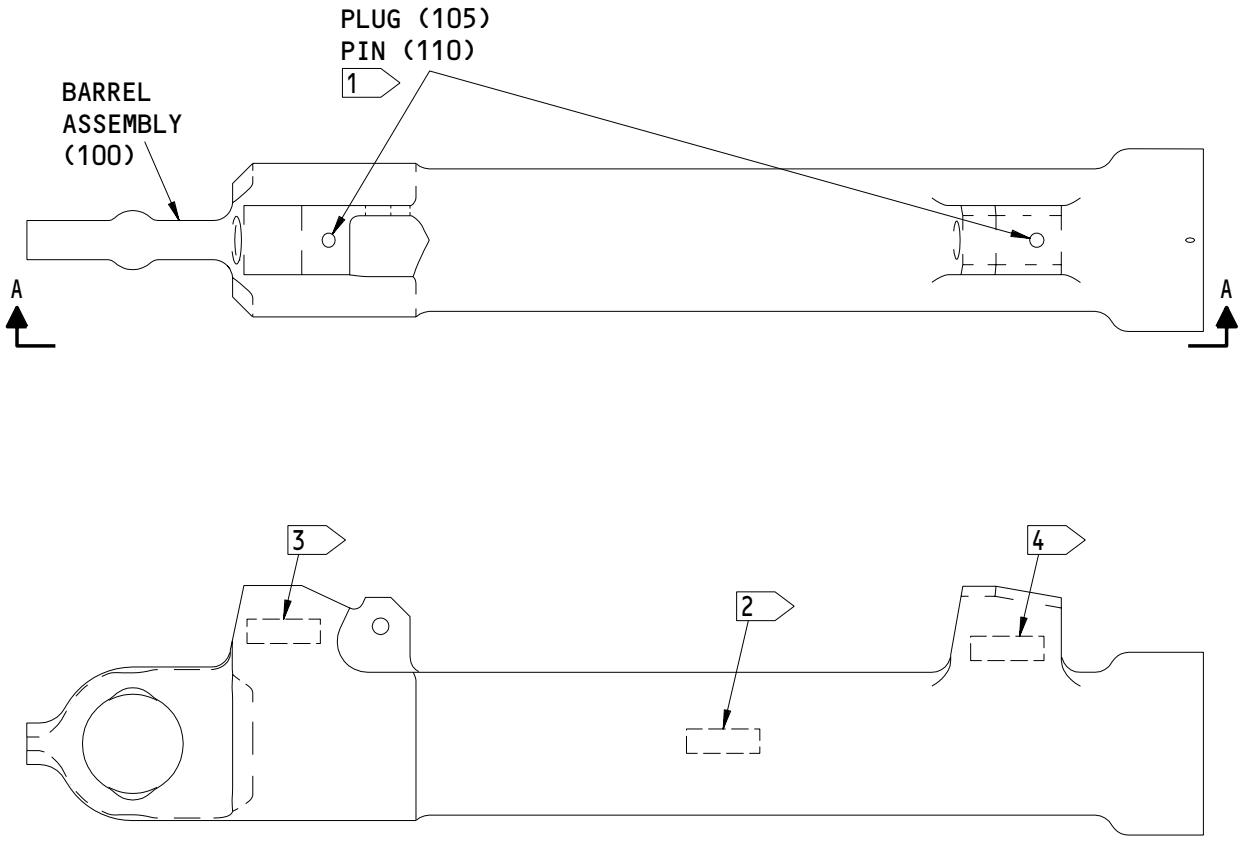
   C. Procedure (Fig. 601)

      (1) Remove the pin (110) and the plug (105).

      (2) Install a replacement plug and pin as shown in SOPM 20-50-04.

      (3) Fill the hole on top of the plug with BMS 5-26 sealant. Let the sealant fully dry.

      (4) Apply Type 41 clear coating (F-21.34) on the sealant.



A–A

1 INSTALL THE PLUG (105) AND PIN (110) AS SHOWN IN SOPM 20-50-40. THEN FILL THE HOLE WITH BMS 5-26 SEALANT. THEN APPLY A LAYER OF BAC5710 TYPE 41 SEALANT TO THE SURFACE OF THE SEALANT

2 PART MARK THE AREA SHOWN

3 IDENTIFY THE PORT IN THE AREA SHOWN TO "EXTEND (LOCK)"

4 IDENTIFY THE PORT IN THE AREA SHOWN TO "RETRACT (UNLOCK)"

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T6354-1
Barrel Assembly Repair
Figure 601

K17159

BARREL - REPAIR 4-2

273T6354-2

1. General

A. This repair gives the data that is necessary to repair and refinish the barrel (115).

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

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

D. General repair details:

(1) Shot Peen: 200-240 shot size 0.005-0.010A2 intensity, coverage 2.0

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

2. Barrel Repair

A. References

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

(2) SOPM 20-10-04, Grinding of Chrome Plated Parts

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

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

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

B. Procedure (Fig. 601)

(1) Machine as necessary, within repair limits, to remove defects.

(2) Break all sharp edges before you shot peen.

(3) Do a magnetic particle check as shown in SOPM 20-20-01 Class B before you shot peen.

(4) Shot peen the machine surface as shown in SOPM 20-10-03, intensity 0.007A, coverage 2.0.

(5) Chrome plate (F-15.34) the area to 0.0030-0.0150 inch after grinding.

(6) If it is necessary, to meet chrome plate thickness requirements, nickel plate (F-15.33) the area before you chrome plate.

(a) You must keep 0.00030-0.0050 inch of chrome plate on top of the nickel plate, after grinding the chrome plate.

(7) Finish grind the barrel (115) (SOPM 20-10-04) to design dimensions.

3. Barrel Refinish

A. References

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

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

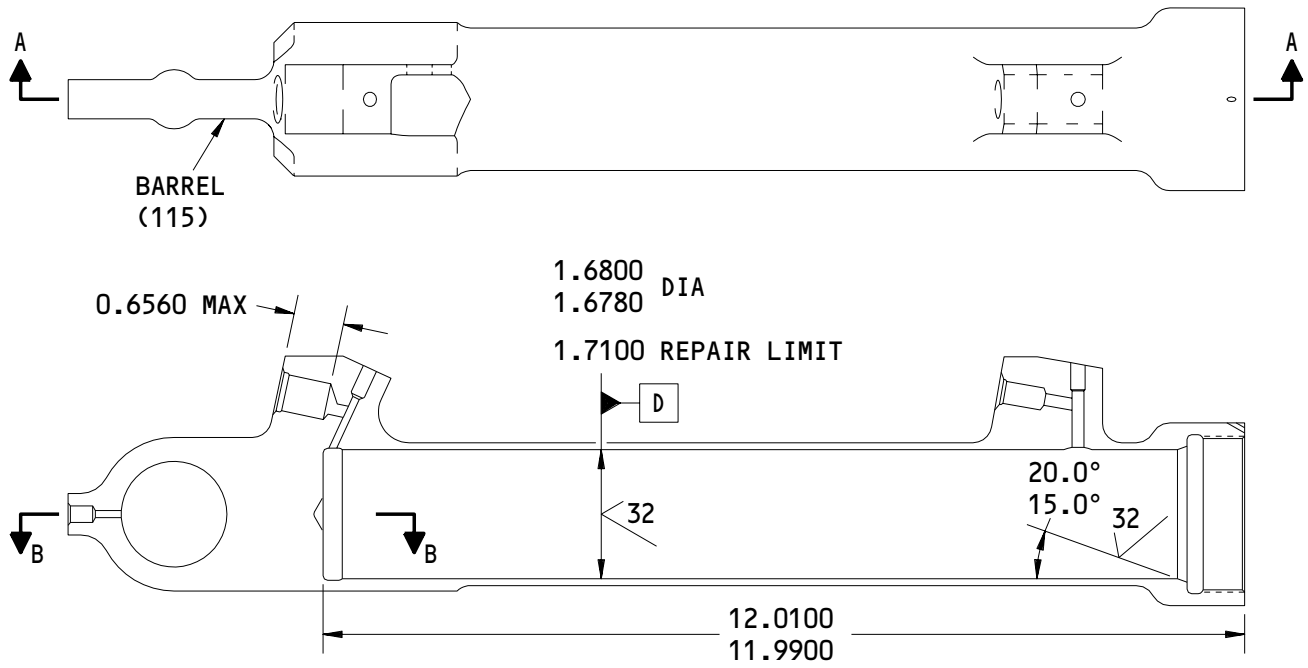
(3) SOPM 20-41-01, Decoding of Boeing Finish Codes

B. Procedure (Fig. 601)

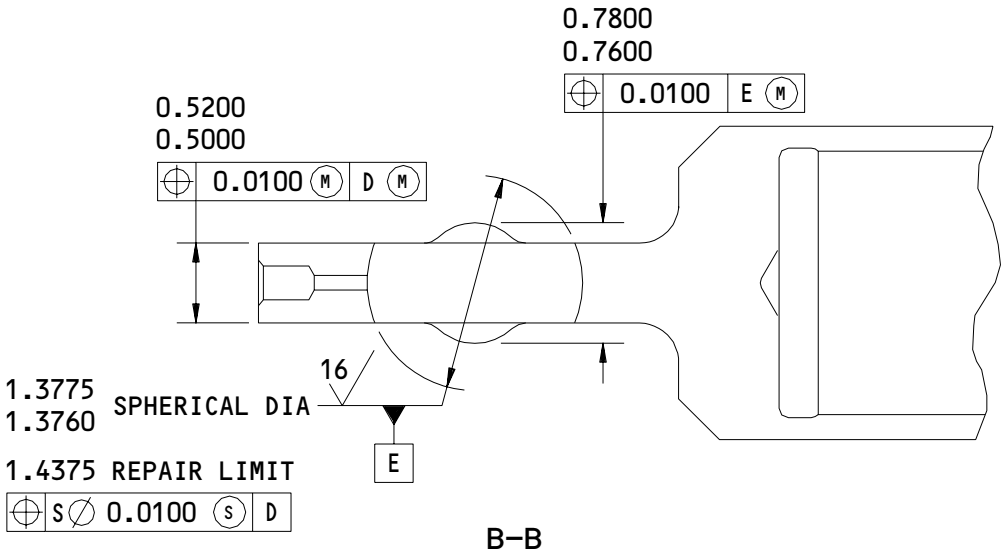
(1) Put a finish on the barrel (115):

(a) Glass bead or aluminum oxide blast (SOPM 20-30-03).

(b) Passivate (F-17.25) all over.



A–A



B–B

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T6354-2
Barrel Repair
Figure 601

K17285

NAMEPLATE INSTALLATION - REPAIR 5-1

BAC27TLG17

1. General

A. This repair has instructions for the replacement of the nameplate (125) and the strap (120).

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

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

2. Nameplate Replacement (Fig. 601)

A. Consumable Materials

(1) A00779 Sealant -- BMS 5-26 (SOPM 20-60-04)

(2) A00323 Adhesive -- Type 54 (SOPM 20-50-12)

(3) B00571 Coating -- Type 41 (SOPM 20-00-02)

B. References

(1) SOPM 20-44-01, Application of Special Purpose Coatings and Finishes

(2) SOPM 20-50-21, How to Install Nameplate Straps and Seals

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

C. Procedure

(1) Install a replacement nameplate with a new strap and Type 54 adhesive as shown in SOPM 20-50-21.

(2) Seal the edges of the nameplate and strap with BMS 5-26 sealant. Topcoat sealant with Type 41 coating (F-21.34).

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 details of the standard procedures.

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

2. Actuator Assembly

   A. Special Tools and Equipment

      NOTE: Equivalent equipment can be used.

      (1) Holding Fixture -- A32121 equipment

      (2) Rod End Adapters -- A32120-5, -9

      (3) Crowfoot Wrench -- A32120-15

   B. Consumable Materials

      NOTE: Equivalent material can be used.

      (1) D00633 Grease -- BMS 3-33 (SOPM 20-60-03)

      (2) D00183 Fluid, Hydraulic -- BMS 3-11, Type 4 (SOPM 20-60-03)

      (3) G01912 Lockwire -- MS20995NC32 (SOPM 20-60-04)

      (4) D00571 Grease -- Batco 8401 (SOPM 20-60-03)

      (5) A00589 Sealant -- BMS 5-26 (SOPM 20-60-04)

(6) C00501 Protective Finish -- Type 41 (SOPM 20-60-02)

(7) A00323 Adhesive -- Type 54 (SOPM 20-50-12)

C. References

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

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

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

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

(5) SOPM 20-50-12, Application of Adhesives

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

(7) SOPM 20-60-03, Lubricants

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

D. Procedure (Fig. 701)

(1) Install the piston seal (45) on the piston rod (50):

(a) Lubricate the piston seal (45) with hydraulic fluid.

(b) Install the piston seal (45) on the piston rod (50).

(2) Install the backup rings (30) and the packing (35A) on the gland - rod seal (40):

(a) Lubricate the backup rings (30) and the packing (35A) with hydraulic fluid.

(b) Install the backup rings and the packing on the rod seal gland.

(3) Install the rod seal gland (40) on the piston rod (50).

(4) Install the packing (25A) and the foot seal (20A) on the piston rod (50):

(a) Lubricate the packing (25) and the foot seal (20) with hydraulic fluid.

(b) Install the packing and the foot seal on the piston rod.

(5) Install the piston rod bushing (15) on the piston rod (50).

(6) Install the scraper (10) on the piston rod (50):

(a) Lubricate the scraper (10) with hydraulic fluid.

(b) Install the scraper on the piston rod.

(7) Install the rod gland nut (5) on the piston rod (50).

(8) Install the rod end (60) on the piston rod (50):

(a) Lubricate the threads of the rod end (60) with Batco 8401 grease. Do not apply the grease on the surfaces that will touch the sealant as shown in Fig. 701.

(b) Install the lockwasher (55) on the rod end (60).

(c) Install the rod end (60) on the piston rod (50) hand tight. Align the keys on the washer with the slots on the piston rod.

(d) Tighten the rod end to 600-650 pound-inches above drive torque.

(e) With a punch or equivalent tool, bend the flange of the cup lockwasher into the slots in the rod end.

(9) Install the piston rod and the attached parts in the barrel (115).

(a) Install the barrel (115) in the holding fixture.

(b) Lubricate the threads of the rod gland nut (5) with Batco 8401 grease. Do not apply the grease on the surfaces that will touch the sealant as shown in Fig. 701.

(c) Carefully move the piston rod and the attached parts into the barrel.

(d) Make sure the flange of the piston rod bushing (15), the foot seal (20A), the packing (25A), the rod seal gland (40), and the scraper (10) are fully engaged together in the barrel.

(e) Turn rod gland nut (5) into the barrel (115).

(f) Torque the rod gland nut to 300-350 pound-inches with the crowfoot wrench.

(g) Remove the barrel from the holding fixture.

(10) Install the bearing (95) in the barrel (115):

CAUTION: KEEP BEARING (95) HALVES TOGETHER. DO NOT MIX THE BEARING (95) HALVES WITH THE BEARING (65) HALVES. BEARING HALVES ARE A MATCHED SET.

(a) Apply a layer of BMS 3-33 grease to the OD of the bearing (95).

(b) Apply a layer of BMS 3-33 grease to the bearing hole ID in the barrel (115).

CAUTION: INSTALL THE BEARING (95) WITH THE INDEX MARKS ALIGNED.

(c) Align the index marks of the bearing (95), then install the bearing in the barrel (115).

(11) Install the bearing (65) in the rod end (60):

CAUTION: KEEP BEARING (65) HALVES TOGETHER. DO NOT MIX THE BEARING (95) HALVES WITH THE BEARING (65) HALVES. BEARING HALVES ARE A MATCHED SET.

(a) Apply a layer of BMS 3-33 grease to the OD of the bearing (65).

(b) Apply a layer of BMS 3-33 grease to the bearing hole ID in the rod end (60).

CAUTION: INSTALL THE BEARING (65) WITH THE INDEX MARKS ALIGNED.

(c) Align the index marks of the bearing (65), then install the bearing in the rod end (60).

(12) Install the lubrication fittings (70) in the rod end (60) and the barrel (115). Tighten the lubrication fittings to 15-20 pound-inches.

(13) Install the union (75) and the union assembly (85).

(a) Lubricate the packings (80A, 90A) with hydraulic fluid.

(b) Install the packings on the union and the union assembly.

(c) Install the union (75) and the union assembly (85) in the hydraulic ports of the barrel (115):

(14) If necessary, install the nameplate and the strap (32-32-35/601, REPAIR 6-1).

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

(16) After assembly, apply BMS 3-33 grease to the spherical surfaces of bearings (65, 95) through the lubrication fittings (70).

(17) Lockwire the rod gland nut (5) to the barrel (115) by the double-twist method (SOPM 20-50-02).

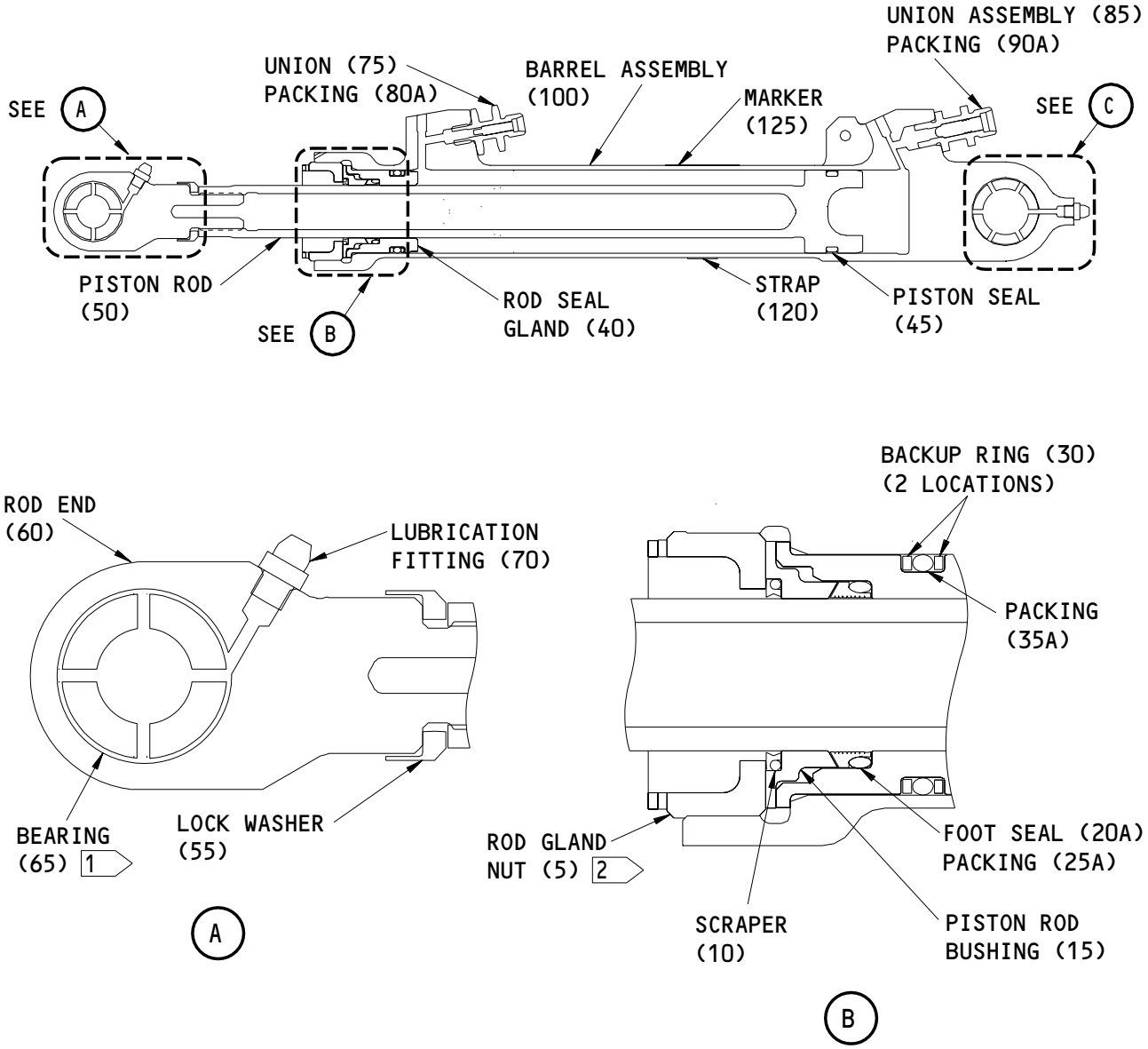
3. Storage

A. Procedure

(1) Partially fill the unit with hydraulic fluid.

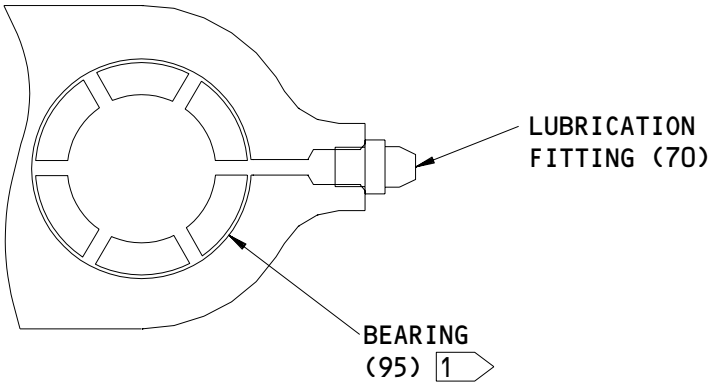
(2) Seal ports with BMS 3-11 resistant plugs or caps.

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



Assembly Details
Figure 701 (Sheet 1)

K19141

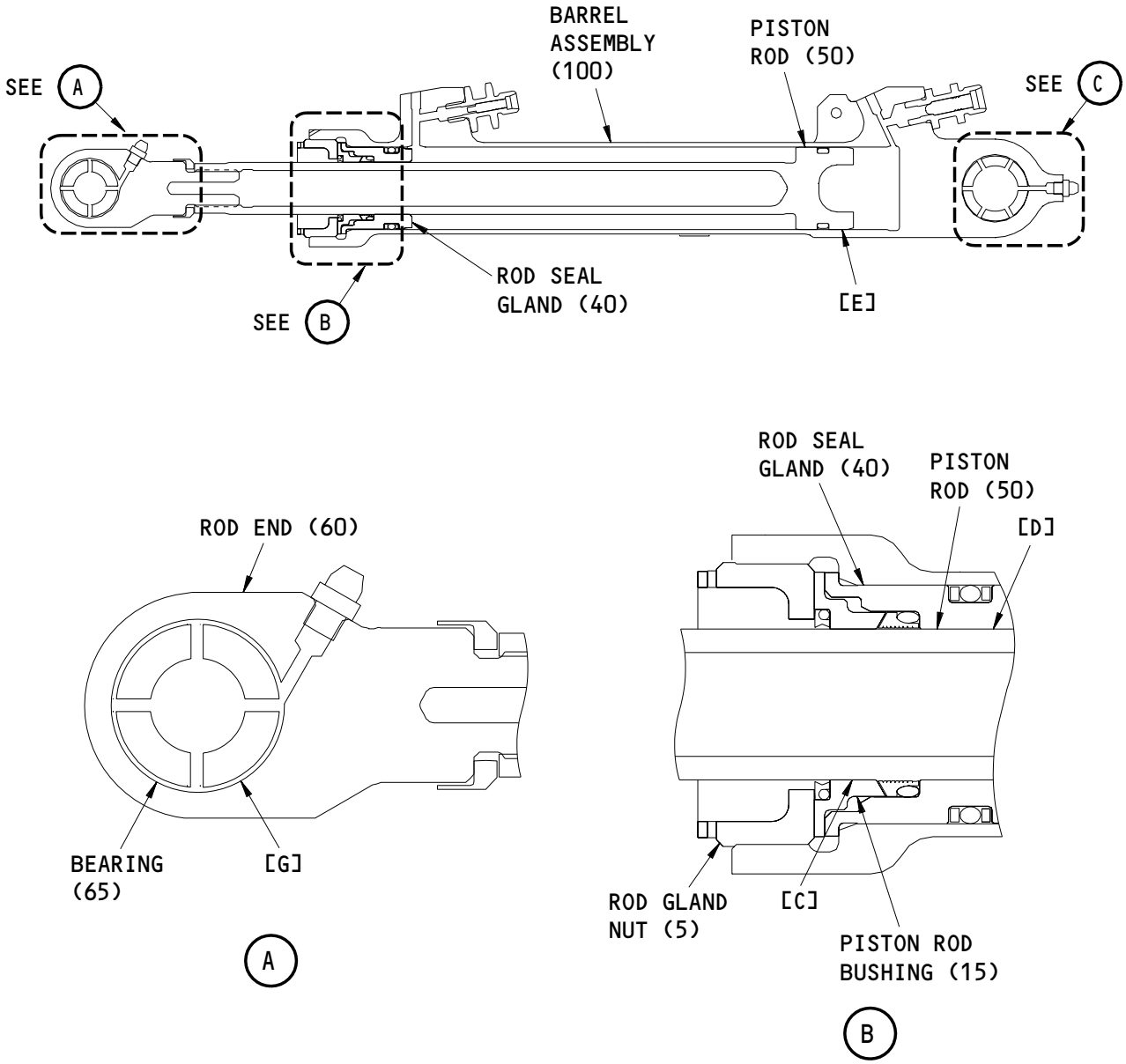


1 APPLY BMS 3-33 GREASE TO THE INTERNAL AND EXTERNAL SURFACES OF THE BEARING

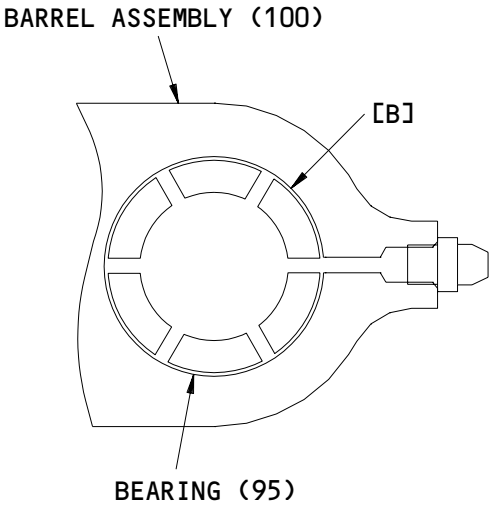
2 APPLY BATCO 8401 GREASE TO THE EXTERNAL THREADS BEFORE ASSEMBLY

ITEM NUMBERS REFER TO IPL FIG. 1

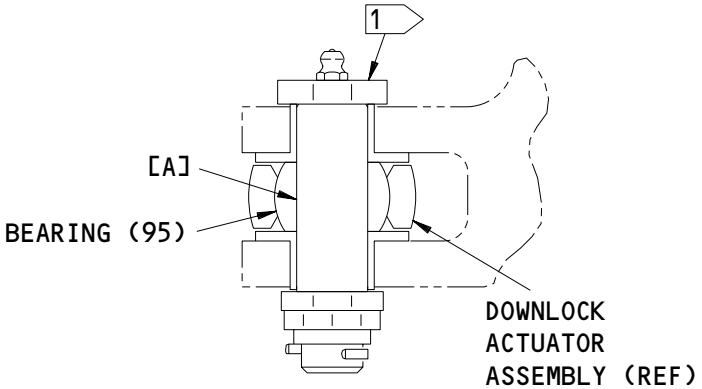
Assembly Details
Figure 701 (Sheet 2)

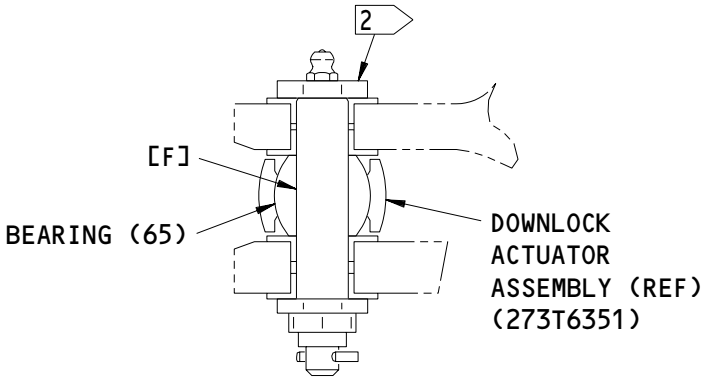


Fits and Clearances
Figure 801 (Sheet 1)



C





ITEM NUMBERS REFER TO IPL FIG. 1

Fits and Clearances
Figure 801 (Sheet 2)

K25229

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 95	0.8750	0.8758	0.0010	0.0028		0.8787	0.0047
	OD 1	0.8730	0.8740			0.8711		
[B]	ID 100	1.3760	1.3775	0.0010	0.0030		1.3785	0.0053
	OD 95	1.3745	1.3750			1.3732		
[C]	ID 15	1.0620	1.0630	0.0020	0.0050		1.0640	0.0071
	OD 50	1.0580	1.0600			1.0569		
[D]	ID 40	1.0620	1.0630	0.0020	0.0050		1.0640	0.0071
	OD 50	1.0580	1.0600			1.0569		
[E]	ID 100	1.6780	1.6800	0.0020	0.0050		1.6817	0.0075
	OD 50	1.6750	1.6760			1.6742		
[F]	ID 65	0.6250	0.6258	0.0010	0.0028		0.6284	0.0044
	OD 2	0.6230	0.6240			0.6214		
[G]	ID 60	1.1910	1.1925	0.0010	0.0030		1.1935	0.0052
	OD 65	1.1895	1.1900			1.1883		

* ALL DIMENSIONS ARE IN INCHES

1 INSTALLATION PIN 161T6171-2

2 INSTALLATION PIN 161T6171-1

Fits and Clearances
Figure 801 (Sheet 3)

K25240

REF IPL		NAME	TORQUE*	
FIG. NO.	ITEM NO.		POUND-INCHES	POUND-FEET
1	5	Gland Nut	300 - 350	
1	60	Rod End	600 - 650	
1	70	Lubrication Fitting	15 - 20	

* REFER TO SOPM 20-50-01 FOR TORQUE VALUES OF STANDARD FASTENERS

Torque Table
Figure 802

K25242

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 Equipment

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

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

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

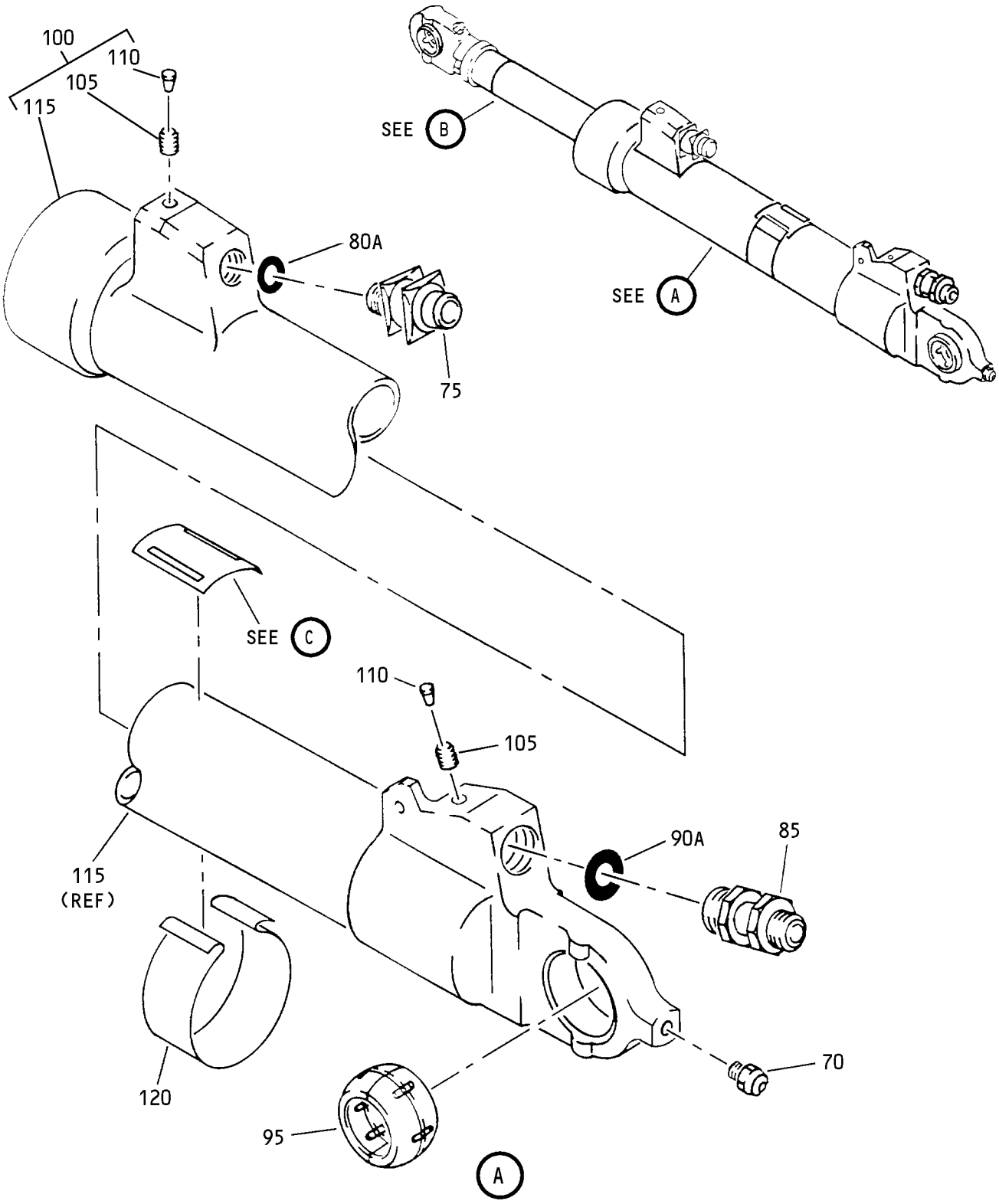
92555 LEE COMPANY
2 PETTIPAUG ROAD PO BOX 424
WESTBROOK, CONNECTICUT 06498-1543

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

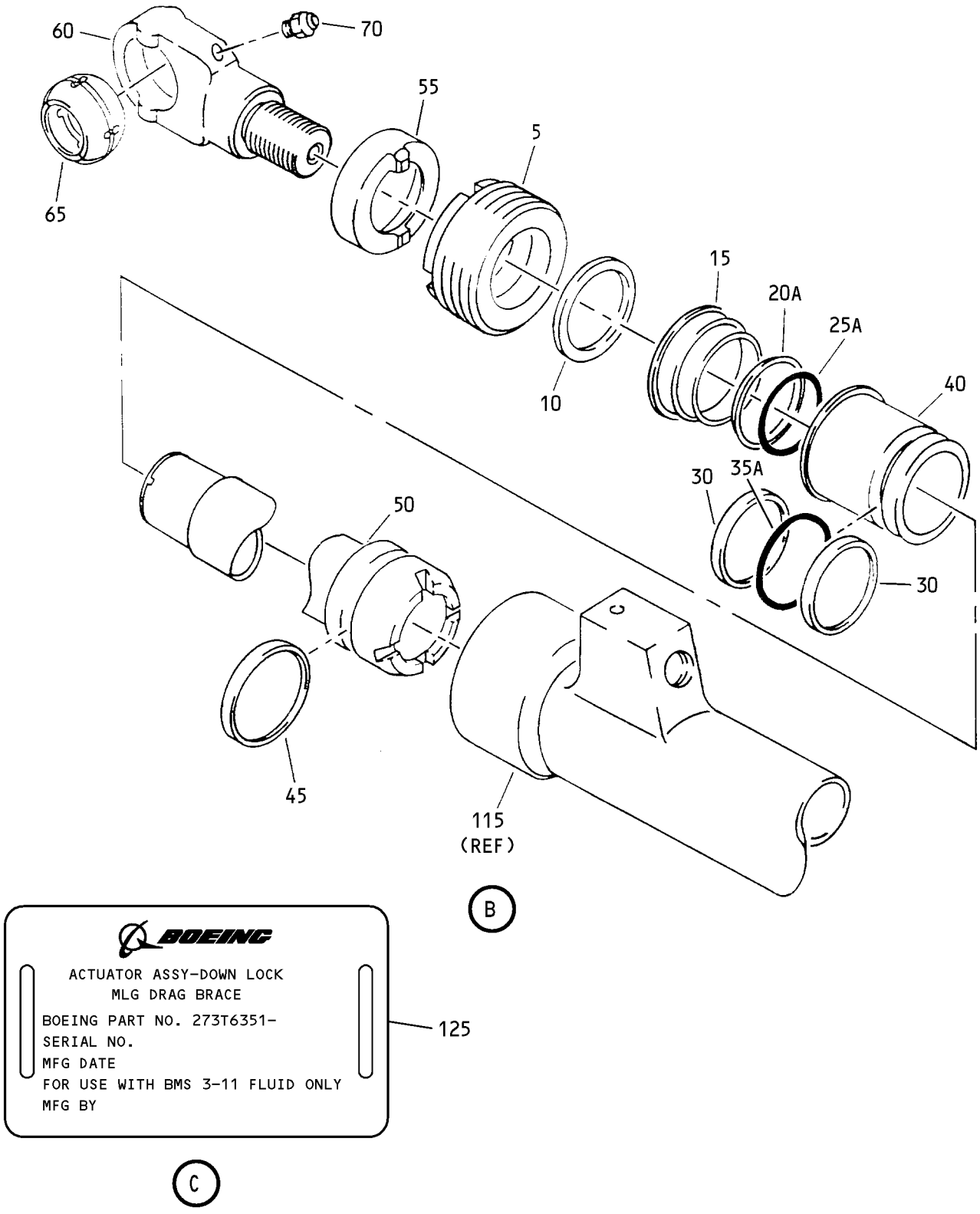
99240 CRISSAIR, INCORPORATED
38905 10TH STREET EAST
PALMDALE, CALIFORNIA 93550-3415

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
BACP20AX15		1	105	2
BACP20AX15P		1	110	2
BACR12BM221		1	30	2
BAC27TLG17		1	125	1
C11236-221B		1	30	2
MS15004-1		1	70	2
NAS1611-215A		1	25A	1
NAS1611-221A		1	35A	1
NAS1612-3A		1	80A	1
NAS1612-5A		1	90A	1
PLGA1876020		1	110	2
PLGA1877020		1	105	2
RMR12BM221		1	30	2
STF800-221		1	30	2
S30294-221-1		1	30	2
S33121-215-99		1	20A	1
S33865-10H99H		1	10	1
S34721-221H99N		1	45	1
TF450-221A		1	30	2
2100-221		1	30	2
273T0050-4		1	120	1
273T6351-1		1	1A	RF
273T6352-1		1	50	1
273T6353-1		1	60	1
273T6354-1		1	100	1
273T6354-2		1	115	1
293W2510-1		1	15	1
293W2513-1		1	5	1
293W2515-1		1	55	1
293W2516-1		1	40	1
293W2521-18		1	65	1
293W2521-6		1	95	1
6F4080		1	85	1
6F4082		1	75	1



Main Landing Gear Drag Brace – Down Lock Actuator Assembly
Figure 1 (Sheet 1)

K17384



Main Landing Gear Drag Brace - Down Lock Actuator Assembly
Figure 1 (Sheet 2)

K17392

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1A	273T6351-1		ACTUATOR ASSY-DOWN LOCK MLG DRAG BRACE		RF
5	293W2513-1		.NUT-ROD GLAND		1
10	S33865-10H99H		.SCRAPPER- (V97820)		1
15	293W2510-1		.BUSHING-PISTON ROD		1
20	S33121-215H99		DELETED		
20A	S33121-215-99		.SEAL-FOOT (V97820)		1
25	NAS1611-215		DELETED		
25A	NAS1611-215A		.PACKING		1
30	C11236-221B		.RING-BACK UP (V26879) (SPEC BACR12BM221) (OPT RMR12BM221 (V94878)) (OPT STF800-221 (V02107)) (OPT S30294-221-1 (V97820)) (OPT TF450-221A (V07128)) (OPT 2100-221 (V26303))		2
35	NAS1611-221		DELETED		
35A	NAS1611-221A		.PACKING		1
40	293W2516-1		.GLAND-ROD SEAL		1
45	S34721-221H99N		.SEAL-PISTON (V97820)		1
50	273T6352-1		.ROD-PISTON		1
55	293W2515-1		.WASHER-LOCK		1
60	273T6353-1		.ROD END		1
65	293W2521-18		.BEARING		1
70	MS15004-1		.FITTING		2
75	6F4082		.UNION- (V99240)		1
80	NAS1612-3		DELETED		
80A	NAS1612-3A		.PACKING		1
85	6F4080		.UNION ASSY- (V99240)		1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
90	NAS1612-5		DELETED		
90A	NAS1612-5A		.PACKING		1
95	293W2521-6		.BEARING		1
100	273T6354-1		.BARREL ASSY		1
105	PLGA1877020		..PLUG- (V92555) (SPEC BACP20AX15)		2
110	PLGA1876020		..PIN- (V92555) (SPEC BACP20AX15P)		2
115	273T6354-2		..BARREL		1
120	273T0050-4		.STRAP		1
125	BAC27TLG17		.MARKER-STAINLESS STEEL		1

- Item Not Illustrated