COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

NOSE LANDING GEAR RETRACT ACTUATOR ASSEMBLY

PART NUMBER 273A1101–1

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COMPONENT MAINTENANCE MANUAL

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To: All holders of NOSE LANDING GEAR RETRACT ACTUATOR ASSEMBLY 32-33-12.

Attached is the current revision to this COMPONENT MAINTENANCE MANUAL

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32-33-12	
REPAIR 3-1	Added a note to use tighter bushings in the head end if bushing migration is a problem.
	Changed the data in the References list.
REPAIR 3-2	Added clarifications.
	Added the References list.

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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR 38036	DEC 01/97

All revisions to this manual will be accompanied by transmittal sheet bearing the revision number. Enter the revision number in numerical order, together with the revision date, the date filed and the initials of the person filing.

Revision		Filed		Revision		Filed	
Number	Date	Date	Initials	Number	Date	Date	Initials

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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 RETRACT ACTUATOR ASSEMBLY - DESCRIPTION AND OPERATION

1. Description

A. The nose landing gear retract actuator assembly is a hydraulic piston type which consists of a CRES piston, a CRES cylinder assembly and a titanium head end assembly.

2. Operation

A. The actuator extends and retracts when hydraulic pressure is applied. There is a snubber that slows the rate of the piston when it gets to the end of the extend and retract strokes.

3. Leading Particulars (Approximate)

A. Length (retracted) – 18; (extended) – 26 inches

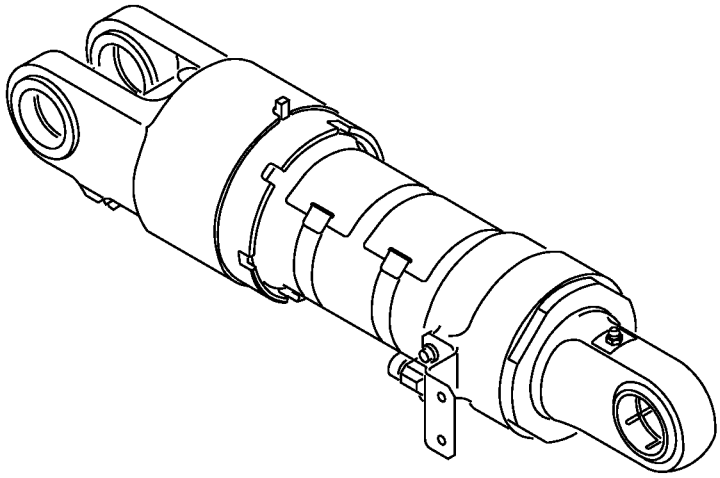
B. Diameter – 3.5 inches

C. Weight – 26.5 pounds

D. Pressure (proof) – 4500 psi

E. Pressure (operate) – 3000 psi

F. Fluid (operate) – BMS 3-11 hydraulic fluid fluid, D00153



Retract Actuator Assembly - Nose Landing Gear
Figure 1

TESTING AND FAULT ISOLATION

1. General

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

(1) Nose Gear Retract Actuator Test

(a) External leakage

(b) Internal leakage

(c) Seal friction

(d) Extend rate

(e) Retract rate

(f) Proof pressure

(2) Fault Isolation

(3) Fault Correction

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

C. Refer to IPL Figure 1 for item numbers.

2. Nose Gear Retract Actuator Test

A. 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)
G50347	Lockwire - Nickel-copper, 0.032 inch diameter	NASM20995N˜C32

B. References

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

C. Test Requirements

(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 60-120°F.

D. Prepare for Test

(1) Install the actuator in the C32036-2 – Stand

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

(3) Fill the actuator with fluid, D00153.

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

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

E. Procedure

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

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

(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 piston.

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 fluid, D00153 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 3 drops.

3) The leakage limit for static seals is zero.

(2) Do an internal leakage test:

(a) Fully extend the piston.

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

(c) Apply 3000-3100 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 one (1) cc per minute.

(e) Remove the pressure from the extend port.

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

(g) Fully retract the piston.

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

(i) Apply 3000-3100 psi to the retract port for a minimum of 1 minute.

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

1) Recommended leakage is zero.
2) The leakage limit is one (1) cc per minute.

(k) Remove the pressure from the retract port.

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

(3) Do a seal friction test:

(a) Retract the piston fully.

(b) With no load applied to the piston, slowly increase the pressure at 50 psid maximum pressure at the extend port until the rod extends smoothly and continuously. Monitor the rod motion through the complete range of travel to make sure the rod moves smoothly.

(c) Make sure the piston is fully extended.

(d) With no load applied to the piston, slowly increase the pressure at 100 psid maximum pressure at the retract port until the rod retracts smoothly and continuously. Monitor the rod motion through the complete range of travel to make sure the rod moves smoothly.

(e) Decrease the pressure applied to the ports to zero.

(4) Do an extend rate test:

(a) Retract the piston fully.

(b) Let the fluid, D00153 flow freely from the retract port to a reservoir.

(c) Apply 3000-3200 psi pressure to the extend port:

1) Keep a record of the piston position related to the time.
2) The piston must fully extend, from the retracted position, in 4.5-6.0 seconds.
3) Make sure the piston speed decreases at the end of the travel.

(d) Remove the pressure from the extend port.

(5) Do a retract rate test:

(a) Extend the piston fully.

(b) Let the fluid, D00153 flow freely from the extend port to a reservoir.

(c) Apply 3000-3200 psi pressure to the retract port:

1) Keep a record of the piston position related to the time.
2) The piston must fully retract, from the extended position, in 9.0-11.0 seconds.
3) Make sure the piston speed decreases at the end of the travel.

(d) Remove the pressure from the retract port.

(6) Do a proof pressure test:

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

(a) Retract the piston fully.

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

(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 piston fully.

(f) Apply 4500-4600 psi pressure to the extend 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 pressure from the extend port.

(7) Make sure that the actuator has a minimum extend length of 25.77 inches and maximum retract length of 18.01 inches.

(8) Remove the actuator from the stand after the test.

(9) Lockwire the nut (125) to the key (120) by the double-twist method (SOPM 20-50-02) using lockwire, G50347.

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

3. Fault Isolation

A. Procedure

(1) Refer to TESTING AND FAULT ISOLATION, Table 101 for fault isolation.

Table 101: Fault Isolation Chart

TROUBLE	PROBABLE CAUSE	CORRECTIONS
Excessive leakage at the rod assembly end	Defective excluder (290), seal (285), packing (280), or rings (275)	Disassemble and replace the parts as shown in TESTING AND FAULT ISOLATION, Paragraph 4..
Binding or irregular movement of the rod assembly	Defective piston (305), head (115), bearing (130) or cylinder (150)	Disassemble and replace the parts as shown TESTING AND FAULT ISOLATION, Paragraph 4.in .
	Dirt or foreign material in the cylinder	Disassemble and clean parts.
The actuator failed the extend or retract rate test	Defective snubber (235) or related part	Disassemble and replace the parts as shown in TESTING AND FAULT ISOLATION, Paragraph 4.

4. Fault Correction

A. 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)
G50227	Tie - Plastic, Adjustable, Self-clinching, Tiedown Strap	AS33671

B. References

Reference	Title
CMM 32-33-23	NOSE GEAR LOCK VALVE MANIFOLD ASSEMBLY

C. Procedure

(1) Drain all the fluid, D00153 from the unit.

(2) Replacement of excluder (290), seal (285), rings (275) or packing (280):

(a) Remove the bearing (65) from piston (305). Remove bearing (130) and lockwasher (135) from cylinder assembly (140).

(b) Remove the excluder (290), seal (285), rings (275) and packing (280).

(c) Replace parts as necessary.

(d) Install packing (280), rings (275), seal (285), and excluder (290) on bearing (130).

(e) Install lockwasher (135) and bearing (130) in cylinder assembly (140) per ASSEMBLY. Do the test again to see if the problem was corrected.

(3) Replacement of the packing (260) or the rings (235):

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

(b) Remove the piston (305) from the cylinder (140).

(c) Replace the defective packing (260) or the rings (235).

(d) Install the piston (305) in the cylinder (140).

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

D. Replacement of the piston (305), the cylinder (140) or the snubber (235):

(1) Drain the fluid, D00153 from the actuator.

(2) Disassemble the actuator CMM 32-33-23, DISASSEMBLY.

(3) Replace the defective parts.

(4) Assemble the actuator CMM 32-33-23, ASSEMBLY.

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

(6) Install the bearing (65) and secure it with a tie wrap, G50227.

DISASSEMBLY

1. General

A. This procedure tells how to disassemble the nose 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 the SOPM subjects identified in this procedure.

D. Refer to IPL Figure 1 for item numbers.

2. Disassembly

A. Part Replacement

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

(1) Packings, O-rings and seals (25, 160, 165A, 205, 260, 280, 285)

(2) Excluder (290)

(3) Backup rings (155, 200, 255, 275)

NOTE: Do not remove orifice (90B) or insert (95, 145) unless it is damaged or to clean the area.

(4) Lockwasher (135, 265)

B. Procedure

(1) Use standard industry practices and these steps.

(2) Install the actuator in the C32036-2 – Stand.

(3) Remove the lockwire from the nut (125), the key (120) and the head end assembly (80).

(4) Bend the tab of the lockwasher (135) to release the bearing (130).

(5) With the C32036-10 – Spanner wrench , loosen the bearing (130) in the cylinder (140).

(6) Remove the fittings (100) from the piston (305).

(7) With the C32036-8 – Large Crowfoot Wrench, loosen the nut (125) on the head end assembly (80).

(8) Remove the key (120) from the head end assembly (80).

(9) Turn the cylinder (140) to remove it from the head end assembly (80).

(10) Move the piston (305) from the cylinder (140).

(11) Bend the tabs of the lockwasher (265) to release the jamnut (270).

(12) Loosen the jamnut (270) with the C32036-7 – Small Crowfoot Wrench.

(13) Remove the jamnut (270), the lockwasher (265) and the guide assembly (220) from the piston (305).

(14) Remove the seal (165A) from the piston (305).

(15) Turn the bearing (130) to remove it from the cylinder (140).

(16) Remove the lockwasher (135) from the cylinder (140).

(17) Turn the nut (125) to remove it from the cylinder (140).

(18) Remove the packing (160) and the backup rings (155) from the head end assembly (80).

(19) Remove the snubber stop (190) from the pull tube (195).

(a) Loosen the nut (185).

(b) Remove the nut (185), the washers (175, 180), the bolt (170) and the snubber stop (190) from the pull tube (195).

(20) Remove the guide (220), lockwasher (265) and jamnut (270) from the pull tube (195).

(21) Remove the bolts (70) and washers (75) from the retainer (215).

(22) Remove the retainer (215), the snubber assembly (235), the spring (210) and the pull tube (195) from the head end assembly (80).

(23) Remove the head end assembly (80) from the C32036-2 – Stand.

CLEANING

1. General

A. This procedure has the data necessary to clean the nose gear retract 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 bearing (65) 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) Fitting (20)

(b) Cylinder (150)

(c) Pull tube (195)

(d) Retainer (215)

(e) Retract slide (240)

(f) Extend slide (245)

(g) Sleeve (250)

(h) Piston (305)

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

(a) Head end (115)

(b) Locknut (125)

(c) Bearing (130)

(d) Jamnut (270)

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
273A1102	CYLINDER ASSEMBLY	2-1
273A1103	HEAD END ASSEMBLY	3-1
273A1103	HEAD END ASSEMBLY	3-2
273A1104	PISTON	4-1
273A1105	BEARING	5-1
273A1106	SNUBBER ASSEMBLY	6-1
273A1115	RETAINER	7-1
273A1116	BEARING	8-1
273A2110	PULL TUBE	9-1
273A2121	FITTING	10-1
273A2508	NAMEPLATE	11-1

2. Dimensioning Symbols

A. Standard True Position Dimensioning Symbols used in the applicable repair procedures are shown in REPAIR-GENERAL, Figure 601.

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

EXAMPLES

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

True Position Dimensioning Symbols
Figure 601

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. 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 20-60-02	FINISHING MATERIALS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. General

(1) Instructions for the repair of the parts listed in REPAIR 1-1, Table 601 is for repair of the initial finish.

D. Procedure

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 finishing materials, refer to SOPM 20-60-02. For miscellaneous materials, refer to SOPM 20-60-04.

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

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
Locknut (125)	Titanium Alloy	Apply lubricant, D00113 (F-19.10) to the face of the nut that is opposite the notches.
Nut (270)	Aluminum Alloy	Anodize (F-17.35) all over.
Stop (190)	Aluminum Alloy	Anodize (F-17.35) all over.
Spring (210)	Titanium Wire	Apply no finish (F-25.01).

Table 601: Refinish Details (Continued)

IPL FIG. & ITEM	MATERIAL	FINISH
Key (120)	15-5PH CRES	Anodize (F-17.25) all over.
Bracket (51)	301 CRES	Passivate (F-17.25).
Retract slide (240)	440C CRES	Passivate (F-17.25).
Extend slide (245)	440C CRES	Passivate (F-17.25).
Sleeve (250)	440C CRES	Passivate (F-17.25).

CYLINDER - REPAIR 2-1

273A1102–2

1. General

A. This procedure has the data necessary to repair and refinish the cylinder (150).

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

C. Refer to the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

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

(2) Shot Peen: See the flagnote in REPAIR 2-1, Figure 601.

(a) Shot size 0.017 - 0.046

(b) Intensity 0.005 - 0.010A2

2. Cylinder Repair

A. References

Reference	Title
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
SOPM 20-42-09	ELECTRODEPOSITED NICKEL PLATING
SOPM 20-60-02	FINISHING MATERIALS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

B. Procedure (REPAIR 2-1, 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 finishing materials, refer to SOPM 20-60-02. For miscellaneous materials, refer to SOPM 20-60-04.

(1) Repair the cylinder (150).

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

1) Obey the flagnotes in REPAIR 2-1, Figure 601.

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

(c) Shot peen the cylinder (150) (SOPM 20-10-03).

1) Obey the flagnote in REPAIR 2-1, Figure 601.

(d) Nickel plate if necessary (SOPM 20-42-09).

1) Obey the flagnotes in REPAIR 2-1, Figure 601.

(e) Chrome plate (F-15.34) to a maximum finish plating thickness of 0.01 inches, if required (SOPM 20-42-03), and grind as shown (SOPM 20-10-04).

1) Obey the flagnotes in REPAIR 2-1, Figure 601.

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

3. Cylinder 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 20-60-02	FINISHING MATERIALS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

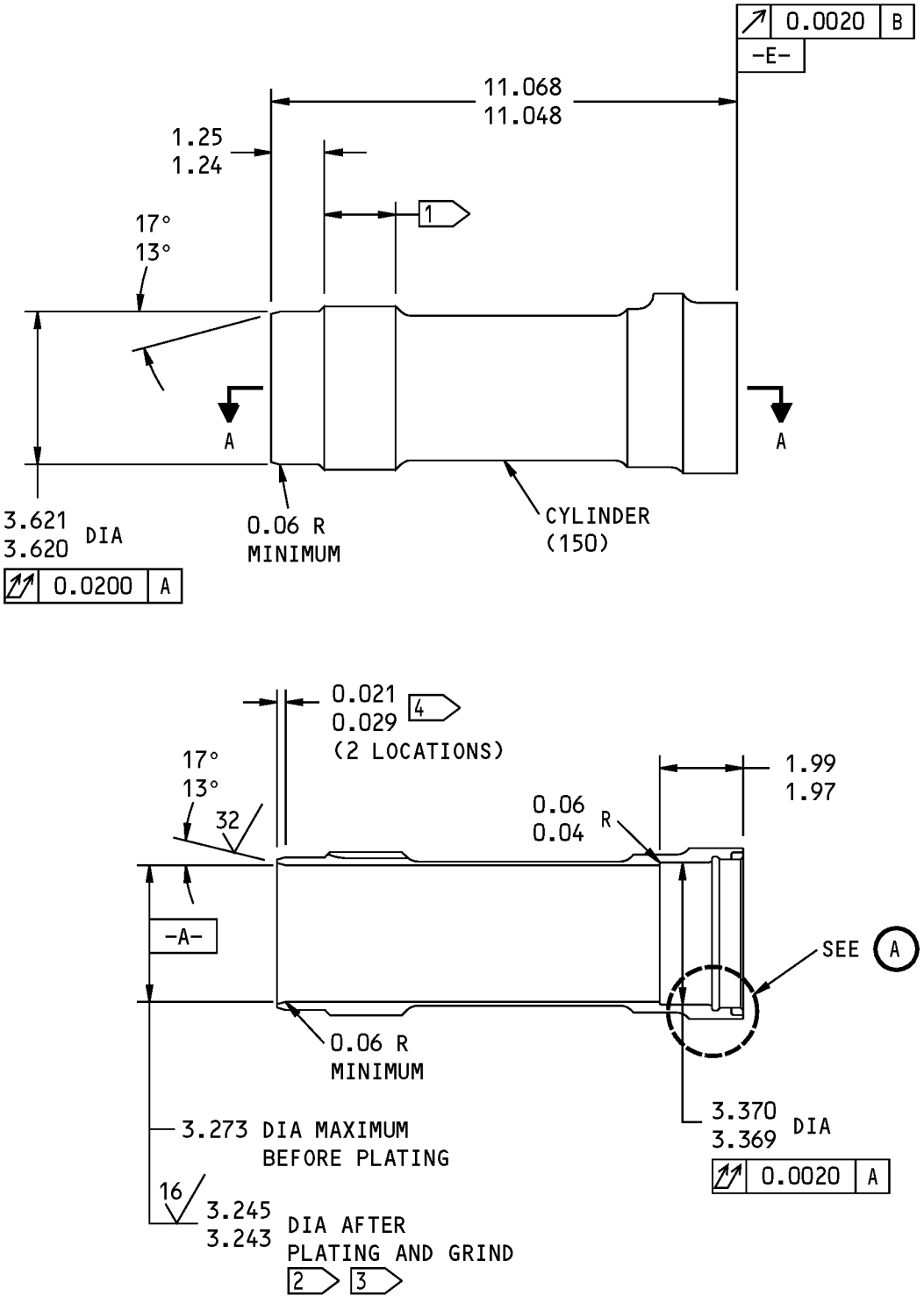
C. Procedure (REPAIR 2-1, Figure 601)

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 finishing materials, refer to SOPM 20-60-02. For miscellaneous materials, refer to SOPM 20-60-04.

(1) Put a finish on the cylinder (150).

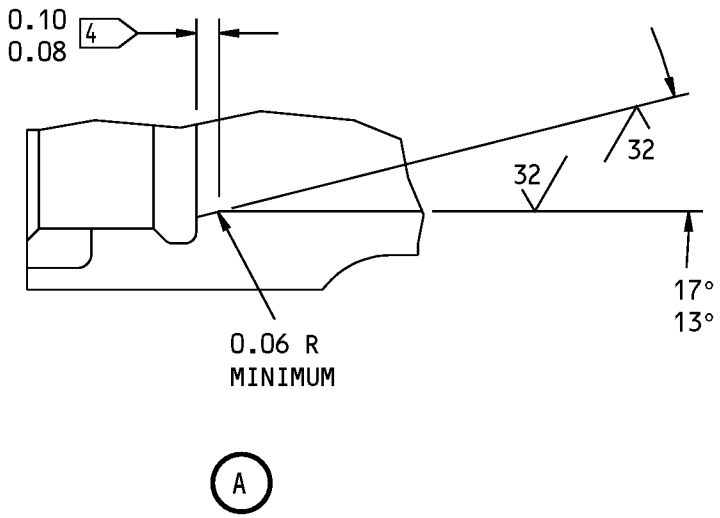
(a) Prepare the surface and passivate per method 2 (F-17.25).

(b) Apply lubricant, D00113 (F-19.10) (SOPM 20-50-08) as shown by flagnote 1.



A–A

273A1102-2 Cylinder Assembly Repair
Figure 601 (Sheet 1 of 2)



1 APPLY BMS 3-8, TYPE 8, SOLID FILM LUBRICANT.

2 SHOT PEEN THIS AREA.

3 AFTER SHOT PEEN, PLATE THE NOTED SURFACE (F-15.33, F-15.34).

4 PLATE RUNOUT 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

273A1102-2 Cylinder Assembly Repair
Figure 601 (Sheet 2 of 2)

HEAD END ASSEMBLY - REPAIR 3-1

273A1103–1

1. General

A. Use this procedure to replace the bushings in head end assembly (80).

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

C. Refer to the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair figures.

D. Refer to IPL Figure 1 for item numbers.

2. Bushing Replacement

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
A00551	Sealant - Fuel Tank	BAC5010, Type 44 (BMS5-44, BMS5-45)

B. References

Reference	Title
SOPM 20-50-03	BEARING AND BUSHING REPLACEMENT
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Procedure (REPAIR 3-1, Figure 601)

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

NOTE: If you find that bushing migration is a problem (the old bushings are not down against the lugs), we recommend that you install replacement bushings with a tighter fit, such as the repair equivalents made in REPAIR 3-2.

(1) Remove the old bushings (SOPM 20-50-03).

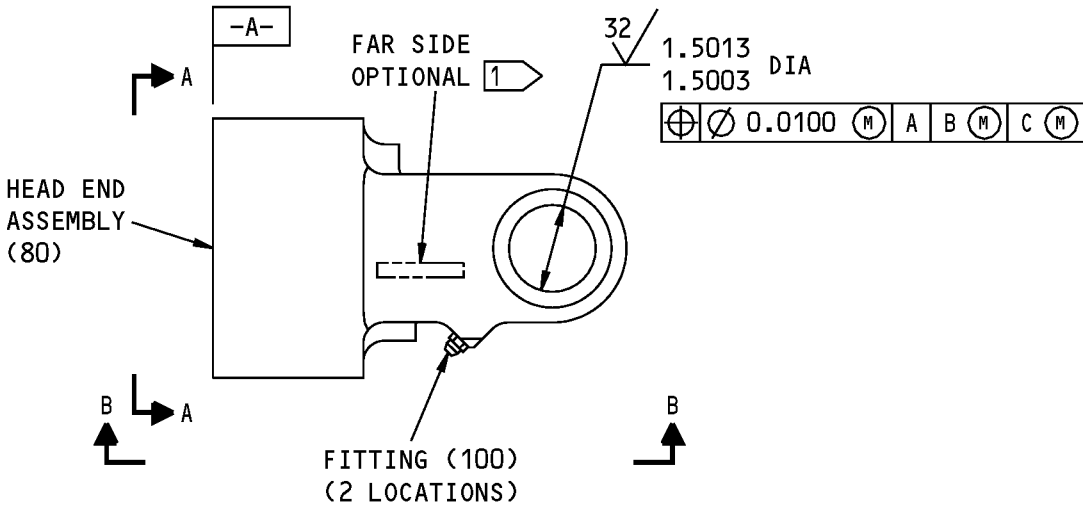
(2) If you find defects on the head end surfaces, refer to REPAIR 3-2 for repair instructions.

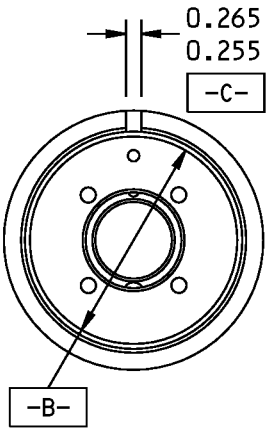
(3) Install replacement bushings by the shrink fit procedure (SOPM 20-50-03).

(4) Machine the bushing bores to design dimensions and finish.

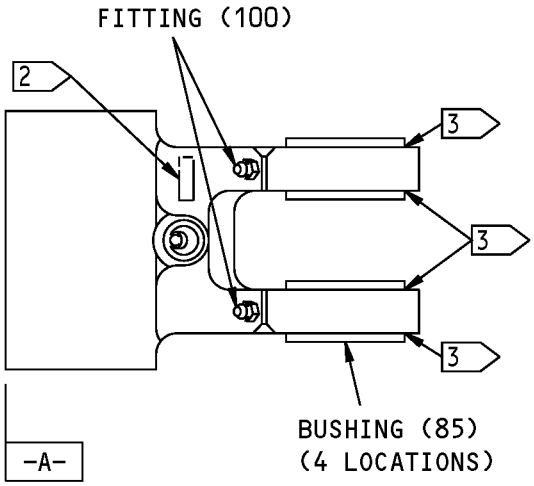
(5) Seal the bushings with sealant, A00551 (flagnote 3).

(6) If necessary, replace lube fittings (100) and tighten the replacements to 20 to 25 pound-inches.





A-A



B-B

1 PART MARK THIS AREA

2 IDENTIFY THE EXTEND PORT AS FOLLOWS - EXT.

3 APPLY A BEAD OF SEALANT TO THE JOINT BETWEEN THE HEAD AND THE BUSHING.

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273A1103-1 Head End Assembly
Figure 601

HEAD END - REPAIR 3-2

273A1103–2

1. General

A. Use this procedure to repair head end (115).

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

C. Refer to the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair figures.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: Titanium, annealed

(2) Shot peen: Not necessary

2. Repair

A. References

Reference	Title
SOPM 20-10-07	MACHINING OF TITANIUM
SOPM 20-20-02	PENETRANT METHODS OF INSPECTION
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES

B. Procedure (REPAIR 3-2, Figure 601)

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For machining of titanium, refer to SOPM 20-10-07.

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

(2) Penetrant examine (SOPM 20-20-02).

(3) Make oversize bushings (REPAIR 3-1) as necessary to adjust for the material removed.

3. Refinish

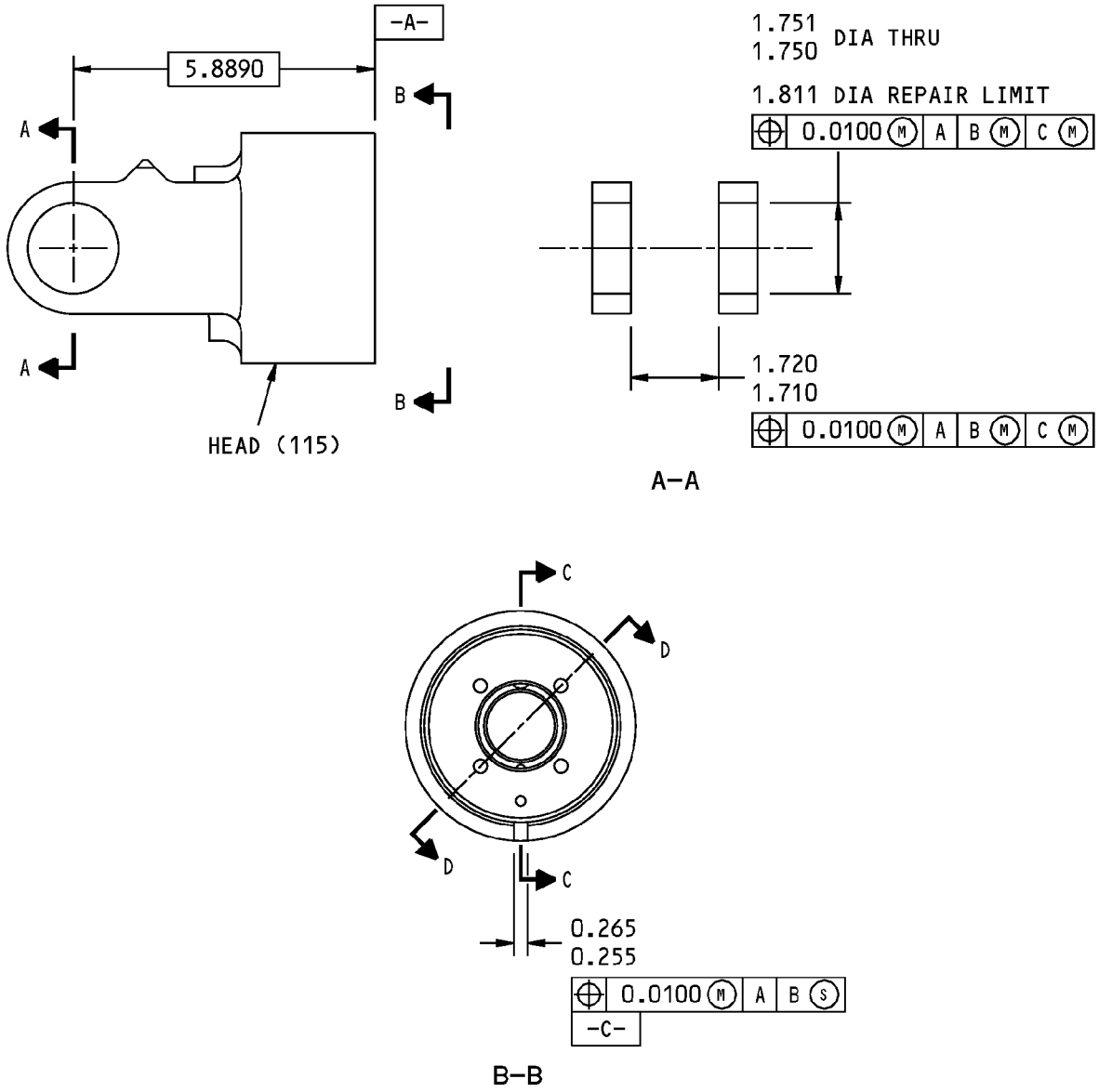
A. References

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

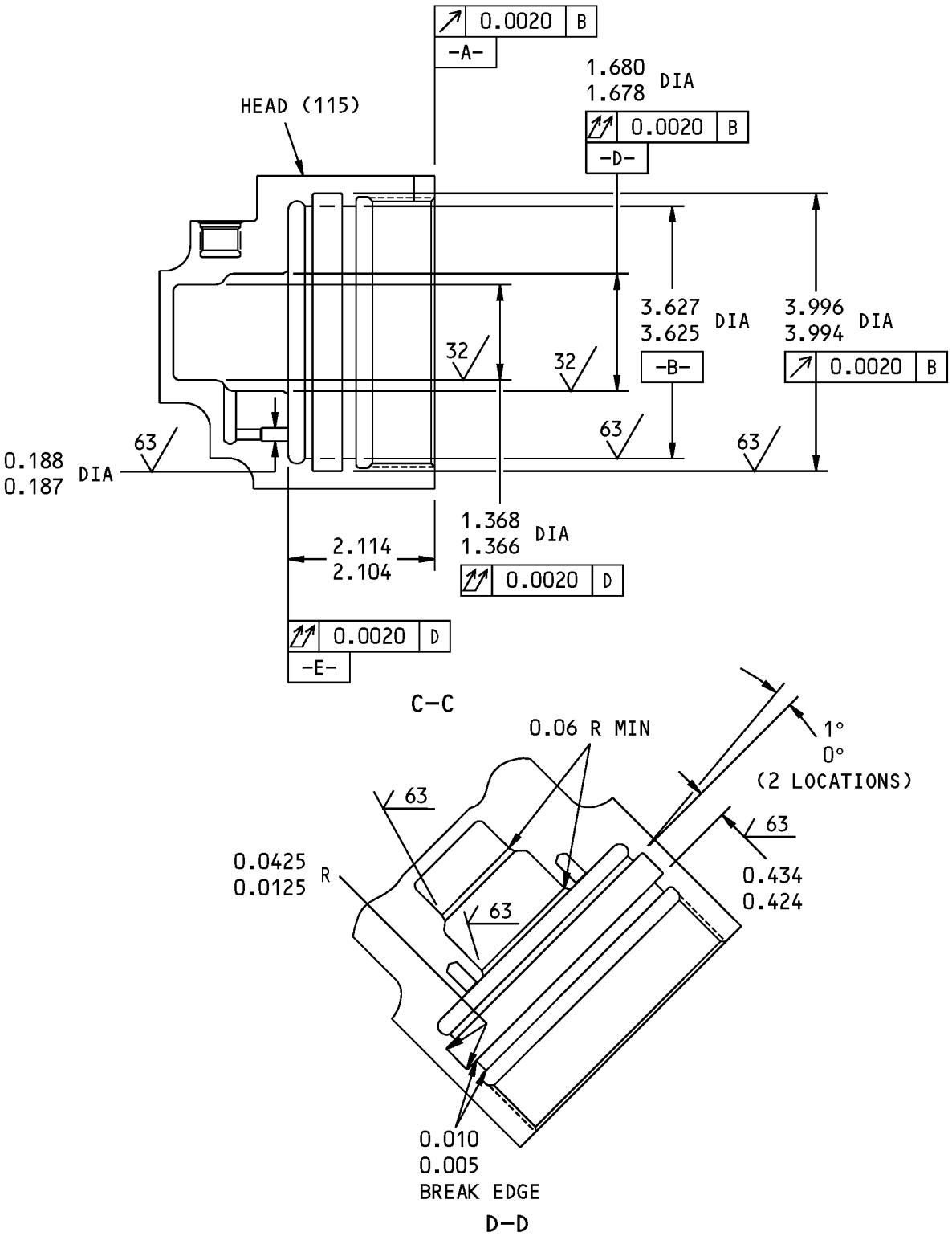
B. Procedure (REPAIR 3-2, Figure 601)

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

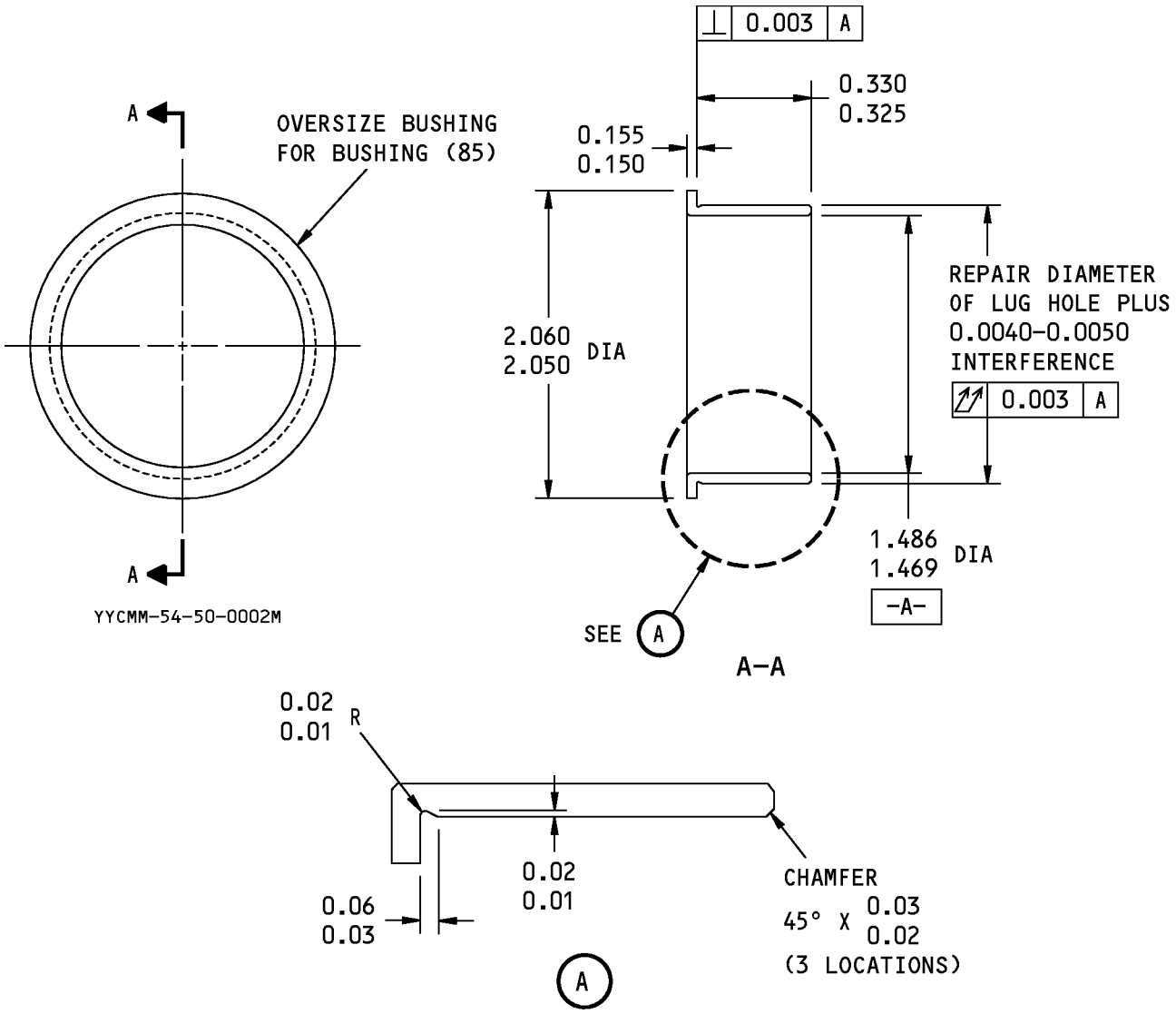
(1) Apply no finish (F-25.01)



273A1103-2 Head End Repair
Figure 601 (Sheet 1 of 2)



273A1103-2 Head End Repair
Figure 601 (Sheet 2 of 2)



63 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES 0.02-0.04 R

MATERIAL: AL-NI-BRZ (AMS 4640 OR AMS 4880)

FINISH: NO FINISH

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

F94345 S0004999132_V2

Oversize Bushing Details
Figure 602

PISTON - REPAIR 4-1

273A1104–1

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 the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

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

(2) Shot peen: All surfaces, unless as shown

(a) Intensity 0.008 - 0.013A2

(b) Overspray is permitted

2. Piston Repair

A. References

Reference	Title
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
SOPM 20-42-09	ELECTRODEPOSITED NICKEL PLATING
SOPM 20-60-02	FINISHING MATERIALS

B. Procedure (REPAIR 4-1, 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 finishing materials, refer to SOPM 20-60-02.

(1) Repair the piston (305):

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

(b) Obey the flagnotes in REPAIR 4-1, Figure 601.

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

(d) Shot peen the piston (305) (SOPM 20-10-03).

1) Obey the flagnote 2.

(e) Apply nickel plate if necessary (SOPM 20-42-09).

1) Obey the flagnotes 3, 4 and 5.

(f) The maximum total plating thickness is 0.015 inches.

(g) Apply chrome plate (F-15.34) (SOPM 20-42-03) to a maximum finish plating thickness of 0.01 inches and grind (SOPM 20-10-04) as shown.

1) Obey the flagnotes 4 and 5.

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

3. Piston Refinish

A. References

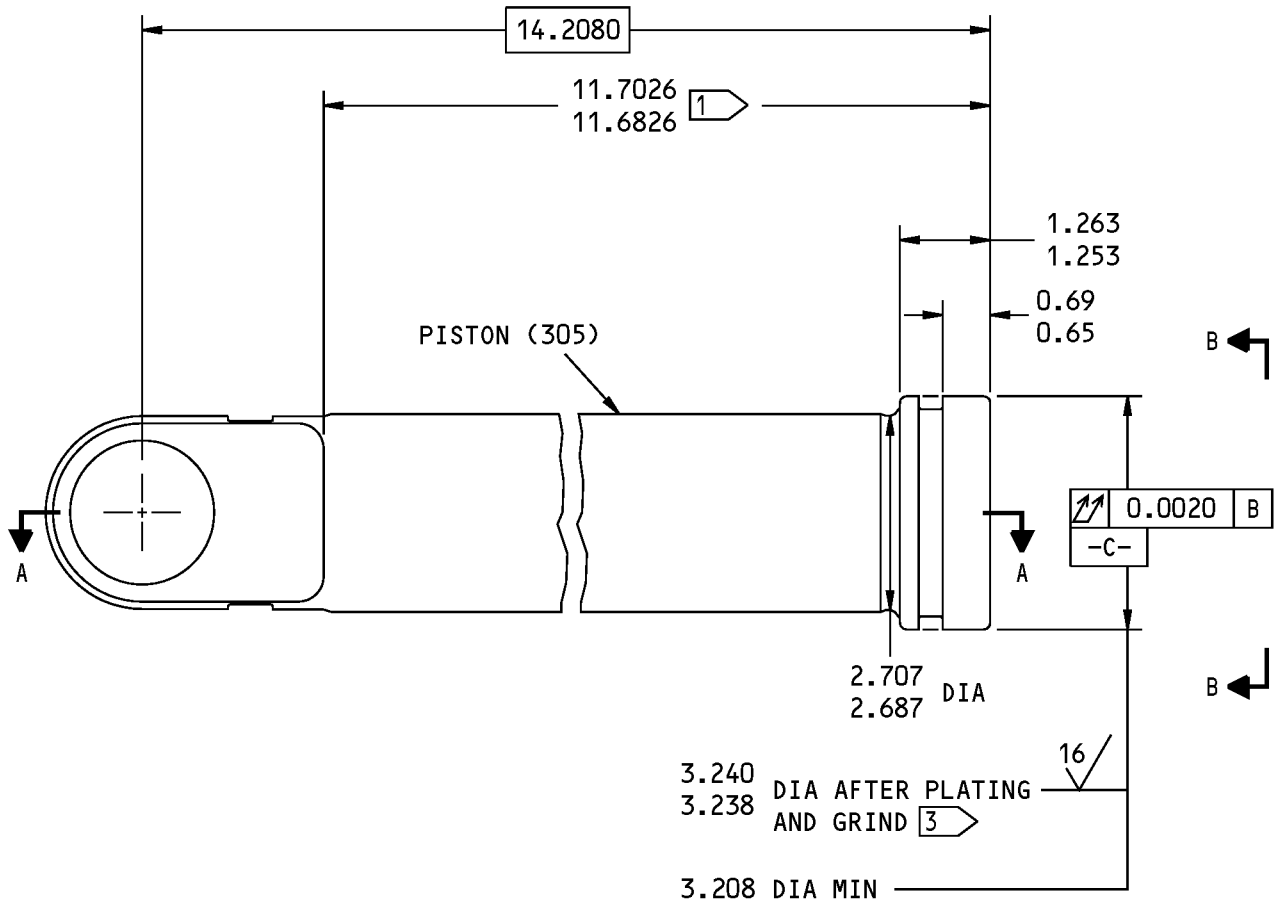
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

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

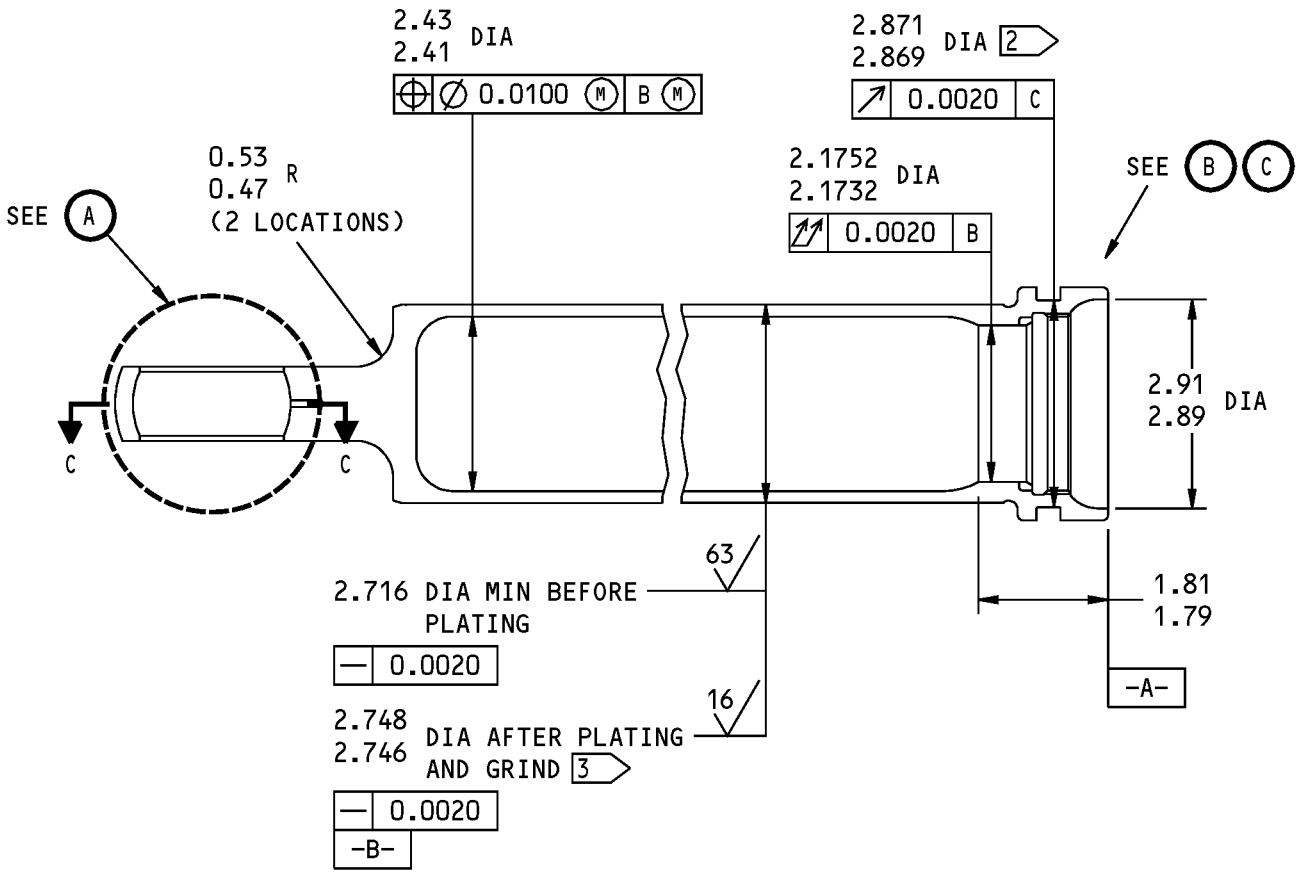
NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For decoding table for Boeing finish codes, refer to SOPM 20-41-01. For finishing materials, refer to SOPM 20-60-02.

(1) Put a finish on the piston (305):

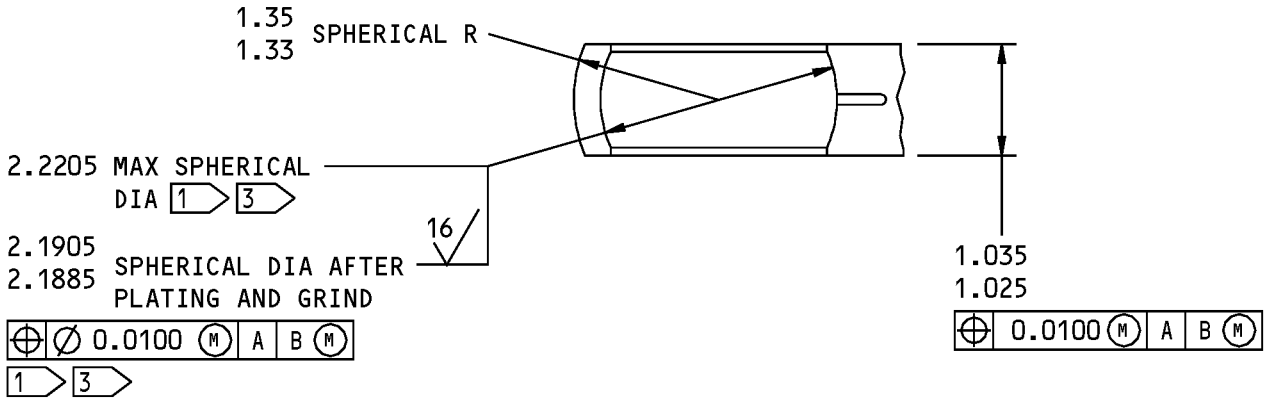
(a) Passivate (F-17.25).



273A1104-1 Piston Repair
Figure 601 (Sheet 1 of 4)

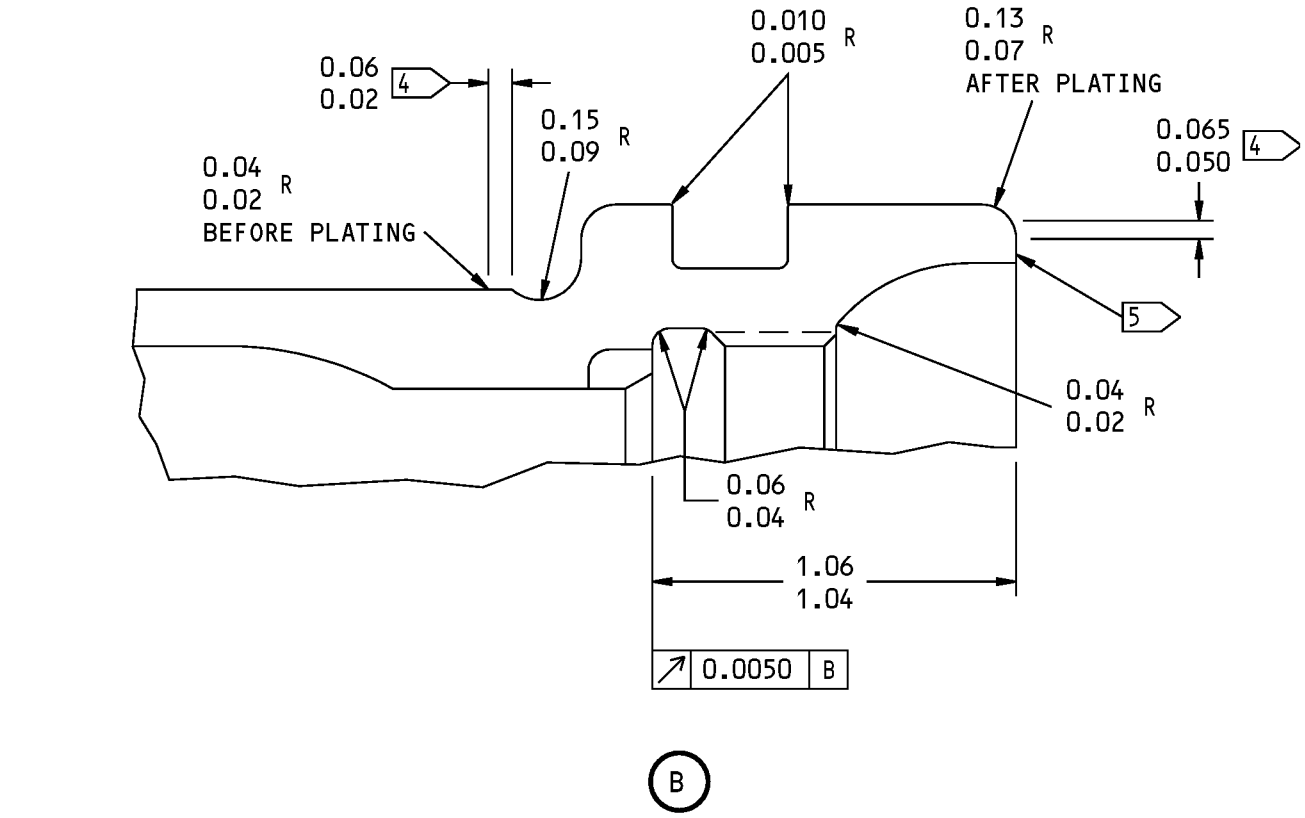


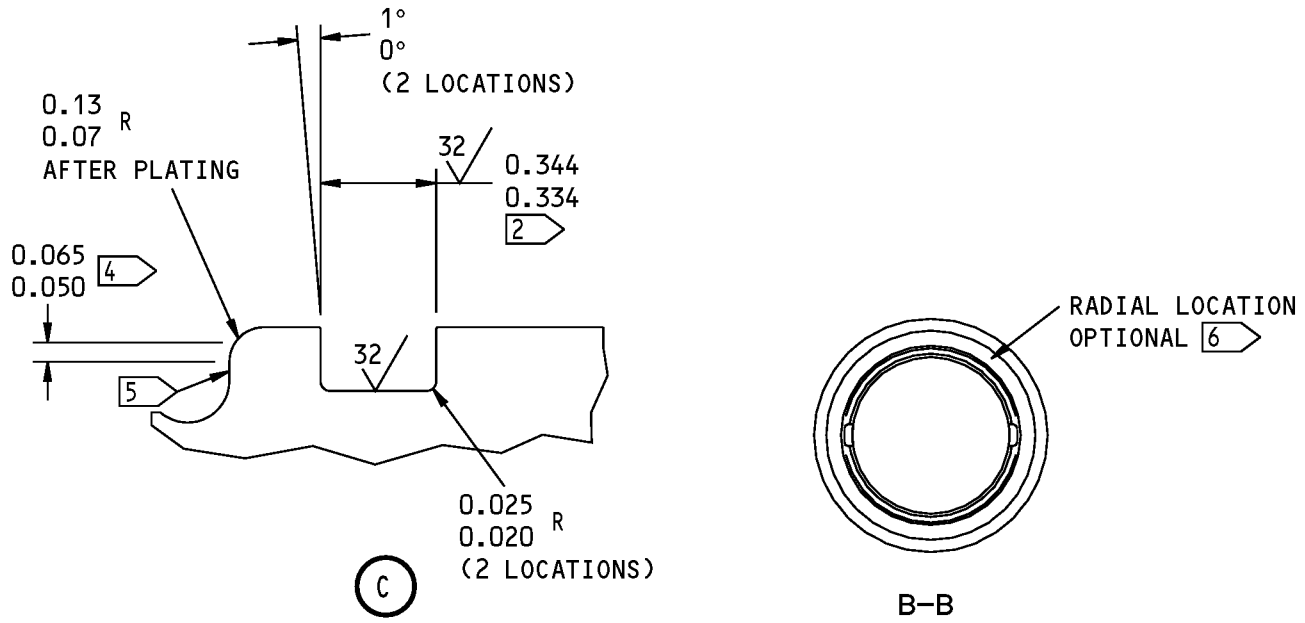
A–A



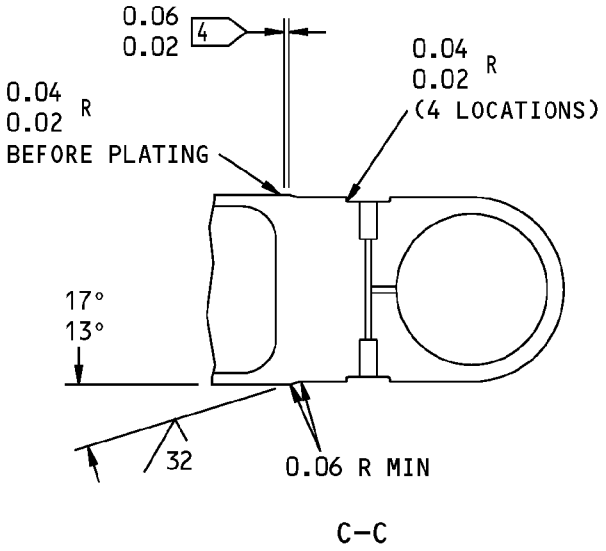
A

273A1104-1 Piston Repair
Figure 601 (Sheet 2 of 4)





273A1104-1 Piston Repair
Figure 601 (Sheet 3 of 4)



C–C

1 SHOT PEEN THIS AREA.

2 DO NOT SHOT PEEN THIS AREA.

3 PLATE THIS AREA (F-15.33,F-15.34).

4 PLATE RUNOUT IN THIS AREA.

5 DO NOT PLATE THIS FACE.

6 THE PART NUMBER IS HERE.

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273A1104-1 Piston Repair
Figure 601 (Sheet 4 of 4)

BEARING - REPAIR 5-1

273A1105–1

1. General

A. This procedure has the data necessary to repair the bearing (65).

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

C. Refer to the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

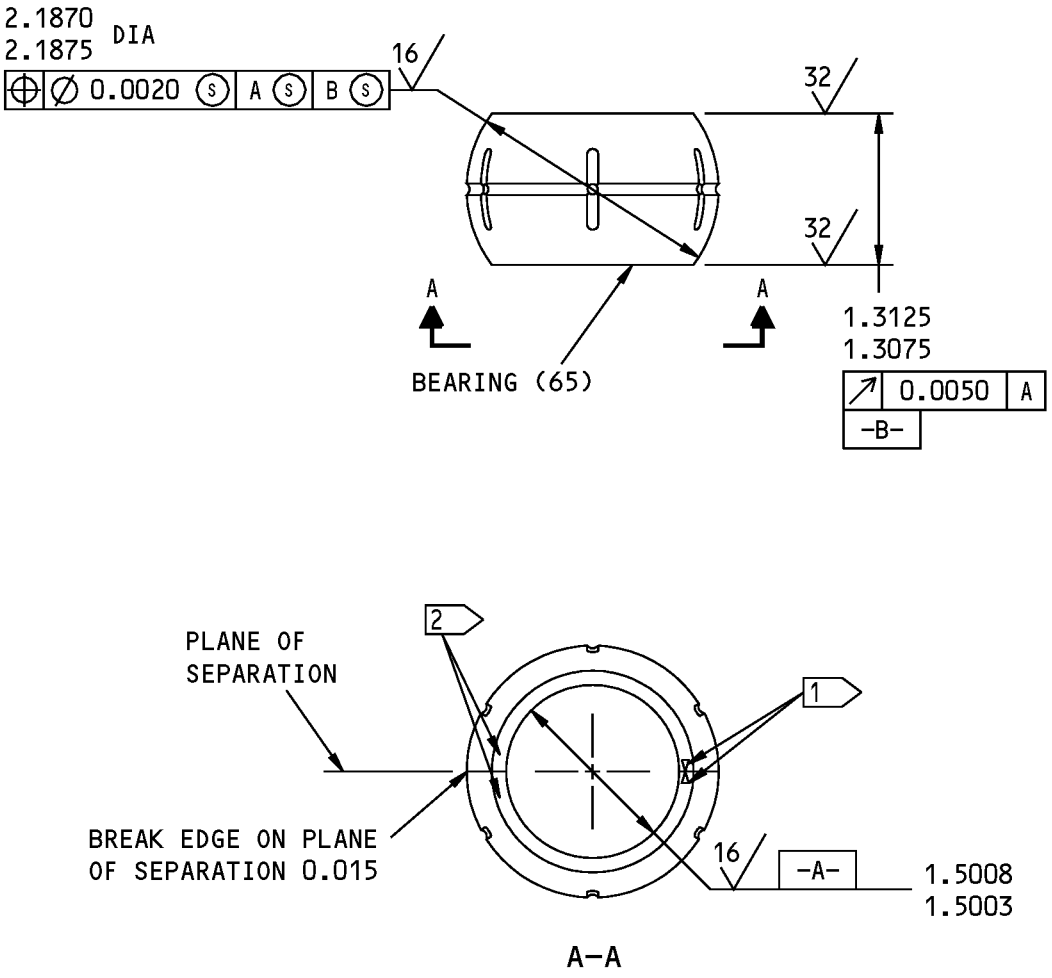
(1) Material: AL-NI-Bronze, AMS 4640

2. Bearing Refinish

A. Procedure

(1) Put a finish on the bearing (65):

(a) Apply no finish. You can use a temporary compound for transportation and storage.



1 THE MATING INDEX MARKS ARE ON THIS SIDE ONLY.

2 THE PART NUMBER AND THE SERIAL NUMBER ARE ON THIS SIDE.

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273A1105-1 Bearing Refinish
Figure 601

SNUBBER ASSEMBLY - REPAIR 6-1

273A1106–1

1. General

A. This procedure has the data necessary to refinish the snubber assembly (235).

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

C. Refer to the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: 440C CRES HRC 57-60

2. Snubber Assembly Refinish

A. 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)

B. References

Reference	Title
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS
SOPM 20-60-03	LUBRICANTS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

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

CAUTION: THE SNUBBER (235) IS A PRECISION ASSEMBLY. BE CAREFUL NOT TO DAMAGE IT.

NOTE: For decoding table for Boeing finish codes, refer to SOPM 20-41-01. For finishing materials, refer to SOPM 20-60-02. For miscellaneous materials, refer to SOPM 20-60-04.

(1) Install the retract slide (240) and the extend slide (245) in the sleeve (250):

(a) Obey the flagnotes in REPAIR 6-1, Figure 601.

(b) Lubricate the retract slide (240), the extend slide (245) and the sleeve (250) with fluid, D00153 (SOPM 20-60-03).

(c) Install the retract slide (240) in the sleeve (250) so that they align at one end.

(d) Install the extend slide (245) in the retract slide (240) so that one end of the retract slide (240), the extend slide (245) and the sleeve (250) align.

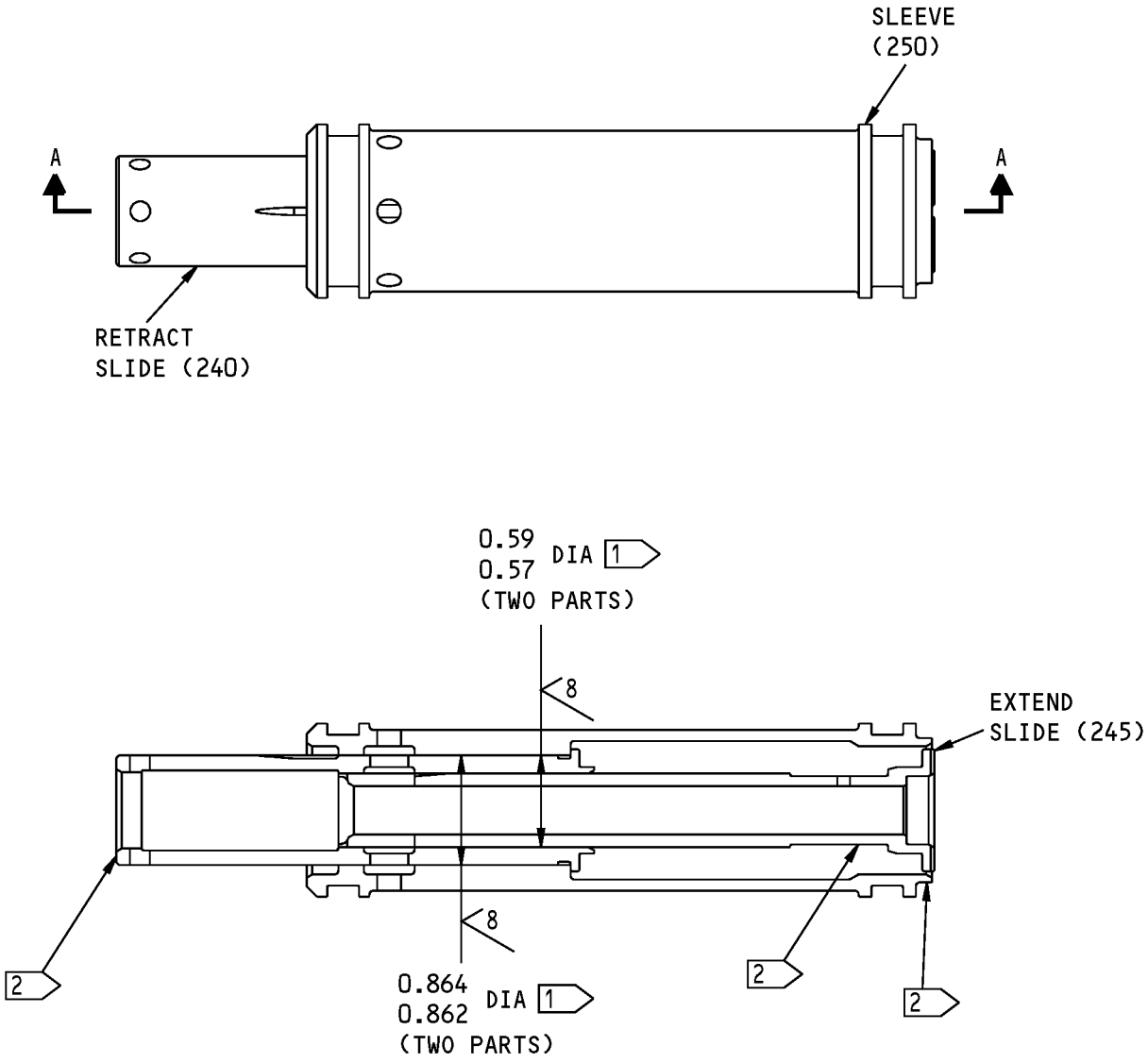
(2) Tilt the sleeve approximately 45 degrees so that the slides move by their own weight.

(3) Align one end of the three parts.

(4) Turn the snubber assembly (235) approximately 120 degrees.

(5) Do REPAIR 6-1, Paragraph 2.C.(2), REPAIR 6-1, Paragraph 2.C.(3) and REPAIR 6-1, Paragraph 2.C.(4) again.

(6) Replace the snubber assembly (235) if the slides do not move by their own weight.



A-A

1 MAKE SURE THAT THE CLEARANCE BETWEEN THE TWO DIAMETERS IS 0.0006 TO 0.0008.

2 THE SERIAL NUMBER OF THIS MATCHED SET IS ON THIS SURFACE.

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES 0.0005 MAX.

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273A1106-1 Snubber Assembly
Figure 601

RETAINER - REPAIR 7-1

273A1115–1

1. General

A. This procedure has the data necessary to refinish the retainer (215).

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

C. Refer to the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

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

2. Retainer Refinish

A. References

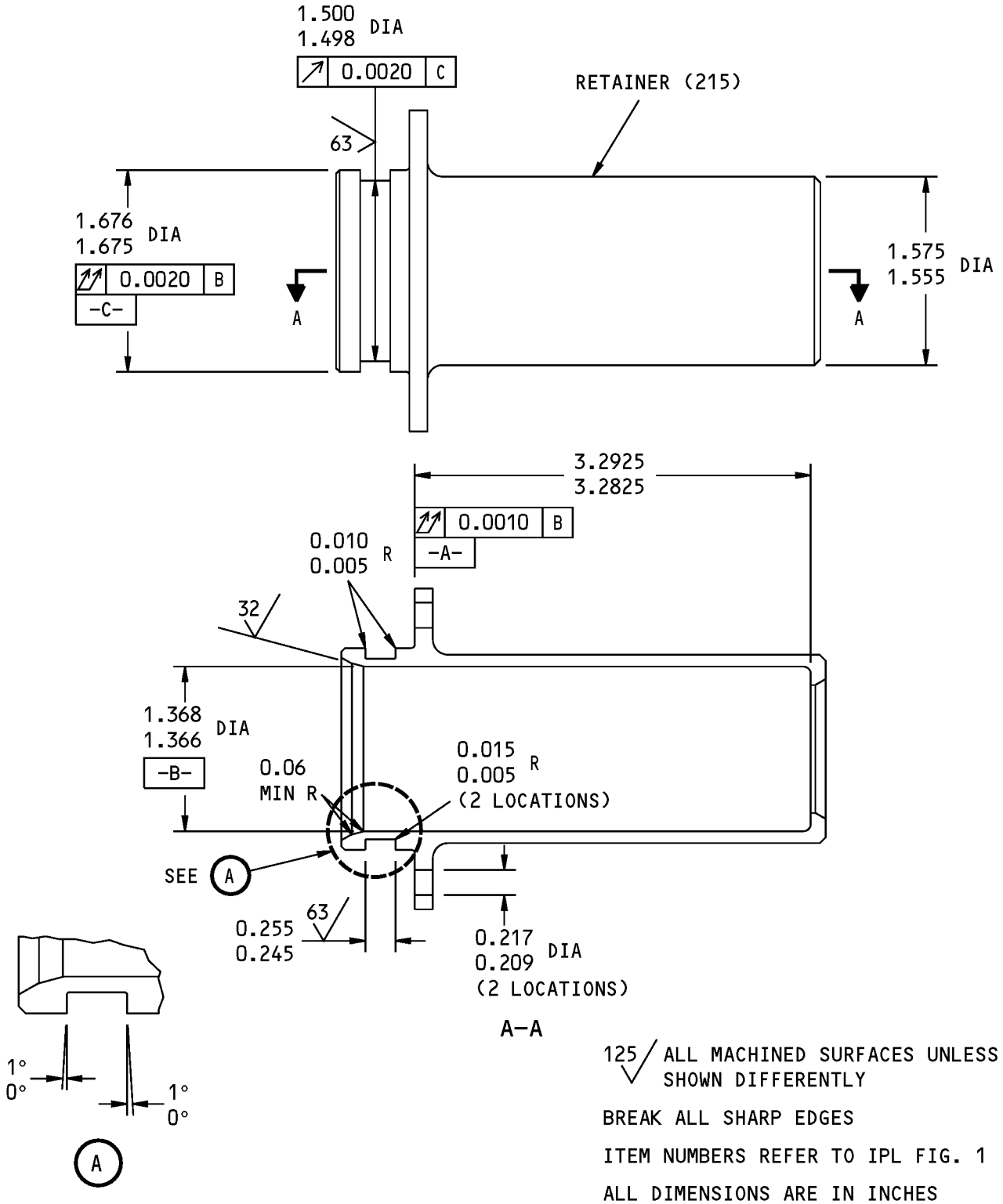
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

B. Procedure (REPAIR 7-1, 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 finishing materials, refer to SOPM 20-60-02.

(1) Put a finish on the retainer (215):

(a) Passivate (F-17.25).



273A1115-2 Retainer Repair
Figure 601

BEARING - REPAIR 8-1

273A1116–1

1. General

A. This procedure has the data necessary to replace and refinish the bearing (130).

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

C. Refer to the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: AL-NI-Bronze, AMS 4640

2. Bearing Refinish

A. References

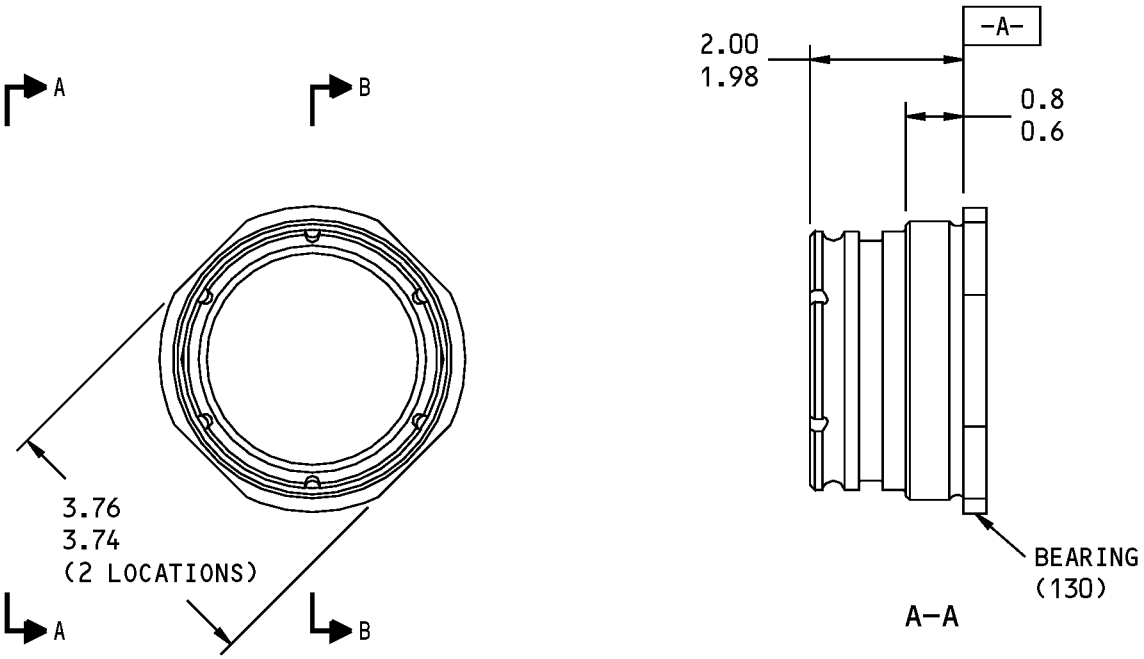
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

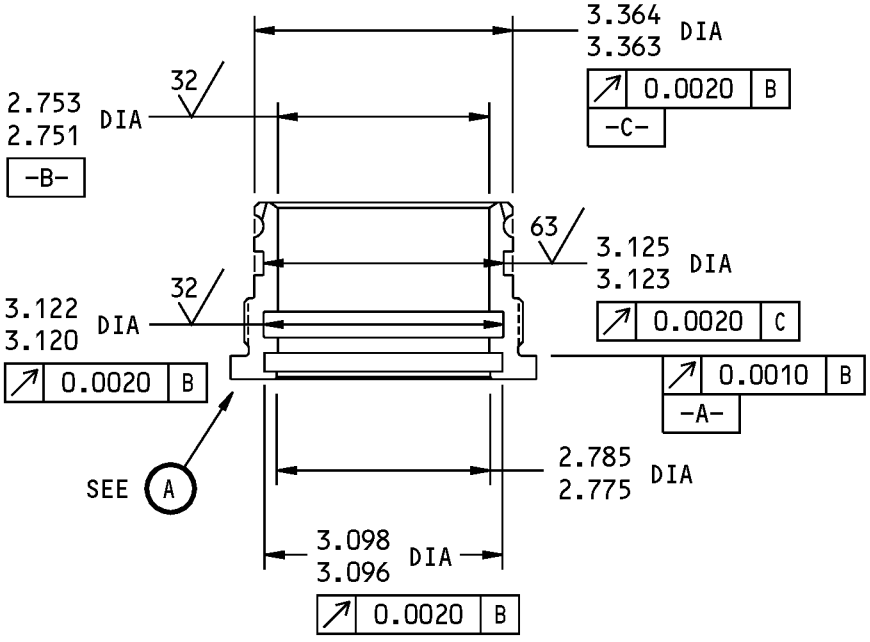
B. Procedure (REPAIR 8-1, Figure 601)

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 finishing materials, refer to SOPM 20-60-02.

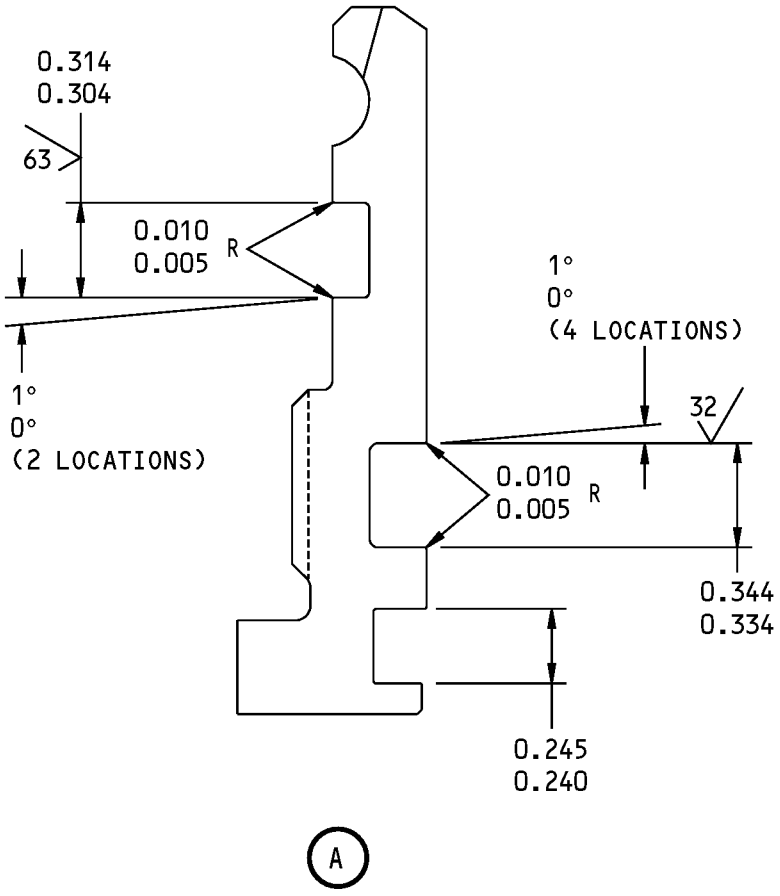
(1) Put a finish on the bearing (130):

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





273A1116-1 Bearing Repair
Figure 601 (Sheet 1 of 2)



125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273A1116-1 Bearing Repair
Figure 601 (Sheet 2 of 2)

PULL TUBE - REPAIR 9-1

273A2110–2

1. General

A. This procedure has the data necessary to repair and refinish the pull tube (195).

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

C. Refer to the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

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

2. Pull Tube Refinish

A. References

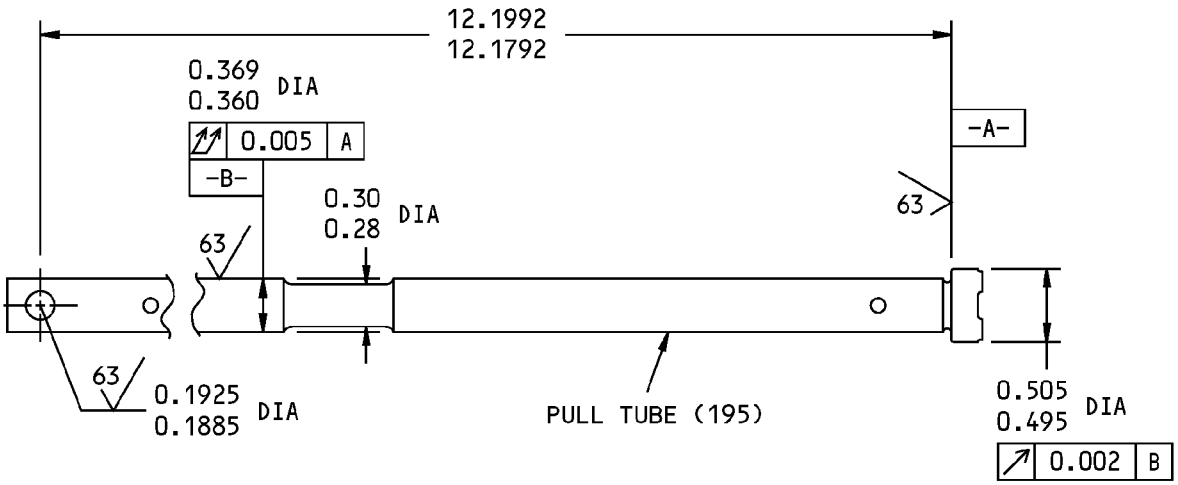
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

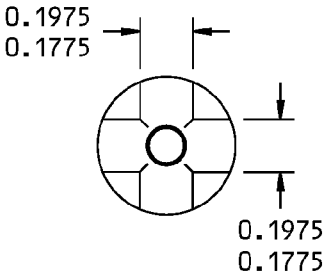
B. Procedure (REPAIR 9-1, Figure 601)

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 finishing materials, refer to SOPM 20-60-02.

(1) Put a finish on the pull tube (195):

(a) 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

273A2110-2 Pull Tube Refinish
Figure 601

FITTING - REPAIR 10-1

273A2121–1

1. General

A. This procedure has the data necessary to refinish the fitting (20).

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

C. Refer to the REPAIR-GENERAL, Figure 601 for the Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

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

2. Fitting Refinish

A. References

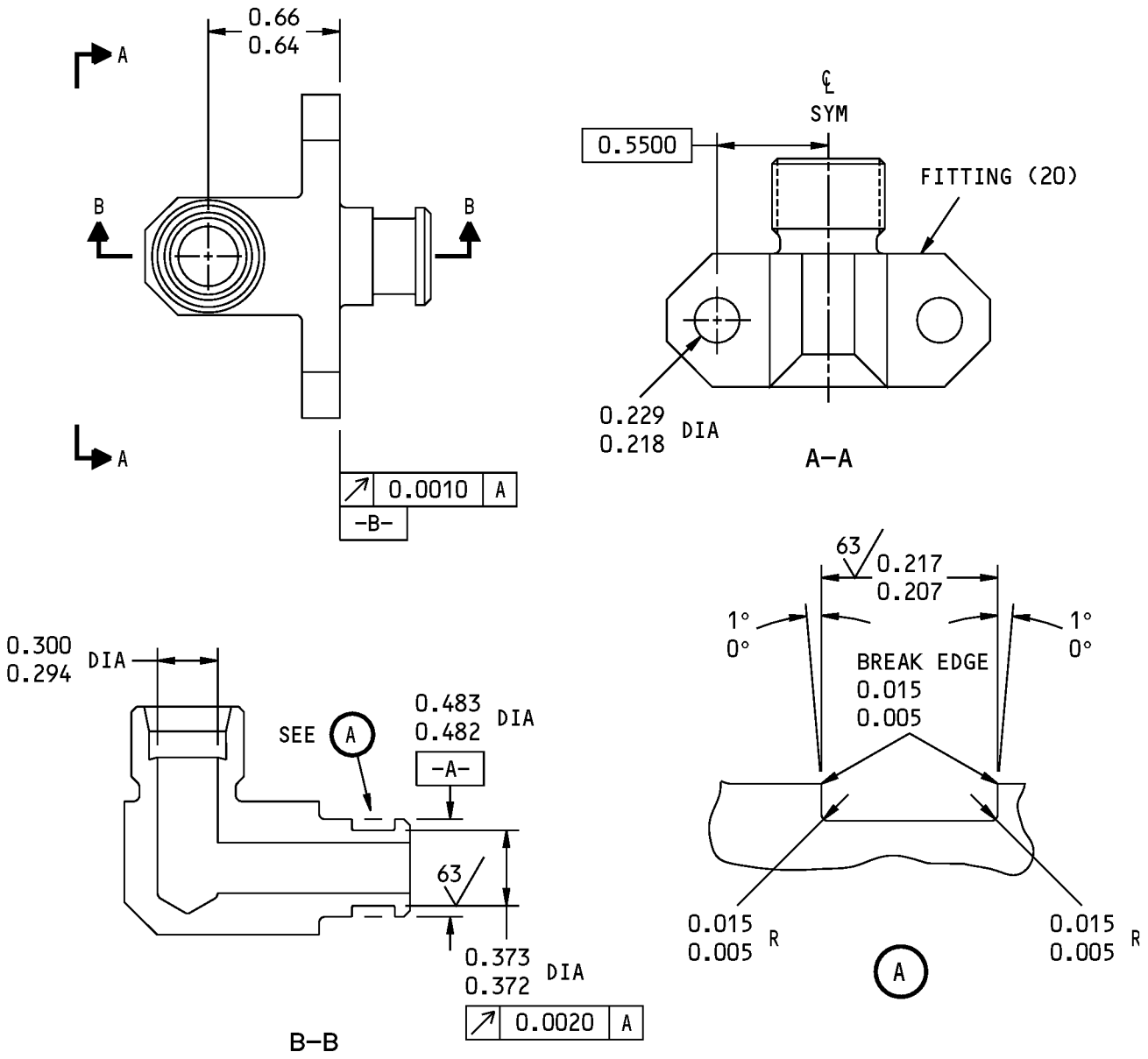
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

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. For finishing materials, refer to SOPM 20-60-02.

(1) Put a finish on the fitting (20):

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



125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273A2121-1 Fitting Repair
Figure 601

NAMEPLATE INSTALLATION - REPAIR 11-1

273A2508–7, –8

1. General

A. This repair has instructions for the replacement of the nameplate (310, 315).

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. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
A00551	Sealant - Fuel Tank	BAC5010, Type 44 (BMS5-44, BMS5-45)

B. References

Reference	Title
SOPM 20-50-05	APPLICATION OF ALUMINUM FOIL AND OTHER MARKERS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. General

(1) Use each strap only one time.

D. Procedure

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

(1) Prepare the nameplates (310, 315) (SOPM 20-50-05).

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

(a) Bend the nameplate in a curve smaller than the barrel radius.

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

(2) Attach the nameplate to the barrel :

(a) Hold the nameplate on the barrel.

(b) Install the straps through the slot of the nameplate.

(c) Pull the strap tight. Make sure the strap and the nameplate are tight against the barrel.

(d) Bend the strap down around the end of the nameplate. Keep the strap tight.

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

(f) Bend the strap end down with a soft-nosed hammer.

(3) Seal the edges of the nameplate and strap with sealant, A00551 (SOPM 20-60-04).

ASSEMBLY

1. General

A. This procedure tells how to assemble the nose landing gear retract 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. 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
D50025	Grease - PAG No. 2 Lithium Based - BATCO X8401-2	
G50227	Tie - Plastic, Adjustable, Self-clinching, Tiedown Strap	AS33671

B. References

Reference	Title
SOPM 20-50-01	BOLT AND NUT INSTALLATION
SOPM 20-50-02	INSTALLATION OF SAFETYING DEVICES
SOPM 20-60-03	LUBRICANTS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Special Tools and Equipment

NOTE: Equivalent substitutes can be used.

(1) C32036-2 – Stand

(2) C32036-7 – Small Crowfoot Wrench

(3) C32036-8 – Large Crowfoot Wrench

(4) C32036-10 – Spanner Wrench

D. Procedure

NOTE: For bolt and nut installation, refer to SOPM 20-50-01. For lubricants, refer to SOPM 20-60-03. For miscellaneous materials, refer to SOPM 20-60-04.

(1) Use standard industry practices and these steps. See ASSEMBLY, Figure 701.

(2) Put the head end assembly (80) in the stand.

(3) Install the restrictor (30B) and the packing (25) in the head end assy (80):

(a) Lubricate the packing (25) with fluid, D00153.

(b) Install the packing (25) on the restrictor (30B).

(c) Install the restrictor (30B) in the head end assembly (80).

(4) Install the packings (205) and rings (200) on the snubber assembly (235):

(a) Lubricate the packings (205) with fluid, D00153.

(b) Install the packings (205) and rings (200) on the snubber assembly (235).

(5) Install the snubber assembly (235) in the head end assembly (80):

(a) Remove the extend slide (245) from the snubber assembly (235).

(b) Install the spring (210) on the extend slide (245).

(c) Install the extend slide (245) in the snubber assembly (235).

(d) Install the pull tube (195) in the snubber assembly (235).

(e) Install the snubber assembly (235) in the head end assembly (80).

(6) Install the retainer (215) in the head end assembly (80):

(a) Lubricate the packing (260) with fluid, D00153.

(b) Install the packing (260) and the rings (255) on the retainer (215).

(c) Install the retainer (215) with the bolts (70) and washers (75) in the head end assembly (80).

(d) Tighten the bolts (70) to 30-40 pound-inches.

(7) Install the guide (220) on the pull tube (195):

(a) Move the jamnut (270) and the lockwasher (265) along the pull tube (195) to put them on top of the retainer (215).

(b) Install the guide (220) on the pull tube (195).

(8) Install the snubber stop (190) on the pull tube (195):

(a) Install the snubber stop (190) with the bolt (170), washers (175, 180) and the nut (185) on the pull tube (195).

(b) Tighten the nut (185) to 30-40 pound-inches.

(9) Install the rings (275), packing (280), seal (285), and rod excluder (290) in the bearing (130):

(a) Lubricate the packing (280) and seal (285) with fluid, D00153.

(b) Install the rings (275), packing (280), seal (285) and rod excluder (290) in the bearing (130).

(10) Install the bearing (130) and the lockwasher (135) in the cylinder assembly (140), finger tight.

(11) Install the seal (165A) on the piston (305):

(a) Lubricate the seal (165A) with fluid, D00153.

(b) Install the seal (165A) on the piston (305).

(12) Install the piston (305) in the cylinder assembly (140).

(13) Install the piston (305) on the guide (220):

(a) Move the guide (220) along the pull tube (195) until it touches the snubber stop (190).

(b) Install the guide (220), the lockwasher (265) and the jamnut (270) in the piston (305).

(c) Hold the piston (305) with a wrench, then tighten the jamnut (270) to 100 to 200 pound-inches with the small crowfoot wrench.

(d) Break the flange of the lockwasher (265) into three equally spaced slots of the jamnut (270).

(14) Install the packing (160) and the rings (155) in the head end assembly (80):

(a) Lubricate the packing (160) with fluid, D00153.

(b) Install the packing (160) and the rings (155) in the head end assy (80).

(15) Install the cylinder assembly (140) in the head end assembly (80):

(a) Apply BATCO X8401-2 grease, D50025 to the external threads of cylinder assembly (140).

(b) Turn the locknut (125) on the cylinder assembly (140) until it starts to come off the threads at the far end.

(c) Turn the cylinder assembly (140) into the head end assembly (80) until it stops.

(d) Turn the cylinder assembly (140) back, less than one turn, to align the key slots on the cylinder assembly (140) and the head end assembly (80).

(16) Install the key (120) in the key slot of the cylinder assembly (140).

(17) Tighten the locknut (125) on the head end assembly (80) by hand, to keep the key (120) in its position.

(18) With the large crowfoot wrench, tighten the locknut (125) to 1500-1700 pound-inches.

(19) Move the piston (305) in and out by hand to make sure it moves freely.

(20) With the spanner wrench, tighten the bearing (130) to 1400-1600 pound-inches.

(21) Bend the lockwasher (135) over the two opposite flats of the bearing (130) (SOPM 20-50-02).

(22) Install the fitting (20), fittings (100), packing (300), rings (295), bracket assembly (36), washers (15) and bolts (10A).

(a) Lubricate the packing (300) with fluid, D00153.

(b) Install the packing (300) and the rings (295) in the fitting (20).

(c) Install the fitting (20) and the bracket assembly on the cylinder assembly (140) with the bolts (10A) and the washers (15).

(d) Tighten the bolts (10A) to 30-40 pound-inches.

(e) Install the fittings (100) in the piston (305).

(23) Install the nameplate (310, 315) (REPAIR 11-1), if it is necessary.

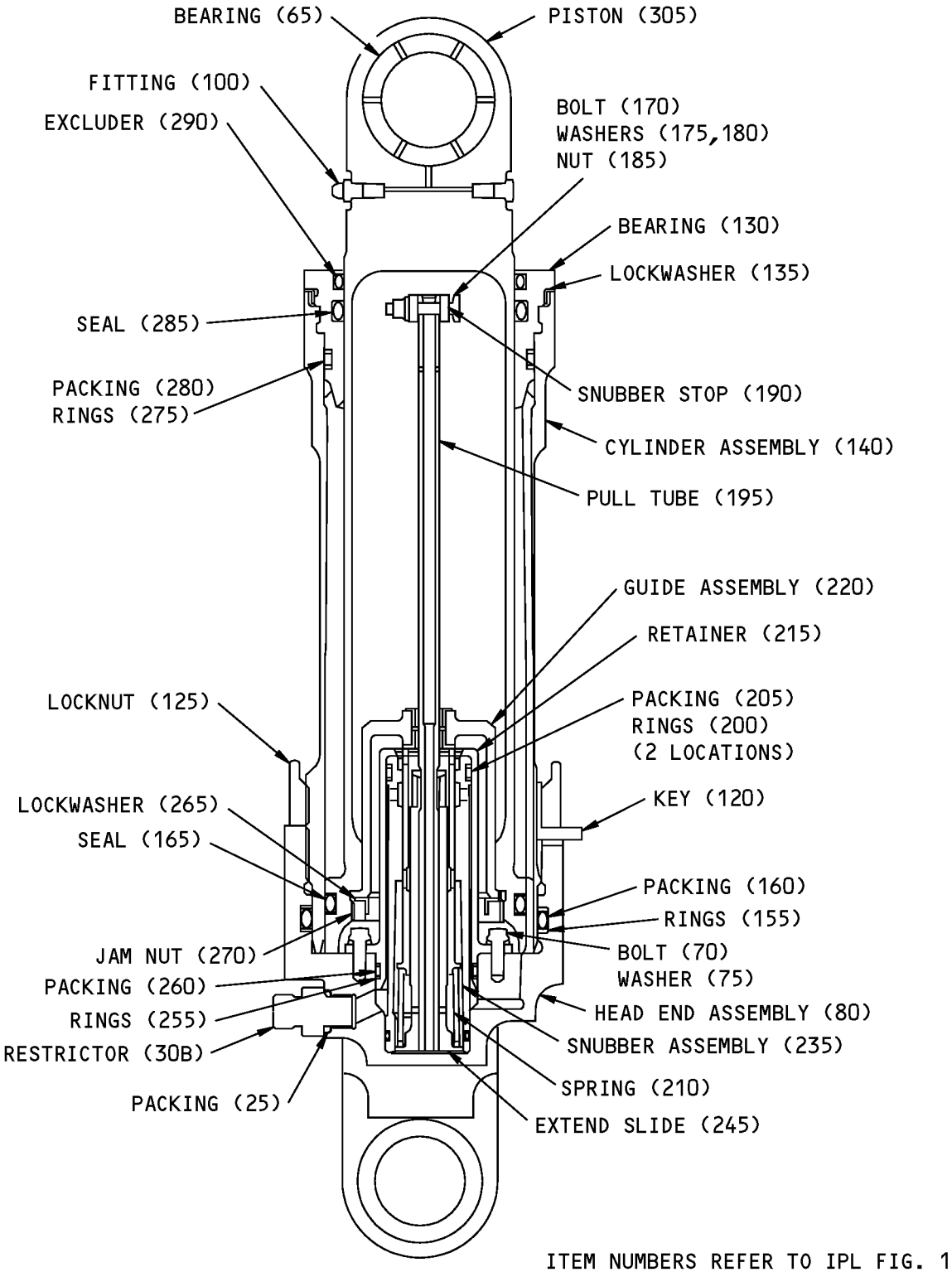
(24) Install the bearing (65) in the piston (305):

(a) Apply grease, D00633 to the bearing bore of the piston (305).

(b) Install the bearing (65) in the bearing bore.

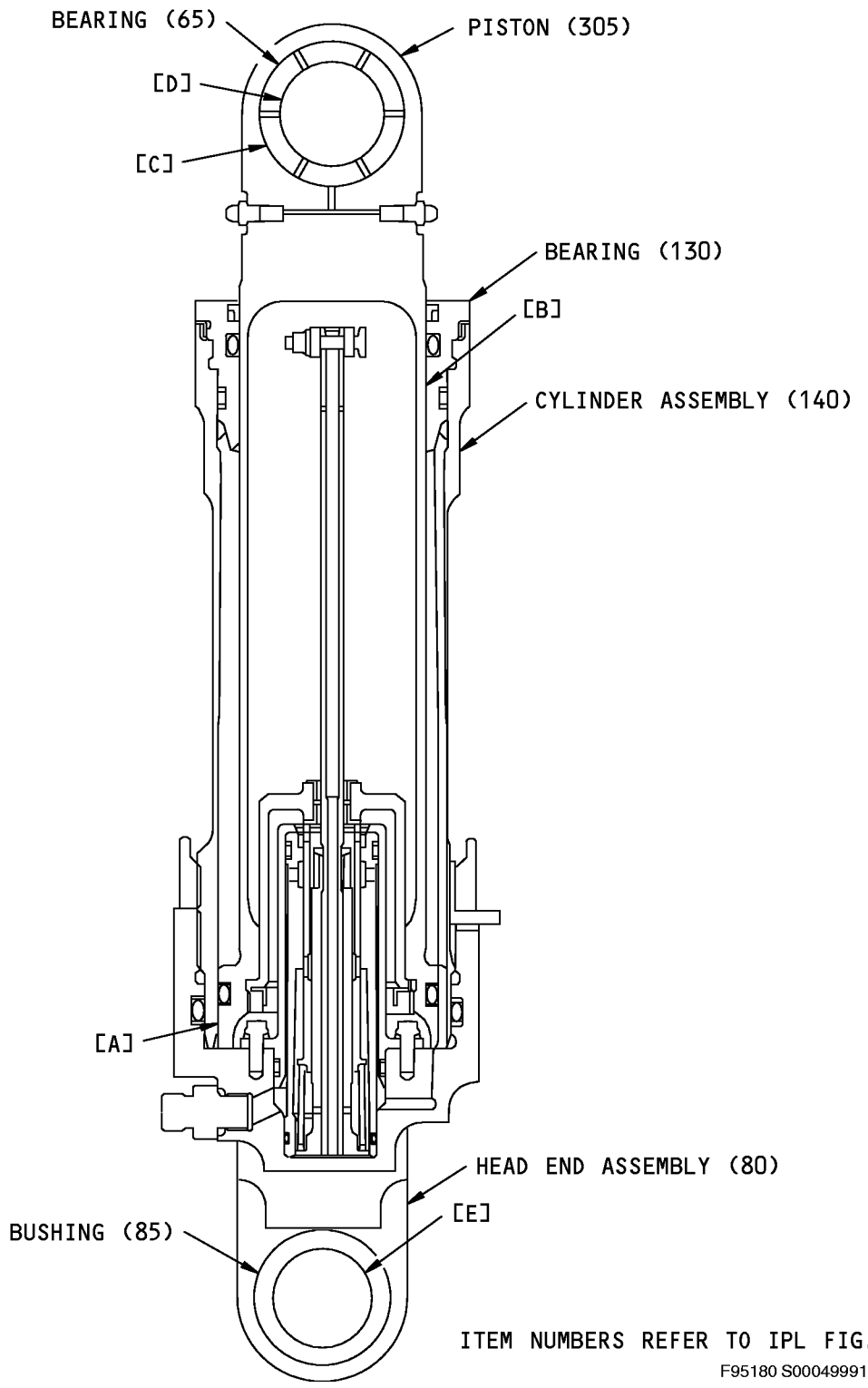
(c) Tie the bearing (65) in position with a tie wrap, G50227 for transportation or storage.

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



Assembly Details
Figure 701

FITS AND CLEARANCES



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 140	3.243	3.245	0.003	0.007		3.247	0.009
	OD 305	3.238	3.240			3.236		
[B]	ID 130	2.751	2.753	0.003	0.007		2.755	0.009
	OD 305	2.746	2.748			2.745		
[C]	ID 305	2.1885	2.1905	0.001	0.0035		2.1925	0.007
	OD 65	2.1870	2.1875			2.185		
[D]	ID 65	1.5003	1.5008	0.0013	0.0028		1.503	0.006
	OD 1	1.4980	1.4990			1.496		
[E]	ID 85	1.5003	1.5013	0.0013	0.0033		1.5025	0.006
	OD 1	1.4980	1.4970			1.496		

* ALL DIMENSIONS ARE IN INCHES

1 RETRACT ACTUATOR PIN 273A1121-1,-2
(INSTALLATION PART)

F93904 S0004999157_V2

Fits and Clearances
Figure 801 (Sheet 2 of 2)

REF IPL		NAME	TORQUE*	
FIG. NO.	ITEM NO.		POUND-INCHES	POUND-FEET
1	70	Bolt	30-40	
1	125	Nut, Lock	1500-1700	
1	130	Bearing	1400-1600	
1	185	Nut, Snubber	30-40	
1	270	Nut, Jam	100-120	

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

Torque Table
Figure 802

(NOT APPLICABLE)

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
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
11815	CHERRY AEROSPACE FASTENERS DIV OF TEXTRON 1224 EAST WARNER AVENUE PO BOX 2157 SANTA ANA, CALIFORNIA 92707-0157 FORMERLY IN LOS ANGELES, CALIF , FORMERLY CHERRY FASTENERS TOWNSEND DIV OF TEXTRON INC V71087
15653	ALCOA GLOBAL FASTENERS INC DIV KAYNAR PRODUCTS 800 S STATE COLLEGE BLVD FULLERTON, CALIFORNIA 92831-3001 FORMERLY VK6405 MICRODOT AEROSP LTD; FORMERLY KAYNAR TECH FORMERLY FAIRCHILD FASTENERS KAYNAR 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

Code	Name
26879	CORONADO MFG INC 11069 PENROSE AVENUE SUN VALLEY, CALIFORNIA 90352-2722 FORMERLY CORONADO PLASTICS INC IN BURBANK, CALIFORNIA
52828	REPUBLIC FASTENER MFG CORP 1300 RANCHO CONEJO BLVD NEWBURY PARK, CALIFORNIA 91320-1405 FORMERLY IN SYLMAR, CALIFORNIA
53551	ALLFAST FASTENING SYSTEMS INC 15200 EAST DON JULIAN ROAD PO BOX 3166 CITY OF INDUSTRY, CALIFORNIA 91745-1001 FORMERLY V0736B FORMERLY ALLFAST INC V5K545
72962	HARVARD INDUSTRIES INC 3 WERNER WAY SUITE 210 LEBANON, NEW JERSEY 08833 FORMERLY ESNA V7A079 FORMERLY ELASTIC STOP NUT IN UNION, NJ
92215	FAIRCHILD IND INC FAIRCHILD AEROSPACE FASTENER DIV 3010 W LOMITA BLVD TORRANCE, CALIFORNIA 90505-5102 FORMERLY VOI-SHAN IN CULVER CITY, CALIF
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

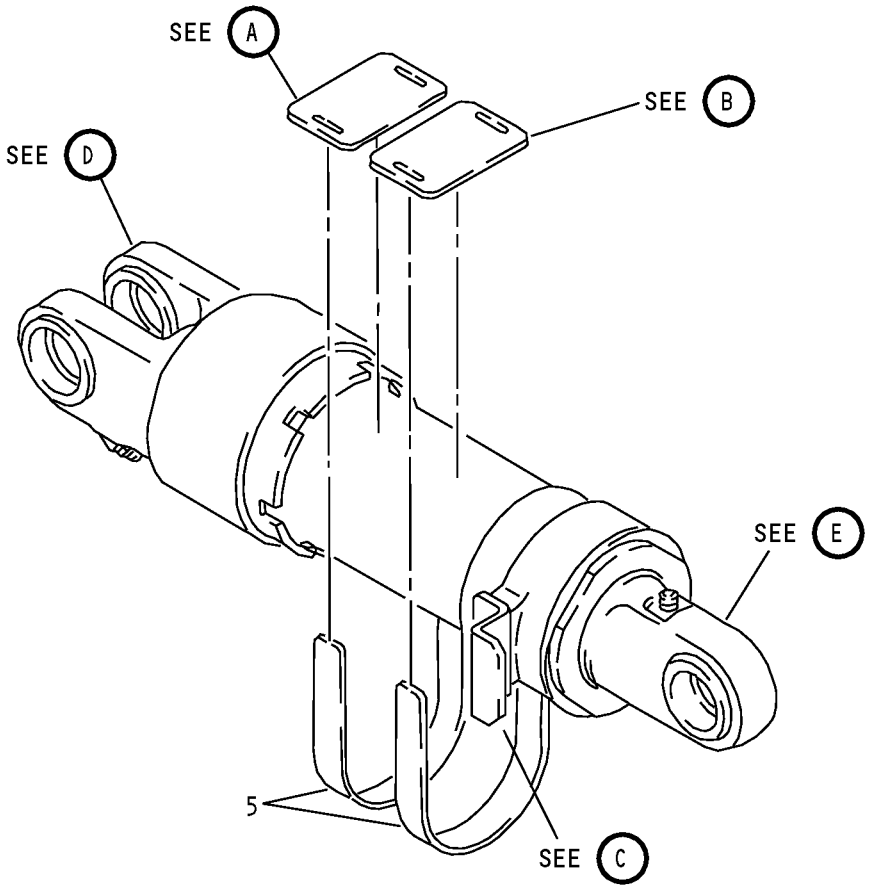
Code	Name
98996	OLYMPIC FASTENING SYSTEMS INC DOWNEY, CALIFORNIA 90241-4986 OBSOLETE RECORD

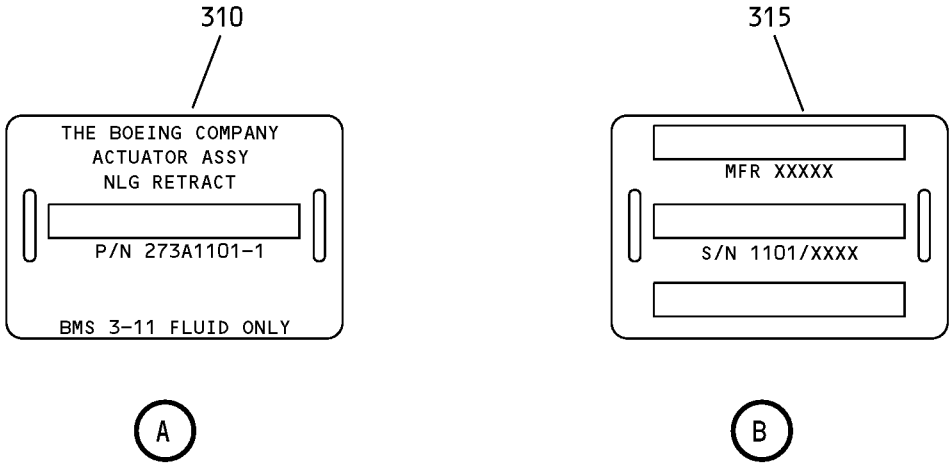
NUMERICAL INDEX

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
109F9207-3		1	46	2
2100-012		1	295	2
273A1101-1		1	1A	RF
273A1102-1		1	140	1
273A1102-2		1	150	1
273A1103-1		1	80	1
273A1103-2		1	115	1
273A1104-1		1	305	1
273A1105-1		1	65	1
273A1106-1		1	235	1
273A1108-1		1	240	1
273A1109-1		1	245	1
273A1112-1		1	220	1
273A1112-2		1	230	1
273A1112-3		1	220A	1
273A1113-1		1	270	1
273A1114-1		1	265	1
273A1115-1		1	215	1
273A1116-1		1	130	1
273A1117-1		1	135	1
273A1118-1		1	125	1
273A1119-1		1	36	1
273A1119-2		1	51	1
273A2107-1		1	250	1
273A2110-2		1	195	1
273A2111-1		1	190	1
273A2117-1		1	210	1
273A2119-1		1	120	1
273A2121-1		1	20	1
273A2508-7		1	310	1
273A2508-8		1	315	1
273T0050-8		1	5	2
AF5141-3-4		1	41	4
BACB28AT24B033A		1	85	4

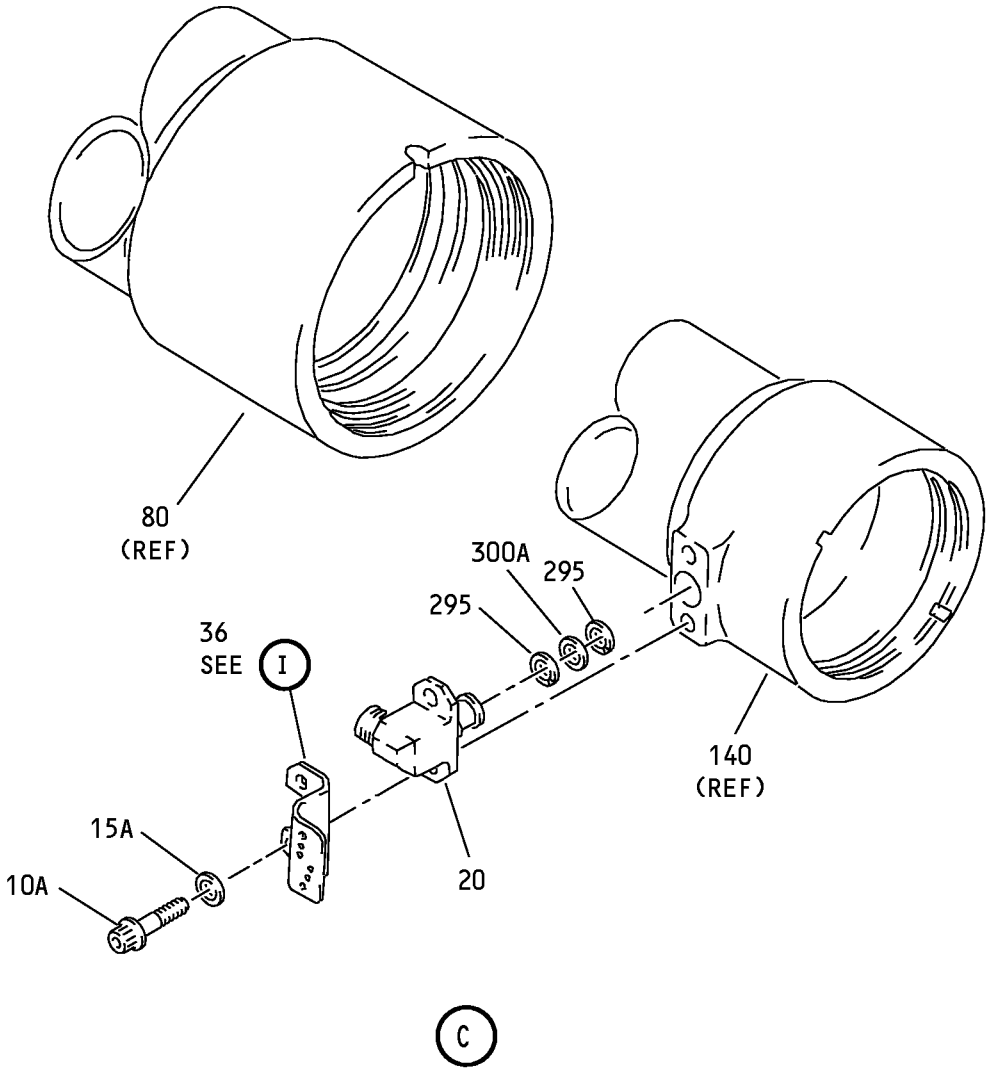
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
BACB28AU07B025A		1	225	2
BACB30LE3U3		1	70	4
BACB30LE3U4		1	10A	2
BACN10KB3CFM		1	46	2
BACR12BM012		1	295	2
BACR12BM123		1	200	4
BACR12BM128		1	255	2
BACR12BM235		1	275	2
BACR12BM342		1	155	2
BACR15DR3A4		1	41	4
BACW10BP3ACU		1	15	2
		1	75	4
		1	175	1
BACW10BP3APU		1	180	1
BRF100C3M		1	46	2
C11236-012B		1	295	2
CCR264CS3-4		1	41	4
CCR264CS3-4TT		1	41	4
F2001-3		1	46	2
		1	46	2
JEHX0517450B		1	30B	1
JETA1875100D		1	90B	1
MS15004-1		1	100	4
MS21209F1-15L		1	95	4
		1	145	2
NAS1611-012A		1	300A	1
NAS1611-123		1	205	2
NAS1611-128A		1	260A	1
NAS1611-235A		1	280A	1
NAS1611-342A		1	160A	1
NAS1612-6		1	25	1
NAS1805-3		1	185	1
NAS6703U12		1	170	1
RMR12BM012		1	295	2
RV541A3-4		1	41	4

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
S30294-012-1		1	295	2
S32925-27H99		1	290	1
S34711-335H99		1	285	1
S34721-336H99N		1	165A	1
STF800-012		1	295	2
T8113C1032C		1	46	2
TF450-012A		1	295	2
VN151D1-02		1	46	2

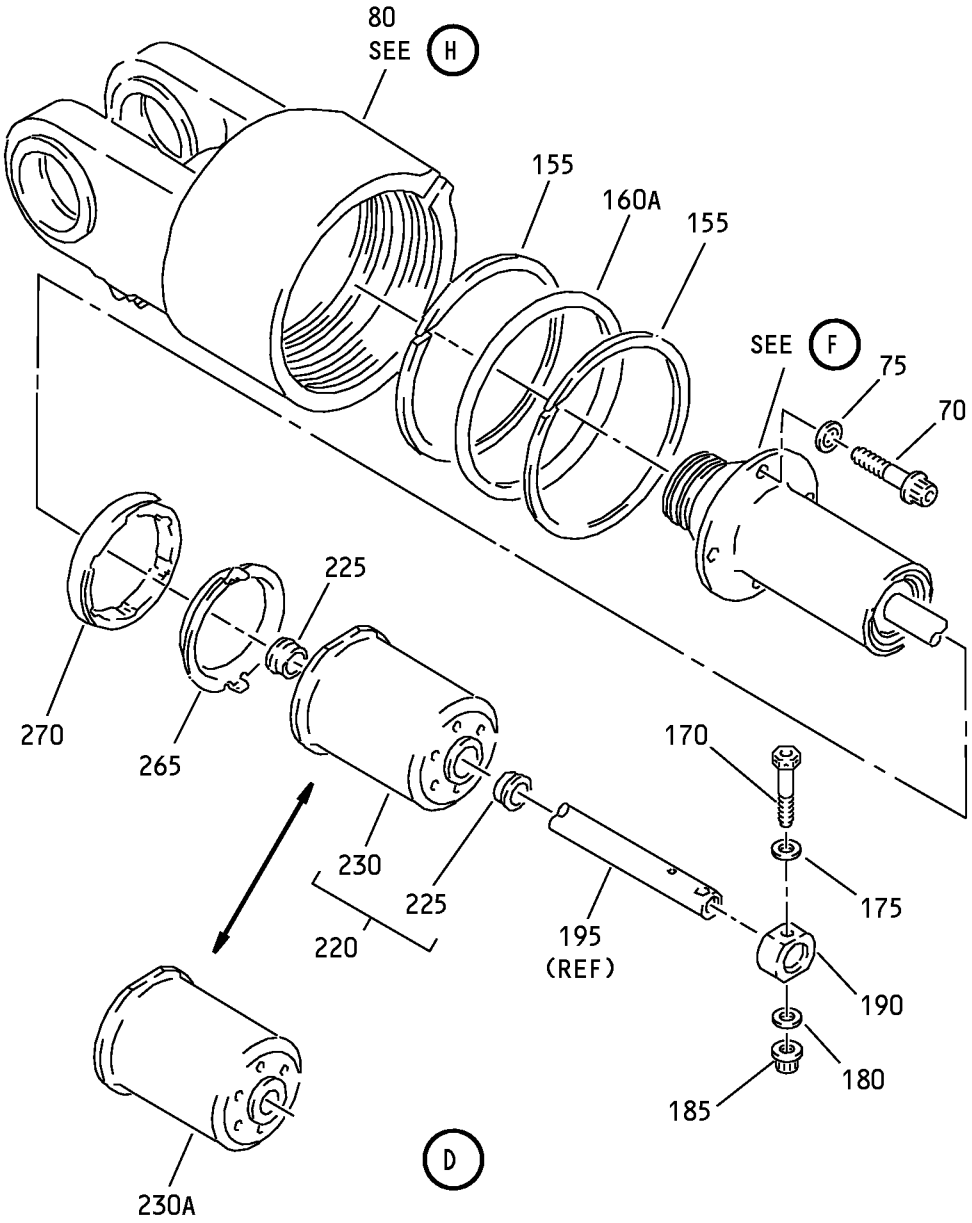




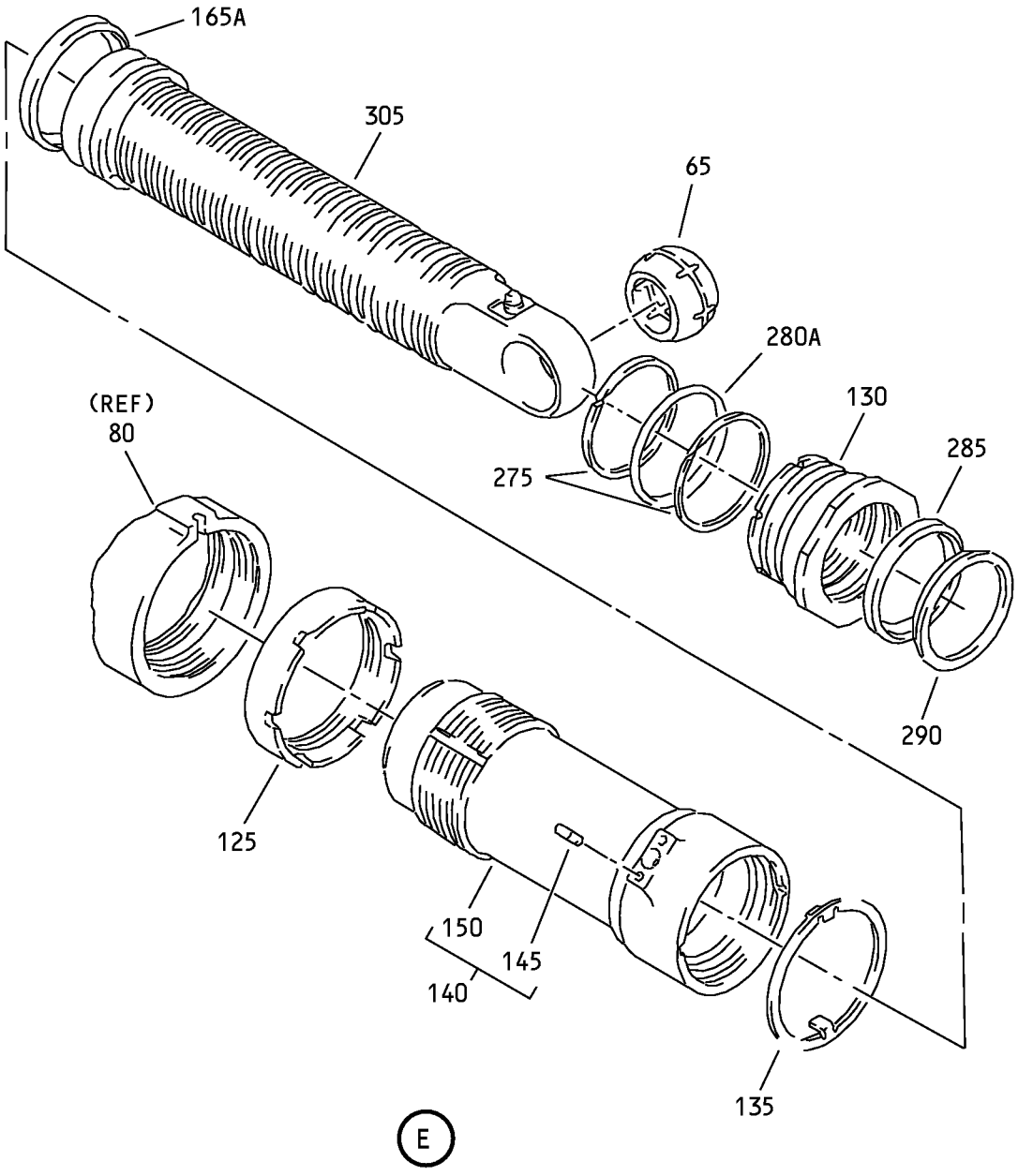
Retract Actuator Assembly - Nose Landing Gear
IPL Figure 1 (Sheet 1 of 6)



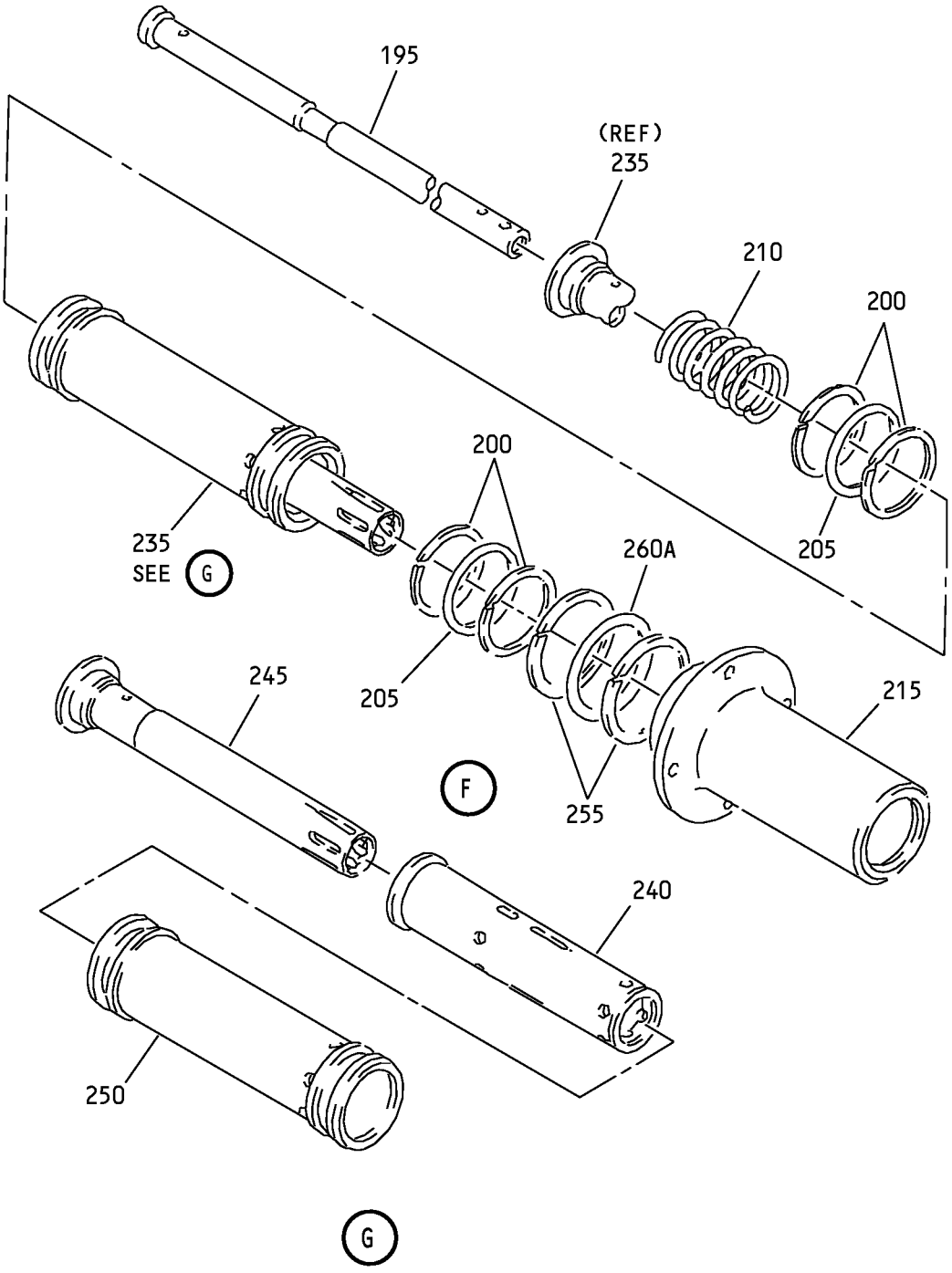
Retract Actuator Assembly - Nose Landing Gear
IPL Figure 1 (Sheet 2 of 6)



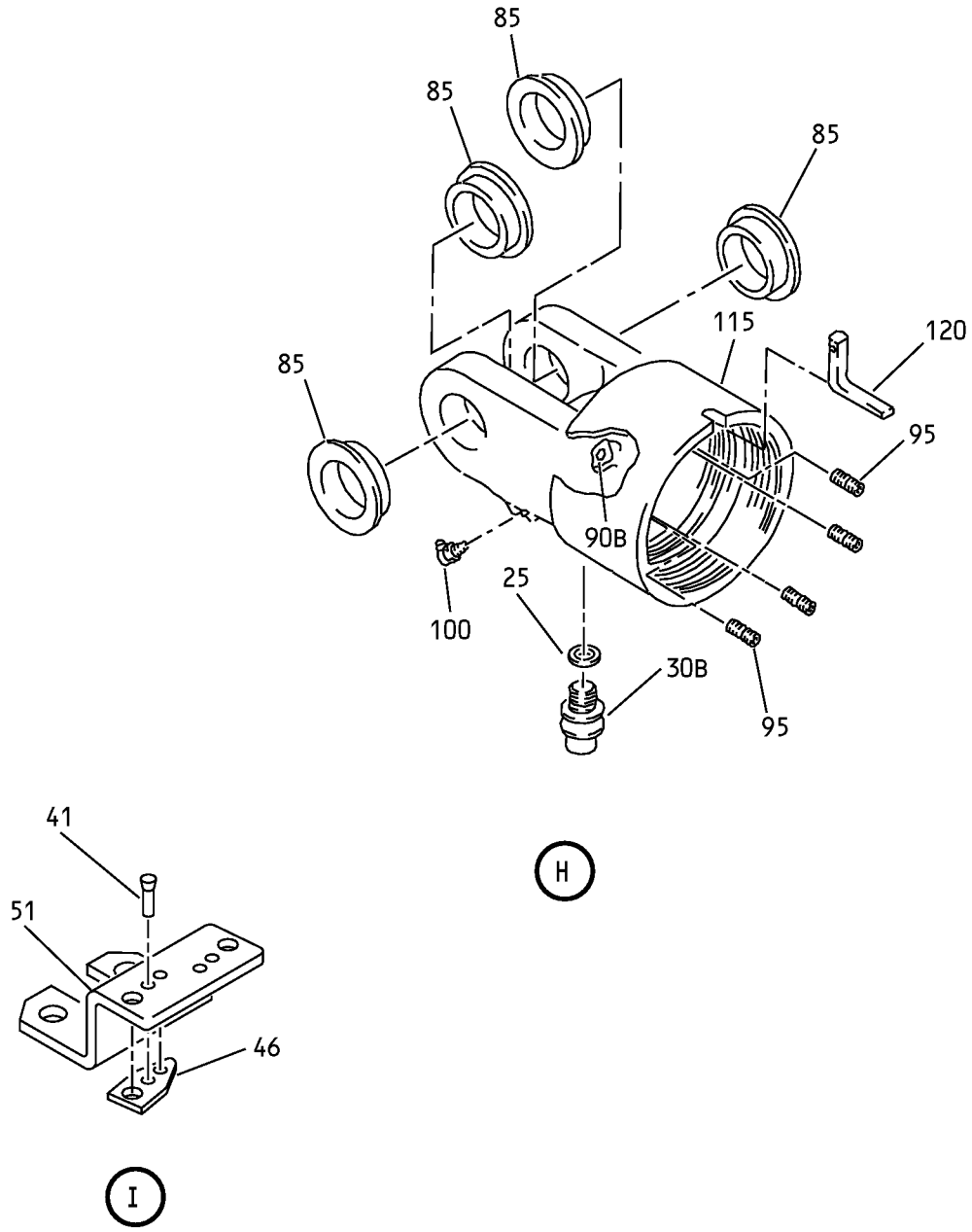
Retract Actuator Assembly - Nose Landing Gear
IPL Figure 1 (Sheet 3 of 6)



Retract Actuator Assembly - Nose Landing Gear
IPL Figure 1 (Sheet 4 of 6)



Retract Actuator Assembly - Nose Landing Gear
IPL Figure 1 (Sheet 5 of 6)



Retract Actuator Assembly - Nose Landing Gear
IPL Figure 1 (Sheet 6 of 6)

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–1A	273A1101-1		ACTUATOR ASSY-NOSE GEAR RETRACT		RF
5	273T0050-8		. STRAP		2
10	BACB30LE3U3		DELETED		
10A	BACB30LE3U4		. BOLT		2
15	BACW10BP3ACU		. WASHER		2
20	273A2121-1		. FITTING		1
25	NAS1612-6		. PACKING		1
30	6F3810		DELETED		
–30A	JEKC2815175L		DELETED		
30B	JEHX0517450B		. RESTRICTOR (V92555)		1
35	BACN10YA6N		DELETED		
36	273A1119-1		. BRACKET ASSY		1
40	C11236-110B		DELETED		
41	AF5141-3-4		. . RIVET (V53551) (SPEC BACR15DR3A4) (OPT CCR264CS3-4 (V11815)) (OPT RV541A3-4 (V98996)) (OPT CCR264CS3-4TT (V11815))		4
45	NAS1611-110		DELETED		
46	BRF100C3M		. . NUTPLATE (V52828) (SPEC BACN10KB3CFM) (OPT F2001-3 (V15653)) (OPT T8113C1032C (V11815)) (OPT VN151D1-02 (V92215)) (OPT 109F9207-3 (V72962)) (OPT F2001-3 (V15653))		2
50	273A2122-2		DELETED		
51	273A1119-2		. . BRACKET		1
55	DB0S13BX06H		DELETED		
60	273A2122-4		DELETED		
65	273A1105-1		. BEARING		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–					
70	BACB30LE3U3		. BOLT		4
75	BACW10BP3ACU		. WASHER		4
80	273A1103-1		. END ASSY-HEAD		1
85	BACB28AT24B033A		. . BUSHING		4
90	JETA1875150D		DELETED		
–90A	6F3818		DELETED		
90B	JETA1875100D		. . ORIFICE (V92555)		1
95	MS21209F1-15L		. . INSERT		4
100	MS15004-1		. . FITTING		4
105	PLGA2506020		DELETED		
110	PLGA2507020		DELETED		
115	273A1103-2		. . HEAD		1
120	273A2119-1		. KEY		1
125	273A1118-1		. LOCKNUT		1
130	273A1116-1		. BEARING		1
135	273A1117-1		. LOCKWASHER-CUP		1
140	273A1102-1		. CYLINDER ASSY		1
145	MS21209F1-15L		. . INSERT		2
150	273A1102-2		. . CYLINDER		1
155	BACR12BM342		. RING		2
160	NAS1611-342		DELETED		
160A	NAS1611-342A		. PACKING		1
165A	S34721-336H99N		. SEAL (V97820)		1
170	NAS6703U12		. BOLT		1
175	BACW10BP3ACU		. WASHER		1
180	BACW10BP3APU		. WASHER		1
185	NAS1805-3		. NUT		1
190	273A2111-1		. STOP-SNUBBER		1
195	273A2110-2		. TUBE-PULL		1
200	BACR12BM123		. RING		4

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
205	NAS1611-123		. PACKING		2
210	273A2117-1		. SPRING		1
215	273A1115-1		. RETAINER-NLG		1
220	273A1112-1		. GUIDE ASSY		1
220A	273A1112-3		. GUIDE		1
225	BACB28AU07B025A		. . BUSHING (USED ON ITEM 220)		2
230	273A1112-2		. . GUIDE (USED ON ITEM 220)		1
235	273A1106-1		. SNUBBER ASSY		1
240	273A1108-1		. . SLIDE-RETRACT		1
245	273A1109-1		. . SLIDE-EXTEND		1
250	273A2107-1		. . SLEEVE		1
255	BACR12BM128		. RING		2
260	NAS1611-128		DELETED		
260A	NAS1611-128A		. PACKING		1
265	273A1114-1		. LOCKWASHER-CUP		1
270	273A1113-1		. NUT-JAM		1
275	BACR12BM235		. RING		2
280	NAS1611-235		DELETED		
280A	NAS1611-235A		. PACKING		1
285	S34711-335H99		. SEAL (V97820)		1
290	S32925-27H99		. ROD-EXCLUDER DC (V97820)		1
295	C11236-012B		. RING (V26879) (SPEC BACR12BM012) (OPT RMR12BM012 (V94878)) (OPT STF800-012 (V02107)) (OPT S30294-012-1 (V97820)) (OPT TF450-012A (V07128)) (OPT 2100-012 (V26303))		2
300	NAS1611-012		DELETED		
300A	NAS1611-012A		. PACKING		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–					
305	273A1104-1		. PISTON		1
310	273A2508-7		. NAMEPLATE		1
315	273A2508-8		. NAMEPLATE		1

–Item not Illustrated