COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

FLAP ACTUATION SEAL RIB ANGLE GEARBOX ASSEMBLY

PART NUMBER 256A3630–1

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COMPONENT MAINTENANCE MANUAL

Revision No. 12
Jul 01/2009

To: All holders of FLAP ACTUATION SEAL RIB ANGLE GEARBOX ASSEMBLY 27-55-78.

Attached is the current revision to this COMPONENT MAINTENANCE MANUAL

The COMPONENT MAINTENANCE MANUAL is furnished either as a printed manual, on microfilm, or digital products, or any combination of the three. This revision replaces all previous microfilm cartridges or digital products. All microfilm and digital products are reissued with all obsolete data deleted and all updated pages added.

For printed manuals, changes are indicated on the List of Effective Pages (LEP). The pages which are revised will be identified on the LEP by an R (Revised), A (Added), O (Overflow, i.e. changes to the document structure and/or page layout), or D (Deleted). Each page in the LEP is identified by Chapter-Section-Subject number, page number and page date.

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Location of Change	Description of Change
27-55-78	
ASSEMBLY	Changed the data in the Tools/Equipment list.
SPECIAL TOOLS FIXTURES AND EQUIPMENT	Changed the data in the Tool Supplier Information table.
	Added the Commercial Tools table.
	Added the Special Tools table.
	Added the Tool Supplier Information table.
	Changed the data in the Special Tools table.

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

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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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Revision		Filed	
Number	Date	Date	Initials

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Temporary Revision		Inserted		Removed	
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INTRODUCTION

1. General

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

B. This manual is divided into different parts:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) List of Effective Pages

(5) Table of Contents

(6) Temporary Revision & Service Bulletin Record

(7) Record of Revisions

(8) Record of Temporary Revisions

(9) Introduction

(10) Procedures & IPL Sections

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

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

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

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

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

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FLAP ACTUATION SEAL RIB ANGLE GEARBOX ASSEMBLY - DESCRIPTION AND OPERATION

1. Description

A. The Flap Actuation Seal Rib Angle Gearbox Assembly has two bevel gears with ball bearings installed in an aluminum housing. The external ends of the gears have splined couplings which attach to the flap drive torque tubes.

2. Operation

A. The flap drive power drive unit (PDU) supplies power to the flap actuators through the torque tubes. The angle gearbox assembly changes the direction of the torque tube drive line.

3. Leading Particulars (Approximate)

A. Length – 10 inches

B. Width – 6 inches

C. Height – 5 inches

D. Weight – 7.6 pounds

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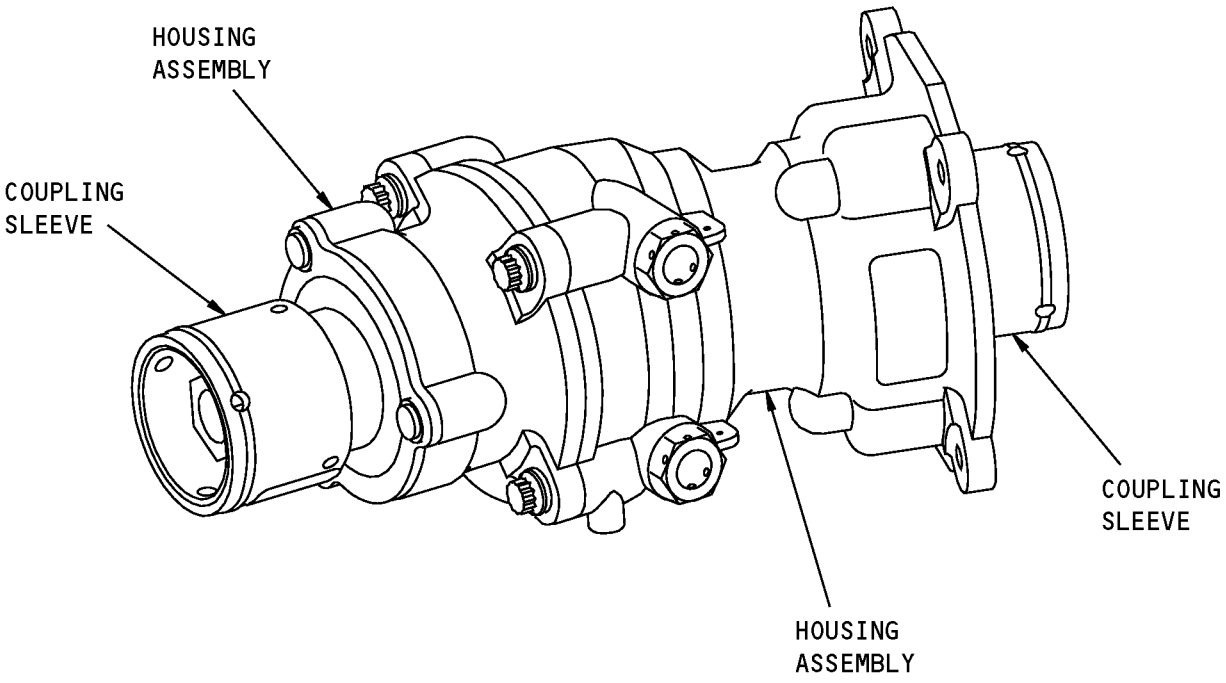

Flap Actuation Seal Rib Angle Gearbox Assembly
Figure 1

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TESTING AND FAULT ISOLATION

1. General

A. This procedure has the data necessary to do a test of the gearbox assembly (1A) after an overhaul or for fault isolation.

B. There are three parts to the procedure:

(1) Gearbox Assembly Test

(2) Fault Isolation

(3) Fault Correction

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

D. Refer to IPL Figure 1 for item numbers.

2. Gearbox Assembly Test

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-4720	Test Equipment - Leakage Test (Part #: J27054-1, Supplier: 81205)
SPL-5703	Test Equipment - T.E. Flap Drive Gearboxes (Part #: C27068-65, Supplier: 81205)

B. Procedure

(1) Use standard industry practices to examine the gearbox assembly.

(2) Install the gearbox assembly on the T.E. Flap Drive Gearbox Test Equipment, SPL-5703 (C27068-65 supersedes C27068-1).

(3) Do a bearing test.

(a) Turn the gears (125) thru a minimum of 720 degrees in each direction.

(b) Make sure that the gears turn smoothly.

(4) Do a torque test.

(a) Turn the gears (125) thru a minimum of 8 turns in each direction at a rate of 10-20 RPM. Use a torque wrench on the retainer bolt (10) on one of the gear shafts.

(b) Make sure that the breakaway and maximum running torque applied at the gear shaft is not more than 10 pound-inches.

(5) Do a backlash test.

(a) Remove the coupling halves (15), coupling sleeves (5), and seal shields (35) from the gear shafts. Remove the seal retainers (40), seal rings (50A), and shaft seals (45) from the housing assemblies (140, 165) (DISASSEMBLY).

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(b) Apply a torque of 10-15 pound-inches to the gear which is not held by the tool. Measure the backlash at a gear pitch diameter of 2.353 inches at three locations approximately 120 degrees apart.

NOTE: Apply the torque to the gear in one direction to get the first position of the gear. Apply the torque in the opposite direction to get the second position of the gear. The backlash is the total clearance between the two gear positions.

(c) Make sure that the backlash is 0.004-0.006 inch.

(6) Remove the gearbox assembly from the T.E. Flap Drive Gearbox Test Equipment, SPL-5703. Install the parts which were removed unless more disassembly is required.

(7) Do a pressure test.

(a) Remove the upper plug (130) with its packing (135). Attach the test equipment, SPL-4720 to the gearbox assembly.

(b) Pressurize the gearbox with air to 14-16 psig for 15 minutes.

(c) Make sure that there is no sign of leakage of air or grease.

3. Fault Isolation

A. General

(1) Refer to TESTING AND FAULT ISOLATION, Table 101 to do fault isolation with the test results.

Table 101: Fault Isolation Table

TROUBLE	PROBABLE CAUSE	CORRECTIONS
Gears do not turn smoothly or move freely	Defective bearings (60,80)	Disassemble and replace the defective bearings (60,80).
Breakaway or maximum running torque is more than 10 lb-in.	Defective bearings (60,80)	Disassemble and replace the defective bearings (60,80).
Backlash is not correct	Shims (90 thru 105) need adjustment or,	Disassemble and adjust the shims (90 thru 105) or,
	Defective or worn gears (125)	Disassemble and replace the gears (125).
Air or grease leakage during pressure test	Defective shaft seal (45) or packings (55,85,135)	Disassemble and replace the defective shaft seal (45) or packings (55,85,135)

4. Fault Correction

A. Procedure

(1) If the gears (125) do not move freely or do not turn smoothly, replace the bearing(s) (60, 80) as follows:

(a) Fully disassemble the gearbox assembly (DISASSEMBLY).

(b) Replace the defective bearing(s) (60, 80) if it is necessary.

(c) Assemble the gearbox assembly (ASSEMBLY).

(d) Do a backlash test on the gearbox assembly.

(e) Do a pressure test on the gearbox assembly.

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(2) If the breakaway or maximum running torque is more than 10 pound-inches, replace the bearing(s) (60, 80) as follows:

(a) Fully disassemble the gearbox assembly (DISASSEMBLY).

(b) Replace the defective bearing(s) (60, 80) if it is necessary.

(c) Assemble the gearbox assembly (ASSEMBLY).

(d) Do a backlash test on the gearbox assembly.

(e) Do a pressure test on the gearbox assembly.

(3) If the backlash is not 0.004-0.006 inch, do the subsequent steps:

(a) Disassemble the gearbox assembly (DISASSEMBLY).

(b) Adjust the shims (90 thru 105) to correct the backlash.

NOTE: To decrease the backlash, increase the shim thickness. To increase the backlash, decrease the shim thickness.

(c) Assemble the gearbox assembly (ASSEMBLY).

NOTE: It is not necessary to measure the bearings (60, 80) again to calculate shim thickness.

(d) Do a backlash test on the gearbox assembly. If the backlash is not 0.004-0.006 inch, replace the gears (125).

(e) Do a pressure test on the gearbox assembly.

(4) If air or grease leakage occurs at a seal or any two surfaces that contact, replace the shaft seal (45) or packing (55, 85, 135).

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DISASSEMBLY

1. General

A. This procedure has the data necessary to disassemble the gearbox assembly (1A).

B. Disassemble this component sufficiently to isolate the defects, do the necessary repairs, and put the component back to a serviceable condition.

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

D. Refer to IPL Figure 1 for item numbers.

2. Gearbox Disassembly

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-5384	Wrench - Coupling Sleeve Flap Actuation (Part #: C27041-1, Supplier: 81205)

B. References

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

C. Part Replacement

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

(1) Packings (55, 85, 135)

(2) Shaft seal (45)

D. Procedure

(1) Remove the coupling halves (15) at each end of the gearbox assembly.

(a) Apply the coupling sleeve wrench, SPL-5384 to hold the coupling sleeve (5) while the retainer bolt (10) is removed.

(b) Remove the retainer bolt (10), coupling half (15), coupling seal (20), coupling sleeve (5), and seal shield (35).

(2) Remove the lockwire from the bolts (70). Remove the bolts (70) and washers (75), then remove the housing assembly (140) from the housing assembly (165).

(3) Remove the bevel gear assemblies (110) with the bearings (80), shims (90 thru 105), and spacers (65) from the housing assemblies (140, 165). Remove the bearings, shims and spacers from the gear assemblies (SOPM 20-50-03). Keep each set of bearings, shims, and bevel gears together with the correct housing assembly to help during assembly of the gearbox.

(4) Measure and record the thicknesses of the shim stacks, S1 and S2, to help during assembly of the gearbox. S1 is the thickness of the shims on the gear removed from the housing assembly (140). S2 is the thickness of the shims on the gear removed from housing assembly (165).

(5) Remove the bolts (25), washers (30), and seal retainer (40) from the housing assemblies (140, 165).

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(6) Remove the seal rings (50A), packings (55), and shaft seals (45) from the housing assemblies (140, 165).

(7) Remove the bearings (60) from the housing assemblies (140, 165) (SOPM 20-50-03).

NOTE: Do not remove the inserts (145, 150, 155, 170) from the housing assemblies (140, 165) unless repair or replacement is necessary.

(8) Remove the lockwire from the plugs (130), then remove the plugs and the packings (135) from the housing assembly (140).

NOTE: Do not remove the markers (180, 185) from the housing assembly (140) unless repair or replacement is necessary.

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CLEANING

1. General

A. This procedure has the data necessary to clean the gearbox assembly (1A).

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

C. Refer to IPL Figure 1 for item numbers.

2. Cleaning

A. References

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

B. Procedure

(1) Clean the bearings (60, 80) as specified in SOPM 20-30-01.

(2) Use standard industry procedures and refer to SOPM 20-30-03 to clean other parts.

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CHECK

1. General

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

B. Refer to FITS AND CLEARANCES for the design dimension and wear limits.

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

D. Refer to IPL Figure 1 for item numbers.

2. Check

A. References

Reference	Title
SOPM 20-20-01	MAGNETIC PARTICLE INSPECTION
SOPM 20-20-02	PENETRANT METHODS OF INSPECTION

B. Procedure

(1) Use standard industry procedures to do a visual check of all the parts for defects. Do a penetrant or magnetic particle check if the visual check shows possible damage or if you think there is possible damage on the parts listed below:

(2) Do a magnetic particle check (SOPM 20-20-01) of these parts:

(a) Coupling sleeve (5)

(b) Seal ring (50A)

(c) Coupling half (15)

(d) Seal shield (35)

(e) Gear (125)

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

(a) Seal retainer (40)

(b) Housing (160, 175)

(c) Spacer (65)

(4) Examine the gear teeth for pit marks or irregular worn areas.

(5) See if the wear pattern on the gear is in the center of the area of the pitch diameter.

(6) Do a visual check for signs of wear on the external spline teeth of the coupling half (15).

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REPAIR

1. General

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

Table 601:

PART NUMBER	NAME	REPAIR
—	REFINISH OF OTHER PARTS	1-1
256A3421	HOUSING ASSEMBLY	2-1
256A3631	HOUSING ASSEMBLY	3-1
256A3633	BEVEL GEAR ASSEMBLY	4-1
256A3741	COUPLING HALF	5-1
256W3244	SEAL RETAINER	6-1

2. Dimensioning Symbols

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

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—	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 THIS FEATURE PERMISSIBLE VARIATIONS ARE ESTABLISHED BY TOLERANCES ON OTHER DIMENSIONS OR NOTES.
[-A-]	DATUM
Ⓜ	MAXIMUM MATERIAL CONDITION (MMC)
Ⓛ	LEAST MATERIAL CONDITION (LMC)
Ⓢ	REGARDLESS OF FEATURE SIZE (RFS)
Ⓟ	PROJECTED TOLERANCE ZONE
FIM	FULL INDICATOR MOVEMENT

EXAMPLES

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

True Position Dimensioning Symbols
Figure 601

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REFINISH OF OTHER PARTS - REPAIR 1-1

1. General

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

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

C. Refer to IPL Figure 1 for item numbers.

2. Refinish of Other Parts

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

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

C. General

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

D. Procedure

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

(1) Refer to REPAIR 1-1, Table 601 for the refinish of other parts.

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1		
Spacer (65)	Aluminum alloy	Anodize all over, and seal in dilute chromate solution (F-17.31).
Ring (50A)	AMS5898 CRES, case hardened HRC 55 min or HT to HRC 55 min	Passivate (F-17.25).
Ring (50B)	XD15NW CRES, case hardened HRC 55 min or HT to HRC 55 min	Passivate (F-17.25).

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Table 601: Refinish Details (Continued)

IPL FIG. & ITEM	MATERIAL	FINISH
Ring (50C)	9310 Steel, case hardened Ra 80 min	Cadmium plate (F-15.23) (0.0002-0.0004 inch thick).
Shield (35)	15-5PH CRES, 180-200 ksi	Passivate (F-17.25).
Sleeve (5)	4140 Steel, 150-170 ksi	Cadmium plate (F-15.36) all over, bake at 375°F for 3 hours after plating. Apply primer, C00259 (F-20.02) all over, but not on spline teeth.

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HOUSING ASSEMBLY - REPAIR 2-1

256A3421–1

1. General

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

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

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

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: Aluminum alloy

2. Housing Repair

A. References

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

B. Procedure

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

(1) Machine the bearing seat in the housing (175) to the repair dimension shown in REPAIR 2-1, Figure 601 to remove defects.

(2) Break all sharp edges.

(3) Do a penetrant check of the machined area (SOPM 20-20-02).

(4) Hard anodize the machined area only, to a maximum thickness of 0.002 inch (F-17.06).

(5) Grind the anodized area to the design dimension shown in REPAIR 2-1, Figure 601. Make sure to keep the surface finish shown in REPAIR 2-1, Figure 601.

3. Housing Assembly Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

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

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Reference	Title
SOPM 20-60-02	FINISHING MATERIALS

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

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

(1) Anodize (F-17.35) all over.

(2) Apply primer, C00259 (F-20.02) to all the external surfaces other than the holes, as shown on REPAIR 2-1, Figure 601.

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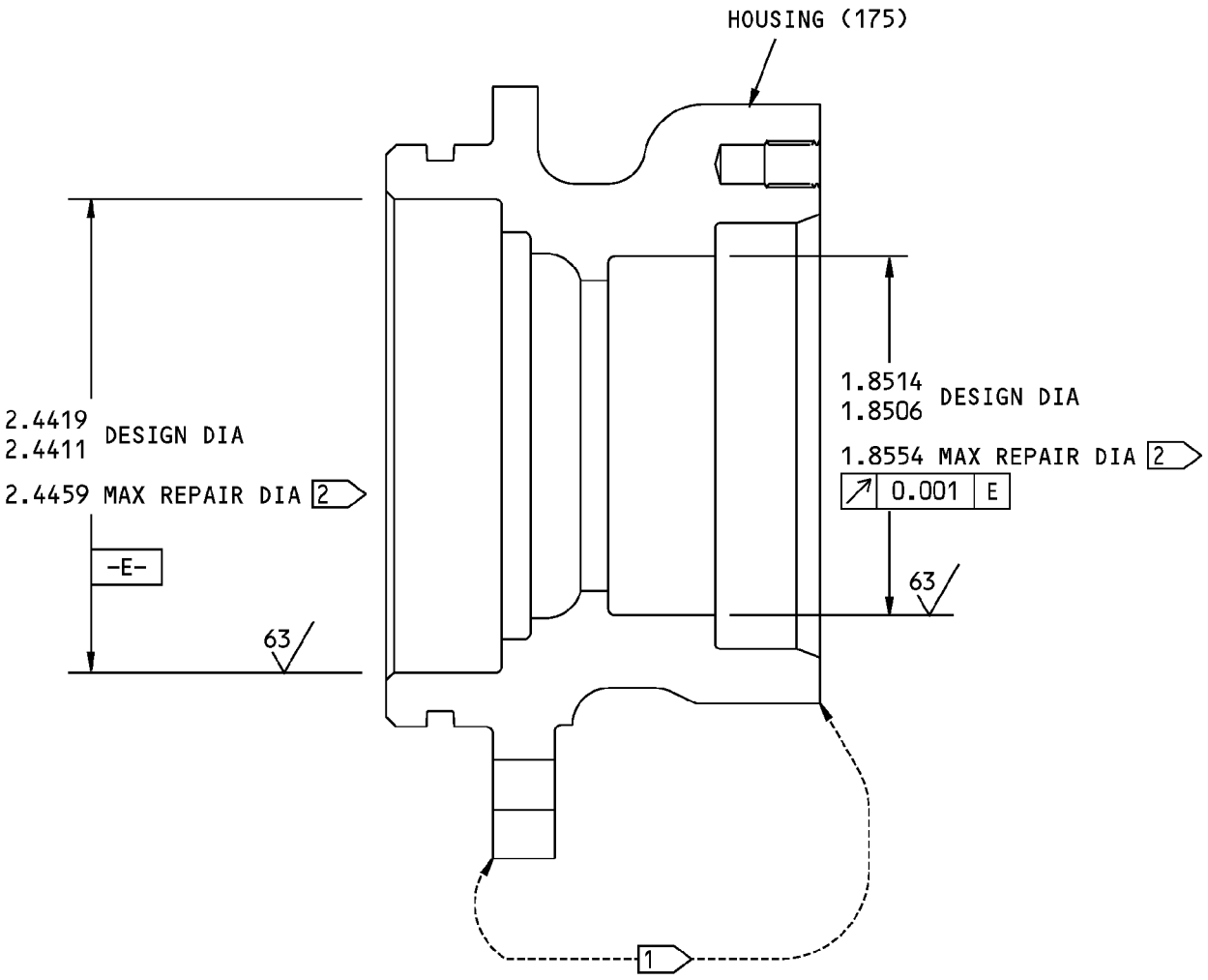

1 APPLY PRIMER ON ALL EXTERNAL SURFACES IN THIS AREA, OTHER THAN HOLES (F-20.02).

2 HARD ANODIZE (F-17.06) AND GRIND TO DESIGN DIMENSION AND FINISH SHOWN. MAXIMUM ANODIZE THICKNESS 0.002.

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

256A3421-1 Housing Assembly Repair
Figure 601

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HOUSING ASSEMBLY - REPAIR 3-1

256A3631–1

1. General

A. This procedure has the data necessary to repair and refinish the housing assembly (140).

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

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

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: Aluminum alloy

2. Housing Repair

A. References

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

B. Procedure

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

(1) Machine the bearing seat in the housing (160) to the repair dimension shown in REPAIR 3-1, Figure 601 to remove defects.

(2) Break all sharp edges.

(3) Do a penetrant check of the machined area (SOPM 20-20-02).

(4) Hard anodize the machined area only, to a maximum thickness of 0.002 inch (F-17.06).

(5) Grind to the design dimension shown in REPAIR 3-1, Figure 601. Make sure to keep the surface finish shown in REPAIR 3-1, Figure 601.

3. Housing Assembly Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

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

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Reference	Title
SOPM 20-60-02	FINISHING MATERIALS

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

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

(1) Anodize (F-17.35) all over.

(2) Apply primer, C00259 (F-20.02) to all the external surfaces other than the holes, as shown on REPAIR 3-1, Figure 601.

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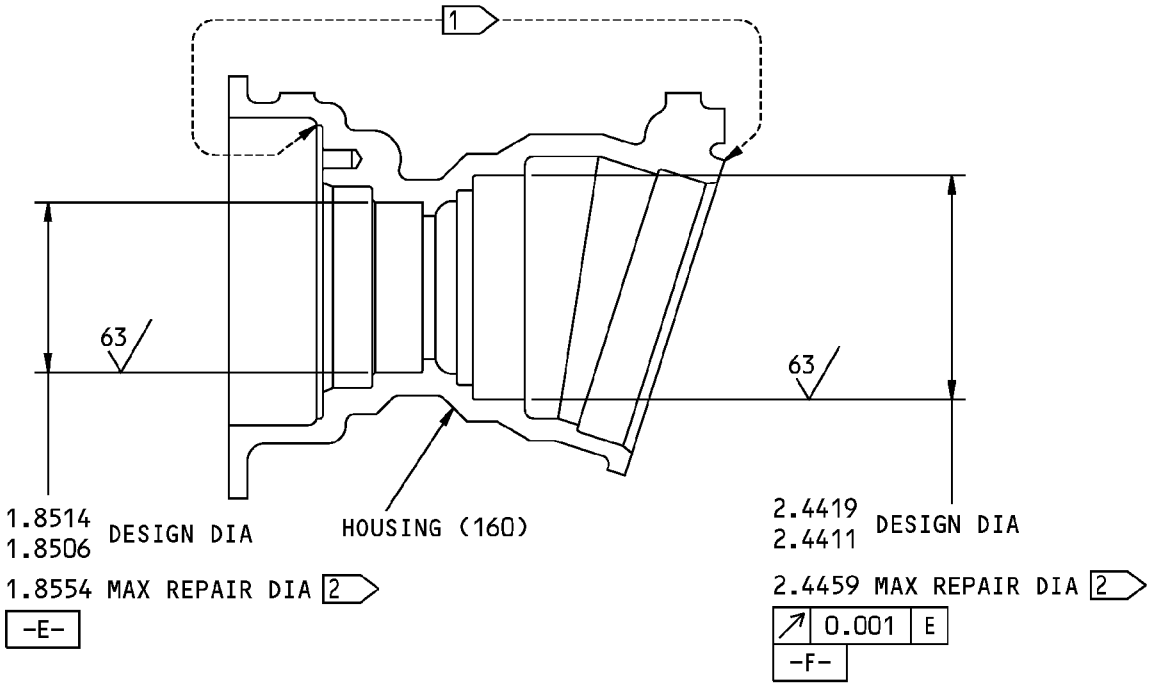

1 APPLY PRIMER ON ALL EXTERNAL SURFACES IN THIS AREA, OTHER THAN HOLES (F-20.02).

2 HARD ANODIZE (F-17.06), AND GRIND TO DESIGN DIMENSION AND FINISH SHOWN. MAXIMUM ANODIZE THICKNESS 0.002.

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

256A3631-1 Housing Assembly Repair
Figure 601

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BEVEL GEAR ASSEMBLY - REPAIR 4-1

256A3633–1

1. General

A. This procedure has the data necessary to repair and refinish the bevel gear assembly (110).

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

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

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: 9310 Steel, AMS 6265, 160-190 ksi

(2) Shot Peen: Surfaces as shown in Fig. 601

(a) Shot Size = 0.017 - 0.046

(b) Intensity = 0.010A

(c) Coverage = 2.0

2. Gear Repair

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

Reference	Title
SOPM 20-10-01	REPAIR AND REFINISH OF HIGH STRENGTH STEEL PARTS
SOPM 20-10-03	SHOT PEENING
SOPM 20-10-04	GRINDING OF CHROME PLATED PARTS
SOPM 20-20-01	MAGNETIC PARTICLE INSPECTION
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

C. Procedure

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

(1) Machine the gear (125) to the repair dimension shown in REPAIR 4-1, Figure 601 to remove defects at the bearing interfaces (SOPM 20-10-01).

(2) Break all sharp edges.

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(3) Do a magnetic particle check of the gear (SOPM 20-20-01).

(4) Shot peen the machined area as shown in REPAIR 4-1, Figure 601 (SOPM 20-10-03).

(5) Apply chrome plate to the area shown in REPAIR 4-1, Figure 601 (F-15.03).

(6) Grind the chrome plate to the design dimension shown in REPAIR 4-1, Figure 601 (SOPM 20-10-04). Make sure to keep the surface finish shown in REPAIR 4-1, Figure 601.

(7) Apply wipe-on primer, C00259 to the chrome-plated surfaces (F-19.45).

3. Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

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

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

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

(1) Apply cadmium plate (F-15.23) on all surfaces other than the surfaces shown in REPAIR 4-1, Figure 601. Plating throw-in is permitted at the mouths of the holes.

(2) Apply primer, C00259 (F-20.02) to all the internal surfaces in the area shown in REPAIR 4-1, Figure 601.

(3) Apply no finish to the bearing surfaces (F-25.01) shown in REPAIR 4-1, Figure 601.

(4) If necessary, install the plug (120) with wet primer, C00259 (F-20.06).

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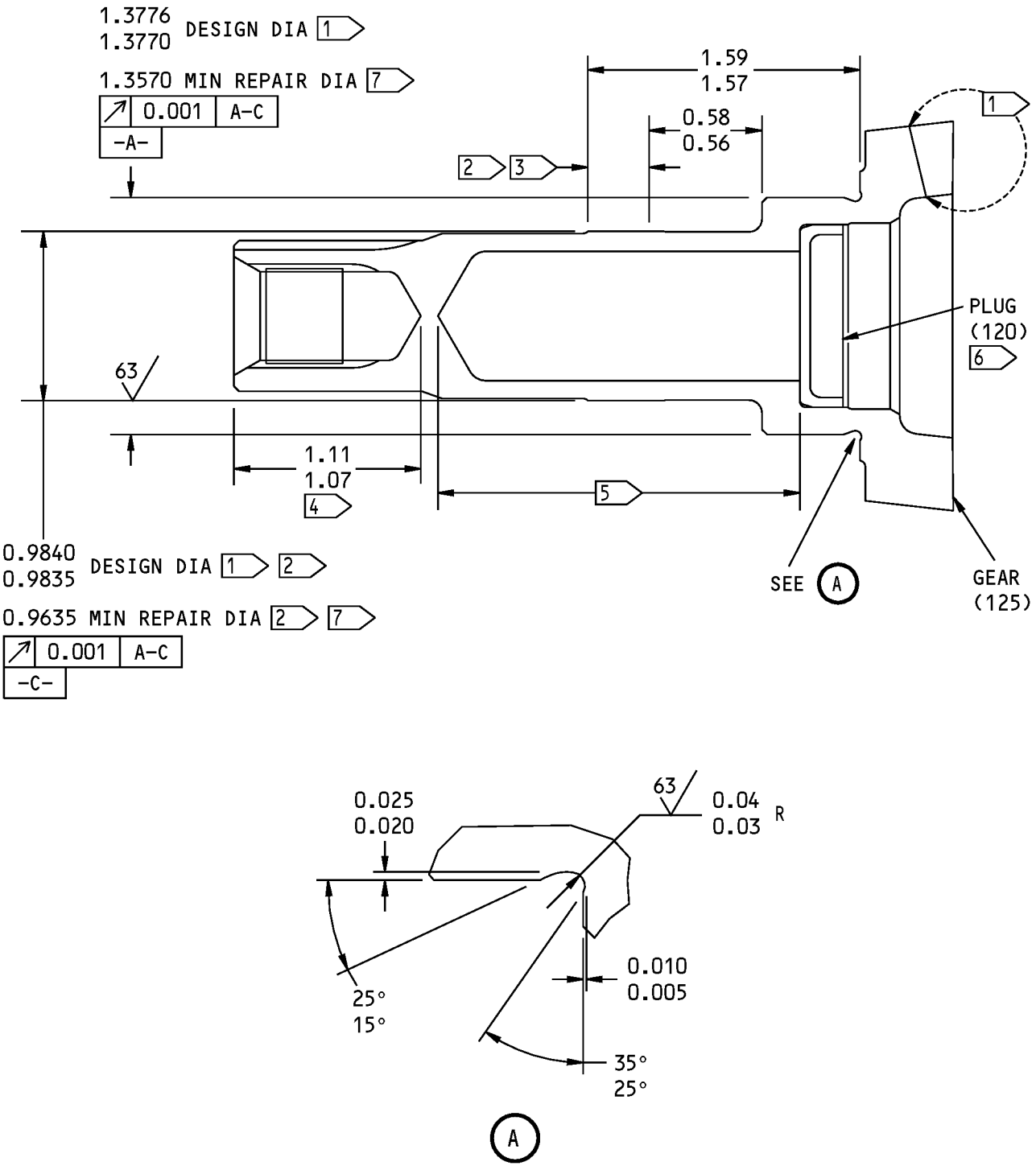

256A3633-1 Gear Assembly Repair
Figure 601 (Sheet 1 of 2)

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1 NO FINISH ON THIS AREA (F-25.01).

2 DIAMETER APPLIES OVER THIS AREA.

3 CADMIUM PLATE RUNOUT ON ADJACENT SURFACES MUST BE 0.030 OR LESS.

4 CADMIUM PLATE REQUIRED IN THE BORE, 0.0002 MINIMUM THICKNESS.

5 APPLY PRIMER ON ALL INTERNAL SURFACES IN THE AREA SHOWN (F-20.02).

6 INSTALL WITH WET PRIMER (F-20.06).

7 SHOT PEEN AND BUILD UP WITH CHROME PLATE (F-15.03). GRIND TO DESIGN DIMENSION AND FINISH SHOWN. MAXIMUM CHROME PLATE THICKNESS 0.010 AFTER GRINDING. CHROME PLATE RUNOUT 0.00-0.08. STOP CHROME PLATE 0.00-0.02 FROM FILLET RADIUS OR EDGE. APPLY WIPE-ON PRIMER (F-19.45).

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

256A3633-1 Gear Assembly Repair
Figure 601 (Sheet 2 of 2)

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COUPLING HALF - REPAIR 5-1

256A3741–1

1. General

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

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

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

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: 4330M Steel, BMS 7-122, 180-200 ksi

2. Coupling Half Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

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

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

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

(1) Apply cadmium plate (F-15.23) all over.

(2) Apply primer, C00259 (F-20.02) to the area shown in REPAIR 5-1, Figure 601.

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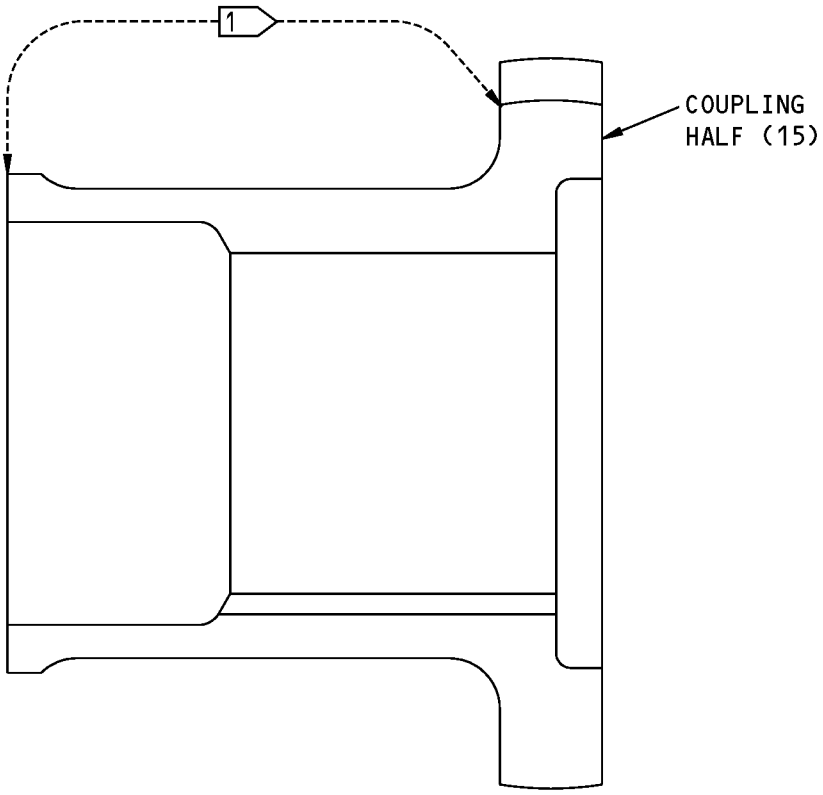

1 APPLY PRIMER TO THIS AREA ONLY

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

256A3741-1 Coupling Half Refinish
Figure 601

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SEAL RETAINER - REPAIR 6-1

256W3244–1

1. General

A. This procedure has the data necessary to repair and refinish the seal retainer (40).

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

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

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: Aluminum alloy

2. Seal Retainer Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

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

(1) Anodize (F-17.35) all over.

(2) Apply primer, C00259 (F-20.02) to all the external surfaces, other than the holes and the surfaces shown on REPAIR 6-1, Figure 601.

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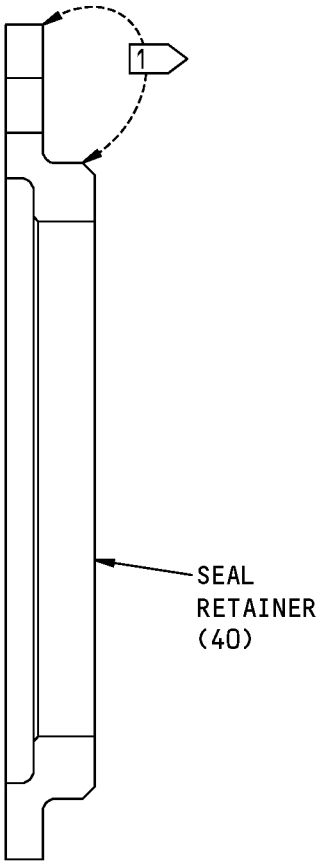

1 NO PRIMER ON THIS SURFACE

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

256W3244-1 Seal Retainer Refinish
Figure 601

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ASSEMBLY

1. General

A. This procedure has the data necessary to assemble the gearbox assembly (1A).

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. Gearbox Assembly

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
SPL-4811	Test Equip - Run-In, Variable Drive (115 VAC) (Opt Part #: J27056-43, Supplier: 81205) (Opt Part #: J27056-45, Supplier: 81205)
SPL-4812	Test Equip - Run-In, Variable Drive (230 VAC) (Opt Part #: J27056-44, Supplier: 81205) (Opt Part #: J27056-46, Supplier: 81205)
SPL-5384	Wrench - Coupling Sleeve Flap Actuation (Part #: C27041-1, Supplier: 81205)
SPL-5385	Seal Installation Equipment, TE Flap Drive (Part #: C27043-16, Supplier: 81205)
SPL-5447	Bearing Width Measurement Equipment (Part #: J27057-22, Supplier: 81205)
SPL-5703	Test Equipment - T.E. Flap Drive Gearboxes (Part #: C27068-65, Supplier: 81205)

B. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00913	Compound - Corrosion Inhibiting Material, Nondrying Resin Mix	BMS 3-27
D00633	Grease - Aircraft General Purpose	BMS3-33
G01048	Lockwire - Corrosion Resistant Steel (0.032 In. Dia.)	NASM20995˜ C32

C. References

Reference	Title
SOPM 20-30-01	CLEANING AND RELUBRICATING BEARINGS
SOPM 20-50-01	BOLT AND NUT INSTALLATION
SOPM 20-50-02	INSTALLATION OF SAFETYING DEVICES
SOPM 20-50-03	BEARING AND BUSHING REPLACEMENT

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Reference	Title
SOPM 20-50-06	INSTALLATION OF O-RINGS AND TEFLON SEALS

D. Procedure (IPL Figure 1)

(1) Remove grease from the bearings (60, 80) (SOPM 20-30-01).

(2) Install the bearings (60) in the housing assemblies (140, 165) with a thin layer of grease, D00633 (SOPM 20-50-03).

(3) Find the necessary shim thicknesses S1 and S2.

NOTE: Use the same shim thicknesses recorded during disassembly, unless bearing (80) or housing assembly (140, 165), was replaced.

(a) Use the J27057 bearing width Measurement Equipment, SPL-5447 to apply a 5-10-pound axial force across the bearing (80) races. Measure the bearing from one side of the inner race to the opposite side of the outer race. Refer to ASSEMBLY, Figure 701. Measure the width of the bearing (80) to a tolerance of 0.001 inch.

(b) Use the width of the bearing (80) to be installed in housing assembly (140) to calculate shim thickness S1, as shown in ASSEMBLY, Figure 701.

(c) Measure the dimension C on the housing assembly (165). Measure the dimension to a tolerance of 0.001 inch.

(d) Use the width of the bearing (80) to be installed in housing assembly (165), and dimension C, to calculate shim thickness S2, as shown in ASSEMBLY, Figure 701.

(e) Mix the minimum number of different shims (90 thru 105) to get approximately the calculated values S1 and S2. The difference between the thickness of each shim stack and S1 and S2 must be 0.0015 inch or less. It is not necessary to use all the shims in each stack.

(4) Install the shims (90 thru 105), bearings (80), and spacers (65) on the bevel gear assemblies (110). Install the bearings with grease, D00633 (SOPM 20-50-03). Make sure that the correct shim thickness S1 or S2 is used with the correct bearing (80) for each housing assembly (140, 165).

(5) Apply a light layer of grease, D00633 to the bearings (80). Install the bevel gear assemblies (110) with the shims (90 thru 105), bearings (80), and spacers (65) in the housing assemblies (140, 165).

(6) Assemble the housing assembly (140) to the housing assembly (165) with the bolts (70) and washers (75).

(7) Do these steps:

(a) Do a check of the backlash (ASSEMBLY).

(b) If the backlash is not within tolerance, disassemble the housing assembly (165). As required, add or subtract shims (90 thru 105) to get 0.004-0.006 inch backlash.

(8) Remove the bolts (70) and washers (75), and disassemble the housing assembly (140) from the housing assembly (165). Remove the bevel gear assemblies (110) with the shims (90 thru 105), bearings (60, 80), and spacers from the housing assemblies (140, 165).

(9) Measure 2.4-3.0 ounces of grease, D00633.

(10) Install the shaft seals (45) into the housing assemblies (140, 165).

CAUTION: BE CAREFUL NOT TO DAMAGE THE SEAL LIP DURING INSTALLATION.

(a) Apply grease, D00633 to the seal bore in the housing assembly (140, 165).

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(b) Use the C27043 Seal Installation Tool, SPL-5385 to install the shaft seal (45) in the housing assembly (140, 165) to a depth of 0.17-0.18 inch. If an equivalent tool is used, make sure it applies the same pressure all around the outer diameter of the seal.

(c) Apply a thick layer of grease, D00633 to the seal lip.

WARNING: BMS 3-27 CORROSION INHIBITING COMPOUND CONTAINS SOLVENTS, CHROMATES, AND A SMALL AMOUNT OF BOUND ASBESTOS. CONSULT THE APPLICABLE SAFETY STANDARDS FOR APPROVED HANDLING PROCEDURES.

CAUTION: BMS 3-27 COMPOUND IS USED ONLY IN STATIC JOINTS WHERE GREASE CANNOT BE APPLIED. BMS 3-27 COMPOUND IN DYNAMIC JOINTS WILL NOT LET THEM MOVE FREELY.

(11) Apply a thin layer of corrosion inhibiting compound, C00913 to the faying surface of the seal retainers (40). Apply the compound from the outer contour to approximately 0.05 inch from the fillet radius. Remove the unwanted compound from the retainers. Install the seal retainers (40) on the housing assemblies (140, 165) with the bolts (25) and washers (30). Install the bolts with corrosion inhibiting compound, C00913 (SOPM 20-50-01).

(12) Fill the spaces between the bearings (60) and the shaft seals (45) with grease, D00633, as shown in ASSEMBLY, Figure 701.

(13) Pack bearings (60, 80) from measured grease. Install bearing (80) onto gear assembly (110) with shims (90 thru 105) and spacers (65) in the housing assemblies (140, 165). Apply some of the grease to the outer surface of the spacers (65) to fill the spaces between the spacer and the housings, as shown in ASSEMBLY, Figure 701.

(14) Apply remaining measured quantity of grease to the gear teeth and in the space between the gears when they are engaged, as shown in ASSEMBLY, Figure 701.

(15) Install the packing (85) on the housing assembly (165) with grease, D00633 (SOPM 20-50-06).

WARNING: BMS 3-27 CORROSION INHIBITING COMPOUND CONTAINS SOLVENTS, CHROMATES, AND A SMALL AMOUNT OF BOUND ASBESTOS. CONSULT THE APPLICABLE SAFETY STANDARDS FOR APPROVED HANDLING PROCEDURES.

CAUTION: BMS 3-27 COMPOUND IS USED ONLY IN STATIC JOINTS WHERE GREASE CANNOT BE APPLIED. BMS 3-27 COMPOUND IN DYNAMIC JOINTS WILL NOT LET THEM MOVE FREELY.

(16) Apply a thin layer of corrosion inhibiting compound, C00913 to the faying surface of the flange on the housing assembly (165). Apply the compound from the outer contour to approximately 0.05 inch from the fillet radius. Remove the unwanted compound from the housing. Assemble the housing assembly (165) to the housing assembly (140) with the bolts (70) and washers (75). Install the bolts with corrosion inhibiting compound, C00913 (SOPM 20-50-01).

(17) Install bearings (60) onto shafts of gear assemblies (110). Install the packings (55) in the seal rings (50A) with grease, D00633 (SOPM 20-50-06), then install the seal rings on the shafts of the gear assemblies (110).

(18) Fill the spaces between the seal retainers (40) and the seal rings (50A) with grease, D00633. Install the seal shields (35) on the gear shafts.

(19) Install the coupling seals (20) on the coupling halves (15). Apply a thin layer of grease, D00633 to the splines of the coupling sleeves (5), then install the coupling sleeves on the coupling halves (15).

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(20) Apply grease, D00633 to the splines of the bevel gear assemblies (110), then install the coupling halves (15) with the coupling seals (20) and coupling sleeves (5) on the gear shafts. Apply grease, D00633 to the threads of the retainer bolts (10), then install the retainer bolts in the gear shafts. Tighten the retainer bolts to 600-720 pound-inches more than the run-on torque. Use the C27041 coupling sleeve wrench, SPL-5384 to hold the coupling sleeve (5) while the bolt is tightened.

(21) Do a run-in procedure on the gearbox assembly.

(a) Install the gearbox assembly on the C27068 T.E. Flap Drive Gearbox Test Equipment, SPL-5703 (27068-65 supersedes C27068-1). Connect the run-in J27056 test equip 115 VAC, SPL-4811 or test equip 230 VAC, SPL-4812.

(b) Operate the gearbox assembly with no load at 600-700 rpm for 1-3 minutes.

(c) Remove the gearbox assembly from the C27068 T.E. Flap Drive Gearbox Test Equipment, SPL-5703.

(22) Do the bearing test and the torque test of the gearbox assembly. Refer to TESTING AND FAULT ISOLATION.

(23) Do the pressure test of the gearbox assembly. Refer to TESTING AND FAULT ISOLATION.

(24) Install the packings (135) on the plugs (130) with grease, D00633. Apply the grease, D00633 to the threads of the plugs, then install the plugs in the threaded ports in the housing assembly (140). Tighten the plugs to a maximum of 110 pound-inches.

(25) Install lockwire, G01048 on the bolts (70) and the plugs (130) as shown on ASSEMBLY, Figure 702. Use the double-twist procedure (SOPM 20-50-02).

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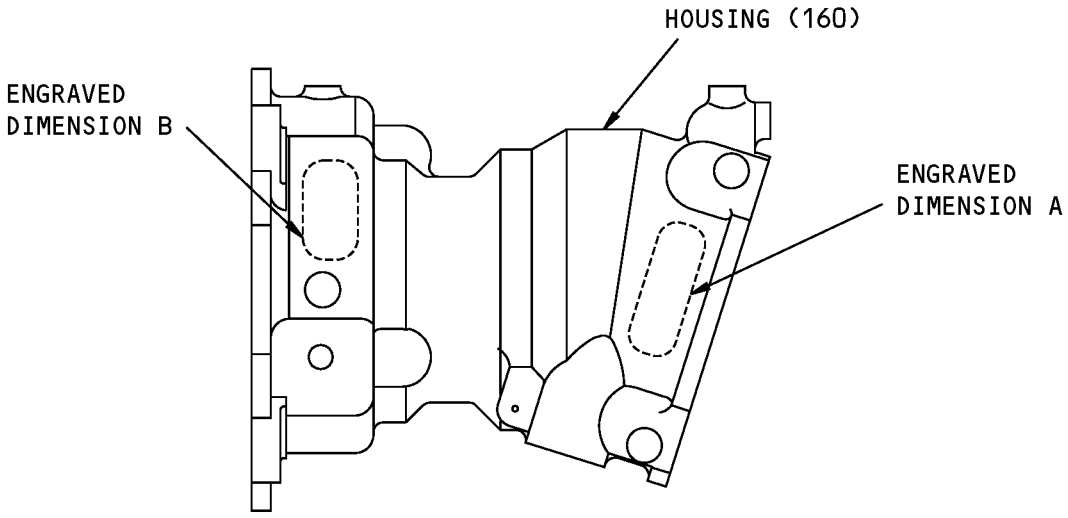
SHIM THICKNESS CALCULATION

SHIM THICKNESS S1 * = A - D - 0.550

SHIM THICKNESS S2 * = B + C - E - 0.550

WHERE A = DIMENSION A ENGRAVED ON HOUSING ASSEMBLY (140)
B = DIMENSION B ENGRAVED ON HOUSING ASSEMBLY (140)
C = MEASURED DIMENSION ON HOUSING ASSEMBLY (165)
D = MEASURED WIDTH OF BEARING 1 (80)
E = MEASURED WIDTH OF BEARING 2 (80)

ITEM	PART NUMBER	SHIM THICKNESS
90	256A3148-29	0.010 ± 0.0005
95	256A3148-30	0.012 ± 0.0010
100	256A3148-31	0.015 ± 0.0010
105	256A3148-32	0.018 ± 0.0010



* SHIM THICKNESS TO BE WITHIN
±0.0015 OF CALCULATED VALUE

Assembly Details and Shim Adjustment
Figure 701 (Sheet 1 of 2)

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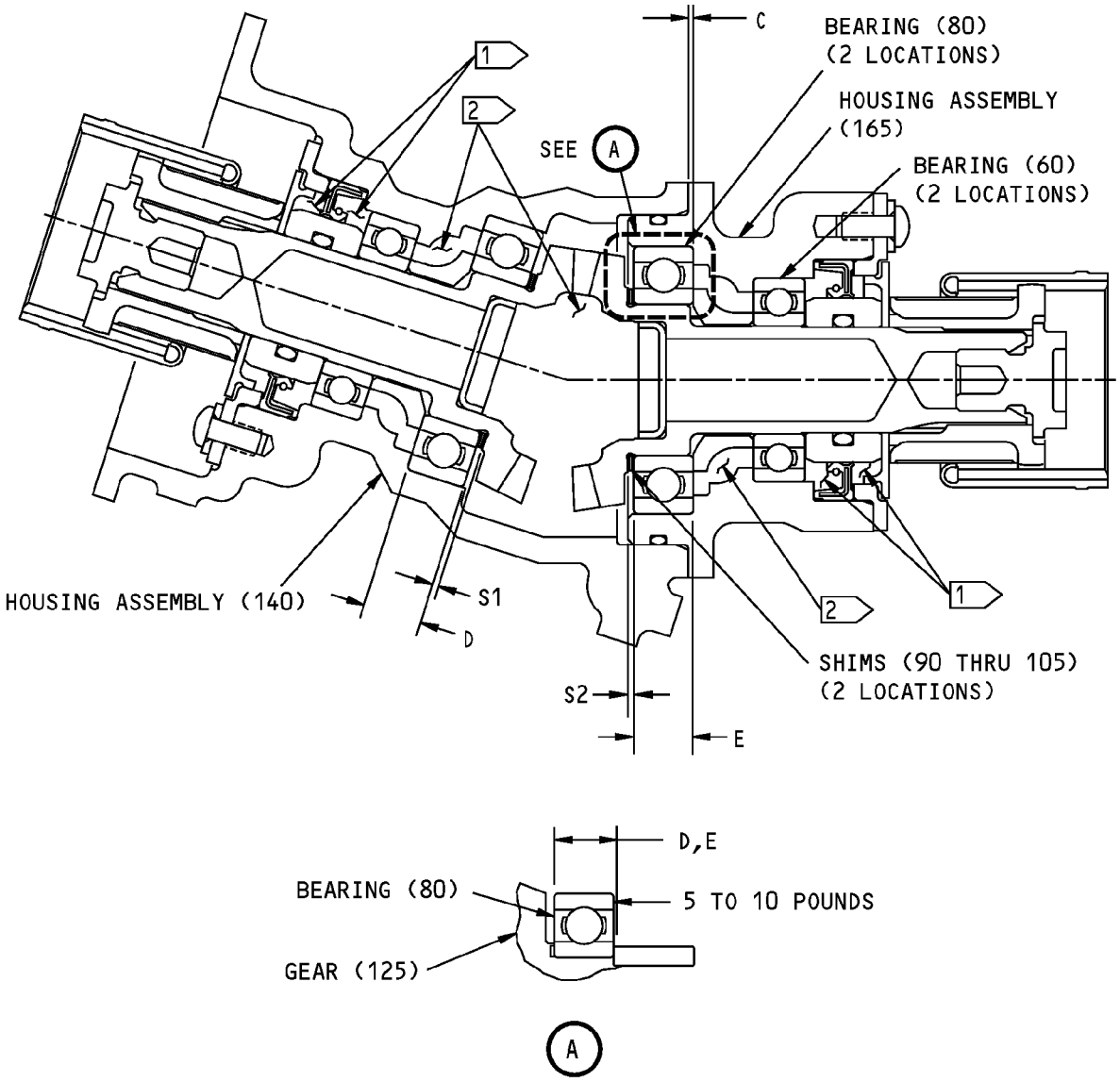

1 FILL SPACES WITH GREASE

2 FILL SPACES WITH MEASURED QUANTITY OF GREASE (2.4-3.0 OUNCES TOTAL)

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

Assembly Details and Shim Adjustment
Figure 701 (Sheet 2 of 2)

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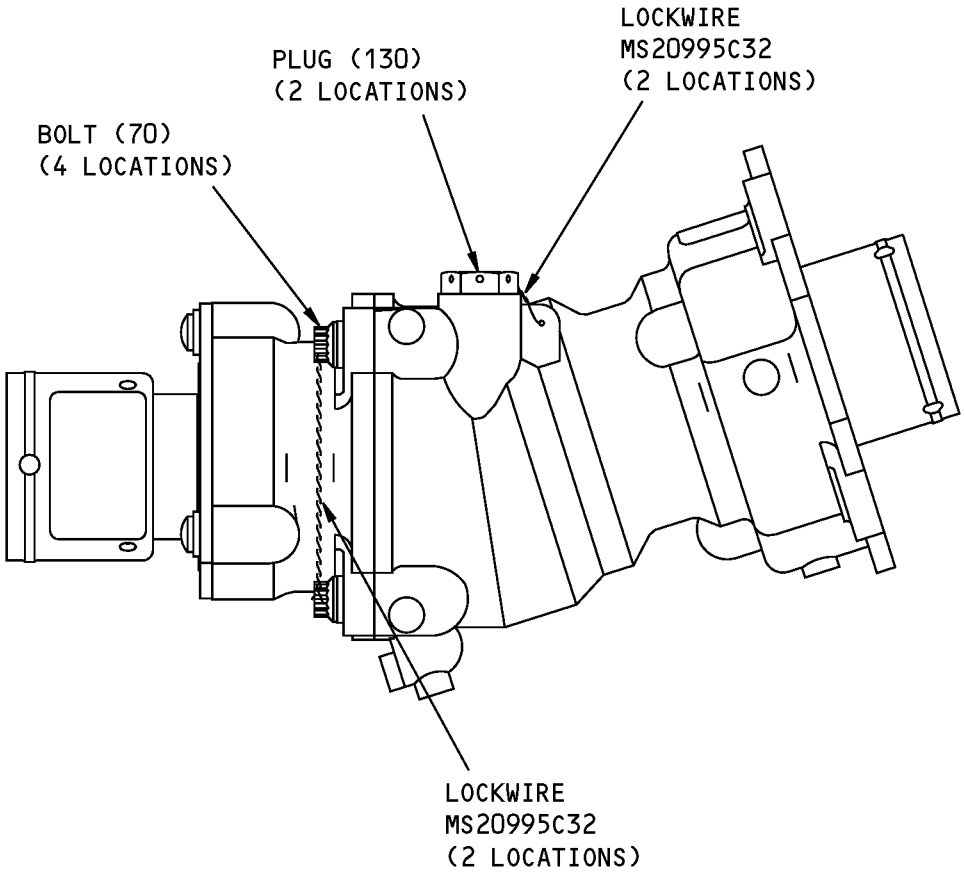

Lockwire Diagram
Figure 702

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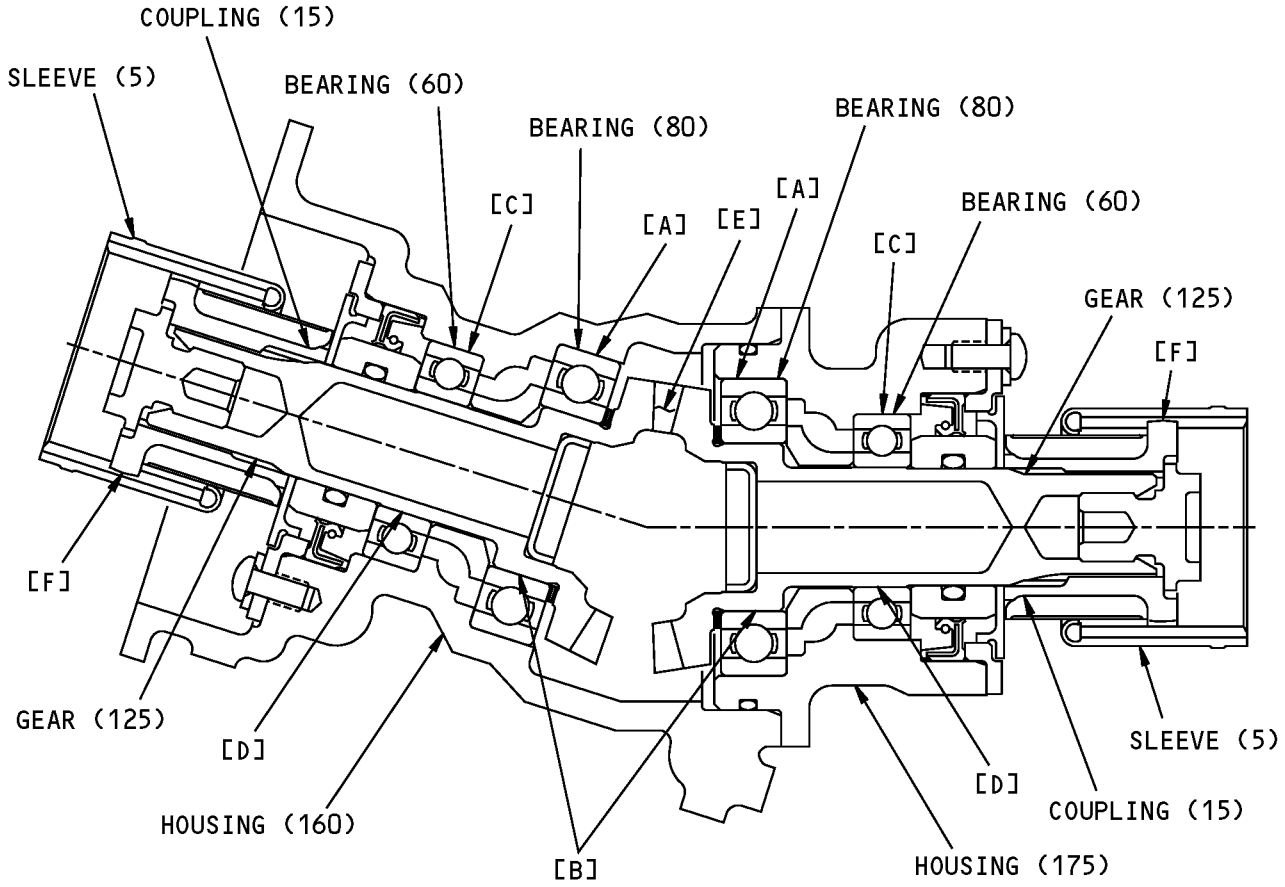

Fits and Clearances
Figure 801 (Sheet 1 of 2)

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REF LETTER	REF IPL		DESIGN DIMENSION*				SERVICE WEAR LIMIT*		
	FIG. NO.	MATING ITEM NO.	DIMENSION		ASSEMBLY CLEARANCE		DIMENSION		MAXIMUM CLEARANCE
			MIN	MAX	MIN	MAX	MIN	MAX	
[A]	1	ID 160,175 OD 80	2.4411 2.4404	2.4419 2.4409	0.0002	0.0015	2.4401	2.4423	0.0022
[B]	1	ID 80 OD 125	1.3775 1.3770	1.3780 1.3776	-0.0001	0.0010	1.3766	1.3783	0.0017
[C]	1	ID 160,175 OD 60	1.8506 1.8499	1.8514 1.8504	0.0002	0.0015	1.8496	1.8518	0.0022
[D]	1	ID 60 OD 125	0.9839 0.9835	0.9843 0.9840	-0.0001	0.0008	0.9832	0.9845	0.0013
[E]	1	125 125			0.0040 <1>	0.0060 <1>			0.0080 <1>
[F]	1	5 15			0.0000 <2>	0.0058 <2>			0.0080 <2>

* ALL DIMENSIONS ARE IN INCHES

<1> BACKLASH MEASURED AT PITCH DIAMETER (2.353 IN.)

<2> BACKLASH MEASURED AT PITCH DIAMETER (1.6875 IN.)

Fits and Clearances
Figure 801 (Sheet 2 of 2)

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REF IPL		NAME	TORQUE*	
FIG. NO.	ITEM NO.		POUND-INCHES	POUND-FEET
1	10	BOLT	600-720	
1	130	PLUG	110 (maximum)	

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

Torque Table
Figure 802

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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-4720	Test Equipment - Leakage Test	J27054-1	81205
SPL-4811	Test Equip - Run-In, Variable Drive (115 VAC)	Opt: J27056-43	81205
		Opt: J27056-45	81205
SPL-4812	Test Equip - Run-In, Variable Drive (230 VAC)	Opt: J27056-44	81205
		Opt: J27056-46	81205
SPL-5384	Wrench - Coupling Sleeve Flap Actuation	C27041-1	81205
SPL-5385	Seal Installation Equipment, TE Flap Drive	C27043-16	81205
SPL-5447	Bearing Width Measurement Equipment	J27057-22	81205
SPL-5703	Test Equipment - T.E. Flap Drive Gearboxes	C27068-65	81205

Tool Supplier Information

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

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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

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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
91251	FREUDENBERG-NOK GENERAL PARTNERSHIP PLEASANT STREET PO BOX B BRISTOL, NEW HAMPSHIRE 03222-0501
U1068	DOWTY SEALS LTD ASHCHURCH, TEWKESBURY GLOS GL20 8JS ENGLAND

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NUMERICAL INDEX

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
1002423607100		1	45	2
		1	45A	2
256A3148-29		1	90	AR
256A3148-30		1	95	AR
256A3148-31		1	100	AR
256A3148-32		1	105	AR
256A3182-1		1	35	2
256A3183-10		1	50B	2
256A3183-12		1	50C	2
256A3183-5		1	50A	2
256A3185-3		1	65	2
256A3195-18		1	185A	1
256A3421-1		1	165	1
256A3421-3		1	175	1
256A3630-1		1	1A	RF
256A3631-1		1	140	1
256A3631-2		1	160	1
256A3633-1		1	110	2
256A3633-2		1	125	1
256A3741-1		1	15	2
256A3743-1		1	20	2
256A3744-1		1	10	2
256A3745-1		1	5	2
256W3080-13		1	120	1
256W3244-1		1	40	2
700-857-2272-99		1	45	2
		1	45A	2
AN814-4DL		1	130	2
BAC27DCT602		1	180A	1
BACB10BA25C		1	60	2
BACB10BA35C		1	80	2
BACB30NM4HK6		1	70	4
BACB30NT3K2		1	25	6
BACI12AEF8-10P		1	115A	1

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PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
M25988-1-110		1	135	2
M25988-1-149		1	85	1
M25988-1-213		1	55	2
MS21209F1-15P		1	145	3
		1	170	3
MS21209F4-15P		1	150	4
MS21209F7-10P		1	155	1
MS21209F8-10P		1	115	1
NAS1149D0332J		1	30	6
NAS1149D0463J		1	75	4
S256W410-11		1	45	2
		1	45A	2

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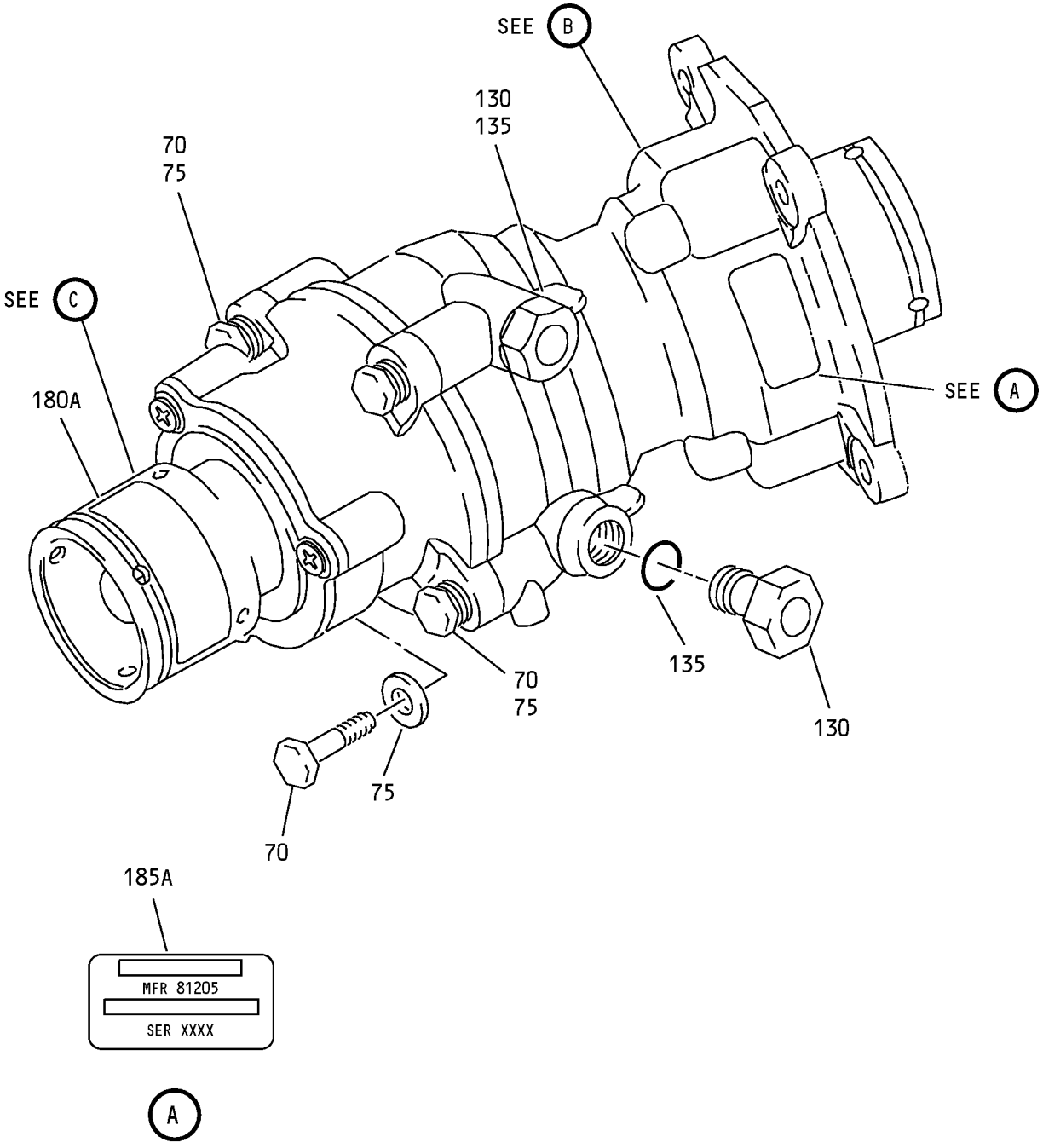

Flap Actuation Seal Rib Angle Gearbox Assembly
IPL Figure 1 (Sheet 1 of 3)

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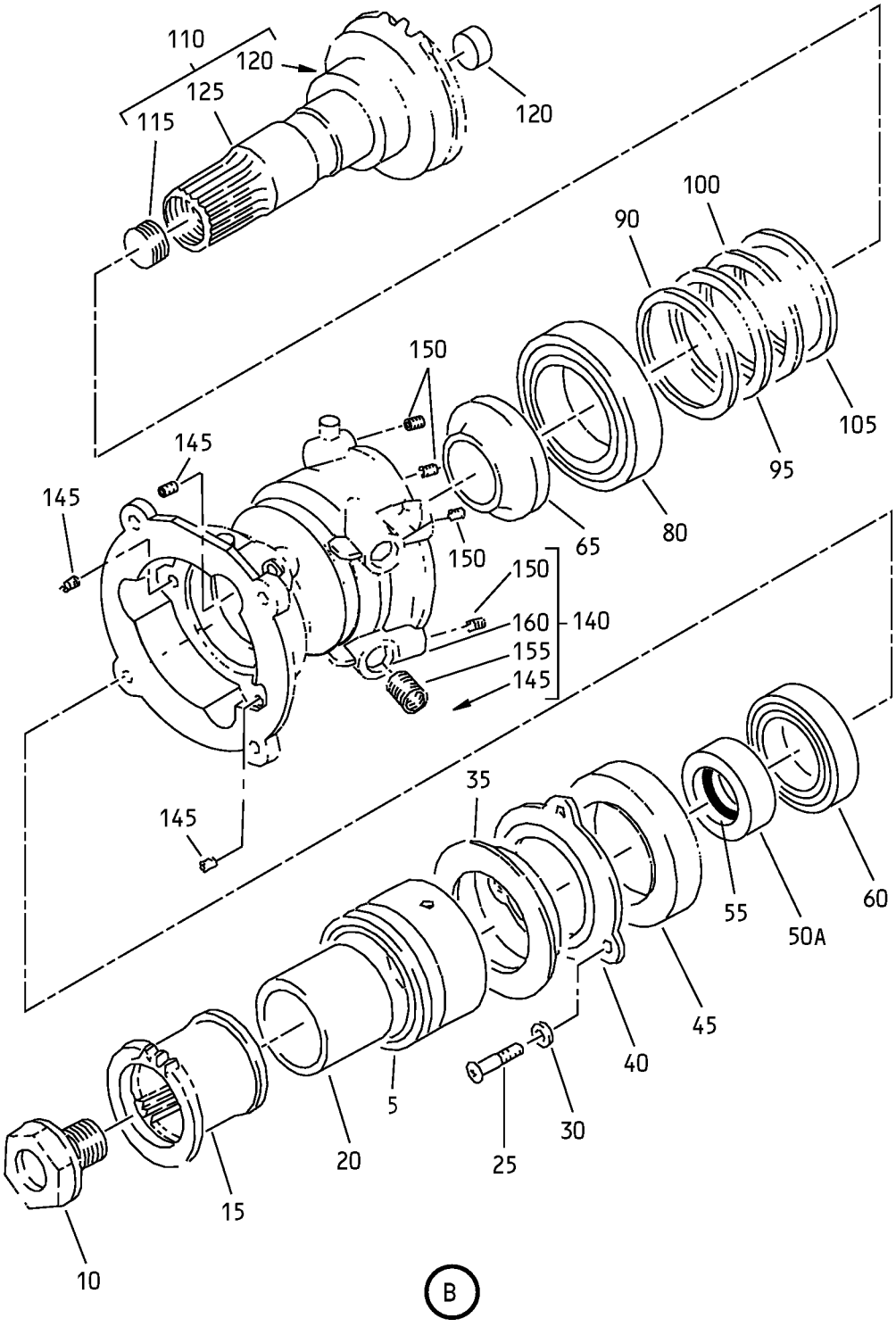

Flap Actuation Seal Rib Angle Gearbox Assembly
IPL Figure 1 (Sheet 2 of 3)

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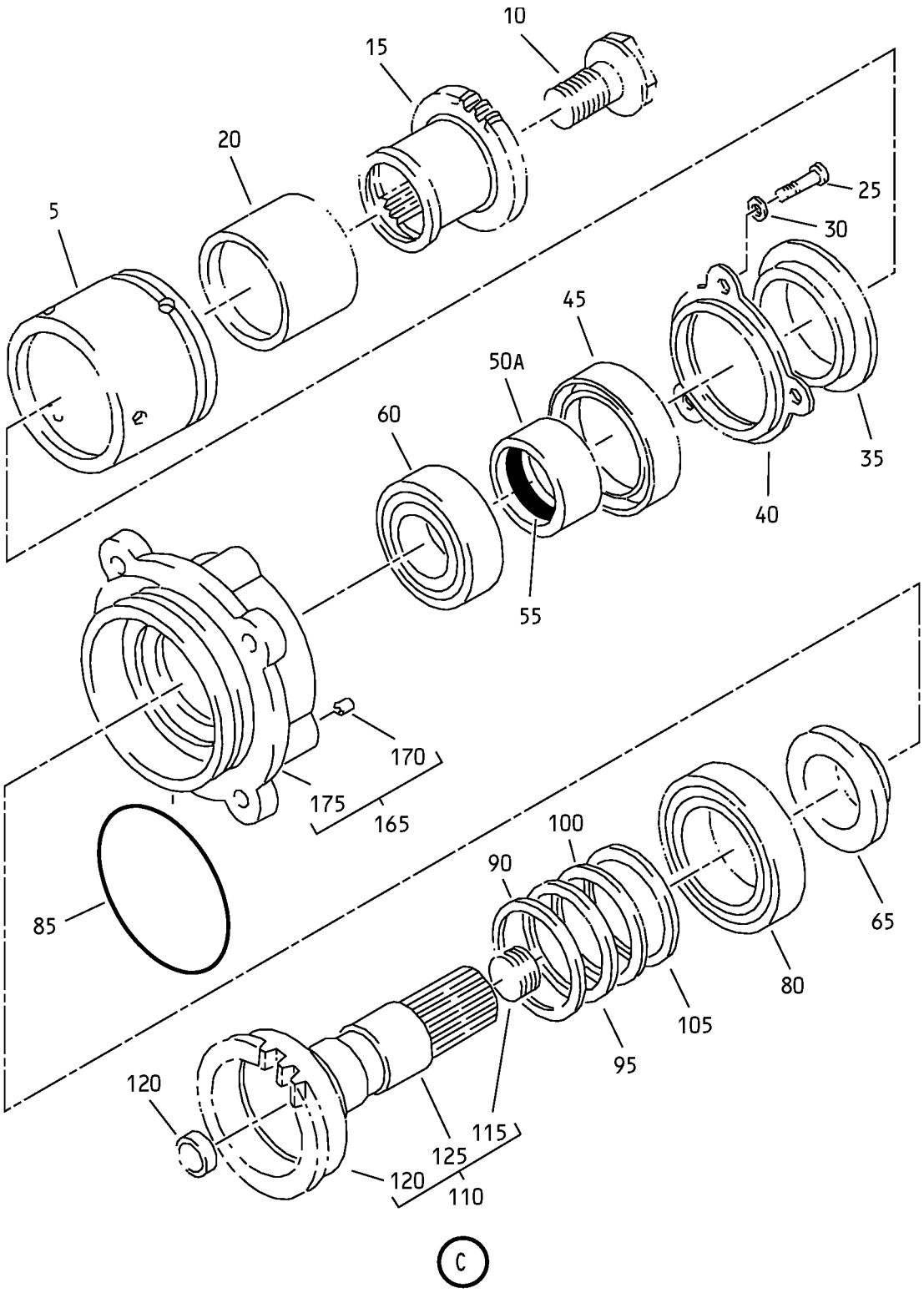

Flap Actuation Seal Rib Angle Gearbox Assembly
IPL Figure 1 (Sheet 3 of 3)

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FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–1A	256A3630-1		GEARBOX ASSY-ANGLE, SEAL RIB FLAP ACTUATION		RF
5	256A3745-1		. SLEEVE-COUPLING		2
10	256A3744-1		. BOLT-RETAINER		2
15	256A3741-1		. COUPLING HALF		2
20	256A3743-1		. SEAL-COUPLING		2
25	BACB30NT3K2		. BOLT		6
30	NAS1149D0332J		. WASHER		6
35	256A3182-1		. SHIELD-SEAL		2
40	256W3244-1		. RETAINER-SEAL		2
45	1002423607100		. SEAL-SHAFT (V91251) (SPEC S256W410-11) (OPT 700-857-2272-99 (VU1068))		2
–45A	700-857-2272-99		. SEAL-SHAFT (VU1068) (SPEC S256W410-11) (OPT 1002423607100 (V91251))		2
50	256A3183-1		DELETED		
50A	256A3183-5		. RING-SEAL (OPT ITEM 50B, 50C)		2
–50B	256A3183-10		. RING-SEAL (OPT ITEM 50A, 50C)		2
–50C	256A3183-12		. RING-SEAL (OPT ITEM 50A, 50B)		2
55	M25988-1-213		. PACKING		2
60	BACB10BA25C		. BEARING		2
65	256A3185-3		. SPACER		2
70	BACB30NM4HK6		. BOLT		4
75	NAS1149D0463J		. WASHER		4
80	BACB10BA35C		. BEARING		2
85	M25988-1-149		. PACKING		1
90	256A3148-29		. SHIM		AR
95	256A3148-30		. SHIM		AR

–Item not Illustrated

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FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
100	256A3148-31		. SHIM		AR
105	256A3148-32		. SHIM		AR
110	256A3633-1		. GEAR ASSY-BEVEL		2
115	MS21209F8-10P		. . INSERT (OPT ITEM 115A)		1
–115A	BACI12AEF8-10P		. . INSERT (OPT ITEM 115)		1
120	256W3080-13		. . PLUG-SHAFT		1
125	256A3633-2		. . GEAR		1
130	AN814-4DL		. PLUG AND BLEEDER		2
135	M25988-1-110		. PACKING		2
140	256A3631-1		. HOUSING ASSY		1
145	MS21209F1-15P		. . INSERT		3
150	MS21209F4-15P		. . INSERT		4
155	MS21209F7-10P		. . INSERT		1
160	256A3631-2		. . HOUSING		1
165	256A3421-1		. HOUSING ASSY		1
170	MS21209F1-15P		. . INSERT		3
175	256A3421-3		. . HOUSING		1
180	256A3195-19		DELETED		
180A	BAC27DCT602		. MARKER-ALUMINUM FOIL		1
185	256A3195-27		DELETED		
185A	256A3195-18		. MARKER		1

–Item not Illustrated

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