TO: ALL HOLDERS OF MAIN LANDING GEAR RETRACT ACTUATOR ASSEMBLY COMPONENT MAINTENANCE MANUAL 32-32-64

REVISION NO. 2 DATED JUL 01/01

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
101-106 301-304 701-703,705	Added clarifications and updated callouts.
101 301 701 901	Identified the tools.

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BOEING

COMPONENT
MAINTENANCE MANUAL

MAIN LANDING GEAR RETRACT ACTUATOR ASSEMBLY

PART NUMBER 273T1151-1,-2

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

K10792

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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

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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

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PAGE	DATE	CODE
32-32-64		
TITLE PAGE		
1	JUL 01/00	01.1
2	BLANK	
REVISION RECORD		
1	JUL 01/99	01
2	BLANK	
TR & SB RECORD		
1	JUL 01/00	01.1
2	BLANK	
LIST OF EFFECTIVE PAGES		
*1	JUL 01/01	01
THRU LAST PAGE		
CONTENTS		
1	JUL 01/99	01
2	BLANK	
INTRODUCTION		
1	JUL 01/99	01
2	BLANK	
DESCRIPTION & OPERATION		
1	JUL 01/99	01
2	JUL 01/99	01
TESTING & FAULT ISOLATION		
*101	JUL 01/01	01.1
*102	JUL 01/01	01.1
*103	JUL 01/01	01.1
*104	JUL 01/01	01.1
*105	JUL 01/01	01.1
*106	JUL 01/01	01.1
107	JUL 01/00	01.1
108	JUL 01/00	01.1

PAGE	DATE	CODE
DISASSEMBLY		
*301	JUL 01/01	01.1
*302	JUL 01/01	01.1
*303	JUL 01/01	01.1
*304	JUL 01/01	01.1
CHECK		
501	JUL 01/00	01.1
502	JUL 01/00	01.1
REPAIR-GENERAL		
601	JUL 01/00	01.1
602	BLANK	
REPAIR 1-1		
601	JUL 01/00	01.1
602	JUL 01/00	01.1
REPAIR 2-1		
601	JUL 01/00	01.1
602	JUL 01/99	01
603	JUL 01/99	01
604	BLANK	
REPAIR 3-1		
601	JUL 01/99	01
602	JUL 01/99	01
603	JUL 01/99	01
604	BLANK	
REPAIR 3-2		
601	JUL 01/99	01
602	JUL 01/99	01
603	JUL 01/99	01
604	JUL 01/99	01
REPAIR 4-1		
601	JUL 01/00	01.1
602	JUL 01/00	01.1
603	JUL 01/00	01.1
604	BLANK	

* = REVISED, ADDED OR DELETED

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PAGE	DATE	CODE
REPAIR 5-1		
601	JUL 01/99	01
602	JUL 01/99	01
603	JUL 01/99	01
604	JUL 01/99	01
605	JUL 01/99	01
606	JUL 01/99	01
REPAIR 6-1		
601	JUL 01/99	01
602	JUL 01/99	01
603	JUL 01/99	01
604	JUL 01/99	01
REPAIR 7-1		
601	JUL 01/00	01.1
602	JUL 01/00	01.1
REPAIR 8-1		
601	JUL 01/00	01.1
602	BLANK	
ASSEMBLY		
*701	JUL 01/01	01.1
*702	JUL 01/01	01.1
*703	JUL 01/01	01.1
704	JUL 01/00	01.1
*705	JUL 01/01	01.1
706	JUL 01/00	01.1
707	JUL 01/00	01.101
708	JUL 01/00	01.101
709	JUL 01/00	01.101
710	BLANK	
FITS AND CLEARANCES		
801	JUL 01/99	01
802	JUL 01/99	01
803	JUL 01/99	01
804	JUL 01/00	01.1

PAGE	DATE	CODE
SPECIAL TOOLS		
*901	JUL 01/01	01.1
902	BLANK	
ILLUSTRATED PARTS LIST		
1001	JUL 01/99	01
1002	JUL 01/00	01.1
1003	JUL 01/00	01.1
1004	JUL 01/00	01.1
1005	BLANK	
1006	JUL 01/99	01
1007	JUL 01/99	01
1008	JUL 01/99	01
1009	JUL 01/99	01
1010	JUL 01/99	01
1011	JUL 01/99	01
1012	JUL 01/99	01
1013	JUL 01/00	01.1
1014	JUL 01/00	01.1

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TABLE OF CONTENTS

*[1] Special instructions are not necessary. Use standard industry procedures.

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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.

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MAIN LANDING GEAR RETRACT ACTUATOR ASSEMBLY

DESCRIPTION AND OPERATION

1. Description

   A. The main landing gear (MLG) retract actuator assembly has a barrel, a piston rod, a rod end, and a head end assembly.

   B. The rod end has a spherical bearing. It is connected to the MLG buildup assembly.

   C. The head end assembly has four bushings. It is connected to the wing MLG support installation.

2. Operation

   A. The MLG retract actuator assembly is operated hydraulically. It is used to retract and extend the main landing gear.

   B. When hydraulic pressure is applied to the RETURN port, the piston rod extends and the MLG is extended.

   C. When hydraulic pressure is applied to the UP port, the piston rod retracts and the MLG is retracted.

3. Leading Particulars (Approximate)

   A. Length from end to end

      -- 77.5 inches (extended)
      -- 50.8 inches (retracted)

   B. Width -- 9 inches

   C. Weight -- 187 pounds

   D. Fluid (operate) -- BMS 3-11 Hydraulic Fluid

   E. Pressure (operate) -- 3000-3100 psi

   F. Pressure (proof) -- 4500-4600 psi

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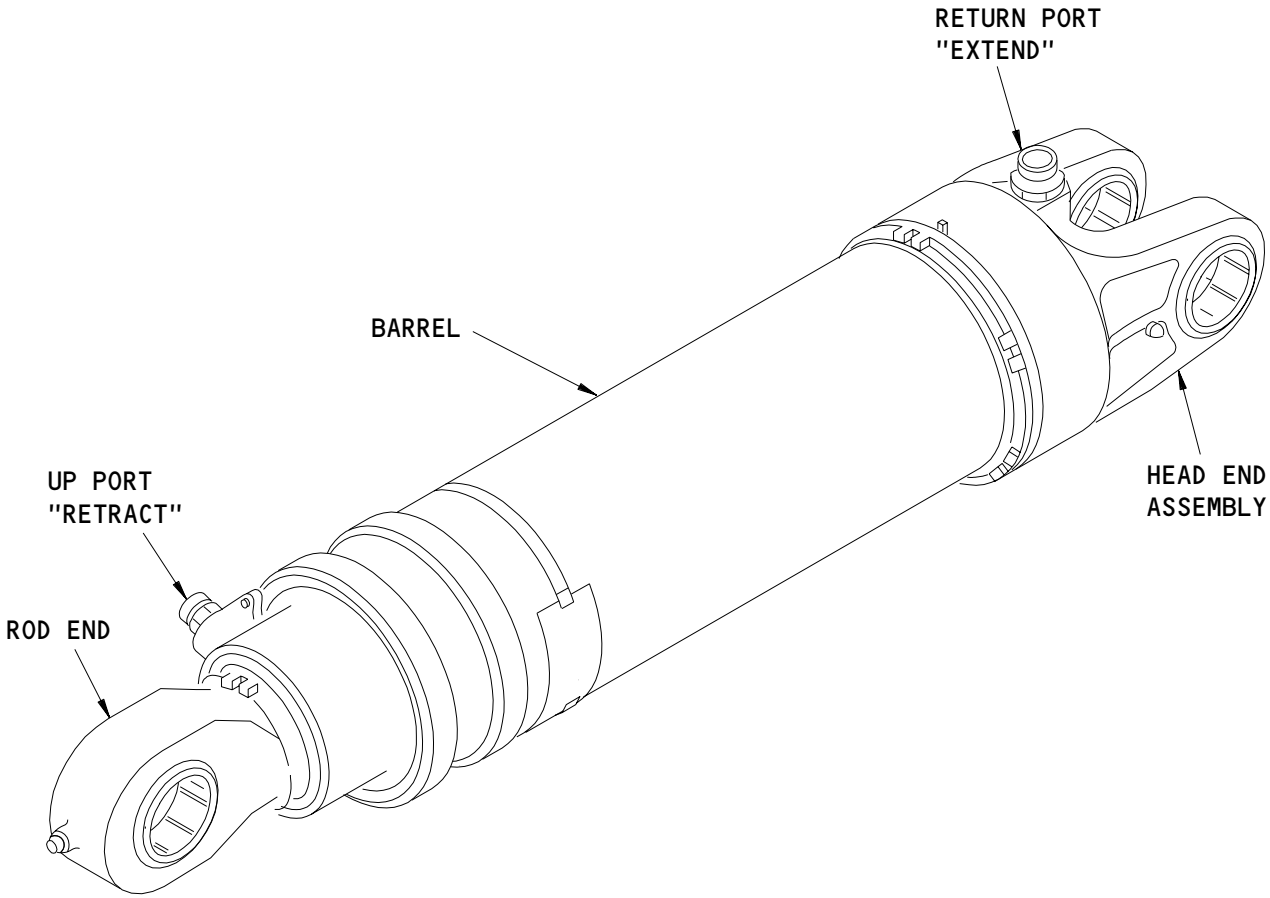

Main Landing Gear Retract Actuator Assembly
Figure 1

K11297

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TESTING AND FAULT ISOLATION

1. General

A. This procedure has the data necessary to do a test of the unit after an overhaul or for 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. MLG Retract Actuator Assembly Test

A. General

(1) The fully extended position is 68.115-68.369 inches.
The fully retracted position is 44.550-44.650 inches.
The nominal stroke length is 23.642 inches.

NOTE: The dimensions are measured from the centerlines of the spherical bearing (60) and bushings (155).

B. Special Tools and Equipment

NOTE: Equivalent tool/equipment can be used.

(1) Fixture Equipment -- A32122-1

C. Standard Tools and Equipment

NOTE: Equivalent equipment can be used.

(1) A hydraulic test stand with these requirement:

(a) Can operate in a range of 0-4600 psi.

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(b) Can operate with BMS 3-11 type 4 hydraulic fluid.

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

(d) The temperature of the hydraulic fluid must be 60-120 degrees F.

D. Consumable Material

(1) D00153 Fluid-- BMS 3-11, type 4, Hydraulic (SOPM 20-60-03)

E. References

(1) 32-32-64/301, Disassembly

(2) 32-32-64/701, Assembly

(3) SOPM 20-60-03, Lubricants

F. Preparation for Tests

(1) The ambient conditions during the tests must be:

(a) Temperature: 60-100 degrees F.

(b) Atmospheric pressure: 13-17 psi.

(c) Relative humidity: 10-90%.

(2) Install the retract actuator assembly (1A) in the test fixture.

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

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(4) Fill the retract actuator assembly with hydraulic fluid.

NOTE: The retract actuator assembly will be continously full of hydraulic fluid for each test.

(5) Bleed all the air from the retract actuator assembly before each test.

G. Procedure

WARNING: DO NOT APPLY AIR PRESSURE TO THE PORTS AT ANY TIME AND DO NOT CYCLE THE UNIT AT PROOF PRESSURE.

(1) Do an external leakage test:

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

(b) Operate the retract actuator assembly for 25 full cycles at a rate of approximately 1 to 2 cycles per minute:

NOTE: One full cycle is when the rod end (55) travels from the fully retracted position to the fully extended position, or vice versa.

1) Put the rod end (55) into the fully retracted position.

CAUTION: DO NOT LET THE ROD END (55) MOVE FASTER THAN 0.5 INCH PER SECOND WHEN NEAR THE FULLY EXTENDED POSITION OR DAMAGE CAN OCCUR.

2) Apply minimum hydraulic pressure to the RETURN port to move the rod end (55) to the fully extended position.

3) When the rod end (55) is at the fully extended position, increase the hydraulic pressure to 3000-3100 psi.

4) Remove the hydraulic pressure from the RETURN port.

5) Change the direction of the hydraulic pressure. The retract actuator assembly is in the fully extended position.

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CAUTION: DO NOT LET THE ROD END (55) MOVE FASTER THAN 0.5 INCH PER SECOND WHEN NEAR THE FULLY RETRACTED POSITION OR DAMAGE CAN OCCUR.

6) Apply minimum hydraulic pressure to the UP port to move the rod end (55) to the fully retracted position.

7) When the rod end (55) is at the fully retracted position, increase the hydraulic pressure to 3000-3100 psi.

8) Remove the hydraulic pressure from the UP port.

9) Do steps 1 through 8 for 25 full cycles.

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

1) The leakage limit for static rod seals is zero drop.

2) The leakage limit for dynamic rod seals 1 drop.

(2) Do an internal leakage test:

(a) Put the rod end (55) to the fully retracted position.

(b) Remove the hydraulic line from the RETURN port. The RETURN port must be open to the atmosphere.

(c) Apply 3000-3100 psi to the UP port.

(d) Do a visual check for leakage from the open RETURN port: The leakage limit is 50 cc per minute.

(e) Apply 200-250 psi to the UP port.

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(f) Do a visual check for leakage from the open RETURN port: The leakage limit is 50 cc per minute.

(g) Remove the hydraulic pressure from the UP port.

(h) Attach the hydraulic line to the RETURN port.

(3) Do a friction test:

(a) Put the rod end (55) approximately 3 inches from the fully retracted position.

(b) Make sure the rod end (55) is unrestrained.

(c) Slowly apply the hydraulic pressure to the RETURN port until a smooth sustained motion is achieved.

Do a visual check as you apply the pressure:

1) The rod end must move smoothly.

2) The rod must extend fully with a maximum differential pressure of 20 psid and maximum outlet pressure of 15 psi.

NOTE: In the snubbing area, you can increase the pressure to adjust for the snubbing effect. Measure and make a note of the pressures in the unsnubbed area.

(d) Remove the hydraulic pressure from the RETURN port.

(e) Put the rod end (55) at the fully extended position.

(f) Make sure the rod end (55) is unrestrained.

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(g) Slowly apply the hydraulic pressure to the UP port until the motion is smooth and steady.

1) The rod end (55) must move smoothly.

2) The rod must retract fully with a maximum differential pressure of 20 psid and a maximum outlet pressure of 15 psi.

NOTE: In the snubbing area, you can increase the pressure to adjust for the snubbing effect. Measure and make note of the pressures in the unsnubbed area.

(h) Remove the hydraulic pressure from the UP port.

(4) Do a retract snubber operation test:

(a) Put the rod end (55) at approximately 20 inches from the fully retracted position.

(b) Apply the hydraulic pressure to the UP port to create a 140-160 psid pressure differential across the two ports while the piston rod is moving. Keep the pressure at the RETURN port no higher than 75 psi. Monitor these conditions:

1) When the rod end (55) moves through the mid-stroke area, the speed must be 2.0 inches per second.

2) After smoothly decelerating into the snubbing area, at 2.4 to 1.4 inches from the fully retracted position, the piston rod must move at a constant speed of 0.09-0.14 inch per second.

(c) Remove the hydraulic pressure from the UP port.

(5) Do an extend snubber operation test:

(a) Put the rod end (55) at approximately 20 inches from the fully extended position.

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(b) Apply the hydraulic pressure to the RETURN port to create a 425-475 psid pressure differential across the two ports while the piston rod is moving. Keep the pressure at the RETURN port no higher than 75 psi. Monitor these conditions:

1) When the rod end (55) moves through the mid-stroke area, at 2.4 to 1.4 inches from the fully retracted position, the speed must be 1.1-1.5 inches per second.

2) After smoothly decelerating into the snubbing area, the piston rod must move at a uniform speed of 0.32-0.52 inch per second.

(c) Remove the hydraulic pressure from the RETURN port.

(6) Do a proof pressure test:

(a) Put the rod end (55) in the fully retracted position.

WARNING: DO NOT CYCLE THE UNIT AT PROOF PRESSURE (4500-4600 PSI)

(b) Apply 4500-4600 psi pressure to the UP port for a minimum of 30 seconds.

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

(d) Remove the hydraulic pressure from the UP port.

(e) Put the rod end (55) in the fully extended position.

(f) Apply 3000-3100 psi pressure to the RETURN port for a minimum of 30 seconds.

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

(h) Remove the hydraulic pressure from the RETURN port.

H. Preparation after Tests

(1) Drain the hydraulic fluid from the actuator.

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(2) Partially fill the assembly with new BMS 3-11 hydraulic fluid. Add only sufficient amount of hydraulic fluid (approximately 500 cc to both ports) to make sure the seals stay lubricated.

(3) Plug all the ports. Use BMS 3-11 resistant closures with gasket or other positive sealing method to prevent leakage during shipping and handling.

(4) When a dynamic seal is motionless, with or without pressure supplied, it is acceptable for the seal to be slightly wet but not sufficient to make one drop after two hours, and no more than one drop in three hours.

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DISASSEMBLY

1. General

   A. This procedure has the data necessary to disassemble the main landing gear retract 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 details of the SOPM subjects identified in this procedure.

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

2. Disassembly

   A. Special Tools

      NOTE: Equivalent substitutes can be used.

      (1) Fixture Equipment -- A32122-1

   B. Part Replacement

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

      (1) Lockwire and locknuts.

      (2) Packings and seals (35, 75, 80, 100, 125, 170, 175, 200, 250).

      (3) Washer (50).

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(4) Backup rings (85, 105, 180, 205, 255).

C. Procedure

(1) Use standard industry procedures and the steps shown below to disassemble this component.

(2) Install the actuator assembly (1A) in a fixture.

(3) Remove the head end assembly (140) from the barrel (265):

(a) Remove the lockwire between the key (130) and the nut (135).

(b) Fully extend the actuator, then apply 1500-300 psi pressure to the RETURN port. Then loosen the nut (135) as necessary, then remove the key (130) from the slot on the barrel (265).

(c) Remove the head end assembly (140) from the barrel (265).

(4) Remove the nut (135) from the barrel (265).

(5) Remove the static seal (170) from the inside of the head end assembly (140).

(6) Remove the snubber assembly (215) from the head end assembly (140):

(a) Loosen the tab on the cuplock nut (210) in the sleeve retainer (260).

(b) Discard the cuplock nut (210).

(c) Remove cuplock nut (210) from the head end assembly (140).

(d) Remove the snubber assembly (215) from the head end assembly (140).

(7) Remove the packing (175) and the backup rings (180) from the sleeve (245).

(8) Remove the packing (200) and the backup rings (205) from the sleeve retainer (260).

(9) Disassemble the snubber assembly (215):

(a) Push on the spring retainer (225) to compress the spring (230), then remove the retaining clip (220) from the slide (240).

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(b) Remove the spring retainer (225) and the spring (230) from the slide (240).

(c) Push the slide (240) through the sleeve (245) and remove the slide (240).

(d) Pull the sleeve (245) and remove it from the sleeve retainer (260).

(e) Remove the packing (250) and the backup rings (255) from the sleeve (245).

CAUTION: THE SPHERICAL BEARING (60) HAS TWO HALVES. THEY ARE A MATCHED SET. KEEP THE BEARING HALVES TOGETHER TO ENSURE THE CORRECT OPERATION AFTER ASSEMBLY.

(10) Remove the spherical bearing (60) from the rod end (55):

(a) Turn one of the bearing halves 90 degrees to the other bearing half and remove it from the rod end (55).

(b) Remove the other bearing half from the rod end (55).

(11) Remove the rod end (55) from the piston rod (185):

(a) Remove the two indents on the cuplock washer (50).

(b) Remove the rod end (55) from the rod end plug (95).

(c) Remove the cuplock washer (50) from the rod end (55). Discard the cuplock washer(50).

(12) Remove the piston rod (185) from the barrel (265):

CAUTION: BE CAREFUL WHEN YOU REMOVE THE PISTON ROD (185). IT MAY CAUSE DAMAGE TO THE FINISH ON THE INSIDE SURFACE OF THE BARREL (265) AND THE OUTSIDE SURFACE OF THE PISTON ROD (185).

(a) Push the piston rod (185) out of the barrel (265).

(13) Remove the bearing ring (190) and the piston seal (195) from the piston rod (185).

(14) Remove the rod end plug (95) from the barrel (265):

(a) Remove the lockwire between the rod end plug (95) and the nut (45).

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(b) Remove the screws (5), washers (10), and the plug retainer assembly (15) from the rod end plug (95).

(c) Push the rod end plug (95) into the barrel until you can remove the three shear rings (90) from the barrel (265).

(d) Pull and remove the rod end plug (95) from the barrel (265).

(15) Remove the nut (45) and piston rod gland bearing (70) from the rod end plug (95):

(a) Remove the nut (45) from the rod end plug (95). This nut (45) was tightened to 5000-5700 pound-inches.

(b) Remove the rod scraper (65) from the rod end plug (95).

(c) Pull and remove the piston rod gland bearing (70) from the rod end plug (95).

(16) Remove rod seal (75) from inside the piston rod gland bearing (70).

(17) Remove the packing (80) and backup ring (85) from the piston rod gland bearing (70).

(18) Remove the snubber ring (110) and retainer (115) from the rod end plug (95):

(a) Use a tool with a small tip to get the lockwire out of the slot on the rod end plug (95).

(b) Use a tool with a small tip to straighten or remove the bend on the lockwire in the tab of the retainer (115).

(c) Turn the retainer (115) and pull the lockwire through the slot to unwrap the lockwire.

(d) Remove the retainer (115) from the rod end plug (95).

(e) Remove the snubber ring (110) from the rod end plug (95).

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CHECK

1. General

   A. This procedure has the data necessary to find defects in the material of 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 details of 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. 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 A magnetic particle check (SOPM 20-20-01) of these parts:

         (a) Slide (240)

         (b) Sleeve (245)

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

         (a) Nut (45, 135)

         (b) Rod end (55)

         (c) Shear ring (90)

         (d) Retainer (115, 225, 260)

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(e) Key (130)

(f) End (165)

(g) Piston rod (185)

(h) Spring (230)

(i) Barrel (265)

(4) Do a penetrant check (SOPM 20-20-02) of these parts:

(a) Bearing (60, 70)

(b) Plug (95)

(c) Ring (110)

(d) Bushing (155)

(5) Do a spring check on the spring (230):

(a) Do a maximum load check:

1) Compress the spring (230) to 3.688 inches. The load must be 70.9-90.9 pounds.

(b) Do a minimum load check:

1) Compress the spring (230) to 5.538 inches. The load must be 36.0-44.0 pounds.

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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
273T1152	BARREL	2-1
273T1153	HEAD END ASSEMBLY	3-1, 3-2
273T1154	ROD END PLUG	4-1
273T1155	PISTON ROD	5-1
273T1156	ROD END	6-1
273T1170	SNUBBER ASSEMBLY	7-1
BAC27TLG15	NAMEPLATE	8-1

2. Dimensioning Symbols

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

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REFINISH OF OTHER PARTS - REPAIR 1-1

1. General

   A. This procedure has the data necessary to refinish the parts which are not given in the specified repairs.

   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. Refinish of Other Parts

   A. General

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

   B. 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 20-41-02, Application of Chemical and Solvent Resistant Finishes

      (5) SOPM 20-42-05, Bright Cadmium Plating

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

   C. Procedure

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IPL FIG. & ITEM	MATERIAL	FINISH
IPL Fig. 1		
Nut (45)	15-5PH, heat treat 180-200 ksi	Passivate (F-17.25), but cadmium plate (F-16.11) the threads.
Ring (90)	17-7PH, heat treat to CH900	Cadmium plate (F-16.06).
Retainer (115, 225)	15-5PH, heat treat 180-200 ksi	Passivate (F-17.25).
Key (130)	15-5PH, heat treat 150-170 ksi	Passivate (F-17.25).
Clip (220)	302 CRES	Passivate (F-17.25).
Spring (230)	17-7PH, heat treat to CH900	Passivate (F-17.25).
Strap (270)	301 CRES. Optional: 302 CRES or 304 CRES	Passivate (F-17.25).

Refinish Details
Table 601

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BARREL - REPAIR 2-1

273T1152-1

1. General

A. This procedure has the data necessary to refinish the barrel (265).

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.

D. General repair details:

(1) Material: 15-5PH CRES. Heat treat 180-200 ksi.

(2) Shot peen: 0.016 A2 Intensity

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 20-42-03, Hard Chrome Plating

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

B. Procedure

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

(2) Break all sharp edges to 0.02 - 0.04 inch.

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

(4) Shot peen the machined area (SOPM 20-10-03).

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(5) Chrome plate the shot peened area as specified in SOPM 20-42-03 class 3. The finish thickness of the chrome plate is 0.0030 - 0.0100 inch after grinding.

(a) Optional: If required to meet the chrome plate thickness requirement, nickel plate (SOPM 20-42-09) the shot peened area before you chrome plate. Maintain 0.0030 - 0.0050 inch chrome plate on top of the nickel plate after grinding the chrome plate.

(6) Do a magnetic particle check as shown in SOPM 20-20-01, class B.

(7) Finish grind (SOPM 20-10-04) to the design dimensions specified in Fig. 601.

3. Barrel Refinish

A. Consumable Materials

NOTE: Equivalent material can be used.

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

B. 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

C. Procedure (Fig. 601)

(1) Passivate (F-17.25) the barrel (265).

(2) On area indicated by flagnote 1:

(a) Cadmium plate (F-16.11).

(3) On the threads, area indicated by flagnote 2:

(a) Apply BMS 3-8 dry solid film lubricant (F-19.10). Run out on chamfers is acceptable.
Optional: Apply SOPM 20-50-08, type VI, class 1 or class 3, or class 4.

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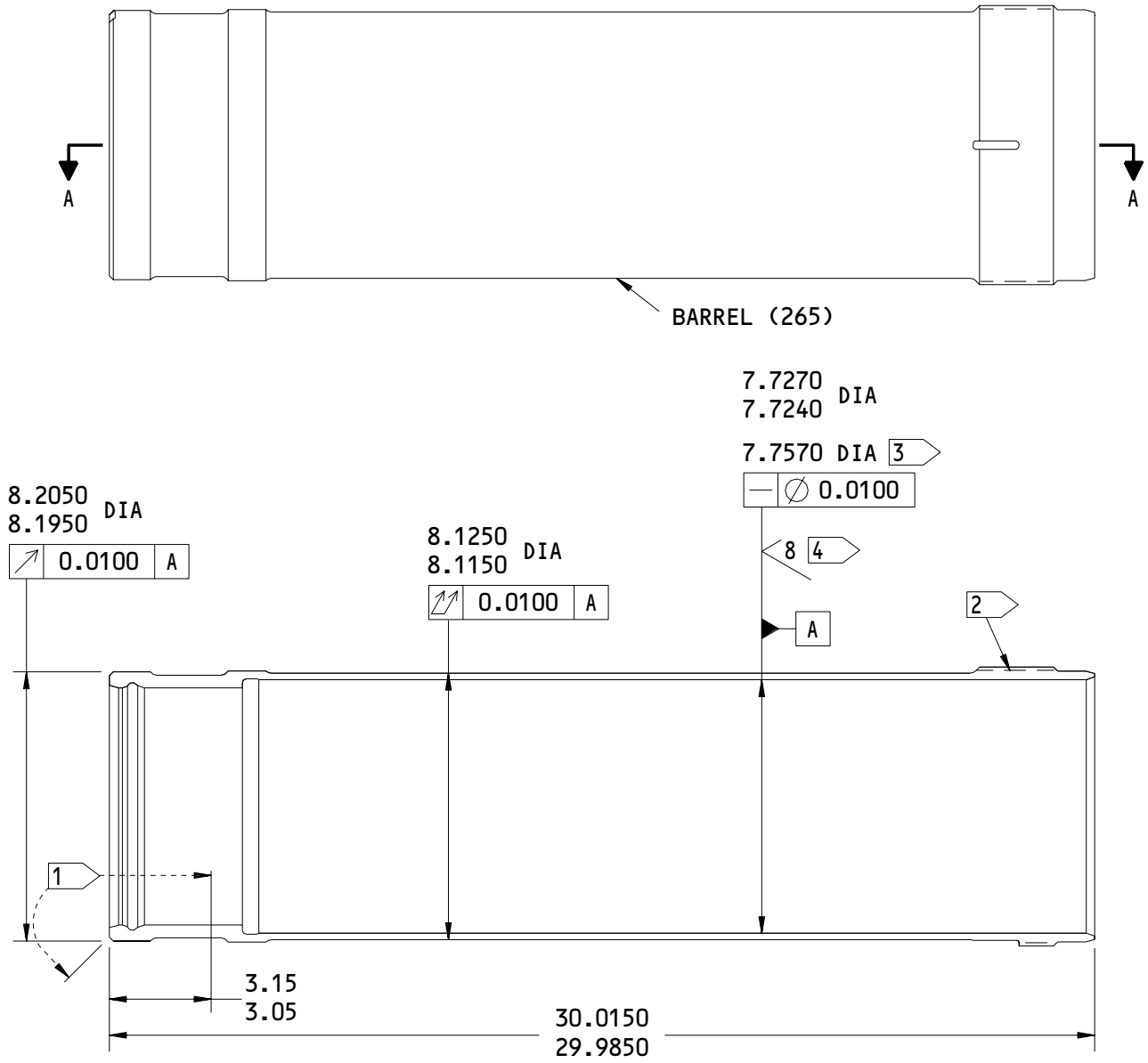

A–A

1 CADMIUM PLATE (F–16.11)

2 BMS 3–8 LUBRICANT (F–19.10)

3 REPAIR LIMIT

4 SURFACE FINISH CAN BE 8 TO 16 MICROINCHES

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T1152–1
Barrel Repair
Figure 601

K10861

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HEAD END ASSEMBLY - REPAIR 3-1

273T1153-1

1. General

   A. This procedure has the data necessary to replace the bushings (155) and the orifice (160) on the head end assembly (55).

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

   C. Refer to the REPAIR - GENERAL (32-32-64/601, REPAIR - GENERAL) for the Standard True Position Dimensioning Symbols shown in the repair.

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

2. Bushing Replacement

   A. References

      (1) SOPM 20-50-03, Bearing Removal, Installation and Retention

   B. Procedure

      (1) Remove the damaged bushing (155) from the end (165).

          NOTE: If service wear limit on the inside diameter of the bushing (155) is exceeded, replace the bushing.

      (2) If you find corrosion or damage in the bushing hole on the end (165), see REPAIR 3-2 for repair instruction.

      (3) Install the new bushing (155) on the end (165). Use the shrink fit method (SOPM 20-50-03).

      (4) Machine the inside diameter of the bushing (155) to the dimensions specified in Fig. 601.

      (5) Break all the sharp edges.

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3. Orifice Replacement

A. References

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

B. Procedure

(1) Remove the damaged orifice (160) from the end (165).

(2) Install the new orifice (160) on the end (165) as specified in SOPM 20-50-04.

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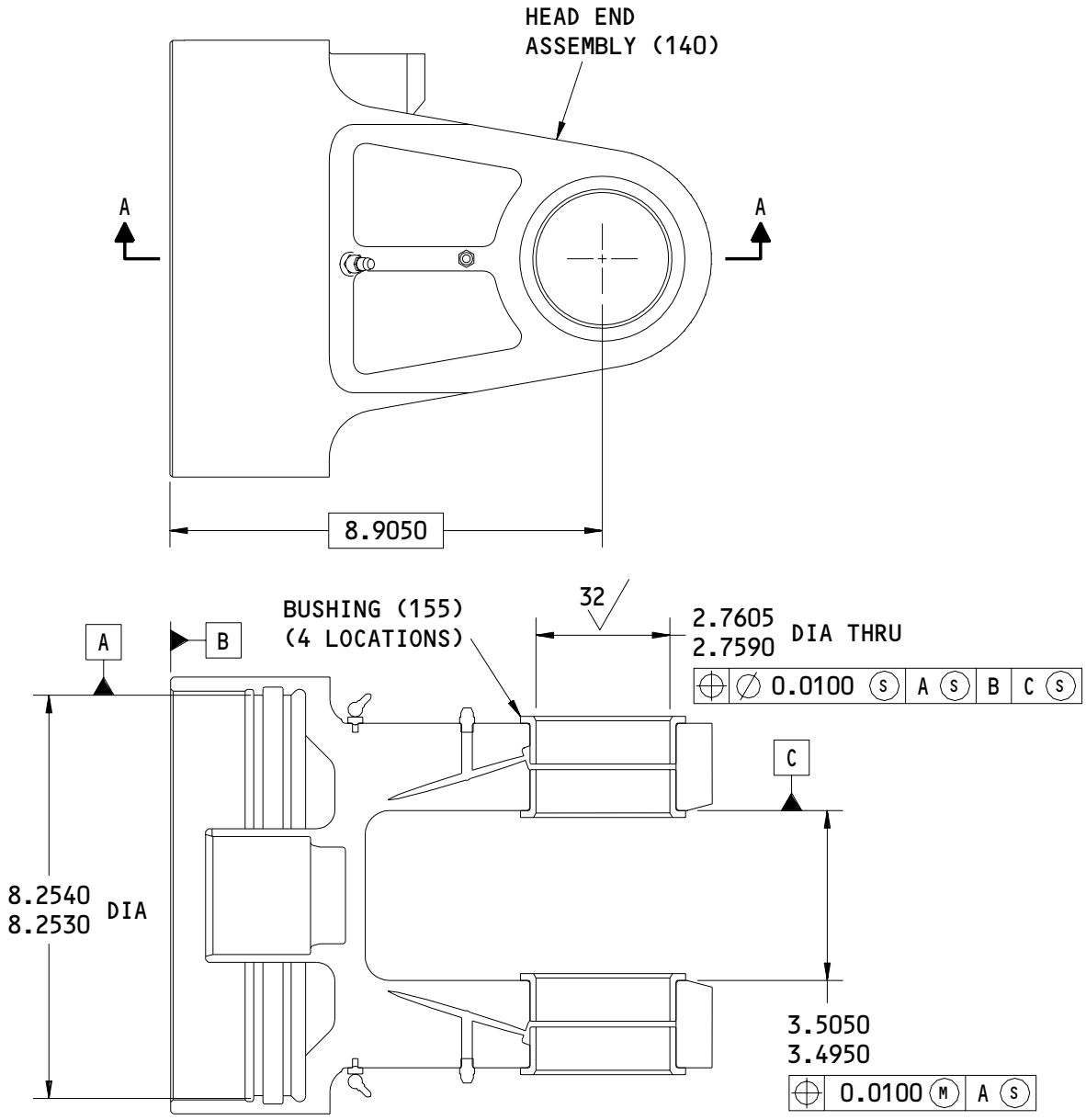

A–A

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T1153-1
Head End Assembly Repair
Figure 601

K10879

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END - REPAIR 3-2

273T1153-2

1. General

A. This procedure has the data necessary to refinish the end (165).

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

C. Refer to the REPAIR - GENERAL (32-32-64/601, 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: 15-5PH CRES
Heat treat 180-200 ksi

2. End Refinish

A. 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

B. Procedure (Fig. 601)

(1) Passivate (F-17.25) the end (165).

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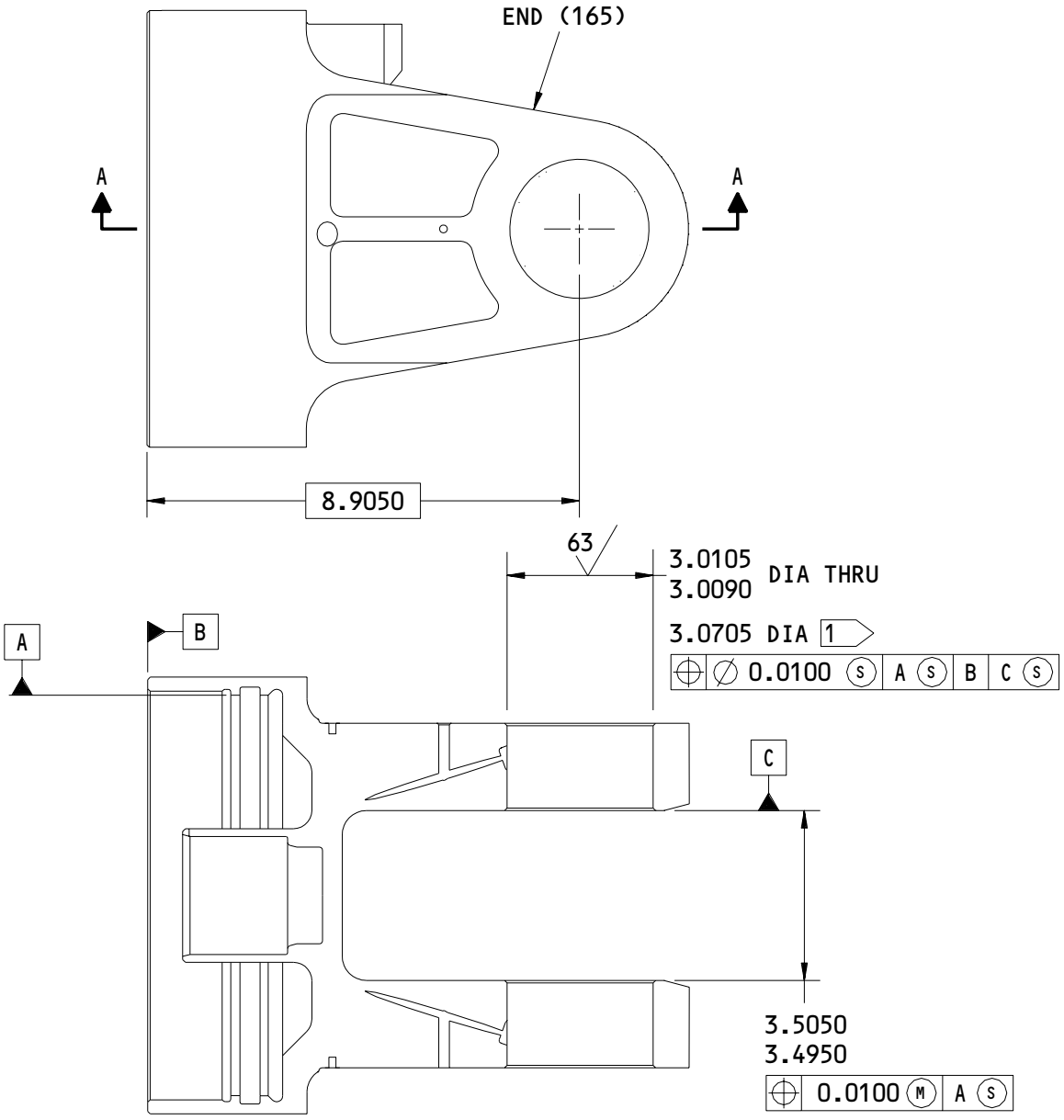

A–A

1 REPAIR LIMIT

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T1153-2
Head End Repair
Figure 601

K10889

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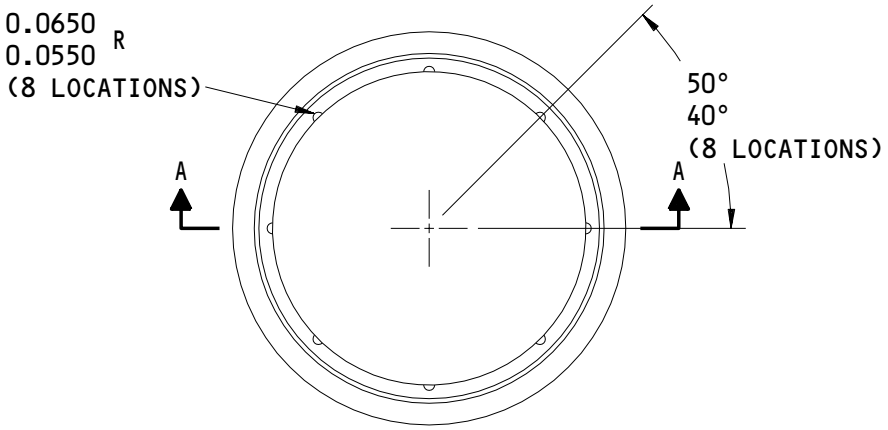
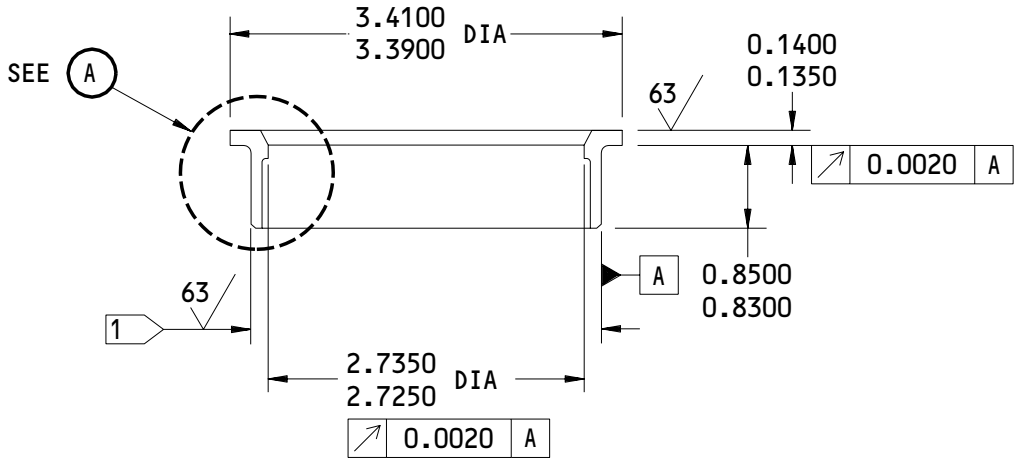


OVERSIZE REPLACEMENT FOR BUSHING (155)



A–A

Oversize Bushing Details
Figure 602 (Sheet 1)

K13561

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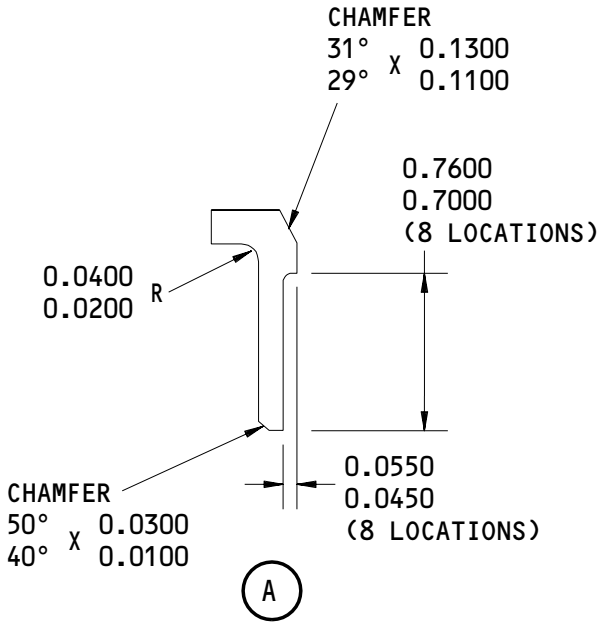

1 THE OUTSIDE DIAMETER OF THE BUSHING IS EQUAL TO THE INSIDE DIAMETER OF THE LUG HOLE PLUS THE INTERFERENCE OF 0.0040–0.0065

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBER REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

Oversize Bushing Details
Figure 602 (Sheet 2)

K13565

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ROD END PLUG - REPAIR 4-1

273T1154-1, -2

1. General

   A. This procedure has the data necessary to refinish the rod end plug (95).

   B. Refer to the REPAIR - GENERAL (32-32-64/601, REPAIR - GENERAL) for the Standard True Position Dimensioning Symbols shown in the repair.

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

   D. General repair details:

      (1) Material: Aluminum alloy

2. Rod End Plug Refinish

   A. 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 20-43-03, Chemical Conversion Coatings For Aluminum

   B. Procedure

      (1) On area indicated by flagnote 1: Hard anodize (F-17.061), 0.002-003 inch thickness.

      (2) On area indicated by flagnote 2: Flash hard anodize or sulfuric acid anodize (F-17.30).

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(3) Chemical treat (F-17.26) the other surfaces of only the 273T1154-1 rod end plug (95).

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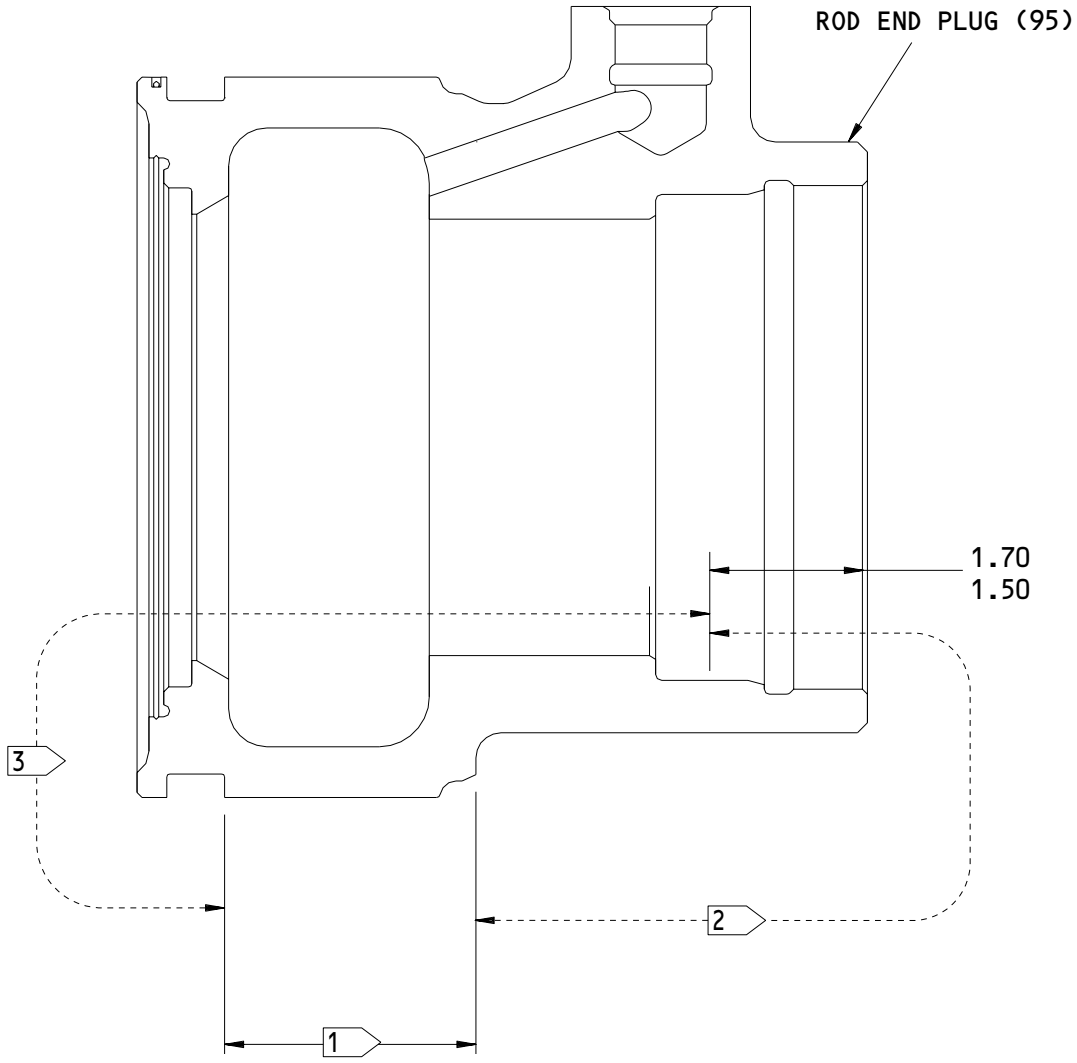

1 HARD ANODIZE (F-17.061, 0.002-0.003 THICK

2 HARD ANODIZE (F-17.30)

3 NO FINISH (273T1154-2)

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T1154-1,-2
Rod End Plug Repair and Refinish
Figure 601

K10921

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PISTON ROD - REPAIR 5-1

273T1155-1

1. General

A. This procedure has the data necessary to repair and refinish the piston rod (185).

B. Refer to the REPAIR - GENERAL (32-32-64/601, REPAIR - GENERAL) for the Standard True Position Dimensioning Symbols shown in the repair.

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

D. General repair details:

(1) Material: 15-5PH CRES. Heat treat 180-200 ksi.

(2) Shot Peen: Intensity 0.016A
Coverage 2.0

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 20-42-03, Hard Chrome Plating

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

B. Procedure

(1) Repair of interacting surface between the piston rod (185) and the piston rod gland bearing (70):

(a) Machine the worn or damaged surface, as necessary, to remove defects, cracks, and/or corrosion up to the limits shown in Fig. 601.

(b) Break all sharp edges to 0.02000 - 0.0400 inch.

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(c) Do a magnetic particle check as shown in SOPM 20-20-01, class B.

(d) Shot peen the machined area as specified in SOPM 20-10-03.

(e) Chrome plate the shot peened area as specified in SOPM 20-42-03 class 3. The finish thickness of the chrome plate is 0.0030 - 0.0100 inch after grinding.

1) Optional: If required to meet the chrome plate thickness requirement, nickel plate (SOPM 20-42-09) the shot peened area before you chrome plate. Maintain 0.0030 - 0.0050 inch chrome plate on top of the nickel plate after grinding the chrome plate.

(f) Do a magnetic particle check as shown in SOPM 20-20-01, class B.

(g) Finish grind (SOPM 20-10-04) to the design dimensions specified in Fig. 601.

(2) Repair of interacting surface between the piston rod (185) and the snubber ring (110) when the piston rod (185) is extended:

(a) Machine the worn or damaged surface, as necessary, to remove defects, cracks, and/or corrosion up to the limits shown in Fig. 601.

(b) Break all sharp edges to 0.02000 - 0.0400 inch.

(c) Do a magnetic particle check as shown in SOPM 20-20-01, class B.

(d) Shot peen the machined area as specified in SOPM 20-10-03.

(e) Nickel plate (SOPM 20-42-09) as required to meet the dimensions specified in the next step.

(f) Machine the piston rod (185) to 4.3730 - 4.3740 inches. Make sure the nickel plate lumps are removed.

(g) Machine the three grooves as required to remove nickel plate to meet the design dimensions specified. See view B-B in Fig. 601.

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(h) On area indicated by flagnote 10: Break sharp edges of the three grooves to the dimensions specified.

CAUTION: DO NOT GRIND THE CHROME PLATE. FAILURE OF PART MAY OCCUR.

(i) Chrome plate (SOPM 20-42-03, Class 3) the reworked area. Chrome plate thickness is 0.0005 - 0.0010 inch.

Chrome plate (SOPM 20-42-03, Class 3) in the grooves is allowed. Chrome plate thickness 0.0005 - 0.0010 inch.

Chrome plate run out on the ramp area is 0.0005 minimum.

3. Piston Rod Refinish

A. Reference

(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 Table For Boeing Finish Codes

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

B. Procedure

(1) Passivate (F-17.25) the piston rod (185).

(2) On area indicated by flagnote 1:

(a) Shot peen (SOPM 20-10-03). Overspay is allowed.

(3) On area indicated by flagnote 2:

(a) No shot peen is allowed.

(4) On area indicated by flagnote 3:

(a) After shot peening, material may be removed (SOPM 20-10-03) to meet surface finish requirement.

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(5) On area indicated by flagnote 4:

(a) Chrome plate (F-15.34). After all finishing operations, the chrome plate thickness must be 0.0030-0.0050 inch.

(6) On area indicated by flagnote 5:

(a) Chrome plate runout area.

(7) On area indicated by flagnote 6:

(a) Shot peen optional. Surface finish is applicable before shot peening.

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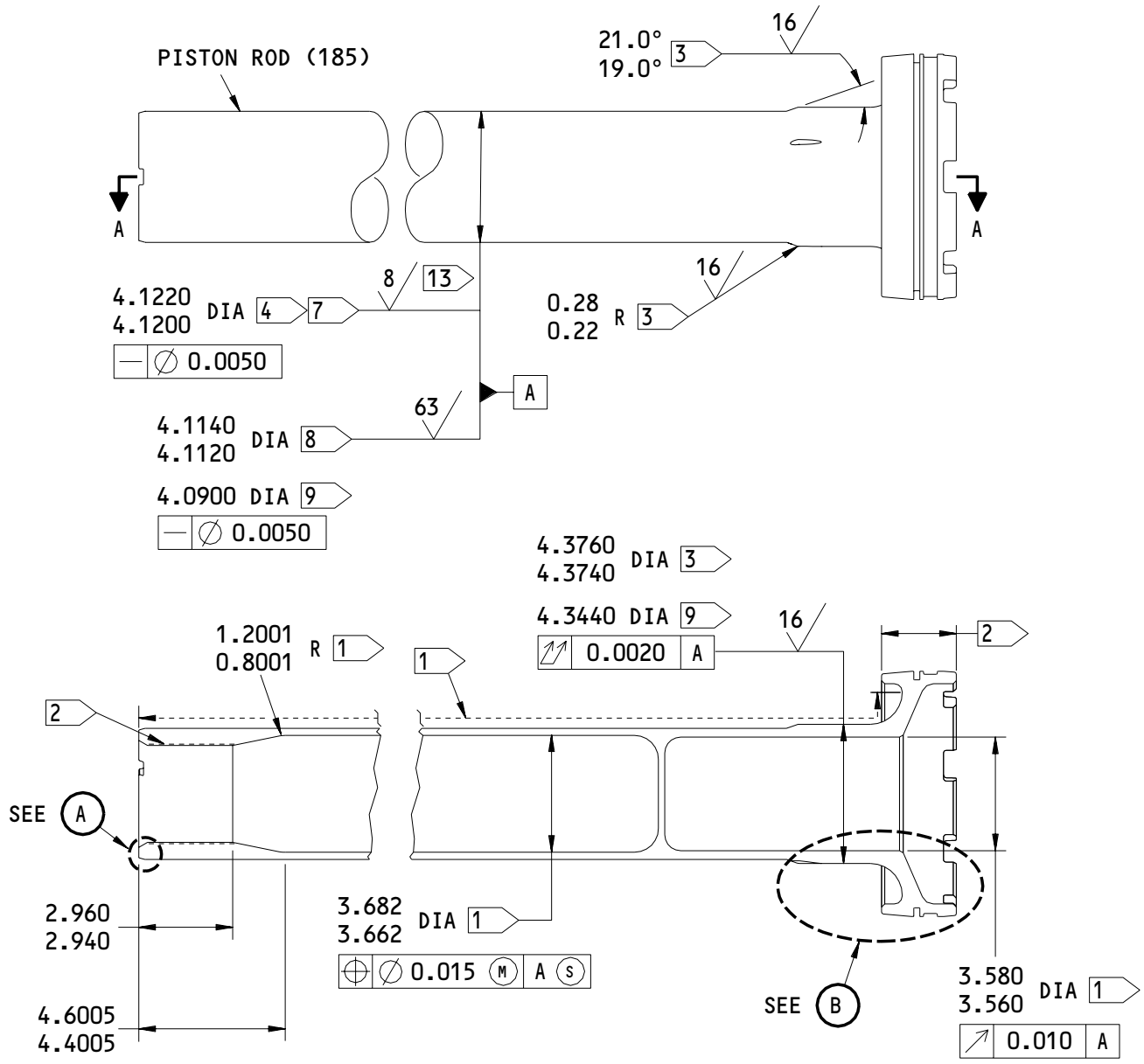

A–A

273T1155-1
Piston Rod Repair
Figure 601 (Sheet 1)

K11006

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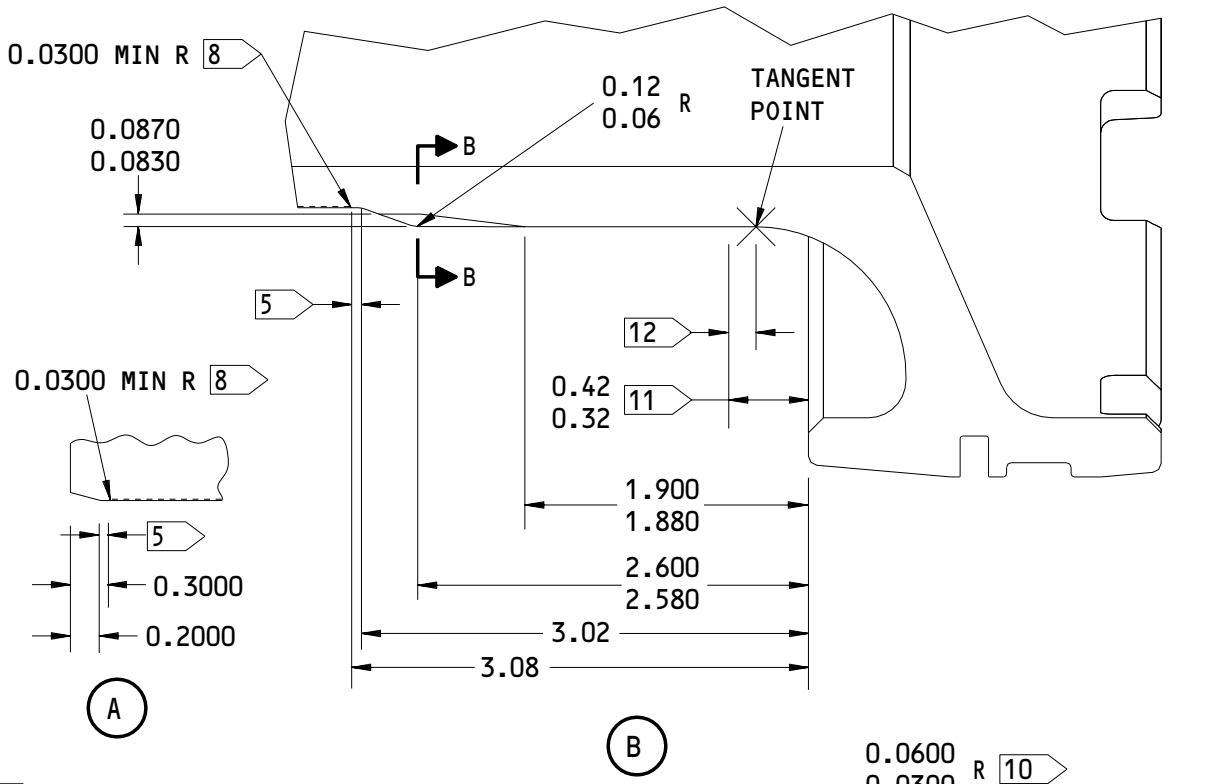

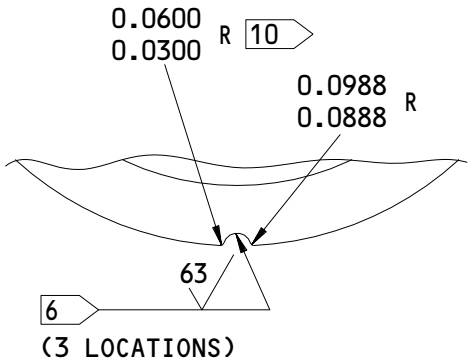

B–B

1 SHOT PEEN

2 NO SHOT PEEN

3 REMOVE MATERIAL

4 CHROME PLATE (F-15.34)

5 CHROME PLATE RUNOUT

6 SHOT PEEN OPTIONAL

7 AFTER PLATING AND FINISHING

8 BEFORE PLATING

9 REPAIR LIMIT

10 SEE TEXT

11 0.000-0.015 MISMATCHED ALLOWED. BLEND TRANSITION RADIUS 0.020-0.040 MINIMUM

12 SURFACE ROUGHNESS 16 MICROINCHES NOT REQUIRED

13 SURFACE FINISH CAN BE 8 TO 16 MICROINCHES

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T1155-1
Piston Rod Repair
Figure 601 (Sheet 2)

K11020

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ROD END - REPAIR 6-1

273T1156-1

1. General

A. This procedure has the data necessary to repair and refinish the rod end (55).

B. Refer to the REPAIR - GENERAL (32-32-64/601, REPAIR - GENERAL) for the Standard True Position Dimensioning Symbols shown in the repair.

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

D. General repair details:

(1) Material: 15-5PH CRES.
Heat treat 180-200 ksi.

(2) Shot Peen: Intensity 0.016A
Coverage 2.0

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 20-42-03, Hard Chrome Plating

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

B. Procedure

(1) Machine the worn or damaged surface, as necessary, to remove defects, cracks, and/or corrosion up to the limits shown in Fig. 601.

(2) Break all sharp edges to 0.02000 - 0.0400 inch.

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

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(4) Shot peen the machined area as specified in SOPM 20-10-03.

(5) Chrome plate the shot peened area as specified in SOPM 20-42-03 class 3. The finish thickness of the chrome plate is 0.0030 - 0.0100 inch after grinding.

(a) Optional: If required to meet the chrome plate thickness requirement, nickel plate (SOPM 20-42-09) the shot peened area before you chrome plate. Maintain 0.0030 - 0.0050 inch chrome plate on top of the nickel plate after grinding the chrome plate.

(6) Do a magnetic particle check as shown in SOPM 20-20-01, class B.

(7) Finish grind (SOPM 20-10-04) to the design dimensions specified in Fig. 601.

3. Rod End Refinish

A. Reference

(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 Table For Boeing Finish Codes

B. Procedure

(1) Passivate (F-17.25) the rod end (55).

(2) On area indicated by flagnote 1:

(a) Shot peen (SOPM 20-10-03). Overspray is allowed.

(3) On area indicated by flagnote 2:

(a) No shot peen is allowed.

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(4) On area indicated by flagnote 3:

(a) Apply BMS 3-8 dry solid film lubricant (F-19.10). Overspray is allowed except on the spherical ID.
Optional: Apply SOPM 20-50-08, type VI, class 1 or class 3, or class 4.

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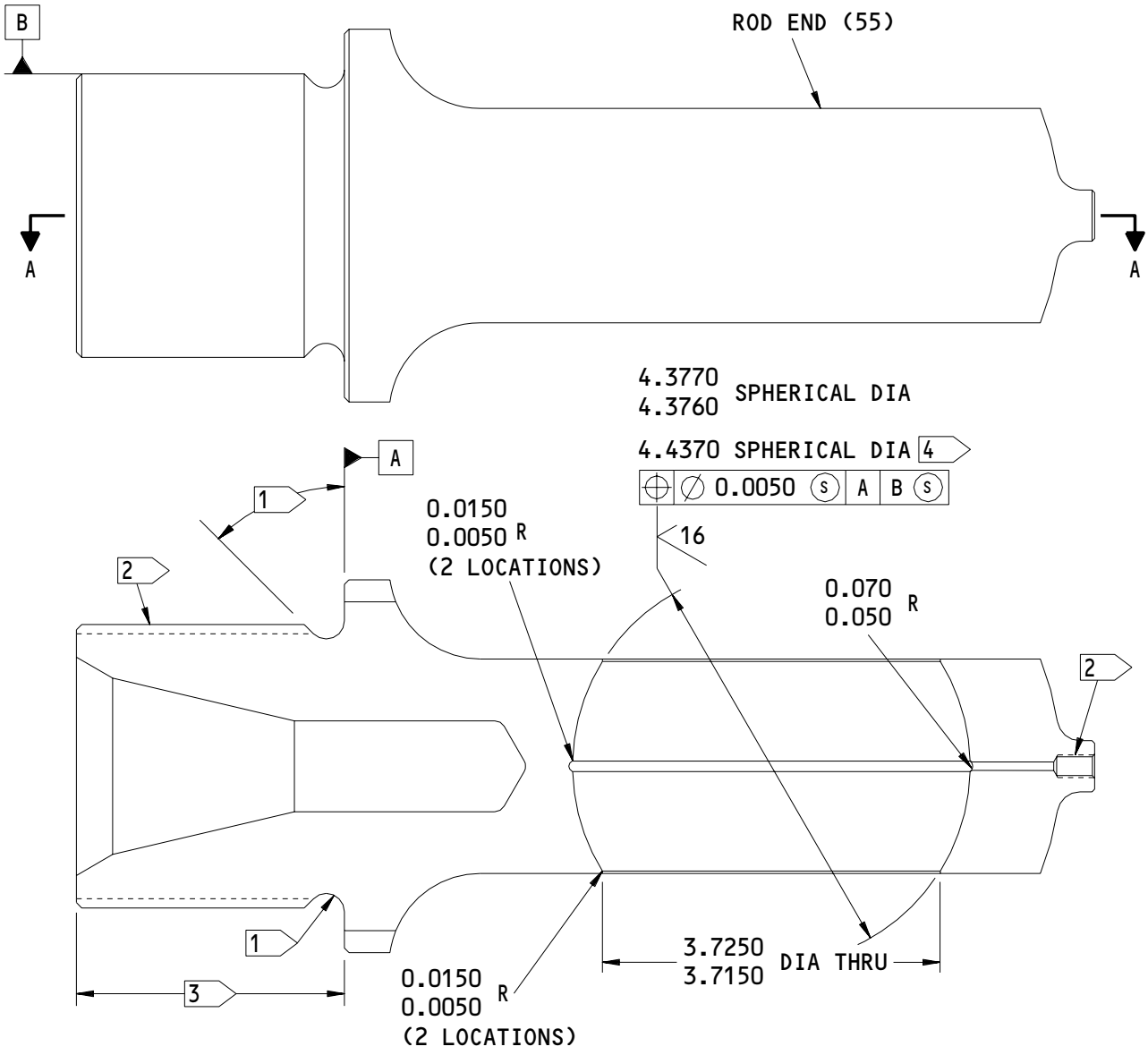

A–A

1 SHOT PEEN

2 NO SHOT PEEN

3 BMS 3-8 LUBRICANT (F-19.10)

4 REPAIR LIMIT

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273T1156-1
Rod End Repair
Figure 601

K11032

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SNUBBER ASSEMBLY - REPAIR 7-1

273T1170-1

1. General

   A. This procedure has the data necessary to replace parts of the snubber assembly (215).

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

2. Slide and Sleeve Replacement

   A. Consumable Materials

      Note: Equivalent material can be used.

      (1) D00153 Fluid -- BMS 3-11, Hydraulic (SOPM 20-60-03)

   B. References

      (1) SOPM 20-60-03, Lubricants

   C. Procedure

      (1) Remove the retaining clip (220) from the slide (240).

      (2) Pull the slide (240) out of the sleeve (245).

      (3) If either the slide (240) or the sleeve (245) are worn more than the wear limits, you must replace both parts as a set.

      (4) If necessary, put the new slide (240) into the new sleeve (245).

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(5) Make sure the valve assembly (235) operates correctly:

(a) Lubricate the valve assembly (235) with BMS 3-11 hydraulic fluid.

(b) Tilt the valve assembly (235) at about 45 degrees to horizontal. The new slide (240) must move by its own weight throughout the entire lapped area.

(c) Do step (b) at three different positions at approximately 120 degrees apart relative to the new sleeve (245).

(6) Install the spring retainer (225) on the new slide (240).

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NAMEPLATE INSTALLATION - REPAIR 8-1

BAC27TLG15

1. General

   A. This procedure has the data necessary to replace the strap (270) and the nameplate (275).

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

2. Marker Replacement

   A. Consumable Materials

      NOTE: Equivalent material may be used.

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

   B. References

      (1) SOPM 20-50-21, How To Install Nameplate Seals and Straps

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

   C. Procedure

      (1) Install a replacement nameplate (275) with new straps (270) and BMS 5-26 sealant per SOPM 20-50-21.

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ASSEMBLY

1. General

   A. This procedure has the data necessary to assemble the main landing gear retract actuator assembly.

   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. Assembly

   A. Special Tools

      NOTE: Equivalent substitutes can be used.

      (1) Fixture Equipment -- A32121-1

   B. Consumable Materials

      NOTE: Equivalent material can be used.

      (1) D00153 Fluid-- BMS3-11, type 4, Hydraulic (SOPM 20-60-03)

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

      (3) G01912 Lockwire -- MS20995C47 (SOPM 20-60-04)

      (4) G01555 Lockwire -- MS20995NC32 (SOPM 20-60-04)

   C. References

      (1) SOPM 20-50-01, Bolt and Nut Installation

      (2) SOPM 20-60-03, Lubricants

   D. Procedure

      (1) Use standard industry procedures and the steps shown below to assemble this component.

      (2) Install the snubber ring (110) in the rod end plug (95).

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(3) Install the retainer (115) in the rod end plug (95):

(a) Push MS20995C47 lockwire into the slot on the rod end plug (95). You can use hydraulic fluid to help when you install the lockwire.

(b) Bend the lockwire into the tab of the retainer (115) as shown in Fig. 701.

(c) Install the retainer (115) in the rod end plug (95). The tab must be on the outside. Make sure the lockwire bend stays in the tab.

(d) Turn the retainer (115) while you feed the lockwire. This will help the lockwire wrap around the retainer (115). Turn approximately one revolution (Fig. 701).

(e) Cut the lockwire to leave a small length for future removal. Bend the wire into the slot in the rod end plug (95). Both ends of the wire must be in the position shown in Fig. 701.

(4) Install the piston rod gland bearing (70) in the rod end plug (95):

(a) Install the packing (80) and two backup rings (85) on the piston rod gland bearing (70).

(b) Install the rod seal (75) in the piston rod gland bearing (70).

(c) Install the piston rod gland bearing (70) in the rod end plug (95).

(5) Install the nut (45) in the rod end plug (95):

(a) Install the rod scraper (65) in the rod end plug (95).

(b) Apply BMS 3-33 grease on the threads of the rod end plug (95).

(c) Install the nut (45) in the rod end plug (95).

(d) Tighten nut (45) to 5000-5700 pound-inches.

(e) Install MS20995NC32 lockwire on the nut (45) and the rod end plug (95). Use the double twist method (SOPM 20-50-02).

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(6) Install the rod end plug (95) in the barrel (265):

(a) Install the packing (100) and two backup rings (105) on the rod end plug (95).

(b) Insert the rod end plug (95) into the barrel (265).

(c) Push the rod end plug (95) in far enough then install the three shear rings (90) in the groove on the inside of the barrel (236). When the shear rings (90) are in the groove, pull the rod end plug (95) out to hold the shear rings (90) in the groove.

(7) Install the piston rod (185) into the barrel (265):

(a) Install two bearing rings (190) on the piston rod (185).

(b) Install the piston seal (195), with the step joints 180 degrees apart, on the piston rod (185). The antirotation insert on the expander spring must align with the notches on the piston rings.

CAUTION: BE CAREFUL WHEN YOU INSERT THE PISTON ROD (185). IT MAY CAUSE DAMAGE TO THE FINISH ON THE INSIDE SURFACE OF THE BARREL (265) AND THE OUTSIDE SURFACE OF THE PISTON ROD (185).

(c) Insert the piston rod (185) into the barrel (265) and through the rod end plug (95) and the piston rod gland bearing (70).

(8) Install the rod end (55) on the piston rod (185):

(a) Install the cuplock washer (50) on the rod end (55). Do not reuse the cuplock washer (50).

(b) Apply BMS 3-33 grease on the threads of the rod end (55).

(c) Install the rod end (55) on the piston rod (185).

(d) Tighten rod end (55) to 2000-2400 pound-feet.

(e) Use a punch tool to deform the cuplock washer (50) into the two slots on the rod end (55). The area of deform must touch both corners of each rod end slot.

NOTE: Use punch tool with a spherical end of 0.06 inch radius. Equivalent tools may be used.

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(9) Install the fitting (40) on the rod end (55).

(10) Install the spherical bearing (60) in the rod end (55):

NOTE: The spherical bearing (60) has two bearing halves. They are a matched set.

(a) Apply BMS 3-33 grease to the bearing bore and the outside diameter surface of the bearing halves.

(b) Install one half of the spherical bearing (60) in the rod end (55).

(c) Turn the half of the spherical bearing (60) 90 degrees to the other half and install it in the rod end (55).

NOTE: The index marks on the bearing halves must be on the same side for proper alignment.

(d) Turn the bearing halves until the index marks are aligned.

(11) Install the plug retainer assembly (15) on the rod end plug (95):

(a) Install the plug retainer assembly (15) on the rod end plug (95) with the screws (5) and washers (10). Make sure the plug retainer assembly (15) is in the recess of the barrel (265).

(b) Tighten the screw to 25-35 pound-inches.

(12) Install the snubber assembly (215) in the head end assembly (140):

(a) Put the snubber assembly (215) into the head end assembly (140).

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(b) Slide a new cuplock nut (210) over the snubber assembly (215) and then install it on the head end assembly (140). Do not use the old cuplock nut (210).

(c) Tighten cuplock nut (210) to 90-110 pound-inches.

(d) Bend the flange of the cuplock nut (210) into the slot on the sleeve retainer (260) of the snubber assembly (215). The area of deform must touch both corners of the slot.

(13) Install the head end assembly (140) on the barrel (265):

(a) Apply BMS 3-33 grease on the threads and face of the nut (135).

(b) Install the nut (135) on the barrel (265). Turn the nut (135) until it is at the end of the threads on the barrel (265).

(c) Install the static seal (170) on the inside of the head end assembly (140).

(d) Install the head end assembly (140) on the barrel (265). Turn the head end assembly (140) until it can not turn, then loosen it up to one turn, as required, to install the key (130).

(e) Install the key (130) on the slot on the barrel (265).

(f) Tighten the nut (135) to hold the key (130) in place. Final torque will be done when the unit is pressurized.

(g) Install MS20995NC32 lockwire on the nut (135) and the head end assembly (140). Use the double-twist method (SOPM 20-50-02).

(14) Install the screen fitting (120) and packing (125) on the head end assembly (140).

(15) Tighten the screen fitting (120) to 710-785 pound-inches.

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(16) Install the restrictor valve (30) and packing (35) on the rod end plug (95).

(17) Torque the restrictor valve (30) to 390-430 pound-inches.

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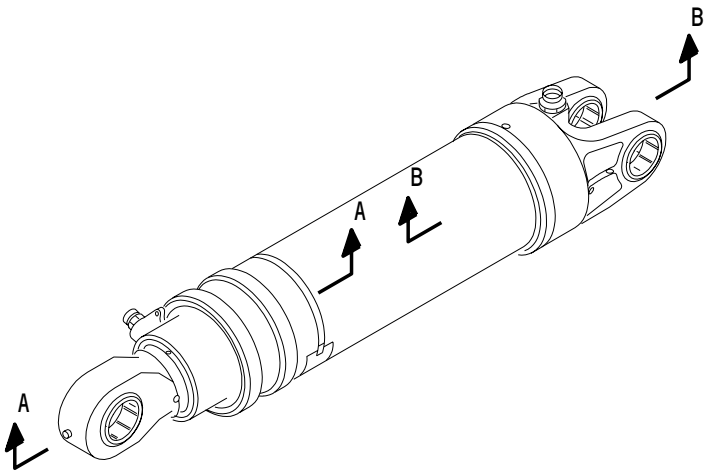

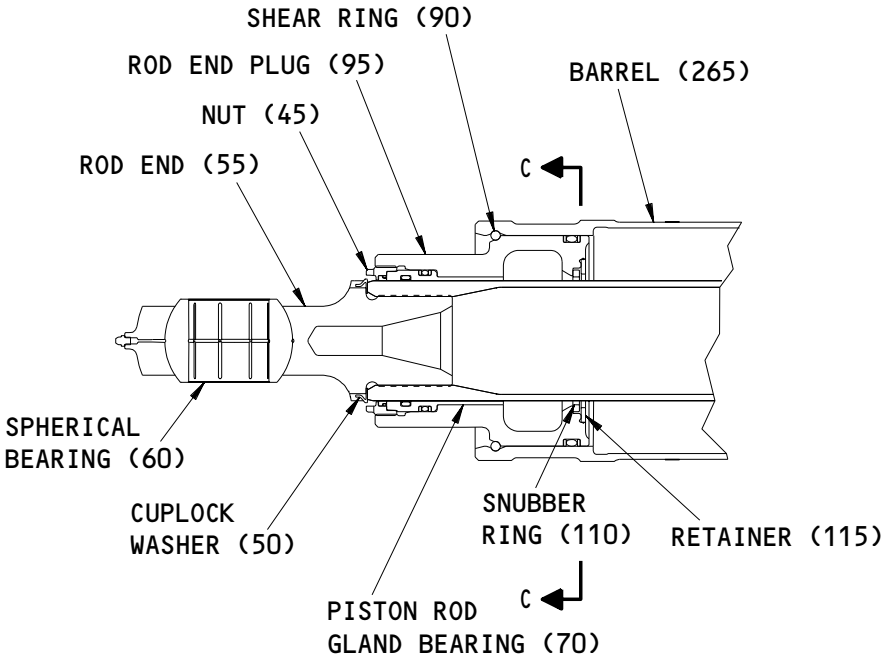

A–A

MLG Retract Actuator Assembly Details
Figure 701 (Sheet 1)

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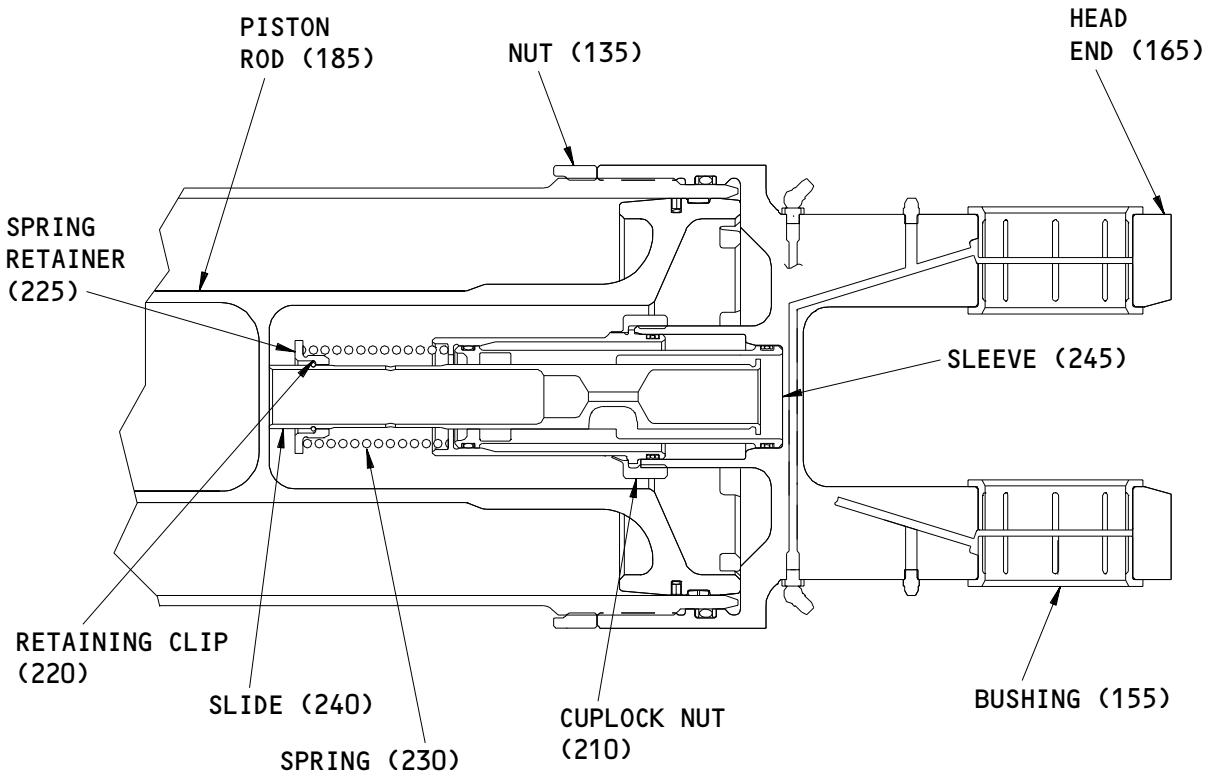

B–B

MLG Retract Actuator Assembly Details
Figure 701 (Sheet 2)

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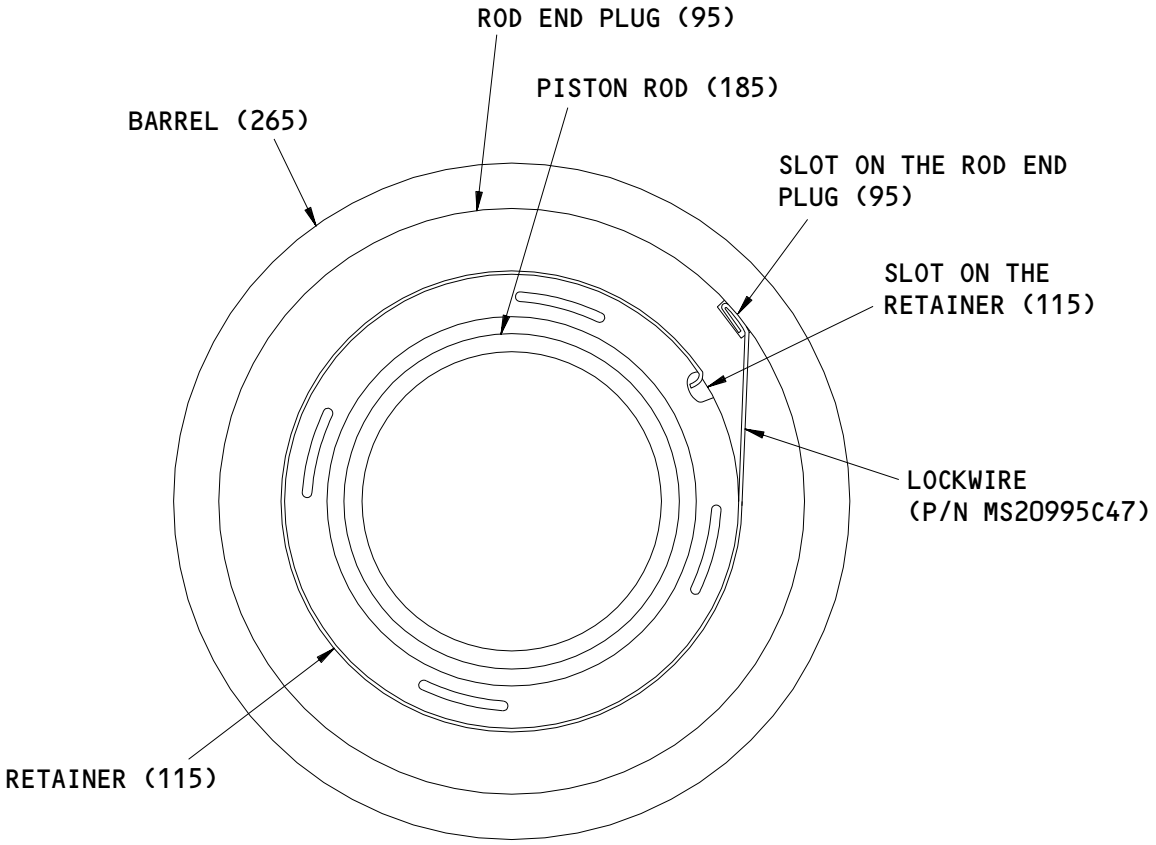

MLG Retract Actuator Assembly Details
Figure 701 (Sheet 3)

K24429

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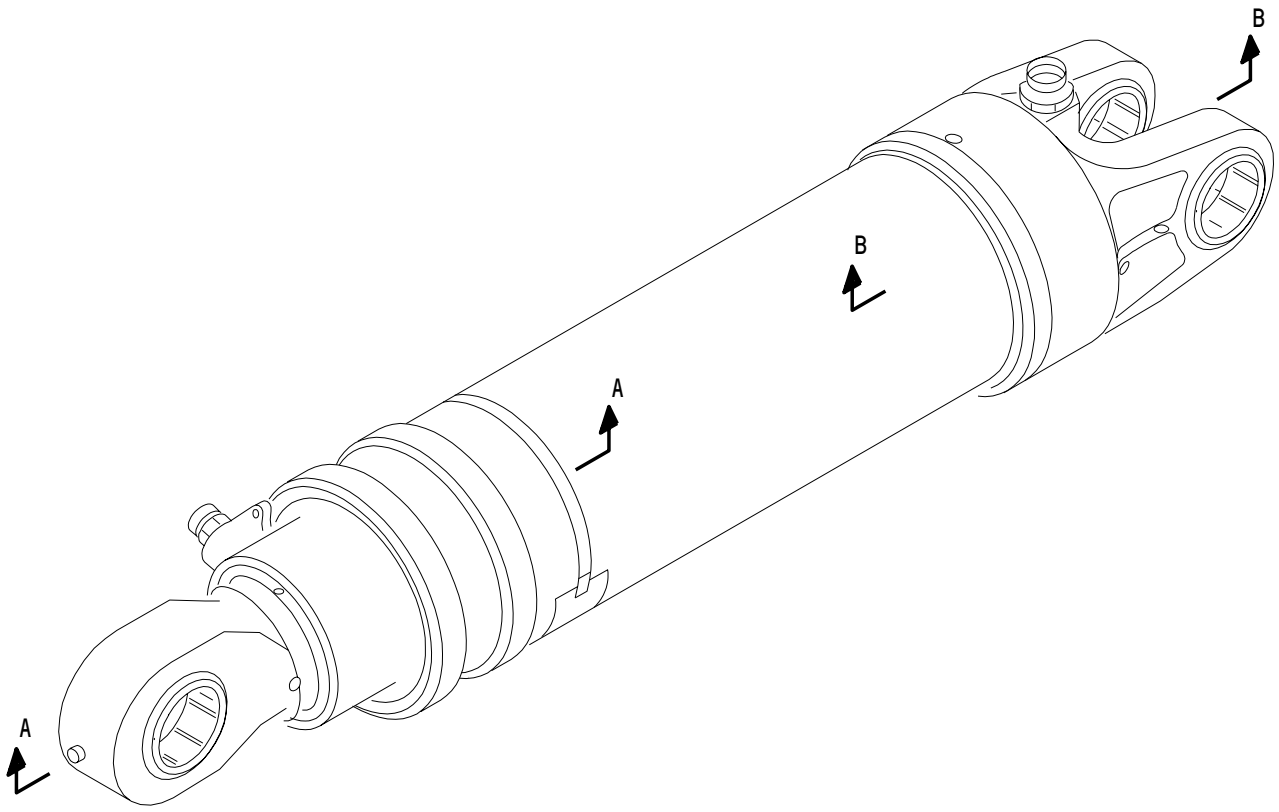

Fits and Clearances
Figure 801 (Sheet 1)

K10769

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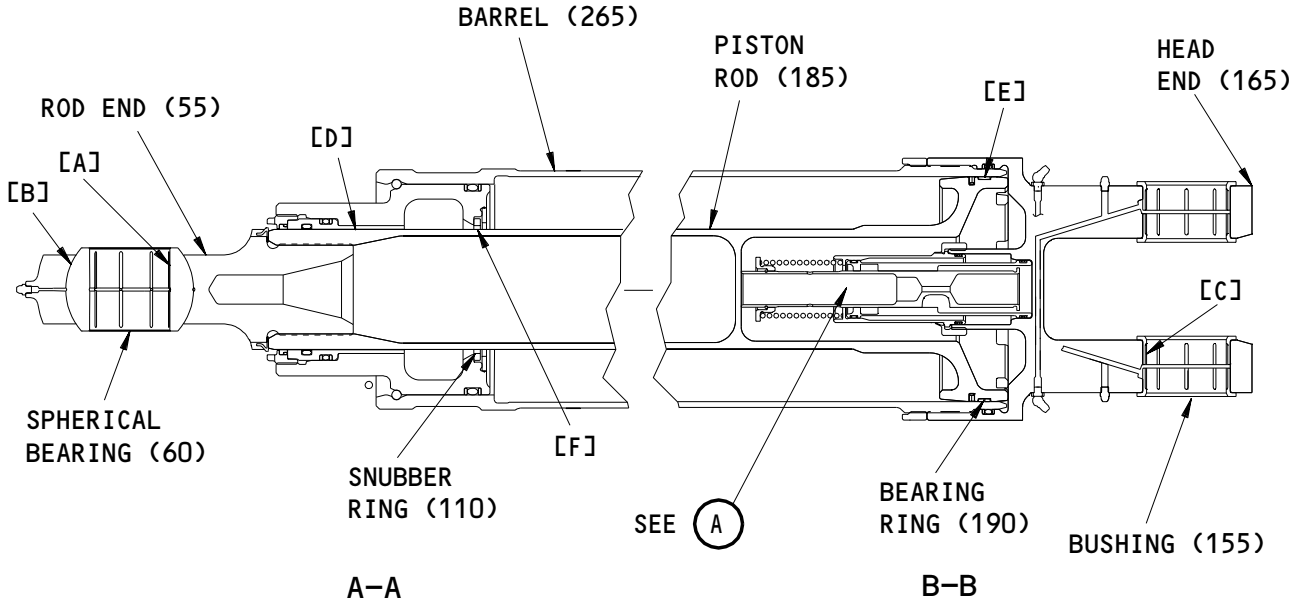

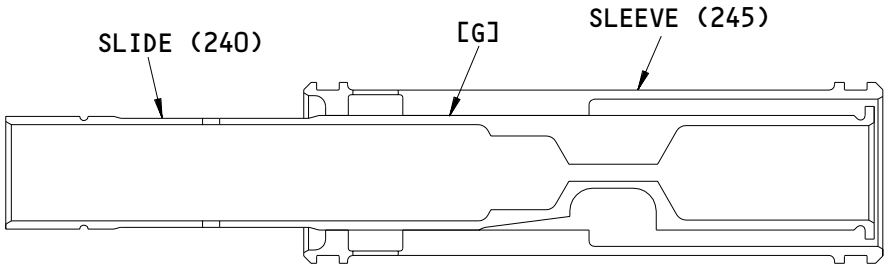

A

ITEM NUMBERS REFER TO IPL FIG. 1

Fits and Clearances
Figure 801 (Sheet 2)

K10780

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REF LETTER	REF IPL FIG. 1, MATING ITEM NO.	DESIGN DIMENSION* DIMENSION MIN	DESIGN DIMENSION* DIMENSION MAX	DESIGN DIMENSION* ASSEMBLY CLEARANCE 7 MIN	DESIGN DIMENSION* ASSEMBLY CLEARANCE 7 MAX	SERVICE WEAR LIMIT* DIMENSION MIN	SERVICE WEAR LIMIT* DIMENSION MAX	SERVICE WEAR LIMIT* MAXIMUM CLEARANCE
[A]	ID 60 6	2.7500	2.7515	0.0010	0.0035	--	2.7558	0.0068
	OD 1	2.7480	2.7480					
[B]	ID 55	4.3760	4.3770	0.0010	0.0030		4.3810	0.0060
	OD 60 6	4.3740	4.3750			4.3710		
[C]	ID 155	2.7590	2.7605	0.0010	0.0030	--	2.7640	0.0060
	OD 2	2.7575	2.7580					
[D]	ID 70 6	4.1240	4.1260	0.0020	0.0060		4.1310	0.0090
	OD 185	4.1200	4.1220			4.1170		
[E]	ID 265	7.7240	7.7270	0.0020	0.0090	7.7140 3 4	7.7300	--
	OD 190 6	7.7180	7.7220					
[F]	ID 110 6	4.3700	4.3800	-0.0060	0.0060		5	--
	OD 185	4.3740	4.3760			4.3700		
[G]	ID 245	1.2590	1.2610	0.0006	0.0008		1.2622	0.0012
	OD 240	1.2590	1.2610			1.2578		

* ALL DIMENSIONS ARE IN INCHES

1 INSTALLATION PIN 161T5010-1

2 INSTALLATION PIN 112T1732-1

3 BEARING RING (190) OD WHEN THE SLIT IN THE BEARING RING IS RESTRAINED TO A 0.0305-0.0295 INCH

4 SERVICE LIMIT THICKNESS OF THE BEARING RING (190) IS 0.0970 INCH MINIMUM

5 THE SERVICE WEAR LIMIT OF THE SNUBBER RING (110) IS DETERMINED BY MEASURING THE WIDTH OF THE SLIT WHILE THE ID IS HELD AT 4.3740-4.3760. THE SERVICE UNIT OF THE WIDTH OF SLIT IS 0.0830 INCH MINIMUM

6 REPLACE PART IF SERVICE WEAR LIMIT IS EXCEEDED

7 NEGATIVE VALUES DENOTE INTERFERENCE FIT

Fits and Clearances
Figure 801 (Sheet 3)

K13922

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REF IPL		NAME	TORQUE*	
FIG. NO.	ITEM NO.		POUND-INCHES	POUND-FEET
1	5	Screw	25-35	
1	30	Restrictor Valve	390-430	
1	45	Nut	5000-5700	
1	55	Rod End		2000-2400
1	120	Screen Fitting	710-785	
1	135	Nut	1700-2000 1	
1	210	Cuplock Nut	90-110	

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

1 WITH 1400-1600 PSI HYDRAULIC
PRESSURE APPLIED TO RETURN PORT

Torque Table
Figure 802

K10786

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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) A32122-1 -- Fixture Equipment (includes fixture and wrenches)

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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.

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VENDORS

5F573 GREENE TWEED AND CO INC
2075 DETWILER RD P.O. BOX 305
KULPSVILLE, PENNSYLVANIA 19443-0305

92555 LEE COMPANY
2 PETTIPAUG ROAD PO BOX 424
WESTBROOK, CONNECTICUT 06498-1591

97820 SHAMBAN POLYMER TECH GROUP
711 MITCHELL ROAD PO BOX 665
NEWBURY PARK, CALIFORNIA 91320-2214

99240 CRISSAIR, INC
38905 TENTH STREET EAST
PALMDALE, CALIFORNIA 93550

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PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
BACR12BM133		1	180	2
		1	255	2
BACR12BM349		1	85	2
BACR12BP140		1	205	2
BACR12BP440		1	105	2
BACW10BP3CD		1	10	2
BAC27TLG15		1	275	1
BCREF11554		1	195A	1
BCREF15589		1	75	1
C11236-349B		1	85	2
FCLX0520200B		1	30	1
FSIX0503850B		1	120	1
JEKA2815130L		1	160	1
MS15004-1		1	40	1
		1	145	2
MS15004-2		1	150	2
MS21209F1-15P		1	20	2
NAS1611-133A		1	175	1
		1	250	1
NAS1611-140A		1	200	1
NAS1611-349A		1	80	1
NAS1611-440A		1	100	1
NAS1612-16A		1	125	1
NAS8203A10		1	5	2
RMR12BM349		1	85	2
STF800-349		1	85	2
S30294-349-1		1	85	2
TF450-349A		1	85	2
2100-349		1	85	2
273A2119-1		1	130	1
273T0050-2		1	270	1
273T1151-1		1	1A	RF
273T1151-2		1	1B	RF
273T1152-1		1	265	1
273T1153-1		1	140	1
273T1153-2		1	165	1
273T1154-1		1	95	1
273T1154-2		1	95B	1
273T1155-1		1	185	1
273T1156-1		1	55	1
273T1157-1		1	90	3
273T1160-1		1	70	1
273T1161-1		1	155	4

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PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
273T1162-1		1	135	1
273T1162-2		1	45	1
273T1163-1		1	210	1
273T1164-1		1	50	1
273T1165-1		1	115	1
273T1166-1		1	15	1
273T1166-2		1	25	1
273T1170-1		1	215	1
273T1171-1		1	235	1
273T1172-1		1	240	1
273T1173-1		1	245	1
273T1174-1		1	260	1
273T1175-1		1	230	1
273T1176-1		1	225	1
273T1177-1		1	220	1
293W2511-26		1	110	1
293W2521-15		1	60	1
293W2527-1		1	190	1
593-346G0-954-0		1	75	1
86903		1	170	1
87322		1	65	1
87323		1	195	
9R3814		1	30A	1
9911-954		1	35	1

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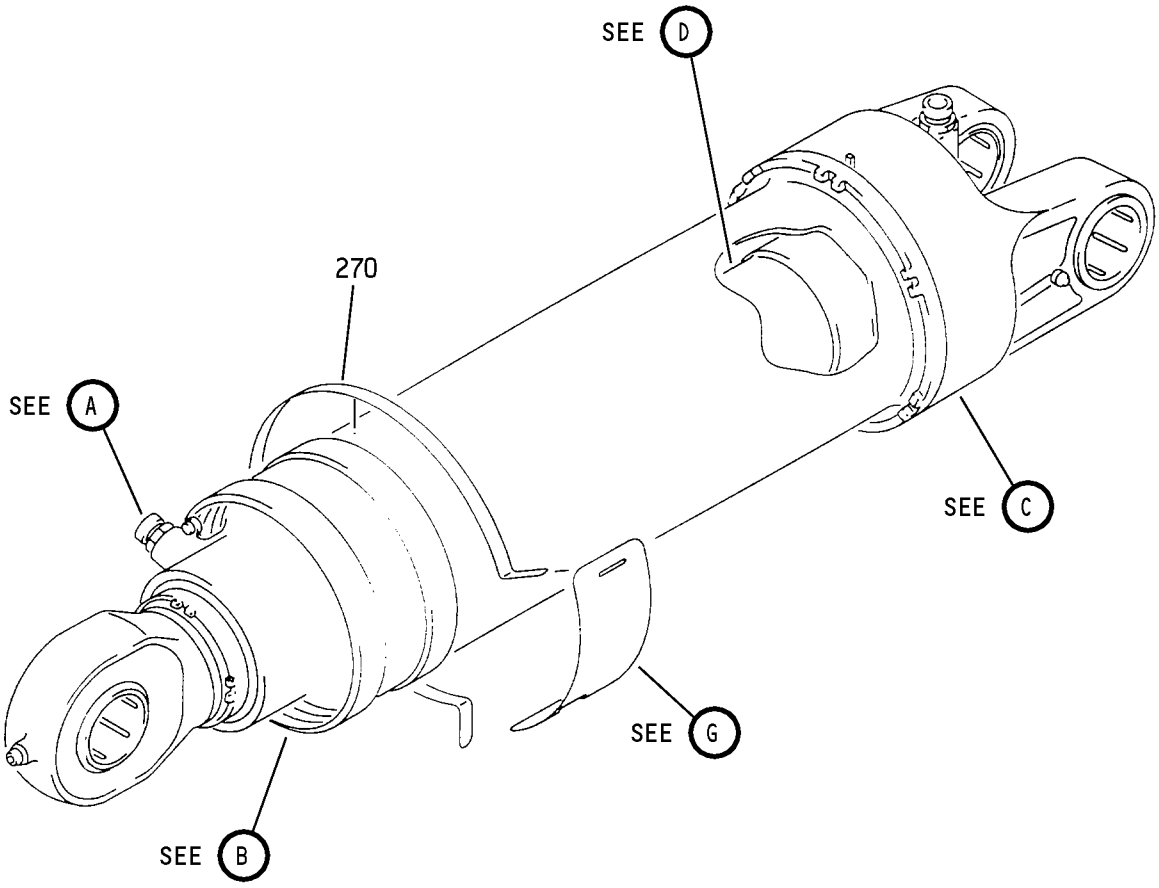

Main Landing Gear Retract Actuator Assembly
Figure 1 (Sheet 1)

K00274

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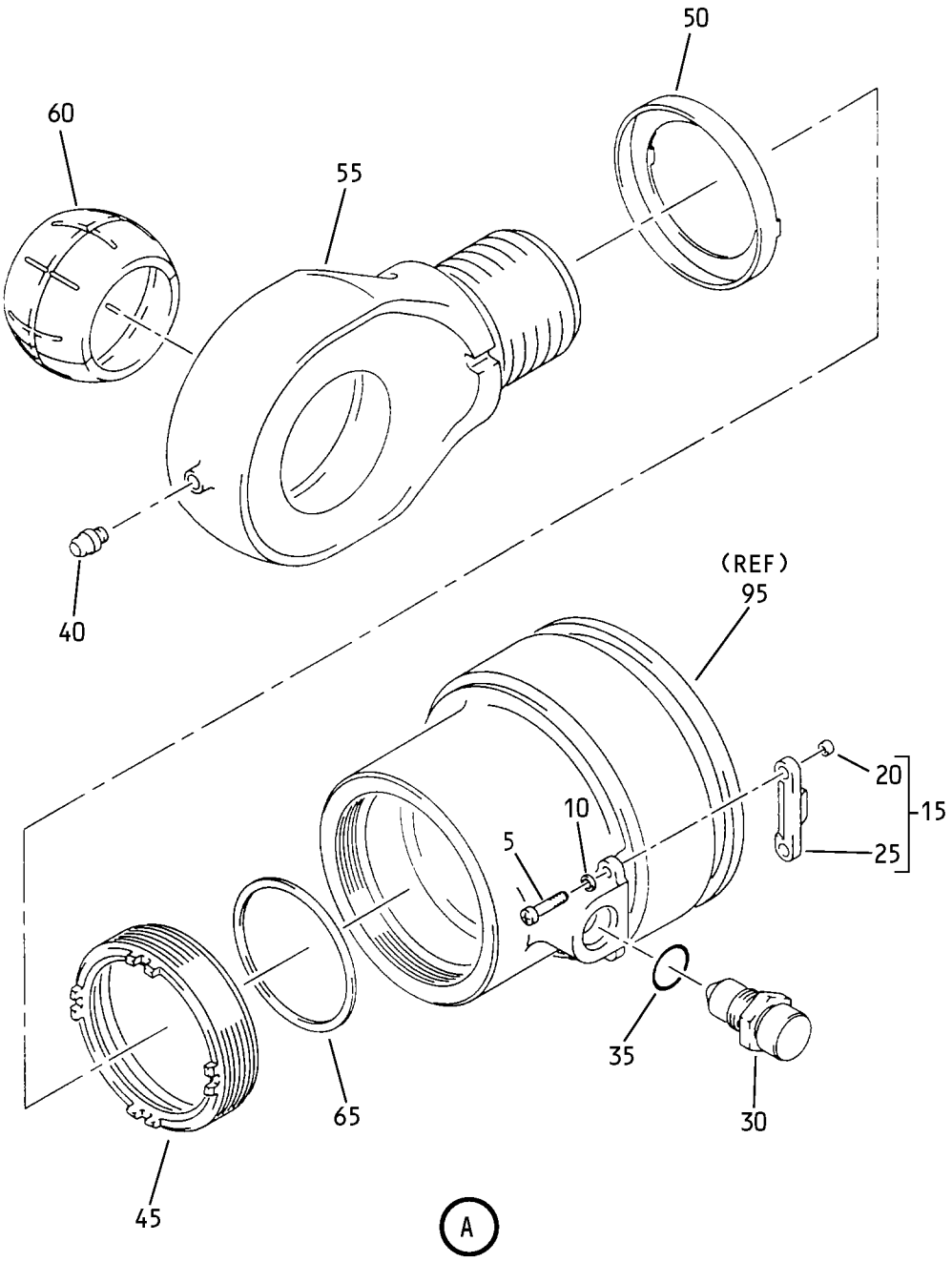

Main Landing Gear Retract Actuator Assembly
Figure 1 (Sheet 2)

K00288

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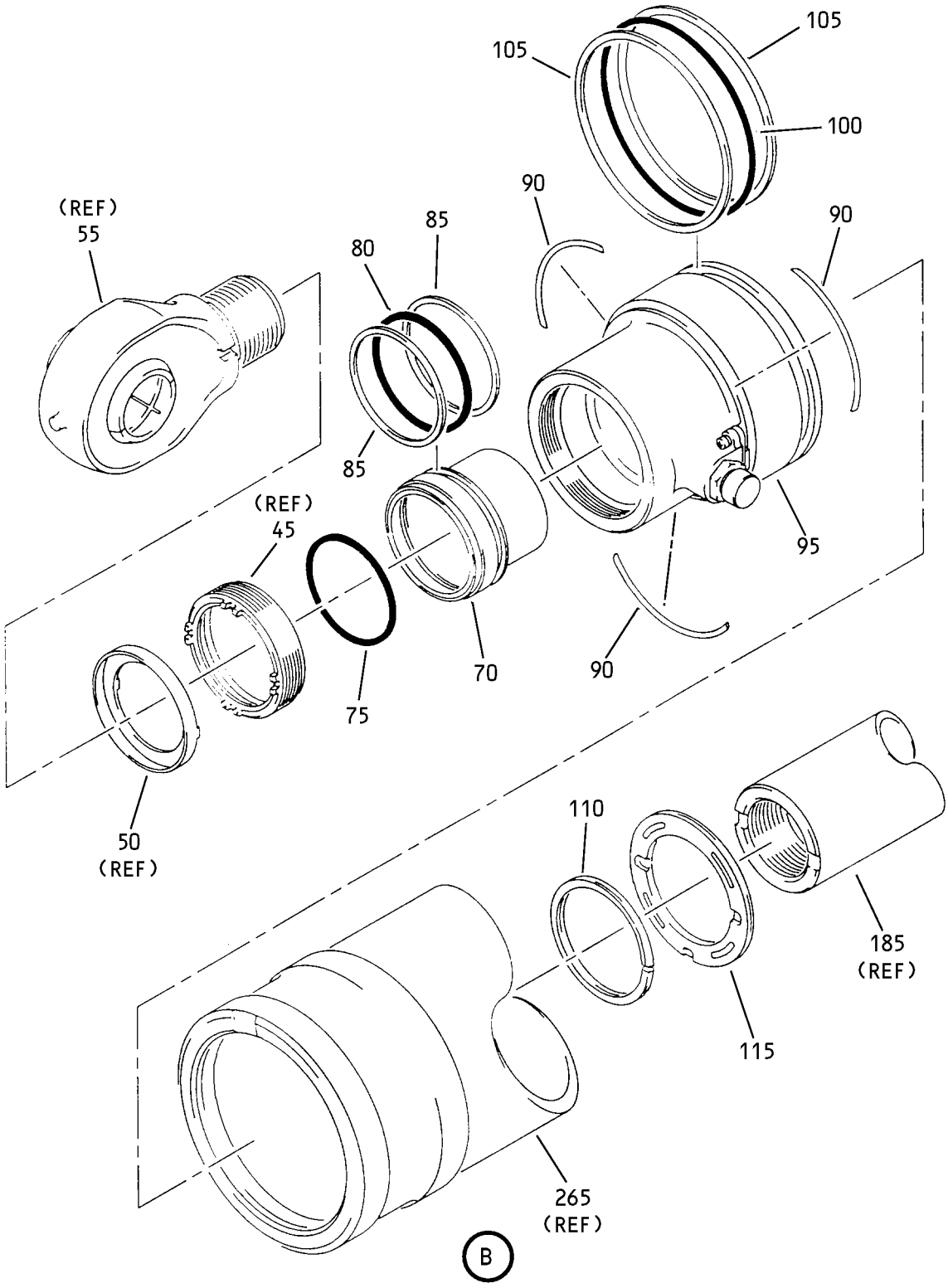

Main Landing Gear Retract Actuator Assembly
Figure 1 (Sheet 3)

K00310

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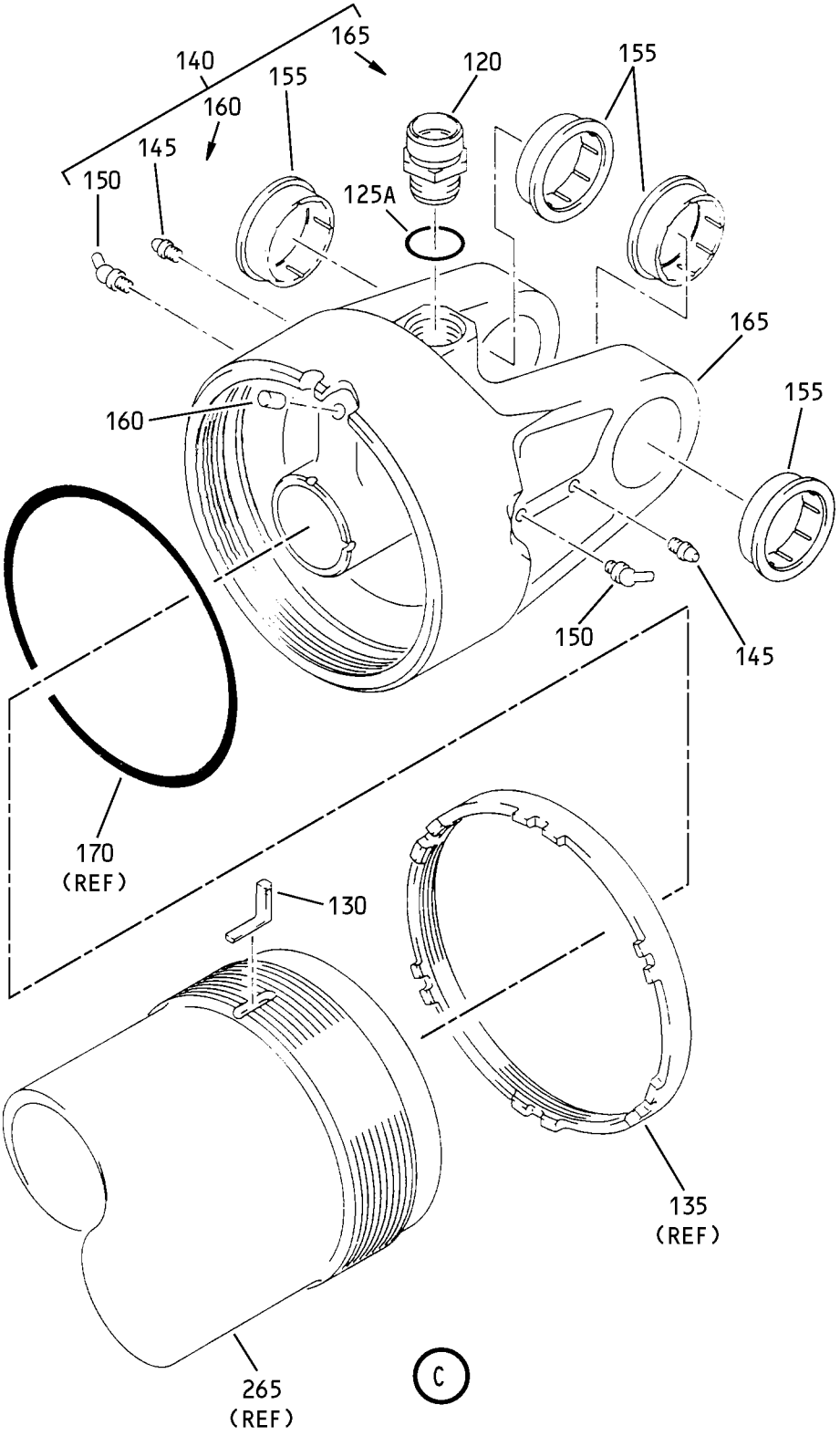

Main Landing Gear Retract Actuator Assembly
Figure 1 (Sheet 4)

K00334

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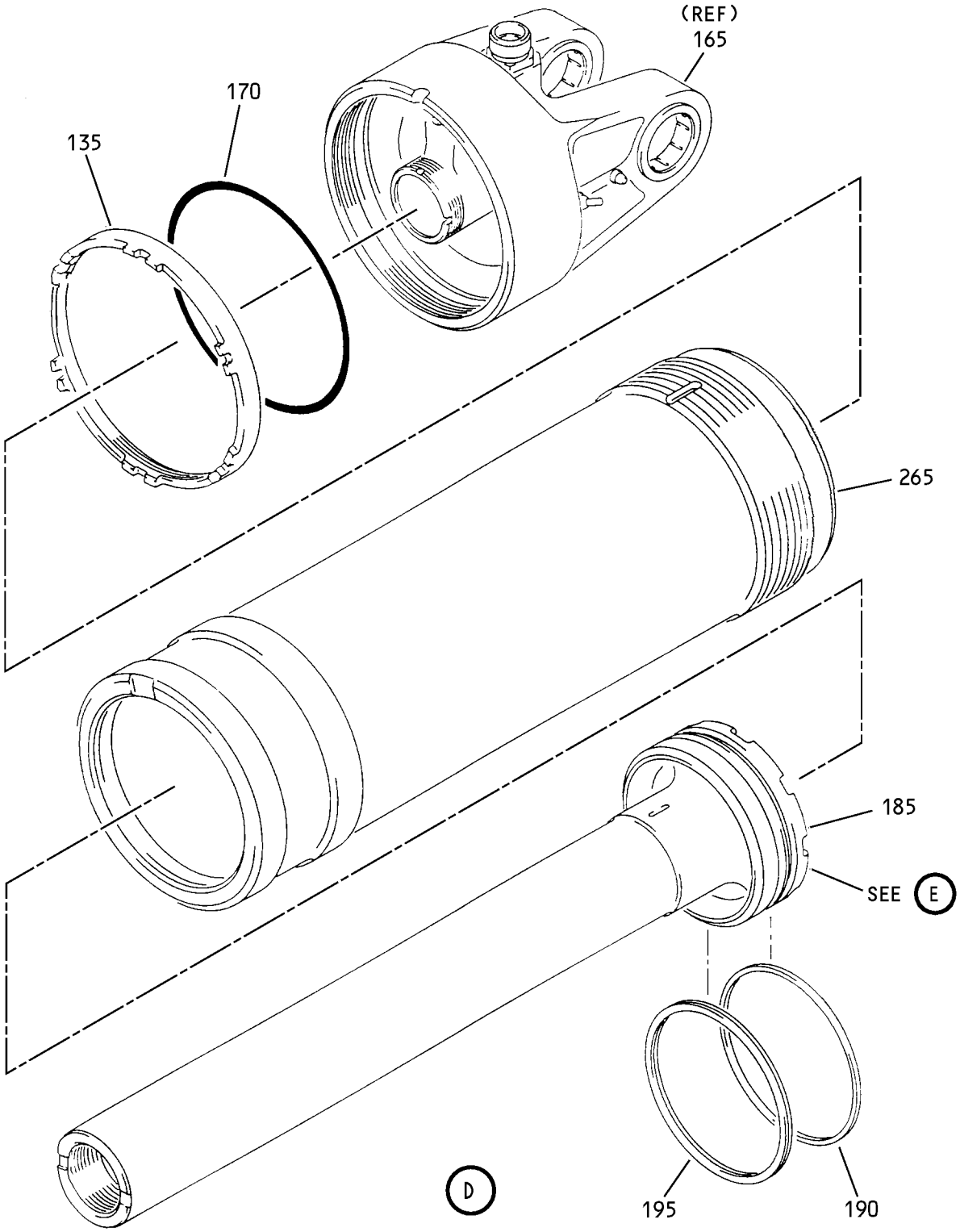

Main Landing Gear Retract Actuator Assembly
Figure 1 (Sheet 5)

K00359

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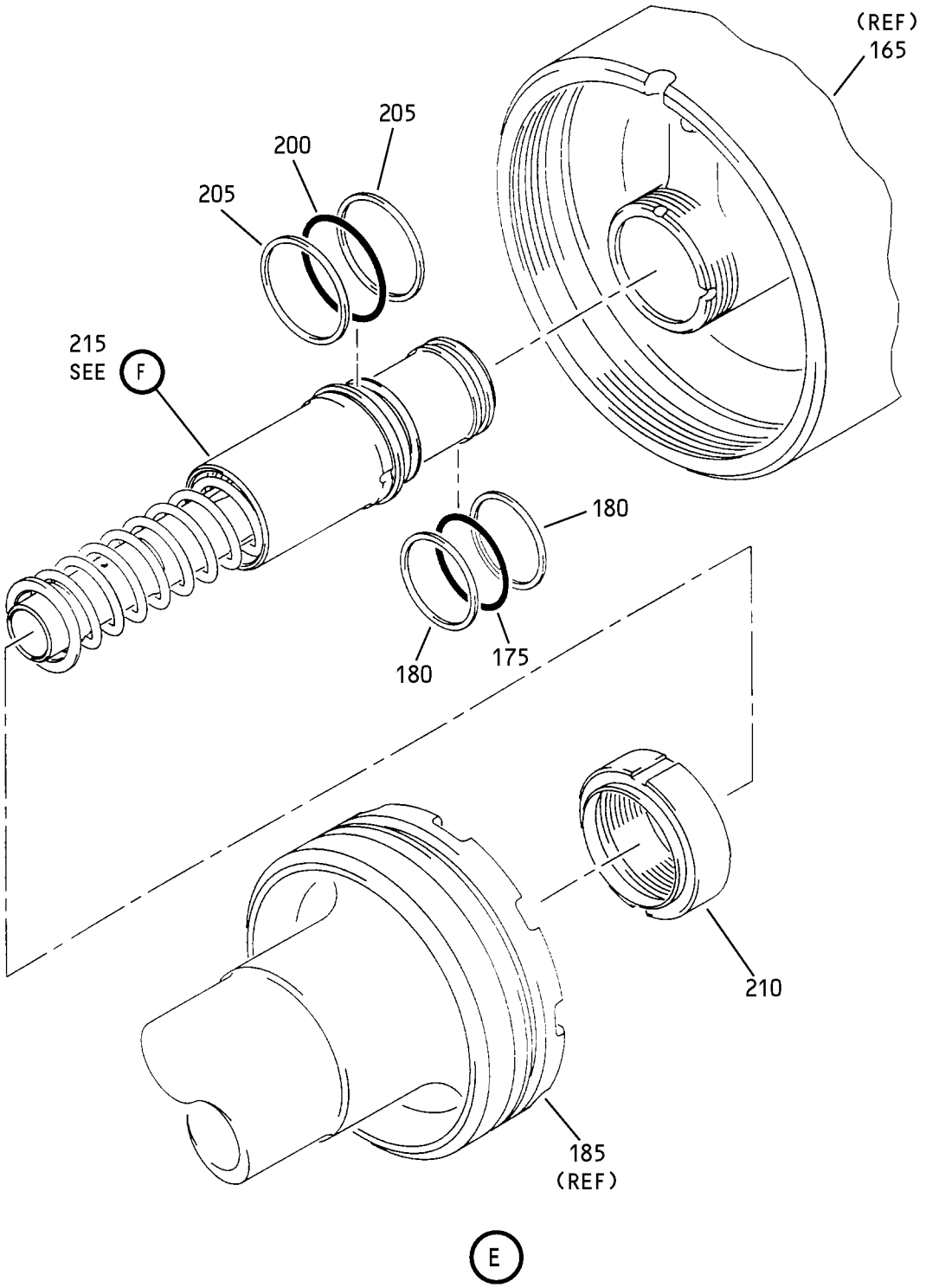

Main Landing Gear Retract Actuator Assembly
Figure 1 (Sheet 6)

K00420

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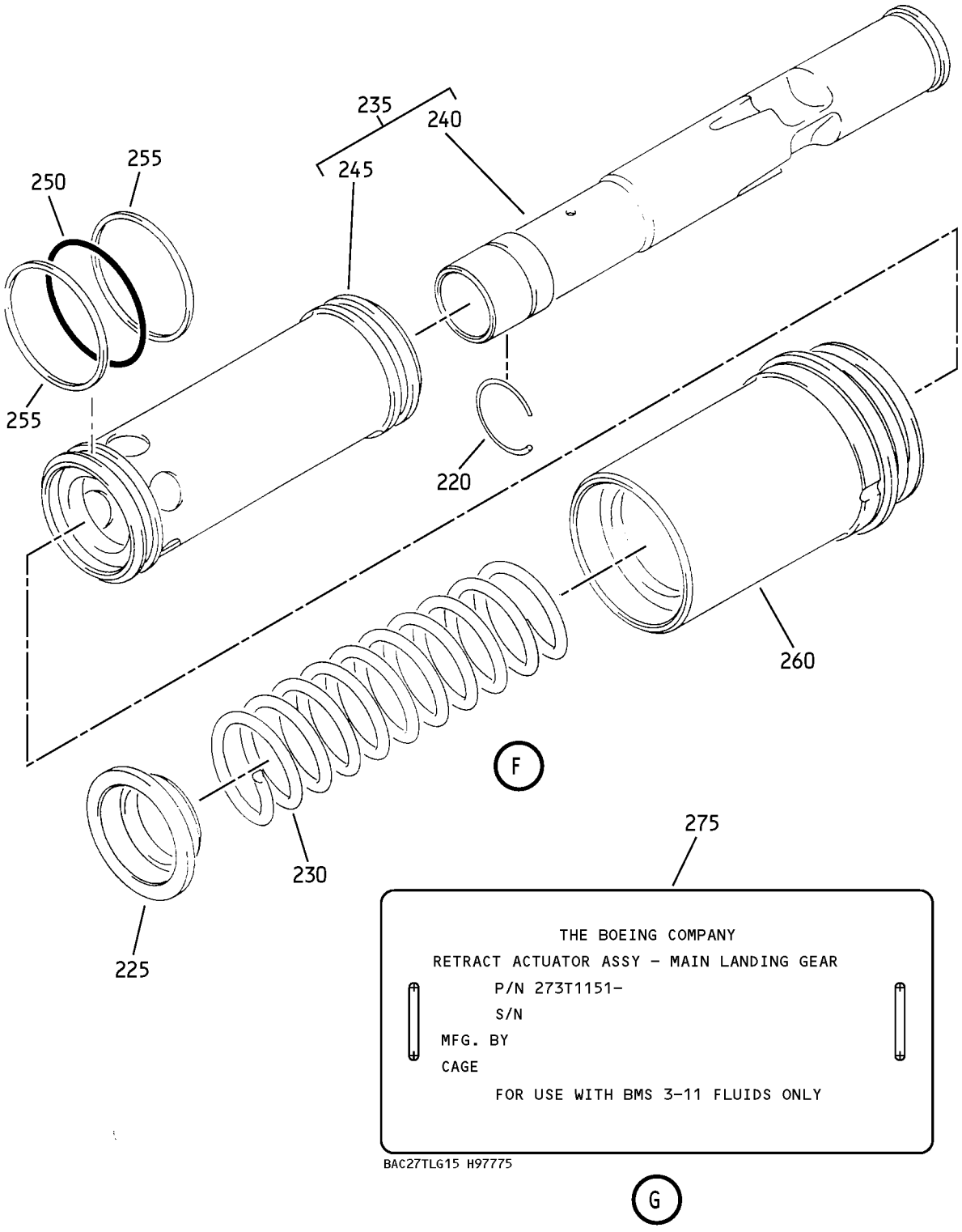

Main Landing Gear Retract Actuator Assembly
Figure 1 (Sheet 7)

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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1A	273T1151-1		ACTUATOR ASSY-RETRACT MLG	A	RF
-1B	273T1151-2		ACTUATOR ASSY-RETRACT MLG	B	RF
5	NAS8203A10		.SCREW		2
10	BACW10BP3CD		.WASHER		2
15	273T1166-1		.RETAINER ASSY-PLUG		1
20	MS21209F1-15P		..INSERT		2
25	273T1166-2		..RETAINER		1
30	FCLX0520200B		.VALVE-RESTRICTOR (V92555)	A	1
-30A	9R3814		.FITTING-FLOW CONTROL (V99240)	B	1
35	9911-954		.PACKING- (V5F573)		1
40	MS15004-1		.FITTING		1
45	273T1162-2		.NUT		1
50	273T1164-1		.WASHER-CUPLOCK		1
55	273T1156-1		.ROD END		1
60	293W2521-15		.BEARING-SPHERICAL		1
65	87322		.SCRAPER-ROD (V5F573)		1
70	273T1160-1		.BEARING-PISTON ROD GLAND		1
75	BCREF15589		.SEAL-ROD (V5F573) (593-346G0-954-0430)		1
80	NAS1611-349A		.PACKING		1
85	BACR12BM349		.RING-BACKUP		2
90	273T1157-1		.SHEAR RING		3
95	273T1154-1		.PLUG-ROD END	A	1
-95B	273T1154-2		.PLUG-ROD END	B	1
100	NAS1611-440A		.PACKING		1
105	BACR12BP440		.RING-BACKUP		2
110	293W2511-26		.RING-SNUBBER		1

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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
115	273T1165-1		.RETAINER		1
120	FSIX0503850B		.FITTING-SCREEN (V92555)		1
125	NAS1612-16A		.PACKING		1
130	273A2119-1		.KEY		1
135	273T1162-1		.NUT		1
140	273T1153-1		.END ASSY-HEAD		1
145	MS15004-1		..FITTING		2
150	MS15004-2		..FITTING		2
155	273T1161-1		..BUSHING		4
160	JEKA2815200L		DELETED		
160A	JEKA2815130L		..ORIFICE- (V92555)		1
165	273T1153-2		..HEAD END		1
170	86903		.SEAL-STATIC (V5F573)		1
175	NAS1611-133A		.PACKING		1
180	BACR12BM133		.RING-BACKUP		2
185	273T1155-1		.ROD-PISTON		1
190	293W2527-1		.RING-BEARING		1
195	87323		DELETED		
-195A	BCREF11554		.SEAL-PISTON (V97820) (S32152-442-29PH-X)		1
200	NAS1611-140A		.PACKING		1
205	BACR12BP140		.RING-BACKUP		2
210	273T1163-1		.NUT-CUPLOCK		1
215	273T1170-1		.SNUBBER ASSY		1
220	273T1177-1		..CLIP-RETAINING		1
225	273T1176-1		..RETAINER-SPRING		1
230	273T1175-1		..SPRING		1
235	273T1171-1		..VALVE ASSY		1
240	273T1172-1		...SLIDE		1
245	273T1173-1		...SLEEVE		1
250	NAS1611-133A		..PACKING		1
255	BACR12BM133		..RING-BACKUP		2
260	273T1174-1		..RETAINER-SLEEVE		1
265	273T1152-1		.BARREL		1
270	273T0050-2		.STRAP		1
275	BAC27TLG15		.MARKER		1

- Item Not Illustrated

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