TO: ALL HOLDERS OF NOSE LANDING GEAR RETRACT ACTUATOR ASSEMBLY COMPONENT MAINTENANCE MANUAL 32-34-00

REVISION NO. 11 DATED NOV 01/05

HIGHLIGHTS

All data that was 767 CMM 32-34-01 is included in this CMM 32-34-00.

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

CHAPTER/SECTION AND PAGE NO.	DESCRIPTION OF CHANGE
101 701,704	Added clarifications and updated callouts.
REPAIR 7-1 601	Added instructions to use only nickel plate to repair the piston OD if the cylinder ID is chrome plated.
1015	Changed usage of union (325, 325A) and packings (340, 340A).

BOEING

COMPONENT
MAINTENANCE MANUAL

NOSE LANDING GEAR RETRACT ACTUATOR ASSEMBLY

PART NUMBER 273T4110-4,-6,-8
273T4112-3,-4,-5

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

T21936

BOEING
COMPONENT
MAINTENANCE MANUAL

REVISION RECORD

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

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

T21925

BOEING
COMPONENT
MAINTENANCE MANUAL

TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR B10425 PRR B10950	OCT 10/82 JUL 10/83

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*[1] Special instructions are not necessary. Use standard industry practices and the instructions in SOPM 20–30–03.

INTRODUCTION

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

This manual is divided into separate sections:

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

Refer to the Table of Contents for the page location of applicable sections. An asterisked flagnote *[ ] in place of the page number indicates that no special instructions are provided since the function can be performed using standard industry practices.

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

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

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

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

Verification:

Testing/TS	June 18/82
Disassembly	June 18/82
Assembly	June 18/82

NOSE LANDING GEAR RETRACT ACTUATOR ASSEMBLY

DESCRIPTION AND OPERATION

1. Description

   A. The nose landing gear retract actuator assembly is a linear type actuator with an unbalanced piston. The actuator has an internally honed microfinished cylinder, piston, head end assembly, end cap, and rod end. A snubber valve and spring provides internal snubbing and limits piston speed during the initial and final portions of piston travel.

2. Operation

   A. When pressure is applied to the UP (extend) port, the piston starts to extend. The piston initially moves slowly, then increases speed approximately one inch from the fully retracted position. The piston decreases speed approximately one inch from full extension, where the piston is snubbed again until stroke is completed.

   B. When pressure is applied to the DN (retract) port, the piston starts to retract. As in extension, the piston moves in snubbed action during the initial and final portions of retraction.

3. Leading Particulars (Approximate)

   Length (between centerlines)
   Retracted -- 34.44 inches
   Extended -- 45.08 inches
   Stroke (nominal) -- 10.64 inches
   Weight (dry) -- 80 pounds
   Weight (filled) -- 92 pounds
   Operating fluid -- BMS 3-11 fire resistant hydraulic fluid
   Operating pressure -- 2950-3050 psi
   Proof pressure -- 4450-4500 psi
   Return pressure -- 45-100 psi

TESTING AND TROUBLE SHOOTING

1. Test Equipment and Materials

NOTE: Equivalent substitutes can be used.

A. Hydraulic test stand with pressure controllable from zero to 4500 psi

B. Hydraulic fluid -- BMS 3-11 filtered to 15 microns absolute, kept at 80-120°F

C. Grease -- BMS 3-33 or MIL-G-23827 (SOPM 20-60-03)

D. Assembly Lube -- MCS352 (SOPM 20-60-03)

E. Sealant -- BMS 5-45 (Replaces BMS 5-26) or MIL-S-8802 (SOPM 20-60-04)

F. Sealant -- BMS 5-95 (SOPM 20-60-04)

G. Lockwire -- MS20995C41 (optional MS20995N40) (SOPM 20-60-04)

H. Rod End Wrench -- A32040-10

I. Crowfoot Wrench -- F70312-39

2. Preparation for Test

A. Do the test at room temperature, 70-90°F.

B. Put the actuator on the bench.

C. Fill the actuator with hydraulic fluid through both UP port and DN port.

D. Connect the hydraulic test stand to the actuator.

E. Cycle the actuator 10 full stroke cycles at 3000 psi to bleed entrapped air.

3. Test

WARNING: DO NOT APPLY AIR PRESSURE TO PORTS AT ANY TIME.

CAUTION: DO NOT EXTEND OR RETRACT UNIT AT PROOF PRESSURE (4450 PSI).

A. External leakage test

(1) Set test stand at 2950-3050 psi inlet pressure and 45-100 psi return pressure.

(2) Cycle actuator for 25 complete stroke cycles at a rate of approximately 2 cycles per minute.

(3) Check that leakage at rod end seal (205, 220, IPL Fig. 1) does not exceed one drop and there is no other leakage.

B. Internal leakage test

(1) Fully extend piston and attach hose to permit leakage from DN port to measuring device.

(2) Apply 3000 psi to UP port. Check that leakage at DN port does not exceed one cc. per minute.

(3) Lower pressure at UP port to 50 psi. Check that leakage at DN port does not exceed one cc. per minute.

(4) Connect test stand to actuator and fully retract actuator.

(5) Remove hydraulic pressure from UP port and remove hydraulic hose from DN port.

(6) Remove hydraulic pressure and attach hose to permit leakage from UP port to measuring device.

(7) Apply 3000 psi to DN port. Check that leakage at UP port does not exceed one cc per minute.

(8) Lower pressure at DN port to 50 psi. Check that leakage at UP port does not exceed one cc. per minute.

(9) Remove hydraulic pressure.

C. Proof pressure test

(1) Connect hydraulic test stand to UP port.

CAUTION: DO NOT ATTEMPT TO EXTEND OR RETRACT ACTUATOR DURING PROOF TEST.

(2) Slowly apply 4450-4550 psi to UP port with no pressure at DN port. Hold pressure for 3 minutes. Check that there is no evidence of external leakage or permanent set to unit.

(3) Repeat this test with 4450-4550 psi to DN port with no pressure at UP port. Check that there is no evidence of external leakage or permanent set to unit.

(4) Remove hydraulic pressure.

D. Snubbing Test

(1) Fully retract actuator.

(2) Apply 3000 psi at UP port with zero psi at DN port. Check that at approximately 1.0 inch from fully retracted position to 1.0 inch from the fully extended position, piston moves at a uniform rate. Check that deceleration occurs at approximately 1.0 inch from extended position to fully extended position.

(3) With piston fully extended, apply 95-105 psi to DN port and zero psi to UP port. Check that at approximately 1.0 inch from fully extended position to 1.0 inch from retracted position, piston moves at a uniform rate. Check that deceleration occurs at approximately 1.0 inch from retracted position to fully retracted position.

E. Disconnect hydraulic test stand and ensure that actuator is partially filled with hydraulic fluid. Cap or plug both ports.

F. Lockwire restrictor (45B) and bolts (85) using double twist method per Assembly Fig. 702.

TROUBLE	PROBABLE CAUSE	CORRECTION
External leakage at rod end of piston (255)	Defective seal between end cap (245) and piston (255)	Disassemble and replace foot seal (220A) per par. 4.B.
External leakage at end cap (245)	Defective seal between end cap (245) and cylinder (320)	Disassemble and replace packing (240) and two backup rings (235) per par. 4.B.
External leakage at restrictor (335)	Defective seal between restrictor (335) and head end (100)	Disassemble and replace packing (340) per par. 4.C.
External leakage at two-way restrictor (45B)	Defective seal between restrictor (45A) and head end (100)	Remove restrictor (45A) and replace packings (60 and 70) and backup rings (55 and 65) per par. 4.C.
External leakage at tube (115)	Defective seals between tube (115) and head end (100) or fitting (285)	Disassemble and replace packings (125) and backup rings (120) per par. 4.D.
External leakage between fitting (285) and cylinder (320)	Defective seal between fitting (285) and cylinder (320)	Disassemble and replace packing (315) and backup rings (310) per par. 4.E.
External leakage between head end (100) and cylinder (320)	Defective seal between head end assy (80) and cylinder (320)	Disassemble and replace packing (110) and backup rings (105) per par. 4.F.

Trouble Shooting Chart
Figure 101 (Sheet 1)

TROUBLE	PROBABLE CAUSE	CORRECTION
Excessive internal leakage when either the UP or DN port is pressurized	Defective piston seal (250)	Disassemble and replace piston seal (250) per par. 4.G.
Deceleration does not occur at approximately 1.0 inches from the fully extended position or the fully retracted position	Defective valve assy (130)	Disassemble and replace valve assy (130) per par. 4.H.
	Defective spring (175)	Disassemble, test spring, and replace spring (175), if required per par. 4.H.
External leakage at union (325)	Defective seal between union (325) and head emt (100)	Remove union (325) and replace packing (330) per par. 4.I.

Trouble Shooting Chart
Figure 101 (Sheet 2)

4. Corrective Procedures

A. Drain hydraulic fluid from unit before disassembling.

B. Replacement of packing (240), seal (220A), scraper (205) and backup rings (235).

CAUTION: BEARING (25) HALVES COMPRISE A MATCHED SET AND MUST BE KEPT TOGETHER TO ENSURE PROPER OPERATION AFTER ASSEMBLY. DO NOT MIX BEARING HALVES.

(1) Remove bearings (25). Straighten lock tabs on lock washer (200).

(2) Secure piston (255) at wrench flats and using wrench A32040-10, remove rod end (190). Remove lockwasher (200).

(3) Using wrench F70312-39, remove nut (195).

(4) Push end cap (245) inward sufficiently to gain access to rings (230) and remove rings.

(5) Slide end cap (245) out of cylinder (320) and disassemble per DISASSEMBLY par. 3.L. and 3.M. Replace defective parts.

(6) Assemble end cap (245) and install per ASSEMBLY par. 3.K. thru 3.O.

(7) Install nut (195) on cap (245) per ASSEMBLY par. 3.R, 3.Z.

(8) Install lockwasher (200) and rod end (190) per ASSEMBLY par. 3.S. thru 3.U.

(9) Install bearings (25) per ASSEMBLY par. 3.AA.

(10) Do the test again.

C. Replacement of packings (60, 70, 340) and backup rings (55, 65).

(1) Remove lockwire and remove restrictors (45A, 335) as applicable.

(2) Remove packings (60, 70, 340) or backup rings (55, 65) and replace parts.

(3) Lubricate packings (60, 70, 340) or backup rings (55, 65) with assembly lube and install parts on restrictors (45A, 335) as applicable.

(4) Install restrictors (45B, 335) and tighten to 65-90 lb-in. Retest unit.

(5) Do the test again.

D. Replacement of packing (125), backup rings (120).

(1) Remove lockwire and remove fasteners (85) and washer (90).

(2) Pull head end assembly (80) out far enough to remove tube (115).

(3) Remove packings (125) and backup rings (120) from tube (115) and replace parts.

(4) Lightly lubricate packings (125) and backup rings (120) with assembly lube or hydraulic fluid and install parts on tube (115).

(5) Install tube (115) on fitting (285) and push head end assembly (80) toward cylinder and insert tube in head end port.

(6) Secure head end (80) to cylinder (320) with bolts (85) and washers (90). Tighten bolts (85) to 675-825 lb-in. Install bolts with BMS 5-95 sealant.

NOTE: If bolts (85A) are used, install bolts with two washers (90A) under each bolthead to provide proper grip length for bolts.

(7) Apply sealant around contact areas of the head end and the cylinder.

(8) Do the test again.

E. Replacement of packing (315) and backup rings (310).

(1) Remove lockwire and remove fasteners (85), washers (90).

(2) Remove fasteners (300), washers (305).

(3) Pull head end assembly (80) away from cylinder (320) so that end of tube (115) clears fitting (285).

(4) Remove fitting (285) and remove packing (315) and backup rings (310) from fitting. Replace seals and rings.

(5) Lubricate packing (315) and backup rings (310) with assembly lube or hydraulic fluid and install parts on fitting (285).

(6) Fill cavity between cylinder (320) and fitting (285) with assembly lube and install fitting on cylinder and secure with fasteners (300, 305). Tighten screw (300) to 65-90 lb-in.

(7) Lubricate seal of tube (115) with assembly lube or hydraulic fluid and push head end assembly with attached tube toward cylinder (320) until end of tube engages with fitting (285).

(8) Secure head end assembly (80) to cylinder (320) with fasteners (85, 90). Install the bolts with BMS 5-95 sealant. Tighten the bolts to 657-825 lb-in.

NOTE: If bolts (85A) are used, install bolts with two washers (90A) under each bolthead to provide proper grip length for bolts.

(9) Apply sealant to contact area between head end assembly (80) and cylinder (320).

(10) Do the test again.

F. Replacement of packing (110) and backup rings (105).

(1) Remove lockwire and remove head end assembly (80) per DISASSEMBLY par. 3.C. and 3.F.

(2) Remove packing (110) and backup rings (105) from head end assembly.

(3) Lightly lubricate packing (110) and backup rings (105) with assembly lube or hydraulic fluid and install parts in head end assembly (80).

(4) Install head end assembly per ASSEMBLY par. 3.0. and apply sealant on contact area between head end assembly (80) and cylinder (320).

(5) Do the test again.

G. Replacement of seal (250).

(1) Remove head end assembly per DISASSEMBLY par. 3.A. thru 3.G. Remove tube (115) from fitting (285).

(2) Push piston (255) into cylinder (320) until the head of piston is exposed and remove piston seal (250).

(3) Lubricate seal (250) with assembly lube or hydraulic fluid and install part on piston (255).

(4) Push piston (255) into cylinder (320).

(5) Install head end assembly per ASSEMBLY par. 3.0 and apply sealant between head end assembly (80) and cylinder (320).

(6) Do the test again.

H. Replacement of valve assembly (130) and spring (175).

(1) Remove lockwire and remove head end assembly (80) and tube (115) per DISASSEMBLY par. 3.C. thru 3.G.

(2) Push piston (255) into cylinder (320) to expose head end of piston and collar assembly (265).

(3) Remove and disassemble valve assembly (130) per DISASSEMBLY par. 3.G. thru 3.J. Replace defective parts.

(4) Assemble valve assembly (130) per ASSEMBLY par. 3.B. and install parts on piston per ASSEMBLY par. 3.C. and 3.D.

(5) Install head end assembly (80) on cylinder (220) per ASSEMBLY par. 3.0. and apply sealant to contact areas between head end assembly and cylinder.

(6) Do the test again.

I. Replacement of packing (330).

(1) Remove union (325) and packing (330) and replace packing.

(2) Lubricate packing (330) with assembly lube or hydraulic fluid and install on union (325).

(3) Install union (325) on head end assembly (80) and restest unit.

(4) Do the test again.

DISASSEMBLY

NOTE: Refer to TESTING/TROUBLE SHOOTING to establish condition or probable cause of any malfunction and to determine extent of disassembly and repair.

1. Equipment

   NOTE: Equivalent substitutes can be used.

   A. Rod End Wrench -- A32040-10 (Rod end)

   B. Crowfoot Wrench -- F70312-39 (Seal nut)

   C. Crowfoot Wrench -- F70312-41 (Piston)

   D. Crowfoot Wrench -- FC52 (Guide), Snap-On Tools Corp., V55719

   E. Crowfoot Wrench -- F70312-40 (Snubber nut)

   F. Cylinder Torque Adapter -- A32041-1

2. Parts Replacement (IPL Fig. 1)

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

   A. Lockwire

   B. Piston seal (250)

   C. Packings (60, 70, 110, 125, 150, 180, 240, 315, 330, 340)

   D. Backup rings (55, 65, 105, 120, 145, 235, 310)

   E. Hat seal and scraper seal (220A, 250)

   F. Cup lockwashers (155, 200)

3. Disassembly (IPL FIg. 1)

CAUTION: BEARING (25) HALVES ARE MATCHED PARTS AND MUST BE KEPT TOGETHER TO ENSURE PROPER OPERATION AFTER ASSEMBLY. DO NOT MIX BEARING HALVES.

A. Remove bearings (25) from rod end (190) and race (40).

NOTE: Race (40) could be an interference fit in head end (80). If necessary, refer to REPAIR for replacement procedures.

B. Remove lockwire and sealant. Remove restrictors (45B, 335) and union (325) from head end (80). Remove packings (60, 70) and backup rings (55, 65) from restrictors (45B). Remove packings (330, 340) from union (325) and restrictor (335). Straighten flange of lockwasher (200).

C. With a vise, hold cylinder (320) and head end (80).

D. Hold piston rod (255) with crowfoot wrench F70312-41 and use rod end wrench A32040-10 to loosen rod end (190).

E. Remove rod end (190) and cup lockwasher (200) from piston (255).

F. Remove bolts (85) and washers (90) from cylinder (320) and head end (80).

CAUTION: VALVE (130) IS A PRECISION PART. BE CAREFUL NOT TO DAMAGE HEAD END (80) WITH ATTACHED VALVE.

G. Pull head end (80) and slide piston (255) with attached valve (130) out of cylinder (320). Remove tube (115) from fitting (285) and head end.

H. Disassemble head end (130).

(1) Straighten flange of lockwasher (155). Use crowfoot wrench F70312-40 to unscrew nut (160). Remove head end (80) and lockwasher (155) from valve (130).

(2) Remove backup rings (105) and packing (110) from head end (80).

CAUTION: VALVE (130) IS A MATCHED SET OF SLIDE (135) AND SLEEVE (140). KEEP THESE PARTS TOGETHER AS A SET. DO NOT MIX WITH PARTS OF OTHER SETS.

I. Remove valve (130).

(1) Remove rivets (260) and remove nut (270) from collar (275).

(2) Remove ring (280) and collar (275).

(3) Remove valve (130) with attached guide (185) from piston (255) bore.

(4) Remove packing (150) and backup ring (145) from slide (135) and remove backup ring (180) from guide (185).

(5) Straighten flange of lockwasher (155). With crowfoot wrench FC52, slowly unscrew parts to separate guide (180) from valve assembly (130). Remove lockwasher (155).

J. Disassemble valve (130).

CAUTION: SLIDE (135) AND SLEEVE (140) ARE MATCHED PARTS. KEEP THEM TOGETHER AS A SET. DO NOT MIX WITH PARTS OF OTHER SETS.

(1) Remove retainers (165), guides (170) and spring (175) from slide (135).

(2) Carefully remove slide (135) from sleeve (140).

(3) Carefully remove nut (160) from slide (135).

K. Hold cylinder (320) with cylinder torque adapter A32041-1. Unscrew seal nut (195) with crowfoot wrench F70312-39.

L. Push end cap (245) inside cylinder (320) sufficiently to gain access to shear rings (230). Remove shear rings (230) from cylinder (320).

M. Remove end cap (245) from cylinder (320).

N. Remove scraper (205), bushing (215), pin (210), seal (220A), packing (240) and backup rings (235) from end cap (245).

O. Remove screws (300), washers (305), and fitting (285) from cylinder (320). Remove packing (315) and backup rings (310) from fitting (285).

P. Remove seal (250) from piston (255).

Q. Remove packings (125) and backup rings (120) from tube (115).

CHECK

1. Check all parts for obvious defects in accordance with standard industry practices.

2. Refer to FITS AND CLEARANCES for design dimensions and wear limits.

3. Magnetic particle check per 20-20-01:

   A. Tube (115, IPL Fig. 1)

   B. Slide (135) and sleeve (140)

   C. Nut (195)

   D. Fitting (285)

   E. Guides (165)

   F. Bearing race (40)

   G. Rod end (190)

   H. Piston (255)

   I. Cylinder (320)

4. Penetrant check per 20-20-02:

   A. Split bearings (25)

   B. End cap (245)

   C. Guide (185)

   D. Nuts (160 and 270)

   E. Collar (275)

   F. Head end (100)

   G. Retainers (170)

   H. Bushing (215)

5. Spring (175) check:

   A. Compress spring to length of 4.25 inches. Load shall be 23.7 - 26.3 pounds.

   B. Compress spring to length of 2.65 inches. Load shall be 43.3 - 48.3 pounds.

REPAIR - GENERAL

1. Content

   A. Repair, refinish and replacement procedures are included in separate repair sections as follows:

P/N	NAME	REPAIR
273T0001	TUBE	1-1
273T0004	END CAP	2-1
273T0016	BEARING RACE	3-1
273T4115	CYLINDER	4-1
273T4116	ROD END	5-1
273T4117	HEAD END	6-1
273T4118	PISTON	7-1
69B80032	BUSHING	8-1
- -	MISCELLANEOUS PARTS REFINISH	9-1
BAC27THY044 BAC27THY2 BAC27THY3	NAMEPLATE/MARKER	10-1

2. Standard Practices

   A. Refer to these standard practices, as applicable, for details of procedures in individual repairs.

SOPM 20-00-00 Introduction
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 20-30-02 Stripping of Protective Finishes
SOPM 20-41-01 Decoding Table for Boeing Finish Codes
SOPM 20-42-02 Low Hydrogen Embrittlement Cadmium-Titanium Alloy Plating
SOPM 20-52-03 Hard Chrome Plating
SOPM 20-42-06 Bright Cadmium Plating
SOPM 20-43-01 Chromic Acid Anodizing
SOPM 20-50-03 Bearing and Bushing Replacement
SOPM 20-50-05 Application of Aluminum Foil Markers
SOPM 20-50-08 Application of Bonded Solid Film Lubricant
SOPM 20-50-21 How to Install Nameplate Straps and Seals
SOPM 20-60-02 Finishing Materials
SOPM 20-60-03 Lubricants

3. Materials

NOTE: Equivalent substitutes can be used.

A. Corrosion Preventive Compound -- MIL-C-11796 Class 1 (SOPM 20-60-03)

B. Dry Film Lubricant -- BMS 3-8 (SOPM 20-50-08)

C. Dry Film Lubricant -- MIL-L-46010 (SOPM 20-50-08)

D. Primer -- BMS 10-11, Type 1 (SOPM 20-60-02)

4. Dimensioning Symbols

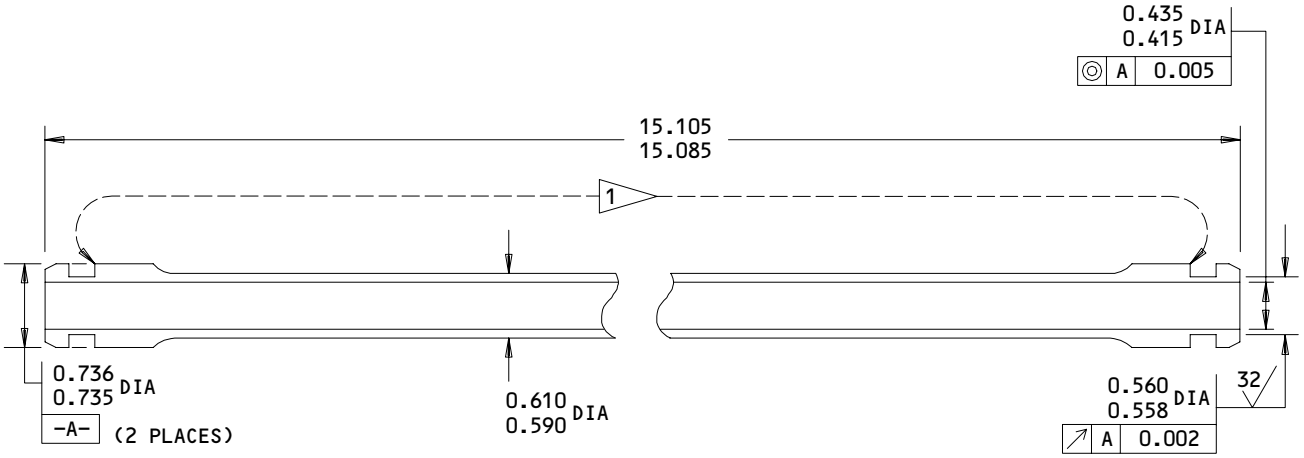
A. Standard True Position Dimensioning Symbols used in applicable repair procedures are shown in SOPM 20-00-00.

TUBE - REPAIR 1-1

273T0001-1

1. Plating Repair

A. Repair is only replacement of the original finish. Refer to Refinish instructions, Fig. 601. Refer to REPAIR - GENERAL for a list of applicable standard practices.



REFINISH

CADMIUM PLATE (F-15.06) ALL OVER
EXCEPT AS NOTED IN 1

1 CADMIUM PLATE (F-15.02) 0.0002-0.0004 INCH THICK THIS AREA

ALL DIMENSIONS ARE IN INCHES
MATERIAL: 4340 STEEL, 150-170 KSI

Tube Refinish
Figure 601

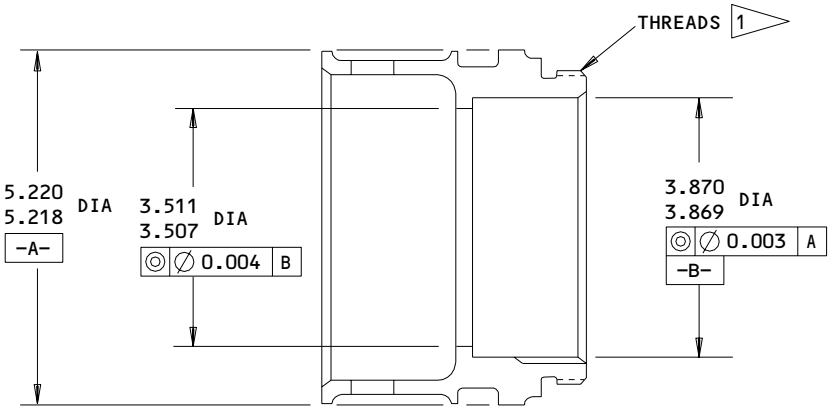
T21926

CAP, END - REPAIR 2-1

273T0004-1

1. Plating Repair

   A. Repair is only replacement of the original finish. Refer to Refinish instructions, Fig. 601. Refer to REPAIR - GENERAL for a list of applicable standard practices.



REFINISH

CHROMIC ACID ANODIZE (F-17.04) AND APPLY LUBRICANT TO THREADS AS SHOWN BY 1

1 APPLY MIL-L-46010, TYPE 1, LUBRICANT (F-19.81) OR BMS 3-8 LUBRICANT (F-19.10)

REPAIR

(SAME AS REFINISH)

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: AL ALLOY

ALL DIMENSIONS IN INCHES

273T0004-1
End Cap Refinish
Figure 601

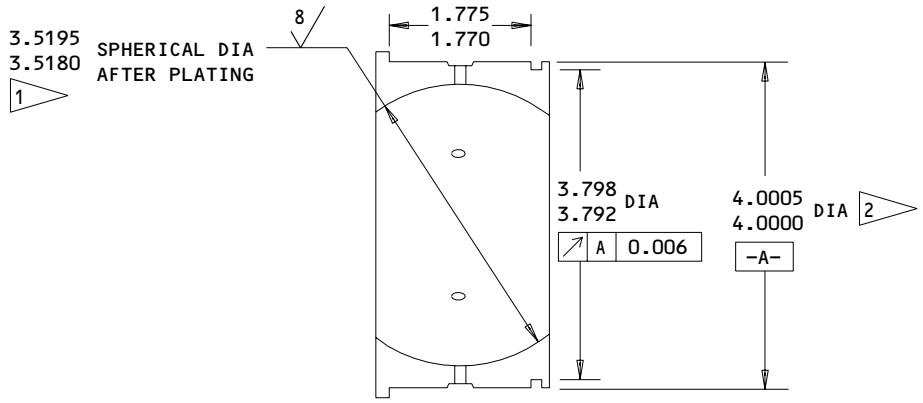
T21928

RACE, BEARING - REPAIR 3-1

273T0016-1

1. Plating Repair

A. Repair is only replacement of the original finish. Refer to Refinish instructions, Fig. 601. Refer to REPAIR - GENERAL for a list of applicable standard practices.



REFINISH

PASSIVATE (F-17.25, WHICH REPLACES F-17.09) UNLESS SHOWN BY 1 2

1 CHROME PLATE (F-15.03) 0.0007-0.0010 THICK. OPTIONAL: THIN DENSE CHROME PLATE (F-15.43), 0.0003-0.0005 THICK

2 CADMIUM PLATE (F-15.06) ON OD. PLATING IN GROOVE OPTIONAL

REPAIR

(SAME AS REFINISH)

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: 15-5PH CRES, 180-200 KSI

ALL DIMENSIONS ARE IN INCHES

Race Refinish
Figure 601

T21929

CYLINDER - REPAIR 4-1

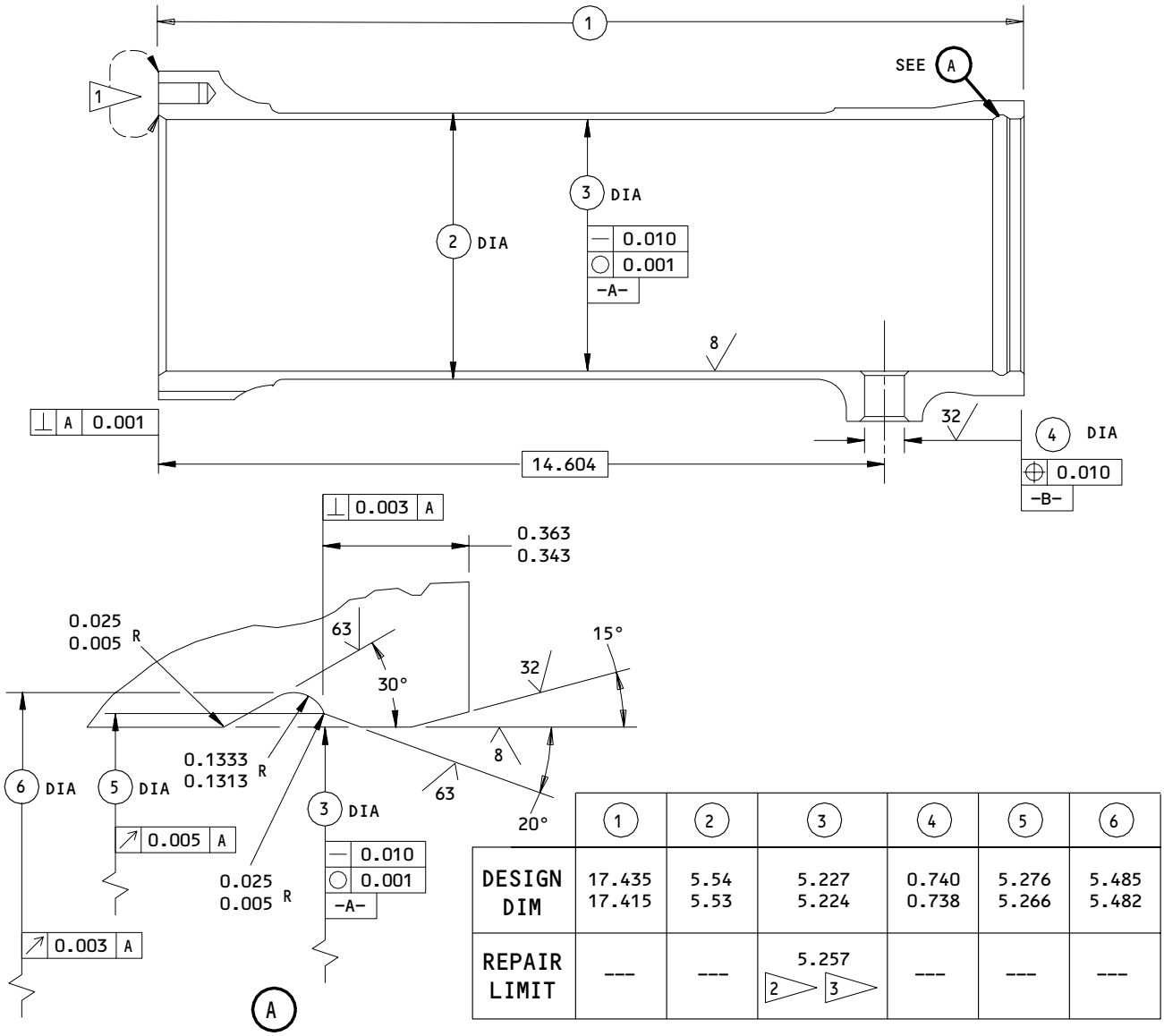
273T4115-1

NOTE: Refer to REPAIR-GENERAL for a list of applicable standard practices. For repair or surfaces which is only replacement of the original finish, refer to Refinish instructions, Fig. 601.

1. Plating Repair (Fig. 601)

A. Machine as required, within repair limits, to remove defects.

B. Shot peen. Build up with chrome plate. Grind the chrome plate to design dimensions and finish.



	1	2	3	4	5	6
DESIGN DIM	17.435 17.415	5.54 5.53	5.227 5.224	0.740 0.738	5.276 5.266	5.485 5.482
REPAIR LIMIT	---	---	5.257 (2) (3)	---	---	---

REFINISH

CHROME PLATE (F-15.34) DIA -A- (2). CADMIUM PLATE AREAS NOTED (1). PASSIVATE (F-17.25, WHICH REPLACES F-17.09) ALL OTHER AREAS

(1) CADMIUM PLATE (F-15.06) THIS AREA, 0.0002-0.0004 THICK

(2) THIS CHANGES ORIGINAL PASSIVATED SURFACE OF DIA -A- TO CHROME PLATE. THE PASSIVATED CONFIGURATION IS NOT RECOMMENDED

(3) LIMIT FOR BUILDUP WITH CHROME PLATE AND GRINDING TO DESIGN DIM AND FINISH

REPAIR

REF (2) (3)

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK SHARP EDGES 0.01-0.03 R

SHOT PEEN:
0.017-0.046 SHOT SIZE
0.010 A2 INTENSITY

MATERIAL: 15-5PH CRES, 180-200 KSI

ALL DIMENSIONS APPLY AFTER PLATING

ALL DIMENSIONS ARE IN INCHES

273T4115-1
Cylinder Repair and Refinish
Figure 601

T21930

ROD END - REPAIR 5-1

273T4116-1, -3

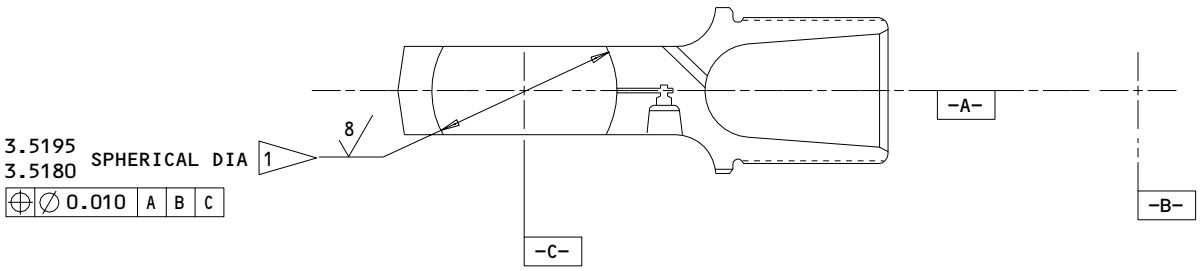
1. Plating Repair

   A. Repair is only replacement of the original finish. Refer to Refinish instructions, Fig. 601. Refer to REPAIR - GENERAL for a list of applicable standard practices.

2. Threads

   A. Blend out defects by standard industry practices. After repair, there must be a minimum of 20 full threads without defects on both the piston and the rod end that will overlap and fully engage.

   B. Refinish the threads as indicated.



REFINISH

PASSIVATE (F-17.25, WHICH REPLACES F-17.09) ALL OVER AND CHROME PLATE SURFACES SHOWN BY 1

1 CHROME PLATE (F-15.03) 0.0007-0.001 THICK.
OPTIONAL: THIN DENSE CHROME PLATE (F-15.43), 0.0003-0.0005 THICK

REFINISH

(SAME AS REFINISH)

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

SHOT PEEN (SOPM 20-10-03)
0.017-0.046 SHOT SIZE
0.016 A2 INTENSITY

MATERIAL: 15-5PH CRES, 180-200 KSI

ALL DIMENSIONS ARE IN INCHES

273T4116-1,-3
Rod End Refinish
Figure 601

T21931

HEAD END ASSEMBLY - REPAIR 6-1

273T4117-1

NOTE: Refer to REPAIR-GENERAL for a list of applicable standard practices. Refer to IPL Fig. 1 for item numbers. For repair of surfaces which is only replacement of the original finish, refer to Refinish instructions, Fig. 601.

1. Bearing Race (40) Replacement

   A. Remove retainer (35).

   B. If the race is an interference fit in the bore, you can use a temperature differential method to remove it. Make the race cold and heat the head end lug as necessary to change the interference fit to a clearance fit.

   C. If you find defects on the bore of the head end, refer to par. 2 for repair instructions.

   D. Install a replacement race (40). If necessary, use the shrink-fit method of SOPM 20-50-03. Then install retainer (35).

2. Bore - Diameter B (Fig. 601)

   A. Machine as required, within repair limits, to remove defects. Restore chamfer as shown.

   B. Chemical treat the surfaces, or refinish as indicated.

   C. Make a repair sleeve per Fig. 602.

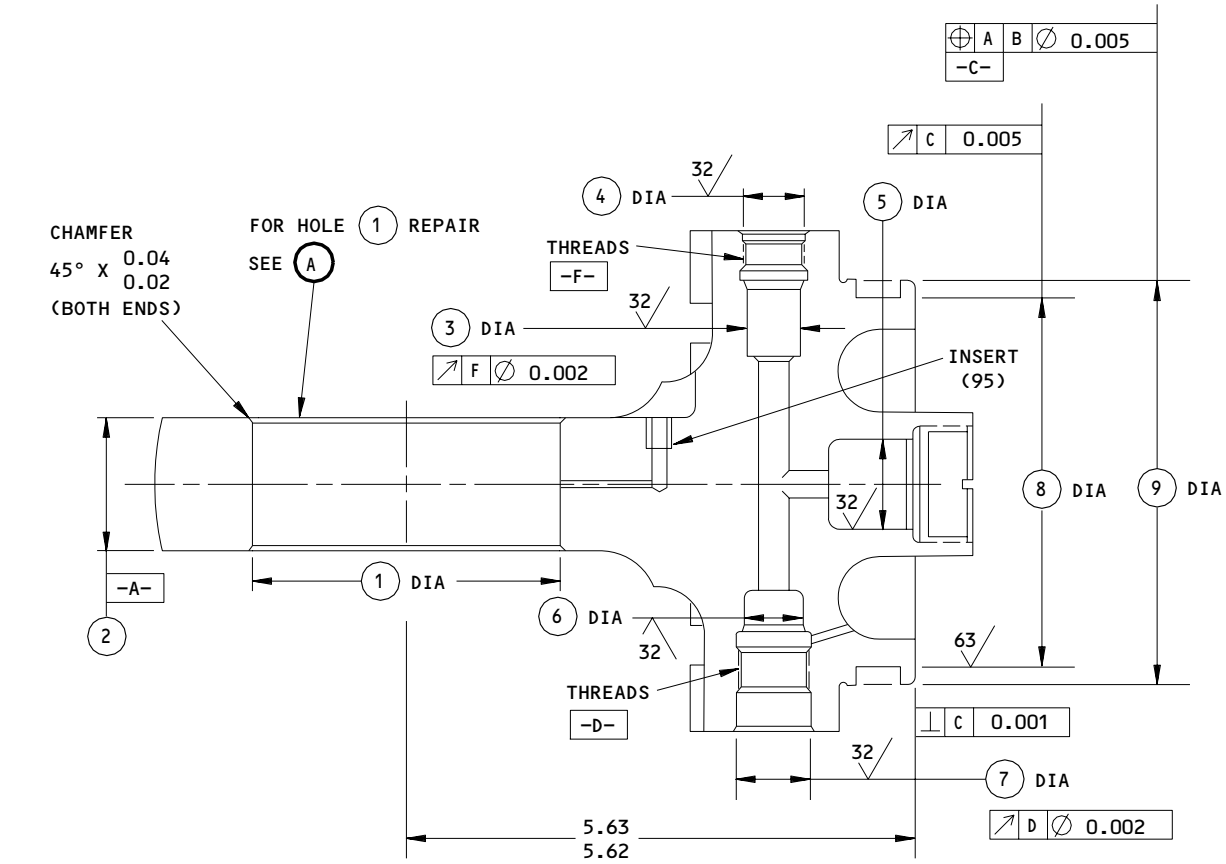
   D. Install the repair sleeve by the shrink-fit method. Roller swage the sleeve in place as shown.

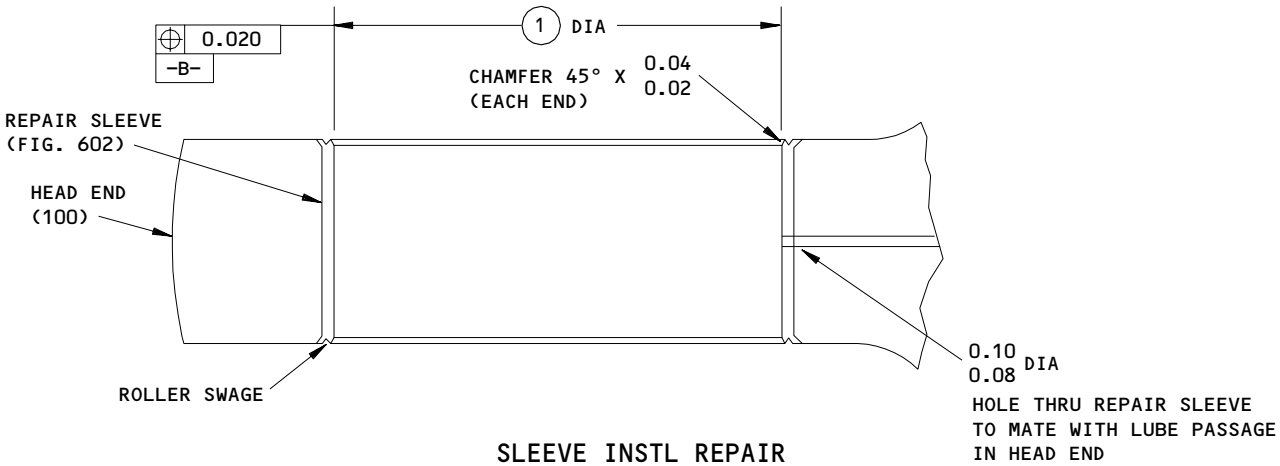
   E. Drill a hole thru the wall of the sleeve to align with the lube passage in the head end. Make sure the lube passages are clear.

3. Insert (95) Replacement

   A. Remove the old insert.

   B. Install a replacement insert 3/4 - 1 1/2 turns below surface. Remove the tang.





SLEEVE INSTL REPAIR
A

273T4117-1
Head End Repair and Refinish
Figure 601 (Sheet 1)

143115

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
DESIGN DIM	4.0005 3.9990	1.715 1.705	0.734 0.732	0.901 0.896	1.180 1.178	0.734 0.732	0.927 0.925	4.747 4.744	5.220 5.218
REPAIR LIMIT	4.0605 4.0590 ▷1	---	---	---	---	---	---	---	---

REFINISH

CHROMIC ACID ANODIZE (F-17.04) ALL OVER

▷1 LIMIT FOR INSTL OF REPAIR SLEEVE

REPAIR:

REF ▷1

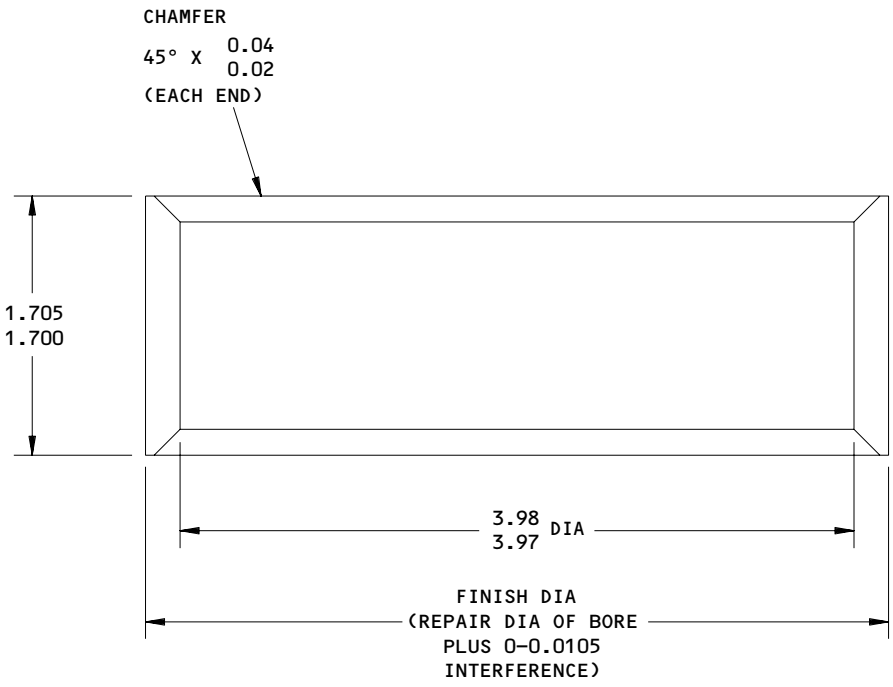
125√ MACHINE FINISH EXCEPT AS NOTED

BREAK SHARP EDGES

MATERIAL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

273T4117-1
Head End Repair and Refinish
Figure 601 (Sheet 2)



125 MACHINE FINISH

BREAK SHARP EDGES 0.01–0.02R

MATERIAL: 6061 AL ALLOY

NO FINISH

ALL DIMENSIONS ARE IN INCHES

Repair Sleeve Details
Figure 602

143117

PISTON - REPAIR 7-1

273T4118-1, -2

NOTE: Refer to REPAIR-GENERAL for a list of applicable standard practices. For repair of surfaces which is only replacement of the original finish, refer to Refinish instructions, Fig. 601.

1. Plating Repair (Fig. 601)

   A. Machine as required, within repair limits, to remove defects.

   B. Shot peen.

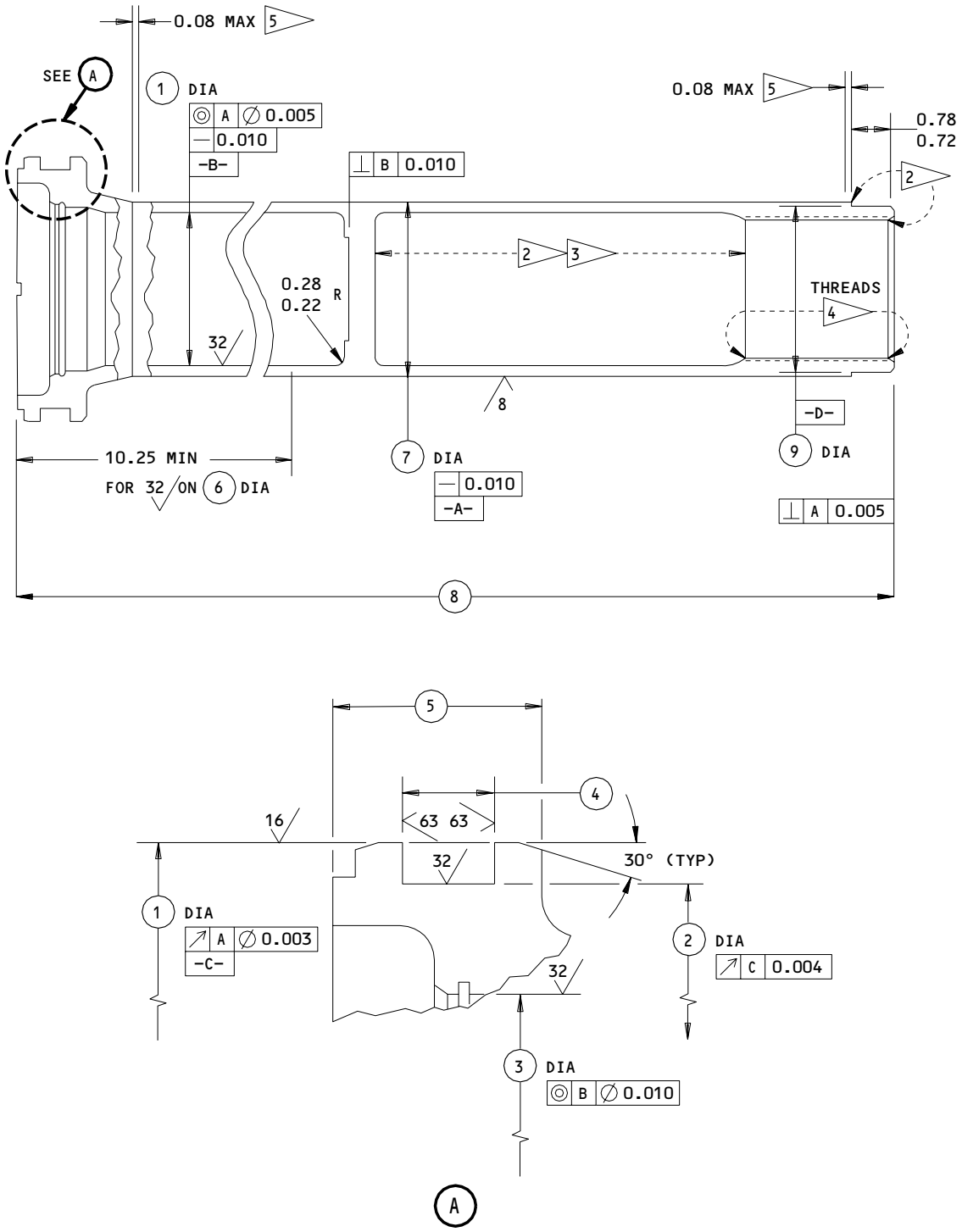
   C. Chrome or nickel plate. Use only nickel plate to repair piston Diameter C if the cylinder ID is chrome plated.

   D. Grind the chrome plate, or machine the nickel plate, to design dimensions and finish.

2. Threads

   A. Blend out defects by standard industry practices. After repair, there must be a minimum of 20 full threads without defects on both the piston and the rod end that will overlap and fully engage.

   B. Refinish the threads as indicated.



273T4118-1,-2
Piston Repair and Refinish
Figure 601 (Sheet 1)

T21932

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
DESIGN DIM	5.220 5.218	4.747 4.744	3.235 3.230	0.589 0.579	1.31 1.29	3.110 3.105	3.497 3.495	23.625 23.605	3.49 3.48
REPAIR LIMIT	5.210 ▷7◁	---	---	---	---	---	3.465 ▷8◁	---	---

REFINISH

CHROME PLATE DIAMETER –A– PER ▷1◁ .
CADMIUM–TITANIUM PLATE DIAMETER –D– PER ▷2◁ .
CADMIUM–TITANIUM PLATE THREADS PER ▷4◁ .
PUT A PLATING RUNOUT SHOWN BY ▷5◁ .

APPLY WIPE PRIMER (F–19.45) ON CHROME PLATE, PLATING RUNOUT AREAS AND THREADS. PASSIVATE (F–17.25, WHICH REPLACES F–17.09) OTHER SURFACES, INCLUDING DIAMETER –C– ▷6◁

▷1◁ CHROME PLATE (F–15.04), 0.003–0.005 THICK

▷2◁ CADMIUM–TITANIUM PLATE (F–15.01) AND APPLY PRIMER, BMS 10–11, TYPE 1 (F–20.03). COAT INTERIOR PER ▷3◁

▷3◁ COAT WITH CORROSION PREVENTIVE COMPOUND MIL–C–11796, CLASS 1 (F–19.03)

▷4◁ CADMIUM–TITANIUM PLATE (F–15.32)

▷5◁ PLATING RUNOUT

▷6◁ THIS CHANGES ORIGINAL CHROME PLATED SURFACE OF DIAMETER –C– TO PASSIVATED. THE CHROME PLATED CONFIGURATION IS NOT RECOMMENDED

▷7◁ LIMIT FOR NICKEL PLATE BUILDUP AND MACHINING TO DESIGN DIMENSION AND FINISH

▷8◁ LIMIT FOR CHROME PLATE BUILDUP AND GRINDING TO DESIGN DIMENSION AND FINISH

REPAIR:

REF ▷6◁ ▷7◁ ▷8◁

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK SHARP EDGES

SHOT PEEN:
0.017–0.046 SHOT SIZE
0.016 A2 INTENSITY

MATERIAL: 4330M STEEL, 220–240 KSI

ALL DIMENSIONS ARE IN INCHES

273T4118–1,–2
Piston Repair and Refinish
Figure 601 (Sheet 2)

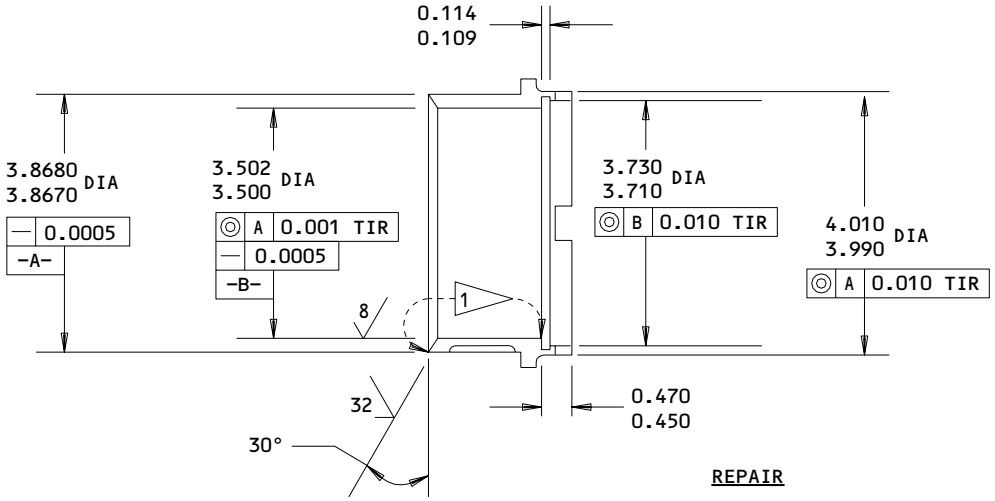
143118

BUSHING - REPAIR 8-1

69B80032-1

1. Plating Repair

A. Repair is only replacement of the original finish. Refer to Refinish instructions, Fig. 601. Refer to REPAIR-GENERAL for a list of applicable standard practices.



REFINISH

CADMIUM PLATE (F-15.06) ALL OVER EXCEPT AS NOTED 1

1 NO FINISH

REPAIR

(SAME AS REFINISH)

125 MACHINE FINISH EXCEPT AS NOTED

MATERIAL: AL-NI-BRZ PER AMS 4640

ALL DIMENSIONS ARE IN INCHES

Bushing Refinish
Figure 601

T21933

MISCELLANEOUS PARTS REFINISH - REPAIR 9-1

1. Repair of these parts is only replacement of the original finish. Refer to REPAIR-GENERAL for a list of applicable standard practices.

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1		
Nut (195)	4340 Steel, 150-170 ksi	Cadmium plate (F-15.02).
Retainer (170) Guide (185) Collar (275) Nut (270)	Al alloy	Chromic acid anodize (F-17.02).
Shear rings (230)	302 CRES	Cadmium plate (F-15.02).
Ring (280)	304 CRES	Passivate (F-17.25, which replaces F-17.09).
Nut (160)	303 CRES	Passivate (F-17.25, which replaces F-17.09).
Guide (165)	17-4PH CRES, 150-170 ksi	Passivate (F-17.25, which replaces F-17.09).

Refinish Details
Figure 601

NAMEPLATE/MARKER - REPAIR 10-1

BAC27THY0044
BAC27THY2
BAC27THY3

NOTE: Refer to REPAIR-GENERAL for a list of applicable standard practices. Refer to IPL Fig. 1 for item numbers.

1. Nameplate Replacement (Fig. 601)

   A. Steel stamp the serial number and part number on the replacement nameplate (15).

   B. Bend nameplate (15) to agree with the curvature of cylinder (320).

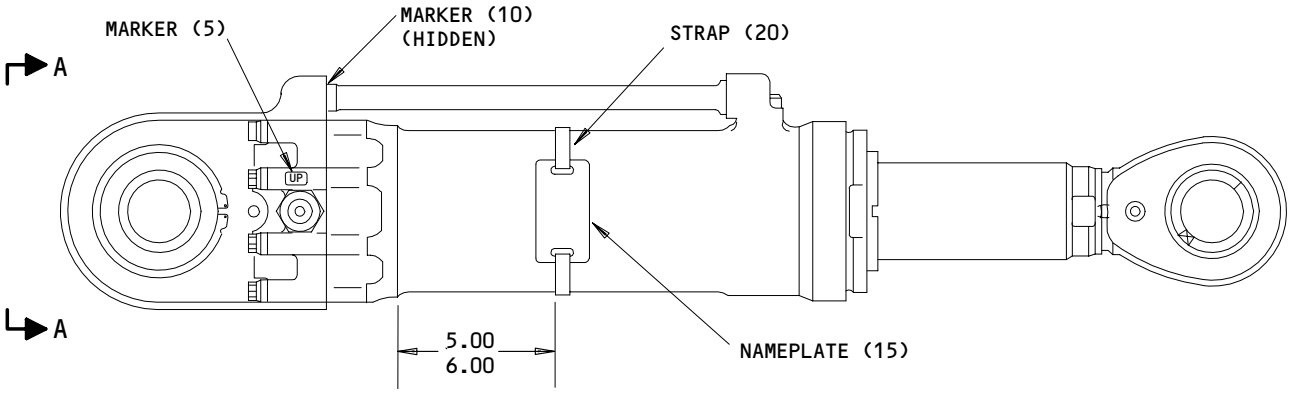
   C. Install nameplate (15) and a new strap (20) on cylinder (320) at the distance shown per SOPM 20-50-21.

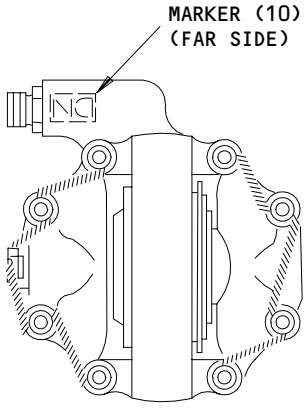
      NOTE: Strap (20) can be used only once. Use a new strap at every nameplate installation.

2. Marker Replacement (Fig. 601)

   A. Apply replacement markers (5, 10) per SOPM 20-50-05.

   B. Apply Type 41 hydraulic fluid resistant clear coating (F-21.34) to the markers. Make this coating go at least 0.38 inch out from the edge of the marker.





A-A

ALL DIMENSIONS ARE IN INCHES

Nameplate/Marker Installation
Figure 601

T21935

ASSEMBLY

1. Materials

NOTE: Equivalent substitutes can be used.

A. Grease -- BMS 3-33 or MIL-G-23827 (SOPM 20-60-03)

B. Sealant -- BMS 5-45 (Replaces BMS 5-26) or MIL-S-8802 (SOPM 20-60-04)

C. Sealant -- BMS 5-95 (SOPM 20-60-04)

D. Assembly Lube -- MCS-352 (SOPM 20-60-03)

E. Hydraulic Fluid -- BMS 3-11 (SOPM 20-60-03)

F. Corrosion Preventive Compound -- BMS 3-27 (SOPM 20-60-02)

2. Equipment

NOTE: Equivalent substitutes can be used.

A. Rod End Wrench -- A32040-10 (Rod end)

B. Crowfoot Wrench -- F70312-39 (Seal nut)

C. Crowfoot Wrench -- F70312-41 (Piston)

D. Crowfoot Wrench -- FC52 (Guide), Snap-On Tools Corp., V55719

E. Crowfoot Wrench -- F70312-40 (Snubber nut)

F. Cylinder Torque Adapter -- A32041-1

3. Assembly (Fig. 701, 702 IPL Fig. 1)

CAUTION: IN A LIMITED NUMBER OF CONFIGURATIONS, THE CYLINDER ID IS NOT PLATED, AND THE MATING PISTON OD IS CHROME PLATED. IN LATER CONFIGURATIONS, THE CYLINDER ID IS CHROME PLATED AND THE MATING PISTON OD IS NOT PLATED. FOR REPAIRED CONFIGURATIONS, A NICKEL PLATED PISTON CAN BE USED WITH A CHROME PLATED CYLINDER.

NOTE: Install packings and seals per SOPM 20-50-06.

A. Install packing (110) and backup rings (105) in head end, assembly (80).

B. Assemble valve assembly (130) and guide (185).

CAUTION: VALVE (130) IS A PRECISION PART. BE CAREFUL WITH IT.

CAUTION: BE VERY CAREFUL WHEN YOU INSTALL NUT (160) ON SLIDE (135).

(1) Put nut (160) on slide (135).

(2) Install slide (135) on sleeve (140).

(3) Install guides (165), retainers (170) and spring (175) on slide (135).

(4) Install lockwasher (155) and guide (185) on sleeve (140).

(5) Tighten guide (185) to 65-90 pound-inches with crowfoot wrench FC52.

(6) Break the flange of lockwasher (155) into the mating slot with a 0.24-inch square punch. Make sure the break is complete.

(7) Install ring (180) on guide (185).

C. Carefully install valve (130) with attached parts into piston (255). Put collar (275) into piston (255) and install ring (280) into the piston groove.

D. Lightly lubricate the threads of nut (270) with assembly lube or hydraulic fluid. Install nut (270) in collar (275) with rivet (260).

E. Install seal (250) in piston (255).

CAUTION: SLIDE (135) IS A PRECISION PART. BE CAREFUL WITH IT.

F. Install backup rings (145) and packing (150) in slide (135).

G. Carefully install slide (135) of valve assembly (130) and attached parts into head end (80). Lightly lubricate the threads of nut (160) with assembly lube or hydraulic fluid. Tighten nut (160) to 65-90 lb-in. with crowfoot wrench F70312-40.

H. Break the flange of lockwasher (155) into one of the mating slots with a 0.24-inch square punch. Make sure the break is complete.

I. Install backup rings (120) and packings (125) in tube (115).

J. Install backup rings (310) and packing (315) in fitting (285). Fill the cavity of the fitting with assembly lube and install fitting in cylinder (320). Attach fitting (285) with screws (300) and washers (305). Tighten screws (300) to 65-90 lb-in.

K. Install backup rings (235) and packing (240) on end cap (245).

L. Install end cap (245) into cylinder (320) until you can see the shearing groove, then install shear rings (230) in the cylinder groove.

M. Push end cap (245) out until the end cap comes against shear rings (230).

N. Slide piston (255) with attached parts into cylinder (320). Put tube (115) into fitting (285).

O. Push on head end (80) and attached parts until head end (80) comes against cylinder (320) and tube (115) goes into the port on the head end. Install washers (90 or 90A), bolts (85 or 85A) as applicable. Install the bolts with BMS 5-95 sealant. Tighten the bolts to 675-825 lb-in.

P. Slide hat seal (220A) on piston (255) and into end cap (245).

Q. Install scraper (205) in bushing (215). Install pin (210) in bushing (215) and slide bushing (215) into end cap (245) with pin (210) mating with the slot in end cap (245).

R. Install nut (195) on end cap (245) and tighten this finger-tight.

S. Apply BMS 3-27 corrosion preventive compound to the threads of the rod end and the piston. Be sure all of the threads have compound on them. Install lockwasher (200) and rod end (190) in piston, and tighten the rod end finger-tight.

T. Hold piston rod (255) with crowfoot wrench F70312-41. With rod end wrench A32040-10, tighten rod end (190) to 7700-8500 lb-in. Clean unwanted corrosion preventive compound from the unit.

U. Break the flange of lockwasher (200) into one of the mating slots with a 0.24-inch square punch. Make sure the break is complete.

V. Put the actuator unit in torque adapter A32041-1. With crowfoot wrench F70312-39, tighten nut (195) to 800-1100 lb-in.

W. Install packings (60, 70), rings (55, 65) in restrictor (45B). Install the restrictor in head end assy (80) and tighten it to 65-90 lb-in.

X. Install union (325) in the head end with packing (330). Install restrictor (335) with packing (340). Be sure to install this restrictor with its hex down against the surface of the head end.

Y. Do a test of the unit per TESTING/TROUBLE SHOOTING.

Z. Lockwire bolts (85) and screws (300), and nut (195) to bushing (215) by the double-twist method.

AA. Apply fillet seals of BMS 5-45 or MIL-S-8802 sealant to these joints. After the sealant is cured, apply Type 41 clear coating (F-21.34) to all sealed areas.

(1) Between nut (195) and bushing (215).

(2) Between bushing (215) and cylinder (320).

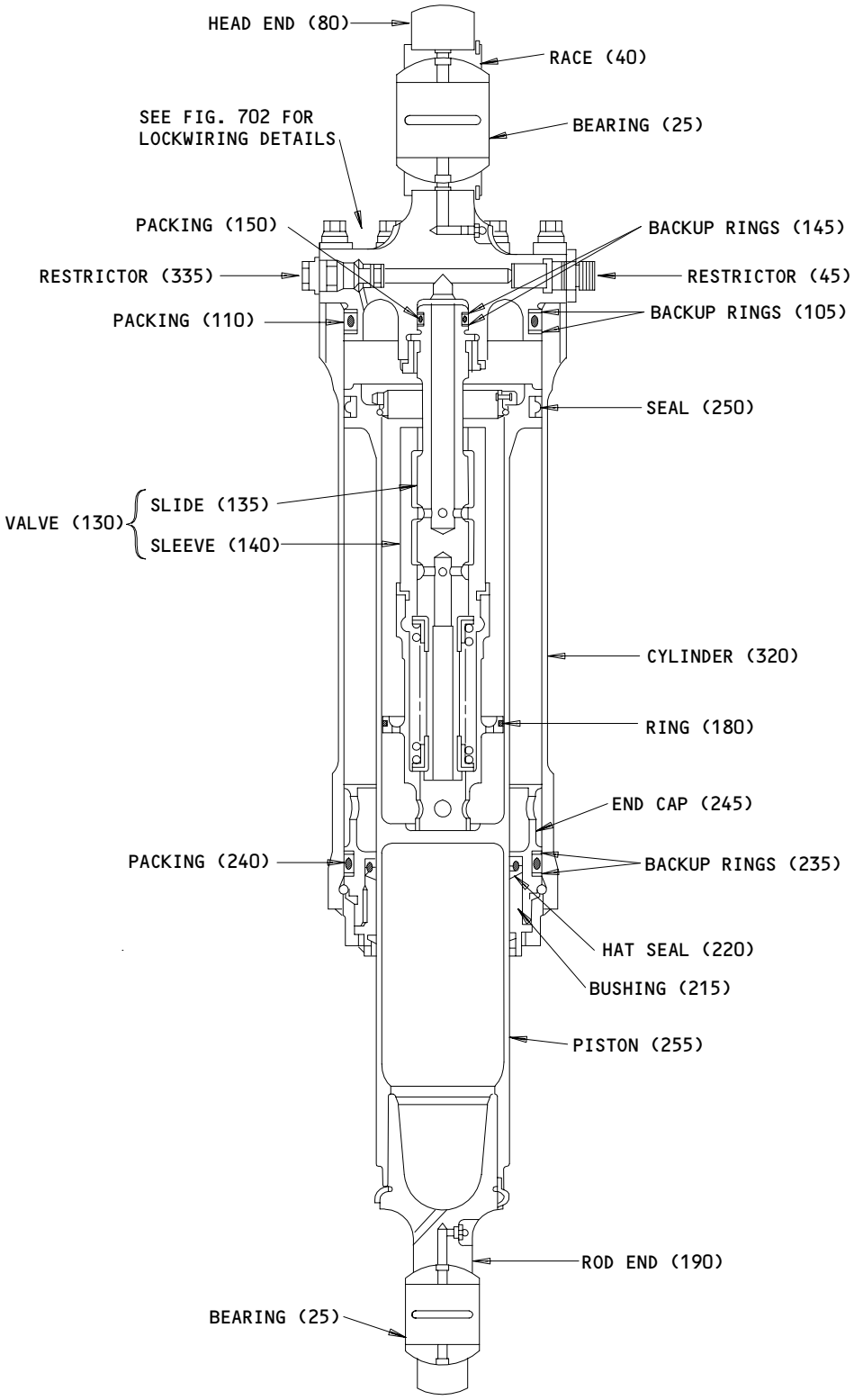
(3) Between head end assembly (80) and cylinder (320).

(4) Between rod end (190) and cup lockwasher (200).

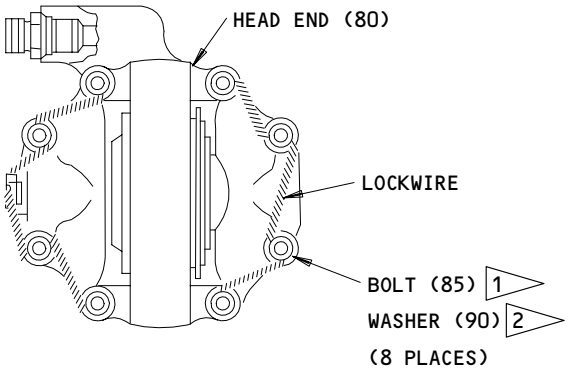
(5) Between cup lockwasher (200) and piston (255).

CAUTION: BEARING (25) HALVES ARE A MATCHED SET AND MUST BE INSTALLED WITH THE INDEX MARKS ALIGNED.

AB. Apply grease to bearings (25). Align the index marks on the bearings and install the bearings on rod end (190) and race (40).



Assembly Details
Figure 701

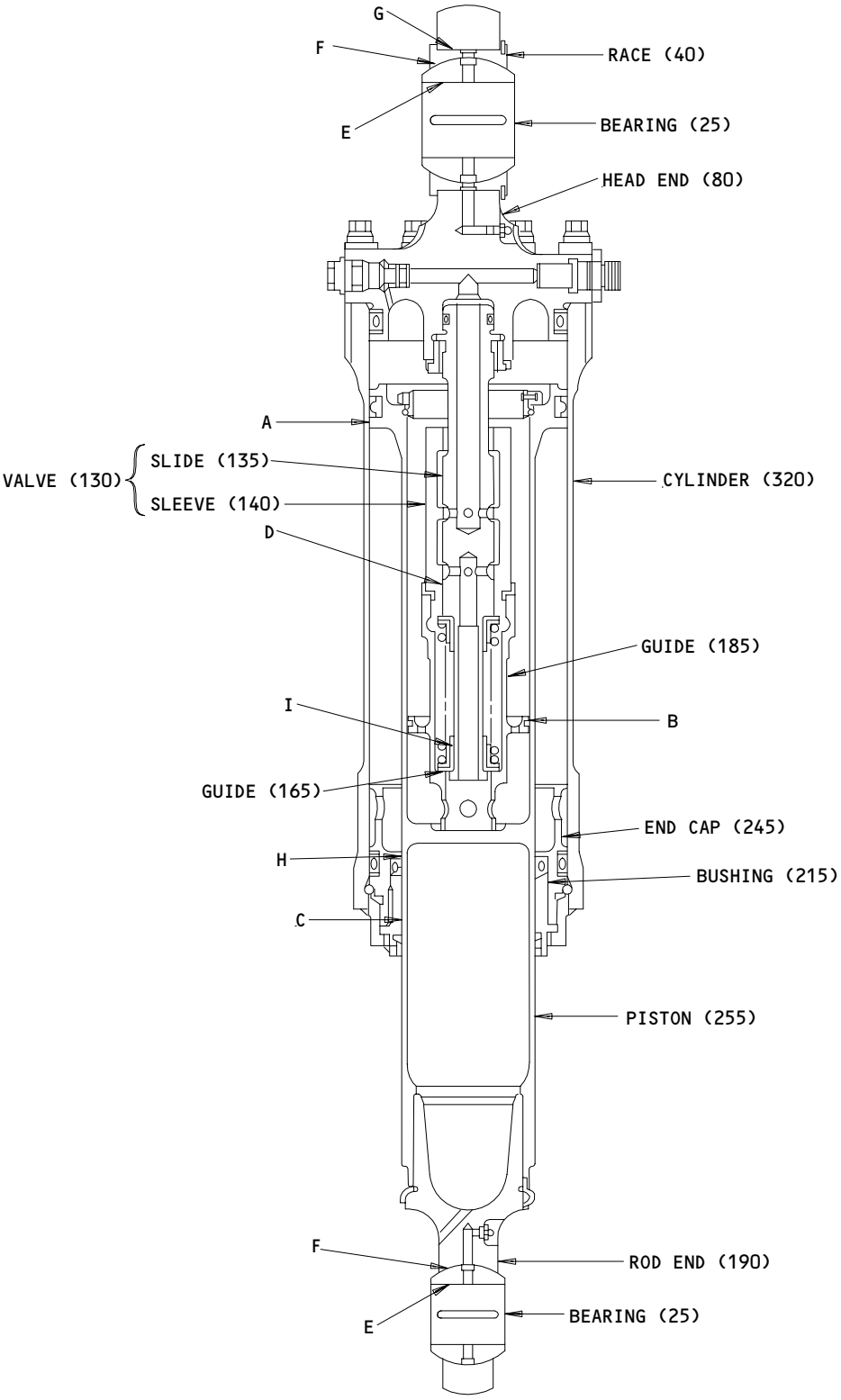


1 LUBRICATE THREADS WITH ASSEMBLY LUBE MCS 352. INSTALL WITH SEALANT BMS 5-95

2 USE TWO WASHERS (90A) WITH 273T0062-1 BOLT (85A)

Lockwire Diagram
Figure 702

FITS AND CLEARANCES



Fits and Clearances
Figure 801 (Sheet 1)

T21942

Ref Letter Fig.801	Mating Item No. IPL Fig. 1	Design Dimension				Service Wear Limit		
		Dimension		Assembly Clearance		Dimension		Maximum Clearance
		Min	Max	Min	Max	Min	Max	
A	ID 320 OD 255	5.224 5.218	5.227 5.220	0.004	0.009	5.217	5.229	0.012
B	ID 255 OD 185	3.105 3.075	3.110 3.108	-0.003 (1)	0.035			
C	ID 215 OD 255	3.500 3.495	3.502 3.497	0.003	0.007	3.485	3.505	0.020
D	ID 140 OD 135	1.056 (2) 1.0625 (2)	1.060 (2) 1.0635 (2)	0.0005 (3)	0.0010 (3)	1.0620	1.0650	0.0015
E	ID 25	2.2495	2.2500					
F	ID 40,190 (4) OD 25 (4)	3.5180 3.5145	3.5195 3.5150	0.0030	0.0050	3.5135	3.5200	0.0065
G	ID 80 OD 40	3.9990 4.0000	4.0005 4.0005	-0.0105	0.0005	3.9998	4.0008	0.0010
H	ID 245 OD 255	3.507 3.495	3.511 3.497	0.010	0.016	3.485	3.523	0.038
I	ID 165 OD 130	0.798 0.794	0.802 0.796	0.000 (5)	0.003 (5)		(6)	

(1) INTERFERENCE FIT
(2) DIMENSIONS BEFORE LAPPING
(3) DIMENSIONS AFTER LAPPING
(4) SPHERICAL DIMENSION
(5) TWO HALVES OF GUIDE (165) MAY HAVE 0-0.018 GAP BETWEEN THEM
(6) REPLACE IF WALL THICKNESS AT ANY POINT IS LESS THAN 0.045

ALL DIMENSIONS ARE IN INCHES

Fits and Clearances
Figure 801 (Sheet 2)

T21943

FOR TORQUE VALUES OF STANDARD FASTENERS, REFER TO SOPM 20-50-01			
ITEM NO. IPL FIG. 1	NAME	TORQUE	
		POUND-INCHES	POUND-FEET
85	BOLT	675-825	
45	RESTRICTOR	65-90	
160	NUT	65-90	
185	GUIDE	65-90	
190	ROD END	7700-8500	
195	NUT	800-1100	

Torque Table
Figure 802

T21944

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

NOTE: Equivalent substitutes can be used.

1. A32040-10 -- Rod End Wrench
2. F70312-39 -- Crowfoot Wrench
3. F70312-41 -- Crowfoot Wrench
4. F70312-40 -- Crowfoot Wrench
5. FC52 -- Crowfoot Wrench (Snap-On Tools Corp., V55719)
6. A32041-1 -- Cylinder Torque Adapter

ILLUSTRATED PARTS LIST

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

2. Indentures show parts relationships as follows:

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

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

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

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

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

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

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

6. Parts Interchangeability

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

VENDORS

V5F573 GREENE TWEED AND CO INC
2075 DETWILLER ROAD
KULPSVILLE, PENNSYLVANIA 19443-0305

55719 SNAP-ON TOOLS CORP
2801 80TH STREET
KENOSHA, WISCONSIN 53141-1410
OR
10801 CORPORATE DRIVE
PLEASANT PRAIRIE, WISCONSIN 53158-1603

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

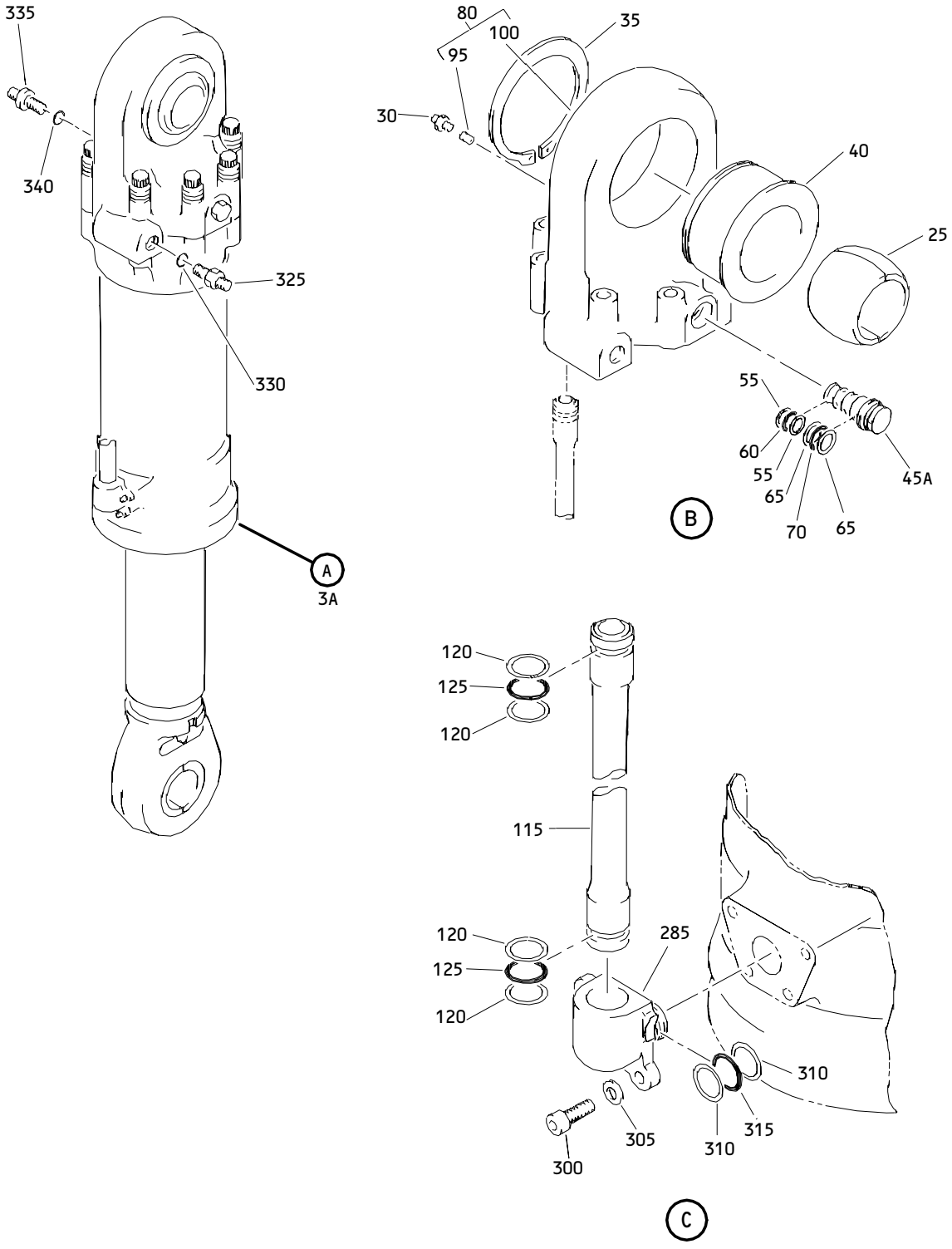
97820 SHAMBAN POLYMER TECH GROUP
711 MITCHELL ROAD
NEWBURY PARK, CALIFORNIA 91320

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

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
AN960C416L		1	305	4
BACB30LE8H30		1	85	8
BACR12BM113		1	55	2
		1	120	4
		1	310	2
BACR12BM116		1	65	2
BACR12BM213		1	145	2
BACR12BM335		1	180	1
BACR12BM427		1	105	2
		1	235	2
BACR15BB3A7		1	260	1
BACR15BB3A7C		1	260A	1
BACU24K8		1	325	1
BAC27THY0044		1	15	1
BAC27THY2		1	5	1
BAC27THY3		1	10	1
C11236-111B		1	74	
FCLX0501550A		1	72A	
MS15004-1		1	30	2
MS16624-1400		1	35A	1
MS16624-4400		1	35	1
MS20002C8		1	90	8
		1	90A	16
MS21209F4-15		1	95	1
MS21902-8T		1	325A	1
NAS1351C4H10		1	300	4
NAS1611-111		1	75	
NAS1611-113		1	60	1
		1	125	2
		1	315	1
NAS1611-113A		1	60A	1
		1	315A	1
NAS1611-116		1	70	1
NAS1611-116A		1	70A	1
NAS1611-213		1	150	1
NAS1611-213A		1	150A	1
NAS1611-427		1	110	1
		1	240	1
NAS1611-427A		1	110A	1
		1	125A	1
		1	240A	1
NAS1612-8		1	77	
		1	330	1
NAS1612-8A		1	330A	1

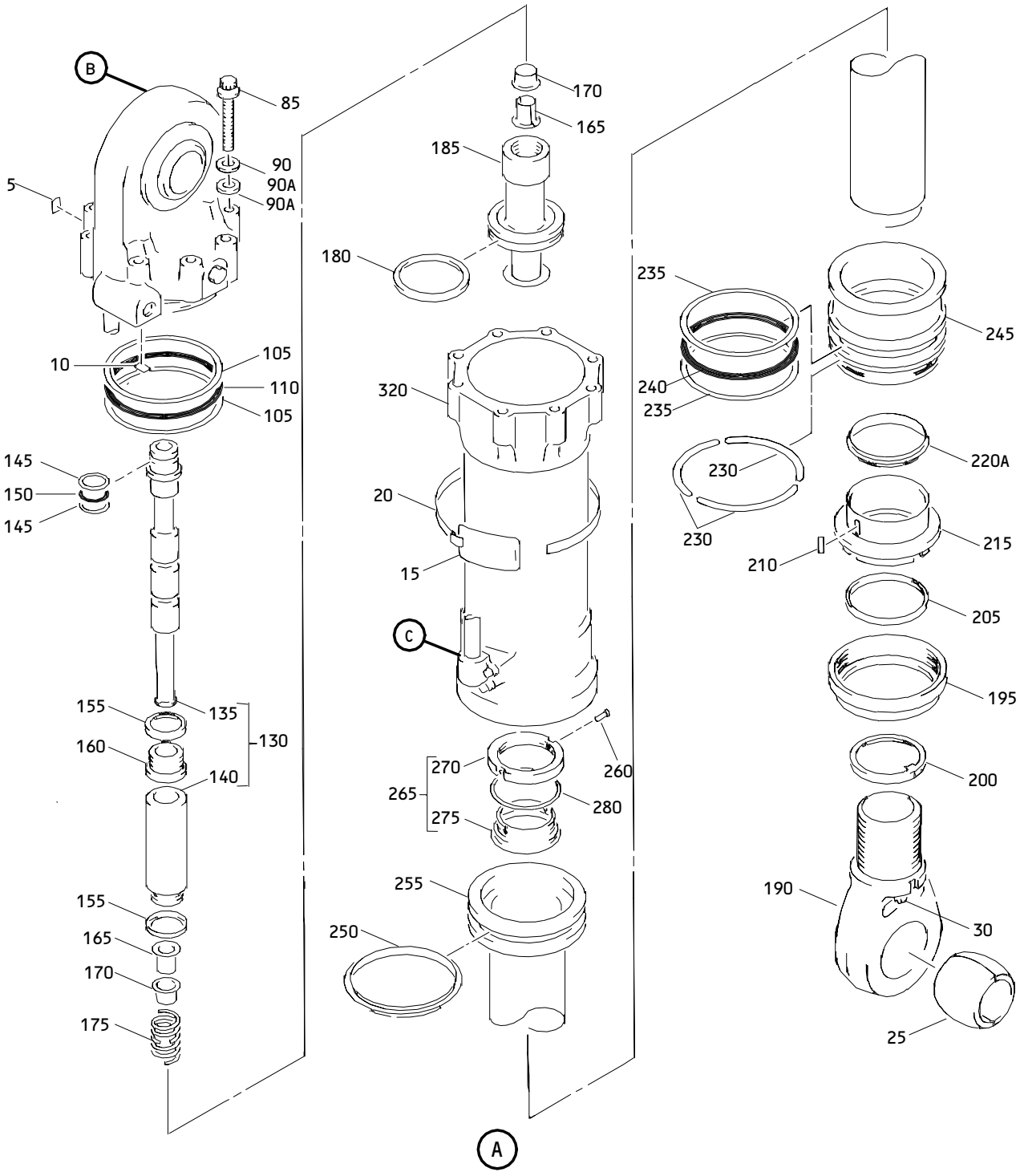
PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
270T0002-136		1	25	2
273T0001-1		1	115	1
273T0002-1		1	135	1
273T0003-1		1	195	1
		1	195	1
273T0004-1		1	245	1
273T0005-1		1	185	1
273T0007-1		1	230	3
273T0008-1		1	265	1
273T0009-1		1	275	1
273T0010-1		1	270	1
273T0012-1		1	280	1
273T0016-1		1	40	1
273T0050-3		1	20	1
273T0062-1		1	85A	8
273T0065-1		1	80A	1
273T0065-2		1	100A	1
273T4110-3		1	1A	
273T4110-4		1	1B	RF
273T4110-6		1	1C	RF
273T4110-8		1	1D	RF
273T4112-1		1	1	
273T4112-2		1	3	
273T4112-3		1	3A	1
273T4112-4		1	3B	1
273T4112-5		1	3C	1
273T4113-1		1	130	1
273T4114-1		1	285	1
273T4115-1		1	320	1
273T4116-1		1	190	1
273T4116-3		1	190A	1
273T4117-1		1	80	1
273T4117-2		1	100	1
273T4118-1		1	255	1
273T4118-2		1	255A	1
6F2484-1		1	45A	
6F2484-7		1	45	
6F3180		1	72	
6F3200		1	45B	1
65B01567-1		1	140	1
66-12156-25		1	200	1
		1	200	1
66-12156-32		1	155	2

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
69B80041-1		1	160	1
69B80042-1		1	170	2
69B80043-1		1	165	4
69B80044-1		1	175	1
7427MT952-4780		1	250	1
9R3212		1	335	1



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

T64467



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

T64871

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1	273T4112-1		DELETED		
-1A	273T4110-3		DELETED		
-1B	273T4110-4		ACTUATOR ASSY-NLG RETRACT	A	RF
-1C	273T4110-6		ACTUATOR ASSY-NLG RETRACT	B	RF
-1D	273T4110-8		ACTUATOR ASSY-NLG RETRACT	C	RF
3	273T4112-2		DELETED		
3A	273T4112-3		.ACTUATOR ASSY (OPT)	A	1
-3B	273T4112-4		.ACTUATOR ASSY	AB	1
-3C	273T4112-5		.ACTUATOR ASSY	C	1
5	BAC27THY2		..MARKER-(UP)		1
10	BAC27THY3		..MARKER-(DN)		1
15	BAC27THY0044		..NAMEPLATE		1
20	273T0050-3		..STRAP		1
25	270T0002-136		..BEARING-SPLIT (MATCHED SET)		2
30	MS15004-1		..FITTING		2
35	MS16624-4400		..RING (OPT ITEM 35A)		1
-35A	MS16624-1400		..RING (OPT ITEM 35)		1
40	273T0016-1		..RACE-BRG		1
45	6F2484-7		DELETED		
45A	6F2484-1		DELETED		
45B	6F3200		..RESTRICTOR - TWO WAY (V99240)		1
55	BACR12BM113		..RING		2
60	NAS1611-113		..PACKING (USED ON ITEMS 3A,3B)		1
-60A	NAS1611-113A		..PACKING (USED ON ITEM 3C)		1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
65	BACR12BM116		..RING		2
70	NAS1611-116		..PACKING		1
			(USED ON ITEMS 3A,3B)		
-70A	NAS1611-116A		..PACKING		1
			(USED ON ITEM 3C)		
72	6F3180		DELETED		
-72A	FCLX0501550A		DELETED		
74	C11236-111B		DELETED		
75	NAS1611-111		DELETED		
77	NAS1612-8		DELETED		
80	273T4117-1		..END ASSY-HEAD		1
			(OPT ITEM 80A)		
-80A	273T0065-1		..END ASSY-HEAD		1
			(OPT ITEM 80)		
			ATTACHING PARTS		
85	BACB30LE8H30		..BOLT		8
			(OPT ITEM 85A)		
-85A	273T0062-1		..BOLT		8
			(OPT ITEM 85)		
90	MS20002C8		..WASHER		8
			(USED WITH ITEM 85)		
90A	MS20002C8		..WASHER		16
			(USED WITH ITEM 85A)		
			-------*-------		
95	MS21209F4-15		...INSERT		1
100	273T4117-2		...END-HEAD		1
			(USED ON ITEM 80)		
-100A	273T0065-2		...END-HEAD		1
			(USED ON ITEM 80A)		
105	BACR12BM427		..RING		2

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
110	NAS1611-427		..PACKING (USED ON ITEMS 3A,3B)		1
-110A	NAS1611-427A		..PACKING (USED ON ITEM 3C)		1
115	273T0001-1		..TUBE		1
120	BACR12BM113		..RING		4
125	NAS1611-113		..PACKING (USED ON ITEMS 3A,3B)		2
-125A	NAS1611-427A		..PACKING (USED ON ITEM 3C)		1
130	273T4113-1		..VALVE ASSY		1
135	273T0002-1		...SLIDE-SNUBBER (MATCHED SET)		1
140	65B01567-1		...SLEEVE-(MATCHED SET)		1
145	BACR12BM213		..RING		2
150	NAS1611-213		..PACKING (USED ON ITEMS 3A,3B)		1
-150A	NAS1611-213A		..PACKING (USED ON ITEM 3C)		1
155	66-12156-32		..WASHER-LOCK		2
160	69B80041-1		..NUT-SNUBBER		1
165	69B80043-1		..GUIDE		4
170	69B80042-1		..RETAINER		2
175	69B80044-1		..SPRING		1
180	BACR12BM335		..RING		1
185	273T0005-1		..GUIDE		1
190	273T4116-1		..ROD END- (OPT ITEM 190A)		1
-190A	273T4116-3		..ROD END- (OPT ITEM 190)		1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
195	273T0003-1		..NUT-SEAL		1
200	66-12156-25		..WASHER-LOCK		1
205	BACS34A33		..SEAL		1
210	MS20253P3-075		..PIN		1
215	69B80032-1		..BUSHING		1
220	S3355-341H99		DELETED		
220A	S33555-341H99		..SEAL-HAT (V97820)		1
230	273T0007-1		..RING-SHEAR		3
235	BACR12BM427		..RING		2
240	NAS1611-427		..PACKING (USED ON ITEMS 3A,3B)		1
-240A	NAS1611-427A		..PACKING (USED ON ITEM 3C)		1
245	273T0004-1		..CAP-END		1
250	7427MT952-4780		..SEAL- (V5F573)		1
255	273T4118-1		..PISTON (USED ON ITEM 3A)		1
-255A	273T4118-2		..PISTON (USED ON ITEMS 3B,3C)		1
260	BACR15BB3A7		..RIVET (USED ON ITEM 3)		1
-260A	BACR15BB3A7C		..RIVET (USED ON ITEMS 3B,3C)		1
265	273T0008-1		..COLLAR ASSY		1
270	273T0010-1		...NUT		1
275	273T0009-1		...COLLAR		1
280	273T0012-1		..RING		1
285	273T4114-1		..FITTING ATTACHING PARTS		1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
300	NAS1351C4H10		..SCREW		4
305	AN960C416L		..WASHER		4
			-------*-------		
310	BACR12BM113		..RING		2
315	NAS1611-113		..PACKING		1
			(USED ON ITEMS 3A,3B)		
-315A	NAS1611-113A		..PACKING		1
			(USED ON ITEM 3C)		
320	273T4115-1		..CYLINDER		1
325	BACU24K8		.UNION	A	1
-325A	MS21902-8T		.UNION	BC	1
330	NAS1612-8		.PACKING	AB	1
-330A	NAS1612-8A		.PACKING	C	1
335	9R3212		.RESTRICTOR		1
			(V99240)		
			(OPT ITEM 335A)		
-335A	JEHX0502600A		.RESTRICTOR		1
			(V92555)		
			(OPT ITEM 335)		
340	NAS1612-10		.PACKING	A	1
-340A	NAS1612-10A		.PACKING	BC	1