



**COMPONENT MAINTENANCE  
MANUAL  
WITH  
ILLUSTRATED PARTS LIST**

**FLAP ACTUATION MLG BEAM ANGLE  
GEARBOX ASSEMBLY**

**PART NUMBER  
256A3640-1, -2**

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## COMPONENT MAINTENANCE MANUAL

Revision No. 13  
Jul 01/2009

To: All holders of FLAP ACTUATION MLG BEAM ANGLE GEARBOX ASSEMBLY 27-55-75.

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.

Pages replaced or made obsolete by this revision should be removed and destroyed.

### ATTENTION

IF YOU RECEIVE PRINTED REVISIONS, PLEASE VERIFY THAT YOU HAVE RECEIVED AND FILED THE PREVIOUS REVISION. BOEING MUST BE NOTIFIED WITHIN 30 DAYS IF YOU HAVE NOT RECEIVED THE PREVIOUS REVISION. REQUESTS FOR REVISIONS OTHER THAN THE PREVIOUS REVISION WILL REQUIRE A COMPLETE MANUAL REPRINT SUBJECT TO REPRINT CHARGES SHOWN IN THE DATA AND SERVICES CATALOG.

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TRANSMITTAL LETTER  
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## COMPONENT MAINTENANCE MANUAL

### Location of Change

27-55-75

ASSEMBLY

SPECIAL TOOLS FIXTURES  
AND EQUIPMENT

### Description of Change

Changed the data in the Tools/Equipment list.

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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# COMPONENT MAINTENANCE MANUAL

## TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL





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Number	Date	Date	Initials	Number	Date	Date	Initials

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REVISION RECORD

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## COMPONENT MAINTENANCE MANUAL

### 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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INTRODUCTION

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## COMPONENT MAINTENANCE MANUAL

### FLAP ACTUATION MLG BEAM ANGLE GEARBOX ASSEMBLY - DESCRIPTION AND OPERATION

#### 1. Description

- A. The Flap Actuation MLG Beam 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 – 7.2 pounds

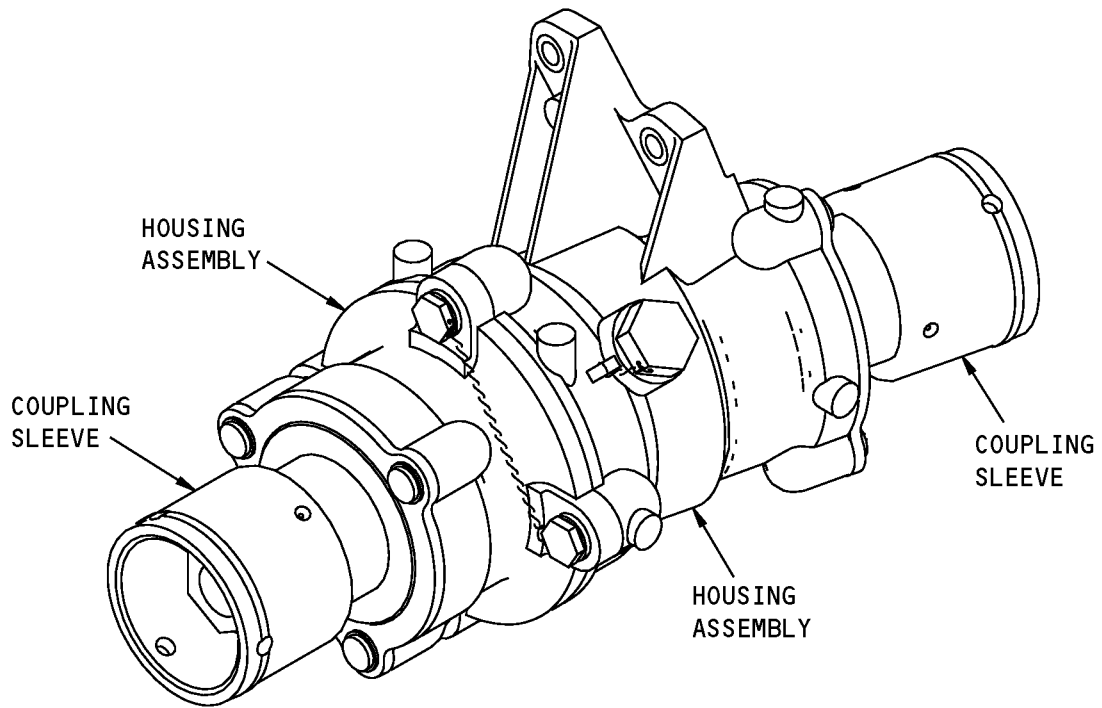
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Flap Actuation Main Landing Gear Beam Angle Gearbox Assembly  
Figure 1

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DESCRIPTION AND OPERATION

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## COMPONENT MAINTENANCE MANUAL

### TESTING AND FAULT ISOLATION

#### 1. General

- A. This procedure has the data necessary to do a test of the gearbox assembly 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 (175) 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 (175) 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 (115), sleeves (15), and shield (120) from the gear shafts. Remove the seal retainers (35), rings (110A), and seals (125) from the housing assemblies (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 2.235 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 plug (65) and packing (70). Attach the leakage test 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 (135,145)	Disassemble and replace the bearings (135,145)
Breakaway or maximum running torque is more than 10 lb-in.	Defective bearings (135,145)	Disassemble and replace the bearings (135,145)
Backlash is not correct	Shims (155 thru 170) need adjustment or,	Disassemble and adjust the shims (155 thru 170) or,
	Defective or worn gears (190)	Disassemble and replace the gears (190)
Air or grease leakage during pressure test	Defective seal (125) or packings (70,130, 150)	Disassemble and replace the seal (125) or packings (70,130, 150)

### 4. Fault Correction

#### A. Procedure

- (1)
- (2) If the gears (190) do not move freely or do not turn smoothly, replace the bearing(s) (135, 145) as follows:
- (a) Fully disassemble the gearbox assembly (DISASSEMBLY).
- (b) Replace the defective bearing(s) (135, 145) if it is necessary.
- (c) Assemble the gearbox assembly (ASSEMBLY).

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- (d) Do a backlash test on the gearbox assembly (TESTING AND FAULT ISOLATION, Paragraph 2.B.(5)).
  - (e) Do a pressure test on the gearbox assembly (TESTING AND FAULT ISOLATION, Paragraph 2.B.(7)).
- (3) If the breakaway or maximum running torque is more than 10 pound-inches, replace the bearing(s) (135, 145) as follows:
- (a) Fully disassemble the gearbox assembly (DISASSEMBLY).
  - (b) Replace the defective bearing(s) (135, 145) if it is necessary.
  - (c) Assemble the gearbox assembly (ASSEMBLY).
  - (d) Do a backlash test on the gearbox assembly (TESTING AND FAULT ISOLATION, Paragraph 2.B.(5)).
  - (e) Do a pressure test on the gearbox assembly (TESTING AND FAULT ISOLATION, Paragraph 2.B.(7)).
- (4) If the backlash is not 0.004-0.006 inch, do the subsequent steps:
- (a) Disassemble the gearbox assembly (DISASSEMBLY).
  - (b) Adjust the shims (155 thru 170) 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 (135, 145) again to calculate shim thickness.
  - (d) Do a backlash test on the gearbox assembly (TESTING AND FAULT ISOLATION, Paragraph 2.B.(5)). If the backlash is not 0.004-0.006 inch, replace the gears (190).
  - (e) Do a pressure test on the gearbox assembly (TESTING AND FAULT ISOLATION, Paragraph 2.B.(7)).
- (5) If air or grease leakage occurs at a seal or any two surfaces that contact, replace the seal (125) or packing (70, 130, 150).

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## COMPONENT MAINTENANCE MANUAL

### DISASSEMBLY

#### 1. General

- A. This procedure has the data necessary to disassemble the gearbox assembly.
- B. Disassemble this component sufficiently to isolate the defects, do the necessary repairs, and put the component back to a serviceable condition.
- C. Refer to the Standard Overhaul Practices Manual (SOPM) for the SOPM subjects identified in this procedure.
- D. Refer to IPL Figure 1 for item numbers.

#### 2. 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 (70, 130, 150)
- (2) Seal (125)

##### D. Procedure

- (1) Remove the coupling halves (115) at each end of the gearbox assembly.
  - (a) Apply the coupling sleeve wrench, SPL-5384 to hold the coupling sleeve (15) while the retainer bolt (10) is removed.
  - (b) Remove the retainer bolt (10), coupling half (115), seal (20), sleeve (15), and shield (120).
- (2) Remove the lockwire from the bolts (40). Remove the bolts (40) and washers (45), then remove the housing assembly (50) from the housing assembly (75, 80).
- (3) Remove the gear assemblies (175) with the bearings (135), shims (155 thru 170), and spacers (140) from the housing assemblies (50, 75, 80). 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 (75, 80). S2 is the thickness of the shims on the gear removed from housing assembly (50).
- (5) Remove the bolts (25), washers (30), and seal retainer (35) from the housing assemblies (50, 75, 80).

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(6) Remove the rings (110A), packings (150), and seals (125) from the housing assemblies (50, 75, 80).

(7) Remove the bearings (145) from the housing assemblies (50, 75, 80) (SOPM 20-50-03).

**NOTE:** Do not remove the inserts (55, 85, 90, 95) from the housing assemblies (50, 75, 80) unless repair or replacement is necessary.

(8) Remove the lockwire from the plug (65), then remove the plug and the packing (70) from the housing assembly (75, 80).

**NOTE:** Do not remove the markers (195, 200, 205) from the housing assembly (75, 80) unless repair or replacement is necessary.

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## COMPONENT MAINTENANCE MANUAL

### CLEANING

#### 1. General

- A. This procedure has the data necessary to clean the gearbox assembly.
- B. Refer to the Standard Overhaul Practices Manual (SOPM) for the SOPM subjects identified in this procedure.
- C. Refer to IPL Figure 1 for item numbers.

#### 2. Cleaning

##### A. References

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

##### B. Procedure

- (1) Clean the bearings (135, 145) 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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CLEANING

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## COMPONENT MAINTENANCE MANUAL

### 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 (15)
  - (b) Seal ring (110A)
  - (c) Coupling half (115)
  - (d) Shield (120)
  - (e) Gear (190)
- (3) Do a penetrant check (SOPM 20-20-02) of these parts:
  - (a) Seal retainer (35)
  - (b) Housing (60, 100, 105)
  - (c) Spacer (140)
- (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 (115).

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CHECK

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## COMPONENT MAINTENANCE MANUAL

### REPAIR

#### 1. General

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

**Table 601:**

<b>PART NUMBER</b>	<b>NAME</b>	<b>REPAIR</b>
—	REFINISH OF OTHER PARTS	1-1
256A3421	HOUSING ASSEMBLY	2-1
256A3641	HOUSING ASSEMBLY	3-1
256A3643	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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REPAIR - GENERAL

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

### EXAMPLES

$\boxed{\text{—}} \boxed{0.002}$	STRAIGHT WITHIN 0.002	$\boxed{\text{◎}} \boxed{\text{∅}} \boxed{0.0005} \boxed{C}$	CONCENTRIC TO DATUM C WITHIN 0.0005 DIAMETER
$\boxed{\text{⊥}} \boxed{0.002} \boxed{B}$	PERPENDICULAR TO DATUM B WITHIN 0.002	$\boxed{\text{≡}} \boxed{0.010} \boxed{A}$	SYMMETRICAL WITH DATUM A WITHIN 0.010
$\boxed{\text{//}} \boxed{0.002} \boxed{A}$	PARALLEL TO DATUM A WITHIN 0.002	$\boxed{\text{∠}} \boxed{0.005} \boxed{A}$	ANGULAR TOLERANCE 0.005 WITH DATUM A
$\boxed{\text{○}} \boxed{0.002}$	ROUND WITHIN 0.002	$\boxed{\text{⊕}} \boxed{\text{∅}} \boxed{0.002} \boxed{\text{Ⓢ}} \boxed{B}$	LOCATED AT TRUE POSITION WITHIN 0.002 DIA RELATIVE TO DATUM B, REGARDLESS OF FEATURE SIZE
$\boxed{\text{⊘}} \boxed{0.010}$	CYLINDRICAL SURFACE MUST LIE BETWEEN TWO CONCENTRIC CYLINDERS, ONE OF WHICH HAS A RADIUS 0.010 INCH GREATER THAN THE OTHER	$\boxed{\text{⊥}} \boxed{\text{∅}} \boxed{0.010} \boxed{\text{Ⓜ}} \boxed{A}$	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
$\boxed{\text{⌒}} \boxed{0.006} \boxed{A}$	EACH LINE ELEMENT OF THE SURFACE AT ANY CROSS SECTION MUST LIE BETWEEN TWO PROFILE BOUNDARIES 0.006 INCH APART RELATIVE TO DATUM A	$\boxed{0.510} \boxed{\text{Ⓟ}}$	
$\boxed{\text{⌓}} \boxed{0.020} \boxed{A}$	SURFACES MUST LIE WITHIN PARALLEL BOUNDARIES 0.020 INCH APART AND EQUALLY DISPOSED ABOUT TRUE PROFILE	$\boxed{2.000}$	THEORETICALLY EXACT DIMENSION IS 2.000
		OR	
		2.000	
		BSC	

True Position Dimensioning Symbols  
Figure 601

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REPAIR - GENERAL

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## COMPONENT MAINTENANCE MANUAL

### 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 (140)	Al alloy	Anodize all over, and seal in dilute chromate solution (F-17.31).
Ring (110A)	AMS5898 CRES, case hardened HRC 55 min or HT to HRC 55 min	Passivate (F-17.25).
Ring (110B)	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 (110C)	9310 Steel, case hardened Ra 80 min	Cadmium plate (F-15.23) (0.0002-0.0004 inch thick).
Shield (120)	15-5PH CRES, 180-200 ksi	Passivate (F-17.25).
Sleeve (15)	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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REPAIR 1-1

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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 (50).
- 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 (60) 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 0.004 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.

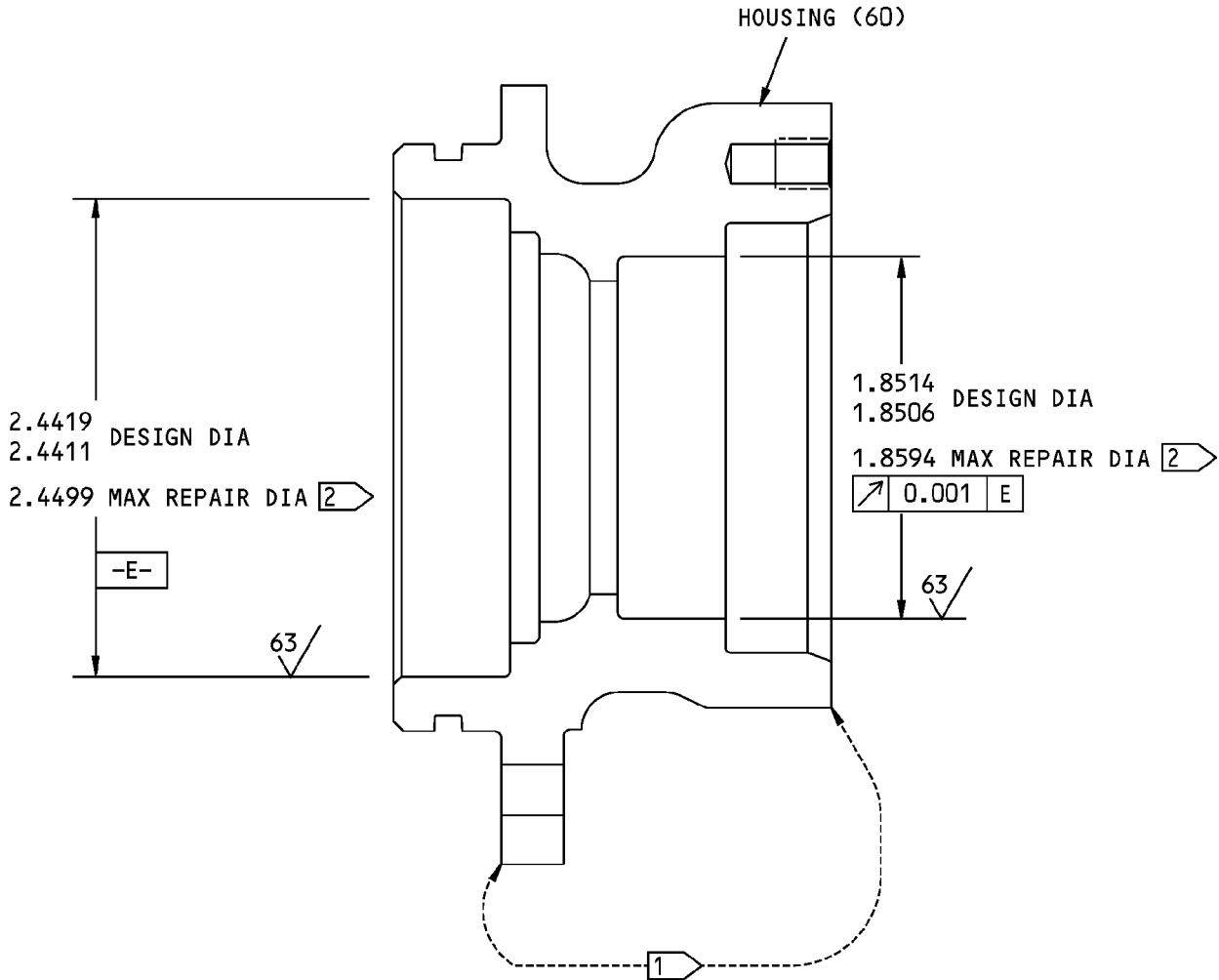
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[1] APPLY PRIMER ON ALL EXTERNAL SURFACES IN THIS AREA, OTHER THAN HOLES (F-20.02).

[2] HARD ANODIZE (F-17.06) AND GRIND TO DESIGN DIMENSION AND FINISH SHOWN. MAXIMUM ANODIZE THICKNESS 0.004.

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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REPAIR 2-1

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### HOUSING ASSEMBLY - REPAIR 3-1

256A3641-1, -2

#### 1. General

- A. This procedure has the data necessary to repair and refinish the housing assembly (75, 80).
- 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 (100, 105) 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 0.004 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.

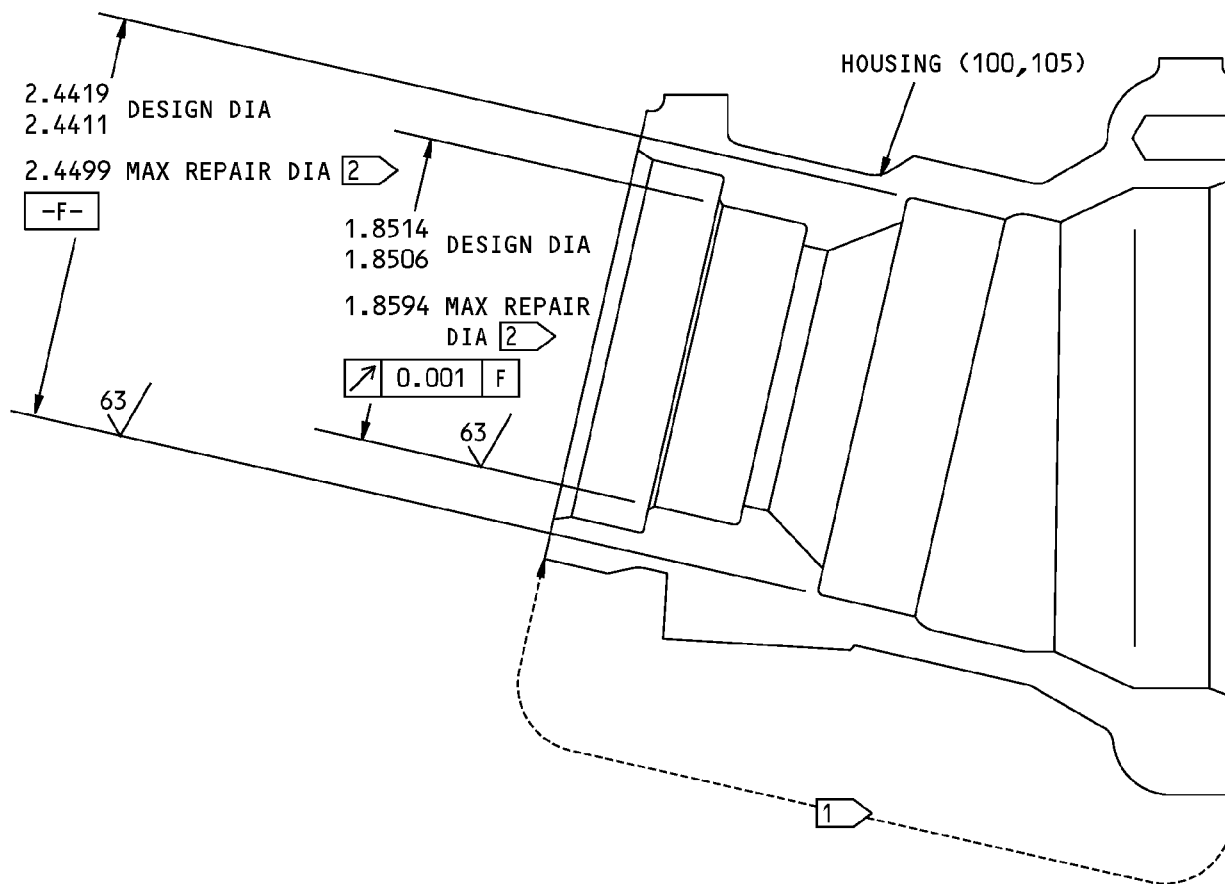
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REPAIR 3-1

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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 0.004.

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

256A3641-1,-2 Housing Assembly Repair  
Figure 601

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REPAIR 3-1

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## COMPONENT MAINTENANCE MANUAL

### BEVEL GEAR ASSEMBLY - REPAIR 4-1

256A3643-1

#### 1. General

- A. This procedure has the data necessary to repair and refinish the bevel gear assembly (175).
- 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: 9310 Steel, AMS 6265, 160-190 ksi
  - (2) Shot Peen: Surfaces as shown in REPAIR 4-1, Figure 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 (190) to the repair dimension shown in REPAIR 4-1, Figure 601 to remove defects at the bearing interfaces (SOPM 20-10-01).

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- (2) Break all sharp edges.
- (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.

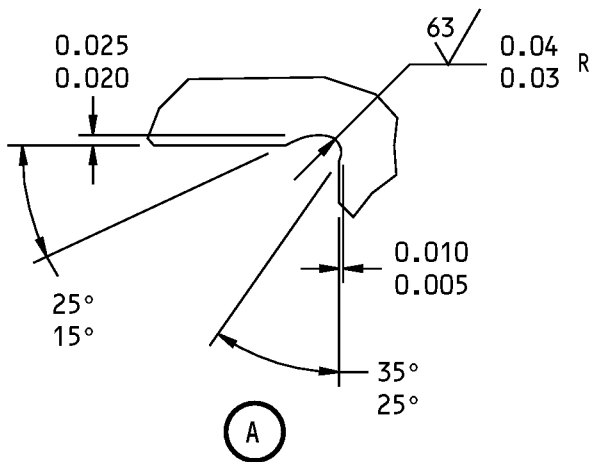
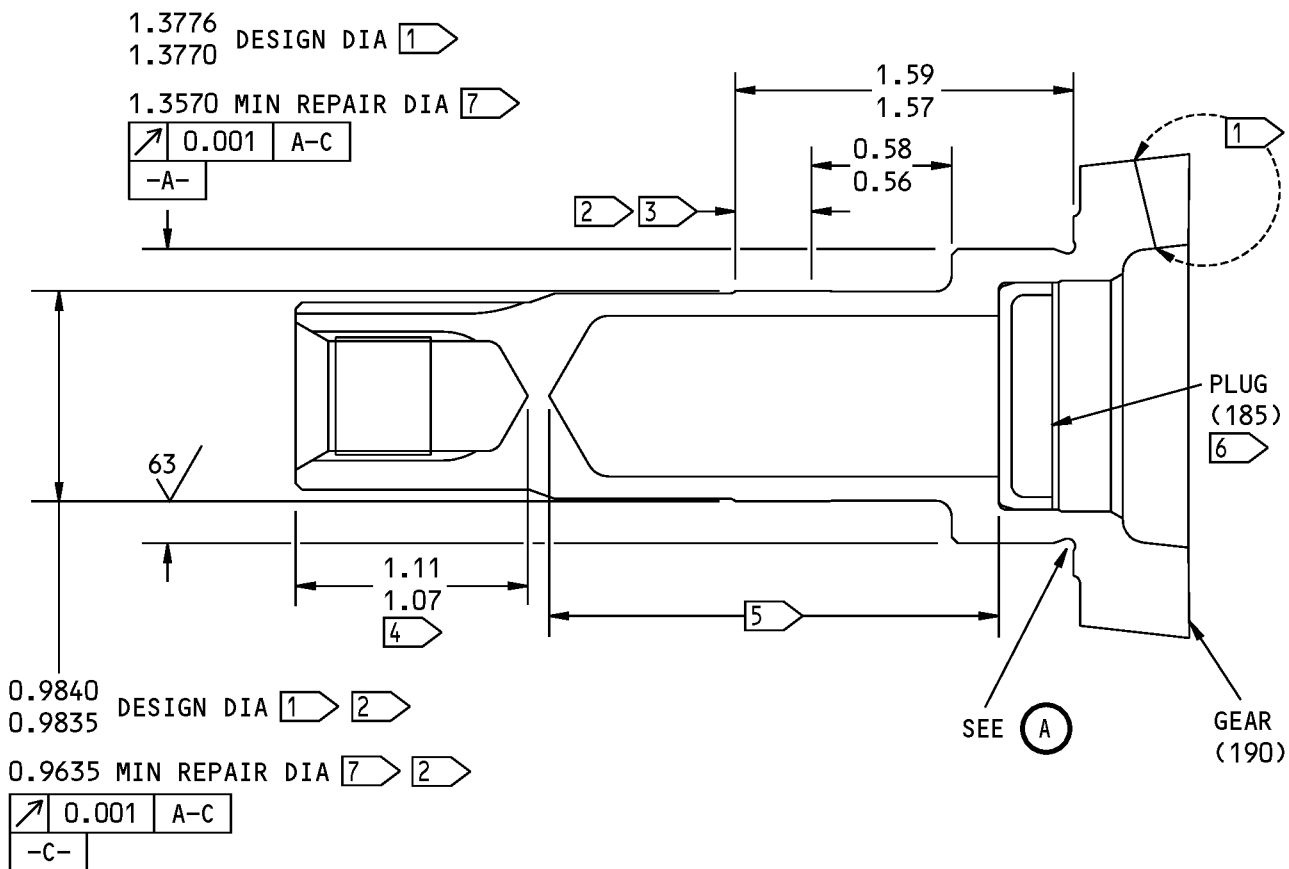
- (1) Apply cadmium plate (F-15.23) on all surfaces other than the surfaces shown in REPAIR 4-1, Figure 601. Plating throw-in is permitted at the entrance of the holes.
- (2) Apply primer, C00259 (F-20.02) to all the internal surfaces in the area shown in REPAIR 4-1, Figure 601.
- (3) Apply no finish to the bearing surfaces (F-25.01) shown in REPAIR 4-1, Figure 601.
- (4) If necessary, install the plug (185) with wet primer, C00259 (F-20.06).

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 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-20.06).
- 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

256A3643-1 Gear Assembly Repair  
Figure 601 (Sheet 2 of 2)

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REPAIR 4-1

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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 (115).
- 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.

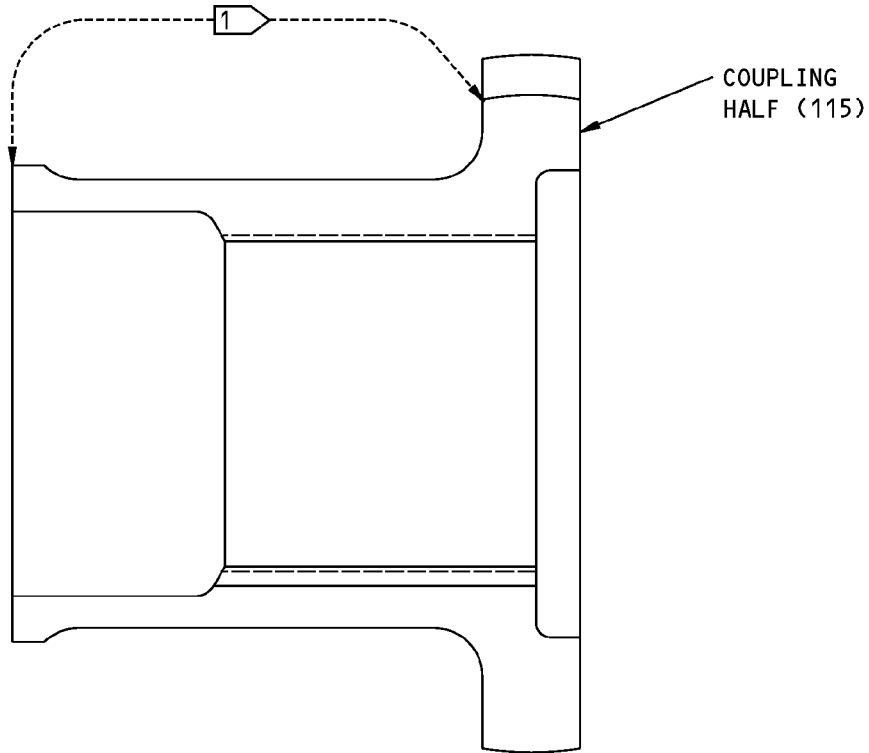
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APPLY PRIMER TO THIS AREA ONLY

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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REPAIR 5-1

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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 (35).
- 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. 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 6-1, Figure 601)

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

- (1) Anodize (F-17.31) 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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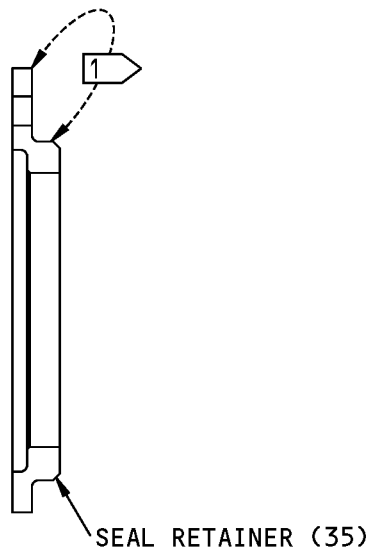
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1 NO PRIMER ON THIS SURFACE

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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REPAIR 6-1

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### ASSEMBLY

#### 1. General

- A. This procedure has the data necessary to assemble the gearbox assembly.
- B. Refer to the Standard Overhaul Practices Manual (SOPM) for the SOPM subjects identified in this procedure.
- C. Refer to IPL Figure 1 for item numbers.

#### 2. 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
SOPM 20-60-02	FINISHING MATERIALS
SOPM 20-60-03	LUBRICANTS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

### D. Procedure (IPL Figure 1)

**NOTE:** For finishing materials, refer to SOPM 20-60-02. For lubricants, refer to SOPM 20-60-03. For miscellaneous materials, refer to SOPM 20-60-04.

- (1) Remove grease from the bearings (135, 145) (SOPM 20-30-01).
- (2) Install the bearings (145) in the housing assemblies (50, 75 or 80) 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 (135) or housing assembly (50, 75 or 80), was replaced.

  - (a) Use the J27057 bearing width Measurement Equipment, SPL-5447 to apply a 5-10 pound axial force across the bearing (135) 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 (135) to a tolerance of 0.001 inch.
  - (b) Use the width of the bearing (135) to be installed in housing assembly (75, 80) to calculate shim thickness S1, as shown in ASSEMBLY, Figure 701.
  - (c) Measure the dimension C on the housing assembly (50). Measure the dimension to a tolerance of 0.001 inch.
  - (d) Use the width of the bearing (135) to be installed in housing assembly (50), and dimension C, to calculate shim thickness S2, as shown in ASSEMBLY, Figure 701.
  - (e) Mix the minimum number of different shims (155 thru 170) 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 (155 thru 170), bearings (135), and spacers (140) on the gear assemblies (175). 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 (135) for each housing assembly (50, 75, 80).
- (5) Apply a light layer of grease, D00633 (SOPM 20-50-03) to the bearings (135). Install the gear assemblies (175) with the shims (155 thru 170), bearings (135), and spacers (140) in the housing assemblies (50, 75 or 80).
- (6) Assemble the housing assembly (50) to the housing assembly (75, 80) with the bolts (40) and washers (45).
- (7) Do these steps:
  - (a) Do a check of the backlash (TESTING AND FAULT ISOLATION, Paragraph 2.B.(5)).
  - (b) If the backlash is not within tolerance, disassemble the housing assemblies (50, 75 or 80). As required, add or subtract shims (155 thru 170) to get 0.004-0.006 inch backlash.

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- (8) Remove the bolts (40) and washers (45), and disassemble the housing assembly (50) from the housing assembly (75, 80). Remove the gear assemblies (175) with the shims (155 thru 170), bearings (135), and spacers from the housing assemblies (50, 75 or 80).
- (9) Measure 2.4-3.0 ounces of grease, D00633.
- (10) Install the seals (125) into the housing assemblies (50, 75 or 80).

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

- (a) Apply grease, D00633 to the seal bore in the housing assembly (50, 75 or 80).
- (b) Use the C27043 Seal Installation Tool, SPL-5385 to install the seal (125) in the housing (50, 75 or 80) 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 (35). 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 (35) on the housing assemblies (50, 75 or 80) 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 (145) and the seals (125) with grease, D00633, as shown in ASSEMBLY, Figure 701.
- (13) Pack bearings (135, 145) from measured grease, D00633 and install onto the gear assemblies (175) with shims (155 thru 170) and spacers (140) in the housing assemblies (50, 75 or 80). Apply some of the grease, D00633 to the outer surface of the spacers (140) to fill the spaces between the spacer and the housings, as shown in ASSEMBLY, Figure 701.
- (14) Apply the remaining measured quantity of grease, D00633 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 (130) on the housing assembly (50) 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 (50). 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 (50) to the housing assembly (75, 80) with the bolts (40) and washers (45). Install the bolts with corrosion inhibiting compound, C00913 (SOPM 20-50-01).

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ASSEMBLY

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## COMPONENT MAINTENANCE MANUAL

- (17) Install bearings (145) onto shafts of gear assemblies (175). Install the packings (150) in the rings (110A) with grease, D00633 (SOPM 20-50-06), then install the rings on the shafts of the gear assemblies (175).
- (18) Fill the spaces between the seal retainers (35) and the rings (110A) with grease, D00633. Install the shields (120) on the gear shafts.
- (19) Install the coupling seals (20) on the coupling halves (115). Apply a thin layer of grease, D00633 to the splines of the sleeves (15), then install the sleeves on the coupling halves (115).
- (20) Apply grease, D00633 to the splines of the gear assemblies (175), then install the coupling halves (115) with the seals (20) and sleeves (15) 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 (15) 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 (C27068-65 supersedes C27068-1). Connect the 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, Paragraph 2.B.(7).
- (24) Install the packing (70) on the plug (65) with grease, D00633 . Apply the grease, D00633 to the threads of the plug, then install the plug in the threaded port in the housing assembly (75 or 80). Tighten the plug to a maximum of 110 pound-inches.
- (25) Install lockwire, G01048 on the bolts (40) and the plug (65) as shown on ASSEMBLY, Figure 702. Use the double twist procedure (SOPM 20-50-02).

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ASSEMBLY

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## COMPONENT MAINTENANCE MANUAL

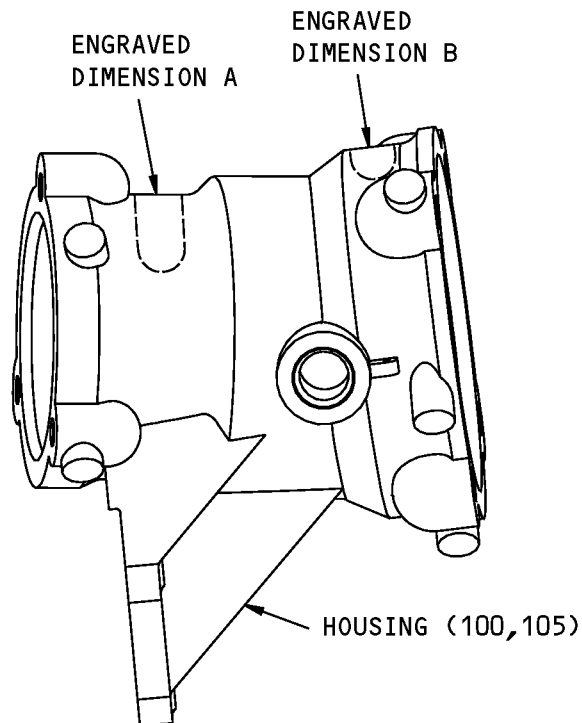
### SHIM THICKNESS CALCULATION

SHIM THICKNESS S1 \* = A - D - 0.550

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

WHERE A = DIMENSION A ENGRAVED ON HOUSING ASSEMBLY (75,80)  
 B = DIMENSION B ENGRAVED ON HOUSING ASSEMBLY (75,80)  
 C = MEASURED DIMENSION ON HOUSING ASSEMBLY (50)  
 D = MEASURED WIDTH OF BEARING 1 (135)  
 E = MEASURED WIDTH OF BEARING 2 (135)

ITEM	PART NUMBER	SHIM THICKNESS
155	256A3148-29	0.010 ± 0.0005
160	256A3148-30	0.012 ± 0.0010
165	256A3148-31	0.015 ± 0.0010
170	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)

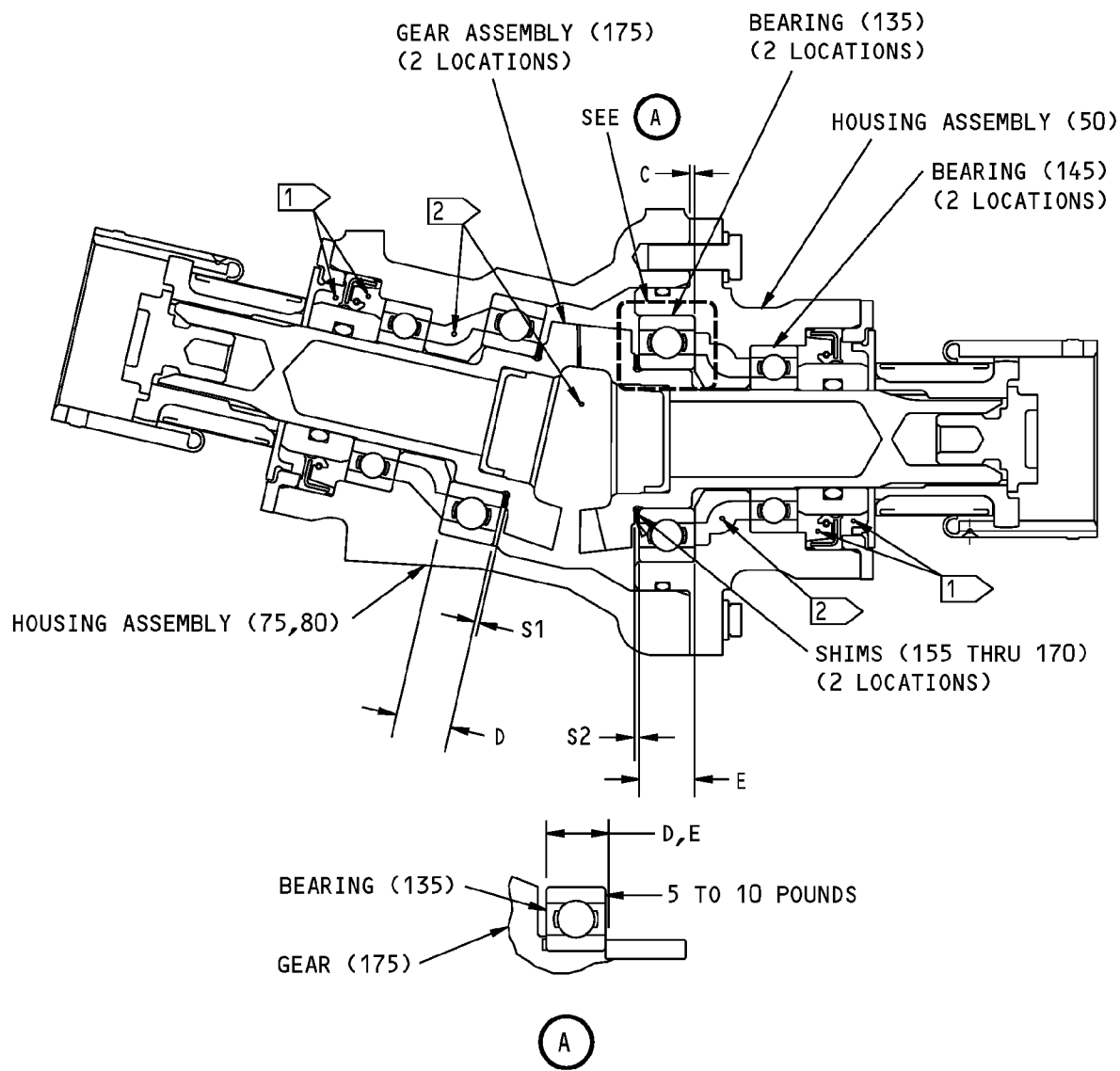
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- 1 FILL SPACES WITH GREASE
- 2 FILL SPACES WITH MEASURED QUANTITY OF GREASE (2.4-3.0 OUNCES TOTAL)

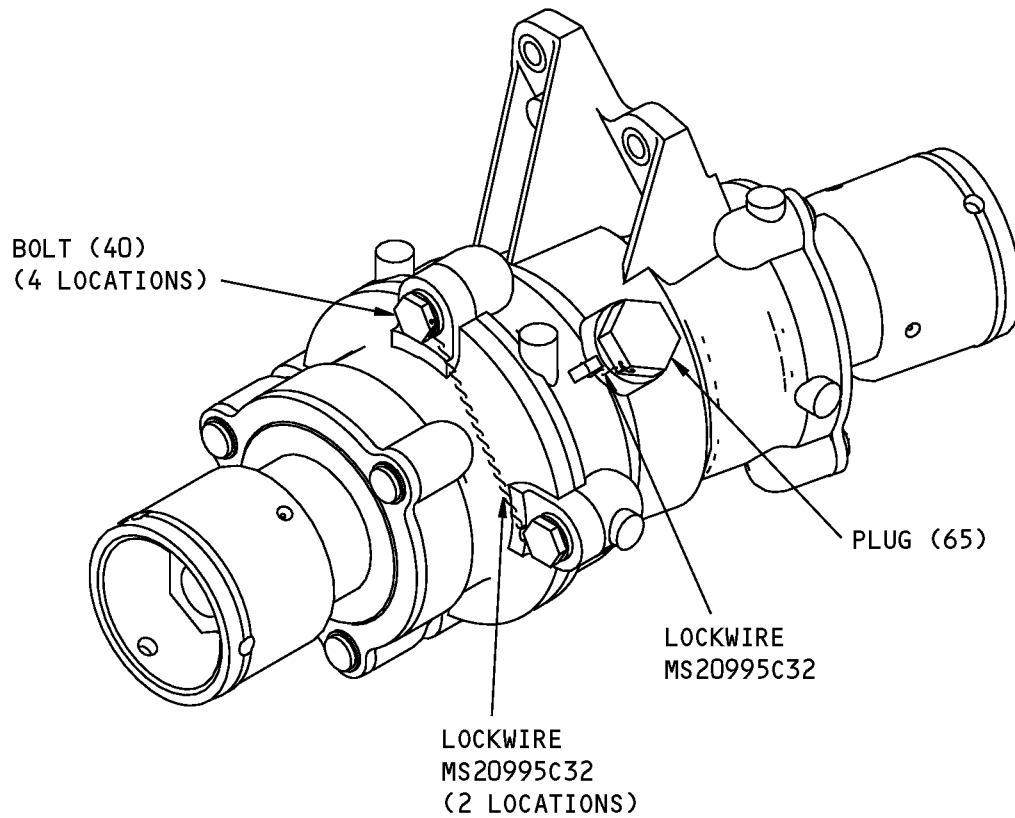
ITEM NUMBERS REFER TO IPL FIG. 1  
 ALL DIMENSIONS ARE IN INCHES

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

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Lockwire Diagram  
Figure 702

**27-55-75**

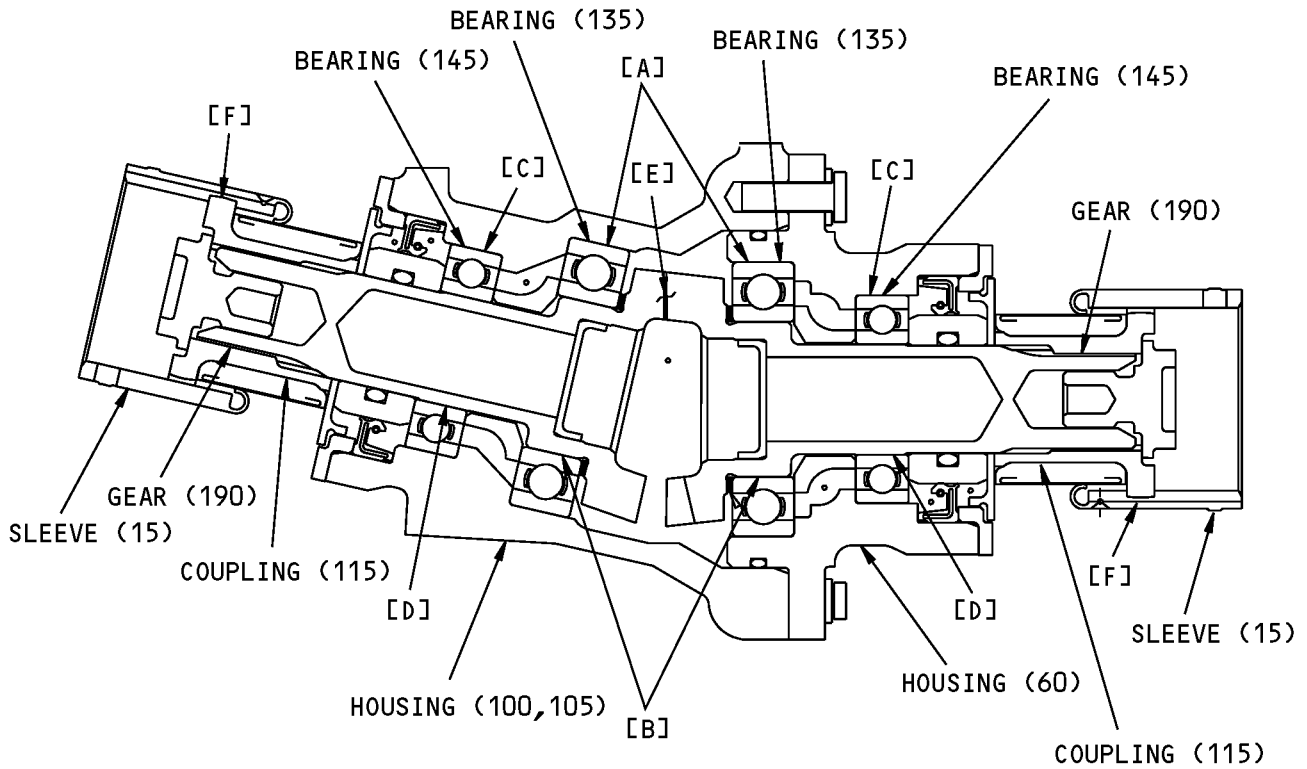
ASSEMBLY

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# COMPONENT MAINTENANCE MANUAL

## FITS AND CLEARANCES



Fits and Clearances  
Figure 801 (Sheet 1 of 2)



## COMPONENT MAINTENANCE MANUAL

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 60, 100, 105 OD 135	2.4411 2.4404	2.4419 2.4409	0.0002	0.0015	2.4402	2.4422	0.0020
[B]	1	ID 135 OD 190	1.3775 1.3770	1.3780 1.3776	-0.0001	0.0010	1.3767	1.3782	0.0015
[C]	1	ID 60, 100, 105 OD 145	1.8506 1.8499	1.8514 1.8504	0.0002	0.0015	1.8497	1.8517	0.0020
[D]	1	ID 145 OD 190	0.9839 0.9835	0.9843 0.9840	-0.0001	0.0008	0.9832	0.9845	0.0013
[E]	1	190 190			0.0040 ①	0.0060 ①			0.0100 ①
[F]	1	15 115			0.0000 ②	0.0058 ②			

① BACKLASH MEASURED AT PITCH DIAMETER (2.235 INCHES)

② BACKLASH MEASURED AT PITCH DIAMETER (1.6875 INCHES)

\* ALL DIMENSIONS ARE IN INCHES

Fits and Clearances  
Figure 801 (Sheet 2 of 2)

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FITS AND CLEARANCES  
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## COMPONENT MAINTENANCE MANUAL

REF IPL		NAME	TORQUE*	
FIG. NO.	ITEM NO.		POUND-INCHES	POUND-FEET
1	10	Bolt	600-720	
1	65	Plug	110 (maximum)	

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

Torque Table  
Figure 802





## COMPONENT MAINTENANCE MANUAL

### 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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SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

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## COMPONENT MAINTENANCE MANUAL

### 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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## COMPONENT MAINTENANCE MANUAL

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

<b>Code</b>	<b>Name</b>
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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## COMPONENT MAINTENANCE MANUAL

### NUMERICAL INDEX

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
1002423607100		1	125	2
		1	125A	2
256A3148-29		1	155	AR
256A3148-30		1	160	AR
256A3148-31		1	165	AR
256A3148-32		1	170	AR
256A3182-1		1	120	2
256A3183-10		1	110B	2
256A3183-12		1	110C	2
256A3183-5		1	110A	2
256A3185-3		1	140	2
256A3195-18		1	205	1
256A3421-1		1	50	1
256A3421-3		1	60	1
256A3640-1		1	1A	RF
256A3640-2		1	5	RF
256A3641-1		1	75	1
256A3641-2		1	80	1
256A3641-3		1	100	1
256A3641-4		1	105	1
256A3643-1		1	175	2
256A3643-2		1	190	1
256A3741-1		1	115	2
256A3743-1		1	20	2
256A3744-1		1	10	2
256A3745-1		1	15	2
256W3080-13		1	185	1
256W3244-1		1	35	2
700-857-2272-99		1	125	2
		1	125A	2
AN814-4DL		1	65	1
BAC27DCT570		1	195A	1
BAC27DCT571		1	200A	1
BACB10BA25C		1	145	2

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## COMPONENT MAINTENANCE MANUAL

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
BACB10BA35C		1	135	2
BACB30NM4HK6		1	40	4
BACB30NT3K2		1	25	6
M25988-1-110		1	70	1
M25988-1-149		1	130	1
M25988-1-213		1	150	2
MS21209F1-15P		1	55	3
		1	95	3
MS21209F4-15P		1	85	4
MS21209F7-10P		1	90	1
MS21209F8-10P		1	180	1
NAS1149D0332J		1	30	6
NAS1149D0463J		1	45	4
S256W410-11		1	125	2
		1	125A	2

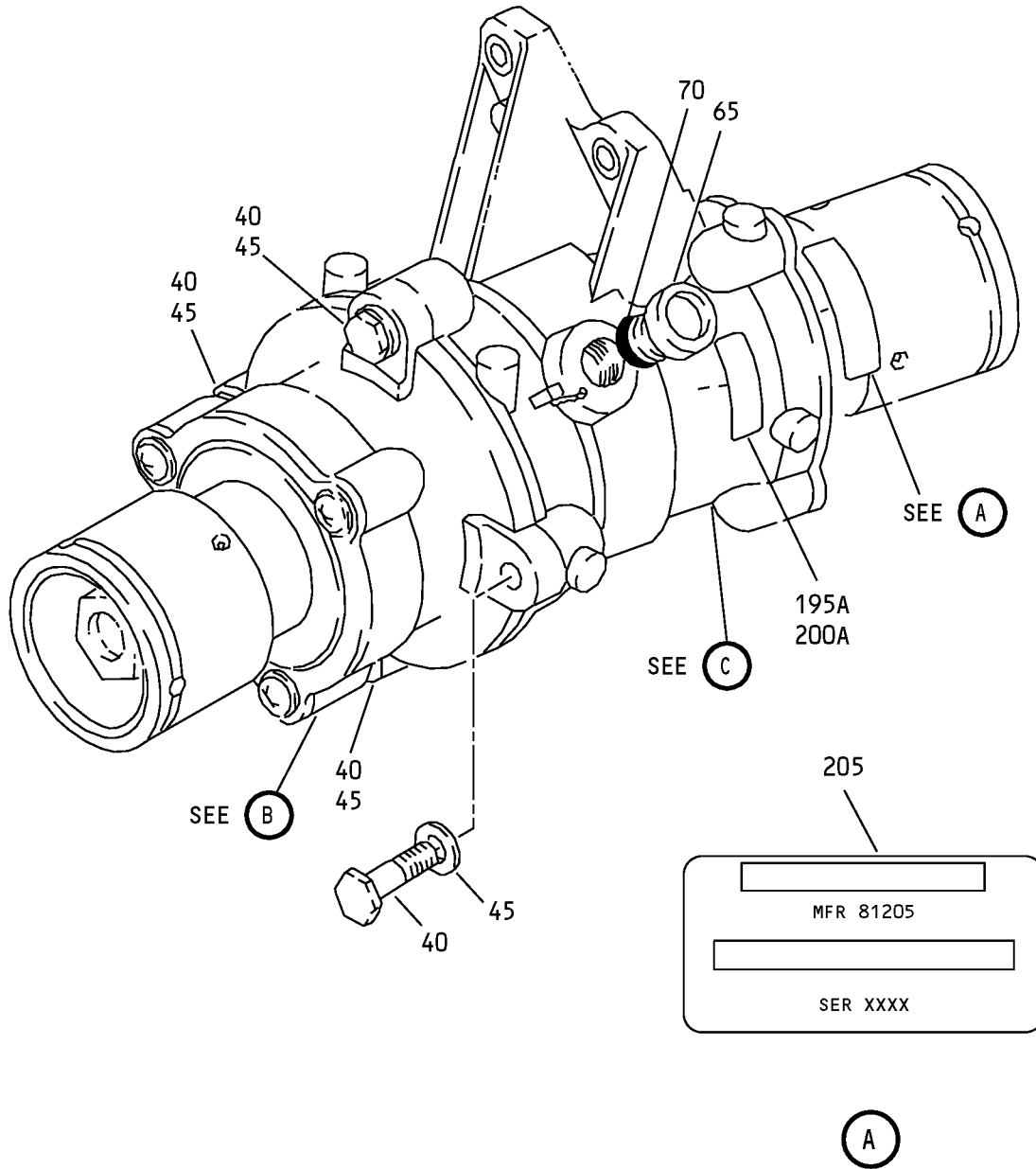
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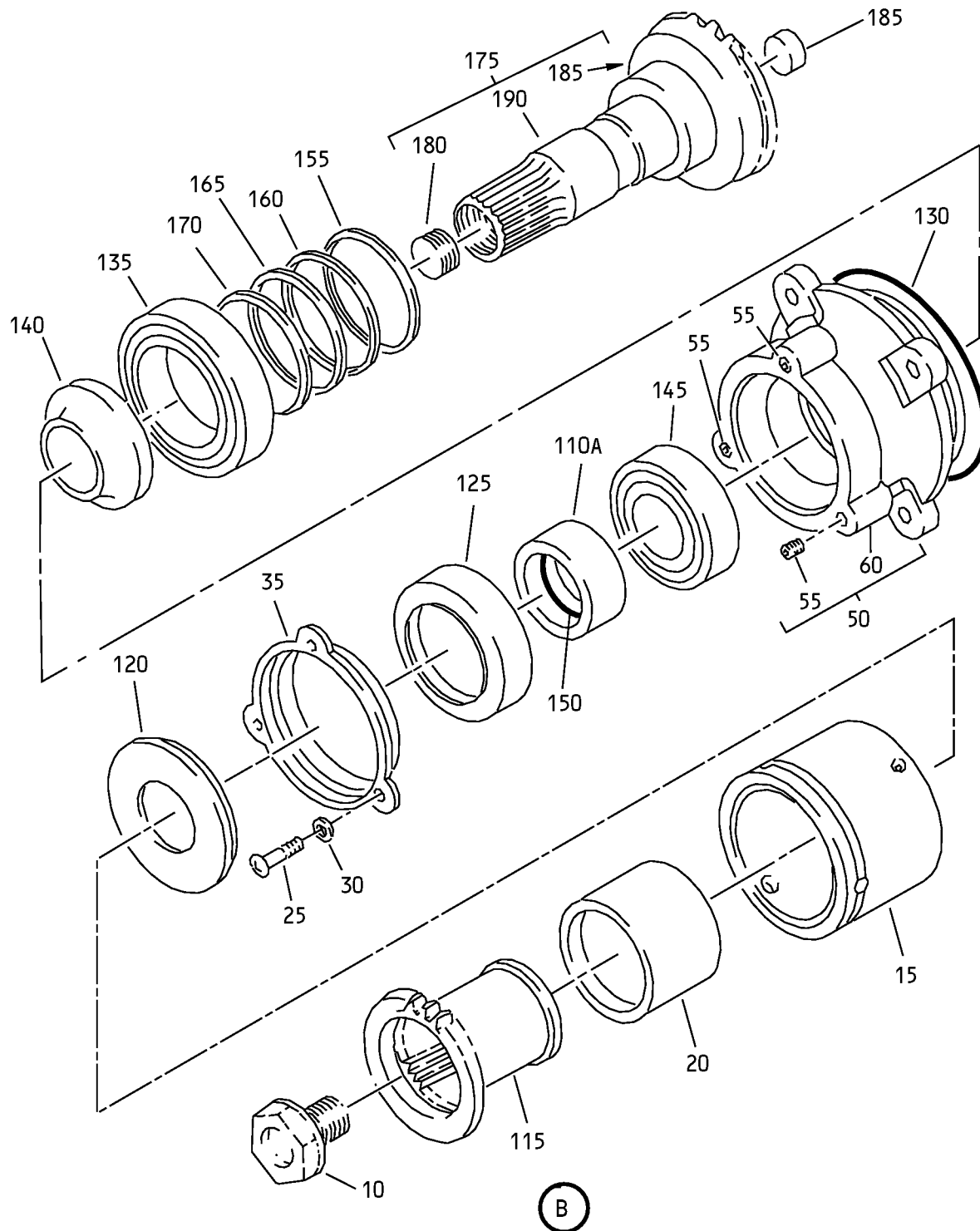
COMPONENT MAINTENANCE MANUAL



Flap Actuation Main Landing Gear Beam Angle Gearbox Assembly  
IPL Figure 1 (Sheet 1 of 3)

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Flap Actuation Main Landing Gear Beam Angle Gearbox Assembly  
IPL Figure 1 (Sheet 2 of 3)

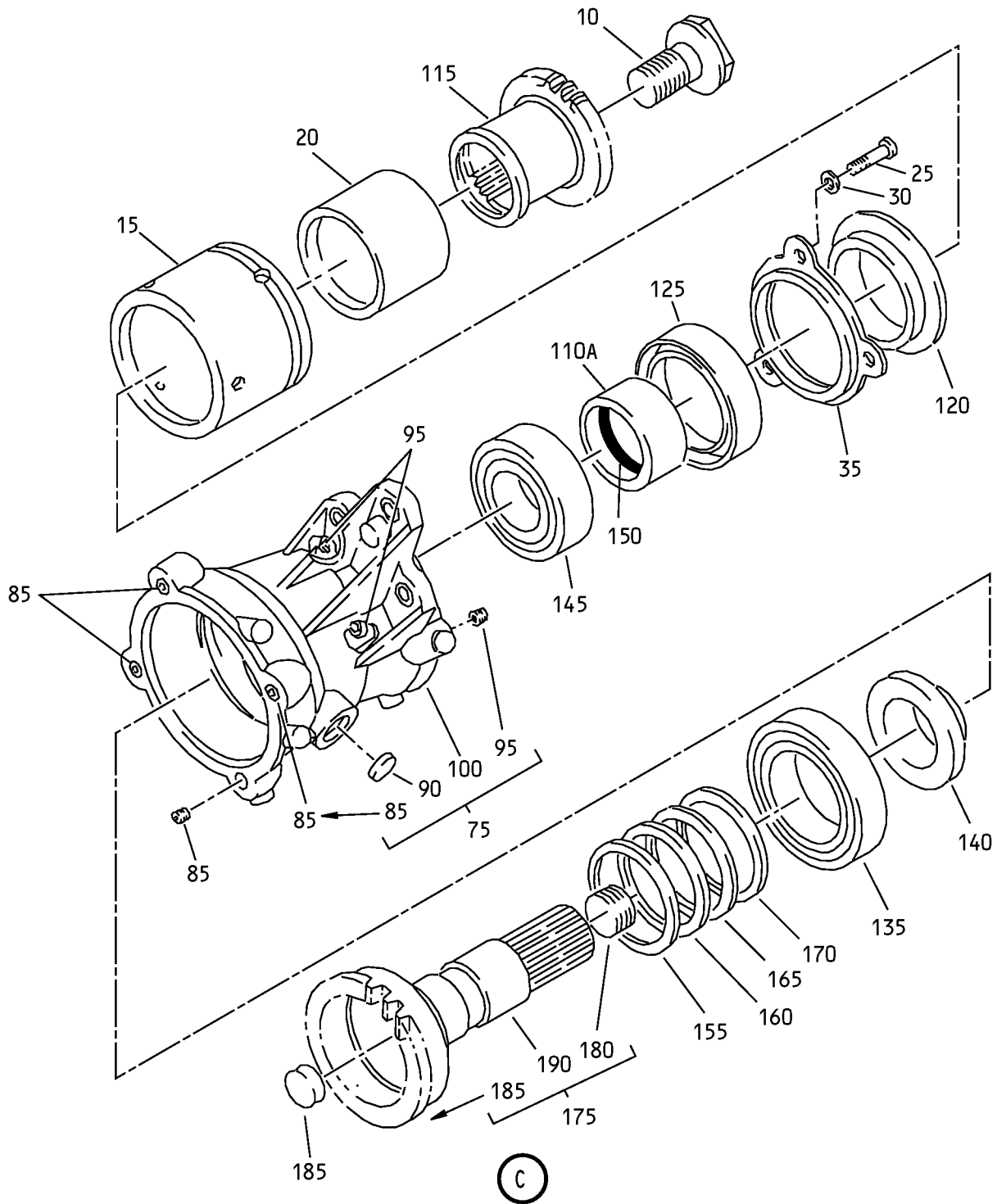
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Flap Actuation Main Landing Gear Beam Angle Gearbox Assembly  
IPL Figure 1 (Sheet 3 of 3)

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## COMPONENT MAINTENANCE MANUAL

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE							USAGE CODE	UNITS PER ASSY
			1	2	3	4	5	6	7		
1-											
-1A	256A3640-1		GEARBOX ASSY-ANGLE, FLAP ACTUATION MLG BEAM							A	RF
-5	256A3640-2		GEARBOX ASSY-ANGLE, FLAP ACTUATION MLG BEAM							B	RF
10	256A3744-1		. BOLT-RETAINER								2
15	256A3745-1		. SLEEVE-CPLG								2
20	256A3743-1		. SEAL-CPLG								2
25	BACB30NT3K2		. BOLT								6
30	NAS1149D0332J		. WASHER								6
35	256W3244-1		. RETAINER-SEAL								2
40	BACB30NM4HK6		. BOLT								4
45	NAS1149D0463J		. WASHER								4
50	256A3421-1		. HOUSING ASSY								1
55	MS21209F1-15P		. . INSERT								3
60	256A3421-3		. . HOUSING								1
65	AN814-4DL		. PLUG AND BLEEDER								1
70	M25988-1-110		. PACKING								1
75	256A3641-1		. HOUSING ASSY							A	1
-80	256A3641-2		. HOUSING ASSY							B	1
85	MS21209F4-15P		. . INSERT								4
90	MS21209F7-10P		. . INSERT								1
95	MS21209F1-15P		. . INSERT								3
100	256A3641-3		. . HOUSING							A	1
-105	256A3641-4		. . HOUSING							B	1
110	256A3183-1		DELETED								
110A	256A3183-5		. RING (OPT ITEM 110B, 110C)								2
-110B	256A3183-10		. RING (OPT ITEM 110A, 110C)								2
-110C	256A3183-12		. RING (OPT ITEM 110A, 110B)								2
115	256A3741-1		. COUPLING								2

-Item not Illustrated

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## COMPONENT MAINTENANCE MANUAL

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE							USAGE CODE	UNITS PER ASSY
			1	2	3	4	5	6	7		
1-											
120	256A3182-1		.								2
125	1002423607100		.								2
-125A	700-857-2272-99		.								2
130	M25988-1-149		.								1
135	BACB10BA35C		.								2
140	256A3185-3		.								2
145	BACB10BA25C		.								2
150	M25988-1-213		.								2
155	256A3148-29		.								AR
160	256A3148-30		.								AR
165	256A3148-31		.								AR
170	256A3148-32		.								AR
175	256A3643-1		.								2
180	MS21209F8-10P		.	.							1
185	256W3080-13		.	.							1
190	256A3643-2		.	.							1
195	256A3195-16										
195A	BAC27DCT570		.							A	1
200	256A3195-17										
200A	BAC27DCT571		.							B	1
205	256A3195-18		.								1

-Item not Illustrated

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