COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

NOSE LANDING GEAR STEERING ACTUATOR ASSEMBLY

PART NUMBER 275A1101–3, –4, –5, –6, –7, –8

PUBLISHED BY BOEING COMMERCIAL AIRPLANES GROUP, SEATTLE, WASHINGTON, USA
A DIVISION OF THE BOEING COMPANY
PAGE DATE: Jul 01/2009

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COMPONENT MAINTENANCE MANUAL

Revision No. 20
Jul 01/2009

To: All holders of NOSE LANDING GEAR STEERING ACTUATOR ASSEMBLY 32-51-52.

Attached is the current revision to this COMPONENT MAINTENANCE MANUAL

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A = Added, R = Revised, D = Deleted, O = Overflow

Subject/Page	Date	Subject/Page	Date	Subject/Page	Date
32-51-52 ILLUSTRATED PARTS LIST (cont)					
1009	Mar 01/2007				
1010	Mar 01/2007				
1011	Mar 01/2007				
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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR 38117	JUN 01/97

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Revision		Filed	
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Temporary Revision		Inserted		Removed	
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INTRODUCTION

1. General

A. The instructions in this manual supply the data necessary to do the maintenance functions together with the test, fault isolation, repair, and replacement of the defective parts.

B. This manual is divided into different parts:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) List of Effective Pages

(5) Table of Contents

(6) Temporary Revision & Service Bulletin Record

(7) Record of Revisions

(8) Record of Temporary Revisions

(9) Introduction

(10) Procedures & IPL Sections

C. Components that can be repaired have a different repair number for each specified repair. To find the repair number location of a component, look in the Repair-General procedure at the beginning of the REPAIR section. The Repair-General procedure also has an explanation of the True Position Dimension symbols used.

D. All dimensions, measures, quantities and weights included are in English units. When metric equivalents are given they will be in the parentheses that follow the English units.

E. The introduction to the Illustrated Parts List (IPL) shows how the IPL data is used.

F. Design changes, optional parts, configuration differences and Service Bulletin modifications may cause different part numbers. These part numbers are identified in the IPL with an alphabetical letter which is added to the end of the basic item number. This new item number is referred to as an alpha-variant. Throughout the manual, IPL basic item number references also apply to alpha-variants unless shown differently.

G. The tool reference numbers found in the individual procedures and in the Special Tools, Fixtures, and Equipment section are used to identify if a tool is a standard tool (STD-XXXX), a commercial tool (COM-XXXX), or a Special Tool (SPL-XXXX). This reference number is also used to distinguish between tools with similar names in the same procedure. These reference numbers are for use in the documentation only. They are not to be used for ordering tools.

NOSE LANDING GEAR STEERING ACTUATOR ASSEMBLY - DESCRIPTION AND OPERATION

1. Description

A. The nose landing gear steering actuator assembly is a double action hydraulic piston type which includes a piston, a cylinder assembly and a rod end assembly.

2. Operation

A. Two of these actuators are attached by the trunnion assembly between the top and the bottom steering plates on the nose gear outer cylinder. The actuator rod ends are attached to the steering collar of the torque links. Mechanical movement is transmitted through the torque links to the inner cylinder of the nose landing gear.

3. Leading Particulars (Approximate)

A. Length – 15 inches

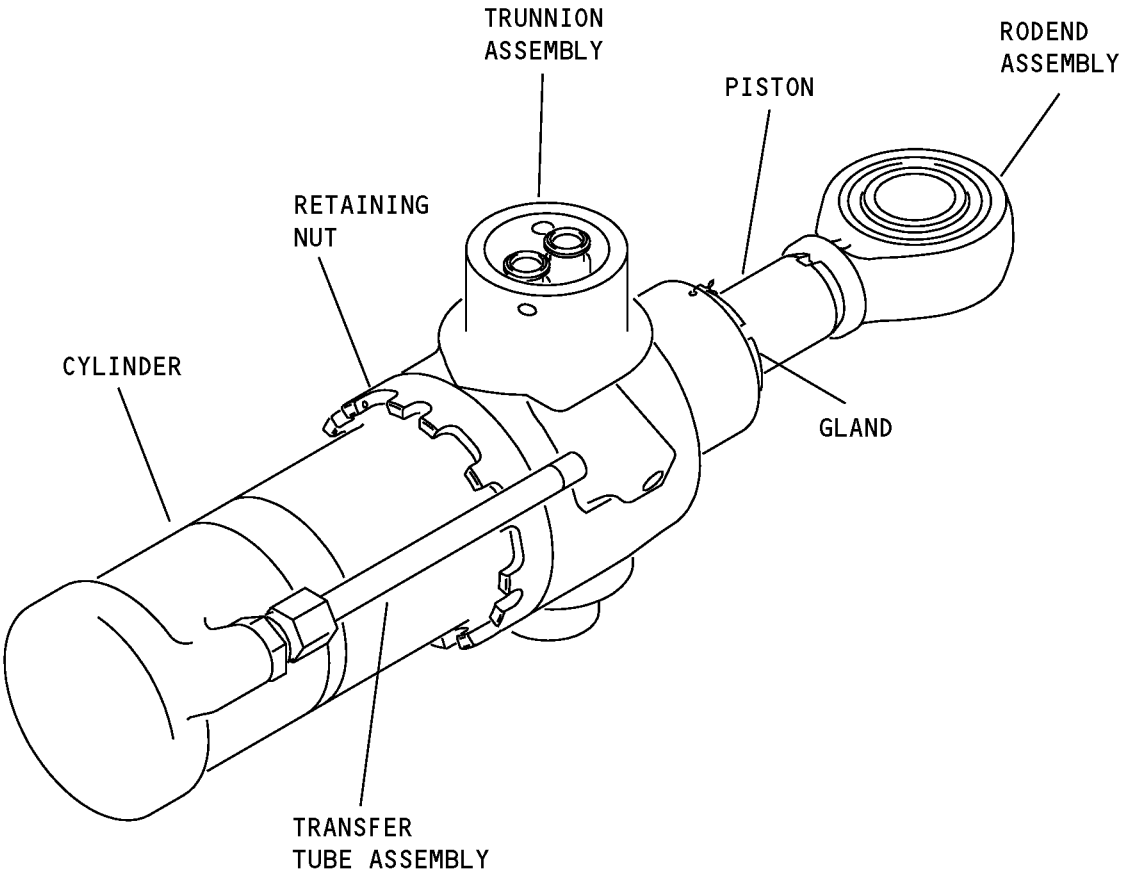
B. Diameter – 4 inches

C. Weight – 18 pounds

D. Pressure (proof) – 4500 psi

E. Pressure (operate) – 3000 psi

F. Hydraulic Fluid – fluid, D00153



Nose Landing Gear Steering Actuator Assembly
Figure 1

TESTING AND FAULT ISOLATION

1. General

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

(1) Nose Gear Steering Actuator Assembly Test

(a) External leakage

(b) Internal leakage

(c) Seal friction

(d) 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 Figure 1 for item numbers.

2. Nose Gear Steering Actuator Test

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-5401	NLG Actuator Assembly Removal/Installation Fixture Equipment (Part #: C32036-45, Supplier: 81205)
SPL-5405	Adapter-Functional Test, NLG Steering Actuator (Part #: C32039-1, Supplier: 81205)

B. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00153	Fluid - Hydraulic, Erosion Arresting, Fire Resistant	BMS3-11 Type IV (interchange˜able & intermixable with Type V)
G01912	Lockwire - Monel (0.032 In. Dia.)	NASM20995N˜C32 (QQ-N-281)

C. References

Reference	Title
SOPM 20-50-02	INSTALLATION OF SAFETYING DEVICES
SOPM 20-60-03	LUBRICANTS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

D. General

(1) You will visibly monitor the actuator for leaks and measure the rate of the piston.

E. Standard Tools and Equipment

(1) A hydraulic test stand with these requirements:

(a) Can operate with fluid, D00153.

(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 60-100°F.

F. Prepare for Test

(1) Install the functional test adapter tool, SPL-5405 on the actuator.

(2) Attach the Removal/Installation Fixture Equipment, SPL-5401 lines to the ports.

(3) Fill the actuator with hydraulic fluid.

NOTE: The actuator will stay full of hydraulic fluid, D00153 for each test.

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

NOTE: Use the minimum pressure that is necessary to extend and retract the actuator until the hydraulic fluid has no air.

(5) Tighten the nut (35).

(a) Use the miminum pressure to extend the piston (90).

(b) Apply 2900-3100 psi to the extend port.

(c) With the spanner wrench, tighten the nut (35) to 1000-1200 pound-inches.

G. Procedure

NOTE: For lubricants, refer to SOPM 20-60-03. For miscellaneous materials, refer to SOPM 20-60-04.

WARNING: DO NOT APPLY COMPRESSED AIR TO PORT AT ANY TIME. IF COMPRESSED AIR IS APPLIED, THE UNIT CAN OPERATE ACCIDENTALLY. THIS CAN CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(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.

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 3000-3100 psi when the actuator stops at the end of the piston travel and maintain the pressure for 0.5 to 2 seconds.

4) Remove the pressure from the extend port.

5) Change the hydraulic fluid direction.

NOTE: The actuator is in the fully extended position.

6) Apply the minimum hydraulic pressure to the retract port that is necessary to move the piston.

7) Increase the pressure to 3000-3100 psi when the actuator stops at the end of the piston travel and maintain the pressure for 0.5 to 2 seconds.

8) Remove the pressure from the retract port.

9) Do steps 1-8 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 2 drops.

3) The leakage limit for static seals is zero.

(2) Do an internal leakage test.

(a) Fully extend the rod.

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

(c) Apply 2900-3100 psi to the extend port for a minimum of 1 minute.

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

1) Recommended leakage is zero.

2) The leakage limit is 2 drops per minute.

(e) Apply 100 psi to the extend port of a minimum of 1 minute.

(f) Do a visual check for leakage from the open retract port:

1) Recommended leakage is zero.

2) The leakage limit is 2 drops per minute.

(g) Remove the pressure from the extend port.

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

(i) Fully retract the rod.

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

(k) Apply 2900-3100 psi to the retract port for a minimum of 1 minute.

(l) Do a visual check for leakage from the open extend port.

1) Recommended leakage is zero.

2) The leakage limit is 2 drops per minute.

(m) Apply 100 psi to the retract port of a minimum of 1 minute.

(n) Do a visual check for leakage from the open extend port.

1) Recommended leakage is zero.

2) The leakage limit is 2 drops per minute.

(o) Remove the pressure from the retract port.

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

(3) Do a seal friction test.

(a) Retract the actuator rod fully.

(b) Apply no pressure to the retract port.

(c) With no load applied to the rod, slowly increase the pressure to 50 psi maximum at the extend port.

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

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

(e) Make sure the rod is fully extended.

(f) Apply no pressure to the extend port.

(g) With no load applied to the rod, slowly increase the pressure to 50 psi maximum at retract port.

1) The rod must retract fully with a smooth, continuous movement.

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

(4) Do a proof pressure test.

(a) Retract the actuator rod fully.

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

(b) Apply 4500-4700 psi pressure to the retract port for a minimum of 1 minute.

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

(d) Remove the pressure from the retract port.

(e) Extend the actuator rod fully.

(f) Apply 4500-4700 psi pressure to the extend port for a minimum of 1 minute.

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

(h) Remove the pressure from the extend port.

(5) Make sure that the actuator has an extend dimension of 13.5309-13.6309 inches and a retract length of 5.6525-5.8158 inches between the centerline of the trunnion and the centerline of the rod end bearing.

(6) Remove the actuator from the holding fixture.

(7) Lockwire the bearing (15) to the trunnion assembly (40), and lockwire the nut (35) to the key (37A) using lockwire, G01912. Use the double-twist method (SOPM 20-50-02).

(8) Fill the unit with hydraulic fluid, D00153 and install the shipping caps.

3. Fault Isolation

A. Refer to the TESTING AND FAULT ISOLATION, Table 101 for causes of the problems found and the procedures to correct them.

Table 101: Fault Isolation Chart

TROUBLE	PROBABLE CAUSE	CORRECTIONS
Too much leakage at the rod end assembly	Defective scraper (55B), seal (60), rings (65B), seal (70A) or rings (75A)	Disassemble and replace the parts as shown in TESTING AND FAULT ISOLATION, Paragraph 4.A. and TESTING AND FAULT ISOLATION, Paragraph 4.B..
Too much internal leakage	Defective seal (80) or rings (85B), or scored barrel (130)	Disassemble and replace the parts as shown in TESTING AND FAULT ISOLATION, Paragraph 4.A. and TESTING AND FAULT ISOLATION, Paragraph 4.B..
Movement of the rod assembly not smooth	Defective piston (90), bearing (15), cylinder (130) or trunnion assembly (40)	Disassemble and replace the parts as shown in TESTING AND FAULT ISOLATION, Paragraph 4.A. and TESTING AND FAULT ISOLATION, Paragraph 4.B..
	Dirt or unwanted matter in the cylinder	Disassemble and clean the parts.

4. Fault Correction

A. Procedure

(1) Drain all the hydraulic fluid from the unit.

(2) Replacement of scraper (55B), seal (60), rings (65B), packing (70A) and rings (75A):

(a) Remove the rod end assembly (100A) from piston (90). Remove rod end (110A) and cup lockwasher (95A) from piston (90).

(b) Remove the gland (15) from trunnion assembly (40).

(c) Remove the scraper (55B), seal (60), rings (65B), gland (15), packing (70A) and rings (75A).

(d) Replace parts as necessary.

(e) Install gland (15) with packing (70A) and rings (75A), scraper (55B), rings (65B), seal (60), and cup lockwasher (95) on piston (90). Push these parts back into trunnion assembly (40).

(f) Install gland (15) in trunnion assembly (40). Install cup lockwasher (95) and rod end assembly (100A) on piston (90) as shown in ASSEMBLY. Do the test again to see if the problem was corrected.

(3) Replacement of piston seal (80) and rings (85B).

(a) Do steps TESTING AND FAULT ISOLATION, Paragraph 4.A.(1), TESTING AND FAULT ISOLATION, Paragraph 4.A.(2).

(b) Remove piston (90) from cylinder (130).

(c) Replace defective seal (80) and rings (85B).

(d) Install piston (90) in cylinder (130).

(e) Do steps TESTING AND FAULT ISOLATION, Paragraph 4.A.(1), TESTING AND FAULT ISOLATION, Paragraph 4.A.(2).

B. Replacement of piston (90) or cylinder (130).

(1) Drain the hydraulic fluid from the actuator.

(2) Disassemble the actuator (DISASSEMBLY).

(3) Replace the defective parts.

(4) Assemble the actuator (ASSEMBLY).

(5) Test as shown in TESTING AND FAULT ISOLATION, Paragraph 2.G..

DISASSEMBLY

1. General

A. This procedure has the data necessary to disassemble the nose gear steering 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 Figure 1 for item numbers.

2. Disassembly

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-5401	NLG Actuator Assembly Removal/Installation Fixture Equipment (Part #: C32036-45, Supplier: 81205)

B. General

(1) To disassemble the actuator, it is necessary to hold the actuator in the holding fixture.

C. Part Replacement

NOTE: The parts which follow are recommended for replacement. Unless a procedure tells you to replace a part, replacement is optional.

(1) Packings, O-rings and seals (25, 60, 67, 70A, 80, 140, 160)

(2) Scraper (55B)

(3) Backup rings (30, 65B, 68, 75A, 85B, 155)

NOTE: Do not remove pin (45B), plug (47) unless necessary to stop a leak here or to clean the area.

D. Procedure

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

(2) Install the actuator in the Removal/Installation Fixture Equipment, SPL-5401.

(3) Remove the lockwire from the nut (35) and the key (37A).

(4) Loosen the transfer tube assembly (165) on the union (145).

(5) Move the transfer tube assembly (165) into the trunnion assembly (40) until it is clear of the cylinder (130).

(6) Loosen the nut (35) with the spanner wrench.

(7) Remove the key (37A) from the trunnion assembly (40).

(8) Turn the cylinder (130) to remove it from the trunnion assembly (40) and the piston (90).

(9) Turn the nut (35) to remove it from the cylinder (130).

(10) Remove the transfer tube assembly (165), the union (145) and the packing (140) from the cylinder (130) and the trunnion assembly (40).

(11) Remove the piston seal (80) and the backup rings (85B) from the piston (90).

(12) Remove the packing (67, 160) and the backup rings (68, 155) from the trunnion assembly (40).

(13) Install the piston (90) and the attached items in the torque adapter.

(14) Bend the tab of the lockwasher cup (95A) to release the rod end assembly (100A).

(15) Loosen the rod end assembly (100A) on the piston (90).

(16) Loosen the bearing (15) in the trunnion assembly (40).

(17) Turn the rod end assembly (100A) to remove it from the piston (90).

(18) Remove the lockwasher cup (95A) from the rod end assembly (100A).

(19) Remove the piston (90) from the trunnion assembly (40).

(20) Remove the scraper (55B), the seal (60) and the backup rings (65B) from the bearing (15).

(21) Turn the bearing (15) to remove it from the trunnion assembly (40).

(22) Remove the packing (70A) and the backup rings (75A) from the bearing (15).

(23) Remove the transfer tubes (20) from the trunnion assembly (40).

(24) Remove the packing (25) and backup rings (30) from the transfer tubes (20).

CLEANING

1. General

A. This procedure has the data necessary to clean the nose gear steering actuator assembly.

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

C. Refer to IPL Figure 1 for item numbers.

2. Cleaning

A. References

Reference	Title
SOPM 20-30-01	CLEANING AND RELUBRICATING BEARINGS
SOPM 20-30-03	GENERAL CLEANING PROCEDURES

B. Procedure

(1) Clean the bearings (105) as specified in SOPM 20-30-01.

(2) Clean the other parts by standard industry procedures and the instructions in SOPM 20-30-03.

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 the SOPM subjects identified in this procedure.

D. Refer to IPL Figure 1 for item numbers.

2. Check

A. References

Reference	Title
SOPM 20-20-01	MAGNETIC PARTICLE INSPECTION
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 magnetic particle check (SOPM 20-20-01) of these parts:

(a) Transfer tube (20)

(b) Nut (35)

(c) Trunnion (50)

(d) Piston (90)

(e) Rod end (110A, 110B)

(f) Cylinder (130)

(g) Tube (175)

(h) Key (37A)

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

(a) Bearing (15)

REPAIR

1. General

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

Table 601:

PART NUMBER	NAME	REPAIR
—	REFINISH OF OTHER PARTS	1-1
273A2122	TRANSFER TUBE ASSEMBLY	2-1
273A2508	NAMEPLATE	3-1
275A1102	CYLINDER	4-1
275A1103	PISTON	5-1
275A1104	TRUNNION ASSEMBLY	6-1
275A1105	BEARING, ROD GLAND	7-1
275A1106	ROD END ASSEMBLY	8-1, 8-2
275A1107	NUT, CYLINDER RETAINING	9-1
275A1108	TRANSFER TUBE	10-1

2. Dimensioning Symbols

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

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 the SOPM subjects identified in this procedure.

C. Refer to IPL Figure 1 for item numbers.

2. Refinish of other parts

A. References

Reference	Title
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES

B. Procedure

NOTE: For the decoding table for Boeing finish codes, refer to SOPM 20-41-01.

(1) Refer to REPAIR 1-1, Table 601 for refinish details.

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
IPL Fig. 1		
Bearing (97)	Al-Ni-Bronze	No finish (F-25.01).

TRANSFER TUBE ASSEMBLY - REPAIR 2-1

273A2122–5

1. General

A. This procedure has the data necessary to repair and refinish the transfer tube assembly (165).

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

C. Refer to IPL Figure 1 for item numbers.

D. General repair details:

(1) Material: Steel tubing 21-6-9

2. Transfer Tube Assembly Refinish

A. References

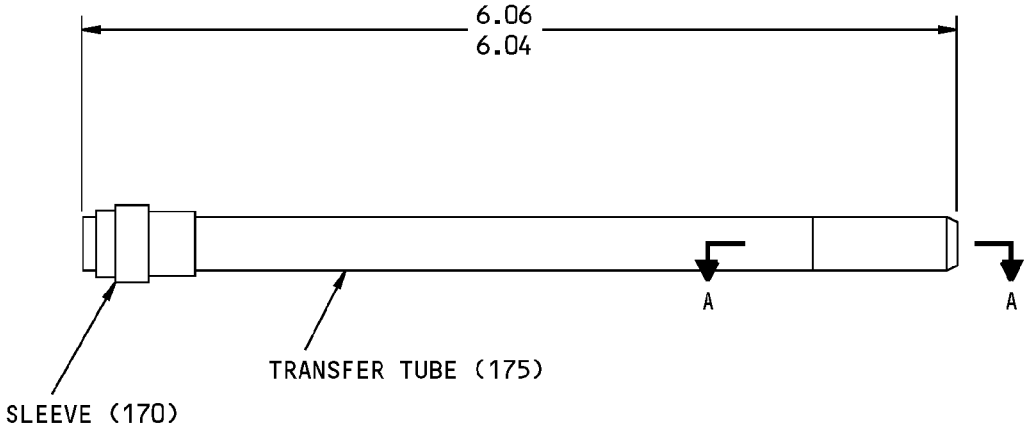
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES

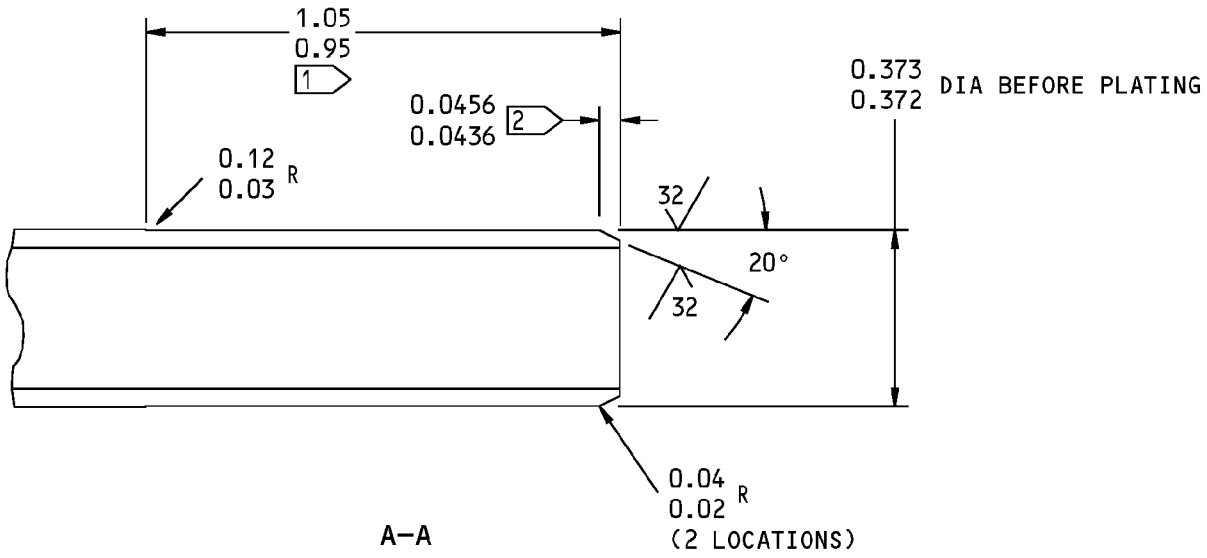
B. Procedure (REPAIR 2-1, Figure 601)

NOTE: For stripping of protective finishes, mrefer to SOPM 20-30-02. For the decoding table for Boeing finish codes, refer to SOPM 20-41-01.

(1) Passivate (F-17.25).

(2) Chrome plate (F-15.43, which replaces F-14.892) the area shown.





1 CHROME PLATE (F-15.43, WHICH REPLACES F-14.892) THIS AREA, 0.0005-0.0007 THICK

2 CHROME PLATE RUNOUT AREA

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273A2122-5 Transfer Tube Assembly Repair and Refinish
Figure 601

NAMEPLATE INSTALLATION - REPAIR 3-1

273A2508–4

1. General

A. This repair has instructions for the replacement of the nameplate (180).

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

C. Refer to IPL Figure 1 for item numbers.

2. Nameplate Replacement

A. References

Reference	Title
SOPM 20-50-21	HOW TO INSTALL NAMEPLATE STRAPS AND SEALS

B. General

(1) Use a new strap (130) each time you install the nameplate (180).

C. Procedure

(1) Install a replacement nameplate (180) as shown in SOPM 20-50-21.

CYLINDER - REPAIR 4-1

275A1102–1

1. General

A. This procedure has the data necessary to repair and refinish the cylinder (130).

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

C. Refer to IPL Figure 1 for item numbers.

D. General repair details:

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

(2) Shot peen: As shown Intensity 0.008-0.013A2

2. Cylinder Repair

A. References

Reference	Title
SOPM 20-10-01	REPAIR AND REFINISH OF HIGH STRENGTH STEEL PARTS
SOPM 20-10-02	MACHINING OF ALLOY STEEL
SOPM 20-10-03	SHOT PEENING
SOPM 20-10-04	GRINDING OF CHROME PLATED PARTS
SOPM 20-20-01	MAGNETIC PARTICLE INSPECTION
SOPM 20-42-03	HARD CHROME PLATING

B. Procedure (REPAIR 4-1, Figure 601)

(1) Machine as required (SOPM 20-10-01 and SOPM 20-10-02), within the repair limits, to remove any defects.

(2) Do a magnetic particle check (SOPM 20-20-01).

(3) Shot peen the surfaces (SOPM 20-10-03).

(4) Build up with chrome plate (SOPM 20-42-03) and grind to design dimensions and finish (SOPM 20-10-04).

(5) Do a magnetic particle check (SOPM 20-20-01).

3. Cylinder Refinish

A. References

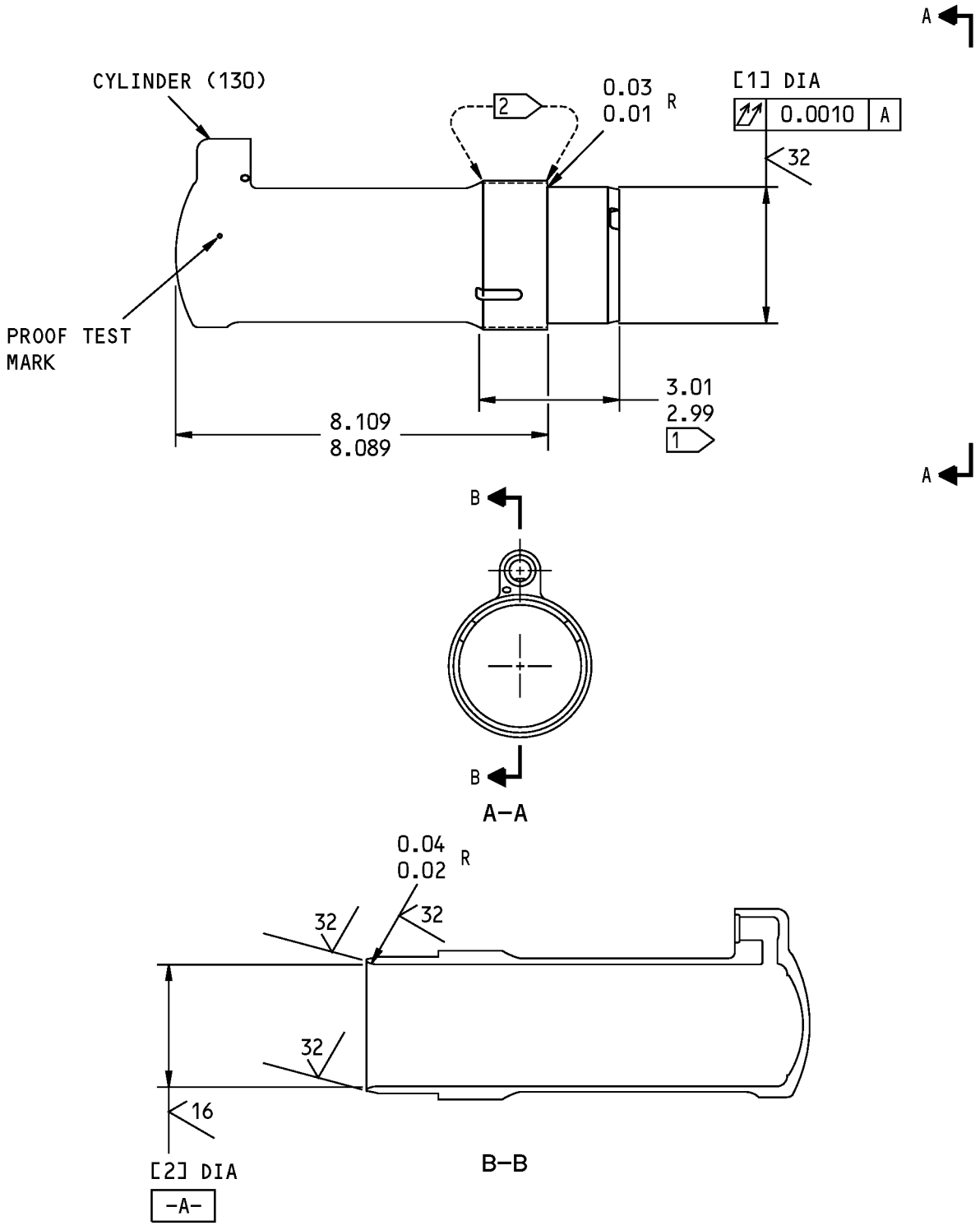
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-03	LUBRICANTS

B. Procedure (REPAIR 4-1, Figure 601)

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For the decoding table for Boeing finish codes, refer to SOPM 20-41-01. For lubricants, refer to SOPM 20-60-03.

(1) Passivate (F-17.25).

(2) Apply solid film lubricant (F-19.10) as shown.



275A1102-1 Cylinder Repair and Refinish
Figure 601 (Sheet 1 of 2)

REFERENCE NUMBER	[1]	[2]
DESIGN DIMENSION	2.873 2.871	2.620 2.618
REPAIR LIMIT 3	2.843	2.648

1 DO NOT SHOT PEEN THIS AREA

2 APPLY SOLID FILM LUBRICANT (F-19.10) (F-19.81 OR F-19.82 OPTIONAL) TO THE THREADS. OVERSPRAY IS PERMITTED

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

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

275A1102-1 Cylinder Repair and Refinish
Figure 601 (Sheet 2 of 2)

PISTON - REPAIR 5-1

275A1103–1, –2

1. General

A. This procedure has the data necessary to repair and refinish the piston (90).

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

C. Refer to IPL Figure 1 for item numbers.

D. General repair details:

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

(2) Shot peen: All surfaces, unless shown, Intensity 0.008-0.013A2

(3) Make sure the edges of the slot are not sharp.

2. Piston Repair and Refinish

A. References

Reference	Title
SOPM 20-10-01	REPAIR AND REFINISH OF HIGH STRENGTH STEEL PARTS
SOPM 20-10-02	MACHINING OF ALLOY STEEL
SOPM 20-10-03	SHOT PEENING
SOPM 20-10-04	GRINDING OF CHROME PLATED PARTS
SOPM 20-20-01	MAGNETIC PARTICLE INSPECTION
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-42-03	HARD CHROME PLATING

B. Procedure (REPAIR 5-1, Figure 601)

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For the decoding table for Boeing finish codes, refer to SOPM 20-41-01.

(1) Repair

(a) Machine as required, within repair limits to remove defects (SOPM 20-10-01 and SOPM 20-10-02).

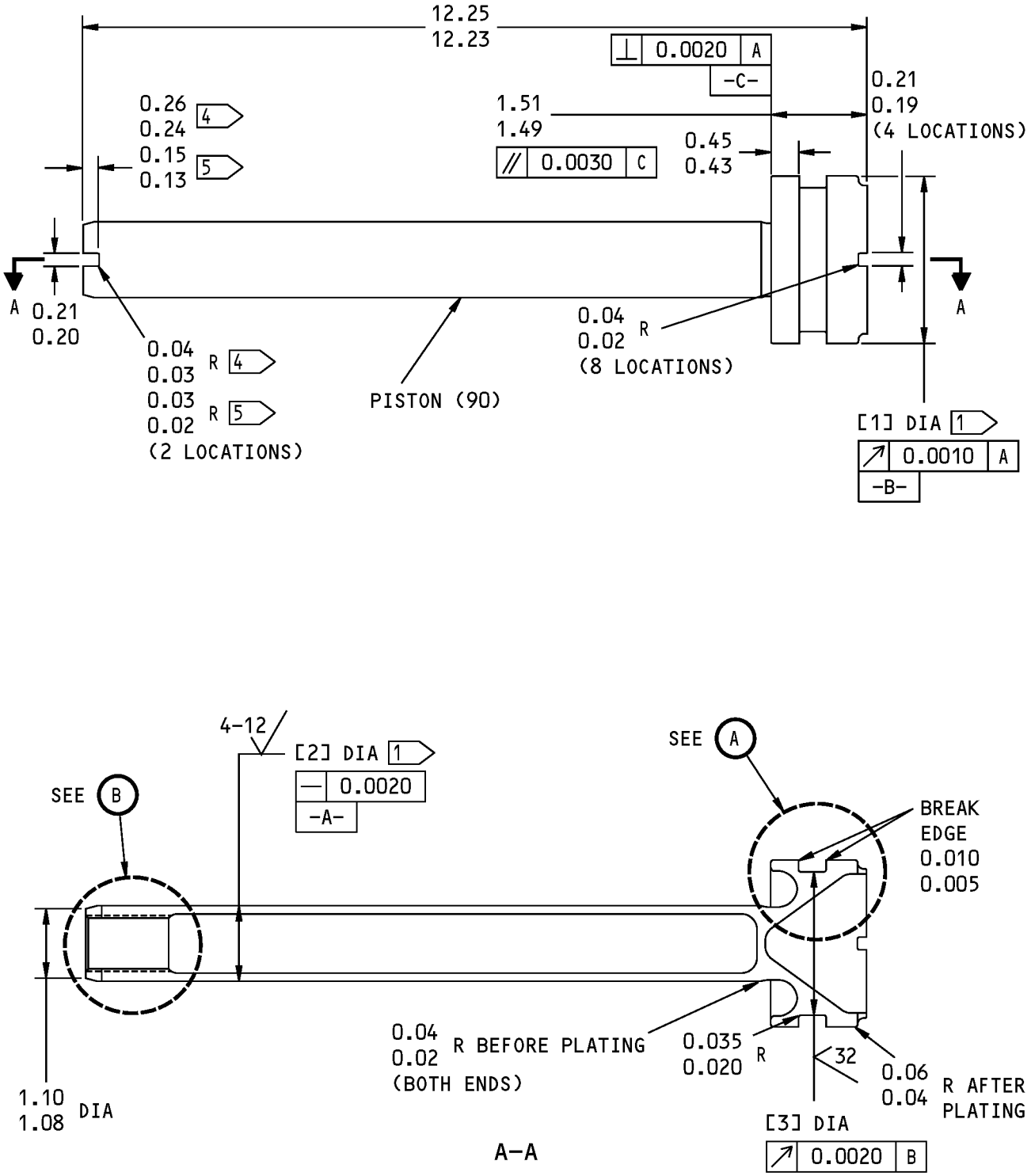
(b) Do a magnetic particle check (SOPM 20-20-01).

(c) Shot peen the surfaces (SOPM 20-10-03).

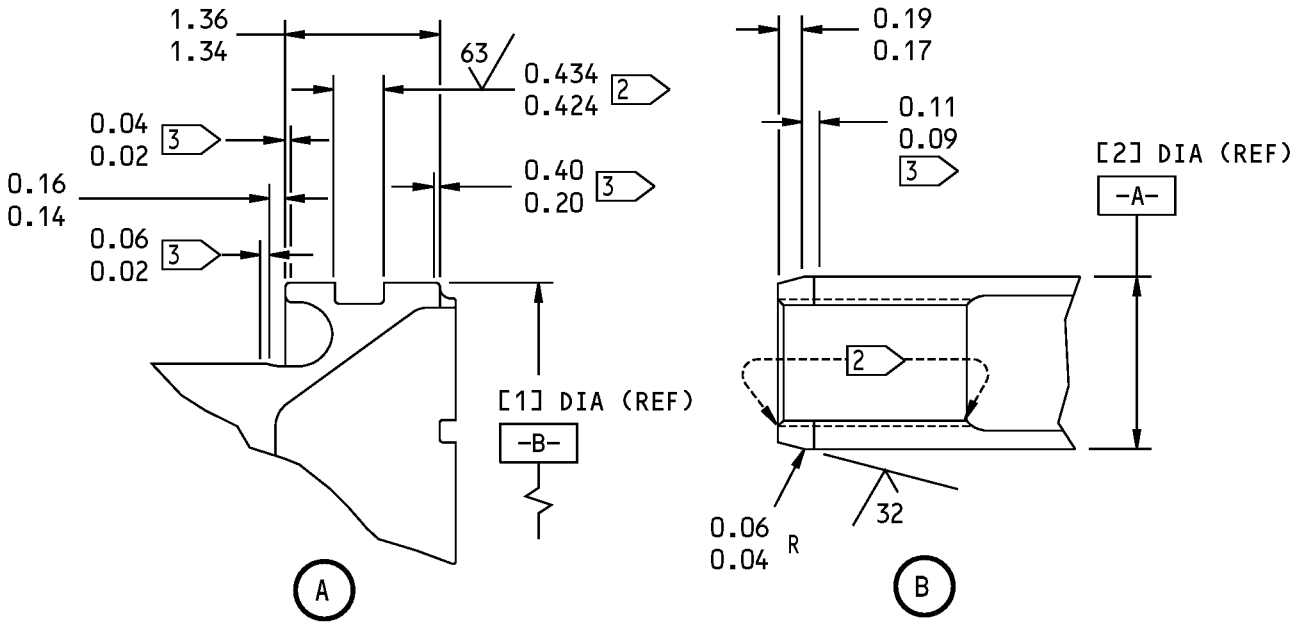
(d) Build up with chrome plate (SOPM 20-42-03) and grind to design dimensions (SOPM 20-10-04).

(2) Refinish

(a) Passivate (F-17.25); chrome plate the surfaces shown.



275A1103-1,-2 Piston Repair and Refinish
Figure 601 (Sheet 1 of 2)



REFERENCE NUMBER	[1]	[2]	[3]
DESIGN DIMENSION	2.615 2.613	1.185 1.183	2.246 2.244
REPAIR LIMIT 6	2.585	1.155	----

1 CHROME PLATE (F-15.34) AND GRIND TO DESIGN DIMENSIONS AND FINISH

2 NO SHOT PEEN IN THIS AREA

3 CHROME PLATE RUNOUT IN THIS AREA

4 275A1103-1

5 275A1103-2

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

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

275A1103-1,-2 Piston Repair and Refinish
Figure 601 (Sheet 2 of 2)

TRUNNION ASSEMBLY - REPAIR 6-1

275A1104–1, –3, –5, –6, –9, –10

1. General

A. This procedure tells how to repair and refinish the trunnion assembly (40).

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

C. Refer to IPL Figure 1 for item numbers.

D. General repair details:

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

(2) Shot peen: Surfaces as noted, Intensity 0.014-0.019A2

2. Trunnion Assembly Repair

A. References

Reference	Title
SOPM 20-10-01	REPAIR AND REFINISH OF HIGH STRENGTH STEEL PARTS
SOPM 20-10-02	MACHINING OF ALLOY STEEL
SOPM 20-10-03	SHOT PEENING
SOPM 20-10-04	GRINDING OF CHROME PLATED PARTS
SOPM 20-20-01	MAGNETIC PARTICLE INSPECTION
SOPM 20-42-03	HARD CHROME PLATING
SOPM 20-50-04	INSTALLATION OF PERMANENT PINS AND PLUGS IN DRILL PASSAGES

B. Procedure (REPAIR 6-1, Figure 601)

(1) Plug (47) and pin (45A) replacement – Install replacements per SOPM 20-50-04.

(2) Trunnion (50)

(a) Machine as required, within repair limits, to remove defects (SOPM 20-10-01 and SOPM 20-10-02). On the old trunnions 275A1104-1, -3 increase the fillet radius to the 0.05-0.07-inch value, with an undercut, as shown for the later trunnions, to let the shot get into the radius. You can then change the part number of the trunnion to 275A1104-5, -6.

(b) Do a magnetic particle check (SOPM 20-20-01).

(c) Shot peen machined surfaces (SOPM 20-10-03).

(d) Build up with chrome plate (SOPM 20-42-03) to design dimensions and grind (SOPM 20-10-04) to design dimensions and finish.

(e) Do a magnetic particle check (SOPM 20-20-01).

3. Trunnion Assembly Refinish

A. References

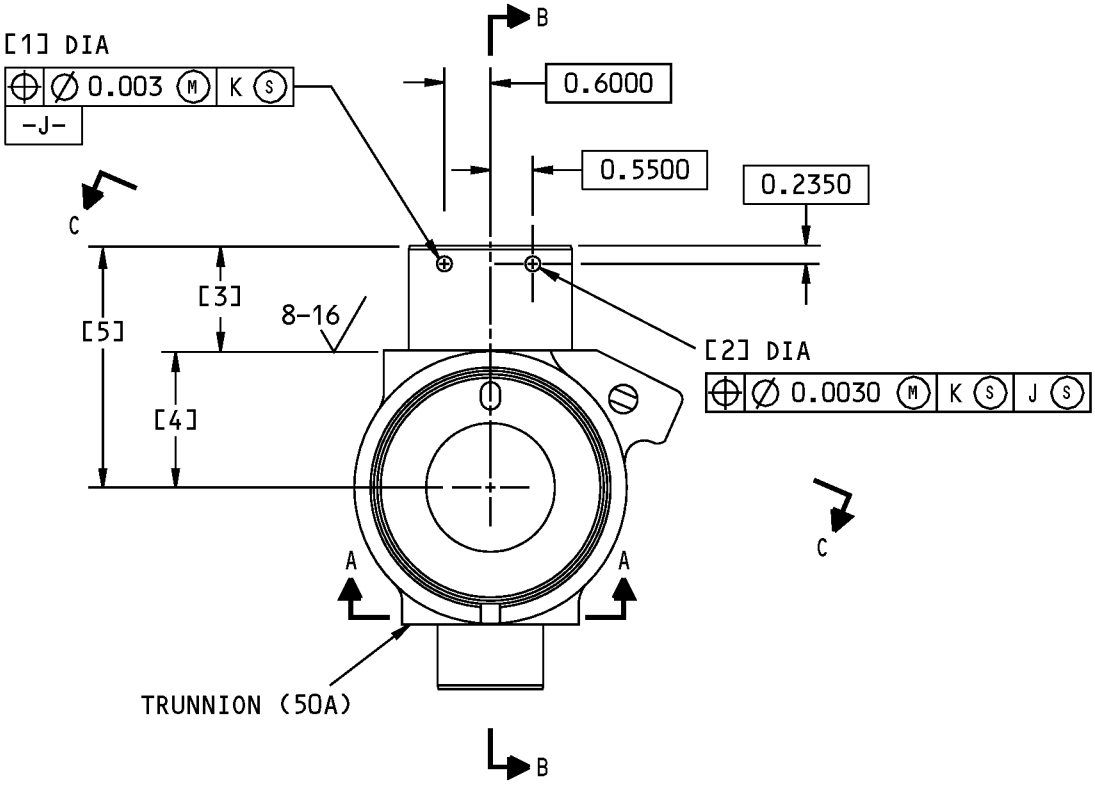
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES

B. Procedure (REPAIR 6-1, Figure 601)

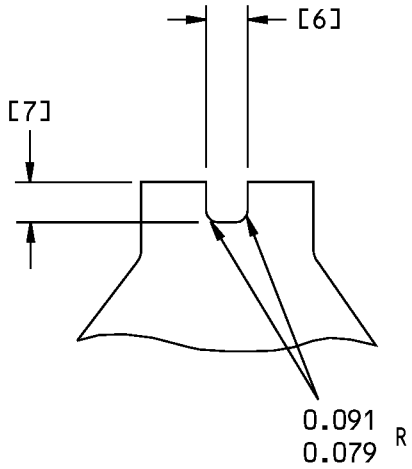
NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For the decoding table for Boeing finish codes, refer to SOPM 20-41-01.

(1) Passivate (F-17.25) the trunnion (50).

(2) On trunnions 275A1104-9, -10, chrome plate as indicated.

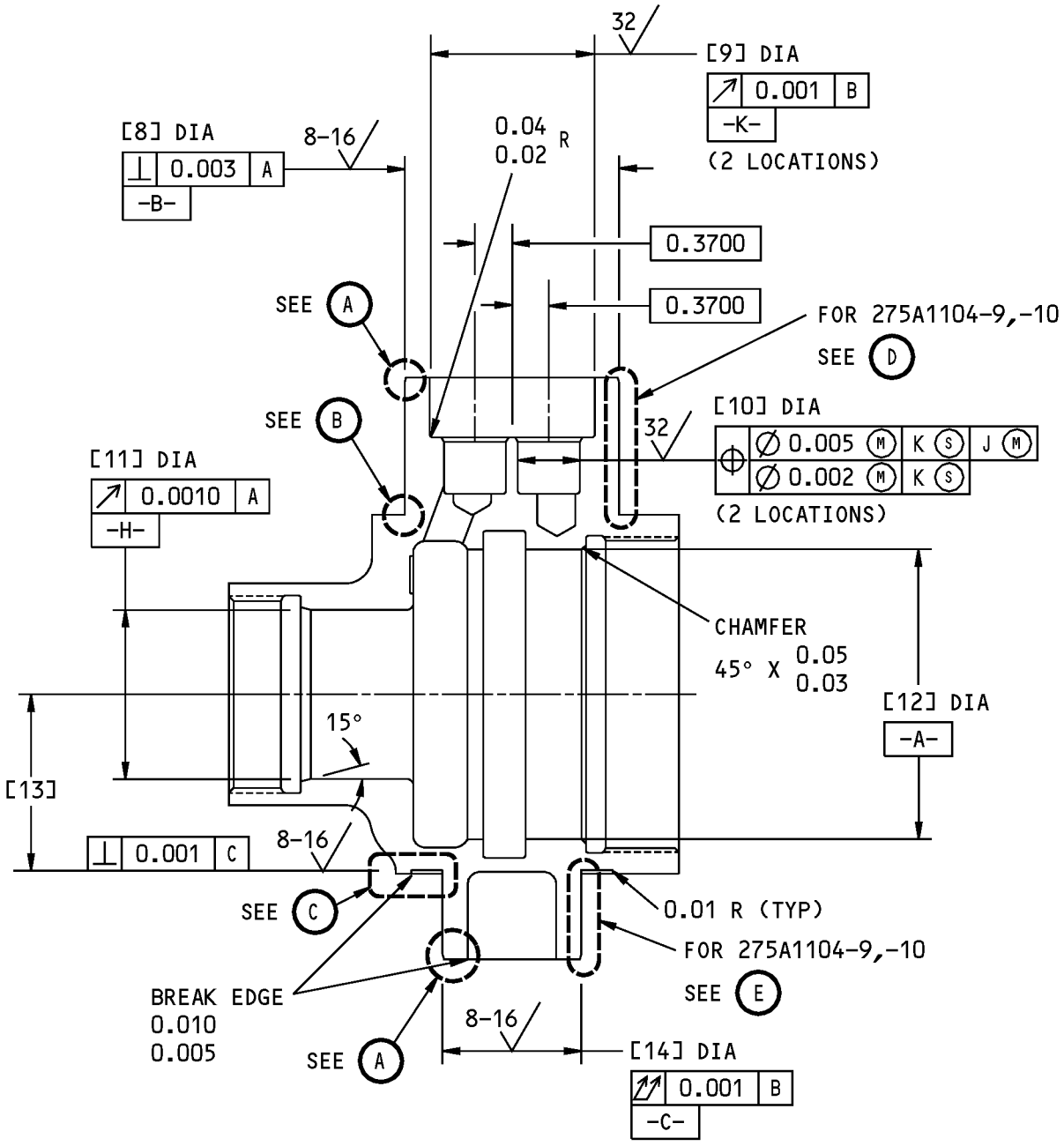


275A1104-1,-5,-9 SHOWN
275A1104-3,-6,-10 OPPOSITE



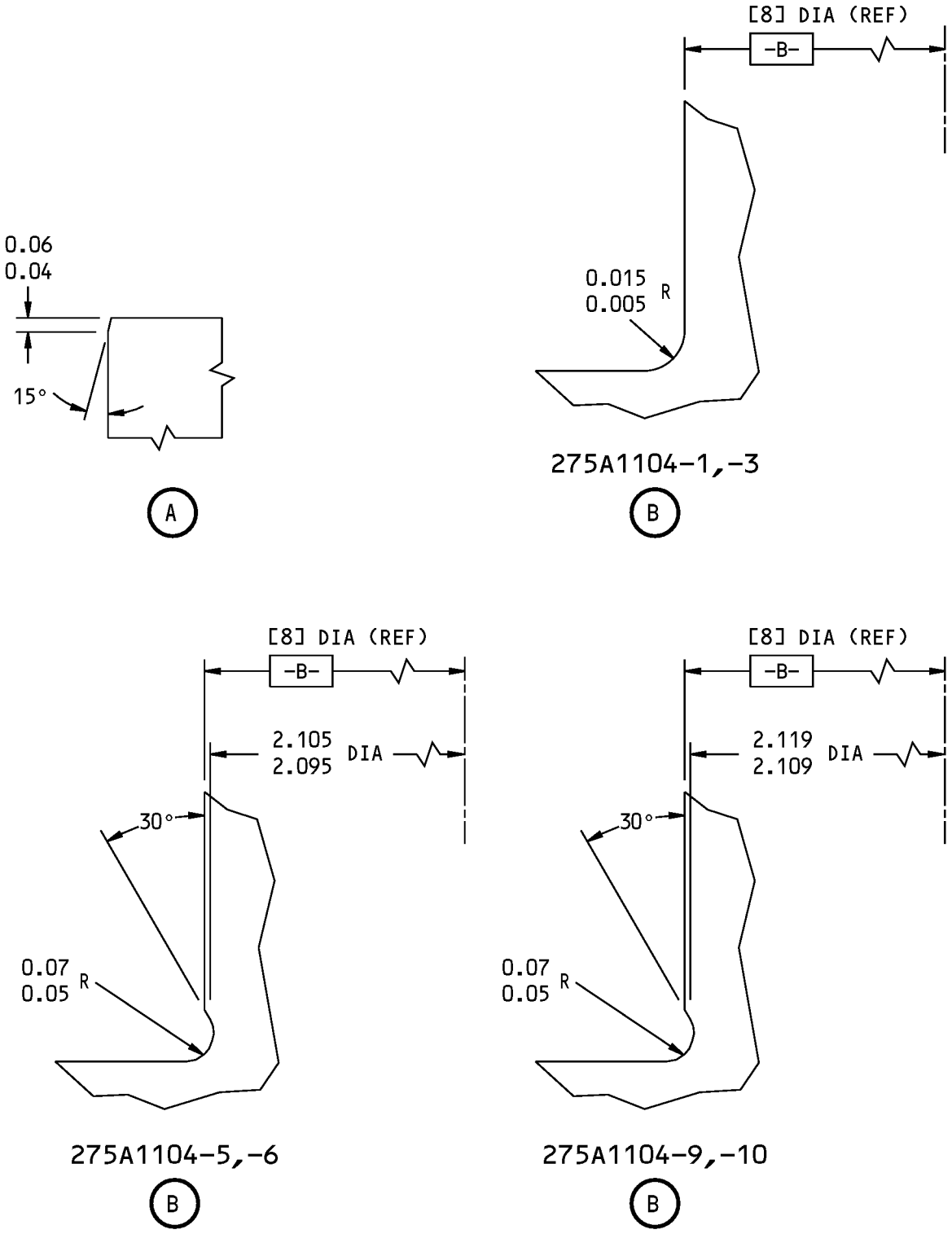
A-A

275A1104-1,-3,-5,-6,-9,-10 Trunnion Assembly Repair and Refinish
Figure 601 (Sheet 1 of 6)

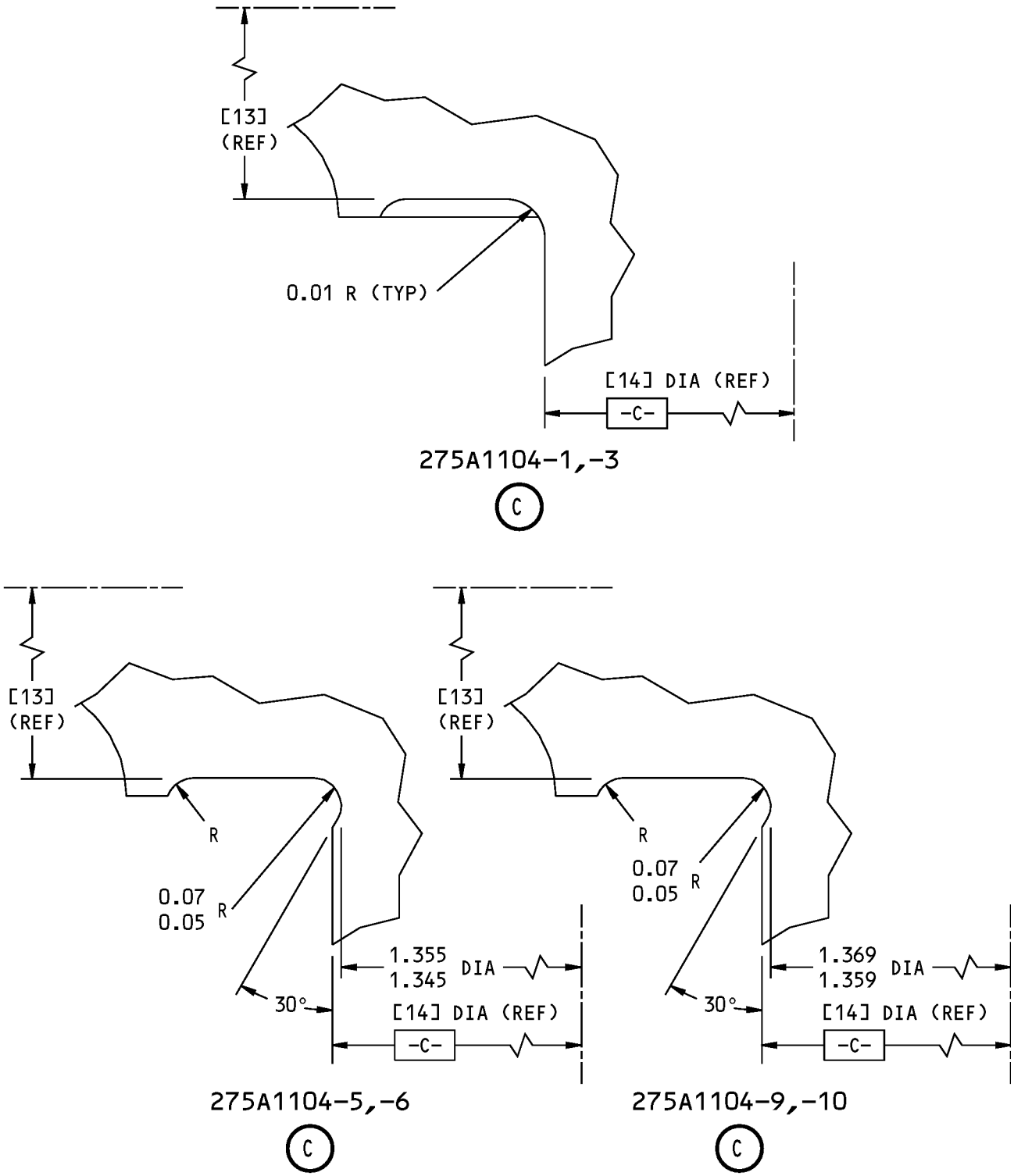


B–B

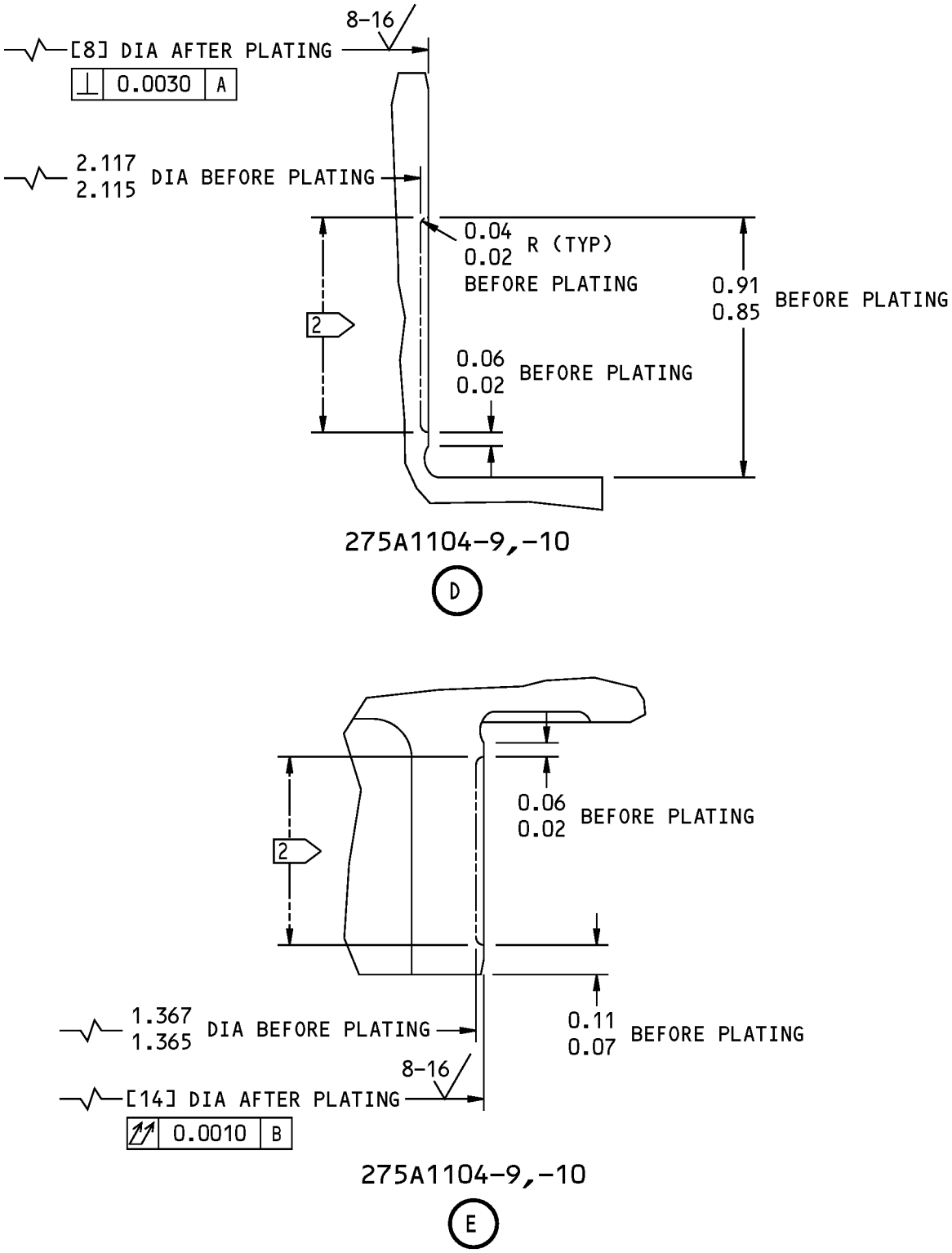
275A1104-1,-3,-5,-6,-9,-10 Trunnion Assembly Repair and Refinish
Figure 601 (Sheet 2 of 6)



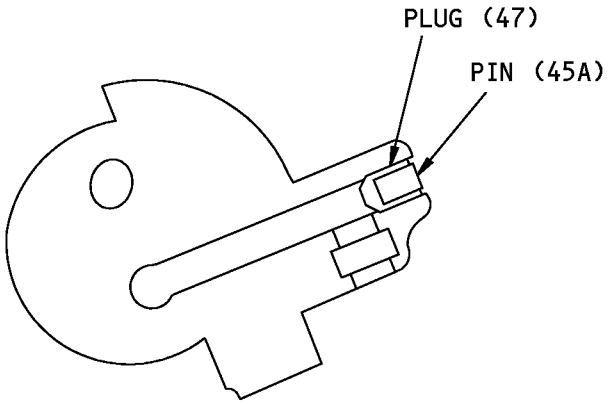
275A1104-1,-3,-5,-6,-9,-10 Trunnion Assembly Repair and Refinish
Figure 601 (Sheet 3 of 6)



275A1104-1,-3,-5,-6,-9,-10 Trunnion Assembly Repair and Refinish
Figure 601 (Sheet 4 of 6)



275A1104-1,-3,-5,-6,-9,-10 Trunnion Assembly Repair and Refinish
Figure 601 (Sheet 5 of 6)



C–C

REFERENCE NUMBER	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
DESIGN DIMENSION	0.198 0.194	0.198 0.194	1.3735 1.3535	1.7865 1.7765	3.150 3.140	0.253 0.247	0.245 0.235	2.1250 2.1230	1.629 1.625
REPAIR LIMIT	----	----	----	----	----	----	----	2.0950 <1>	----

REFERENCE NUMBER	[10]	[11]	[12]	[13]	[14]
DESIGN DIMENSION	0.615 0.613	1.680 1.678	2.878 2.876	1.747 1.737	1.375 1.373
REPAIR LIMIT	0.643 <1>	1.708 <1>	2.906 <1>	----	1.345 <1>

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

<2> CHROME PLATE (F-15.03)

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

G44289 S0004999674_V2

275A1104-1,-3,-5,-6,-9,-10 Trunnion Assembly Repair and Refinish
Figure 601 (Sheet 6 of 6)

BEARING, ROD GLAND - REPAIR 7-1

275A1105–1

1. General

A. This procedure has the data necessary to repair and refinish the bearing (15).

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

C. Refer to IPL Figure 1 for item numbers.

D. General repair details:

(1) Material: Al-Ni-Bronze, AMS 4640

2. Bearing Refinish

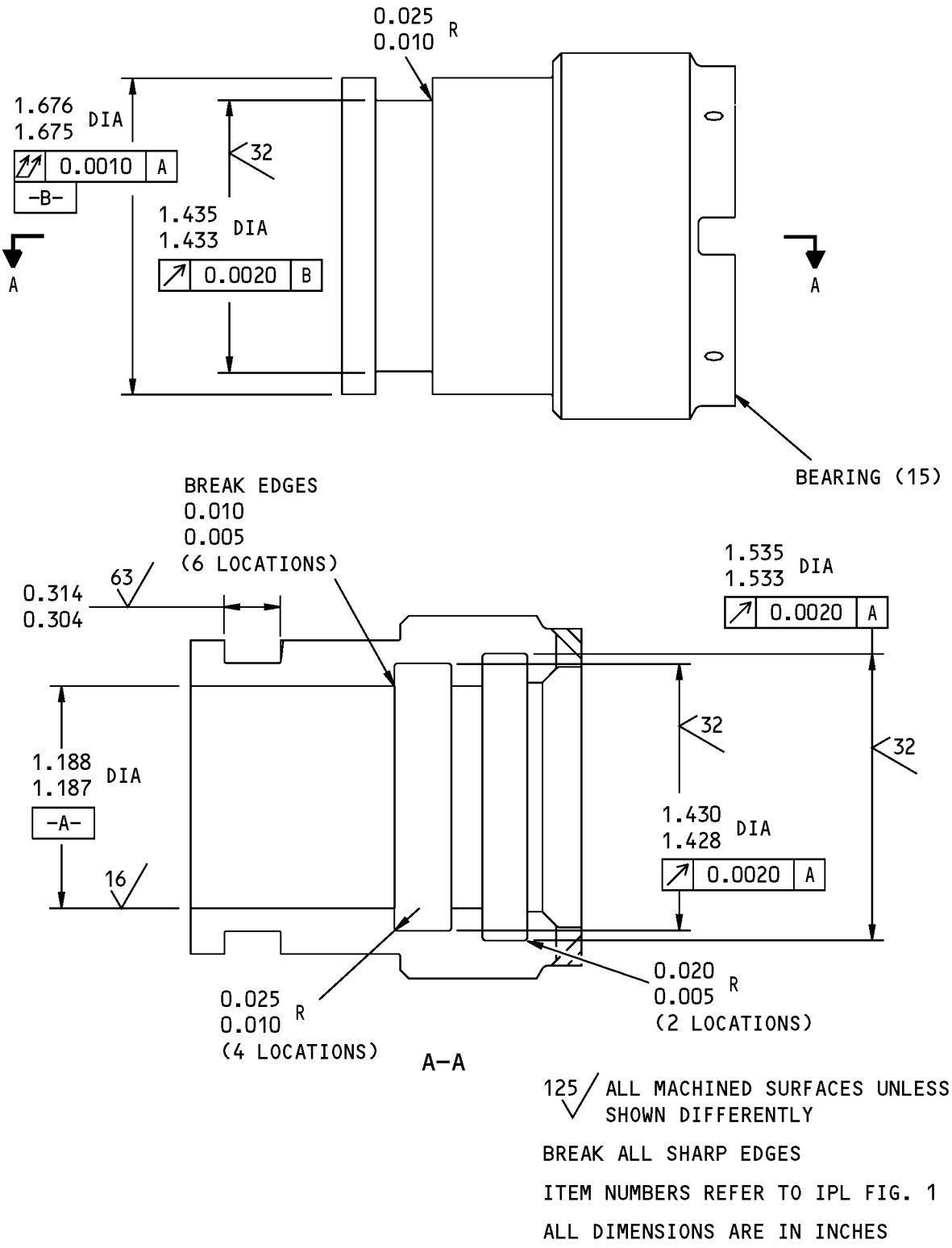
A. References

Reference	Title
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES

B. Procedure (REPAIR 7-1, Figure 601)

NOTE: For the decoding table for Boeing finish codes, refer to SOPM 20-41-01.

(1) Apply no finish (F-25.01). You can use a temporary protection for transportation and storage.



275A1105-1 Bearing - Rod Gland Repair
Figure 601

ROD END ASSEMBLY - REPAIR 8-1

275A1106–3, –5

1. General

A. This procedure has the data necessary to replace the parts of the rod end assembly (100A, 100B).

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

C. Refer to IPL Figure 1 for item numbers.

2. Bearing Replacement (275A1106-3)

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00015	Grease - Aircraft Bearing (Use BMS 3-24 until existing stocks are depleted, BMS 3-33 supersedes BMS 3-24)	BMS3-24 (Superseded by BMS 3-33)
D00633	Grease - Aircraft General Purpose	BMS3-33

B. References

Reference	Title
SOPM 20-50-03	BEARING AND BUSHING REPLACEMENT
SOPM 20-60-03	LUBRICANTS

C. Procedure (REPAIR 8-1, Figure 601)

NOTE: For lubricants, refer to SOPM 20-60-03.

(1) Remove the bearing (105) from the rod end (110A).

(2) If you find defects on the rod end, refer to REPAIR 8-2 for repair instructions.

(3) Install a replacement bearing with grease, D00633 or grease, D00015 (SOPM 20-50-03) on the mating surfaces.

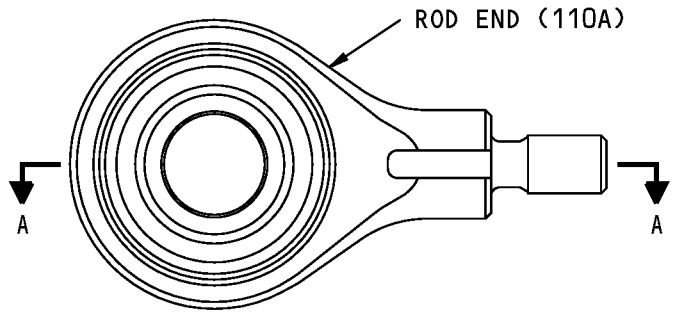
(4) Roller swage (SOPM 20-50-03) the bearing on each side.

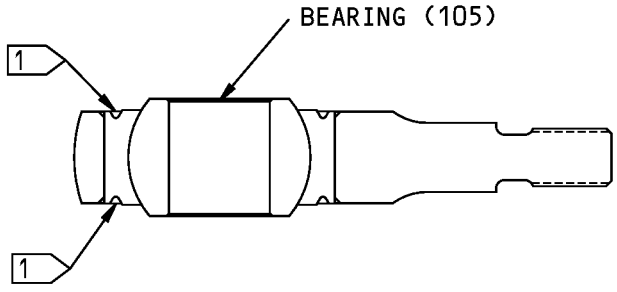
3. Lube Fitting Replacement (275A1106-5)

A. Procedure (REPAIR 8-1, Figure 602)

(1) Remove the old lube fittings (107).

(2) Install replacement lube fittings.

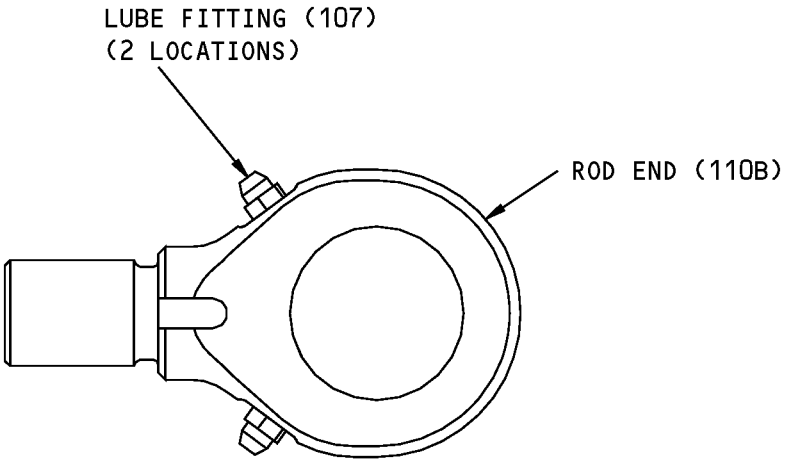




A–A

1 ROLLER SWAGE

275A1106-3 Rod End Assembly Bearing Replacement
Figure 601



275A1106-5 Rod End Assembly Lube Fitting Replacement
Figure 602

ROD END - REPAIR 8-2

275A1106–4, –6

1. General

A. This procedure has the data necessary to repair and refinish the rod end (110A, 110B).

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

C. Refer to IPL Figure 1 for item numbers.

D. General repair details:

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

2. Rod End Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00113	Lubricant - Liquid Dispersed Solid Film Lubricant	BMS3-8, BAC 5811, TYPE VIII

B. References

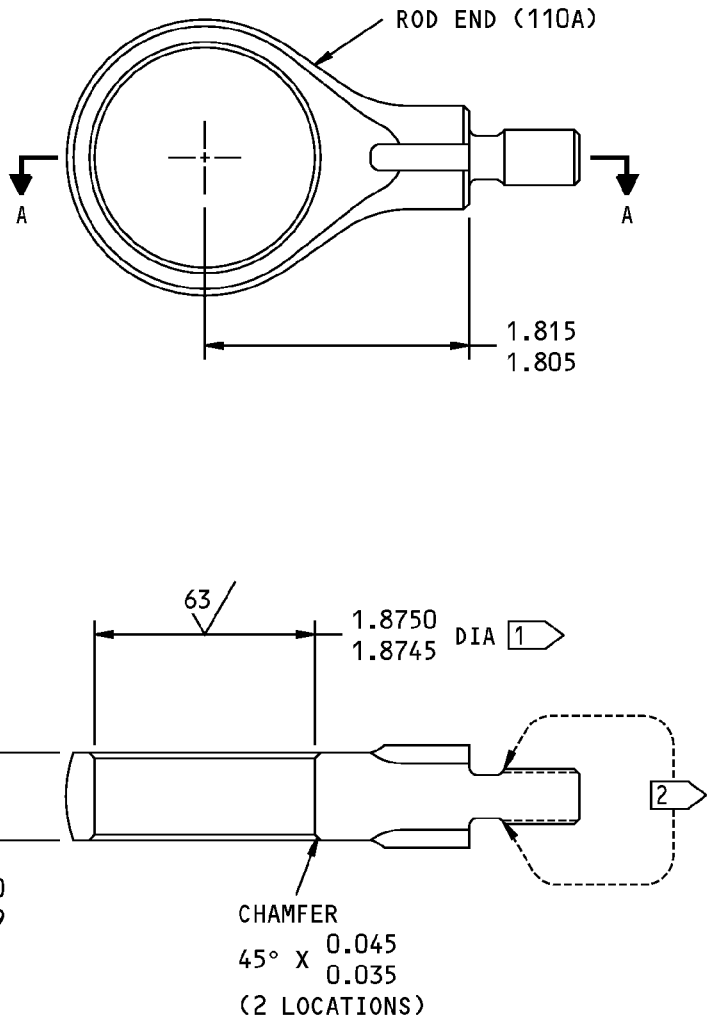
Reference	Title
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-50-08	APPLICATION OF BONDED SOLID FILM LUBRICANTS
SOPM 20-60-03	LUBRICANTS

C. Procedure (REPAIR 8-2, Figure 601 and REPAIR 8-2, Figure 602)

NOTE: For the decoding table for Boeing finish codes, refer to SOPM 20-41-01. For lubricants, refer to SOPM 20-60-03.

(1) Passivate (F-17.25, which replaces F-17.09).

(2) Apply lubricant, D00113 (SOPM 20-50-08) (F-19.10) (F-19.81 or F-19.82 optional) to the threads, as shown.



A–A

1 DO NOT SHOT PEEN THIS AREA

2 APPLY SOLID FILM LUBRICANT (F-19.10) (F-19.81 OR F-19.82 OPTIONAL) TO THIS AREA

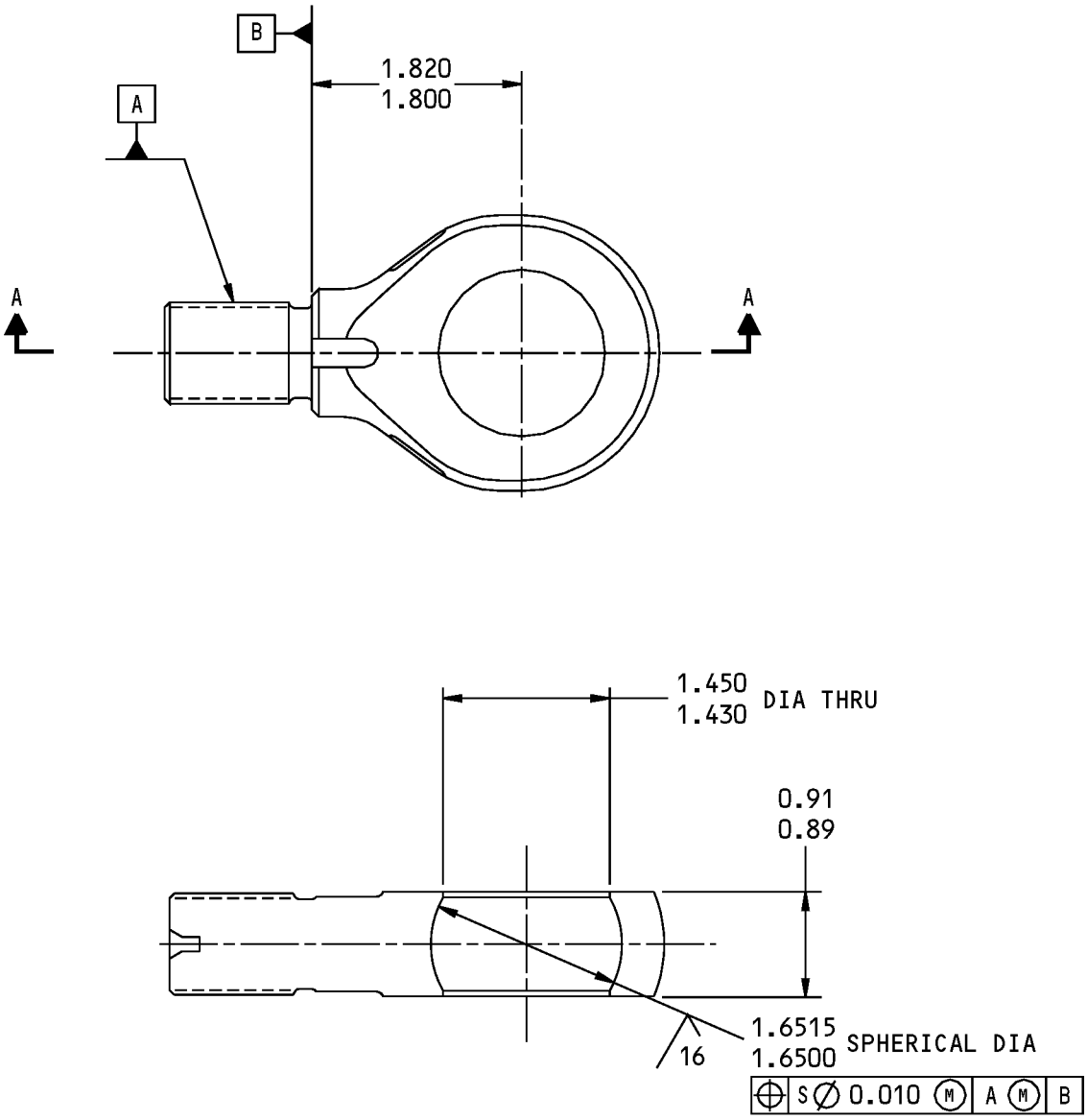
125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

275A1106-4 Rod End Repair
Figure 601



125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ALL DIMENSIONS ARE IN INCHES

275A1106-6 Rod End Repair
Figure 602

NUT - REPAIR 9-1

275A1107–1

1. General

A. This procedure has the data necessary to refinish the nut (35).

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

C. Refer to IPL Figure 1 for item numbers.

D. General repair details:

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

2. Nut Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00113	Lubricant - Liquid Dispersed Solid Film Lubricant	BMS3-8, BAC 5811, TYPE VIII

B. References

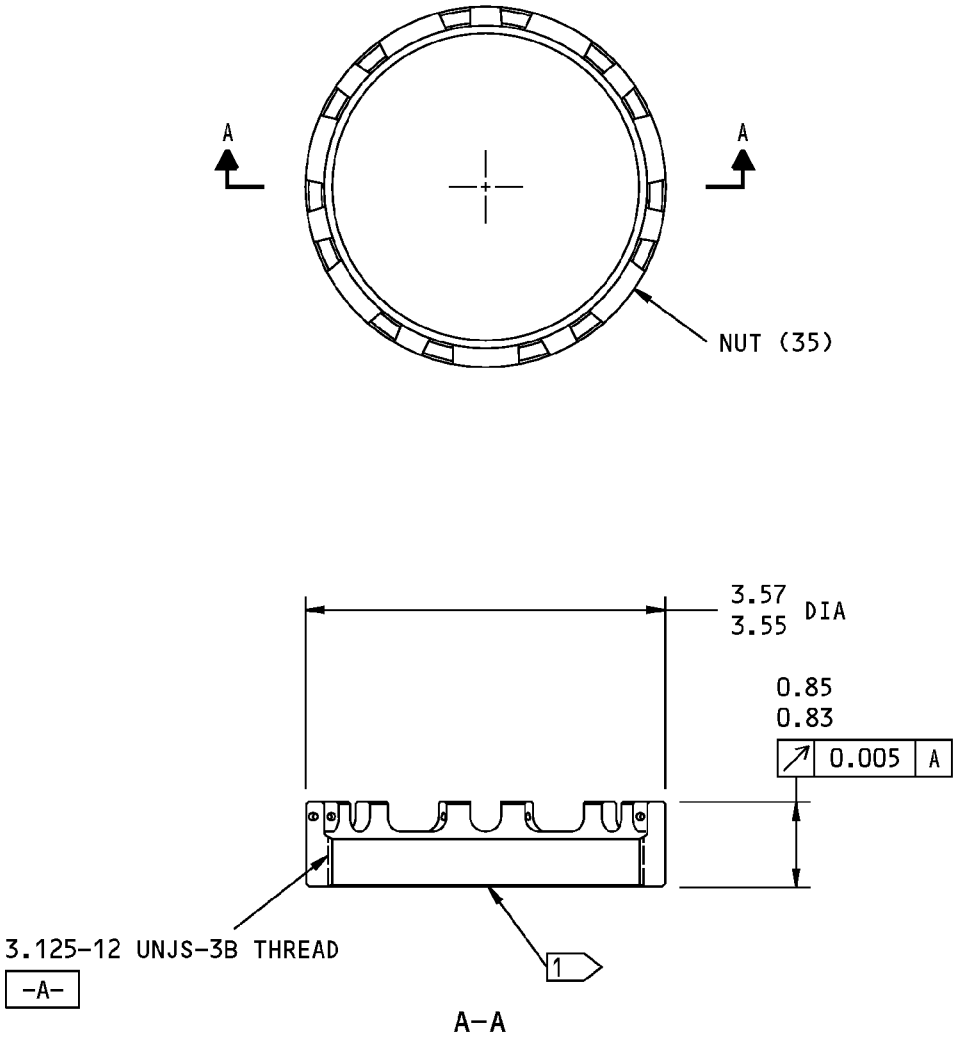
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-50-08	APPLICATION OF BONDED SOLID FILM LUBRICANTS
SOPM 20-60-03	LUBRICANTS

C. Procedure (REPAIR 9-1, Figure 601)

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For decoding table for Boeing finish codes, refer to SOPM 20-41-01. for lubricants, refer to SOPM 20-60-03.

(1) Passivate (F-17.25).

(2) Apply lubricant, D00113 (SOPM 20-50-08) (F-19.10) (F-19.81 or F-19.82 optional) to the surfaces shown.



1 APPLY SOLID FILM LUBRICANT (F-19.10) (F-19.81 OR F-19.82 OPTIONAL) THIS SURFACE. OVERSPRAY PERMITTED

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

275A1107-1 Nut Refinish
Figure 601

TRANSFER TUBE - REPAIR 10-1

275A1108–1

1. General

A. This procedure has the data necessary to repair and refinish the transfer tube (20).

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

C. Refer to IPL Figure 1 for item numbers.

D. General repair details:

(1) Material: 15-5PH CRES, AMS 5659, 150-170 ksi

2. Transfer Tube Refinish

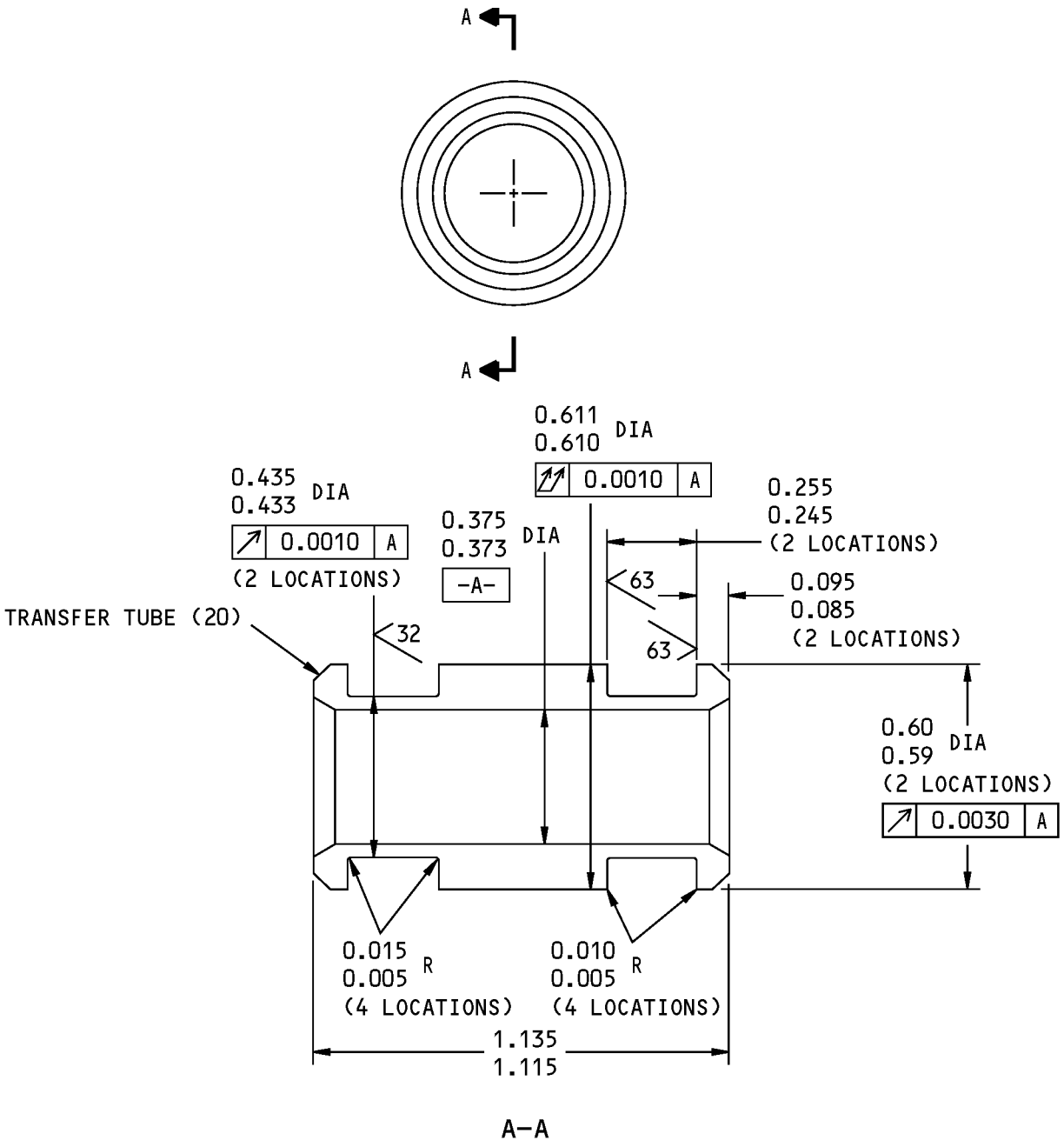
A. References

Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES

B. Procedure (REPAIR 10-1, Figure 601)

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For decoding table for Boeing finish codes, refer to SOPM 20-41-01.

(1) Passivate (F-17.25).



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

275A1108-1 Transfer Tube Refinish
Figure 601

ASSEMBLY

1. General

A. This procedure has the data necessary to assemble the nose landing gear steering actuator assembly.

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

C. Refer to IPL Figure 1 for item numbers.

2. Assembly

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-5401	NLG Actuator Assembly Removal/Installation Fixture Equipment (Part #: C32036-45, Supplier: 81205)

B. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00153	Fluid - Hydraulic, Erosion Arresting, Fire Resistant	BMS3-11 Type IV (interchange~able & intermixable with Type V)
D00633	Grease - Aircraft General Purpose	BMS3-33

C. References

Reference	Title
SOPM 20-50-01	BOLT AND NUT INSTALLATION
SOPM 20-50-02	INSTALLATION OF SAFETYING DEVICES
SOPM 20-60-03	LUBRICANTS

D. Procedure

NOTE: For bolt and nut installation, refer to SOPM 20-50-01. For installation of safety devices, refer to SOPM 20-50-02. For lubricants, refer to SOPM 20-60-03.

(1) To assemble the actuator, it is necessary to hold the actuator in the holding fixture.

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

(a) Install the cylinder (130) in the Removal/Installation Fixture Equipment, SPL-5401.

(b) Install the piston seal (80) and backup rings (85B) on the piston (90).

1) Lubricate the piston seal (80) with hydraulic fluid, D00153.

2) Install the piston seal (80) and backup rings (85B) on the piston (90).

(c) Install the bearing (15) in the trunnion assembly (40).

1) Lubricate the seal (60) with hydraulic fluid, D00153.

2) Install the seal (60) and backup rings (65B) in the bearing (15).

3) Lubricate the packing (70A) with hydraulic fluid, D00153.

4) Install the rings (75A) and the packing (70A) on the bearing (15).

5) Install the bearing (15) in the trunnion assembly (40).

6) Lubricate the scraper (55B) with hydraulic fluid, D00153.

7) Install the scraper (55B) in the bearing (15).

8) Install the packing (67) and backup rings (68) in the trunnion assembly (40).

9) Install the packing (160) and backup rings (155) in the trunnion assembly (40).

(d) Install the piston (90) in the bearing (15).

(e) Apply a thin coat of grease, D00633 to the internal threads of the piston (90) lockwasher-face of the rod end (100).

(f) Install the lockwasher cup (95A) on the rod end assembly (100A).

(g) Install the rod end assembly (100A) or the rod end (100B) with bearing (97), on the piston (90).

(h) Put the piston (90), and the attached items, in the torque adapter.

(i) Tighten the rod end assembly (100A, 100B) to 2200 to 2500 pound-inches.

(j) Tighten the bearing (15) to 1000 to 1200 pound-inches.

(k) Break the flange of the lockwasher cup (95A) fully into the slot on the rod end assembly (100A, 100B) that is away from the slot used in the piston (90). Make sure the break is complete.

(l) Remove the piston (90), and the attached items, from the torque adapter.

(m) Install the nut (35) on the cylinder (130).

(n) Continue to turn the nut on the cylinder. The internal threads of the nut (35) must start to come off the far end of the cylinder (130) threads.

(o) Install the transfer tube (165) into the trunnion assembly (40) until it stops.

(p) Install the packing (140) and the union (145) on the cylinder (130) and tighten the union (145).

(q) Put the piston (90) into the cylinder (130) and turn the cylinder (130) into the trunnion assembly (40) until it stops at the bottom of the trunnion.

(r) Turn the cylinder (130) back, less than one turn, to align the keyslots on the cylinder (130) and the trunnion assembly (40) and to align the transfer tube (165) with the union (145) on the cylinder (130).

(s) Install the key (37A) in the keyslot of the trunnion assembly (40).

(t) Attach the transfer tube (165) on the union (145).

(u) Tighten the transfer tube (165).

(v) Tighten the nut (35) on the cylinder by hand.

(w) Move the piston rod in and out by hand to make sure it moves freely.

(x) Torque the nut (35) to 3000-3200 pound-inches. Optional method: During the functional test, apply 2900-3100 psi to the extend port of the actuator assembly and torque the nut (35) to 1000-1200 pound-inches.

(y) Install the transfer tubes (20) with the backup rings (30) and the packings (25) in the trunnion assembly (40):

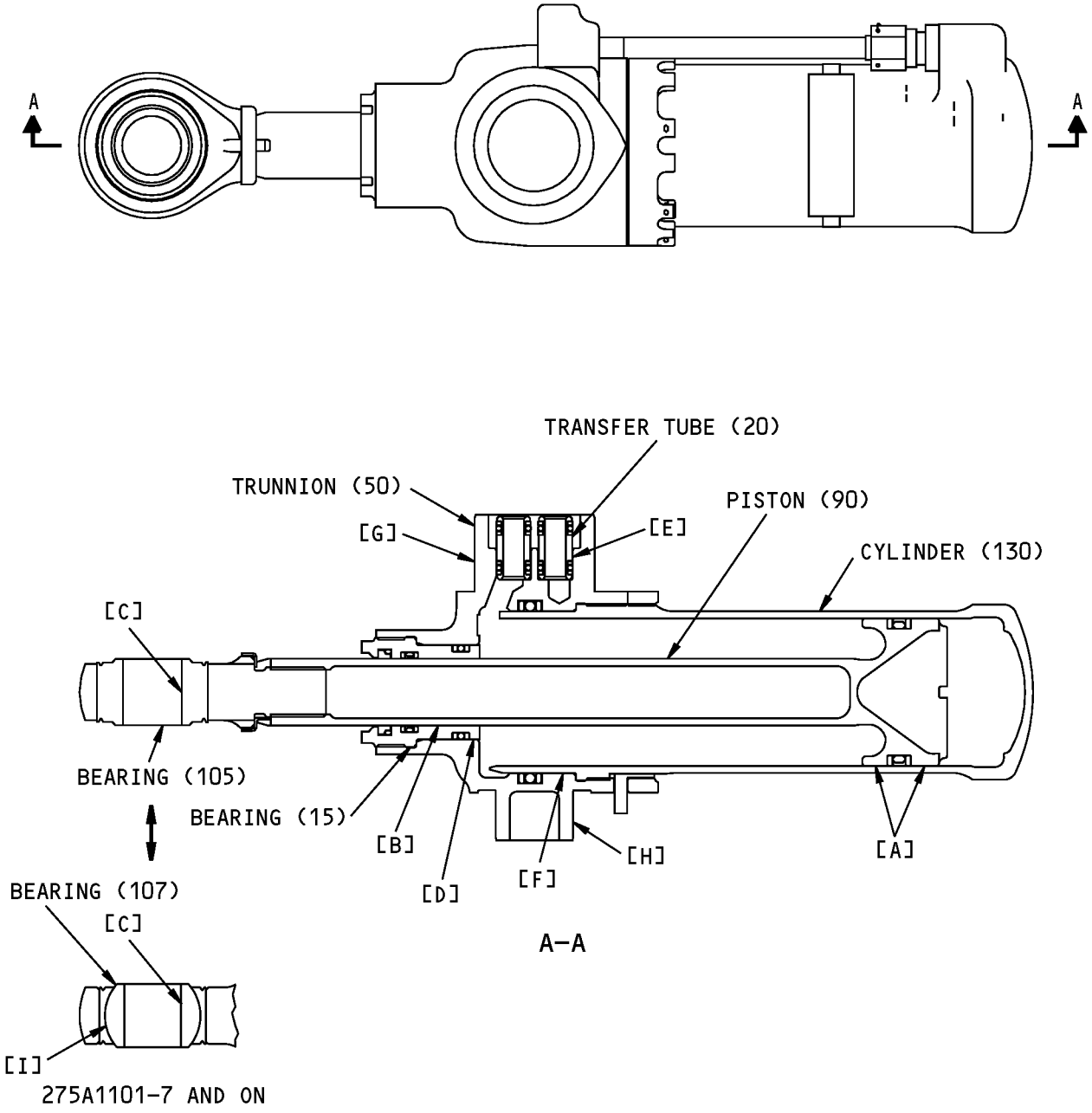
1) Lubricate the packings (25) with hydraulic fluid, D00153.

2) Install the packings (25) and the backup rings (30) on the transfer tubes (20).

3) Install the transfer tubes (20) in the trunnion assembly (40).

(z) Install the nameplate (180) and strap (125) (REPAIR 3-1) if it is necessary.

(aa) Do the test of the actuator (TESTING AND FAULT ISOLATION).



Fits and Clearances
Figure 801 (Sheet 1 of 2)

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 130	2.618	2.620	0.003	0.007		2.622	0.010
	OD 90	2.613	2.615			2.612		
[B]	ID 15	1.187	1.188	0.002	0.005		1.189	0.007
	OD 90	1.183	1.185			1.182		
[C]	ID 105, 107	1.000	1.001	0.001	0.003		1.002	0.004
	OD 1	0.998	0.999			0.997		
[D]	ID 50	1.678	1.680	0.002	0.005		1.681	0.007
	OD 15	1.675	1.676			1.674		
[E]	ID 50	0.613	0.615	0.002	0.005		0.615	0.006
	OD 20	0.610	0.611			0.609		
[F]	ID 50	2.876	2.878	0.003	0.007		2.880	0.011
	OD 130	2.871	2.873			2.869		
[G]	OD 50	2.123	2.125			2.120		
[H]	OD 50	1.373	1.375			1.371		
[I]	ID 110B	1.6500	1.6515	0.0010	0.0030			
	OD 107	1.6485	1.6490					

* ALL DIMENSIONS ARE IN INCHES

1 PIN 162A1411-1 (INSTALLATION PART)
(CMM 32-21-16)

Fits and Clearances
Figure 801 (Sheet 2 of 2)

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

1. General

A. This section lists the special tools, fixtures, and equipment necessary for maintenance.

NOTE: Equivalent substitutes may be used.

Special Tools

Reference	Description	Part Number	Supplier
SPL-5401	NLG Actuator Assembly Removal/Installation Fixture Equipment	C32036-45	81205
SPL-5405	Adapter-Functional Test, NLG Steering Actuator	C32039-1	81205

Tool Supplier Information

CAGE Code	Supplier Name	Supplier Address
81205	THE BOEING COMPANY	17930 INTERNATIONAL BLVD. SOUTH SEATAC, WA 98188-4321 Telephone: 206-662-6650 Facsimile: 206-662-7145

ILLUSTRATED PARTS LIST

1. Introduction

A. The Illustrated Parts List (IPL) contains an illustration and a list of component parts you can repair or replace. The Illustrated Parts Catalog (IPC) shows how to use the Boeing part number system.

B. This shows how parts are related: The relation of each item to its next higher assembly (NHA) is shown in the NOMENCLATURE column. Use the indenture system that follows:

1 2 3 4 5 6 7

. Assembly

. Attaching parts for assembly

. . Detail parts for assembly

. . Subassembly

. . Attaching parts for subassembly

. . . Detail parts for subassembly

. . . Sub-subassembly

. . . Attaching parts for subassembly

. . . . . Details parts for sub-subassembly

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

C. Each top assembly is given one use code letter (A, B, C, etc.) in the USAGE CODE column. All subsequent component parts in the list can have one or more of the use code letters to show effectivity to top assemblies. A component part without a use code applies to all top assemblies.

D. An alphabetical letter is added after the item number for optional parts, parts changed by a Service Bulletin, configuration differences (except left-handed and right-handed parts), last engineering releases, and parts added between item numbers in a sequence. The alphabetical letter will not be shown on the illustration for equivalent parts of the same part number.

E. Color-coded parts are identified with a single digit alpha following the dash number or with ''SP'' suffix. If the ''SP'' suffix is used, it represents consolidation of all color codes applicable for a given usage which are not separately listed. Orders for color-coded parts should include the registry number of the airplane for which the parts are ordered.

F. If a part number is 15 characters long but will not fit in the part number column, the part number will be displayed with a ''~'' at the end of the line and will be continued on the next line. The ''~'' denotes that the part number continues on the next line.

G. Parts changed by a Service Bulletin are shown by PRE SB XXXX and POST SB XXXX added to the NOMENCLATURE column.

(1) When a new top assembly is added by a Service Bulletin, PRE SB XXXX and POST SB XXXX will be added at the top assembly level only. The configuration differences at the detail part level are shown by use code letters.

(2) When the top assembly part number is not changed by the Service Bulletin, PRE SB XXXX and POST SB XXXX will be added at the detail level.

H. Interchangeable Parts

Optional (OPT)	The part is optional to and interchangeable with other parts that have the same item number.
Replaces, Replaced by and not interchangeable with (REPLACES, REPLACED BY AND NOT INTCHG/W)	The part replaces and is not interchangeable with the initial part.
Replaces, Replaced by (REPLACES, REPLACED BY)	The part replaces and is interchangeable with, or is an alternative to, the initial part.

VENDOR CODES

Code	Name
01673	AIRDROME PRECISION COMPONENTS 3251 E AIRPORT WAY LONG BEACH, CALIFORNIA 90806-2407 FORMERLY AIRDROME PARTS CO
02107	FLOUROCARBON CO OHIO DIV DOVER, OHIO 44622 CANCELLED NO REPLACEMENT FORMERLY SPARTA MANUFACTURING CO
07128	TETRAFLUOR INC 2051 EAST MAPLE AVENUE EL SEGUNDO, CALIFORNIA 90245-5009 FORMERLY ROYAL IND TETRAFLUOR DIV V0667B ENGLEWOOD CALIF
08199	SIERRACIN CORPORATION DBA HARRISON 3020 EMPIRE AVENUE BURBANK, CALIFORNIA 91504-3109 FORMERLY TECHNICAL IND INC OR HARRISON MFG CO DIV AXIAL CORP
09257	BUSAK AND SHAMBAN INC SEALS DIV 2531 BREMER DR PO BOX 176 FORT WAYNE, INDIANA 46801 FORMERLY SHAMBAN, W S AND CO

Code	Name
11328	Replaced: [V11328] AEROQUIP SEE EATON AEROQUIP V00624 LINAIR ENG A TELEDYNE CO SEE TELEDYNE LINAIR ENGINEERING TELEDYNE INC SEE LINAIR ENGINEERING TELEDYNE LINAIR ENG SEE AEROQUIP CORP LINAIR DIV by Code: Name and Address below 00624: EATON AEROQUIP INC ENGINEERED SYSTEMS DIV 300 S EAST AVE JACKSON, MICHIGAN 49203-1972 FORMERLY AEROQUIP ELBEE PLANT V99879 OR WESTERN PLANT V70128; FORMERLY AEROQUIP AEROSP DIV JACKSON PLANT; FORMERLY V11328 AEROQUIP LINAIR DIV
14798	DEUTSCH CO METAL COMPONENTS DIV 14800 SOUTH FIGUEROA STREET GARDEN, CALIFORNIA 90248-1795 FORMERLY WEATHERHEAD V79470 FOR AEROSPACE PROD V 61498 DEUSCH CO THE DEUTSCH AEROSPACE FITTINGS CO DIV
26303	GREENE TWEED IND INC ADVANTEC DIV 7101 PATTERSON DRIVE PO BOX 5037 GARDEN GROVE, CALIFORNIA 92645-5037 FORMERLY OHIO AIRCRAFT SUPPLIES INC IN INGLEWOOD, CALIFORNIA FORMERLY ADVANTEC DIV OF IFP INC, LOS ANGELES, CA V5P801
26879	CORONADO MFG INC 11069 PENROSE AVENUE SUN VALLEY, CALIFORNIA 90352-2722 FORMERLY CORONADO PLASTICS INC IN BURBANK, CALIFORNIA
30974	AEROFIT PRODUCTS INC 6460 DALE STREET BUENA PARK, CALIFORNIA 90621-3115
50632	KAMATICS CORP SUB OF KAMAN CORP 1335 BLUE HILLS ROAD BLOOMFIELD, CONNECTICUT 06002-1304
5F573	GREENE TWEED AND CO ILP DBA GREENE TWEED AND CO 2075 DETWILER RD KULPSVILLE, PENNSYLVANIA 19443-0305

Code	Name
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 FORMERLY IN CULVER CITY, CALIF; FORMERLY SHAMBAN W S & CO
97829	SINGER, JOSEPH B. CO PHILADELPHIA, PENNSYLVANIA BUSINESS DISCONTINUED

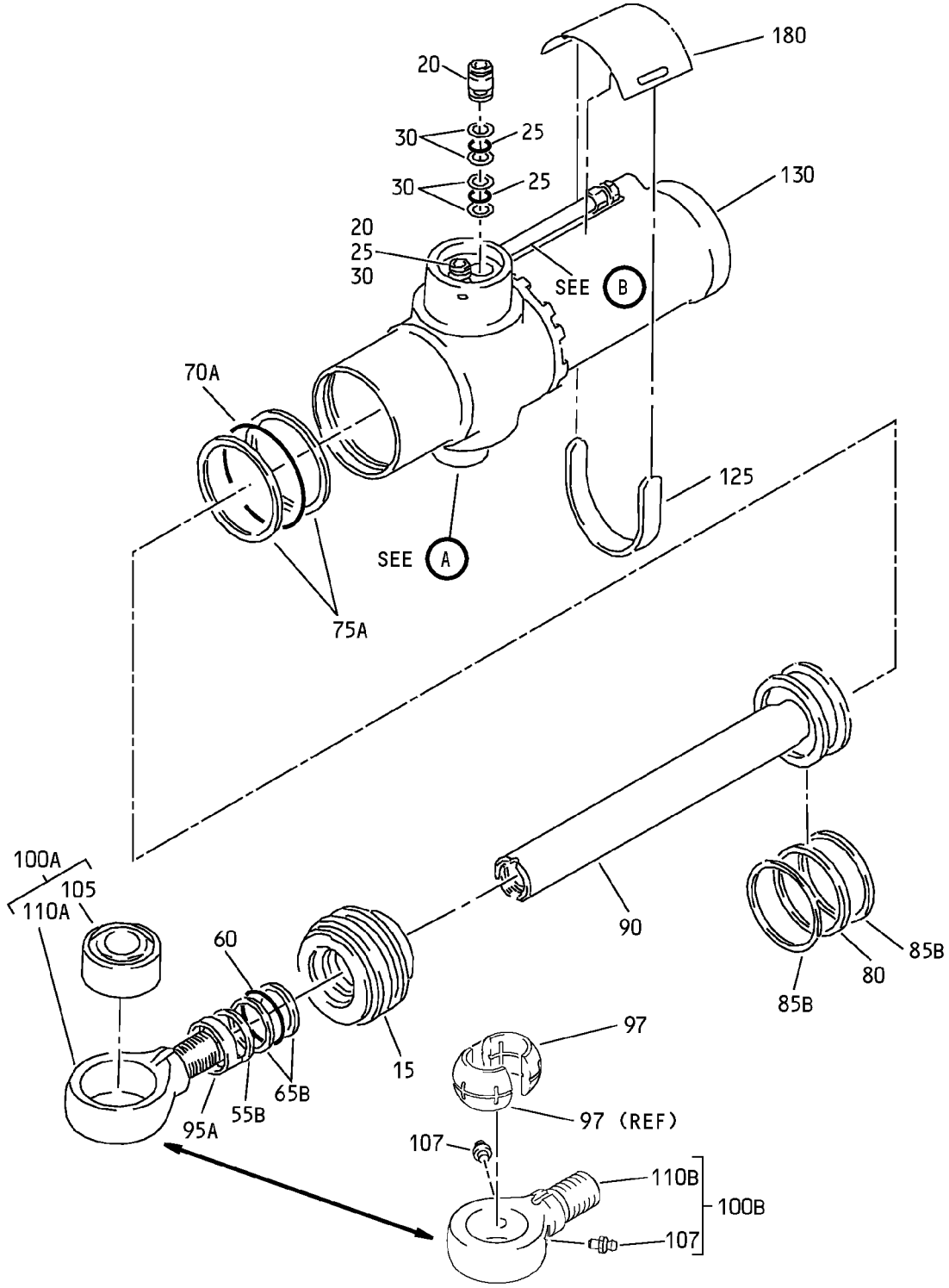
NUMERICAL INDEX

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
2-02903-06H		1	170	1
2100-110		1	155	2
2100-111		1	30	8
2100-221		1	75A	2
2100-336		1	68A	2
2270-712-66-21		1	55C	1
273A2122-5		1	165	1
273A2122-6		1	175	1
273A2508-4		1	180	1
273T0050-6		1	125	1
275A1101-3		1	1C	RF
275A1101-4		1	1D	RF
275A1101-5		1	1E	RF
275A1101-6		1	1F	RF
275A1101-7		1	1G	RF
275A1101-8		1	1H	RF
275A1102-1		1	130	1
275A1103-1		1	90	1
275A1103-2		1	90A	1
275A1104-1		1	40	1
275A1104-10		1	40E	1
		1	40J	1
275A1104-11		1	50D	1
275A1104-12		1	50E	1
275A1104-2		1	50	1
275A1104-3		1	40A	1
275A1104-4		1	50A	1
275A1104-5		1	40B	1
		1	40F	1
275A1104-6		1	40C	1
		1	40G	1
275A1104-7		1	50B	1
275A1104-8		1	50C	1
275A1104-9		1	40D	1

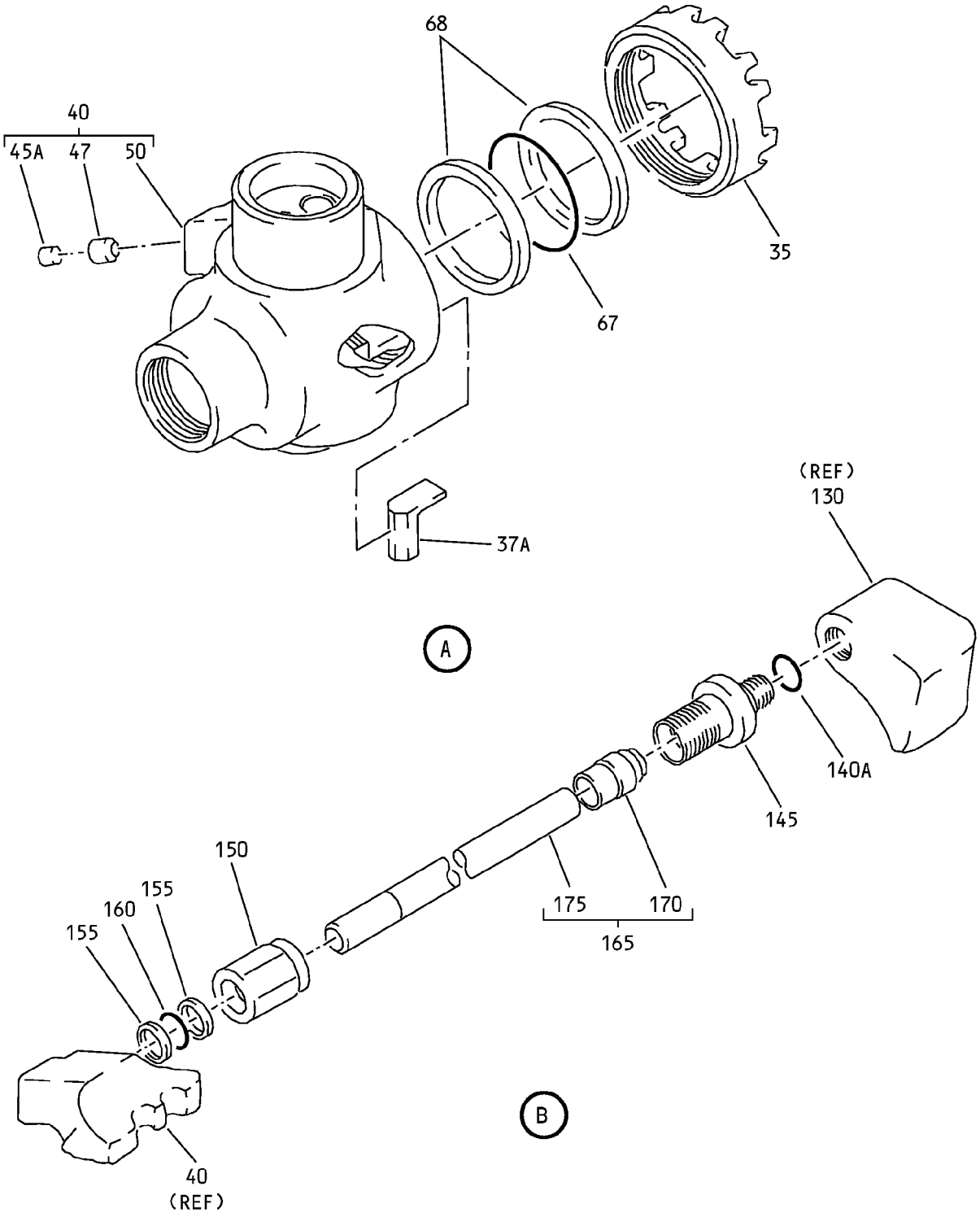
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
		1	40H	1
275A1105-1		1	15	1
275A1106-3		1	100A	1
275A1106-4		1	110A	1
275A1106-5		1	100B	1
275A1106-6		1	110B	1
275A1107-1		1	35	1
275A1108-1		1	20	2
275A1111-1		1	37A	1
275A1112-1		1	95A	1
293W2521-20		1	97	1
35235V06		1	170	1
591-21760-952-043		1	60A	1
591-21760-952-0432		1	60C	1
592-33100-952-0432		1	80A	1
5979P33100-042D		1	85C	2
5979R21700-042D		1	65C	2
AFP175V06		1	170	1
AP2097-06H		1	170	1
BACN10YE6N		1	150	1
BACP20AX31		1	47	1
BACP20AX31P		1	45A	1
BACR12BM110		1	155	2
BACR12BM111		1	30	8
BACR12BM221		1	75A	2
BACR12BM336		1	68A	2
BACS13BX06H		1	170	1
BCREF12313		1	60A	1
BCREF12314		1	80A	1
BCREF51149		1	60C	1
C11236-110B		1	155	2
C11236-111B		1	30	8
C11236-221B		1	75A	2
C11236-336B		1	68A	2
DB0S13BX06H		1	170	1

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
KSC135216B		1	105	1
MS15004-1		1	107	2
MS21902-6T		1	145	1
NAS1611-110		1	160	1
NAS1611-110A		1	160A	1
NAS1611-111		1	25	4
NAS1611-111A		1	25A	4
NAS1611-221		1	70A	1
NAS1611-221A		1	70B	1
NAS1611-336		1	67	1
NAS1611-336A		1	67A	1
NAS1612-6		1	140A	1
NAS1612-6A		1	140B	1
PLGA3436020		1	45A	1
PLGA3437020		1	47	1
RMR12BM110		1	155	2
RMR12BM111		1	30	8
RMR12BM221		1	75A	2
RMR12BM336		1	68A	2
S30294-110-1		1	155	2
S30294-111-1		1	30	8
S30294-221-1		1	75A	2
S30294-336-1		1	68A	2
S30855-217H99N		1	60	1
		1	60B	1
S32925-712H99		1	55B	1
S33157-217-99C		1	65B	2
S33157-331-99C		1	85B	2
S34760-331H99N		1	80	1
STF800-110		1	155	2
STF800-111		1	30	8
STF800-221		1	75A	2
STF800-336		1	68A	2
TF450-110A		1	155	2
TF450-111A		1	30	8

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
TF450-221A		1	75A	2
TF450-336A		1	68A	2



Steering Actuator Assembly - Nose Landing Gear
IPL Figure 1 (Sheet 1 of 2)



Steering Actuator Assembly - Nose Landing Gear
IPL Figure 1 (Sheet 2 of 2)

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–1A	275A1101-1		DELETED		
–1B	275A1101-2		DELETED		
–1C	275A1101-3		ACTUATOR ASSY-NOSE GEAR STEERING	A	RF
–1D	275A1101-4		ACTUATOR ASSY-NOSE GEAR STEERING	B	RF
–1E	275A1101-5		ACTUATOR ASSY-NOSE GEAR STEERING	C	RF
–1F	275A1101-6		ACTUATOR ASSY-NOSE GEAR STEERING	D	RF
–1G	275A1101-7		ACTUATOR ASSY-NOSE GEAR STEERING	E	RF
–1H	275A1101-8		ACTUATOR ASSY-NOSE GEAR STEERING	F	RF
5	BACB30NM3K2		DELETED		
10	BACW10BP32NAPU		DELETED		
15	275A1105-1		. BEARING-ROD GLAND		1
20	275A1108-1		. TRANSFER TUBE		2
25	NAS1611-111		. PACKING-O-RING (OPT ITEM 25A)		4
–25A	NAS1611-111A		. PACKING-O-RING (OPT ITEM 25)		4
30	C11236-111B		. RING-BACKUP- (V26879) (SPEC BACR12BM111) (OPT RMR12BM111 (V94878)) (OPT STF800-111 (V02107)) (OPT S30294-111-1 (V97820)) (OPT TF450-111A (V07128)) (OPT 2100-111 (V26303))		8
35	275A1107-1		. NUT-RETAINING CYL		1
37	295W1714-1		DELETED		
37A	275A1111-1		. KEY		1
40	275A1104-1		. TRUNNION ASSY (OPT ITEM 40B)	A	1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–40A	275A1104-3		. TRUNNION ASSY (OPT ITEM 40C)	B	1
–40B	275A1104-5		. TRUNNION ASSY (OPT ITEM 40, 40H)	A	1
–40C	275A1104-6		. TRUNNION ASSY (OPT ITEM 40A, 40J)	B	1
–40D	275A1104-9		. TRUNNION ASSY (OPT ITEM 40F)	C, E	1
–40E	275A1104-10		. TRUNNION ASSY (OPT ITEM 40G)	D, F	1
–40F	275A1104-5		. TRUNNION ASSY (OPT ITEM 40D)	C, E	1
–40G	275A1104-6		. TRUNNION ASSY (OPT ITEM 40E)	D, F	1
–40H	275A1104-9		. TRUNNION ASSY (OPT ITEM 40B)	A	1
–40J	275A1104-10		. TRUNNION ASSY (OPT ITEM 40C)	B	1
45	MS21209F1-15L		DELETED		
45A	PLGA3436020		. . PIN (V92555) (SPEC BACP20AX31P)		1
47	PLGA3437020		. . PLUG (V92555) (SPEC BACP20AX31)		1
50	275A1104-2		. . TRUNNION (USED ON ITEM 40)		1
–50A	275A1104-4		. . TRUNNION (USED ON ITEM 40A)		1
–50B	275A1104-7		. . TRUNNION (USED ON ITEM 40B, 40F)		1
–50C	275A1104-8		. . TRUNNION (USED ON ITEM 40C, 40G)		1
–50D	275A1104-11		. . TRUNNION (USED ON ITEM 40D, 40H)		1
–50E	275A1104-12		. . TRUNNION (USED ON ITEM 40E, 40J)		1
55	S32925-12H99		DELETED		

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–55A	2270-12-66-21		DELETED		
55B	S32925-712H99		. SCRAPER (V09257) (OPT ITEM 55C)		1
–55C	2270-712-66-21		. SCRAPER (V26303) (OPT ITEM 55B)		1
60	S30855-217H99N		. SEAL (V09257) (OPT ITEM 60A)		1
–60A	BCREF12313		. SEAL (V26303) (591-21760-952-043) (OPT ITEM 60)		1
–60B	S30855-217H99N		. SEAL (V97829) (OPT ITEM 60C)		1
–60C	BCREF51149		. SEAL (V5F573) (591-21760-952-0432) (OPT ITEM 60B)		1
65	S33157-217-99		DELETED		
–65A	5979R21700-043D		DELETED		
65B	S33157-217-99C		. RING-BACKUP (V09257) (OPT ITEM 65C)		2
–65C	5979R21700-042D		. BACKUP (V26303) (OPT ITEM 65B)		2
67	NAS1611-336		. PACKING (OPT ITEM 67A)		1
–67A	NAS1611-336A		. PACKING (OPT ITEM 67)		1
68	BACR10BM336		DELETED		

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
68A	2100-336		. RING-BACKUP (V26303) (SPEC BACR12BM336) (OPT TF450-336A (V07128)) (OPT STF800-336 (V02107)) (OPT RMR12BM336 (V94878)) (OPT C11236-336B (V26879)) (OPT S30294-336-1 (V97820))		2
70	NAS1611-331		DELETED		
70A	NAS1611-221		. PACKING-O-RING (OPT ITEM 70B)		1
–70B	NAS1611-221A		. PACKING-O-RING (OPT ITEM 70A)		1
75	BACR12BM331		DELETED		
75A	C11236-221B		. RING (V26879) (SPEC BACR12BM221) (OPT RMR12BM221 (V94878)) (OPT STF800-221 (V02107)) (OPT S30294-221-1 (V97820)) (OPT TF450-221A (V07128)) (OPT 2100-221 (V26303))		2
80	S34760-331H99N		. SEAL-PISTON (V09257) (OPT ITEM 80A)		1
–80A	BCREF12314		. SEAL-PISTON (V26303) (592-33100-952-0432) (OPT ITEM 80)		1
85	S33157-331-99		DELETED		
–85A	5979P33100-043D		DELETED		
85B	S33157-331-99C		. BACKUP (V09257) (OPT ITEM 85C)		2
–85C	5979P33100-042D		. RING-BACKUP (V26303) (OPT ITEM 85B)		2
90	275A1103-1		. PISTON (OPT ITEM 90A)		1
–90A	275A1103-2		. PISTON (OPT ITEM 90)		1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–90B	275A1103-1		DELETED		
95	66-12156-4		DELETED		
95A	275A1112-1		. LOCKWASHER-CUP		1
97	293W2521-20		. BEARING	E, F	1
100	275A1106-1		DELETED		
100A	275A1106-3		. ROD END ASSY (ITEM 100B PLUS ITEM 97 OPT ITEM 100A)	A-D	1
100B	275A1106-5		. ROD END ASSY (ITEM 100B PLUS ITEM 97 OPT ITEM 100A)	E, F	1
105	KSC135216B		. . BEARING (V50632) (USED ON ITEM 100A)		1
107	MS15004-1		. . FITTING (USED ON ITEM 100B)		2
110	275A1106-2		DELETED		
110A	275A1106-4		. . END (USED ON ITEM 100A)		1
110B	275A1106-6		. . END (USED ON ITEM 100B)		1
115	PLGA3436020		DELETED		
120	PLGA3437020		DELETED		
125	273T0050-6		. STRAP		1
130	275A1102-1		. CYLINDER		1
135	273A2508-4		DELETED		
140	NAS1612-06		DELETED		
140A	NAS1612-6		. PACKING (OPT ITEM 140B)		1
–140B	NAS1612-6A		. PACKING (OPT ITEM 140A)		1
145	MS21902-6T		. UNION		1
150	BACN10YE6N		. NUT		1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
155	C11236-110B		. RING-BACKUP (V26879) (SPEC BACR12BM110) (OPT RMR12BM110 (V94878)) (OPT STF800-110 (V02107)) (OPT S30294-110-1 (V97820)) (OPT TF450-110A (V07128)) (OPT 2100-110 (V26303))		2
160	NAS1611-110		. PACKING (OPT ITEM 160A)		1
–160A	NAS1611-110A		. PACKING (OPT ITEM 160)		1
165	273A2122-5		. TUBE ASSY-TRANSFER		1
170	DB0S13BX06H		. . SLEEVE (V14798) (SPEC BACS13BX06H) (OPT 2-02903-06H (V11328)) (OPT 35235V06 (V08199)) (OPT AP2097-06H (V01673)) (OPT AFP175V06 (V30974))		1
175	273A2122-6		. . TUBE		1
180	273A2508-4		. NAMEPLATE		1

–Item not Illustrated