COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

THRUST REVERSER NON-LOCKING ACTUATOR ASSEMBLY

PART NUMBER 315A1800–4, –5, –6, –7, 315N3800–1

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COMPONENT MAINTENANCE MANUAL

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To: All holders of THRUST REVERSER NON-LOCKING ACTUATOR ASSEMBLY 78-31-05.

Attached is the current revision to this COMPONENT MAINTENANCE MANUAL

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Location of Change	Description of Change
78-31-05	
ILLUSTRATED PARTS LIST	Added I/W data to IPL.

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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
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		PRR 33962	MAR 05/86
		PRR N53102	JAN 10/85
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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.

DESCRIPTION AND OPERATION

1. Description

A. The non-locking actuator is a hydraulic, linear motion operation device consisting of a housing and attached cylinder with the following major components.

(1) A piston, with a head-end surface area of 0.98 sq-in and rod-end surface area 0.54 sq-in.

(2) A threaded (Acme) lead screw and nut. The lead screw rotates thru the nut fastened at the head end of the piston. An integral shaft at the head end of the lead screw mounts in two anti-friction bearings. The other end of the lead screw has an aluminum-nickel-bronze guide attached which rotates against the inside diameter of the piston. This maintains the 22-inch free end of the lead screw concentric with the piston, and allows the piston to move axially independently of the fixed-position lead screw.

(3) A worm wheel, mounted at the end of the lead screw.

(4) A bearing-mounted worm gear shaft, positioned perpendicular to the axis of the lead screw and worm wheel. The ends of the shafts are splined for attachment of flexible shafts.

2. Operation

A. Hydraulic pressure applied to the EXTEND port is directed to both the piston head and rod-end. The piston extends due to pressure on the differential surface areas.

B. Movement of the piston causes the lead screw to turn by the forces reacting thru the lead screw nut. This rotates the worm wheel and turns the mounting worm gear shaft. In system operation, the worm gear shaft is attached to other actuators by flexshafts for synchronized operation. The flexshafts are enclosed in rigid hydraulic supply tubes, which transmit hydraulic pressure. The actuator is held in the locked position by the locking actuator and flex shafts.

C. As the actuator extends and nears the end of stroke, an internal hydraulic snubber restricts fluid flow out of the rod end and stops piston movement within the last 1.5 inches. Snubbing is not required for retraction since the actuator is not subjected to external loads and the retract velocity is lower.

3. Leading Particulars (Approximate)

A. Length – 32 inches (Retracted)

B. Width – 6 inches

C. Height – 4 inches

D. Weight – 18 pounds

TESTING AND FAULT ISOLATION

1. General

A. This procedure has the data necessary to do a test of the mechanism after an overhaul or for fault isolation.

B. Refer to IPL Figure 1 for item numbers.

2. Testing

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
COM-5782	Oscilloscope (Part #: TDS-220, Supplier: 80009)
SPL-5349	X-Y Recorder/Plotter (Part #: 925E, Supplier: 60795)
SPL-5359	Test Fixture - Rod End and Stroke Stop, Locking and Non-Locking Thrust Reverser Actuator (Part #: B78014-37, Supplier: 81205) (Opt Part #: B78014-29, Supplier: 81205)
SPL-6280	Test Equipment - Velocity/Position Transducer (Part #: B20005-82, Supplier: 81205) (Opt Part #: B20005-75, Supplier: 81205)
SPL-6281	Stand - Test, Functional (Part #: B78010-28, Supplier: 81205)
SPL-6373	Transducer Assembly - Velocity/Position (Part #: B20005-41, Supplier: 81205)
SPL-7292	Adapter - Worm Gear Shaft (B78016-9 is included in B78016-1) (Part #: B78016-9, Supplier: 81205)
SPL-8238	Test Equipment - Velocity/Position Transducer (Part #: B20005-52, Supplier: 81205)
STD-1238	Indicator - Dial

B. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00153	Fluid - Hydraulic, Erosion Arresting, Fire Resistant	BMS3-11 Type IV (interchange˜able & intermixable with Type V)

C. References

Reference	Title
SOPM 20-60-03	LUBRICANTS

D. Length Check

NOTE: This check is not required if the extended and retracted length has been adjusted and verified during assembly before testing.

(1) Mount unit in rod end and stroke stop test fixture, SPL-5359. Pull out on rod end to fully extend piston against internal stop. Secure rod end in fixture clevis with fixture pin.

(2) Perform check per ASSEMBLY, Paragraph 4.D.(5)(j) , ASSEMBLY, Paragraph 4.D.(5)(k), ASSEMBLY, Paragraph 4.D.(5)(l) and ASSEMBLY, Paragraph 4.D.(5)(q) and verify that extended length is 43.235-43.335 inches and retracted length is 23.495-23.505 inches.

E. Preparation for Test

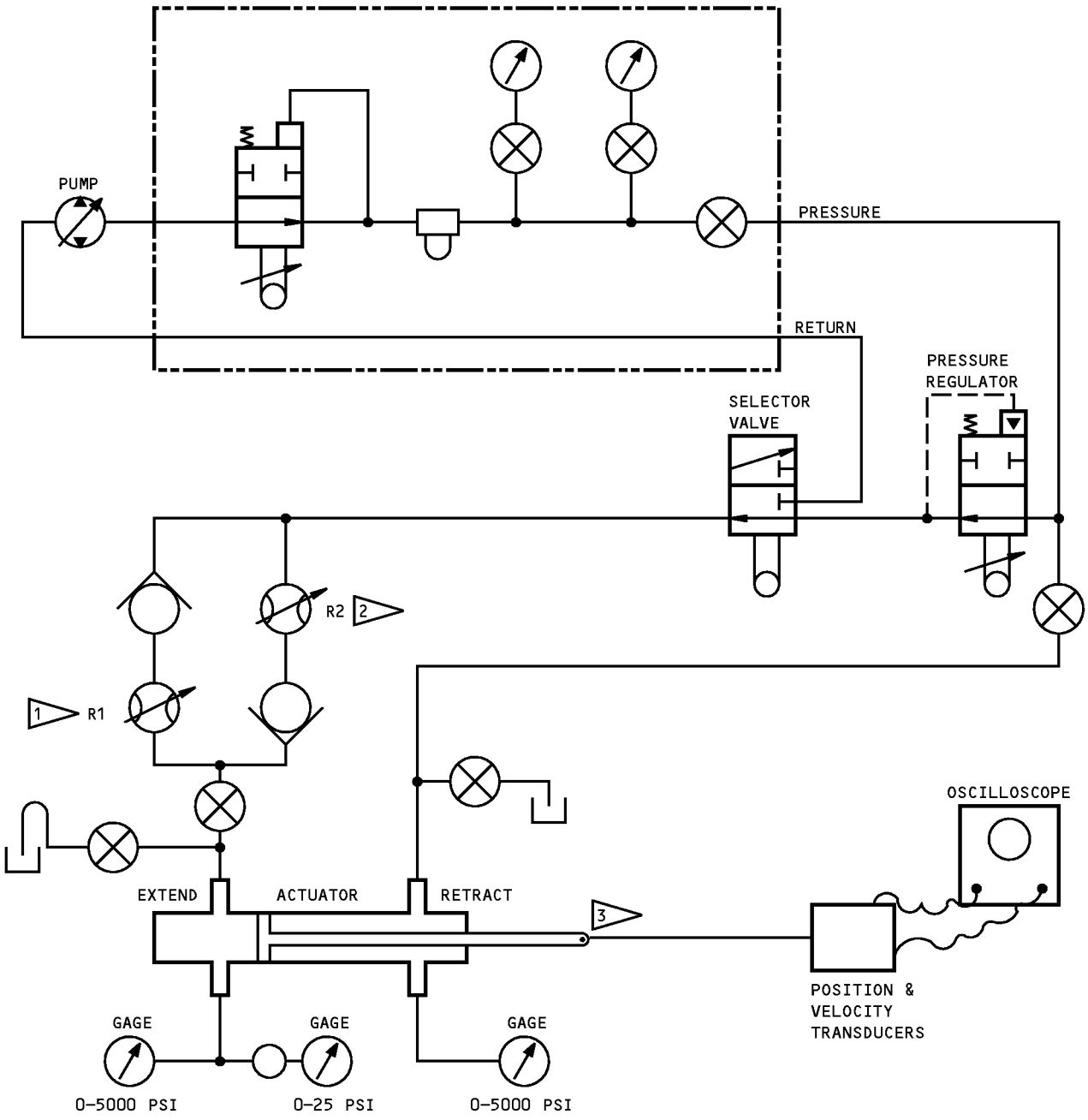
CAUTION: DO NOT ROTATE PISTON ROD AT ANY TIME. ROTATION FROM ORIGINAL SETTING WILL CHANGE CRITICAL LINEAR ADJUSTMENTS.

NOTE: Use a hydraulic test stand capable of supplying hydraulic fluid at a variable pressure of 0-4500psi and at a temperature of 60-140°F.

NOTE: For lubricants, refer toSOPM 20-60-03.

(1) Install actuator in test fixture test fixture, SPL-6281. Connect lines per TESTING AND FAULT ISOLATION, Figure 101.

(2) Fill actuator with fluid, D00153. Apply 1500 psi pressure to RET and EXT ports and cycle unit slowly until air is removed.



1 RESTRICTOR R1 LIMITS EXTEND VELOCITY TO 11-12 IN/SEC WITH SELECTOR VALVE OPEN

2 RESTRICTOR R2 LIMITS RETRACT VELOCITY TO 3-12 IN/SEC WITH SELECTOR VALVE CLOSED

CAUTION: DO NOT EXCEED 12 IN/SEC RETRACT VELOCITY UNDER ANY CONDITION

3 DURING ALL TESTS MAKE SURE THAT PISTON ROD END DOES NOT ROTATE DURING ACTUATOR OPERATION

Schematic Diagram
Figure 101

F. Proof Pressure Test

WARNING: DO NOT APPLY AIR PRESSURE TO ANY PORTS, OR DAMAGE TO THE ACTUATOR AND INJURY TO PERSONNEL CAN OCCUR.

CAUTION: DO NOT ROTATE PISTON ROD AT ANY TIME. ENSURE THAT ACTUATOR PISTON IS COMPLETELY RETRACTED OR EXTENDED IN THE PROPER DIRECTION BEFORE HIGH PRESSURE FLUID IS APPLIED, OR DAMAGE TO ACTUATOR MAY OCCUR.

CAUTION: DO NOT EXTEND OR RETRACT PISTON AT PROOF PRESSURE, OR DAMAGE TO ACTUATOR MAY OCCUR.

(1) Using worm gear shaft adapter, SPL-7292, rotate worm gear shaft and manually retract piston. Close or plug ports not used.

(2) Gradually apply 4500 psi pressure to RET port and hold for 2 minutes. Reduce pressure to 5 psi and hold for 2 minutes. Check that there is no external leakage, permanent deformation, or loosening of parts.

(3) Reduce pressure to zero. Manually extend piston. Remove adapter.

(4) Repeat TESTING AND FAULT ISOLATION, Paragraph 2.F.(2), except apply pressure to RET and EXT ports.

G. Operation/Leakage

(1) Plug or close unused ports. Retract and extend actuator for 25 full stroke cycles with pressure increasing to 3000 psi at fully retracted and fully extended positions.

(2) Check that there is no binding or external leakage, except one drop per 25 cycles is acceptable at dynamic seal (200).

H. Internal Leakage

(1) Plug or close unused ports, except leave one EXT port open.

(2) Apply 3000 psi pressure at RET port and hold for 5 minutes. Check that internal leakage does not exceed 5 cc/min during the last minute. No external leakage is acceptable.

I. Friction Test

(1) Apply and maintain 3000 psi pressure at RET port for stepsTESTING AND FAULT ISOLATION, Paragraph 2.F.(2) and TESTING AND FAULT ISOLATION, Paragraph 2.F.(3). Extend and retract actuator piston by increasing/decreasing pressure at EXT port.

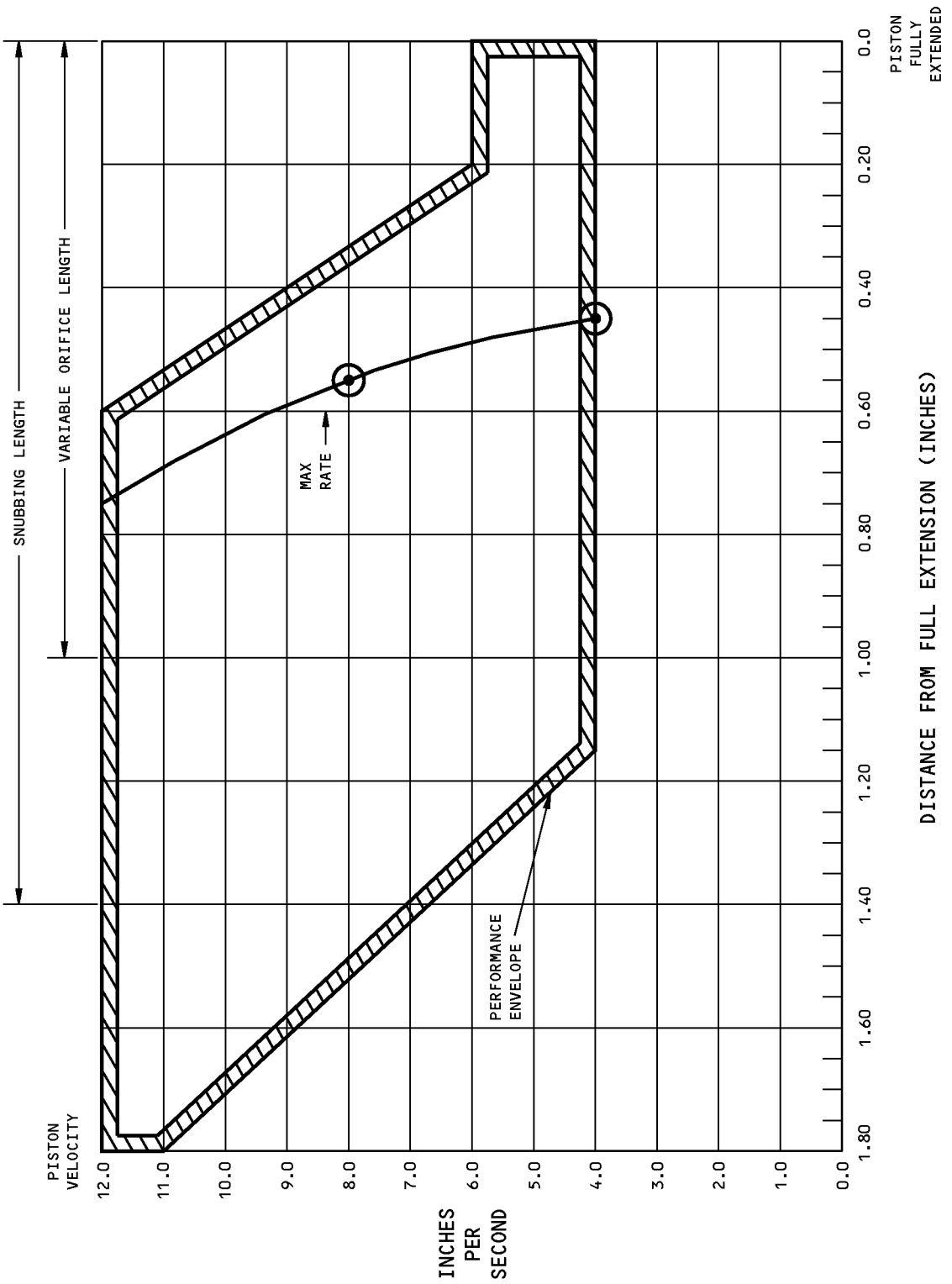
(2) Apply enough pressure to extend piston approximately two inches, decrease pressure to stop movement, then slowly increase pressure again to extend piston another two inches. Repeat this procedure four more times for full travel of piston (approximately 20 inches). Pressure at EXT port required to extend piston at any two-inch increment shall not exceed 1800 psi.

(3) Repeat step TESTING AND FAULT ISOLATION, Paragraph 2.F.(2), except reduce pressure to retract piston and increase pressure to stop movement. Pressure at EXT port required to retract piston shall not be less than 1500 psi.

J. Snubbing Test

(1) Install transducer assembly, SPL-6373 on test fixture, SPL-6281. Connect transducer assembly, SPL-6373 to piston rod end. Connect the transducer assembly, SPL-6373 to the B20005-51 or test equipment, SPL-8238 test equipment. Connect transducer, SPL-6280 or test equipment, SPL-8238 test equipment to and X-Y recorder/plotter, SPL-5349 or an oscilloscope, COM-5782 to record piston velocity and position.

(2) With piston fully retracted, apply 3000 psi to EXT and RET ports to extend piston at a rate of 11-12 inches/second, and check velocity versus position during the last 1.8 inches of travel. Velocity/ stroke shall be within limits shown in TESTING AND FAULT ISOLATION, Figure 102.



Snubbing Test
Figure 102

K. Synchronous Drive Backlash Check

(1) Position actuator piston approximately at mid-stroke. Connect worm gear shaft adapter, SPL-7292 to shaft.

(2) Mount dial indicator, STD-1238 on test fixture, SPL-6281 to measure movement of piston.

(3) Turn worm gear shaft in both directions to extend and retract piston. Check that rotation angle of shaft does not exceed 35 degrees for piston movement of ±0.001 inch.

L. Static Friction Check

(1) With RET and EXT ports open to atmosphere, no pressure applied, and piston fully retracted, apply a tension force to rod end and check that piston extends 0.75 inch or more at a force not exceeding 35 lb.

M. Remove Actuator from Fixture

(1) Disconnect hydraulic lines and remove actuator from test fixture, SPL-6281. Partially drain hydraulic fluid from actuator. Seal open ports with MS21914 caps or polypropylene caps and gaskets.

3. Troubleshooting

A. Refer to TESTING AND FAULT ISOLATION, Table 101 for probable cause of indicated problems and corrective procedures.

Table 101: Trouble Shooting Chart

TROUBLE	PROBABLE CAUSE	CORRECTION
Proof Pressure Test		
External leakage At piston rod end	Defective gland nut (175), bearing (195), hat seal (200), foot seal (201), O-rings (215,225), retainers (210,270)	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.B.
At cylinder housing	Defective O-ring (310), backup rings (305)	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.B.
At tube ends	Defective union (70), O-rings (130), backup ring s (125), tube (95)	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.C.
Operation/ Leakage Test		
External leakage exceeds one drop in 25 cycles	Defective seals (320,325) (Refer to Proof Pressure Test preceding)	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.B.
Internal Leakage Test		
Internal leakage exceeds 5cc/min.	Defective piston seal and rings (320,325)	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.B.
Friction Test		
Pressure to extend exceeds 1900 psi	Worm wheel (265B) worm gear shaft (55A), bearings (295A) binding. Lead screw/lead screw nut (355A,365A) thread binding	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.D.
Pressure to retract less than 1500 psi	Worm wheel (265B), worm wheel bearings (295A) worn	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.D.
Snubbing Test		

Table 101: Trouble Shooting Chart (Continued)

TROUBLE	PROBABLE CAUSE	CORRECTION
Piston snubs too rapidly or too slowly	Defective snubber rings (230A,233) or stop (235)	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.E.
Synchronous Drive Backlash Check		
Rotation of shaft exceeds 35 degrees for piston movement of ± 0.001 inch	Worn worm wheel/worm gear shaft (55A,265B). Worn lead screw/lead screw nut (355A, 365A).	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.D.
Static Friction Check		
Force to extend piston exceeds 35 lb.	(Refer to Friction Test)	Replace parts per TESTING AND FAULT ISOLATION, Paragraph 4.D.

4. Corrective Procedures

NOTE: Many parts of the actuator are selected and adjusted after dimensional measurements during original assembly. Corrective procedures will be simplified if such parts are identified and segregated, if not replaced.

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-6255	Wrench (B78008-7 is included in B78008-19) (Part #: B78008-7, Supplier: 81205)

B. Piston/Cylinder Seal replacement

(1) Ensure that piston is fully retracted. Pry out indents of lockwasher (155). Hold stop (160) with wrench, SPL-6255 and unscrew nut toward rod end. Slide stop back and remove key (165).

(2) Unscrew rod end and remove stop, lockwasher, and nut. Remove O-rings and backup rings (185, 190).

(3) Loosen tube coupling nut (105A).

(4) Remove parts per DISASSEMBLY, Paragraph 4.B.(5), DISASSEMBLY, Paragraph 4.B.(6), and DISASSEMBLY, Paragraph 4.B.(7).

(5) Replace seal parts (200, 201, 210, 215, 220, 225, 305, 310, 320, 325); install per ASSEMBLY, Paragraph 4.D.(3)(b) thru ASSEMBLY, Paragraph 4.D.(3)(j). Ensure end of tube (95D) aligns with union (70) in housing.

(6) Tighten coupling nut (105A) to 133-147 lb-in.

(7) Install and check parts per ASSEMBLY, Paragraph 4.D.(5)(c), ASSEMBLY, Paragraph 4.D.(5)(i), ASSEMBLY, Paragraph 4.D.(5)(k), ASSEMBLY, Paragraph 4.D.(5)(l) , and ASSEMBLY, Paragraph 4.D.(5)(q).

C. Transfer tube (95D) seal replacement

(1) Cut and remove ties (80) from around spacers (375). Loosen nut (105) at tube coupling. Rotate tube to clear housing.

(2) Remove union (70) and O-ring (75). Slide tube out of cylinder port and remove O-rings and backup rings (130, 125).

(3) Replace parts and install per ASSEMBLY, Paragraph 4.D.(5)(a) and ASSEMBLY, Paragraph 4.D.(5)(b).

D. Worm wheel (265B), bearings (295A) lead screw/nut (355A, 365A) piston (360A), worm gear shaft (55A).

(1) A complete disassembly and assembly is required.

E. Snubber rings (230A, 233), stop (235) replacement

(1) Disassemble and assemble parts per preceding steps TESTING AND FAULT ISOLATION, Paragraph 4.B.(1) thru TESTING AND FAULT ISOLATION, Paragraph 4.B.(7)) except additionally replace rings and stop.

DISASSEMBLY

1. **General**
   A. This procedure has the data to disassemble the thrust reverser non-locking actuator assembly.
   B. Refer to TESTING AND FAULT ISOLATION to establish condition or probable cause of any malfunction and to determine extent of disassembly and repair.
   C. Refer to IPL Figure 1 for item numbers.
2. **Equipment**
   A. Bearing Instl Tool - cap, SPL-6274 B78016-3, plate, SPL-7299 Worm Gear
3. **Parts Replacement**

   NOTE: The following listed parts are recommended for replacement. Actual replacement may be based on in-service experience.

   A. O-rings, seals, seal rings (15, 65, 75, 125, 130, 180, 185, 190, 200, 201, 210, 215, 220, 225, 305, 310, 320, 325)
   B. Lockwasher (155), retaining ring (317, 340), pin (345)
   C. Guide (350)
   D. Snubber rings (230A, 233)
4. **Disassembly**

   NOTE: Many parts of the actuator are selected and adjusted to obtain specified dimensional and functional requirements. If the unit is only partially disassembled to replace parts in segregated places, parts which are not replaced should be noted accordingly to reduce the extent of procedures required for reassembly.

   A. Tools/Equipment

      NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-6255	Wrench (B78008-7 is included in B78008-19) (Part #: B78008-7, Supplier: 81205)
SPL-6256	Wrench (B78008-6 included in Kit B78008-19) (Part #: B78008-6, Supplier: 81205)
SPL-6257	Wrench (B78008-5 is included in B78008-19) (Part #: B78008-5, Supplier: 81205)
SPL-6283	Equipment - Bearing Installation, Lead Screw (Part #: B78017-1, Supplier: 81205)
SPL-6284	Fixture - Torque, Locking and Non-Locking Thrust Reverser Acutator Assembly (Part #: B78011-25, Supplier: 81205)
SPL-8213	Spanner Wrench - Nut, Cylinder Locking Actuator (B78008-16 is included in B78008-19) (Part #: B78008-16, Supplier: 81205)

B. Procedure

(1) Pry out indents in flange of lockwasher (155). Hold flats of stop (160) with wrench , loosen nut (150) using wrench, (rod end nut) wrench, SPL-6255, and unscrew nut toward rod end. Slide stop back and remove key (165). Unscrew rod (135) from piston (360A) and remove stop (160) lockwasher (155), and nut (150). Remove O-rings and backup rings (185, 190).

(2) Cut and remove ties (80) from around spacers (375B). Loosen nut (105A) at tube coupling. Remove tube assembly (95D) from cylinder (380A) and spacers.

NOTE: Do not remove synthetic rubber spacers bonded to cylinder unless necessary for repair.

(3) Remove unions (60, 70) and O-rings (65, 75) from housing.

(4) Remove fitting (5A) and adapter screw (10A) from housing. Press out shaft (55) (towards adapter screw end) and remove sleeve (45), shims (20 thru 40), and shaft with bearing (50B). Remove bearing (50B) from shaft and other bearing (50B) from housing. Remove O-rings (15) from fitting (5A) and adapter screw (10A).

NOTE: If parts removed in DISASSEMBLY, Paragraph 4.B.(4) are not interchanged or replaced, assembly procedures will be simplified if parts are identified and segregated accordingly.

(5) Remove spacer (170) from gland nut (175). (Spacer is bonded inside gland nut.) Install unit in torque fixture, SPL-6284. Remove gland nut using wrench, SPL-6257. Remove scraper (180). Using adapter wrench, (cylinder nut) spanner wrench, SPL-8213, loosen cylinder nut (330). Remove unit from fixture.

(6) Remove cylinder nut (330). Slide cylinder outward from housing and free of lead screw and piston. Remove cylinder nut rings (335). Remove locating pin (300) from housing.

(7) Remove gland (205) and remove O-rings, backup rings, and retainers (225, 220, 215, 210). Remove hatseal (200), bearing (195), and snubber rings (230, 233) from gland. Remove stop (235) from cylinder.

(8) Remove assembled lead screw/piston from housing.

NOTE: If lead screw parts are not interchanged or replaced, assembly procedure will be simplified if parts are identified and segregated accordingly.

(a) Pry up retaining ring (340) and remove locking pin (315). Restrain piston (360A) and unscrew lead screw nut (365A) from piston using Wrench, (Lead Screw Nut) wrench (B78008-6), SPL-6256. Remove piston from lead screw and remove O-ring and retainers (320, 325).

(b) Remove retaining ring (340), pin (345), and guide (350) from end of lead screw. Unscrew nut (365A) from lead screw and remove retaining ring (340).

NOTE: Nut (365A) is part of piston assy (360A).

(9) Pry up deformed edges of lockwasher (250) at end of lead screw. Restrain lead screw with wrench across flats of shoulder and remove bolt (245). Remove lockwasher from lead screw.

(10) Using bearing tool, SPL-6283, remove bearing (255B) from lead screw.

(11) Remove worm wheel (265A), shims (270 thru 290) and key (260) from lead screw.

(12) Remove bearings (295A) from lead screw using bearing tool, SPL-6283.

NOTE: Bearings (295A) are a matched set.

(NOT APPLICABLE)

CHECK

1. General

A. This procedure has the data necessary to find defects in the material of the specified parts.

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. 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. Do the penetrant or magnetic particle check if the visual check shows possible damage or if you suspect possible damage on the parts listed below:

(a) Penetrant check fitting (5A), sleeve (45), quill (115C), tube (120C), rod end assembly ball (140), key (165), piston bearing (195), snubber ring (230A, 233), bolt (245), cup lockwasher (250), worm wheel (265B), pin (300, 315), retaining pin (345) and guide (350) in accordance with SOPM 20-20-02.

(b) Magnetic particle check

1) Magnetic particle check as specified in SOPM 20-20-01, Class A – retaining ring (317), lead screw nut (365A).

2) Magnetic particle check as specified in SOPM 20-20-01, Class B – worm gear shaft (55A), housing (240), cylinder nut ring (335), lead screw (355A).

3) Magnetic particle check as specified in SOPM 20-20-01, Class C – rod end assembly body (145), nut (150), cup lockwasher (155), stop (160, 235), gland nut (175), gland (205), cylinder nut (330), retaining ring (340), piston (370A), cylinder assembly (380A).

(2) Refer to FITS AND CLEARANCES section for allowable wear and rework information.

REPAIR

1. Content

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

Table 601:

P/N	NAME	REPAIR
315A1808	CYLINDER ASSEMBLY	1-1, 1-2
315A1810	HOUSING	2-1
315A1812	GLAND	3-1
315A1813	WORM WHEEL	4-1
315A1816	PISTON	5-1
315A1817	WORM GEAR SHAFT	6-1
315A1818	FITTING	7-1
315A1822	LEAD SCREW	8-1
315A1831	ROD END ASSEMBLY	9-1
315A1834	SLEEVE	10-1
315A1870	NUT	11-1
315A1891	STOP	12-1
315A1903	SCREW ADAPTER	13-1
315A1914	BOLT	14-1
- -	MISCELLANEOUS PARTS REFINISH	15-1
- -	EXTERNAL PARTS REPLACEMENT	16-1, 16-2
315N3832	ROD END ASSEMBLY	17-1

2. Standard Practices

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

(1) SOPM 20-10-01 Repair and Refinish of High Strength Steel Parts

(2) SOPM 20-10-03 Shot Peening

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

(4) SOPM 20-20-01 Magnetic Particle Inspection

(5) SOPM 20-30-02 Stripping of Protective Finishes

(6) SOPM 20-30-03 General Cleaning Procedures

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

(8) SOPM 20-41-02 Application of Chemical and Solvent Resistant Finishes

(9) SOPM 20-42-06 Silver Plating

(10) SOPM 20-43-01 Chromic Acid Anodizing

(11) SOPM 20-50-03 Bearing Installation and Retention

(12) SOPM 20-50-05 Installation of Aluminum Foil and Other Markers

(13) SOPM 20-50-12 Application of Adhesives

(14) SOPM 20-50-08 Application of Dry Film Lubricants

(15) SOPM 20-60-02 Finishing Materials

(16) SOPM 20-60-03 Lubricants

3. Materials

NOTE: Equivalent substitutes may be used.

A. Primer – primer, C00259 BMS 10-11 type 1

B. Enamel – coating, C50069 BMS 10-11 type 2, gloss white color 702

C. Dry Film Lube – dry film lubricant, D50107 Micro Seal 100-1

D. Dry Film Lube – Everlube 967 lubricant, D00543 Everlube 967

E. Topcoat, BMS 3-11 resistant – coating, B00571 Type 41

F. Grease – grease, D00015 BMS 3-24

G. Sealant – sealant, A00247 BMS 5-95

H. Adhesive:

- adhesive, A01070 – Type 38
- adhesive, A00273 – BMS 5-126

4. 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)
Ø	DIAMETER
S Ø	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 WHICH 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
TIR	TOTAL INDICATOR READING

EXAMPLES

[— | 0.002]	STRAIGHT WITHIN 0.002
[⊥ | 0.002 | B]	PERPENDICULAR TO B WITHIN 0.002
[// | 0.002 | A]	PARALLEL TO 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 PLANE A
[⌓ | 0.020 | A]	SURFACES MUST LIE WITHIN PARALLEL BOUNDARIES 0.02 INCH APART AND EQUALLY DISPOSED ABOUT TRUE PROFILE
[◎ Ø 0.0005 | C]	CONCENTRIC TO C WITHIN 0.0005 DIAMETER
[⌯ | 0.010 | A]	SYMMETRICAL WITH A WITHIN 0.010
[∠ | 0.005 | A]	ANGULAR TOLERANCE 0.005 WITH A
[⌖ Ø 0.002 Ⓢ | B]	LOCATED AT TRUE POSITION WITHIN 0.002 DIA RELATIVE TO DATUM B, REGARDLESS OF FEATURE SIZE
[⊥ Ø 0.010 Ⓜ | A] [0.510 Ⓟ]	AXIS IS TOTALLY WITHIN A CYLINDER OF 0.010-INCH DIAMETER, PERPENDICULAR TO, AND EXTENDING 0.510-INCH ABOVE, DATUM A, MAXIMUM MATERIAL CONDITION
[2.000] OR 2.000 BSC	THEORETICALLY EXACT DIMENSION IS 2.000

NOTE: DATUM MAY APPEAR AT EITHER SIDE OF TOLERANCE FRAME [0.020 | A] [A | 0.020]

True Position Dimensioning Symbols
Figure 601

CYLINDER ASSEMBLY - REPAIR 1-1

315A1808–3

1. General

A. This repair gives the data that is necessary to refinish the cylinder assembly.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

2. Bushing Replacement

A. Remove bushings.

B. Install new bushings using shrink-fit method per SOPM 20-50-03 with grease, D00015 on faying surfaces.

CYLINDER - REPAIR 1-2

315A1808–4

1. General

A. This repair gives the data that is necessary to refinish the cylinder assembly.

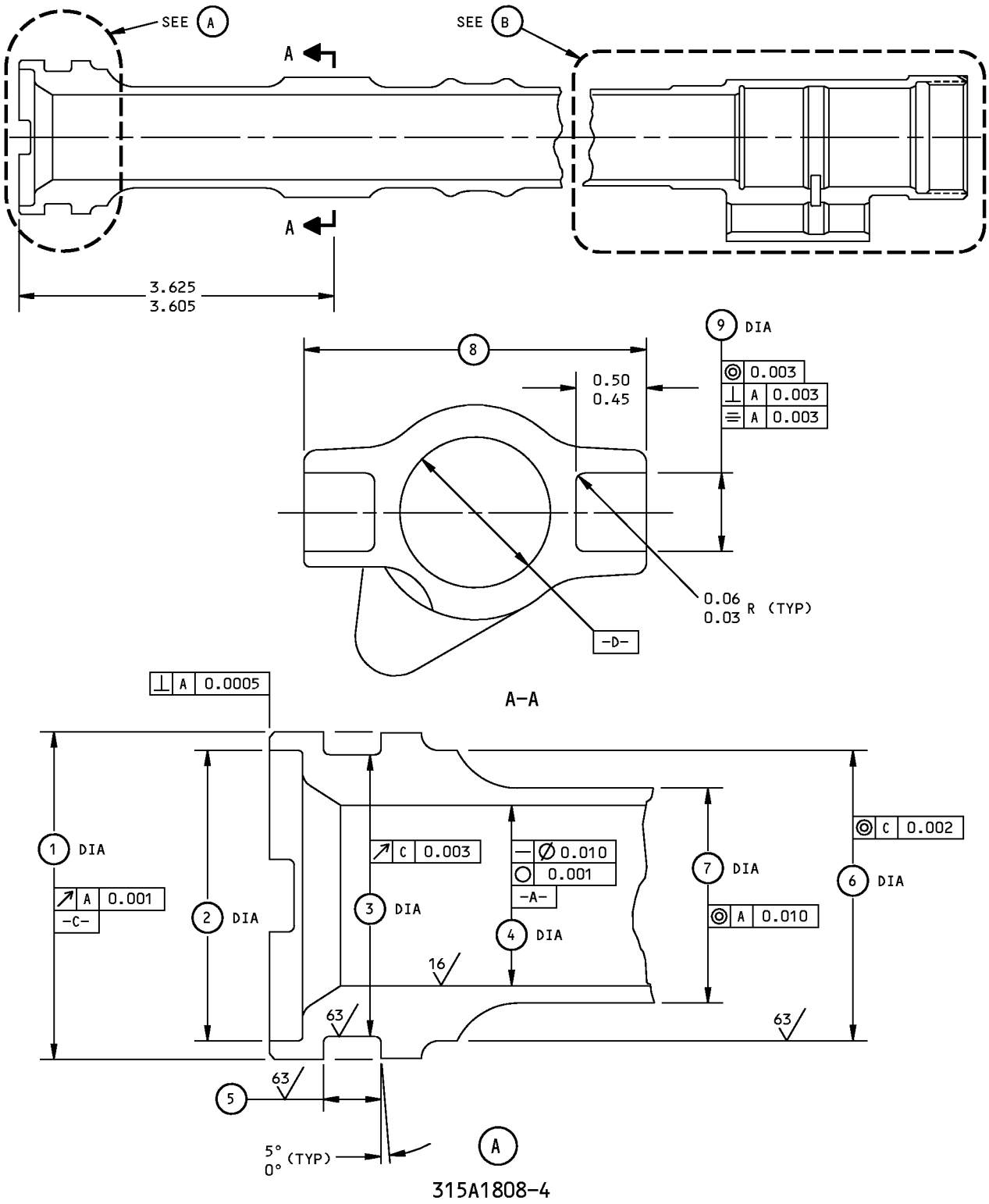
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

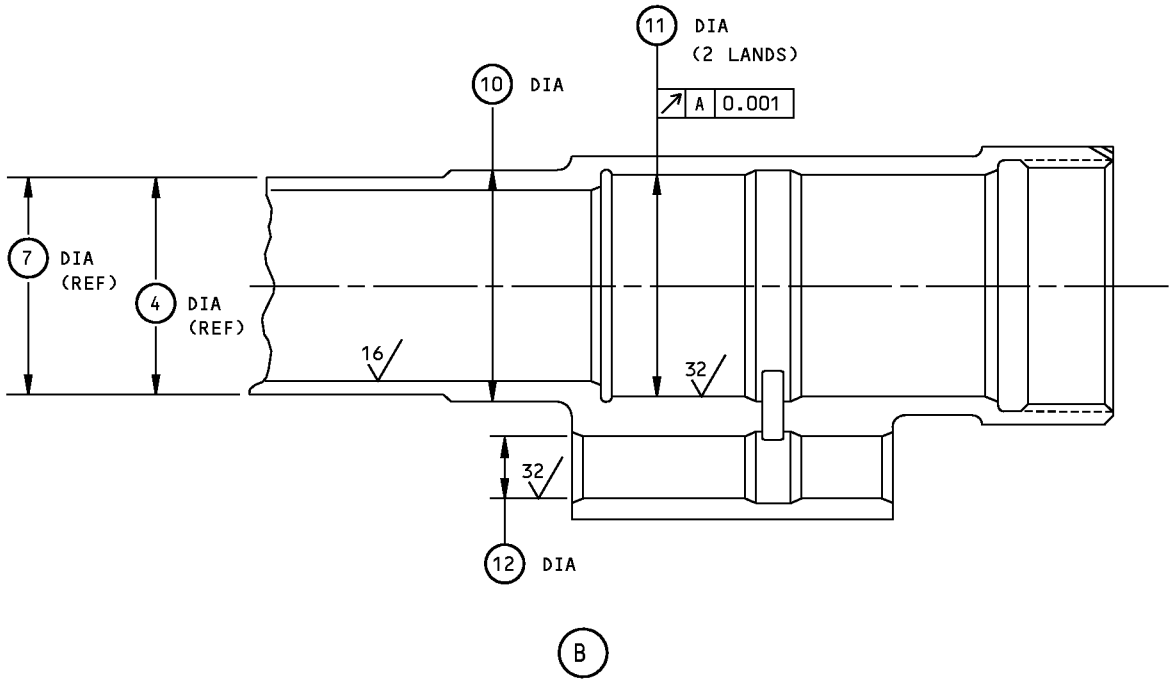
D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 1-2, Figure 601 for repair and refinish details.



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



	1	2	3	4	5	6	7	8	9	10	11	12
DESIGN DIM	1.864 1.863	1.660 1.640	1.624 1.622	1.118 1.116	0.314 0.304	1.670 1.660	1.273 1.268	2.386 2.376	0.5631 0.5625	1.315 1.310	1.305 1.303	0.361 0.360
REPAIR LIMIT	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

REFINISH

PASSIVATE (F-17.25) AND SOPM 20-30-03

REPAIR

125 MACHINE FINISH EXCEPT AS NOTED

MATERIAL: 15-5PH CRES, 150-170 KSI

ALL DIMENSIONS ARE IN INCHES

315A1808-4

Cylinder Repair and Refinish
Figure 601 (Sheet 2 of 2)

HOUSING - REPAIR 2-1

315A1810–1

1. General

A. This repair gives the data that is necessary to refinish the housing.

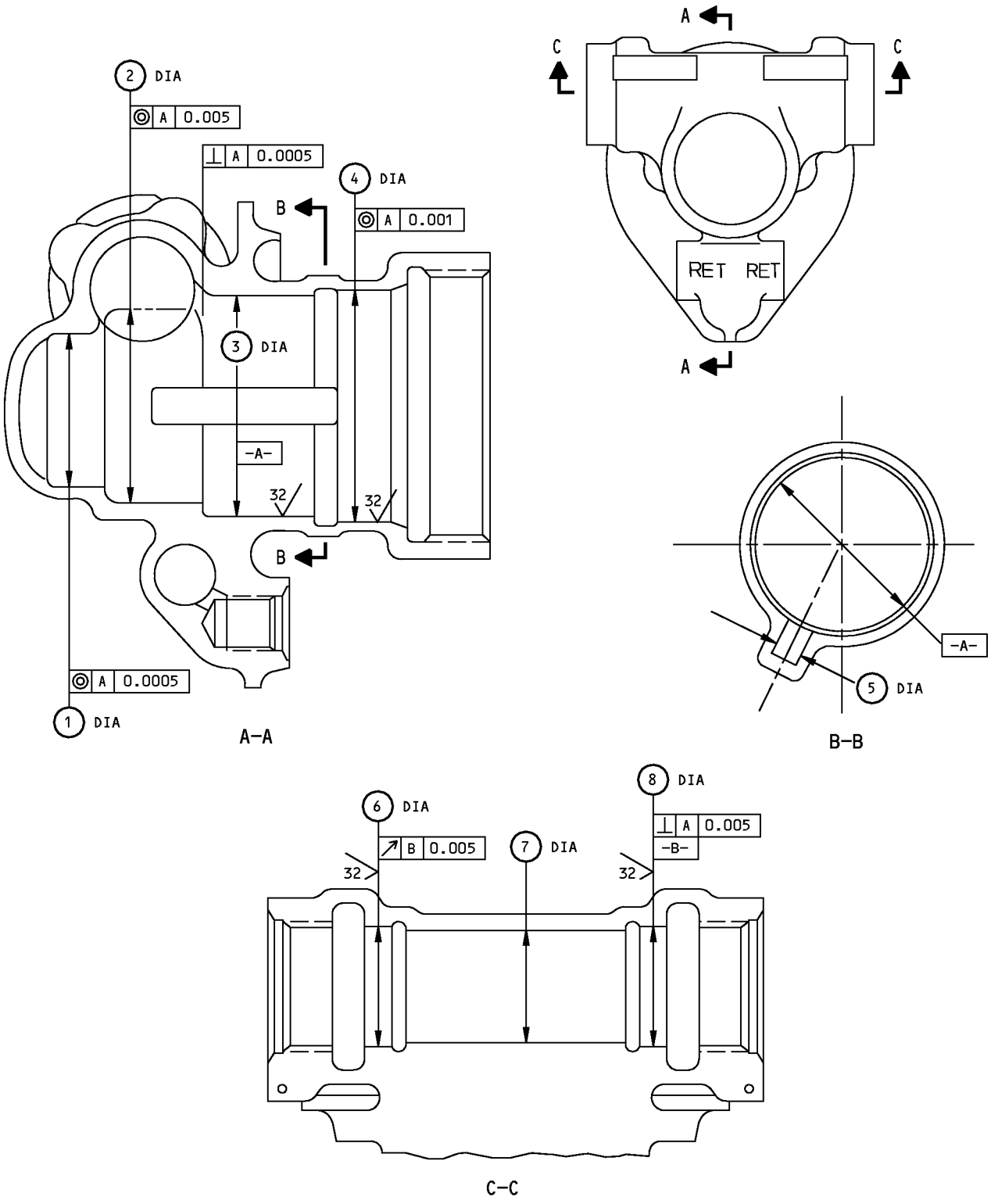
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 2-1, Figure 601 for repair and refinish details.



315A1810-1 Housing Repair and Refinish
Figure 601 (Sheet 1 of 2)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DESIGN DIM	1.2604 1.2598	1.660 1.650	1.8510 1.8504	1.869 1.867	0.257 0.254	0.9454 0.9449	0.885 0.875	0.9454 0.9449
REPAIR LIMIT	----	----	----	----	----	----	----	----

REFINISH

PASIVATE (F-17.09) ALL OVER

REPAIR

63 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: 15-5PH CRES

ALL DIMENSIONS ARE IN INCHES

315A1810-1 Housing Repair and Refinish
Figure 601 (Sheet 2 of 2)

GLAND - REPAIR 3-1

315A1812–1

1. General

A. This repair gives the data that is necessary to refinish the gland.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

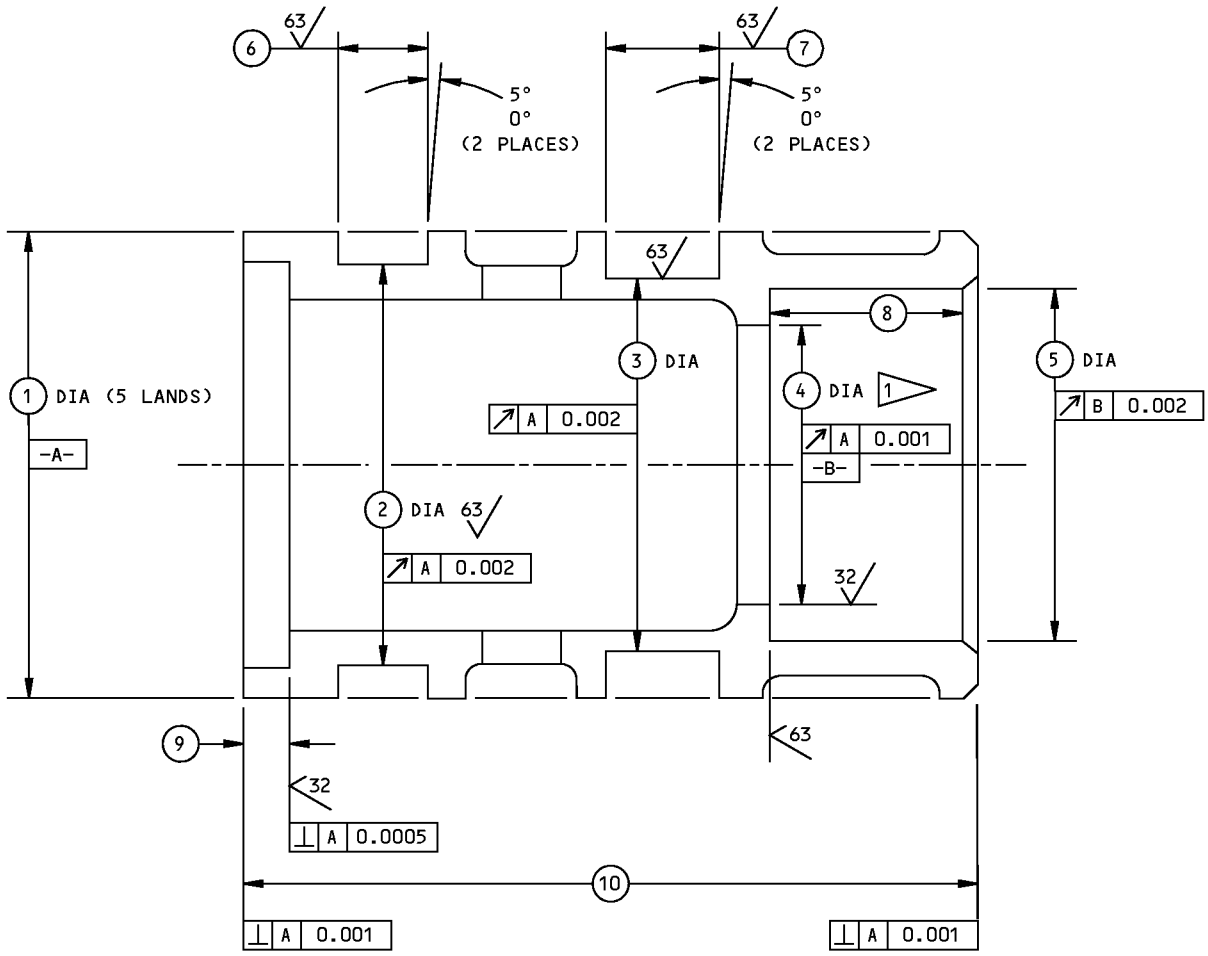
A. Refer to REPAIR 3-1, Figure 601 for repair and refinish details.

3. Diameter B

A. Refer to REPAIR 3-1, Figure 601

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

C. Chrome plate and grind to design dimensions and finish.



	1	2	3	4	5	6	7	8	9	10
DESIGN DIM	1.301 1.300	1.125 1.123	1.060 1.058	0.751 0.750	0.928 0.926	0.255 0.245	0.314 0.304	0.602 0.598	0.135 0.115	2.062 2.058
REPAIR LIMIT	---	---	---	0.780 2	---	---	---	---	---	---

REFINISH

PASSIVATE (F-17.09) ALL OVER

1 CHROME PLATE (F-15.03)

2 LIMIT FOR CHROME PLATE BUILD UP AND GRINDING TO DESIGN DIM & FINISH

REPAIR

REF 1 2

125 MACHINE FINISH EXCEPT AS NOTED

MATERIAL: 15-5PH CRES, 150-170 KSI

ALL DIMENSIONS ARE IN INCHES

315A1812-1 Gland Repair and Refinish
Figure 601

WORM WHEEL - REPAIR 4-1

315A1813–4

1. General

A. This repair gives the data that is necessary to refinish the worm wheel.

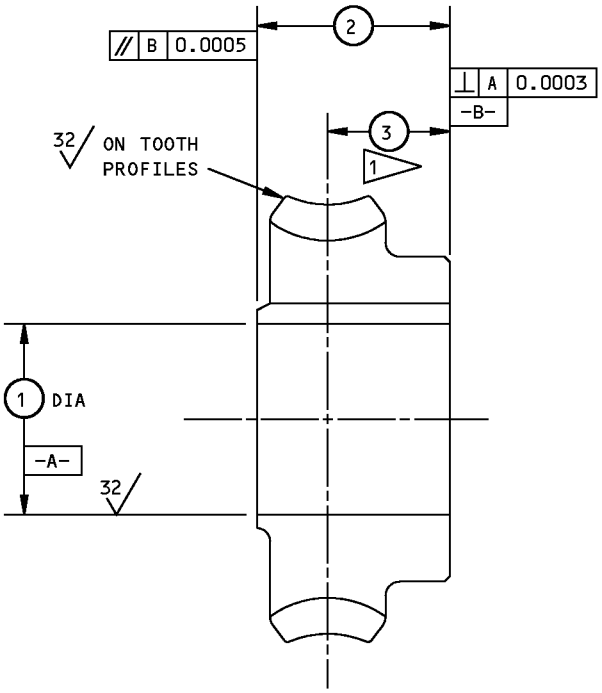
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 4-1, Figure 601 for repair and refinish details.



	1	2	3
DESIGN DIM	0.5912 0.5909	0.700 0.690	0.425 0.415 1
REPAIR LIMIT	—	—	—

REFINISH

NO FINISH

1 THIS DIM TO BE MARKED ON FACE, TO NEAREST 0.001 INCH, FOR USE DURING ASSEMBLY PROCEDURES

REPAIR

125 MACHINE FINISH EXCEPT AS NOTED

MATERIAL: AL-NI-BRZ PER AMS 4640

ALL DIMENSIONS ARE IN INCHES

315A1813-4

Worm Wheel Repair
Figure 601

PISTON - REPAIR 5-1

315A1816–2

1. General

A. This repair gives the data that is necessary to refinish the piston.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Plating Repair

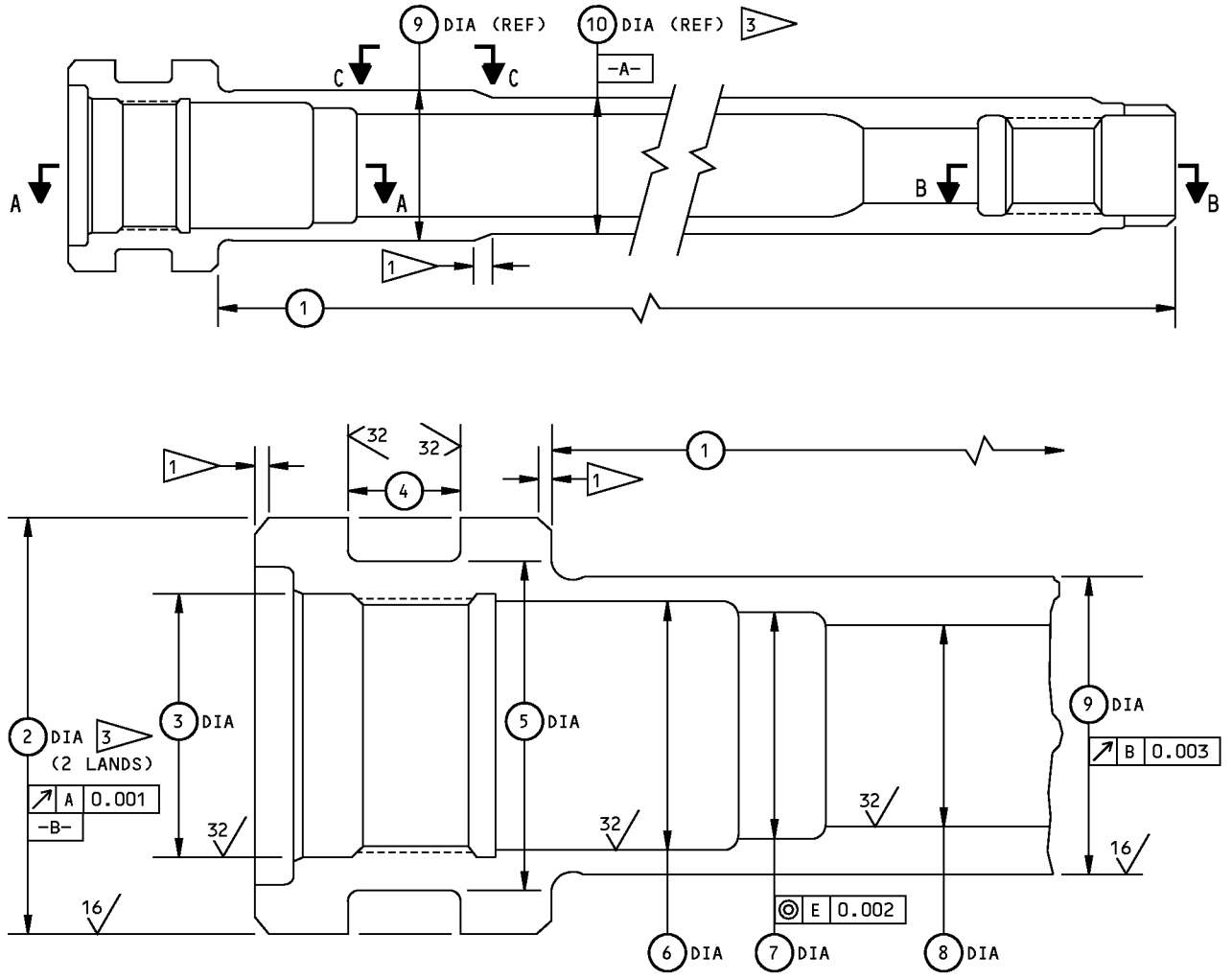
A. Refer to REPAIR 5-1, Figure 601 for repair and refinish details.

3. Repairable Piston Diameters

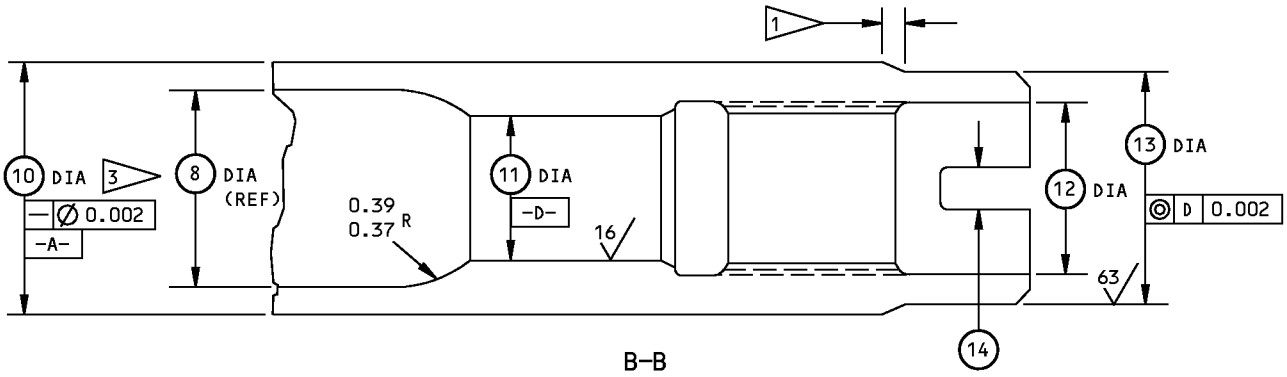
A. Refer to REPAIR 5-1, Figure 601 for repair and refinish details.

B. Machine repairable piston diameters as required, within repair limits to remove defects.

C. Shot-peen, chrome plate and grind to design dimensions and finish.

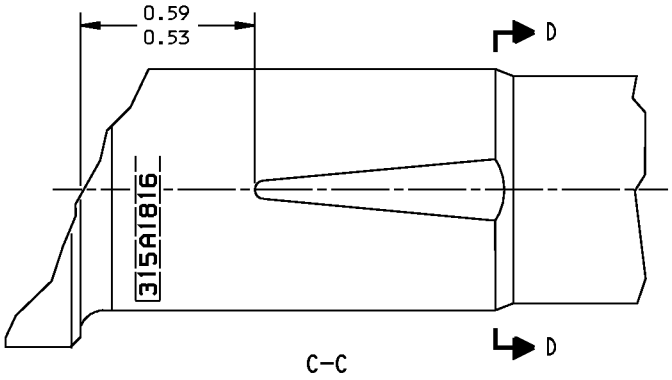


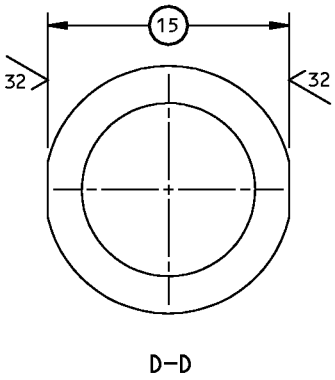
A–A



B–B

315A1816-2 Piston Repair and Refinish
Figure 601 (Sheet 1 of 2)





	1	2 ▷3	3	4	5	6	7	8	9
DESIGN DIM	23.807 23.797	1.114 1.113	0.700 0.698	0.314 0.304	0.873 0.871	0.652 0.642	0.619 0.617	0.560 0.557	0.801 0.799
REPAIR LIMIT	----	1.083 ▷2	----	----	----	----	----	----	----

	10 ▷3	11	12	13	14	15
DESIGN DIM	0.748 0.746	0.423 0.422	0.521 0.514	0.727 0.725	0.127 0.125	0.778 0.774
REPAIR LIMIT	0.738 ▷2	----	----	----	----	----

REFINISH

CHROME PLATE (F-15.03) DIAS -A-, -B-, 0.003-0.005 THICK. BAKE 12 HOURS AT 350-400°F. OBSERVE CHROME PLATE RUNOUT AS NOTED ▷1. PASSIVATE (F-17.09) ALL OTHER SURFACES

▷1 CHROME PLATE RUNOUT 0.10 MAX

▷2 LIMIT FOR CHROME PLATE BUILD UP AND GRINDING TO DESIGN DIMENSION AND FINISH

▷3 REPAIRABLE DIAMETER

REPAIR

REF ▷2

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

SHOT PEEN:
0.017-0.046 SHOT SIZE
0.008 A2 INTENSITY

MATERIAL: 15-5PH CRES, 150-170 KSI

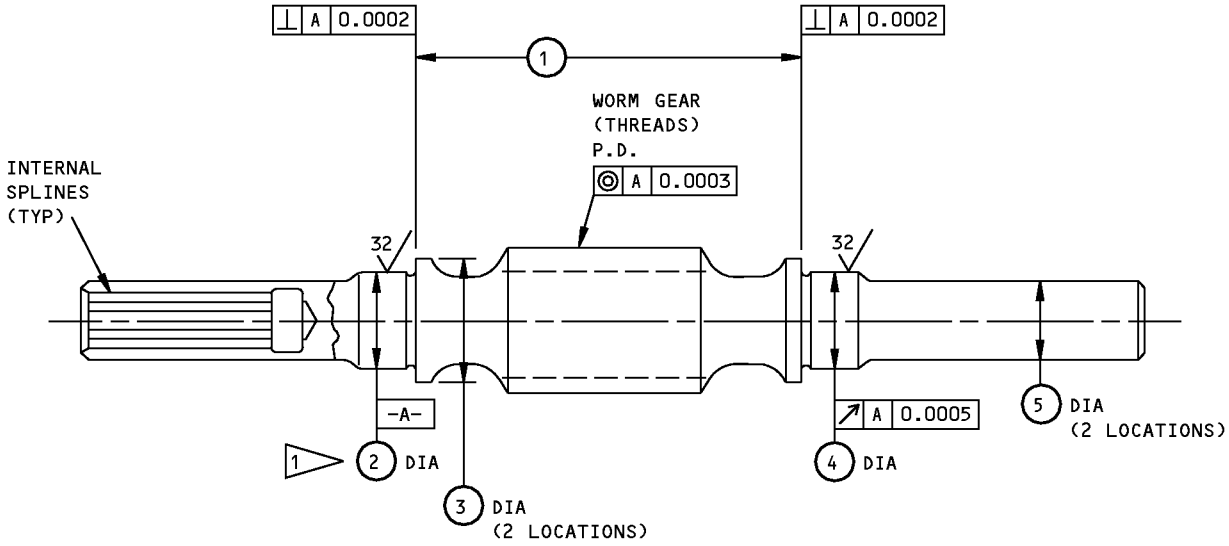
ALL DIMENSIONS ARE IN INCHES

315A1816-2 Piston Repair and Refinish
Figure 601 (Sheet 2 of 2)

WORM GEAR SHAFT - REPAIR 6-1

315A1817–2, –3

1. **General**
   A. This repair gives the data that is necessary to refinish the worm gear shaft.
   B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.
   C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.
   D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.
2. **Coating Repair**
   A. Refer to REPAIR 6-1, Figure 601 for repair and refinish details.
3. **Diameter A**
   A. Refer to REPAIR 6-1, Figure 601 for repair and refinish details.
   B. Machine, as required, within repair limits to remove defects.
   C. Chrome plate and grind to design dimensions and finish.



	1	2	3	4	5
DESIGN DIM	1.855 1.845	0.4726 0.4723	0.525 0.520	0.4726 0.4723	0.385 0.365
REPAIR LIMIT	—	0.441 ▷2	—	—	—

REFINISH

ON WORM GEAR THREADS, APPLY DRY FILM LUBE MICROSEAL 100-1

▷1 CHROME PLATE (F-15.03)

▷2 LIMIT FOR CHROME PLATE BUILD UP

REPAIR

REF ▷1 ▷2

125√ ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: 9310 STEEL

ALL DIMENSIONS ARE IN INCHES

315A1817-2,-3 Worm Gear Shaft Repair and Refinish
Figure 601

FITTING - REPAIR 7-1

315A1818–2

1. General

A. This repair gives the data that is necessary to refinish the fitting.

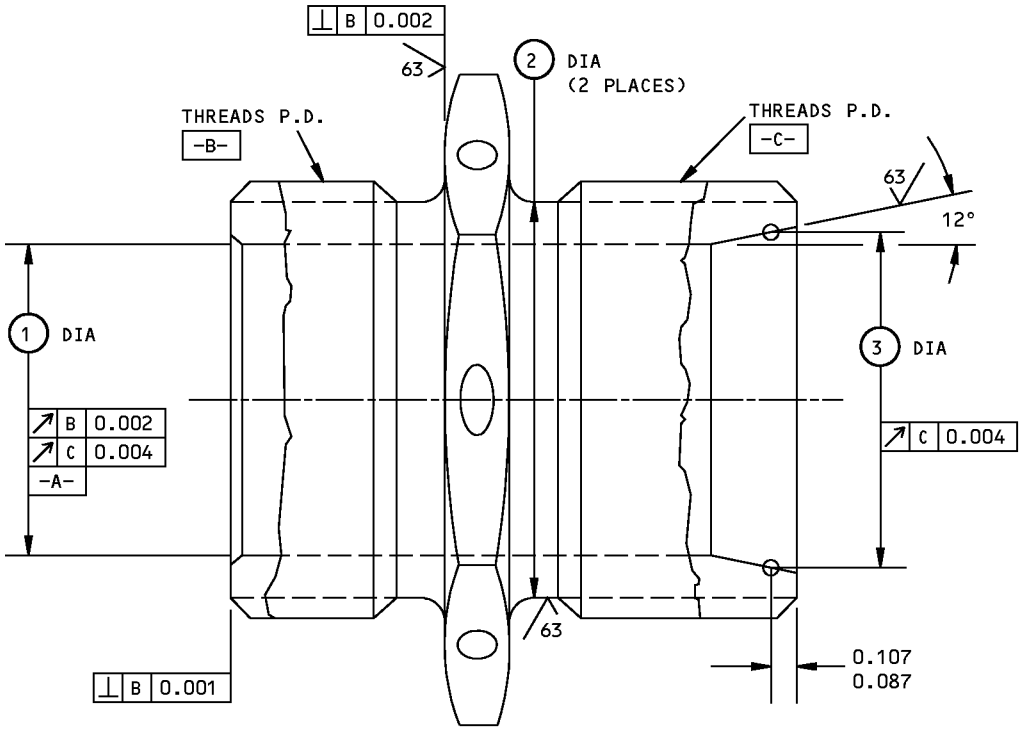
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 7-1, Figure 601 for repair and refinish details.



	1	2	3
DESIGN DIM	0.770 0.766	0.947 0.942	0.8101 0.8099
REPAIR LIMIT	—	—	—

REFINISH

PASSIVATE (F-17.09) ALL OVER

REPAIR

(SAME AS REFINISH)

125 MACHINE FINISH EXCEPT AS NOTED

MATERIAL: 303, 303SE, OR 304 CRES

ALL DIMENSIONS ARE IN INCHES

315A1818-2 Fitting Repair and Refinish
Figure 601

LEAD SCREW - REPAIR 8-1

315A1822–3, –4, –5

1. General

A. This repair gives the data that is necessary to refinish the lead screw.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

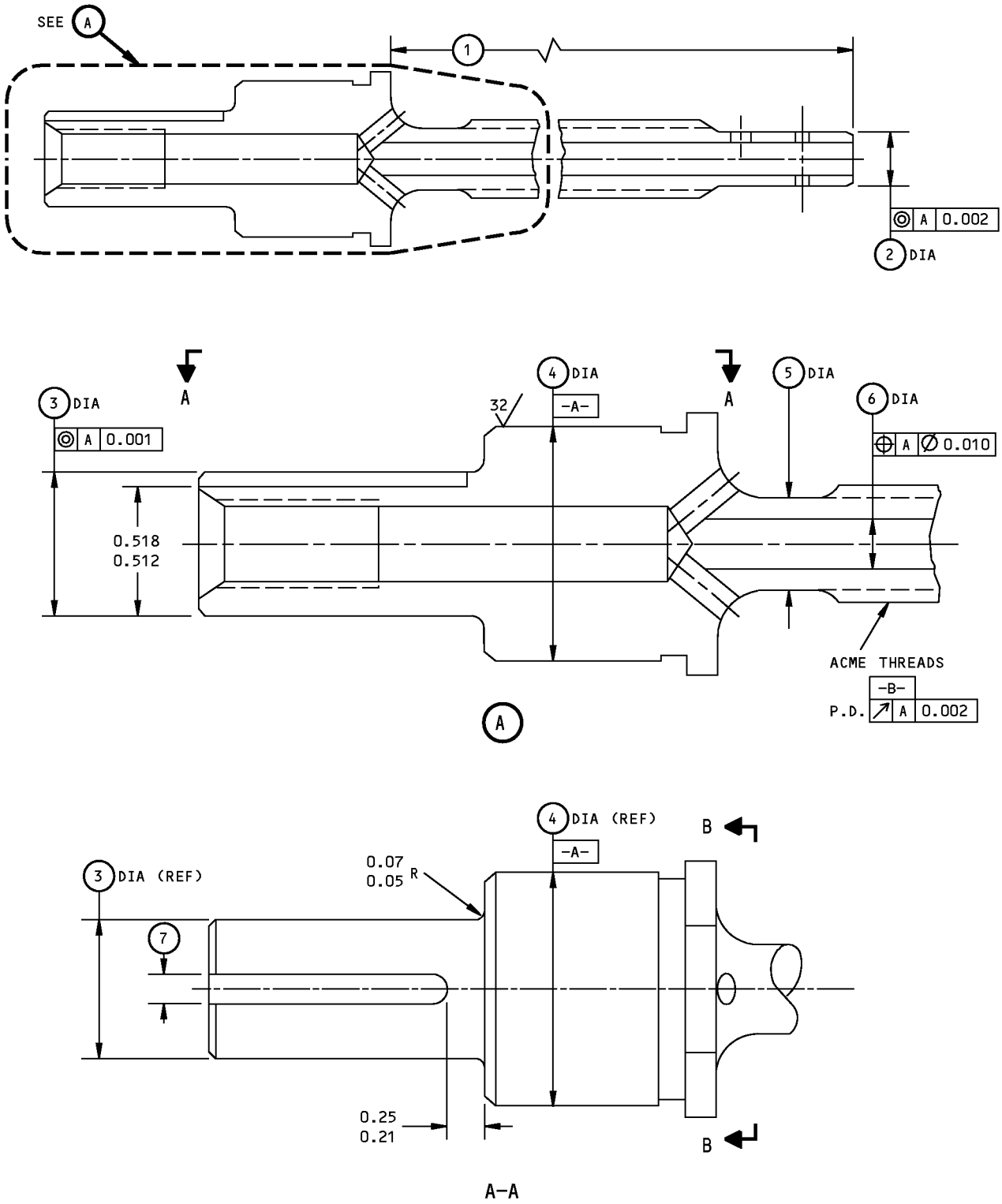
C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

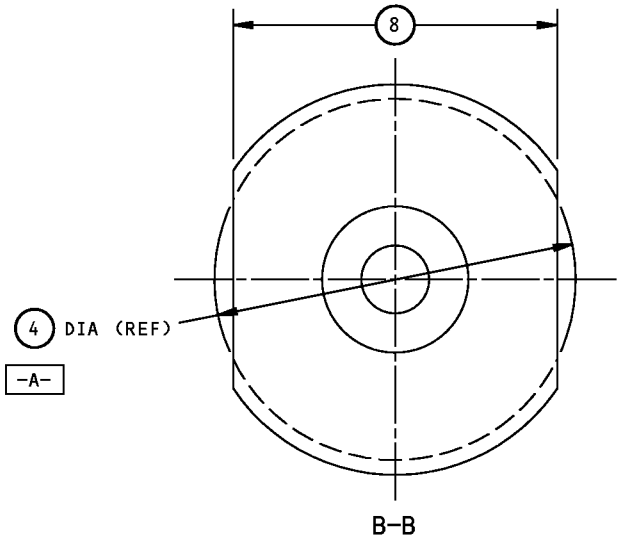
E. Refer to IPL Figure 1 for item numbers.

2. Coating Repair

A. Refer to REPAIR 8-1, Figure 601 for repair and refinish details.



315A1822-3,-4,-5 Lead Screw Repair and Refinish
Figure 601 (Sheet 1 of 2)



	1	2	3	4	5	6	7	8
DESIGN DIM	22.980 22.920	0.311 0.310	0.5908 0.5905	0.9843 0.9839	0.375 0.370	0.187 0.180	0.125 0.124	0.950 0.945
REPAIR LIMIT	----	----	----	----	----	----	----	----

REFINISH

ON ACME THREADS (DIA -B-) APPLY DRY FILM LUBE MICROSEAL 100-1

REPAIR

(SAME AS REFINISH)

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

SHOT PEEN:
0.017-0.046 SHOT SIZE
0.016 A2 INTENSITY

MATERIAL: 4340 STEEL, 180-200 KSI

315A1822-3,-4,-5 Lead Screw Repair and Refinish
Figure 601 (Sheet 2 of 2)

ROD END ASSEMBLY - REPAIR 9-1

315A1831–1

1. General

A. This repair gives the data that is necessary to refinish the rod end assembly.

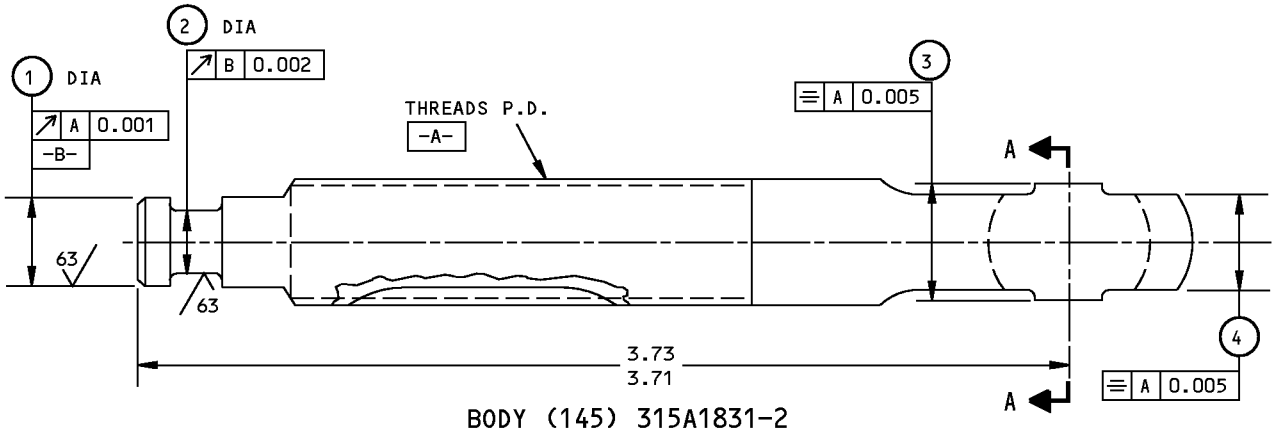
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

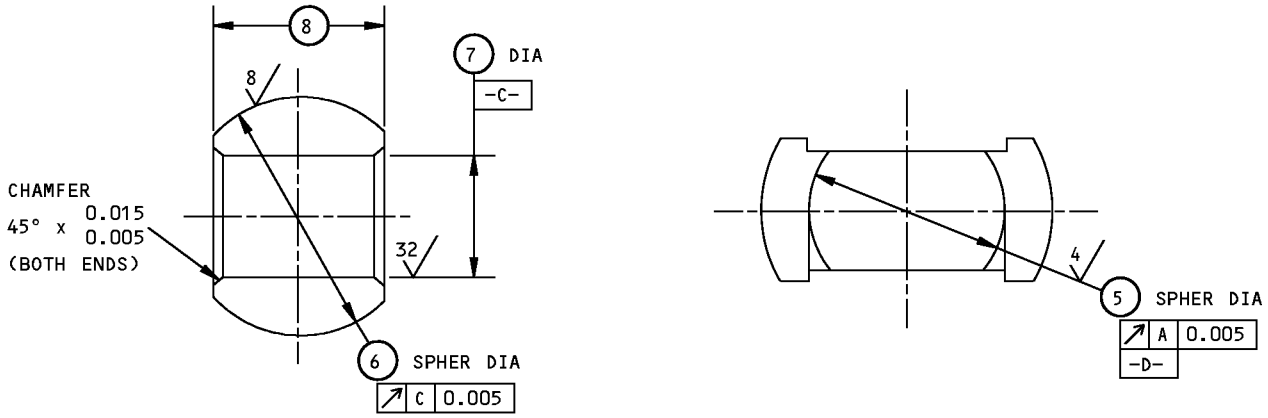
D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 9-1, Figure 601 for repair and refinish details.



BODY (145) 315A1831-2



BALL (140) 315A1831-3 A-A

	1	2	3	4	5	6	7	8
DESIGN DIM	0.420 0.419	0.310 0.309	0.425 0.415	0.380 0.370	0.6270 0.6265	0.6255 0.6250	0.3125 0.3120	0.437 0.433
REPAIR LIMIT	—	—	—	—	—	—	—	—

REFINISH

BALL (140): NO FINISH
BODY (145): PASSIVATE (F-17.09) ALL OVER. APPLY DRY FILM LUBRICANT EVER-LUBE 967, 0.0003-0.0007 THICK ON DIA -D-

REPAIR

(SAME AS REFINISH)

125 MACHINE FINISH EXCEPT AS NOTED

MATERIAL: BODY (145): 15-5PH CRES, 150-170 KSI
BALL (140): STELLITE NO. 6 PER AMS 5387

DIMENSIONS APPLY BEFORE APPLICATION OF DRY-FILM LUBRICANT

ALL DIMENSIONS ARE IN INCHES

315A1831-1 Rod End Repair and Refinish
Figure 601

SLEEVE - REPAIR 10-1

315A1834–1

1. General

A. This repair gives the data that is necessary to refinish the sleeve.

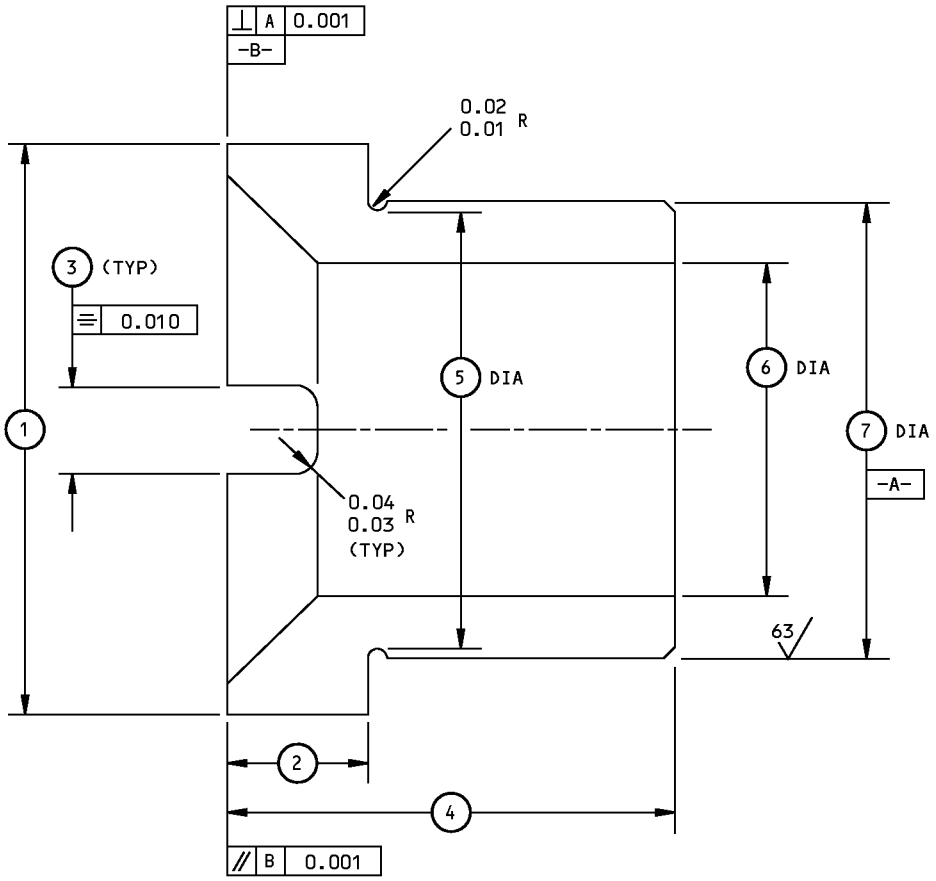
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 10-1, Figure 601 for repair and refinish details.



	1	2	3	4	5	6	7
DESIGN DIM	0.92 0.90	0.255 0.245	0.16 0.14	0.74 0.72	0.740 0.735	0.57 0.55	0.764 0.760
REPAIR LIMIT	----	----	----	----	----	----	----

REFINISH

PASIVATE (F-17.09) ALL OVER

REPAIR

(SAME AS REFINISH)

125 MACHINE FINISH EXCEPT AS NOTED

MATERIAL: 304 CRES

ALL DIMENSIONS ARE IN INCHES

315A1834-1 Sleeve Repair and Refinish
Figure 601

NUT - REPAIR 11-1

315A1870–3, –4

1. General

A. This repair gives the data that is necessary to refinish the nut.

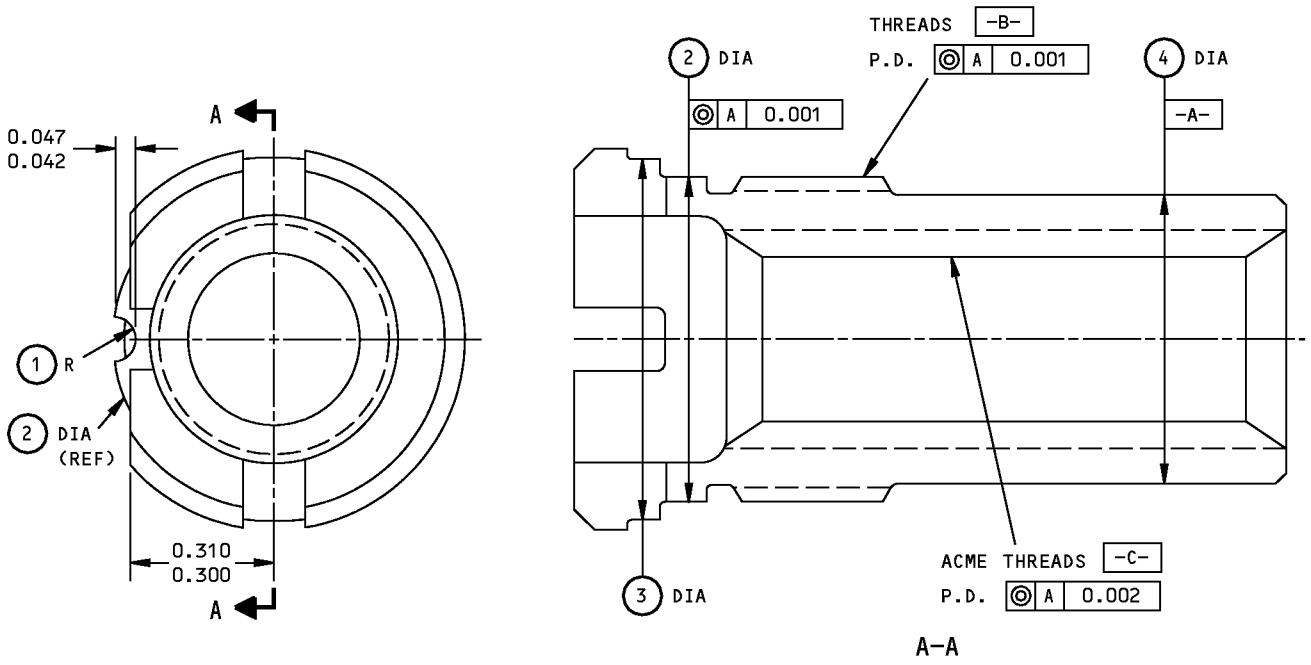
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 11-1, Figure 601 for repair and refinish details.



	1	2	3	4
DESIGN DIM	0.0480 0.0470	0.697 0.696	0.755 0.745	0.616 0.615
REPAIR LIMIT	----	----	----	----

REFINISH

ON ACME THREADS (DIA -C-) APPLY DRY FILM LUBE MICROSEAL 100-1

REPAIR

(SAME AS REFINISH)

125 MACHINE FINISH

MATERIAL: 314A1870-3: 52100 TOOL STEEL PER AMS6440 HT TR 55-60
315A1870-4: AISI06 GRAPH-MO PER QQ-T-570 HT TR 47-50

ALL DIMENSIONS ARE IN INCHES

315A1870-3,-4 Nut Repair and Refinish
Figure 601

STOP - REPAIR 12-1

315A1891–7

1. General

A. This repair gives the data that is necessary to refinish the stop.

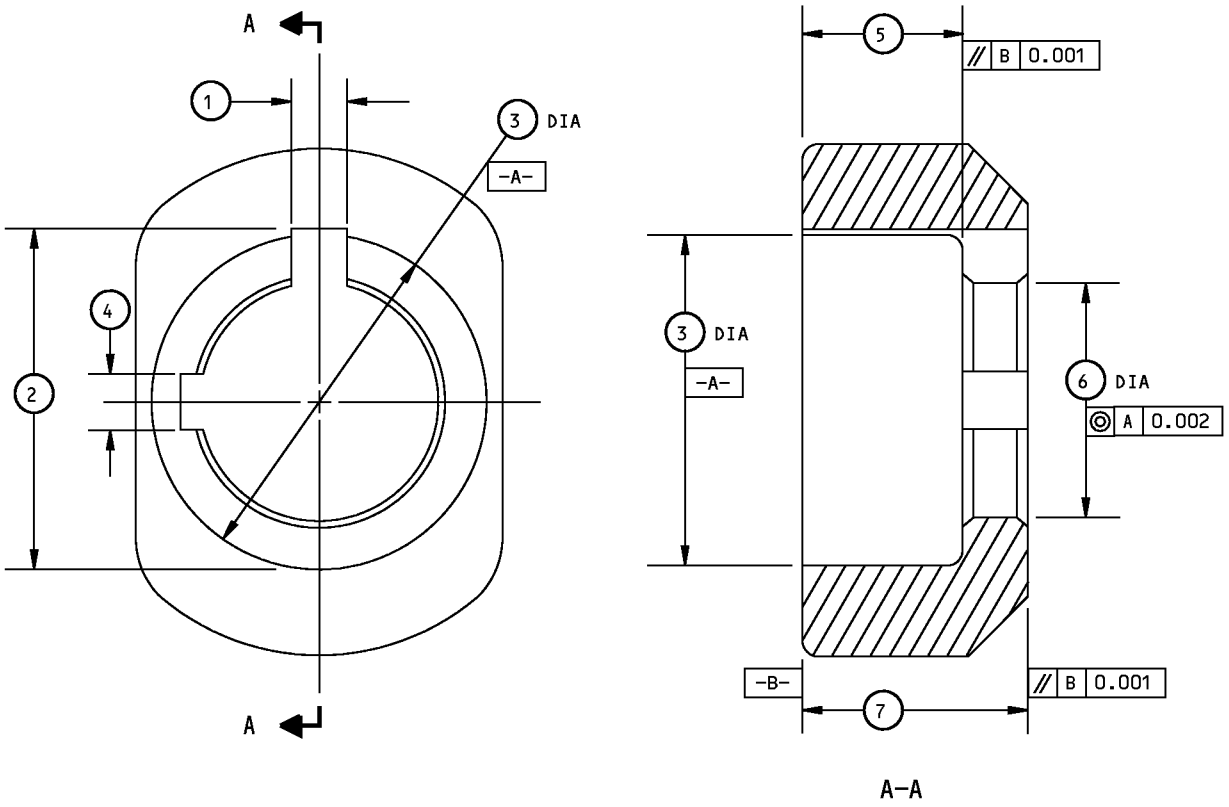
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 12-1, Figure 601 for repair and refinish details.



	1	2	3	4	5	6	7
DESIGN DIM	0.127 0.125	0.736 0.734	0.731 0.729	0.13 0.12	0.354 0.344 ▷1	0.516 0.512	0.489 0.479
REPAIR LIMIT	_____	_____	_____	_____	_____	_____	_____

REFINISH

PASSIVATE (F-17.09) ALL OVER

▷1 ORIGINAL DESIGN DIM. SEE FIG 705 FOR FINAL MACHINING

REPAIR

REF ▷1

125√ MACHINE FINISH

MATERIAL: 15-5PH CRES, 150-170 KSI

ALL DIMENSIONS ARE IN INCHES

315A1891-1 Stop Repair and Refinish
Figure 601

SCREW ADAPTER - REPAIR 13-1

315A1903–2

1. General

A. This repair gives the data that is necessary to refinish the screw adapter.

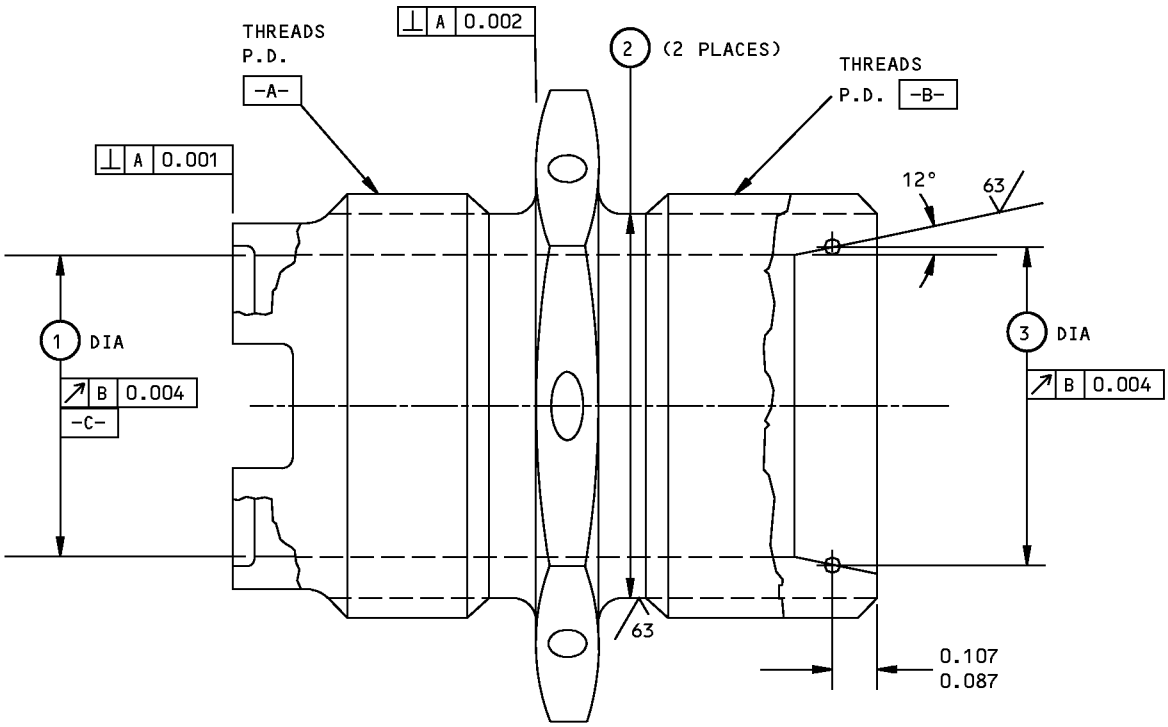
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 13-1, Figure 601 for repair and refinish details.



	1	2	3
DESIGN DIM	0.770 0.766	0.947 0.942	0.8100 0.8099
REPAIR LIMIT	_____	_____	_____

REFINISH

PASSIVATE (F-17.09) ALL OVER

REPAIR

(SAME AS REFINISH)

125 MACHINE FINISH EXCEPT AS NOTED

MATERIAL: 303,303SE,OR 304 CRES

ALL DIMENSIONS ARE IN INCHES

315A1903-2 Adapter Repair and Refinish
Figure 601

BOLT - REPAIR 14-1

315A1914–1

1. General

A. This repair gives the data that is necessary to refinish the bolt.

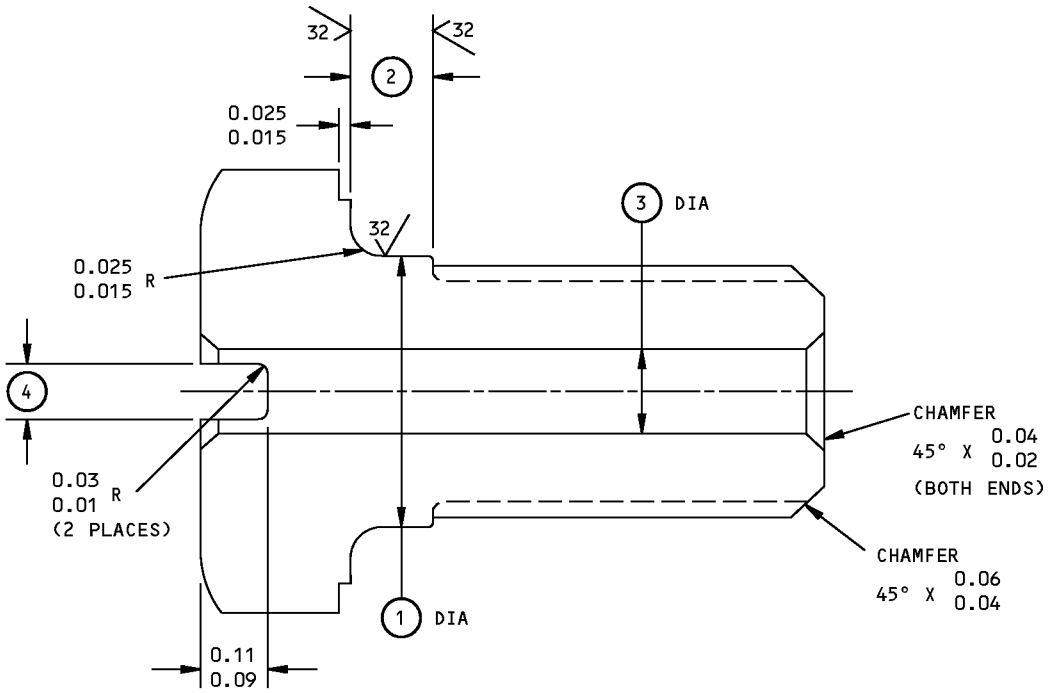
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

A. Refer to REPAIR 14-1, Figure 601 for repair and refinish details.



	1	2	3	4
DESIGN DIM	0.3745 0.3740	0.135 0.115	0.13 0.11	0.07 0.05
REPAIR LIMIT	----	----	----	----

REFINISH

PASSIVATE (F-17.09) ALL OVER

REPAIR

(SAME AS REFINISH)

125 MACHINE FINISH EXCEPT AS NOTED

MATERIAL: A286 CRES PER AMS 5737 (MADE FROM BACB30LM6U2)

ALL DIMENSIONS ARE IN INCHES

315A1914-1 Bolt Repair and Refinish
Figure 601

MISCELLANEOUS PARTS REFINISH - REPAIR 15-1

1. General

A. This repair gives the data that is necessary to refinish miscellaneous parts refinish .

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

E. Refer to IPL Figure 1 for item numbers.

2. Repair

A. Repair of parts listed in REPAIR 15-1, Table 601 consists of restoration of the original finish.

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1		
Shims (20, 25, 30, 35, 40, 270, 275, 285, 290)	301 CRES	Passivate (F-17.09).
Nut (150), Stop (235)	15-5PH CRES, 150-170 ksi	Passivate (F-17.09).
Key (165), Pin (315)	304 CRES	Passivate (F-17.09).
Nuts (175, 330)	15-5PH CRES, 150-170 ksi	Passivate (F-17.09). Sliver plate (F-15.07) threads, 0.00015-0.00020 thick.
Pin (300)	303 CRES	Passivate (F-17.09).

EXTERNAL PARTS REPLACEMENT - REPAIR 16-1

BAC27DTR–12, BAC27NPP–44, 315A1836–1

1. General

A. This repair gives the data that is necessary to refinish the external parts replacement.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to IPL Figure 1 for item numbers.

2. Nameplate Replacement

A. Refer to REPAIR 16-1, Figure 601 for refinish details.

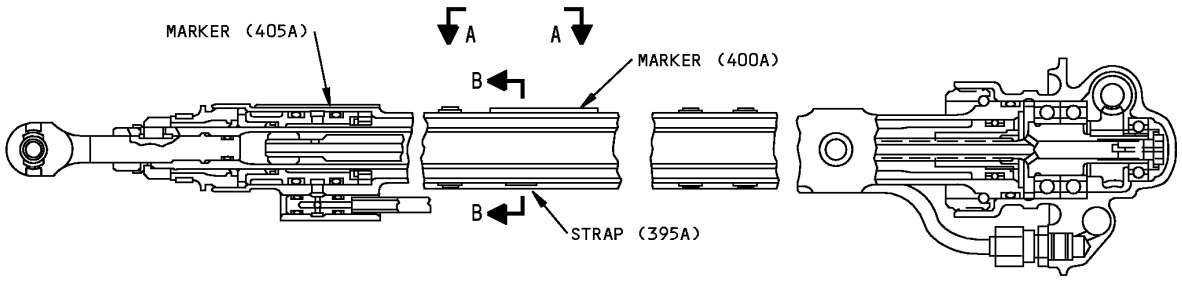
B. Steel stamp serial number and part number on nameplate (400A).

C. Preform nameplate (400A) to match curvature of cylinder (320).

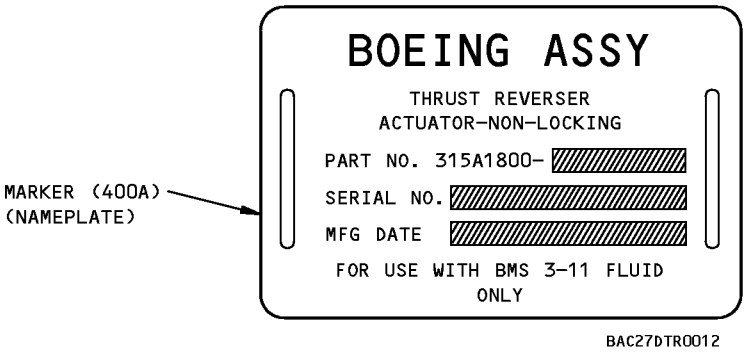
D. Coat back of nameplate (400A) with adhesive, A01070 adhesive.

E. Install nameplate (400A) and strap (395A) on cylinder (380A) at position shown. Strap may be used only once. Use new strap at every nameplate installation.

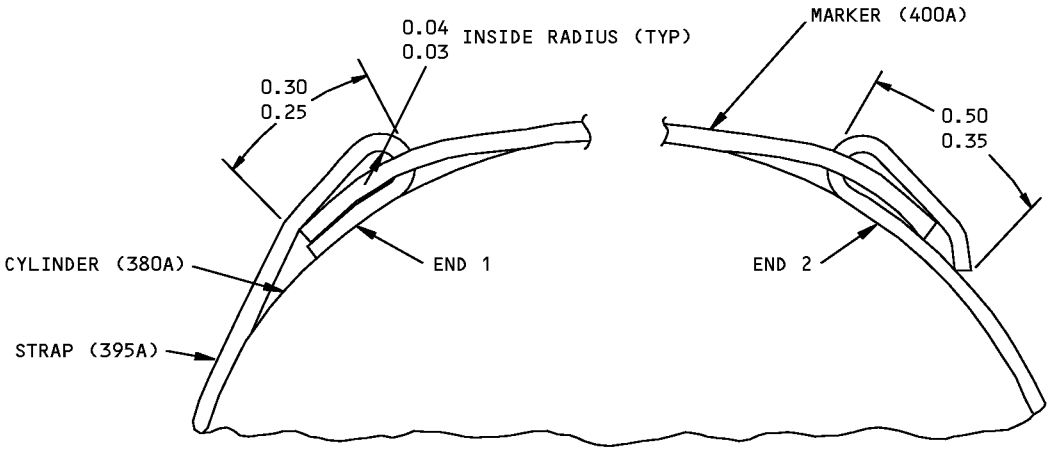
F. After adhesive has cured, completely edge-seal nameplate and strap with a bead of adhesive, A00273. Ensure that adhesive fills slots for strap in nameplate.



Nameplate and Marker Replacement
Figure 601 (Sheet 1 of 2)



A-A



B-B

NOTE: STRAP MAY BE USED ONLY ONCE. STRAP AND NAMEPLATE SHALL BE SNUG ON MOUNTING SURFACE

1. FORM NAMEPLATE TO A RADIUS SLIGHTLY SMALLER THAN CYLINDER RADIUS
2 DEFORM CORNERS OF NAMEPLATE SLIGHTLY TOWARDS MOUNTING SURFACE
3. FORM BEND ON STRAP END 1, INSERT THRU HOLE IN NAMEPLATE AND FORM STRAP END AS SHOWN
4. HOLD NAMEPLATE ON CYLINDER AND FEED STRAP THRU HOLE
5. SLIGHTLY BEND STRAP END 2 WHILE APPLYING SUFFICIENT PULLING FORCE TO OBTAIN PRETENSION OF NAMEPLATE AND STRAP
6. CUT STRAP END 2 TO CONFORM TO DIMENSION SHOWN
7. WHILE MAINTAINING THE PRETENSION, USE SUITABLE TOOL TO MAKE FINAL BEND OF STRAP END 2 AND TO OBTAIN ADDITIONAL TENSION. USE CARE NOT TO TEAR NAMEPLATE HOLE BY OVERTENSION
8. BEND STRAP END 2 DOWN OVER EDGE OF NAMEPLATE AND TAP WITH SUITABLE SOFT NOSED HAMMER

ALL DIMENSIONS ARE IN INCHES

Nameplate and Marker Replacement
Figure 601 (Sheet 2 of 2)

EXTERNAL PARTS REPLACEMENT - REPAIR 16-2

315A1867–3

1. General

A. This repair gives the data that is necessary to refinish the external parts replacement.

B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

E. Refer to IPL Figure 1 for item numbers.

2. Spacer (375B) Replacement

A. Refer to REPAIR 16-2, Figure 601 for refinish details.

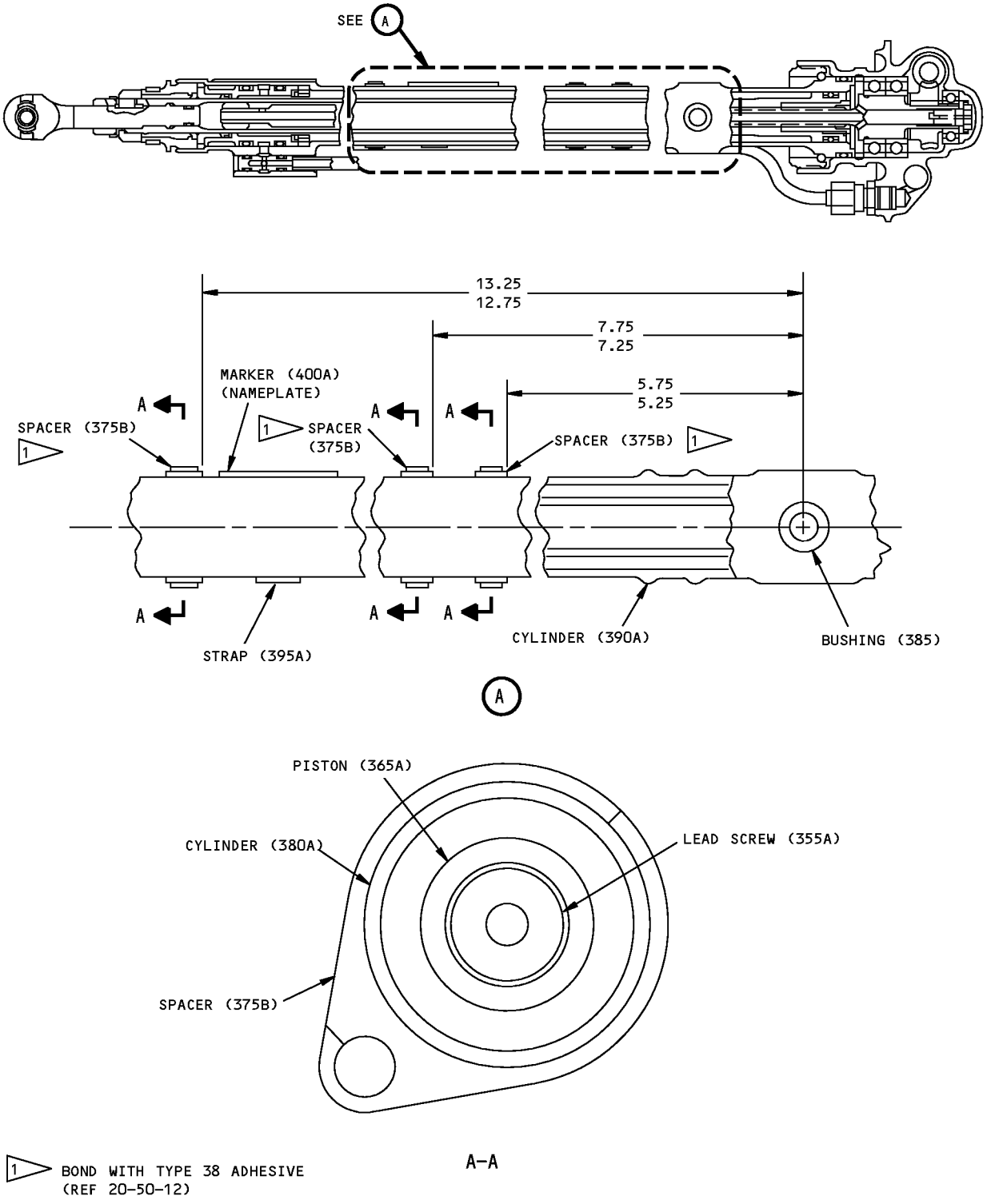
CAUTION: SPACERS (375B) MUST BE RADIALLY POSITIONED ON CYLINDER (380A) SO THAT TUBE (95D) IS SUPPORTED WITHOUT STRAIN, OR LEAKAGE MAY RESULT WHEN END FITTING IS TIGHTENED.

B. Before removing spacers, index radial position of tube support holes by temporary marking means on cylinder, to facilitate positioning of replacement spacers. Then remove defective spacers (375A) from cylinder (380A).

C. Clean substrate surfaces with solvent. Do not obliterate index marks.

D. Bond replacement spacers on cylinder per SOPM 20-50-12, with adhesive, A01070, positioning supports to line up tube support holes with index marks.

E. Remove index marks after tube (95D) is installed.



Spacer Replacement
Figure 601

ROD END ASSEMBLY - REPAIR 17-1

315N3832–1

1. General

A. This repair gives the data that is necessary to refinish the rod end assembly.

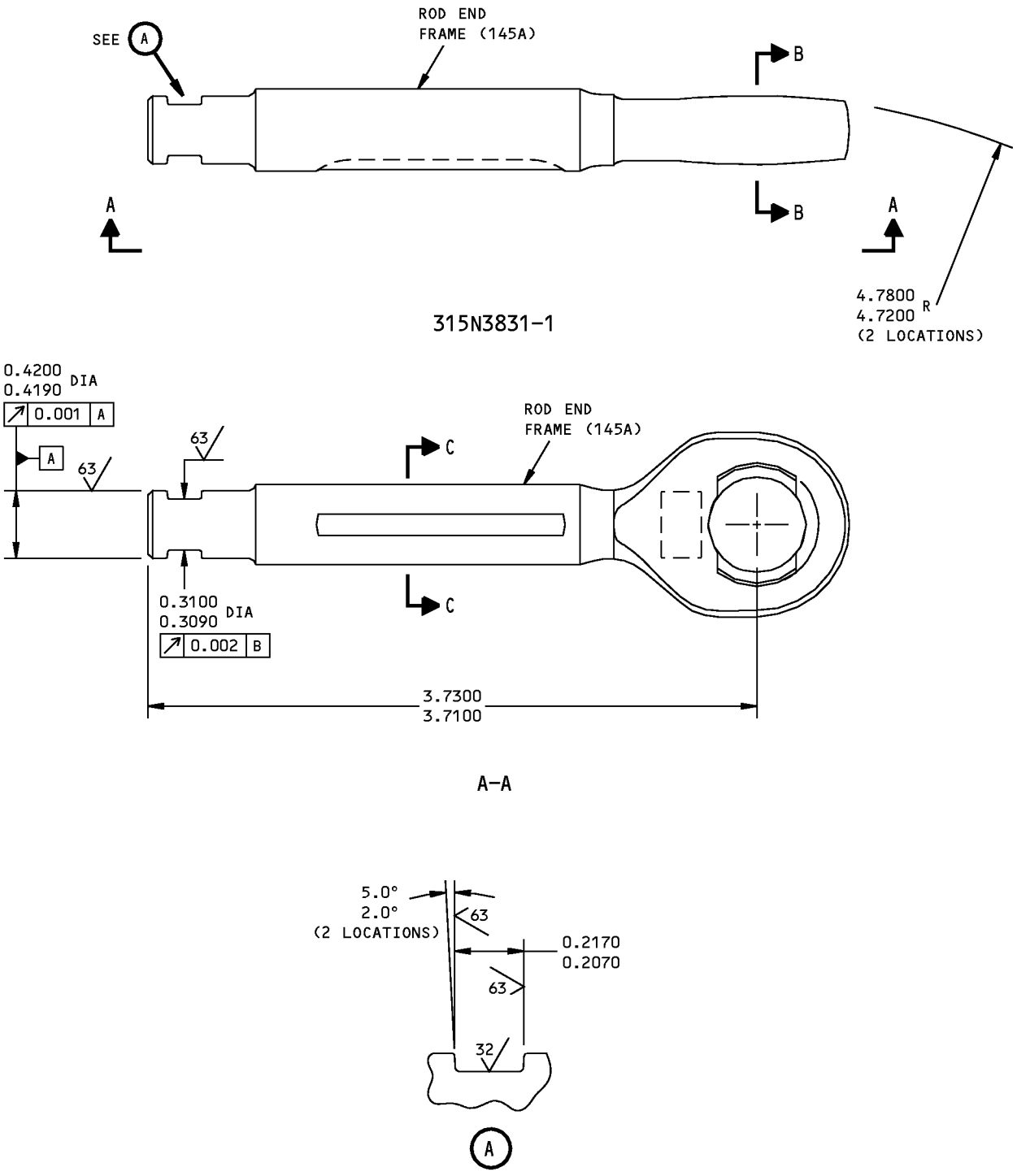
B. Refer to REPAIR-GENERAL, Paragraph 2. for the Standard Overhaul Practices Manual (SOPM) subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Paragraph 3. for the description of the Material codes identified in this procedure.

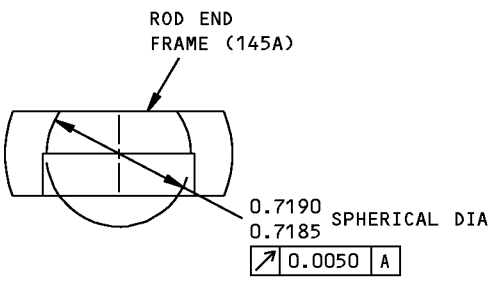
D. Refer to REPAIR-GENERAL, Figure 601 for standard true position dimensioning symbols shown in the repair.

2. Coating Repair

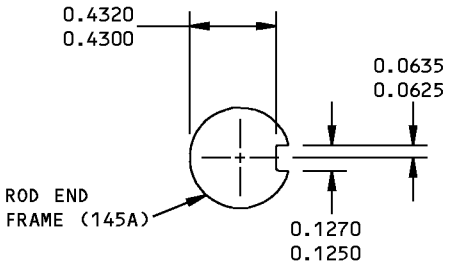
A. Refer to REPAIR 17-1, Figure 601 for repair and refinish details.



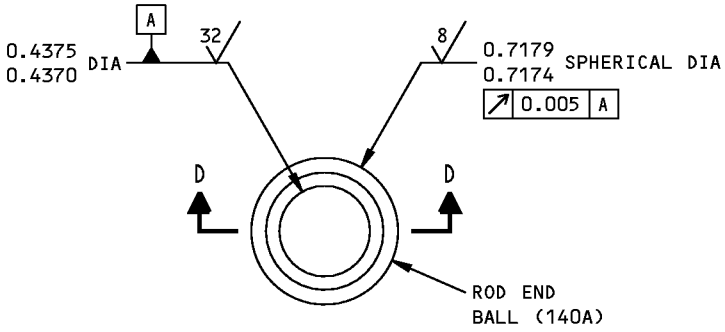
315N3831-1,-2 Rod End Detail Refinish
Figure 601 (Sheet 1 of 2)



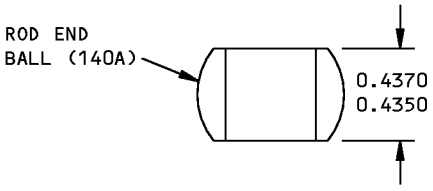
B–B



C–C



315N3831-2



D–D

REFINISH

BALL (140A): NO FINISH
FRAME (145A): PASSIVATE (F-17.09) ALL OVER.
NITRIDE SPHERICAL INSIDE DIAMETER AND ENTRY 0.004-0.008 INCH MAXIMUM PER BAC5640. APPLY DRI-FILM LUBE WITH EVERLUBE 967, 0.0003-0.0007 INCH THICK ON THE DIAMETER

REPAIR

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL:
BALL (140A): METALLIC RAW MATERIAL
FRAME (145A): 15-5PH CRES PER AMS 5659

DIMENSIONS APPLY BEFORE APPLICATION OF DRI-FILM LUBRICANT

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

315N3831-1,-2 Rod End Detail Refinish
Figure 601 (Sheet 2 of 2)

ASSEMBLY

1. General

A. This procedure contains the data necessary to assemble the thrust reverser non-locking 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 the item numbers.

2. Equipment

A. Measuring – Micrometers micrometer (0-1 Inch, readable to 1/1000 Inch), STD-1096 (Depth and External)/dial indicator, STD-1238, 0-3 inch ranges, 0.001 increment

3. Lubrication

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00054	Fluid - Hydraulic Assembly Lubricant - MCS 352B (Formerly Monsanto MCS 352B)	
D00153	Fluid - Hydraulic, Erosion Arresting, Fire Resistant	BMS3-11 Type IV (interchange˜able & intermixable with Type V)

B. References

Reference	Title
SOPM 20-60-03	LUBRICANTS

C. Procedure

(1) Lubricate all O-rings and seals at assembly with fluid, D00153 or MCS 352B fluid, D00054 per SOPM 20-60-03.

(2) Lubricate all internal parts with fluid, D00153 per SOPM 20-60-03.

4. Assembly

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
COM-4950	Installation Tool - Cable Tie, (Part #: GS4MT, Supplier: 06383) (Part #: PPTMT, Supplier: 06383) (Part #: ST2MT, Supplier: 06383)
SPL-5359	Test Fixture - Rod End and Stroke Stop, Locking and Non-Locking Thrust Reverser Actuator (Part #: B78014-37, Supplier: 81205) (Opt Part #: B78014-29, Supplier: 81205)
SPL-6255	Wrench (B78008-7 is included in B78008-19) (Part #: B78008-7, Supplier: 81205)
SPL-6256	Wrench (B78008-6 included in Kit B78008-19) (Part #: B78008-6, Supplier: 81205)
SPL-6272	Plug (B78016-6 is included in B78016-1) (Part #: B78016-6, Supplier: 81205)
SPL-6274	Cap (B78016-3 is included in B78016-1) (Part #: B78016-3, Supplier: 81205)
SPL-6283	Equipment - Bearing Installation, Lead Screw (Part #: B78017-1, Supplier: 81205)
SPL-6284	Fixture - Torque, Locking and Non-Locking Thrust Reverser Acutator Assembly (Part #: B78011-25, Supplier: 81205)
SPL-7292	Adapter - Worm Gear Shaft (B78016-9 is included in B78016-1) (Part #: B78016-9, Supplier: 81205)
SPL-7299	Plate (B78016-4 is included in B78016-1) (Part #: B78016-4, Supplier: 81205)
SPL-7301	Housing - Non-Locking (B78016-8 included in Overhaul Set B78016-1) (Part #: B78016-8, Supplier: 81205)
SPL-7407	Wrench - Nut Gland (B78008-5 included in T/R Actuator Wrench Set B78008-18) (Part #: B78008-5, Supplier: 81205)
SPL-8213	Spanner Wrench - Nut, Cylinder Locking Actuator (B78008-16 is included in B78008-19) (Part #: B78008-16, Supplier: 81205)
STD-551	Knife - Razor
STD-595	Micrometer
STD-1096	Micrometer - Depth, 0-1 Inch, Readable to 1/1000 Inch
STD-1238	Indicator - Dial

B. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
A01070	Adhesive - Polyamide	BAC5010, Type 38
D00015	Grease - Aircraft Bearing (Use BMS 3-24 until existing stocks are depleted, BMS 3-33 supersedes BMS 3-24)	BMS3-24 (Superseded by BMS 3-33)
D00153	Fluid - Hydraulic, Erosion Arresting, Fire Resistant	BMS3-11 Type IV (interchange˜able & intermixable with Type V)
G50340	Abrasive Paper - Aluminum Oxide, 400 Grit	
G50347	Lockwire - Nickel-copper, 0.032 inch diameter	NASM20995N˜C32

C. References

Reference	Title
SOPM 20-50-02	INSTALLATION OF SAFETYING DEVICES
SOPM 20-50-12	APPLICATION OF ADHESIVES

D. Procedure

(1) Lead Screw/Piston Components

CAUTION: BEARINGS (295A) ARE A MATCHED SET, AND MUST BE INSTALLED WITH UNMARKED FACE OF INNER RACES TOGETHER OR PARTS WILL NOT FUNCTION PROPERLY.

(a) Using bearing tool, SPL-6283, install one bearing (295A) set on lead screw (355A) with the unstamped faces of the outer races next to each other. Make sure that the inner race of the first bearing installed is firmly seated against the shoulder on the lead screw (355A).

(b) On worm wheel (265A), the design dimension D from the face (at the largest diameter) to the centerline of the worm teeth is 0.415-0.425 inch (ASSEMBLY, Figure 702). The actual dimension is marked on the face to the nearest 0.001 inch. Note this dimension D.

(c) Using plug, SPL-6272 mounted in housing (240), obtain and note the centerline dimension C of mounting holes in housing per ASSEMBLY, Figure 703. Note the actual measurment to nearest 0.001 inch. (Design dimension is 0.515-0.545 inch)

(d) Subtract dimension C obtained in ASSEMBLY, Paragraph 4.D.(1)(c) from dimension D obtained in step ASSEMBLY, Paragraph 4.D.(1)(b) (Result, S1, will be 0.090-0.130). Select minimum combination of shims (270, 275, 280, 285, 290) which will obtain calculated dimension S1 to nearest 0.001 inch.

(e) Install shim combination on lead screw against bearing (295A). Install key (260) in slot on lead screw (355A). Install worm wheel (265B) on lead screw (with largest diameter against shims) and key slot engaging key (260). Seat parts firmly against bearings.

(f) Using tool bearing tool, SPL-6283, install bearing (255B) on lead screw and seat inner race firmly against worm wheel.

(g) Apply an ink index mark on flange of cup lockwasher (250) opposite protruding tang. Install lockwasher, with tang engaging keyway in lead screw. Install bolt (245) in lead screw. Restrain lead screw with wrench across flats of shoulder, and tighten bolt to 275-325 lb-in.

(h) Install assembled parts in housing (240) and retain with non-locking housing, SPL-7301 used with rings (335) and cylinder nut (330). Install unit in fixture torque fixture, SPL-6284, and tighten nut to 2900-3100 lb-in using wrench, (cylinder nut) spanner wrench, SPL-8213.

(i) Check that torque required to rotate lead screw does not exceed 2.5 lb-in. If torque is acceptable, proceed to ASSEMBLY, Paragraph 4.D.(1)(j). If torque exceeds limit, proceed as follows:

1) Remove parts from housing and replace bearings (295A).

2) Reinstall parts per steps ASSEMBLY, Paragraph 4.D.(1)(a) thruASSEMBLY, Paragraph 4.D.(1)(i) and recheck torque.

(j) Remove non-locking housing, SPL-7301 and lead screw from housing. Deform flange of lockwasher (250) against two opposite flats of bolt (245) which are not adjacent to the index mark applied in ASSEMBLY, Paragraph 4.D.(1)(g).

(k) Remove restraining tool, wrench, (lead screw nut), wrench (B78008-6), SPL-6256 and lead screw nut (365A) from piston (370A). Install retaining ring (317) on nut. Screw nut on lead screw to approximate center of threaded length.

NOTE: Nut (365A) is part of piston assy (360)

(l) Install guide (350), retaining pin (345), and retaining ring (340) on end of lead screw.

(m) Install O-ring and two retainers (320, 325) on head of piston (360A). Slide piston over lead screw. Restrain piston and using wrench, (lead screw nut) B78008-6, screw lead screw nut (365A) into piston until two halves of holes for locking pin (315) align. Insert pin with end under retaining ring (340) and lightly tap pin into hole until it bottoms. Ensure that retaining ring engages shoulder of locking pin (ASSEMBLY, Figure 706).

NOTE: When installing new lead screw nut (365A) into piston (370A), do the following (this procedure can only be used to drill one additional hole in the piston without prior Boeing approval):

- Confirm that the lead screw nut (365A) and piston (370A) are within repair limits listed in the REPAIR 8-1.

- Torque the existing or replacement lead screw nut (365A) into piston (370A) to 180-200 in-lbs.

- Re-machine the hole in the piston (370A) (matching the hole half in the lead screw nut) only if the new hole half will be separated from any existing hole half in the piston by 0.125 inches circumferentially. If this separation can not be maintained, use a different nut that will allow the required separation.

(2) Select Worm Gear Components (ASSEMBLY, Figure 704)

(a) Using tool cap, SPL-6274, plate, SPL-7299 install one bearing (50B) against shoulder of worm gear shaft (55A).

(b) Insert shaft thru port in housing for adapter screw (255B) and seat bearing against shoulder in hole. Install O-ring (15) on adapter screw (10A), install screw in housing, and tighten to 1140-1200 lb-in.

(c) Install other bearing (50B) on worm gear shaft and into housing using tool cap, SPL-6274, plate, SPL-7299.

(d) Position unit so that worm gear shaft is vertical and adapter screw (10A) at bottom. Press downward on shaft to ensure outer race of bottom bearing is seated against adapter screw. Check that inner race of upper bearing is seated against shoulder of worm gear shaft. Using micrometer (0-1 Inch, readable to 1/1000 Inch), STD-1096, measure distance from face of housing (at seating surface for fitting) to outer race of bearing. Measure two places, 180 degrees apart, and divide sum by two. (Result, dimension D3, will be 0.783-0.833.) Note dimension D3 to nearest 0.001 inch.

(e) Install sleeve (45) in short thread end of fitting (5A). Using micrometer (0-1 Inch, readable to 1/1000 Inch), STD-1096, measure dimension from face of sleeve (surface which seats against bearing) to bottom face of fitting flange. Measure two places, 180 degrees apart, and divide sum by two. (Result, dimension D4, wil be 0.740-0.760.) Note dimension D4 to nearest 0.001 inch.

(f) Subtract dimension D3, obtained in ASSEMBLY, Paragraph 4.D.(2)(d) , from dimension D4, obtained in ASSEMBLY, Paragraph 4.D.(2)(e). (Result, dimension S2, will be 0.023-0.093). Select minimum combination of shims (20, 25, 30, 35, 40) which will obtain calculated dimension S2 to nearest 0.001 inch.

(g) Remove sleeve (45) from fitting (5A). Install O-ring (15) on shortest thread end. Install shims (20 thru 40), as applicable, on sleeve and install sleeve in fitting. Install assembled parts in housing and tighten fitting to 1140-1200 lb-in.

(h) Check that worm gear shaft turns freely. Check that axial movement (end play) does not exceed 0.003 inch.

1) If shaft does not turn freely, reduce total shim thickness in 0.002 inch increments until free rotation is obtained.

2) If end play exceeds 0.003 inch, replace bearings (50) and repeat assembly/check procedures.

(i) Remove fitting (5) and adapter screw (10A) from housing. Press out shaft (toward adapter screw end) and remove parts assembled in ASSEMBLY, Paragraph 4.D.(2)(a) thru ASSEMBLY, Paragraph 4.D.(2)(g). Removal of bearing from adapter screw end of shaft is not necessary.

NOTE: Segregate and maintain identity and location of worm gear components for installation in subsequent procedures.

(3) Install Cylinder, Lead Screw/Piston Components

(a) Install assembled lead screw/piston (Ref ASSEMBLY, Paragraph 4.D.(1).) in housing. Ensure that outer race of bearing (295A) facing worm wheel (265B) is seated firmly against shoulder in housing.

(b) Coat inside diameter of cylinder (380A) with fluid, D00153. Position cylinder nut (330) on outside diameter of cylinder. Install O-ring and two backup rings (305, 310) in grooves on cylinder. Slide cylinder over piston assy but do not engage cylinder with housing. Ensure O-ring (320) and retainers (325) are installed on end of piston head.

(c) (Optional) Install locating pin (300) in housing. Slide cylinder into housing, with locating pin engaging slot in housing. Seat cylinder firmly.

NOTE: Use of pin (300) is optional, as cylinder will be positioned by use of assembly fixture.

(d) Apply grease, D00015 to cylinder nut rings (335) and threads of cylinder nut (330). Install rings in nut, and screw nut into housing finger tight.

(e) Install stop (235) in end of cylinder.

(f) Install O-ring (225) and backup rings (220), and O-ring (215) and retainers (210) in grooves on gland (205). Position parts per ASSEMBLY, Figure 706 and install hatseal (200) and bearing (195) in gland.

(g) Apply grease, D00015 to snubber rings (230, 233). Position parts per ASSEMBLY, Figure 706 and install rings in gland. Slide gland over piston (370) against stop (235).

NOTE: There is no requirement to locate slot in snubber ring (230) at a specified angular position relative to the four holes in stop (235).

(h) Apply grease, D00015 to threads of gland nut (175). Position scraper (180) per ASSEMBLY, Figure 706 on end of nut, slide nut over piston (370A), and screw nut into cylinder finger tight.

(i) With unit mounted in torque fixture, SPL-6284, use wrench (cylinder nut) spanner wrench, SPL-8213, to tighten cylinder nut (330) to 2900-3100 lb-in. Tighten gland nut (175) to 800-1000 lb-in using wrench, SPL-7407. Remove actuator from fixture.

(j) Install spacer (170) in recess on gland nut (175). Bond in place per SOPM 20-50-12 with adhesive, A01070.

(4) Install Worm Gear Shaft & Fittings (ASSEMBLY, Figure 706)

(a) Install worm gear parts (5A thru 55A) pre-selected and segregated in ASSEMBLY, Paragraph 4.D.(2). Ensure that correct shims (20 thru 40) and O-rings (15) are installed. When inserting shaft, rotate slowly to engage worm wheel (265B). Tighten adapter screw (10A) and fitting (5A) to 1140-1200 lb-in.

(b) Install O-rings (65) on unions (60). Install unions in housing and tighten to 256-284 lb-in. Install O-ring (75) on union (70). Install union in housing and tighten to 133-147 lb-in.

(5) Install Piston Rod & Transfer Tube (ASSEMBLY, Figure 706)

(a) Install O-rings and backup rings (130, 125) on end of tube assembly (95D). Push tube assembly into holes in cylinder spacers (375B) thru split line cuts. Align tube with housing union (70) and port in cylinder. Insert tube assembly into cylinder port, and tighten coupling nut (105A) finger tight.

NOTE: If bonded synthetic rubber spacers (375B) are not installed, bond new spacers to cylinder (refer toREPAIR 16-2) after positioning spacers around cylinder and tube.

(b) Cut along the length on one side of the spacer (117) with a razor knife, STD-551 and bond the spacer (117) on the tube (120C) with adhesive, A01070 as specified in SOPM 20-50-12. See ASSEMBLY, Figure 708 for location of spacer.

(c) Heat shrink the Thermfit sleeving RNF 100-1/2 over the spacer. The sleeving shall not be singed, cracked, split or otherwise damaged. Slight discoloration is acceptable.

(d) Trim the sleeving as required to achieve 0.30-0.50 overlap dimensions. See ASSEMBLY, Figure 708.

(e) Install ties (80) around rubber spacers (375B) and secure using installation tool, (tube ties) cable tie installation tool, COM-4950 at setting of 165 lbs max and locating joints of ties approximately as shown. Tighten coupling nut (105A) to 133-147 lb-in.

(f) Check face of nut (150) to contact cupwasher (155). Nut shall have surface roughness of 63 micro-inches maximum, be free of burrs and sharp edges and smoothed by rubbing in a figure of 8 motion against abrasive paper, G50340.

(g) Apply Braycoat 660, grease lubricant, to face of nut (150) to contact cupwasher (155) and to nut threads. Do not apply lubricant to cupwasher (155).

(h) Screw nut (150) on rod end assembly (135) to end of threads. Slide cup lockwasher (155) onto rod assembly with tang facing away from bearing. Install stop (160) on rod with chamfered side against lockwasher (155).

(i) Install O-ring and backup rings (190, 185) in grooves on rod end (135). Ensure that spiral direction of backup rings (185) is in same direction as threads of rod end to prevent separation of rings when rod is screwed into piston.

(j) Pull out on rod end to fully extend piston against internal stop. Mount unit in rod end and stroke stop test fixture, SPL-5359. Check that clearance between tube and any part of cylinder and housing is minimum of 0.02 inch.

(k) Using worm gear shaft adapter, SPL-7292 to rotate worm gear shaft and using fingers to rotate piston, position slots in end of piston horizontally. Ensure that piston is fully extended against internal stop.

(l) Screw rod end into piston until bearing hole aligns with attach hole in fixture clevis, and the key slot in rod end aligns with either slot in end of piston.

NOTE: If piston is rotated slightly to adjust rod end to fixture clevis, rotate worm gear shaft accordingly to maintain piston against internal stop.

(m) Secure rod end in fixture clevis with fixture pin. Install key (165) in slots in piston and rod end and seat firmly.

(n) Slide stop (160) over key and seat inner shoulder firmly against end of piston. Position tang of lockwasher (155) in slot in stop. Using wrench (rod end nut), wrench, SPL-6255 and holding stop with wrench, tighten nut (150) to 600-800 lb-in.

NOTE: Lockwasher (155) is deformed after assembly is completed.

(o) Mount dial indicator, STD-1238 on fixture to measure axial movement of piston inward from full extended position. Rotate worm gear shaft and retract piston until movement is stopped by contact of the fixture clevis pin with the fixture clevis. Note the distance moved (usually 0.010-0.020 inch) and add the value to 43.272. The result is the fully extended dimension of the actuator. Remove indicator.

NOTE: This sets the fully extended dimension approximately at the mean design dimension of 43.285.

(p) Remove fixture clevis pin from rod end. Push piston inward until stop (160) contacts gland nut (175) to obtain full retracted position. Ensure rod end does not rotate relative to actuator body.

(q) Slide fixture clevis along mounting block until clevis hole aligns with hole in rod end. Install fixture clevis pin thru clevis and rod end. Push on clevis to ensure stop contacts gland nut, and tighten fixture clamp.

(r) Using micrometer, STD-595, measure dimension E1 across gage block and pin of fixture to nearest 0.001 inch (ASSEMBLY, Figure 705). Subtract 1.500 from this value and note result F (value of dimension F will be 0.001-0.073).

(s) Hold stop (160) with wrench and loosen nut (150) using adapter, (wrench, rod end nut) wrench, SPL-6255. Remove fixture clevis pin, and rotate actuator so that rod end is out of fixture clevis. Unscrew nut (150), move lockwasher (155) and stop (160) back, and remove key (165). Unscrew rod end from piston, remove stop, then screw rod end back into piston a few turns.

(t) As shown in ASSEMBLY, Figure 707, machine surface -B- of stop (160) to remove amount of material equal to dimension F, obtained in ASSEMBLY, Paragraph 4.D.(5)(r), within 0.0005 inch.

(u) Remove rod end from piston, install stop machined in ASSEMBLY, Paragraph 4.D.(5)(t) with chamfered side against lockwasher (155). Repeat ASSEMBLY, Paragraph 4.D.(5)(j) thru ASSEMBLY, Paragraph 4.D.(5)(n) and ASSEMBLY, Paragraph 4.D.(5)(p), ASSEMBLY, Paragraph 4.D.(5)(q) preceding.

(v) Using micrometer, STD-595, measure dimension across fixture gage block and pin of fixture and verify that dimension is 1.495-1.505 inch. Add 22.000 to actual measurement and note total. The result is length of actuator between mounting centerlines at retracted position (23.495-23.505 inches).

(6) Test Actuator Assy (Refer toTESTING AND FAULT ISOLATION)

(7) Secure Parts

(a) Using 0.12 inch square punch, break flange of cup lockwasher (155) at piston rod end (135) into each of four slots in nut (150).

(b) Lockwire nut (175) to cylinder (380A) using lockwire, G50347 per SOPM 20-50-02.

NOTE: Steps ASSEMBLY, Paragraph 4.D.(7)(c) and ASSEMBLY, Paragraph 4.D.(7)(d) are not required to be accomplished if the optional lockwire provisions were not machined into housing (240).

(c) For non-locking actuators, P/N 315A1800-4, -5, -6, lockwire cylinder nut (330) to housing (240) using lockwire, G50347 per SOPM 20-50-02.

(d) For non-locking actuators, P/N 315A1800-7 and P/N 315N3800-1, lockwire nut (105A) to the housing (240) and to the cylinder nut (330) using lockwire, G50347 perSOPM 20-50-02.

(e) Lockwire fitting (5A) and adapter screw (10A) to housing using lockwire, G50347 per SOPM 20-50-02.

315A1800-4 THRU -7 THRUST REVERSER NON-LOCKING ACTUATOR ADJUSTMENTS WORKSHEET

DIMENSION D (FIG. 701)	1. ENTER CENTERLINE-TO-FACE DIMENSION AS MARKED ON WORM WHEEL (265)	1	
CALCULATION OF A (FIG. 702)	2. A. ENTER UPPER HEIGHT A1	2A	
	B. ENTER UPPER HEIGHT A2	2B	
	C. ADD LINES 2A AND 2B	2C	
	D. DIVIDE LINE 2C BY TWO (2)	2D	
CALCULATION OF B (FIG. 702)	3. A. ENTER LOWER HEIGHT B1	3A	
	B. ENTER LOWER HEIGHT B2	3B	
	C. ADD LINES 3A AND 3B	3C	
	D. DIVIDE LINE 3C BY TWO (2)	3D	
CALCULATION OF C (FIG. 702)	4. ENTER LINE 2D AMOUNT.	4	
	5. ADD LINES 3D AND 4.	5	
CALCULATION OF S1 SHIM THICKNESS (FIG. 702)	6. DIVIDE LINE 5 BY TWO (2).	6	
			(-)5.500
	7. SUBTRACT 5.500 FROM LINE 6.	7	
	8. ENTER LINE 1 AMOUNT	8	(-)
	9. SUBTRACT LINE 8 FROM LINE 7	9	
	SELECT THICKNESS OF SHIMS (270,275,280,285,290) EQUAL TO LINE 9 WITHIN 0.001.		
CALCULATION OF D3 (FIG. 703)	10. A. ENTER FIRST READING OF DISTANCE FROM HOUSING FACE TO BEARING OUTER RACE.	10A	
	B. ENTER SECOND READING OF DISTANCE FROM HOUSING FACE TO BEARING OUTER RACE.	10B	
	C. ADD LINES 10A AND 10B	10C	
	D. DIVIDE LINE 10C BY TWO (2).	10D	
CALCULATION OF D4 (FIG. 703)	11. A. ENTER FIRST READING OF DISTANCE FROM SLEEVE FACE TO BOTTOM FACE OF FITTING FLANGE	11A	
	B. ENTER SECOND READING OF DISTANCE FROM SLEEVE FACE TO BOTTOM FACE OF FITTING FLANGE	11B	
	C. ADD LINES 11A AND 11B	11C	
	D. DIVIDE LINE 11C BY TWO (2).	11D	
CALCULATION OF S2 SHIM THICKNESS (FIG. 703)	12. ENTER LINE 10D AMOUNT	12	(-)
	13. SUBTRACT LINE 12 FROM LINE 11D.	13	
	SELECT THICKNESS OF SHIMS (20,25,30,35,40) EQUAL TO LINE 13 WITHIN 0.0001.		

315A1800-4 THRU -7

Actuator Adjustments Worksheet
Figure 701 (Sheet 1 of 4)

315A1800-4 THRU -7 THRUST REVERSER NON-LOCKING ACTUATOR ADJUSTMENTS WORKSHEET (CONTINUED)

EXTENDED ACTUATOR LENGTH	14. ENTER DIAL INDICATOR READING OF PISTON AXIAL MOVEMENT INWARD FROM FULLY EXTENDED POSITION	14	
			43.272
	15. ADD 43.272 TO LINE 14.	15	
MACHINING OF STOP (FIG. 704)	16. WITH STOP IN CONTACT WITH GLAND NUT, MEASURE AND ENTER DISTANCE ACROSS GAGE BLOCK AND PIN OF FIXTURE	16	
			(-) 1.500
	17. SUBTRACT 1.500 FROM LINE 16.	17	
	MACHINE SURFACE B OF STOP TO REMOVE AMOUNT OF MATERIAL EQUAL TO LINE 17 WITHIN 0.0005.		
RETRACTED ACTUATOR LENGTH	18. WITH MACHINED STOP IN CONTACT WITH GLAND NUT, MEASURE AND ENTER DISTANCE ACROSS GAGE BLOCK AND PIN OF FIXTURE.	18	
			22.000
	19. ADD 22.000 TO LINE 18.	19	

315A1800-4 THRU -7

Actuator Adjustments Worksheet
Figure 701 (Sheet 2 of 4)

315N3800-1 THRUST REVERSER NON-LOCKING ACTUATOR ADJUSTMENTS WORKSHEET

DIMENSION D (FIG. 701)	1. ENTER CENTERLINE-TO-FACE DIMENSION AS MARKED ON WORM WHEEL (265)	1	
CALCULATION OF A (FIG. 702)	2. A. ENTER UPPER HEIGHT A1	2A	
	B. ENTER UPPER HEIGHT A2	2B	
	C. ADD LINES 2A AND 2B	2C	
	D. DIVIDE LINE 2C BY TWO (2)	2D	
CALCULATION OF B (FIG. 702)	3. A. ENTER LOWER HEIGHT B1	3A	
	B. ENTER LOWER HEIGHT B2	3B	
	C. ADD LINES 3A AND 3B	3C	
	D. DIVIDE LINE 3C BY TWO (2)	3D	
CALCULATION OF C (FIG. 702)	4. ENTER LINE 2D AMOUNT.	4	
	5. ADD LINES 3D AND 4.	5	
CALCULATION OF S1 SHIM THICKNESS (FIG. 702)	6. DIVIDE LINE 5 BY TWO (2).	6	
			(-)5.500
	7. SUBTRACT 5.500 FROM LINE 6.	7	
	8. ENTER LINE 1 AMOUNT	8	(-)
	9. SUBTRACT LINE 8 FROM LINE 7	9	
	SELECT THICKNESS OF SHIMS (270,275,280,285,290) EQUAL TO LINE 9 WITHIN 0.001.		
CALCULATION OF D3 (FIG. 703)	10. A. ENTER FIRST READING OF DISTANCE FROM HOUSING FACE TO BEARING OUTER RACE.	10A	
	B. ENTER SECOND READING OF DISTANCE FROM HOUSING FACE TO BEARING OUTER RACE.	10B	
	C. ADD LINES 10A AND 10B	10C	
	D. DIVIDE LINE 10C BY TWO (2).	10D	
CALCULATION OF D4 (FIG. 703)	11. A. ENTER FIRST READING OF DISTANCE FROM SLEEVE FACE TO BOTTOM FACE OF FITTING FLANGE	11A	
	B. ENTER SECOND READING OF DISTANCE FROM SLEEVE FACE TO BOTTOM FACE OF FITTING FLANGE	11B	
	C. ADD LINES 11A AND 11B	11C	
	D. DIVIDE LINE 11C BY TWO (2).	11D	
CALCULATION OF S2 SHIM THICKNESS (FIG. 703)	12. ENTER LINE 10D AMOUNT	12	(-)
	13. SUBTRACT LINE 12 FROM LINE 11D.	13	
	SELECT THICKNESS OF SHIMS (20,25,30,35,40) EQUAL TO LINE 13 WITHIN 0.0001.		

315N3800-1

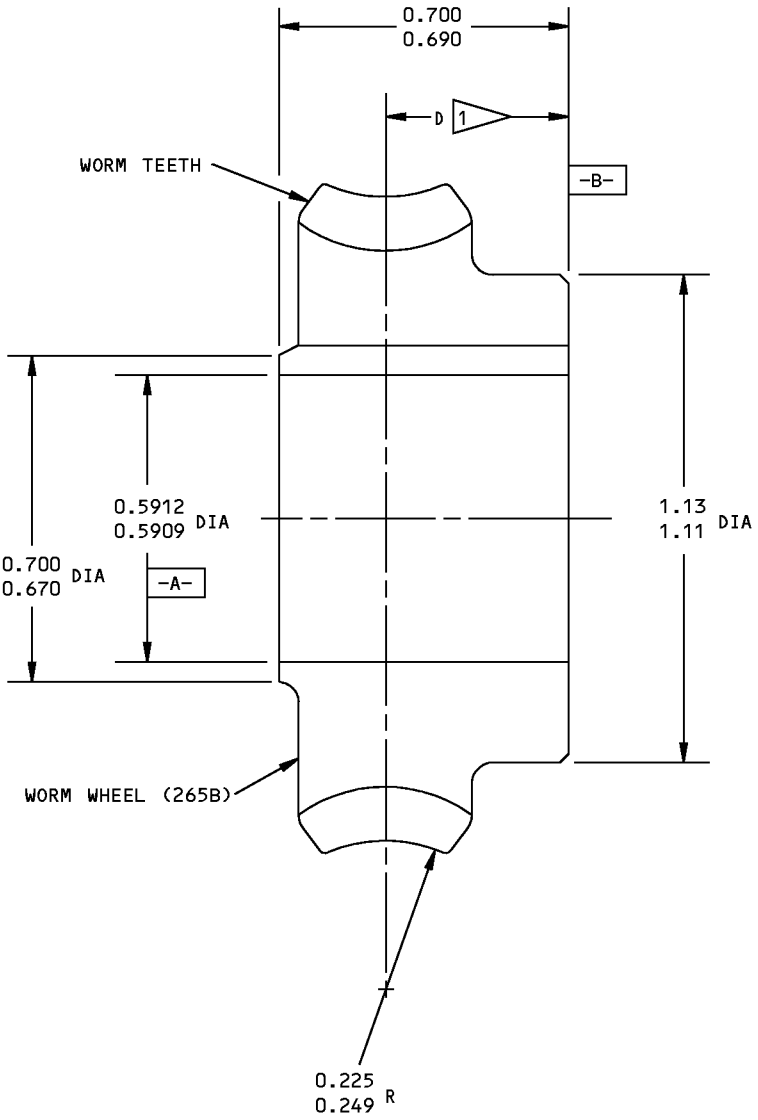
Actuator Adjustments Worksheet
Figure 701 (Sheet 3 of 4)

315N3800-1 THRUST REVERSER NON-LOCKING ACTUATOR ADJUSTMENTS WORKSHEET (CONTINUED)

EXTENDED ACTUATOR LENGTH	14. ENTER DIAL INDICATOR READING OF PISTON AXIAL MOVEMENT INWARD FROM FULLY EXTENDED POSITION	14	
			43.272
	15. ADD 43.272 TO LINE 14.	15	
MACHINING OF STOP (FIG. 704)	16. WITH STOP IN CONTACT WITH GLAND NUT, MEASURE AND ENTER DISTANCE ACROSS GAGE BLOCK AND PIN OF FIXTURE	16	
			(-) 1.500
	17. SUBTRACT 1.500 FROM LINE 16.	17	
	MACHINE SURFACE B OF STOP TO REMOVE AMOUNT OF MATERIAL EQUAL TO LINE 17 WITHIN 0.0005.		
RETRACTED ACTUATOR LENGTH	18. WITH MACHINED STOP IN CONTACT WITH GLAND NUT, MEASURE AND ENTER DISTANCE ACROSS GAGE BLOCK AND PIN OF FIXTURE.	18	
			22.000
	19. ADD 22.000 TO LINE 18.	19	

315N3800-1

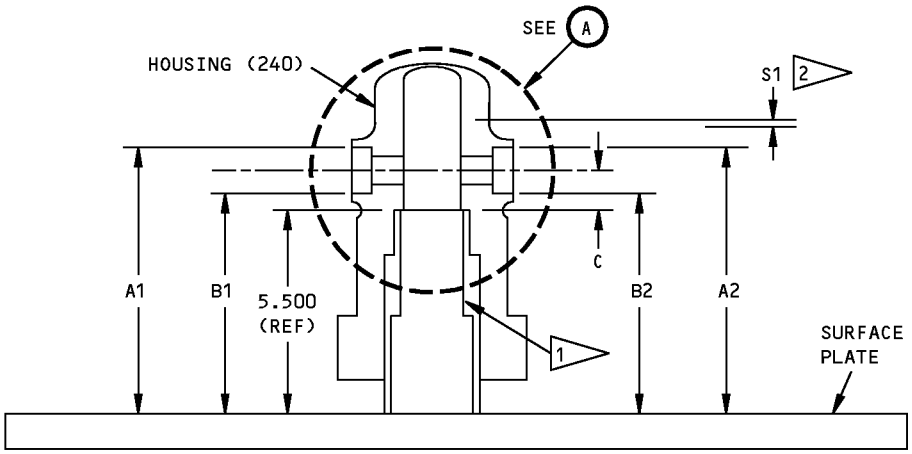
Actuator Adjustments Worksheet
Figure 701 (Sheet 4 of 4)

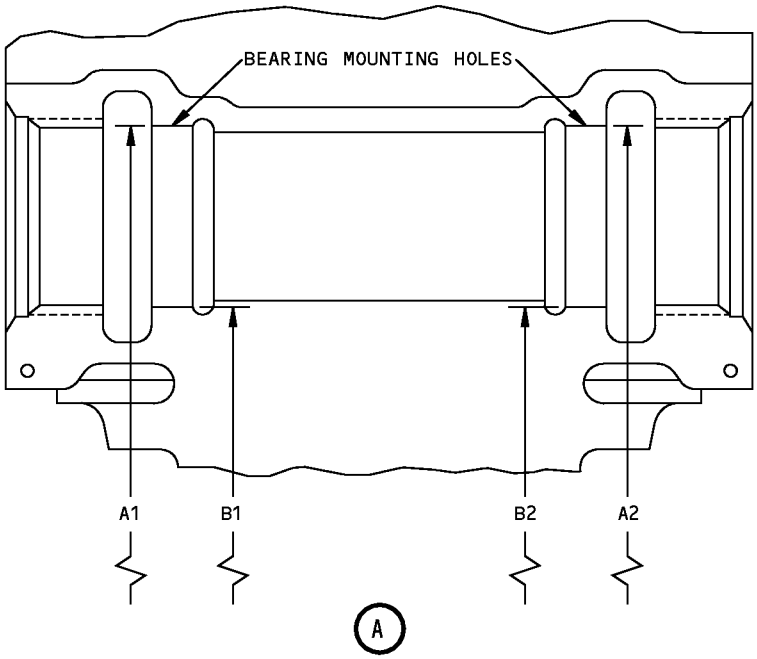


1 DESIGN DIM 0.415–0.425. ACTUAL DIMENSION (WITHIN ±0.001) MARKED ON PART, FOR USE IN CALCULATIONS PER FIG. 702

ALL DIMENSIONS ARE IN INCHES

Worm Wheel Measurement Details
Figure 702





1 HOUSING CHECKING PLUG TOOL 12M NO. B78016-6

2 SHIM (270 THRU 290) THICKNESS CALCULATION:

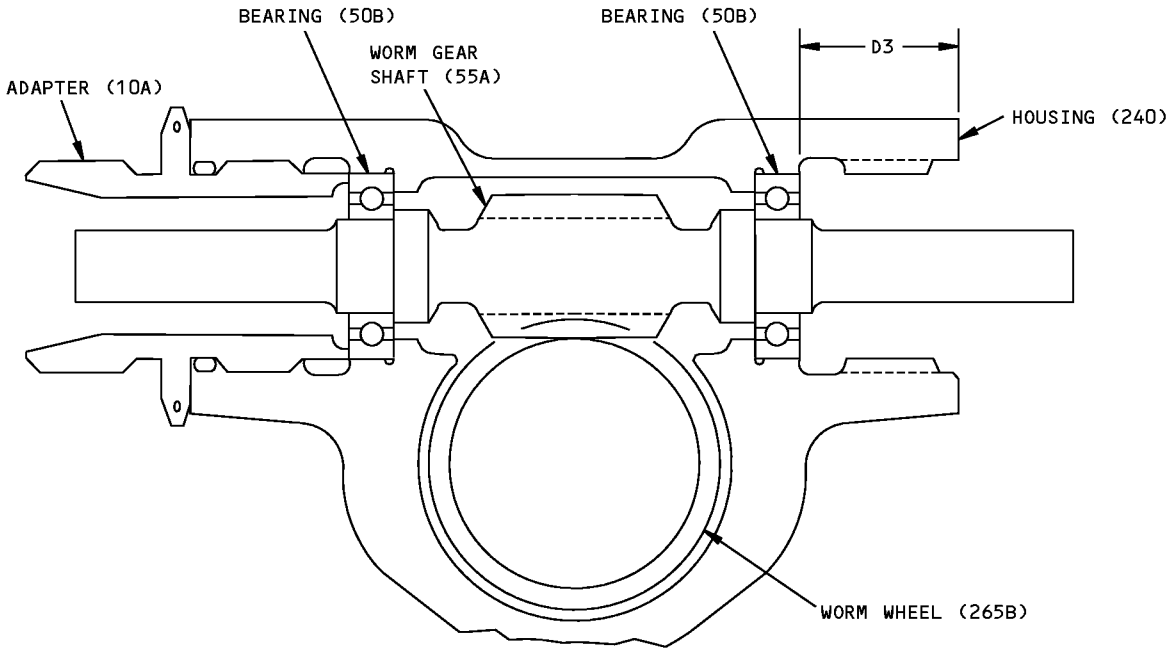
S1 = C-D WHERE

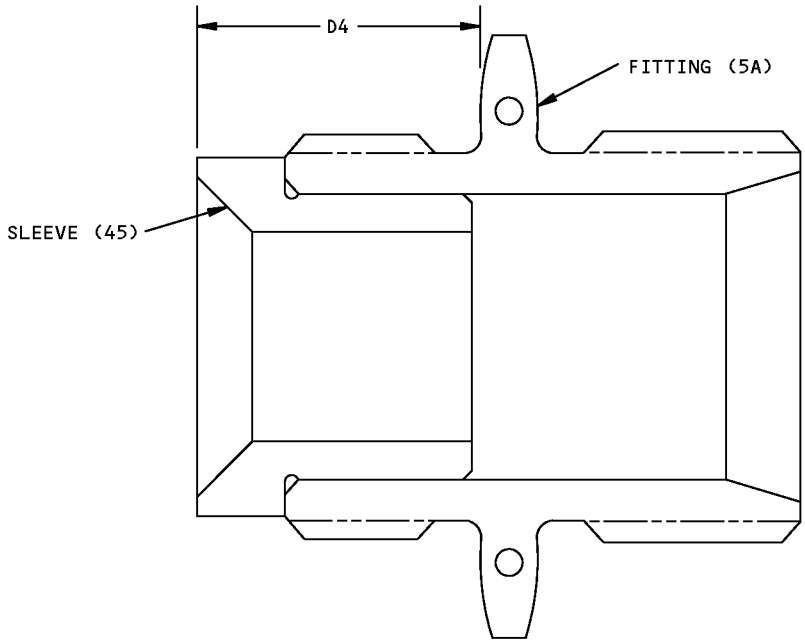
S1 = SHIM (270 THRU 290) THICKNESS (NOMINAL, 0.090-0.130)

C = DISTANCE FROM CENTERLINE OF WORM WHEEL BEARING MOUNTING TO END OF HOUSING (240) ID (NOMINAL, 0.515-0.545). $C = 5.500-\frac{(A+B)}{2}$ WHERE $A = \left(\frac{A1+A2}{2}\right)$ AND $B = \left(\frac{B1+B2}{2}\right)$

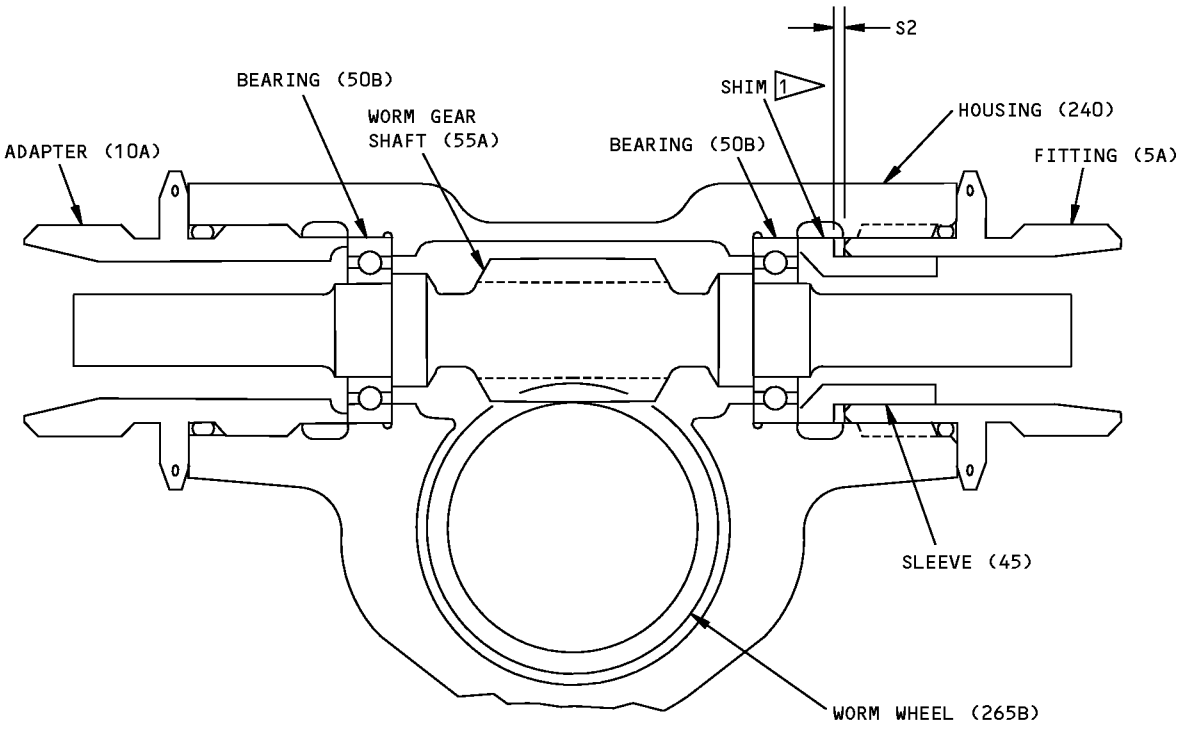
D = DISTANCE FROM FACE TO CENTERLINE AS MARKED ON WORM WHEEL (265B) (SEE FIG. 701)

Housing Measurements - Lead Screw Bearing Shim Thickness Calculations
Figure 703





Worm Gear Assembly Details
Figure 704 (Sheet 1 of 2)



1 SHIM (20 THRU 40) THICKNESS CALCULATION:

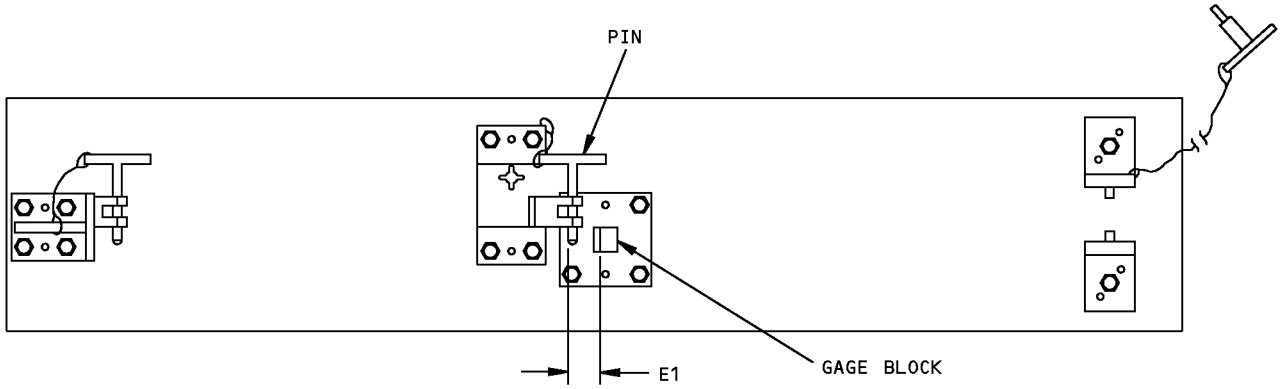
S2 = D3-D4 WHERE

S2 = SHIM (20 THRU 40) THICKNESS (NOMINAL, 0.023-0.093)

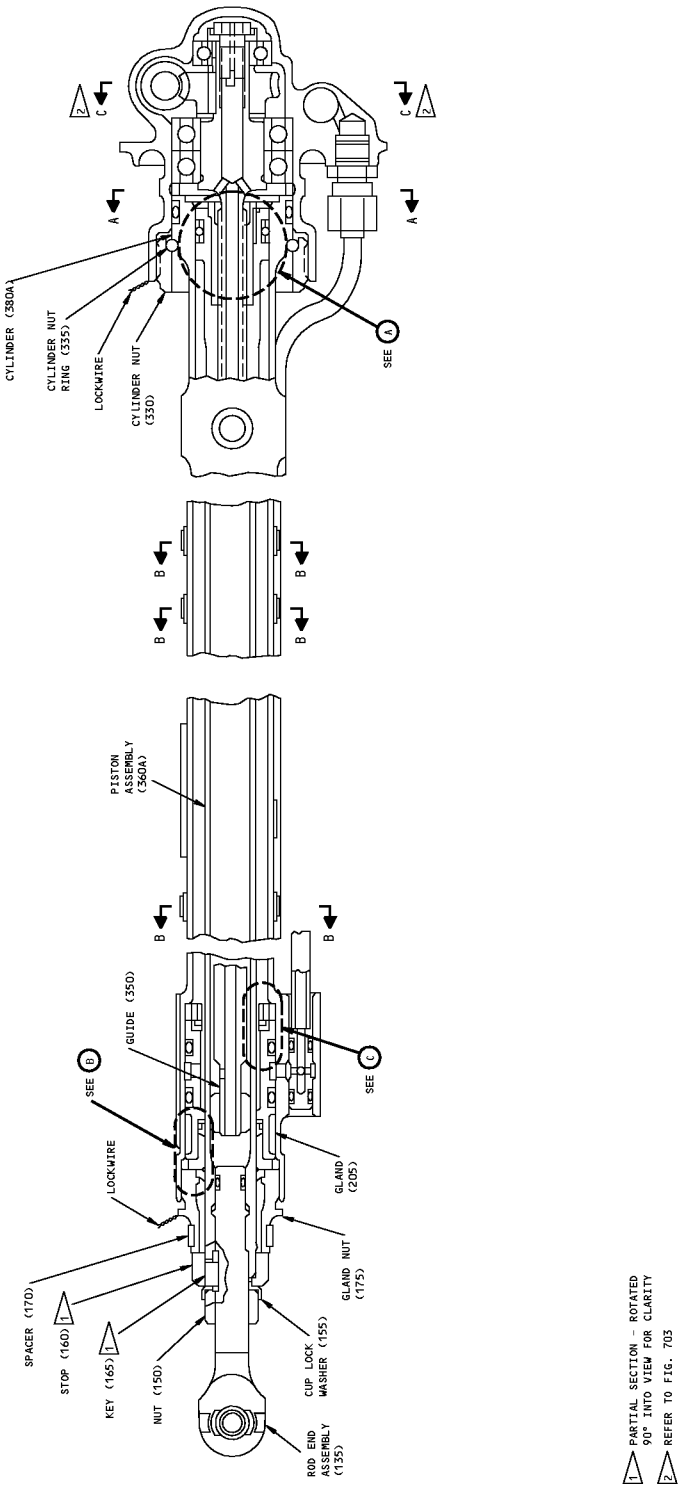
D3 = DISTANCE FROM HOUSING (240) FACE TO BEARING (50B) FACE (NOMINAL, 0.783-0.833)

D4 = DISTANCE FROM FITTING (5A) FACE TO SLEEVE (45) END (NOMINAL, 0.740-0.760)

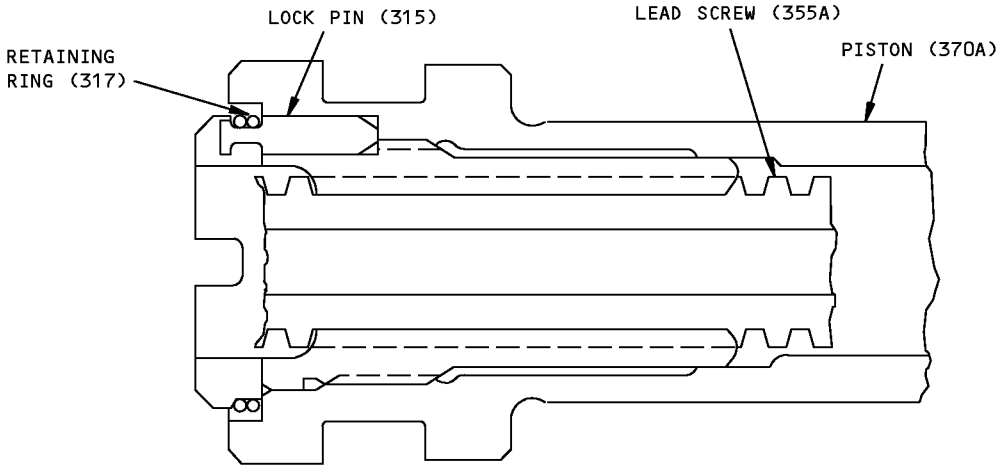
Worm Gear Assembly Details
Figure 704 (Sheet 2 of 2)



Dimension E1 Measurement - Test Fixture
Figure 705

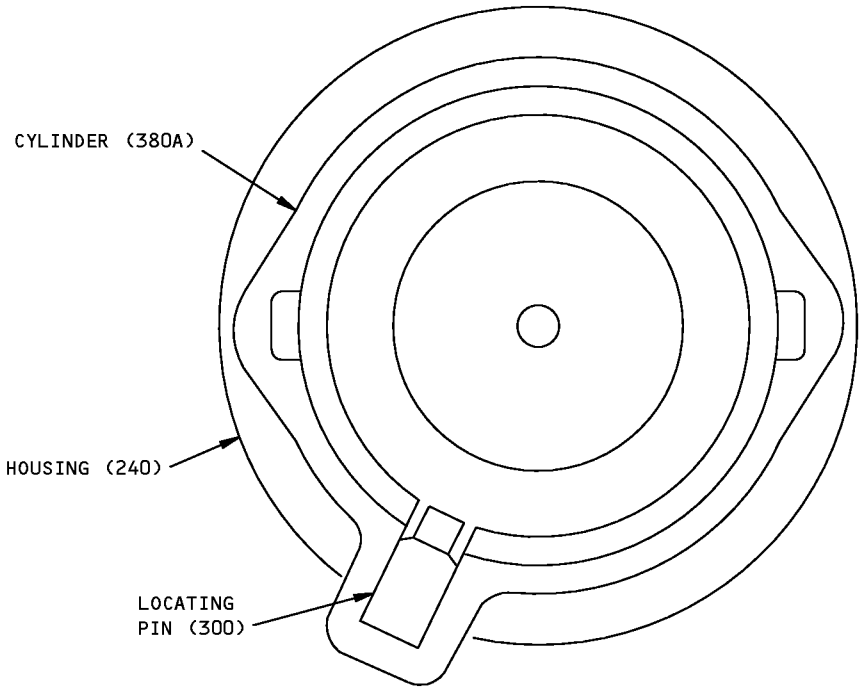


Actuator Assembly Details
Figure 706 (Sheet 1 of 4)



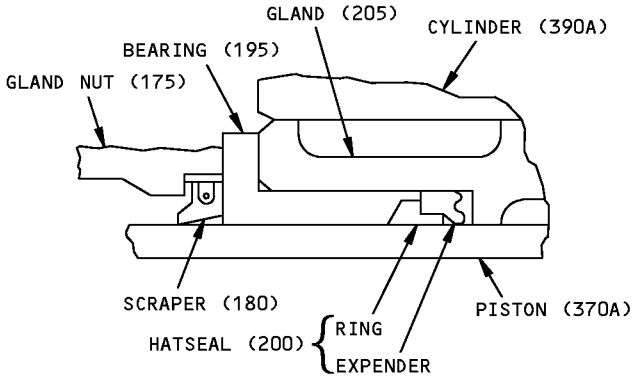
LEAD SCREW AND LEAD SCREW NUT DETAILS

A

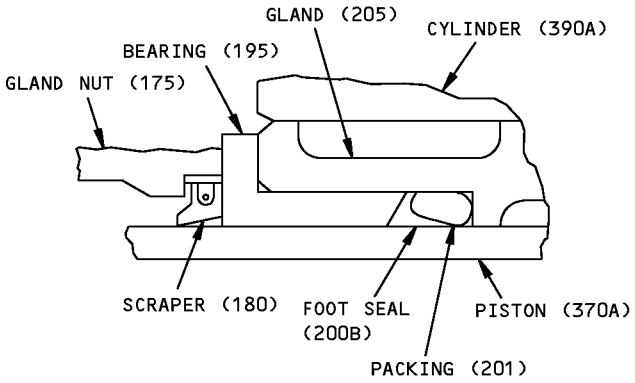


A–A

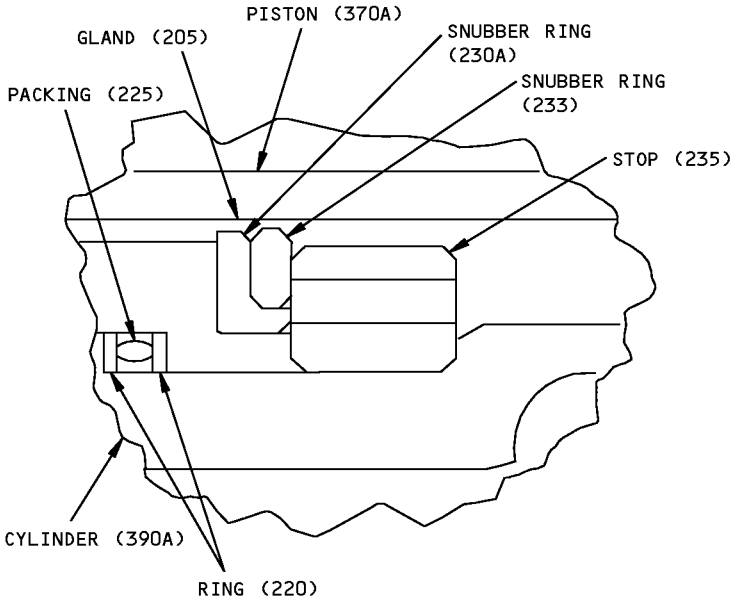
Actuator Assembly Details
Figure 706 (Sheet 2 of 4)

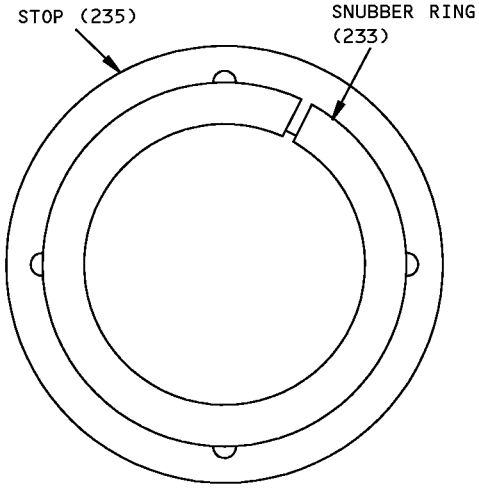


315A3800-4,-5,-6
PISTON/GLAND SEAL DETAILS
B



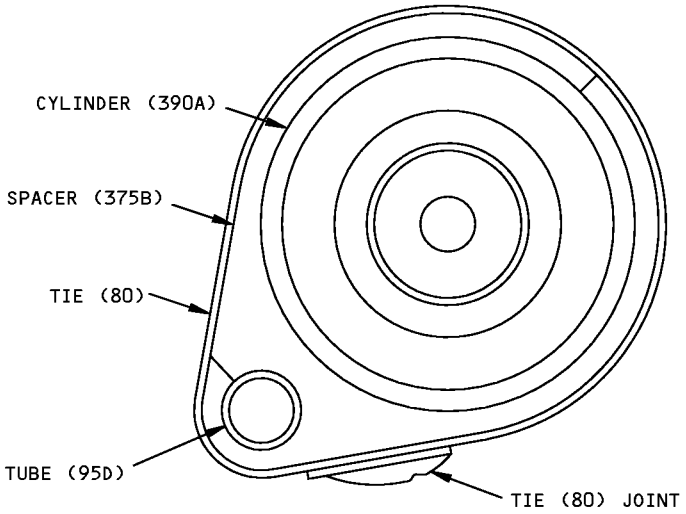
315A1800-7
315N3800-1
PISTON/GLAND SEAL DETAILS
B





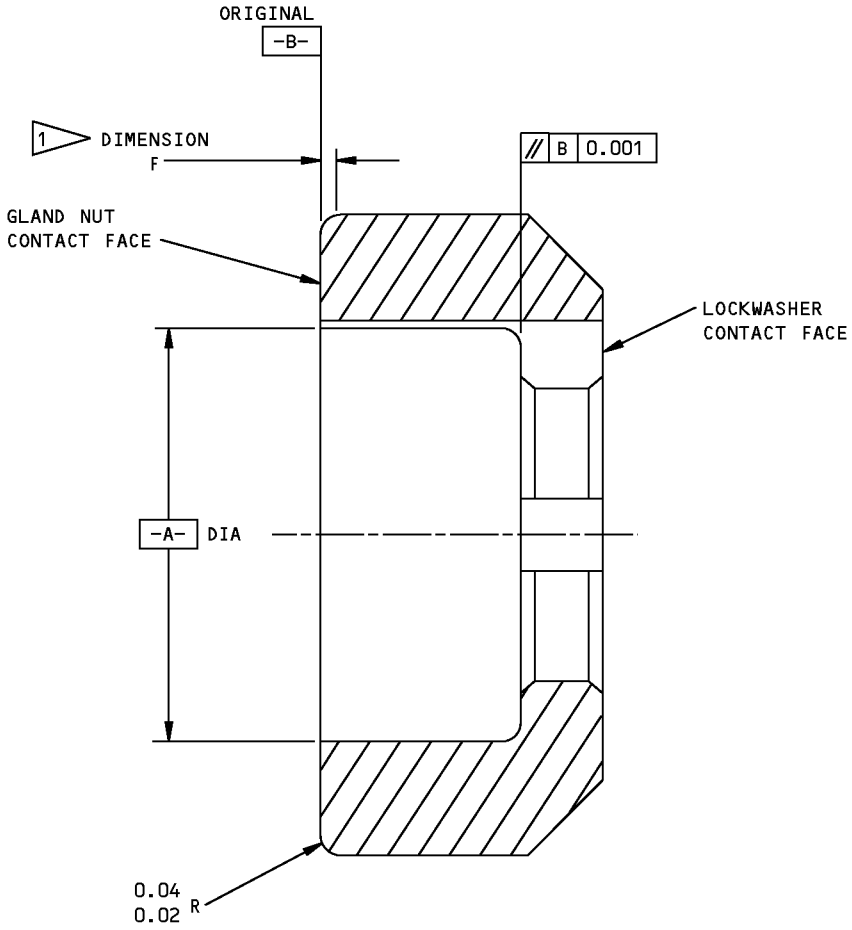
SNUBBER RING INSTALLATION DETAILS
C

Actuator Assembly Details
Figure 706 (Sheet 3 of 4)



TUBE SPACER DETAILS
B–B

Actuator Assembly Details
Figure 706 (Sheet 4 of 4)



STOP (160) 315A1891-1

1 MACHINE MATERIAL FROM SURFACE -B- OF STOP (160) IN ACCORDANCE WITH THE RELATION

F = E1 - 1.500 WHERE

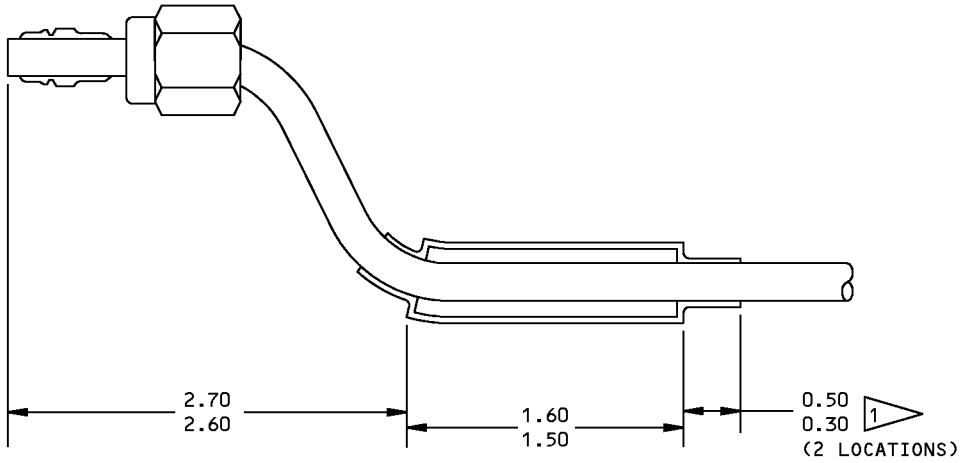
F = MATERIAL AMOUNT TO REMOVE FROM SURFACE -B-

E1 = DISTANCE ACROSS GAGE BLOCK AND FIXTURE PIN (REF ASSEMBLY STEP 4.E.(18))

CAUTION: STOP (160) REMOVED FROM SERVICE WILL HAVE SURFACE -B- AND DEPTH DIMENSION DIFFERENT FROM ORIGINAL DESIGN CONFIGURATION, DUE TO ABOVE MACHINING HAVING BEEN ALREADY PERFORMED DURING PREVIOUS ASSEMBLY OF PARTS

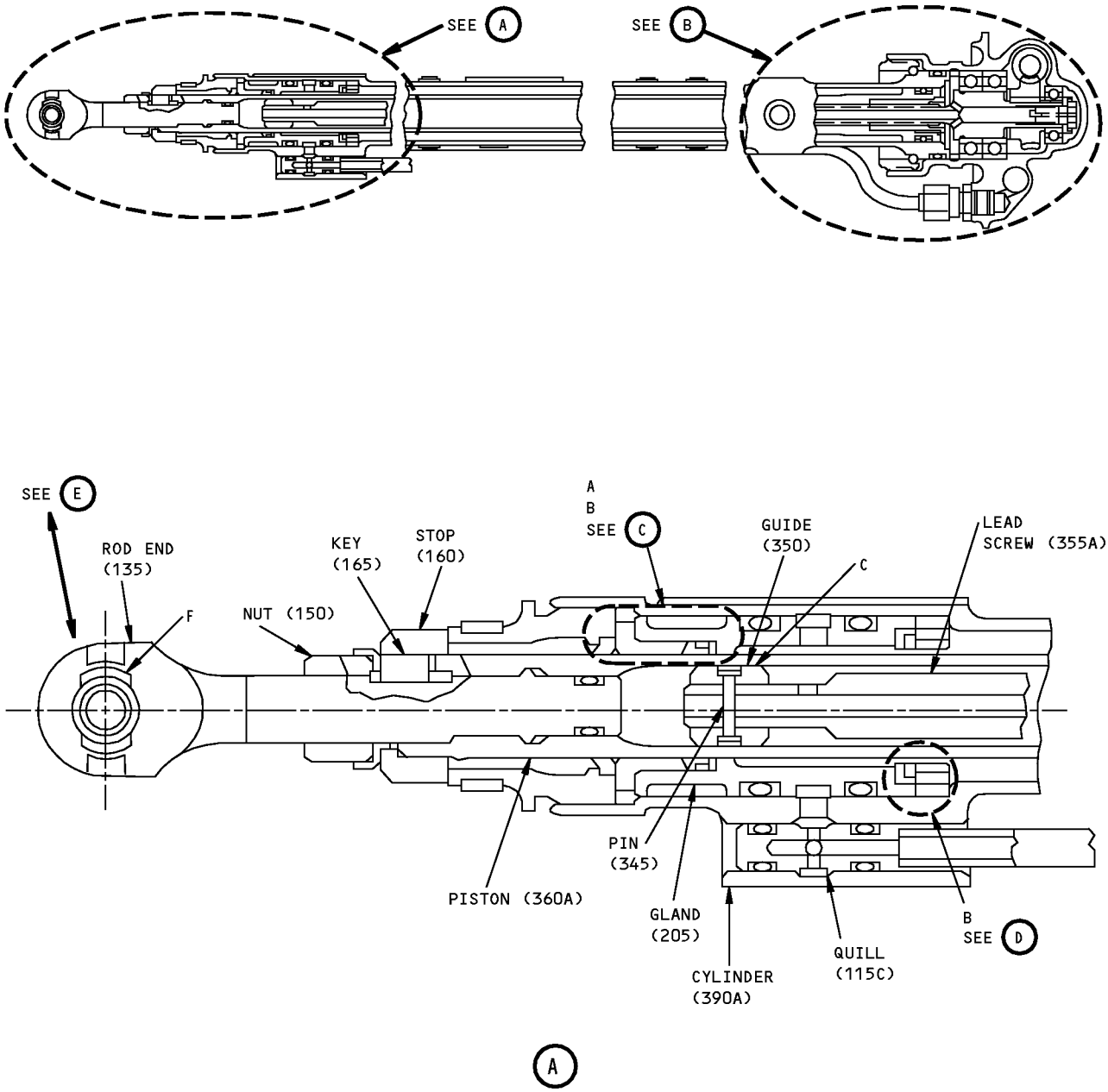
NOTE: REFER TO REPAIR 12-1 FOR ADDITIONAL DETAILS.

Machining of Stop
Figure 707

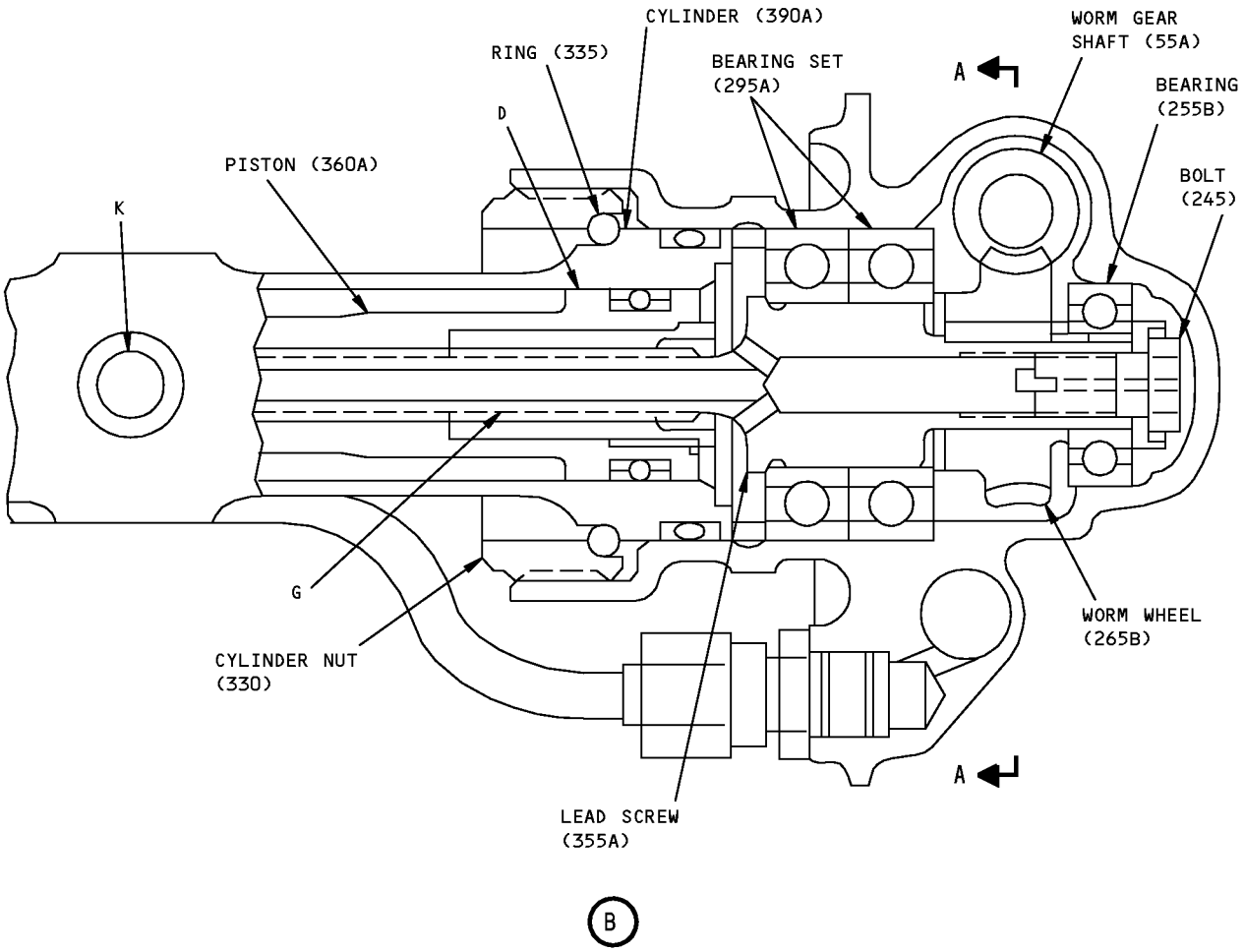


1 DIMENSIONS AFTER PREHEATING AND TRIMMING

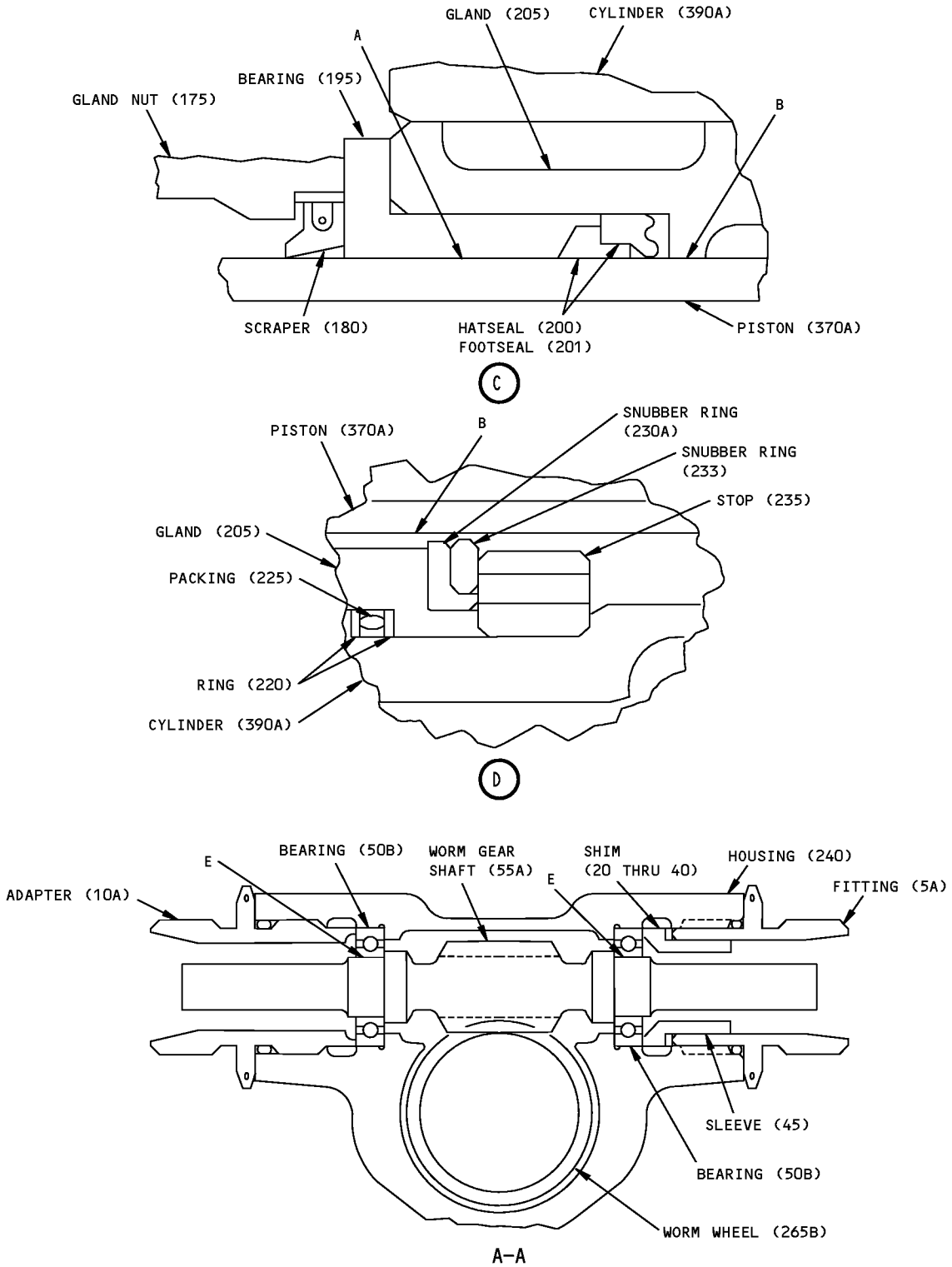
Spacer Installation
Figure 708



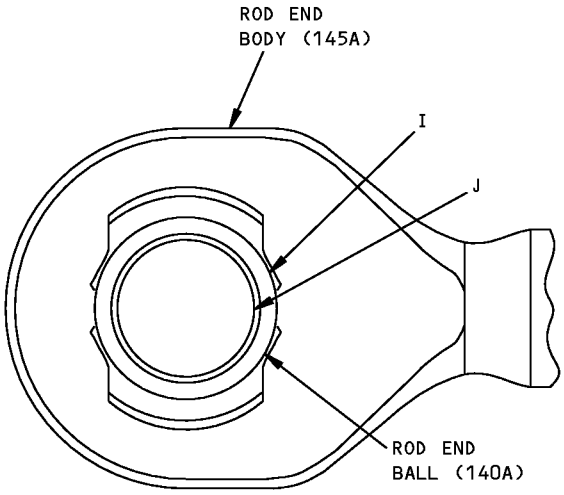
Fits and Clearances
Figure 801 (Sheet 1 of 5)



Fits and Clearances
Figure 801 (Sheet 2 of 5)



Fits and Clearances
Figure 801 (Sheet 3 of 5)



Fits and Clearances
Figure 801 (Sheet 4 of 5)

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 195 OD 370A	0.750 0.746	0.751 0.748	0.002	0.005	0.745	0.755	0.01
B	ID 205 OD 370A	0.750 0.746	0.751 0.748	0.002	0.005	0.745	0.755	0.01
C	ID 370A OD 350	0.557 0.548	0.560 0.552	0.005	0.012	0.525	0.570	0.045
D	ID 390 OD 370	1.116 1.113	1.118 1.114	0.002	0.005	1.110	1.121	0.011
E	ID 50B OD 55A	0.4721 0.4723	0.4724 0.4726	(1) −0.0005	0.0001	0.470	0.473	0.004
F	ID 145 OD 140	0.6265 0.6250	0.6270 0.6255	0.001	0.002	0.620	0.630	0.010
G	ID 365A OD 355A	0.448 (2) 0.440	0.452 (2) 0.444	(3) 0.0011	(3) 0.0033	(4)	(5)	(3) 0.020
I	ID 145A OD 140A	0.7185 0.7174	0.7190 0.7179	0.0006	0.0016	0.7166	0.7198	0.0032
J	ID 140A OD (6)	0.4370 0.4365	0.4375 0.4370	0.0000	0.0010	0.4360	0.4380	0.0020
K	ID 385 OD (7)	0.4375 0.4370	0.4390 0.4375	0.0000	0.0020	0.4366	0.4406	0.0040

ALL DIMENSIONS ARE IN INCHES

(1) NEGATIVE SIGN DENOTES INTERFERENCE
(2) PITCH DIAMETERS
(3) AXIAL BACKLASH
(4) MINUS 10% FLANKWEAR
(5) PLUS 10% FLANKWEAR
(6) INSTALLATION BOLT, P/N BACB30LE7U21
(7) INSTALLATION ACTUATOR RETAINER FITTING, P/N 315N3631-13

Fits and Clearances
Figure 801 (Sheet 5 of 5)

FOR TORQUE VALUES OF STANDARD FASTENERS, REFER TO 20-50-01			
ITEM NO. IPL FIG. 1	NAME	TORQUE	
		POUND-INCHES	POUND-FEET
5A	FITTING	1140-1200	
10A	SCREW	1140-1200	
70	UNION	133-147	
105A	NUT	133-147	
150	NUT	600-800	
175	NUT	800-1000	
245	BOLT	275-325	
330	NUT	2900-3100	

Torque Table
Figure 802

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

1. General

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

NOTE: Equivalent substitutes may be used.

Special Tools

Reference	Description	Part Number	Supplier
SPL-5349	X-Y Recorder/Plotter	925E	60795
SPL-5359	Test Fixture - Rod End and Stroke Stop, Locking and Non-Locking Thrust Reverser Actuator	B78014-37 Opt: B78014-29	81205 81205
SPL-6255	Wrench (B78008-7 is included in B78008-19)	B78008-7	81205
SPL-6256	Wrench (B78008-6 included in Kit B78008-19)	B78008-6	81205
SPL-6257	Wrench (B78008-5 is included in B78008-19)	B78008-5	81205
SPL-6272	Plug (B78016-6 is included in B78016-1)	B78016-6	81205
SPL-6274	Cap (B78016-3 is included in B78016-1)	B78016-3	81205
SPL-6280	Test Equipment - Velocity/Position Transducer	B20005-82 Opt: B20005-75	81205 81205
SPL-6281	Stand - Test, Functional	B78010-28	81205
SPL-6283	Equipment - Bearing Installation, Lead Screw	B78017-1	81205
SPL-6284	Fixture - Torque, Locking and Non-Locking Thrust Reverser Acutator Assembly	B78011-25	81205
SPL-6373	Transducer Assembly - Velocity/Position	B20005-41	81205
SPL-7292	Adapter - Worm Gear Shaft (B78016-9 is included in B78016-1)	B78016-9	81205
SPL-7299	Plate (B78016-4 is included in B78016-1)	B78016-4	81205
SPL-7301	Housing - Non-Locking (B78016-8 included in Overhaul Set B78016-1)	B78016-8	81205
SPL-7407	Wrench - Nut Gland (B78008-5 included in T/R Actuator Wrench Set B78008-18)	B78008-5	81205
SPL-8213	Spanner Wrench - Nut, Cylinder Locking Actuator (B78008-16 is included in B78008-19)	B78008-16	81205
SPL-8238	Test Equipment - Velocity/Position Transducer	B20005-52	81205

Commercial Tools

Reference	Description	Part Number	Supplier
COM-4950	Installation Tool - Cable Tie,	GS4MT	06383
		PPTMT	06383
		ST2MT	06383
COM-5782	Oscilloscope	TDS-220	80009

Tool Supplier Information

CAGE Code	Supplier Name	Supplier Address
06383	PANDUIT CORP.	17301 S. RIDGELAND AVE. TINLEY PARK, IL 60477-3048 Telephone: 800-777-3300 Facsimile: 708-532-1811 www.panduit.com
60795	ALLEN DATAGRAPH INC.	2 INDUSTRIAL WAY SALEM, NH 03079-2837 Telephone: (603) 893-1983 Facsimile: (603) 893-9042
80009	TEKTRONIX INC.	14200 S W KARL BRAUN DRIVE P. O. BOX 500 BEAVERTON, OR 97077 Telephone: (800) 835-9433 Facsimile: (503) 627-3866
81205	THE BOEING COMPANY	17930 INTERNATIONAL BLVD. SOUTH SEATAC, WA 98188-4321 Telephone: 206-662-6650 Facsimile: 206-662-7145

ILLUSTRATED PARTS LIST

1. Introduction

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

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

1 2 3 4 5 6 7

. Assembly

. Attaching parts for assembly

. . Detail parts for assembly

. . Subassembly

. . Attaching parts for subassembly

. . . Detail parts for subassembly

. . . Sub-subassembly

. . . Attaching parts for subassembly

. . . . . Details parts for sub-subassembly

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

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

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

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

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

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

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

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

H. Interchangeable Parts

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

VENDOR CODES

Code	Name
01673	AIRDROME PRECISION COMPONENTS 3251 E AIRPORT WAY LONG BEACH, CALIFORNIA 90806-2407 FORMERLY AIRDROME PARTS CO
02107	FLOUROCARBON CO OHIO DIV DOVER, OHIO 44622 CANCELLED NO REPLACEMENT FORMERLY SPARTA MANUFACTURING CO
02886	DODGE-WASMUND MFG CO INC 9607 BEVERLY ROAD PICO RIVERA, CALIFORNIA 90660-2136
06383	PANDUIT CORPORATION 17301 RIDGELAND AVENUE TINLEY PARK, ILLINOIS 60477-3048
07128	TETRAFLUOR INC 2051 EAST MAPLE AVENUE EL SEGUNDO, CALIFORNIA 90245-5009 FORMERLY ROYAL IND TETRAFLUOR DIV V0667B ENGLEWOOD CALIF
08199	SIERRACIN CORPORATION DBA HARRISON 3020 EMPIRE AVENUE BURBANK, CALIFORNIA 91504-3109 FORMERLY TECHNICAL IND INC OR HARRISON MFG CO DIV AXIAL CORP

Code	Name
11328	Replaced: [V11328] AEROQUIP SEE EATON AEROQUIP V00624 LINAIR ENG A TELEDYNE CO SEE TELEDYNE LINAIR ENGINEERING TELEDYNE INC SEE LINAIR ENGINEERING TELEDYNE LINAIR ENG SEE AEROQUIP CORP LINAIR DIV by Code: Name and Address below 00624: EATON AEROQUIP INC ENGINEERED SYSTEMS DIV 300 S EAST AVE JACKSON, MICHIGAN 49203-1972 FORMERLY AEROQUIP ELBEE PLANT V99879 OR WESTERN PLANT V70128; FORMERLY AEROQUIP AEROSP DIV JACKSON PLANT; FORMERLY V11328 AEROQUIP LINAIR DIV
14798	DEUTSCH CO METAL COMPONENTS DIV 14800 SOUTH FIGUEROA STREET GARDEN, CALIFORNIA 90248-1795 FORMERLY WEATHERHEAD V79470 FOR AEROSPACE PROD V 61498 DEUSCH CO THE DEUTSCH AEROSPACE FITTINGS CO DIV
21335	TIMKEN US CORPORATION DIV FAFNIR 336 MECHANIC STREET LEBANON, NH 03766-0267 FORMERLY FAFNIR BRG AND TEXTRON INC FAFNIR DIV IN NEW BRITAIN, CONNECTICUT ; FORMERLY TORRINGTON CO THE SPECIAL PRODUCTS DIV SUB OF THE INGERSOLL-RAND CO V8D210 FORMERLY TORRINGTON CO FAFNIR BEARING DIV IN TORRINGTON, CT
21760	SCHATZ BEARING CORP 10 FAIRVIEW AVENUE PO BOX 1191 POUGHKEEPSIE, NEW YORK 12601-1312 FORMERLY FEDERAL BRG CO AND SCHATZ MFG CO V53268 FORMERLY SCHATZ MFG CO
26303	GREENE TWEED IND INC ADVANTEC DIV 7101 PATTERSON DRIVE PO BOX 5037 GARDEN GROVE, CALIFORNIA 92645-5037 FORMERLY OHIO AIRCRAFT SUPPLIES INC IN INGLEWOOD, CALIFORNIA FORMERLY ADVANTEC DIV OF IFP INC, LOS ANGELES, CA V5P801
26879	CORONADO MFG INC 11069 PENROSE AVENUE SUN VALLEY, CALIFORNIA 90352-2722 FORMERLY CORONADO PLASTICS INC IN BURBANK, CALIFORNIA

Code	Name
29337	HOOVER GROUP INC BALL AND ROLLER DIV 2220 PENDLEY ROAD PO BOX 899 CUMMING, GEORGIA 30130-8671 FORMERLY IN ERWIN, INDIANA, HOOVER UNIVERSAL CO
30974	AEROFIT PRODUCTS INC 6460 DALE STREET BUENA PARK, CALIFORNIA 90621-3115
38443	MRC BEARINGS 402 CHANDLER STREET JAMESTOWN, NEW YORK 14701-3802 FORMERLY MARLIN-ROCKWELL CORP DIV TRW AND TRW INC
40920	MPB MINIATURE PRECISION BEARING DIV PRECISION PARK PO BOX 547 KEENE, NEW HAMPSHIRE 03431 FORMERLY MPB CORP AND MINIATURE BRG DIV MPB CORP
43334	GENERAL MOTORS CORP DELCO MORAINE DIV 2509 HAYES AVENUE SANDUSKY, OHIO 44870-5359 FORMERLY IN BRISTOL, CONNECTICUT FORMERLY NEW DEPARTURE-HYATT BRG DIV GEN MOTORS CORP
43991	FAG BEARING INCORPORATED 118 HAMILTON AVENUE STAMFORD, CONNECTICUT 06904 FORMERLY NORMA-HOFFMAN BEARING CORPORATION FORMERLY NORMA FAG BEARINGS CORPORATION
52676	SKF INDUSTRIES INC 1100 FIRST AVENUE KING OF PRUSSIA, PENNSYLVANIA 19406-1312 FORMERLY SKF INDUSTRIES INC FRANDFORD PLANT FORMERLY ATLAS BALL DIV OF SKF IND V70648 AND VB0017 FORMERLY IN PHILADELPHIA, PENNSYLVANIA
78118	SPLIT BALL BEARING DIV OF MPB CORP HIGHWAY 4 LEBANON, NEW HAMPSHIRE 03766-7301

Code	Name
94878	RAYBESTOS-MANHATTAN INC PACIFIC COAST DIV FULLERTON, CALIFORNIA 92631 BUSINESS DISCONTINUED
97415	SMITHS AEROSPACE ACTUATION SYSTEMS-YAKIMA 2720 W WASHINGTON AVE YAKIMA, WASHINGTON 98909-0907 FORMERLY DECOTO AIRCRAFT AND DOWTY DECOTO; FORMERLY DOWTY AEROSPACE YAKIMA
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
9V013	TEXTRON INC FAFNIR BEARING DIV US RT 41 S CALHOUN, GEORGIA 30701-9145

NUMERICAL INDEX

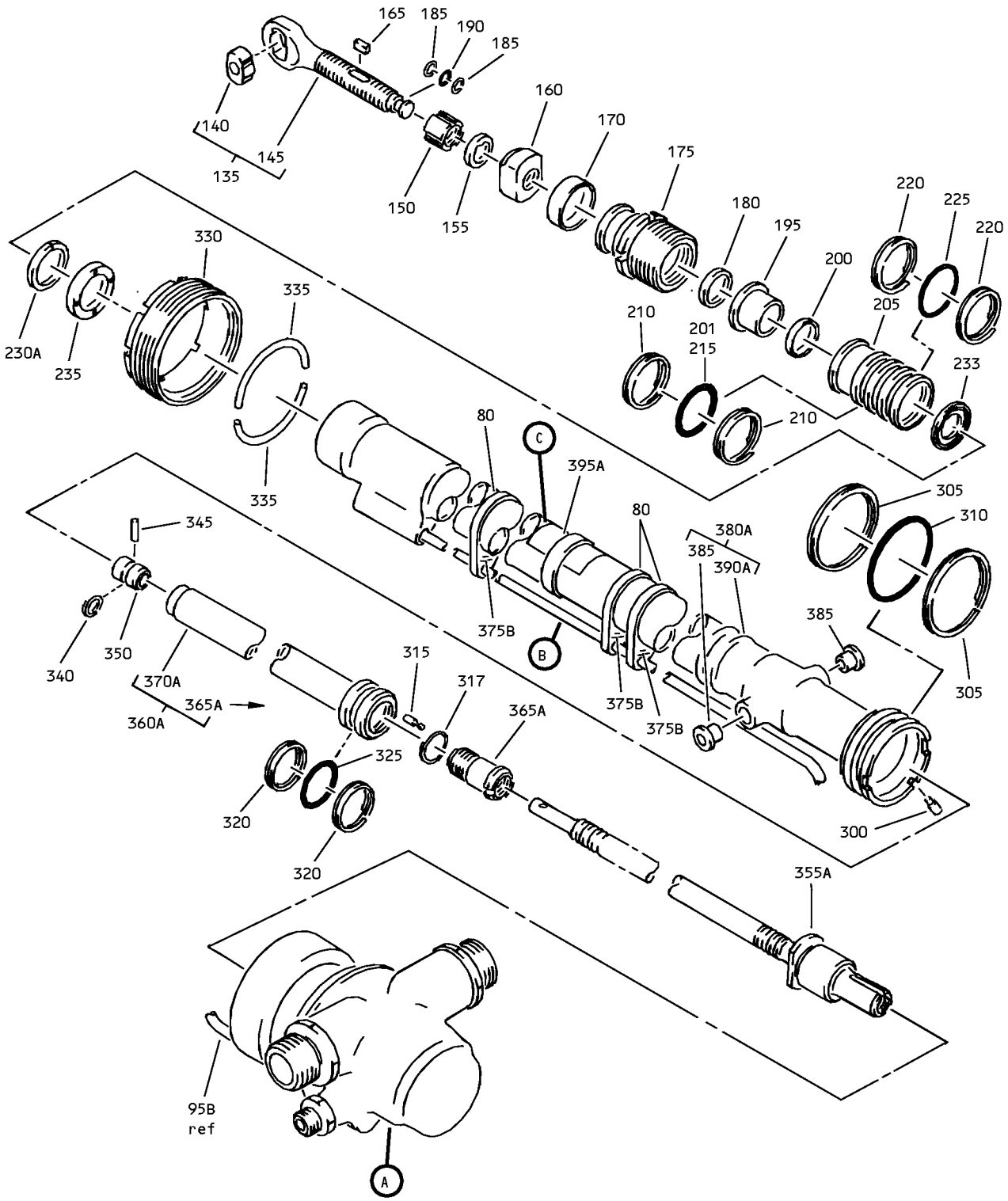
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
102KS		1	255B	1
1334-15		1	380B	1
1901-1B1-01		1	50B	2
1901S		1	50B	2
2-02903-04H		1	110	1
2140-5A		1	180	1
2150-122		1	220	2
315A1800-4		1	1C	RF
315A1800-5		1	1D	RF
315A1800-6		1	1E	RF
315A1800-7		1	1F	RF
315A1808-3		1	380A	1
315A1808-4		1	390A	1
315A1810-1		1	240	1
315A1811-1		1	330	1
315A1812-1		1	205	1
315A1813-4		1	265B	1
315A1816-2		1	370A	1
315A1817-2		1	55A	1
315A1817-3		1	55B	1
		1	55C	1
315A1818-2		1	5A	1
315A1819-3		1	360A	1
315A1821-2		1	335	2
315A1822-3		1	355A	1
315A1822-4		1	355B	1
315A1822-5		1	355C	1
		1	355D	1
315A1824-2		1	230A	1
315A1824-3		1	233	1
315A1826-1		1	350	1
315A1827-1		1	340	1
315A1828-1		1	315A	1
315A1828-2		1	315	1

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
		1	315B	1
315A1829-1		1	345	1
315A1831-1		1	135	1
315A1831-2		1	145	1
315A1831-3		1	140	1
315A1832-10		1	95H	1
		1	95J	1
315A1832-11		1	95K	1
		1	95L	1
315A1832-12		1	117A	1
315A1832-5		1	117	1
315A1832-6		1	95D	1
315A1832-7		1	95E	1
315A1832-8		1	95F	1
315A1832-9		1	95G	1
315A1834-1		1	45	1
315A1835-1		1	20	AR
315A1835-12		1	270	AR
315A1835-13		1	275	AR
315A1835-14		1	280	AR
315A1835-15		1	285	AR
315A1835-16		1	290	AR
315A1835-2		1	25	AR
315A1835-3		1	30	AR
315A1835-4		1	35	AR
315A1835-5		1	40	AR
315A1836-1		1	395A	1
315A1837-1		1	295A	1
315A1853-1		1	195	1
315A1856-1		1	300	1
315A1858-4		1	120C	1
315A1858-5		1	120D	1
315A1858-6		1	120E	1
315A1864-1		1	317	1
315A1865-1		1	235	1

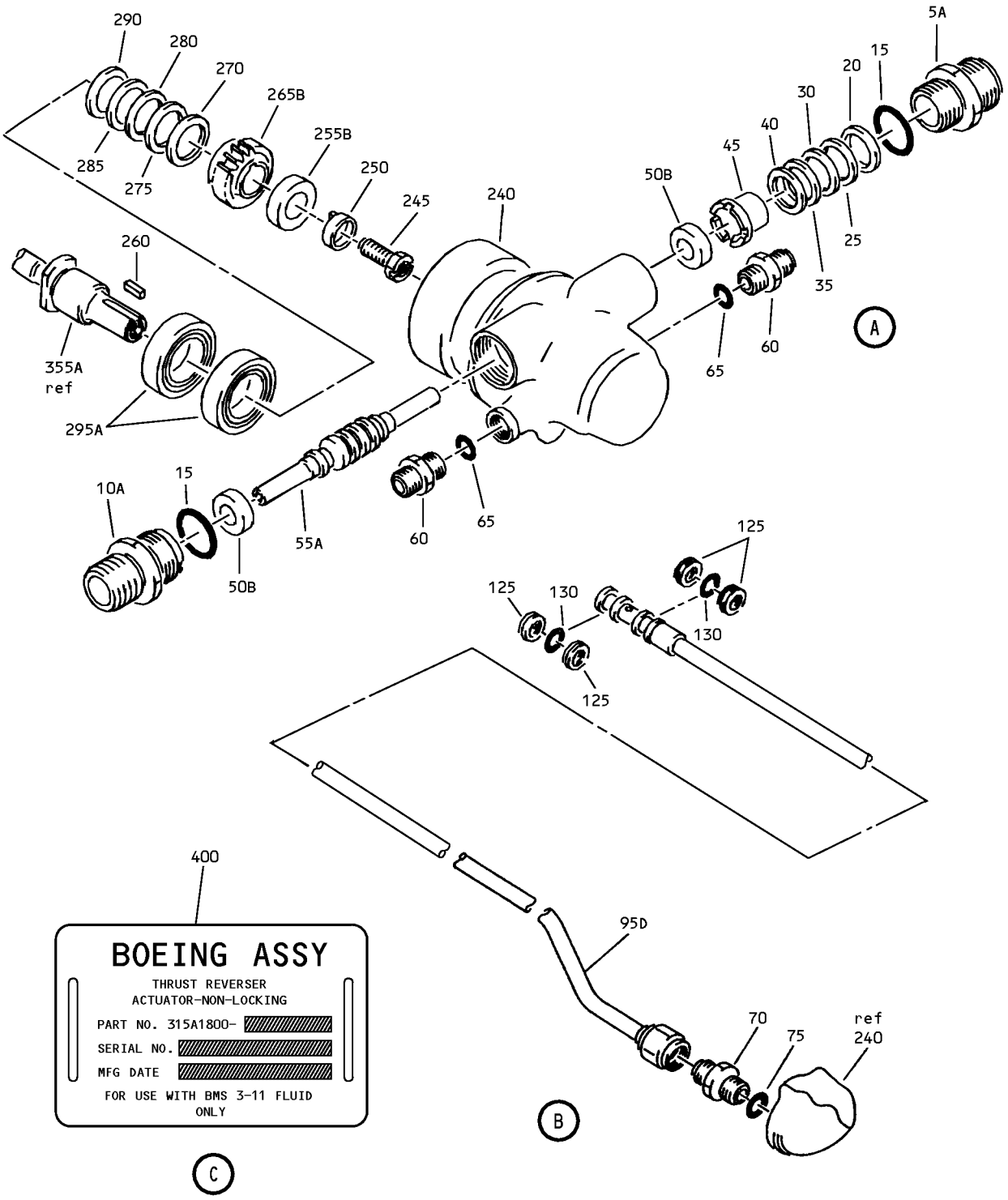
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
315A1866-1		1	175	1
315A1866-2		1	175A	1
		1	175B	1
315A1867-1		1	170	1
315A1867-3		1	375B	3
315A1870-3		1	365A	1
315A1870-4		1	365B	1
315A1871-4		1	115C	1
315A1871-5		1	115D	1
315A1871-6		1	115E	1
315A1874-1		1	150	1
315A1890-1		1	155	1
315A1891-1		1	160	1
315A1901-1		1	165	1
315A1903-2		1	10A	1
315A1910-1		1	250	1
315A1914-1		1	245	1
315N3800-1		1	1G	RF
315N3831-1		1	145A	1
315N3831-2		1	140A	1
315N3832-1		1	135B	1
35235V04		1	110	1
3L02		1	255B	1
		1	255B	1
6002		1	255B	1
6002J		1	255B	1
9102-1B1-01		1	255B	1
9102K		1	255B	1
9301K		1	50B	2
AFP175V04		1	110	1
		1	110	1
AP2097-04H		1	110	1
BAC27DTR0012		1	400A	1
BAC27NPP44		1	400B	1
BACB10BA15		1	255B	1

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
BACB10BB12		1	50B	2
BACB28X7F037		1	385	2
BACN10CS04J		1	105A	1
BACR12BP122		1	220	2
BACS13BX04H		1	110	1
BACS34A5A		1	180	1
C001MCP0		1	50B	2
C001R1P17LY331		1	50B	2
C102RR1P17LY331		1	255B	1
C102RRP0		1	255B	1
C11237-122		1	220	2
CWR76-5B		1	180	1
DB0S13BX04H		1	110	1
DW96801-5A		1	180	1
DW969516-122		1	220	2
MLT2HLP		1	80	3
MS20068-53		1	260	1
MS21902J4		1	70	1
MS21902J6		1	60	2
MS28782-17		1	320	2
MS28782-20		1	210	2
MS28782-5		1	125	4
MS28782-6		1	185	2
MS28783-1		1	305	2
NAS1611-010		1	130	2
NAS1611-010A		1	130A	2
NAS1611-011		1	190	1
NAS1611-011A		1	190A	1
NAS1611-116		1	201	1
NAS1611-116A		1	201A	1
NAS1611-122		1	225	1
NAS1611-122A		1	225A	1
NAS1611-212		1	325	1
NAS1611-212A		1	325A	1
NAS1611-215		1	215	1

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
NAS1611-215A		1	215A	1
NAS1611-223		1	310	1
NAS1611-223A		1	310A	1
NAS1612-12		1	15	2
NAS1612-12A		1	15A	2
NAS1612-4		1	75	1
NAS1612-4A		1	75A	1
NAS1612-6		1	65	2
NAS1612-6A		1	65A	2
PKT001P1		1	50B	2
PKT102P1		1	255B	1
R9102KA4298		1	255B	1
R9301KA4298		1	50B	2
		1	50B	2
RM9157BU122		1	220	2
RMS34A5A		1	180	1
S30310-122		1	220	2
S30388-5-1		1	180	1
S32991-116H5		1	200	1
S33121-116-99		1	200B	1
STS900-122		1	220	2
TF005-5A		1	180	1
TF456-122		1	220	2



Thrust Reverser Non-Locking Actuator Assembly
IPL Figure 1 (Sheet 1 of 2)



Thrust Reverser Non-Locking Actuator Assembly
IPL Figure 1 (Sheet 2 of 2)

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–1	315A1800-1		DELETED		
–1A	315A1800-2		DELETED		
–1B	315A1800-3		DELETED		
–1C	315A1800-4		ACTUATOR ASSY-NON-LOCKING	A	RF
–1D	315A1800-5		ACTUATOR ASSY-NON-LOCKING	B	RF
–1E	315A1800-6		ACTUATOR ASSY-NON-LOCKING	C	RF
–1F	315A1800-7		ACTUATOR ASSY-NON-LOCKING	D	RF
–1G	315N3800-1		ACTUATOR ASSY-NON-LOCKING	E	RF
5	315A1818-1		DELETED		
5A	315A1818-2		. FITTING		1
10	315A1903-1		DELETED		
10A	315A1903-2		. SCREW-ADAPTER		1
15	NAS1612-12		. PACKING	A-D	2
–15A	NAS1612-12A		. PACKING	E	2
20	315A1835-1		. SHIM (MAKE FROM CRES SHEET AISI 301 1/2 HARD TO HARD MIL-S-5059 FINISH PASSIVE PER BAC 5751 TYPE II 0.040IN 1.0IN 1.0IN)		AR
25	315A1835-2		. SHIM (MAKE FROM CRES SHEET AISI 301 1/2 HARD TO HARD MIL-S-5059 FINISH PASSIVE PER BAC 5751 TYPE II 0.010IN 1.0IN 1.0IN)		AR
30	315A1835-3		. SHIM (MAKE FROM CRES SHEET AISI 301 1/2 HARD TO HARD MIL-S-5059 FINISH PASSIVE PER BAC 5751 TYPE II 0.005IN 1.0IN 1.0IN)		AR
35	315A1835-4		. SHIM (MAKE FROM CRES SHEET AISI 301 1/2 HARD TO HARD MIL-S-5059 FINISH PASSIVE PER BAC 5751 JTYPE II 0.003IN 1.0IN 1.0IN)		AR

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
40	315A1835-5		. SHIM (MAKE FROM CRES SHEET AISI 301 1/2 HARD TO HARD MIL-S-5059 FINISH PASSIVE PER BAC 5751 TYPE II 0.001IN 1.0IN 1.0IN)		AR
45	315A1834-1		. SLEEVE		1
50	1901S		DELETED		
–50A	9301K		DELETED		
50B	1901-1B1-01		. BEARING (V21760) (SPEC BACB10BB12) (OPT 1901S (V38443)) (OPT 9301K (V21335)) (OPT PKT001P1 (V78118)) (OPT C001MCP0 (V40920)) (OPT C001R1P17LY331 (V40920)) (OPT R9301KA4298 (V21335)) (OPT R9301KA4298 (V9V013))		2
55	315A1817-1		DELETED		
55A	315A1817-2		. SHAFT-WORM (OPT ITEM 55B)	A-D	1
–55B	315A1817-3		. SHAFT-WORM (OPT ITEM 55A)	A-D	1
–55C	315A1817-3		. SHAFT-WORM	E	1
60	MS21902J6		. UNION		2
65	NAS1612-6		. PACKING	A-D	2
–65A	NAS1612-6A		. PACKING	E	2
70	MS21902J4		. UNION		1
75	NAS1612-4		. PACKING	A-D	1
–75A	NAS1612-4A		. PACKING	E	1
80	MLT2HLP		. TIE (V06383)		3
80A	MLT2HLP		DELETED		
85	315A1825-2		DELETED		
85A	315A1825-2		DELETED		
90	315A1825-3		DELETED		
90A	315A1825-4		DELETED		

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
95	315A1832-1		DELETED		
95A	315A1832-2		DELETED		
95B	315A1832-3		DELETED		
95C	315A1832-4		DELETED		
95D	315A1832-6		. TUBE ASSY (OPT ITEM 95E, 95F)	A	1
–95E	315A1832-7		. TUBE ASSY (OPT ITEM 95D)	A	1
–95F	315A1832-8		. TUBE ASSY (OPT ITEM 95D)	A	1
–95G	315A1832-9		. TUBE ASSY	B	1
–95H	315A1832-10		. TUBE ASSY	C	1
–95J	315A1832-10		. TUBE ASSY (OPT ITEM 95K)	D	1
–95K	315A1832-11		. TUBE ASSY (OPT ITEM 95J)	D	1
–95L	315A1832-11		. TUBE ASSY	E	1
100	BC902T4		DELETED		
–105	AFP101-04		DELETED		
–105A	BACN10CS04J		. . NUT		1
–110	DB0S13BX04H		. . SLEEVE (V14798) (SPEC BACS13BX04H) (OPT 2-02903-04H (V11328)) (OPT 35235V04 (V08199)) (OPT AP2097-04H (V01673)) (OPT AFP175V04 (V30974)) (OPT AFP175V04 (V30974))		1
–115	315A1871-1		DELETED		
–115A	315A1871-2		DELETED		
–115B	315A1871-3		DELETED		
–115C	315A1871-4		. . QUILL (USED ON ITEM 95D)	A	1
–115D	315A1871-5		. . QUILL (USED ON ITEM 95E)	A	1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–115E	315A1871-6		. . QUILL (USED ON ITEMS 95F, 95G, 95H, 95J, 95K, 95L)		1
–117	315A1832-5		. . SPACER (USED ON ITEMS 95D, 95E, 95F, 95G, 95H, 95J)	A-D	1
–117A	315A1832-12		. . SPACER (USED ON ITEMS 95K, 95L)	D, E	1
–120	315A1858-1		DELETED		
–120A	315A1858-2		DELETED		
–120B	315A1858-3		DELETED		
–120C	315A1858-4		. . TUBE	A	1
–120D	315A1858-5		. . TUBE	B	1
–120E	315A1858-6		. . TUBE	C-E	1
125	MS28782-5		. RING		4
130	NAS1611-010		. PACKING	A-D	2
–130A	NAS1611-010A		. PACKING	E	2
135	315A1831-1		. END ASSY-ROD	A-D	1
–135A	315A1831-4		DELETED		
–135B	315N3832-1		. END ASSY-ROD	E	1
140	315A1831-3		. . BALL	A-D	1
140A	315N3831-2		. . DETAIL-ROD END BALL	E	1
145	315A1831-2		. . BODY	A-D	1
145A	315N3831-1		. . DETAIL-ROD END BODY	E	1
150	315A1874-1		. NUT		1
155	315A1890-1		. WASHER-LOCK		1
160	315A1891-1		. STOP		1
165	315A1901-1		. KEY		1
170	315A1867-1		. SPACER		1
175	315A1866-1		. NUT-GLAND (OPT ITEM 175A)	A-D	1
–175A	315A1866-2		. NUT-GLAND (OPT ITEM 175)	A-D	1
–175B	315A1866-2		. NUT-GLAND	E	1

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
180	CWR76-5B		. SCRAPER (V26879) (SPEC BACS34A5A) (OPT S30388-5-1 (V97820)) (OPT TF005-5A (V07128)) (OPT 2140-5A (V26303)) (OPT DW96801-5A (V02886)) (OPT RMS34A5A (V94878))		1
185	MS28782-6		. RING		2
190	NAS1611-011		. PACKING	A-D	1
–190A	NAS1611-011A		. PACKING	E	1
195	315A1853-1		. BEARING-PISTON		1
200	S32991-116H5		. SEAL-HAT (V97820)	A-C	1
–200A	S34853-116H99		DELETED		
–200B	S33121-116-99		. SEAL-FOOT (V97820)	D, E	1
201	NAS1611-116		. PACKING	D	1
–201A	NAS1611-116A		. PACKING	E	1
205	315A1812-1		. GLAND		1
210	MS28782-20		. RING		2
215	NAS1611-215		. PACKING	A-D	1
–215A	NAS1611-215A		. PACKING	E	1
220	C11237-122		. RING (V26879) (SPEC BACR12BP122) (OPT DW969516-122 (V02886)) (OPT RM9157BU122 (V94878)) (OPT STS900-122 (V02107)) (OPT S30310-122 (V97820)) (OPT TF456-122 (V07128)) (OPT 2150-122 (V26303))		2
225	NAS1611-122		. PACKING	A-D	1
–225A	NAS1611-122A		. PACKING	E	1
230	315A1824-1		DELETED		
230A	315A1824-2		. RING-SNUBBER		1
233	315A1824-3		. RING-SNUBBER		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–					
235	315A1865-1		. STOP		1
240	315A1810-1		. HOUSING		1
245	315A1914-1		. BOLT-SPECIAL		1
250	315A1910-1		. LOCKWASHER-CUP		1
255	102KS		DELETED		
–255A	9102K		DELETED		
255B	C102RR1P17LY331		. BEARING (V40920) (SPEC BACB10BA15) (OPT 102KS (V38443)) (OPT 3L02 (V29337)) (OPT 3L02 (V43334)) (OPT 6002 (V43991)) (OPT 6002J (V52676)) (OPT 9102-1B1-01 (V21760)) (OPT 9102K (V21335)) (OPT PKT102P1 (V78118)) (OPT C102RRP0 (V40920)) (OPT R9102KA4298 (V9V013))		1
260	MS20068-53		. KEY		1
265	315A1813-2		DELETED		
265A	315A1813-3		DELETED		
265B	315A1813-4		. WHEEL-WORM		1
270	315A1835-12		. SHIM		AR
275	315A1835-13		. SHIM		AR
280	315A1835-14		. SHIM		AR
285	315A1835-15		. SHIM		AR
290	315A1835-16		. SHIM		AR
295	7105KRDF		DELETED		
295A	315A1837-1		. BEARING		1
300	315A1856-1		. PIN-LOCATING (OPTIONAL)	A	1
305	MS28783-1		. RING		2
310	NAS1611-223		. PACKING	A-D	1
–310A	NAS1611-223A		. PACKING	E	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–					
315	315A1828-2		. PIN (OPT ITEM 315A)	A-C	1
–315A	315A1828-1		. PIN (OPT ITEM 315)	A-C	1
–315B	315A1828-2		. PIN	D, E	1
317	315A1864-1		. RING-RETAINING		1
318	7212MT952T		DELETED		
320	MS28782-17		. RING		2
325	NAS1611-212		. PACKING	A-D	1
–325A	NAS1611-212A		. PACKING	E	1
330	315A1811-1		. NUT-CYLINDER		1
335	315A1821-2		. RING-CYLINDER NUT		2
340	315A1827-1		. RING-RETAINING		1
345	315A1829-1		. PIN-RETAINING		1
350	315A1826-1		. GUIDE		1
355	315A1822-1		DELETED		
355A	315A1822-3		. SCREW-LEAD (OPT ITEM 355B, 355C)	A-C	1
–355B	315A1822-4		. SCREW-LEAD (OPT ITEM 355A, 355C)	A-C	1
–355C	315A1822-5		. SCREW-LEAD (OPT ITEM 355A, 355B)	A-C	1
–355D	315A1822-5		. SCREW-LEAD	D, E	1
360	315A1819-1		DELETED		
360A	315A1819-3		. PISTON ASSY		1
365	315A1870-1		DELETED		
365A	315A1870-3		. . NUT-LEAD (OPT ITEM 365B)		1
–365B	315A1870-4		. . NUT-LEAD (OPT ITEM 365A)		1
370	315A1816-1		DELETED		
370A	315A1816-2		. . PISTON		1
375	315A1867-2		DELETED		
375A	315A1867-2		DELETED		

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
375B	315A1867-3		. SPACER		3
380	315A1808-1		DELETED		
380A	315A1808-3		. CYLINDER ASSY (OPT ITEM 380B)		1
–380B	1334-15		. CYLINDER ASSY (V97415) (OPT ITEM 380A)		1
385	BACB28X7F037		. . BUSHING	A-C	2
390	315A1808-2		DELETED		
390A	315A1808-4		. . CYLINDER	A-C	1
395	69B80300-10		DELETED		
395A	315A1836-1		. STRAP		1
400	BAC27DTR12		DELETED		
400A	BAC27DTR0012		. NAMEPLATE	A-D	1
–400B	BAC27NPP44		. NAMEPLATE	E	1
405	BAC27DTR13		DELETED		
405A	BAC27DTR0013		DELETED		

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