

 **BOEING**
COMPONENT
MAINTENANCE MANUAL

TO: ALL HOLDERS OF INBOARD LEADING EDGE SLAT DRIVE POWER DRIVE UNIT GEARBOX
ASSEMBLY COMPONENTS MAINTENANCE MANUAL 27-81-21

REVISION NO. 11 DATED MAR 01/04

HIGHLIGHTS

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

CHAPTER/SECTION

AND PAGE NO.

1017

DESCRIPTION OF CHANGE

Changed item numbers for shims installed in the cover for easier identification.

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HIGHLIGHTS

01.1

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Mar 01/04



INBOARD LEADING EDGE SLAT DRIVE POWER
DRIVE UNIT GEARBOX ASSY

PART NUMBER 256T2611-1

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

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TITLE PAGE

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REVISION RECORD

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

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

TEMPORARY REVISION AND SERVICE BULLETIN RECORD

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

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TR & SB RECORD

01

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			401	JUL 01/01	01.1
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1	JUL 10/83	01	501	JUL 10/83	01
2	BLANK		502	BLANK	
REVISION RECORD			REPAIR-GENERAL		
1	JUL 10/83	01	601	JUL 01/01	01.101
2	BLANK		602	JUL 01/01	01.1
TR & SB RECORD			603	JUL 01/01	01.1
1	JUL 10/83	01	604	JUL 01/01	01.1
2	BLANK		REPAIR 1-1		
LIST OF EFFECTIVE PAGES			601	JUL 10/83	01
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1	APR 10/84	01.1	605	APR 10/84	01.1
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INTRODUCTION			REPAIR 2-1		
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DESCRIPTION & OPERATION			REPAIR 3-1		
1	JUL 10/83	01	601	JUL 01/01	01.1
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301	JUL 01/01	01.1	REPAIR 6-1		
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			602	APR 10/84	01.1

* = REVISED, ADDED OR DELETED

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602	APR 10/84	01.1	1010	JUL 01/01	01.1
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602	BLANK		1013	JUL 01/01	01.1
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601	JUL 01/01	01.1	1015	JUL 01/01	01.1
602	BLANK		1016	JUL 01/01	01.1
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704	JUL 01/01	01.1			
705	JUL 01/01	01.101			
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801	APR 10/84	01.1			
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803	APR 10/84	01.1			
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SPECIAL TOOLS					
901	JUL 10/86	01.1			
902	BLANK				
ILLUSTRATED PARTS LIST					
1001	JUL 10/83	01			
1002	JUL 01/01	01.1			
1003	JUL 01/01	01.1			
1004	JUL 01/01	01.1			
1005	JUL 01/01	01.1			
1006	JUL 01/01	01.1			
1007	JUL 01/01	01.1			
1008	JUL 01/01	01.1			

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01.1



INTRODUCTION

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

This manual is divided into separate sections:

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

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

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

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

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

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

Verification:

Disassembly	Feb 09/82
Assembly	Feb 09/82

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INBOARD LEADING EDGE SLAT DRIVE POWER DRIVE UNIT GEARBOX ASSEMBLY

DESCRIPTION AND OPERATION

1. The power drive unit gearbox assembly is used in conjunction with a hydraulic motor, electric motor, and feedback follow-up mechanism to provide torque for actuating the aircraft leading edge slat system.
2. Main input power to the gearbox is supplied by a hydraulic motor with an electric motor acting as an alternate power source. A reduction gear train maintains output speed and torque for proper operation of the leading edge slats. A right angle drive takeoff, at the output shaft, provides feedback of actual slat extension to the slat drive control unit assembly.
3. Leading Particulars (Approximate)

Length -- 10 inches

Width -- 12 inches

Height -- 11 inches

Weight -- 14 lbs

Overall gear ratio -- 1:2.8236 Hyd Motor to Output

-- 1:2.3023 Elec Motor to Output

-- 1:157.50 Follow-Up Gear Train

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DESCRIPTION & OPERATION

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TESTING AND TROUBLE SHOOTING1. Equipment

NOTE: Equivalent substitutes may be used.

- A. Lock assembly -- A27051-2
- B. Clamp assembly -- A27051-7
- C. Check fixture -- A27048-8
- D. Crank assemblies -- A27051-8, -9
- E. Dial indicator with magnetic base

2. Test

- A. With no load applied to the output shaft (245), rotate both hydraulic and electric input gear assemblies (170, 185) for a minimum of two revolutions in both directions. Check that there is no roughness or binding.
- B. Backlash check
 - (1) Remove quill shaft (230).
 - (2) Install gearbox in check fixture A27048-8 and install lock assembly A27051-2 to secure output shaft.
 - (3) Install clamp assembly A27051-7 on crank assembly A27051-9. Mate crank assembly A27051-9 to gear assembly (185) and position dial indicator on scribe line of clamp assembly A27051-7.

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- (4) Apply 5–10 lb-in. (5.75–11.50 kg-cm) torque to gear assembly (185) and note the dial indicator reading at the scribe line. Check that backlash is 0.010–0.058 inch (0.254–1.473 mm) FIM.

NOTE: Backlash of 0.010–0.058 inch at the scribe line equals 0.001–0.006 inch backlash at spline pitch diameter of gear assembly (185).

- (5) Remove crank assembly A27051-9 and clamp assembly A27051-7.
- (6) Install clamp assembly A27051-7 on crank assembly A27051-8. Mate crank assembly A27051-8 to gear assembly (170) and position dial indicator on scribe line of clamp assembly.
- (7) Apply 5–10 lb-in. (5.75–11.50 kg-cm) torque to gear assembly (170) and note the dial indicator reading at the scribe line. Check that backlash is 0.008–0.048 inch (0.203–1.219 mm) FIM.

NOTE: Backlash of 0.008–0.048 inch at the scribe line equals 0.001–0.006 inch backlash at spline pitch diameter of gear assembly (170).

- (8) Remove gearbox from check fixture A27048-8 and reinstall quill shaft (230).

C. Alternate method for backlash check

- (1) With the hydraulic input gear assembly (185) locked, check that backlash at the pitch diameter of coupling (70) is 0.001–0.005 inch (0.025–0.127 mm) FIM when a 5–10 lb-in (5.75–11.50 kg-cm) torque is applied to the opposite coupling (70) in both directions.
- (2) With the electric input gear assembly (170) locked, check that backlash at the pitch diameter of coupling (70) is 0.001–0.005 inch (0.025–0.127 mm) FIM when a 5–10 lb-in (5.75–11.50 kg-cm) torque is applied to the opposite coupling (70) in both directions.

3. Trouble Shooting and Corrective Procedures

- A. If backlash is within limits but unit feels rough when turned by hand, disassemble unit and visually check gears for pitting and other obvious defects. Check that gear bearing pattern is centered in area of pitch diameter. If gears are satisfactory, replace all bearings. Reassemble unit and retest per par. 2.

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B. If dial indicator reading at the scribe line exceeds 0.125 inch (3.175 mm) FIM for gear assembly (185) or 0.104 inch (2.642 mm) FIM for gear assembly (170), completely disassemble gearbox assembly and check gears for pitting and other obvious defects. Check that gear bearing pattern is centered in area of pitch diameter. If gears are satisfactory, replace all bearings. Reassemble unit and retest per par. 2.

NOTE: Backlash of 0.125 inch for gear assembly (185) and 0.104 inch for gear assembly (170) measured at scribe line equals maximum wear limit backlash of 0.013 inch measured at spline pitch diameter of gear assemblies (170) and (185).

C. If backlash still exceeds maximum wear limit after replacing all bearings, completely disassemble unit and replace all gears. Reassemble unit and retest per par. 2.

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DISASSEMBLY

NOTE: See Testing and Trouble Shooting to establish the condition of the component or most probable cause of its malfunction. This is to determine the extent of disassembly required without completely tearing down and rebuilding the component.

1. Equipment

NOTE: Equivalent substitutes may be used.

- A. Wrench -- A27051-10
- B. Spanner Adapter -- A27051-3
- C. Clamp -- A27054-11 (2 required)

2. Disassemble Gearbox Assembly (IPL Fig. 1)

- A. Remove cotter pins (55). Using wrench A27051-10 to hold couplings (70), remove nuts (60) and washers (65).
- B. Remove couplings (70).
- C. Remove cover (90) from housing assembly (100) by removing bolts (35A, 40A, 42), nuts (50), and washers (45).
- D. Remove gear shaft (245) from housing assembly (100). If necessary, restrain follow-up gear train (165, 215, 225) from turning while rotating gear shaft (245).
- E. Remove gear assemblies (170, 185).
- F. Remove bearing (135) from gear shaft (245).
- G. Remove bearings (130) from gear assembly (170).
- H. Remove quill shaft (230) from gear assembly (185) and remove O-rings (235, 240).
- I. Remove bearings (130, 140A) from gear assembly (185).
- J. Remove lockwire and remove bolts (80A), washers (85), and retainer (75).
- K. Remove bearing (135) from housing assembly (100).

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- L. Remove lockwire, bolts (35A, 42), nuts (50), washers (45) and remove cover (95). Tag shims (202) for ease of assembly.
- M. Remove follow-up shaft (220) with attached components.
- N. Remove shims (200) and tag for ease of assembly.
- O. Remove bearings (155, 160). Secure follow up shaft (220) with attached components in a vise with clamps A27054-11 and using adapter A27051-3, remove nut (145A) and washer (150). Separate gears (165, 215) from follow up shaft (220).
- P. Remove follow up gear (225) and remove bearings (205, 210).
- Q. Remove bolts (10), washers (15), and inspection cover (5).
- R. Remove bolts (25), washers (30), and drain covers (20).
- S. Do not remove nameplate (250), bearings (105), or inserts (110, 115, 120) in housing assembly (100) unless they are damaged and require replacement.

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CLEANING

- |1. Clean all parts except bearings (130, 135, 140A, 155, 160, 205, 210, IPL Fig. 1) using standard industry practices and information contained in 20-30-03.
- |2. Clean bearings (130, 135, 140A, 155, 160, 205, 210, IPL Fig. 1) per manufacturer's instructions.

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CLEANING
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CHECK

1. Check all parts for obvious defects in accordance with standard industry practices.
2. Penetrant check per 20-20-02 (IPL Fig. 1):
 - A. Retainer (75)
 - B. Worm gear (215)
 - C. Drain cover (20)
 - D. Housing (100)
 - E. Cover (90)
 - F. Cover (95)
 - G. Follow-up gear (225)
3. Magnetic particle check per 20-20-01 (IPL Fig. 1):
 - A. Follow-up gear (165)
 - B. Quill shaft (230)
 - C. Plug (175, 190)
 - D. Gear assy (170)
 - E. Gear assy (185)
 - F. Gear shaft (245)
 - G. Follow-up shaft (220)

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CHECK
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REPAIR – GENERAL1. Content

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

<u>P/N</u>	<u>NAME</u>	<u>REPAIR</u>
256T2612	HOUSING	1-1
256T2614	COVER	2-1
256T2616	COVER	3-1
256T2619	GEAR	4-1
256T2620	GEAR	5-1
256T2621	GEAR SHAFT	6-1
256T2623	FOLLOW-UP SHAFT	7-1
256T2626	FOLLOW-UP GEAR	8-1
256T2635	NAMEPLATE	9-1
- - -	MISCELLANEOUS PARTS REFINISH	10-1

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2. Standard Practices

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

20-10-01 Repair and Refinish of High Strength Steel Parts
20-10-02 Machining of Alloy Steel
20-10-03 Shot Peening
20-10-04 Grinding of Chrome Plated Parts
20-20-01 Magnetic Particle Inspection
20-30-02 Stripping of Protective Finishes
20-30-03 General Cleaning Procedures
20-41-01 Decoding Table for Boeing Finish Codes
20-41-02 Application of Chemical and Solvent Resistant Finishes
20-41-03 Application of Corrosion Preventives to Closed End Tubes
20-42-03 Hard Chrome Plating
20-42-05 Bright Cadmium Plating
20-42-01 Chromic Acid Anodizing
20-50-03 Bearing and Bushing Replacement
20-50-05 Application of Aluminum Foil and Other Markers
20-50-10 Application of Stencils, Insignia, Silk Screen, Part Numbering and Identification Markings
20-50-12 Application of Adhesives
20-60-02 Finishing Materials

3. Materials

NOTE: Equivalent substitutes may be used.

- A. Corrosion Preventive Compound -- MIL-C-11796, Class 1 (Ref 20-60-02)
B. Primer -- BMS 10-11, Type 1 (Ref 20-60-02)
C. Adhesive -- Type 70 (Ref 20-50-12)

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4. Dimensioning Symbols

- A. Standard True Position Dimensioning Symbols used in the applicable repair procedures are shown in Fig. 601.

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

EXAMPLES

— 0.002

STRAIGHT WITHIN 0.002

◎ ∅ 0.0005 C

CONCENTRIC TO C WITHIN 0.0005 DIAMETER

⊥ 0.002 B

PERPENDICULAR TO B WITHIN 0.002

≡ 0.010 A

SYMMETRICAL WITH A WITHIN 0.010

// 0.002 A

PARALLEL TO A WITHIN 0.002

∠ 0.005 A

ANGULAR TOLERANCE 0.005 WITH A

○ 0.002

ROUND WITHIN 0.002

⊕ ∅ 0.002 Ⓢ B

LOCATED AT TRUE POSITION WITHIN 0.002 DIA RELATIVE TO DATUM B, REGARDLESS OF FEATURE SIZE

⊘ 0.010

CYLINDRICAL SURFACE MUST LIE BETWEEN TWO CONCENTRIC CYLINDERS, ONE OF WHICH HAS A RADIUS 0.010 INCH GREATER THAN THE OTHER

⊥ ∅ 0.010 Ⓜ A
0.510 Ⓟ

AXIS IS TOTALLY WITHIN A CYLINDER OF 0.010-INCH DIAMETER, PERPENDICULAR TO, AND EXTENDING 0.510-INCH ABOVE, DATUM A, MAXIMUM MATERIAL CONDITION

⌒ 0.006 A

EACH LINE ELEMENT OF THE SURFACE AT ANY CROSS SECTION MUST LIE BETWEEN TWO PROFILE BOUNDARIES 0.006 INCH APART RELATIVE TO DATUM PLANE A

2.000

THEORETICALLY EXACT DIMENSION IS 2.000

∠ 0.020 A

SURFACES MUST LIE WITHIN PARALLEL BOUNDARIES 0.02 INCH APART AND EQUALLY DISPOSED ABOUT TRUE PROFILE

OR
2.000
BSC

NOTE: DATUM MAY APPEAR AT EITHER SIDE OF TOLERANCE FRAME

0.020 A

A 0.020

True Position Dimensioning Symbols
Figure 601

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REPAIR-GENERAL

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HOUSING ASSY - REPAIR 1-1

256T2612-1

1. Plating Repair

NOTE: Repair consists of restoration of original finish. Refer to Refinish instructions Fig. 601 and to REPAIR-GEN for list of applicable standards.

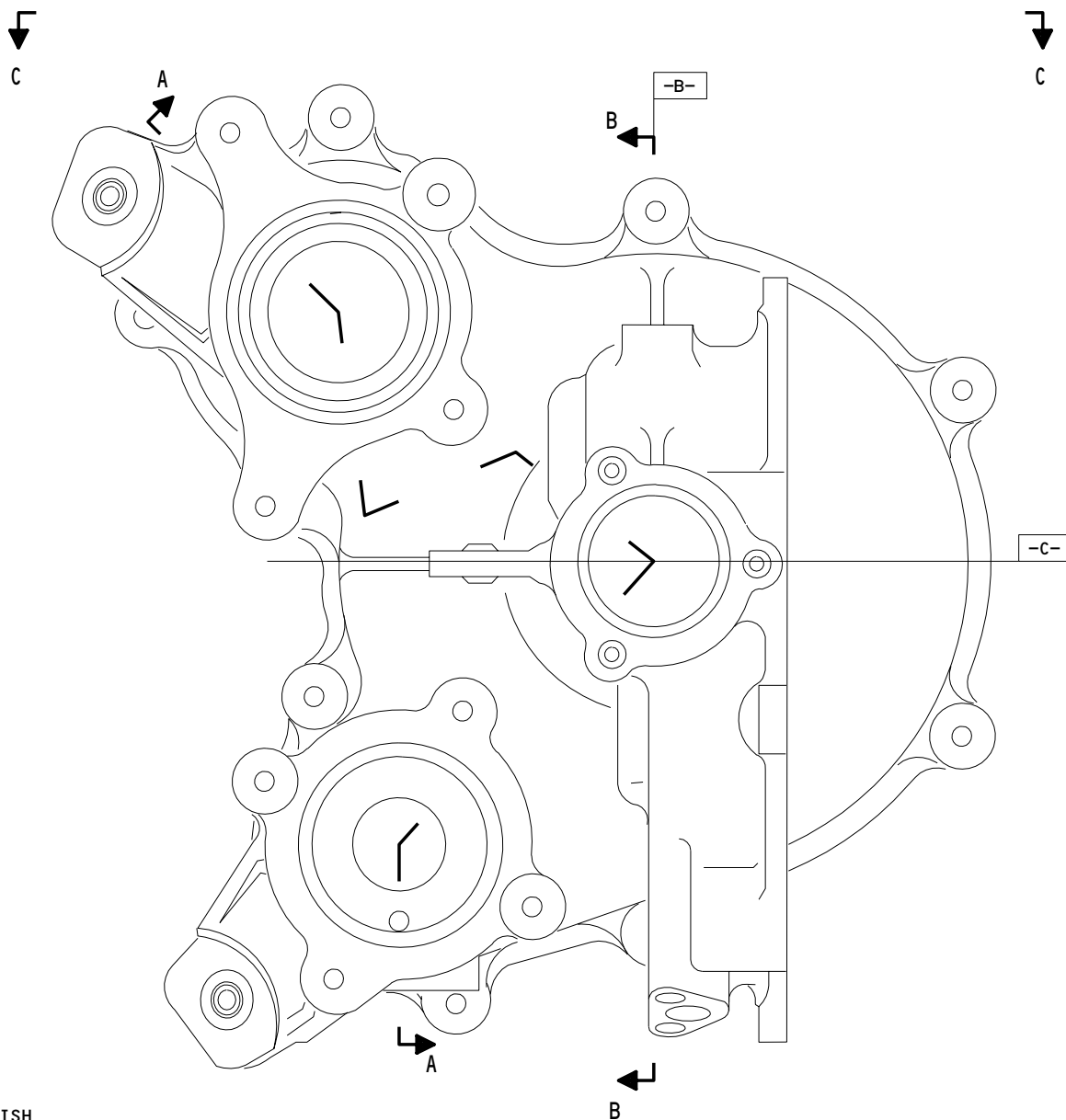
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REPAIR 1-1

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REFINISH

CHROMIC ACID ANODIZE (F-17.02) ALL OVER AFTER MACHINING AND BEFORE BEARING INSTALLATION. APPLY ONE COAT OF BMS 10-11, TYPE 1, PRIMER TO EXTERNAL SURFACES AND BOLT HOLES EXCEPT AS NOTED

1 NO PRIMER THIS SURFACE

MATERIAL: AL ALLOY

125 (3.2 μ m) ALL MACHINED SURFACES EXCEPT AS NOTED

BREAK ALL SHARP EDGES APPROXIMATELY 0.008 (0.203)R

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

256T2612-1
 Housing Assy Repair
 Figure 601 (Sheet 1)

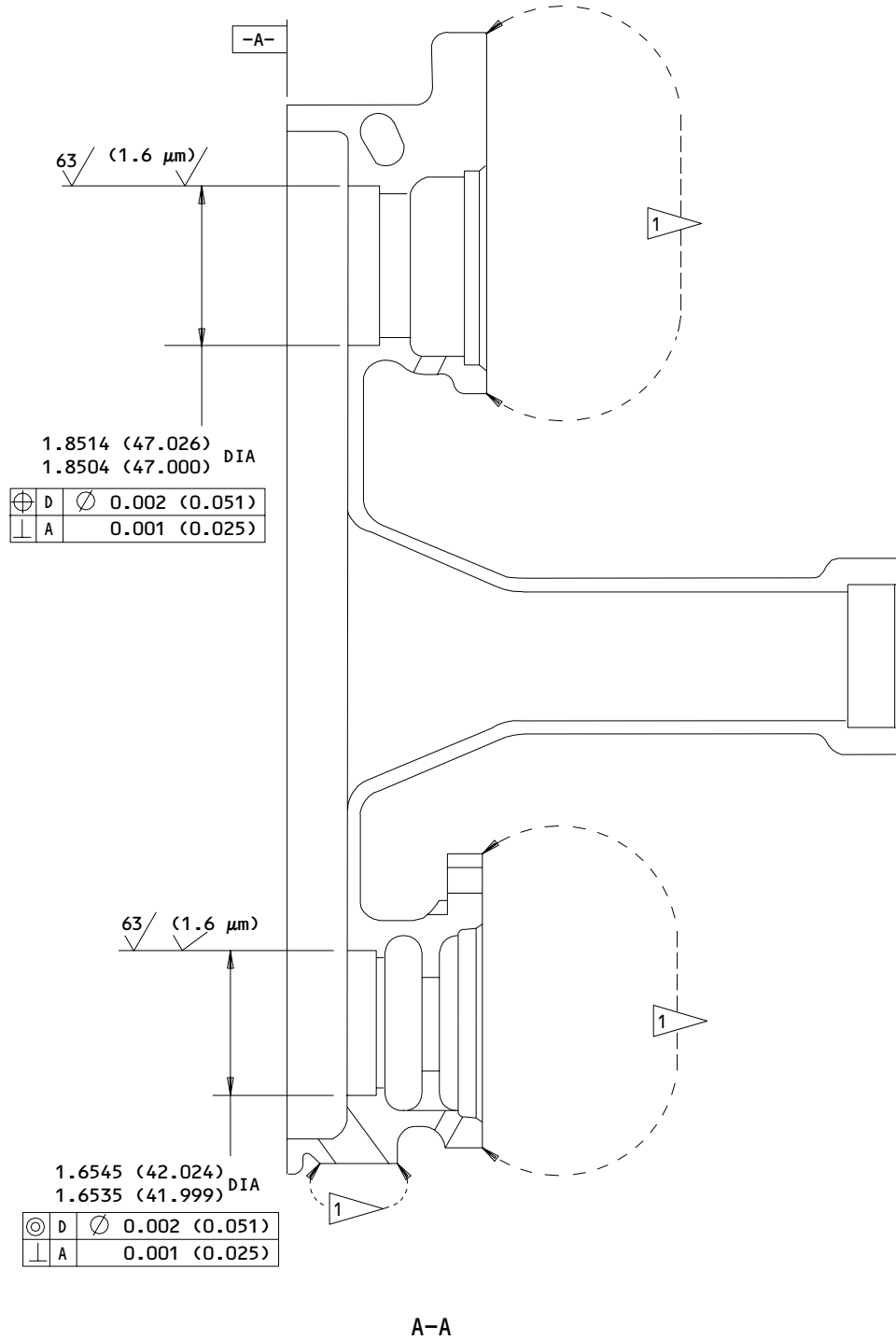
27-81-21

REPAIR 1-1

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ALL DIMENSIONS ARE IN INCHES
 EXCEPT THOSE IN () WHICH
 ARE IN MILLIMETERS

256T2612-1
 Housing Assembly Repair
 Figure 601 (Sheet 2)

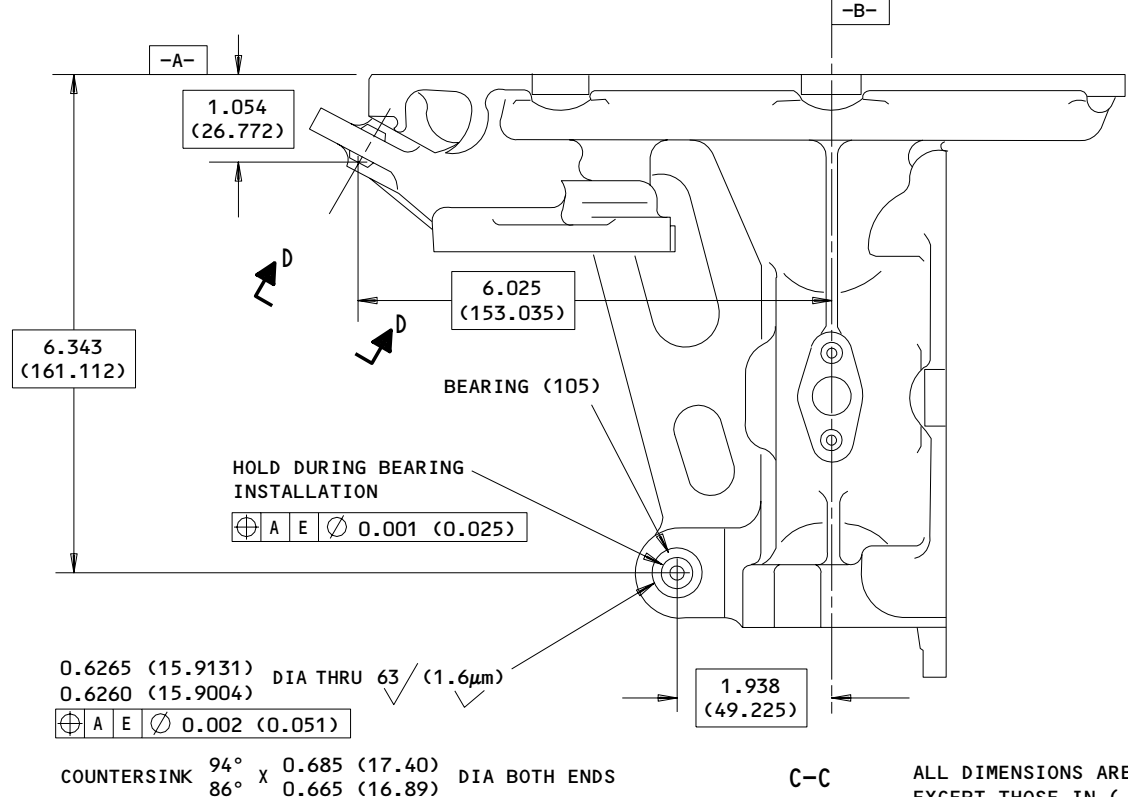
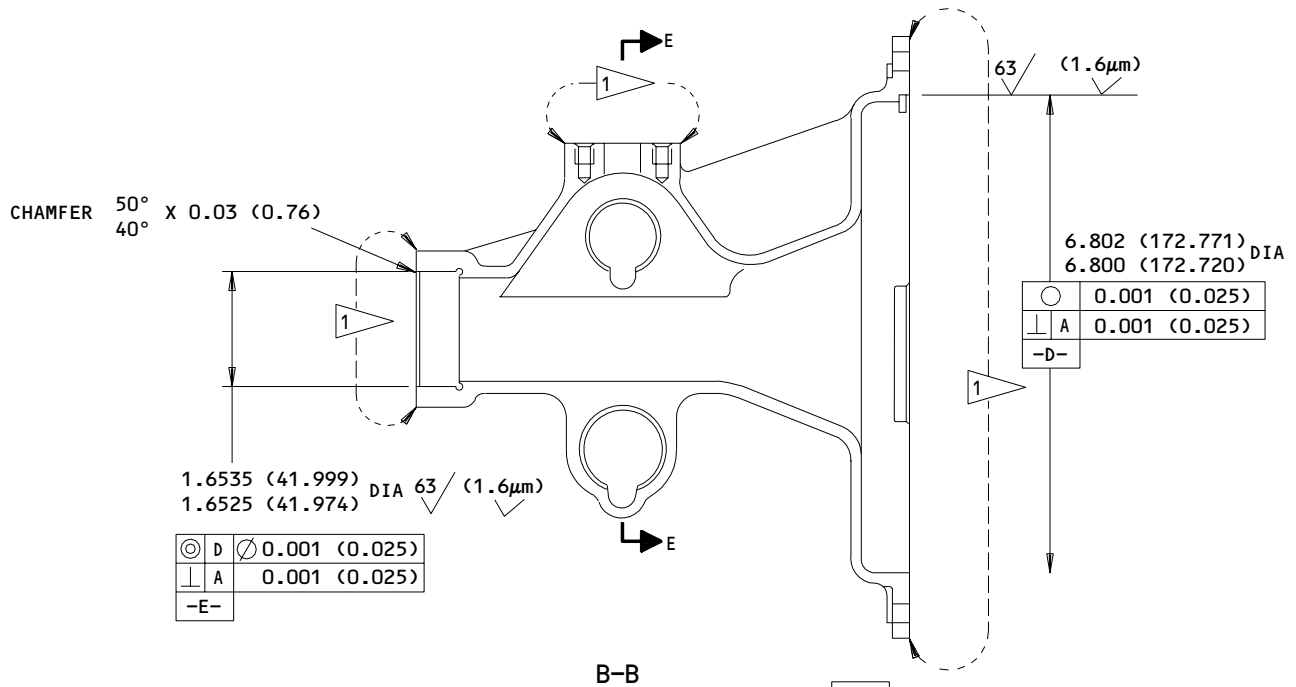
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ALL DIMENSIONS ARE IN INCHES
 EXCEPT THOSE IN () WHICH ARE
 IN MILLIMETERS

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 Housing Assy Repair
 Figure 601 (Sheet 3)

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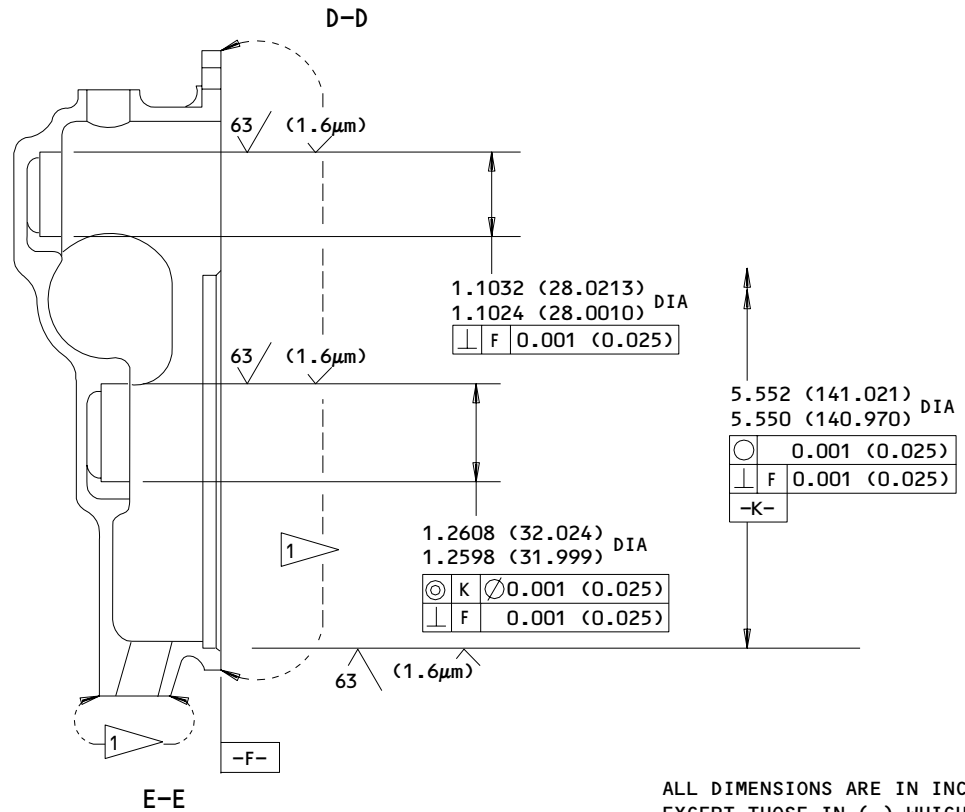
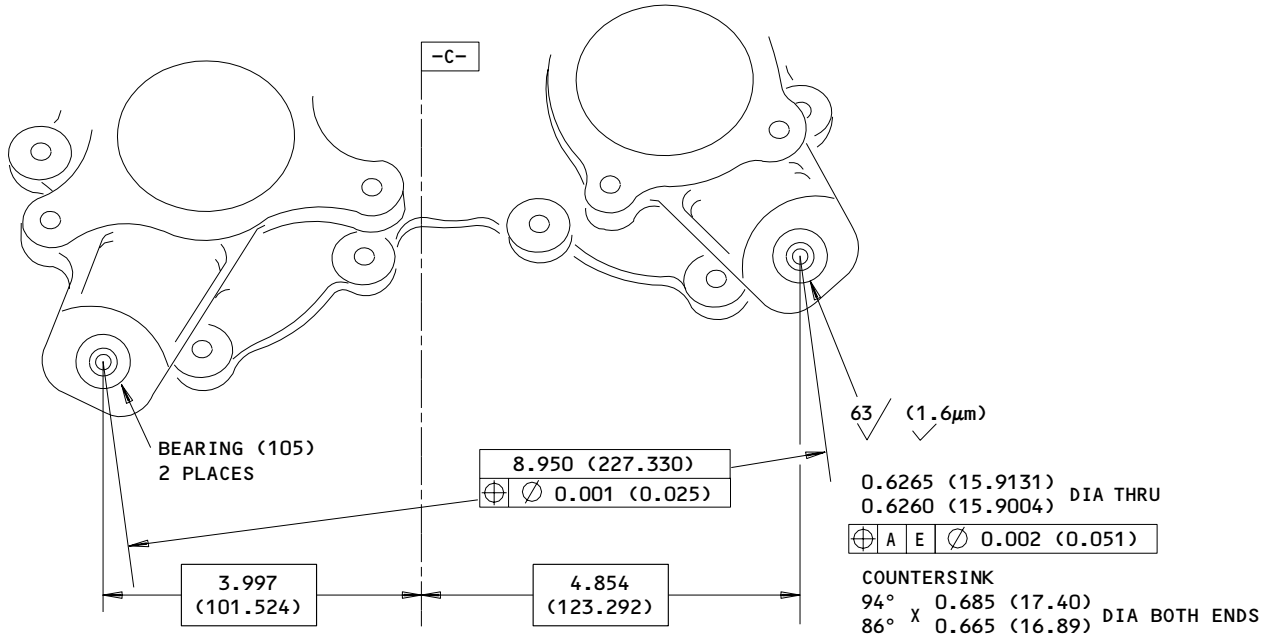
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ALL DIMENSIONS ARE IN INCHES
 EXCEPT THOSE IN () WHICH ARE
 IN MILLIMETERS

256T2612-1
 Housing Assy Repair
 Figure 601 (Sheet 4)

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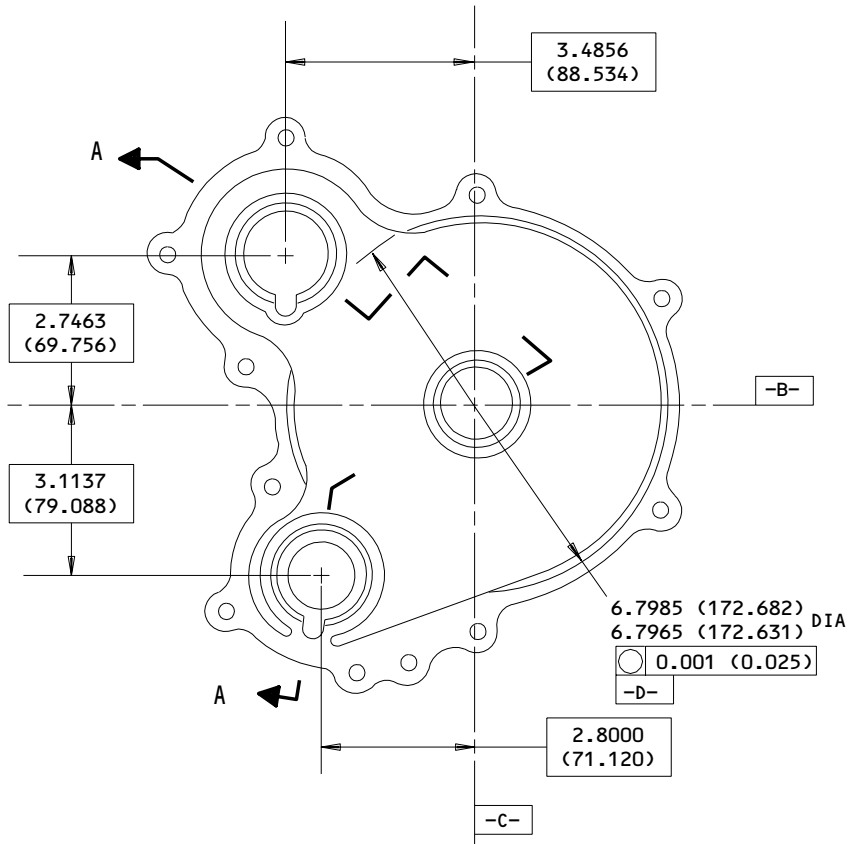
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COVER - REPAIR 2-1

256T2614-1

1. Plating Repair

NOTE: Repair consists of restoration of original finish. Refer to Refinish instructions Fig. 601 and to REPAIR-GEN for list of applicable standards.



REFINISH

ANODIZE (F-17.05) ALL OVER. APPLY ONE COAT BMS 10-11, TYPE 1, PRIMER TO EXTERNAL SURFACES AND BOLT HOLES EXCEPT AS NOTED

1 NO PRIMER THIS SURFACE

MATERIAL: AL ALLOY

125 (3.2µm) ALL MACHINED SURFACES UNLESS NOTED

BREAK ALL SHARP EDGES APPROXIMATELY 0.008 (0.203)R

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

Cover Repair
 Figure 601 (Sheet 1)

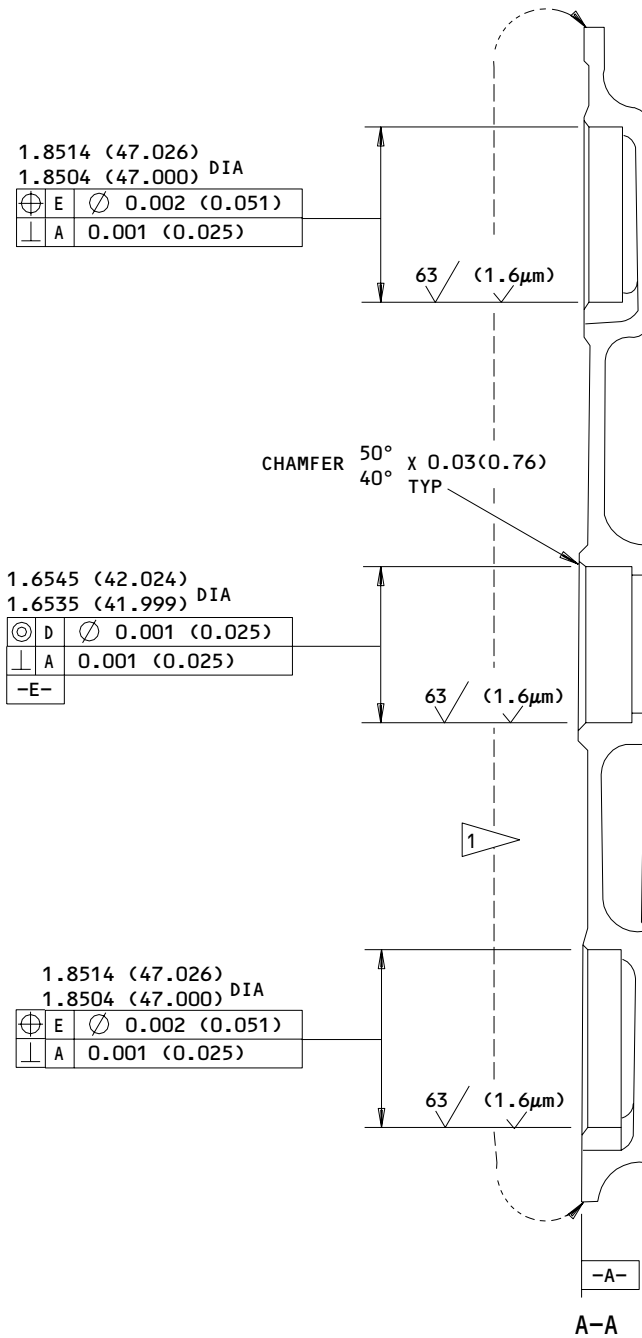
27-81-21

REPAIR 2-1

01.1

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ALL DIMENSIONS ARE IN INCHES EXCEPT
 THOSE IN () WHICH ARE IN MILLIMETERS

256T2614-1
 Cover Repair
 Figure 601 (Sheet 2)

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REPAIR 2-1

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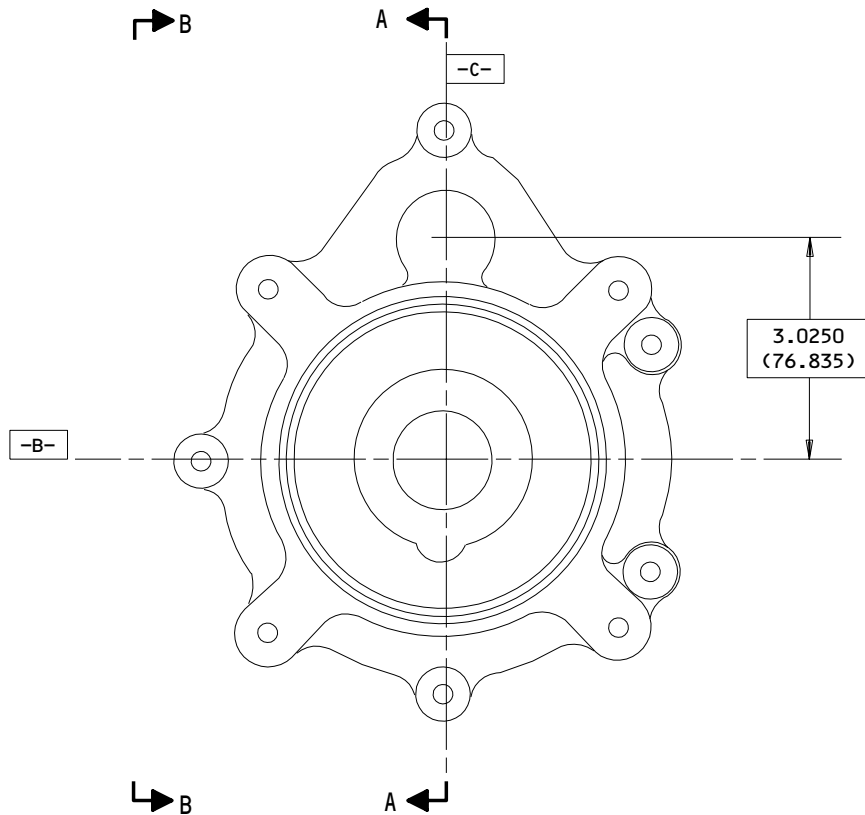
01.1

COVER - REPAIR 3-1

256T2616-1

1. Plating Repair

NOTE: Repair consists of restoration of original finish. Refer to Refinish instructions Fig. 601 and to REPAIR-GEN for list of applicable standards.



REFINISH

ANODIZE (F-17.05) ALL OVER AND APPLY ONE COAT OF BMS 10-11, TYPE 1, PRIMER TO EXTERNAL SURFACES AND BOLT HOLES EXCEPT AS NOTED

 NO PRIMER THIS SURFACE

MATERIAL: AL ALLOY

125 $\sqrt{\text{ (3.2}\mu\text{m)}}$ ALL MACHINED SURFACES EXCEPT AS NOTED

BREAK SHARP EDGES APPROXIMATELY 0.008 (0.203)R

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

256T2616-1
 Cover Repair
 Figure 601 (Sheet 1)

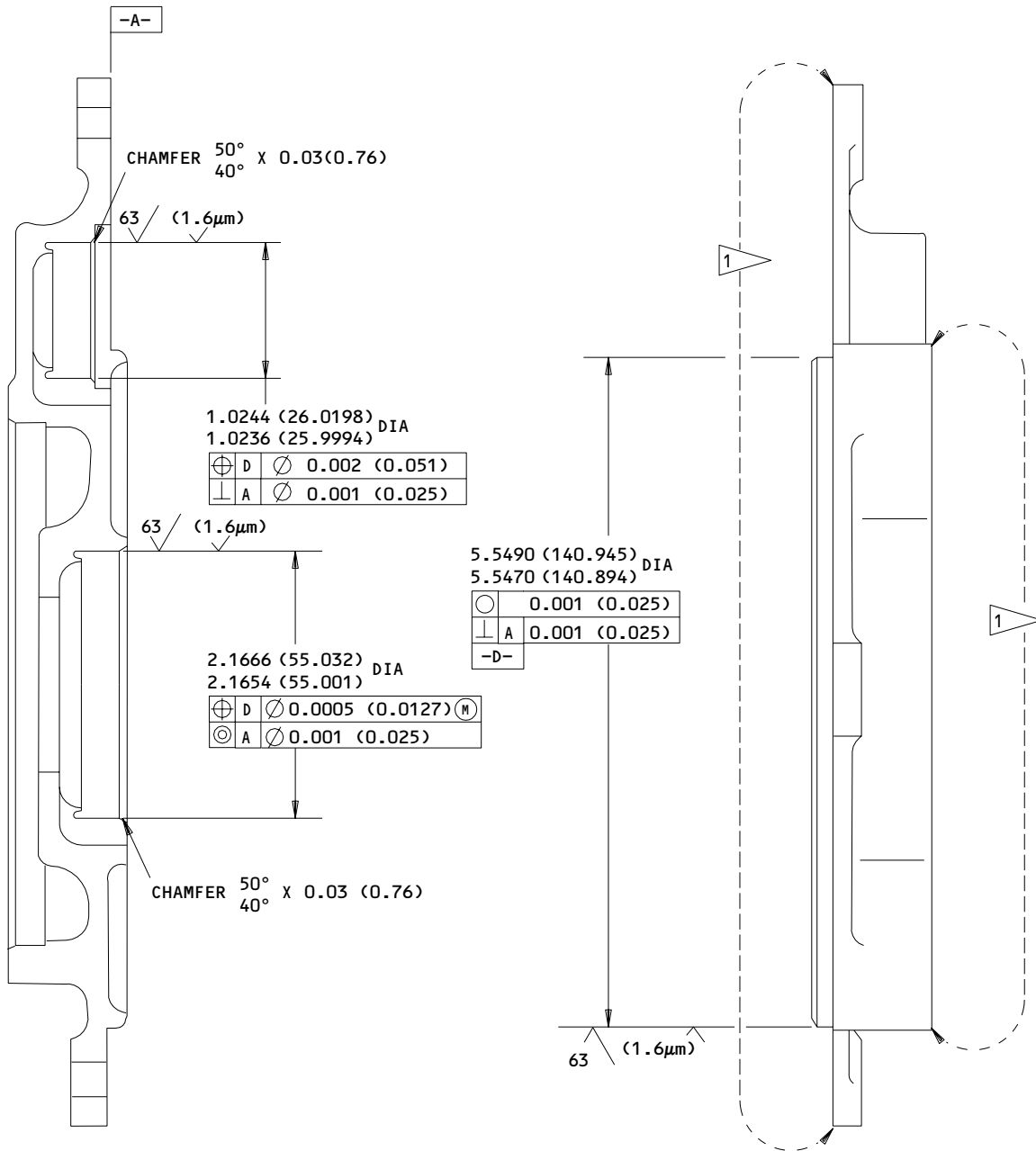
27-81-21

REPAIR 3-1

01.1

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A-A

B-B

ALL DIMENSIONS ARE IN INCHES EXCEPT
 THOSE IN () WHICH ARE IN MILLIMETERS

256T2616-1
 Cover Repair
 Figure 601 (Sheet 2)

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REPAIR 3-1

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01.1

GEAR ASSEMBLY – REPAIR 4-1

256T2619-1

NOTE: Refer to REPAIR-GEN for list of applicable standards. For repair of surfaces which may only require restoration of original finish, refer to Refinish instructions, Fig. 601.

1. Plug Replacement

- A. Remove plug.
- B. Refer to Repair 10-1 for refinish of plug.
- C. Install plug using wet BMS 10-11, type 1 primer.

2. Bearing Seat Repair (Fig. 601)

- A. Machine bearing seat, as required, within repair limits shown to remove defects. Refer to SOPM 20-10-02.
- B. Stress relieve per SOPM 20-10-02.
- C. Do a magnetic particle check of the machined surfaces per SOPM 20-20-01.
- D. Shot peen as indicated per SOPM 20-10-03.
- E. Build up repaired surfaces with chrome plate per SOPM 20-42-03. Grind to design dimensions and finish shown. Refer to SOPM 20-10-04.

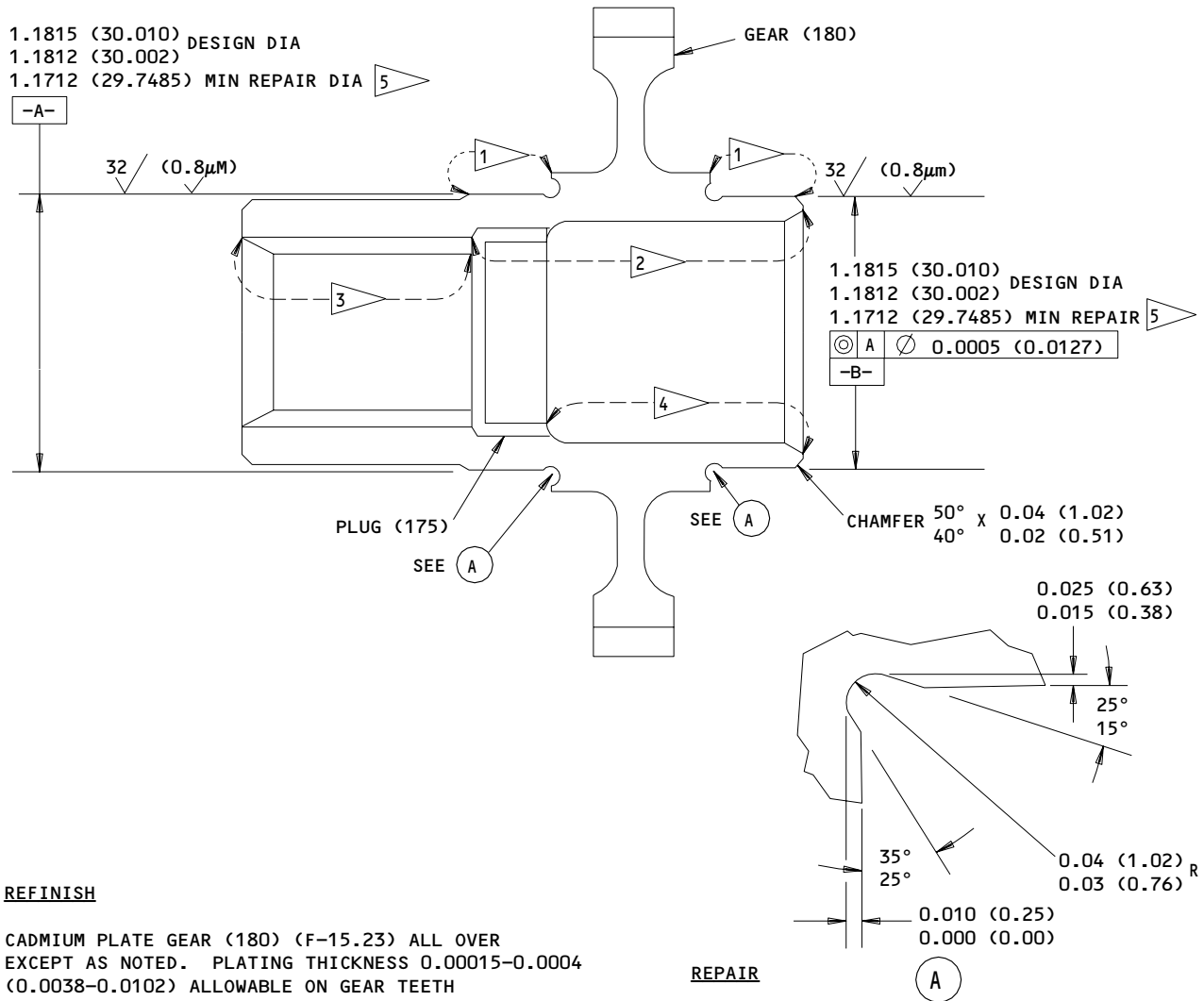
27-81-21

REPAIR 4-1

01.1

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REFINISH

CADMIUM PLATE GEAR (180) (F-15.23) ALL OVER EXCEPT AS NOTED. PLATING THICKNESS 0.00015-0.0004 (0.0038-0.0102) ALLOWABLE ON GEAR TEETH

- 1 NO FINISH THIS SURFACE
- 2 NO FINISH THIS SURFACE PRIOR TO PLUG INSTALLATION
- 3 UNCONTROLLED PLATING THICKNESS ALLOWED
- 4 FOLLOWING PLUG INSTALLATION, PHOSPHATE COAT INTERNAL BORE (F-18.02) EXCEPT OMIT FOLLOW-UP OIL TREATMENT. APPLY TWO COATS BMS 10-11, TYPE 1, PRIMER (F-20.03) AND COAT WITH CORROSION PREVENTIVE COMPOUND (F-19.03)
- 5 BUILD UP WITH CHROME PLATE AND GRIND TO DIMENSIONS AND FINISH SHOWN. CHROME PLATE RUN OUT 0.00-0.08. NO CHROME PLATE ALLOWED IN FILLET RADIUS OR ON EDGE

REPAIR

REF 5

SHOT PEEN: (REF 20-10-03)
 0.017-0.046 SHOT SIZE
 0.010A2 INTENSITY

62 (1.6µm) ON GEAR AND SPLINE TEETH

125 (3.2µm) ALL OVER EXCEPT AS NOTED

BREAK EDGES APPROXIMATELY 0.008 (0.203)R

MATERIAL: 9310 STEEL, 150-190 KSI (GEAR TEETH CARBURIZED 0.012-0.023 (0.30-0.58) DEEP)

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

256T2619-1
 Gear Assy Repair
 Figure 601

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REPAIR 4-1

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01.1

GEAR ASSEMBLY – REPAIR 5-1

256T2620-1

NOTE: Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may only require restoration of original finish, refer to Refinish instruction, Fig. 601.

1. Bearing Seat Repair (Fig. 601)

- A. Machine bearing seat, as required, within repair limits shown to remove defects. Refer to SOPM 20-10-02.
- B. Stress relieve per SOPM 20-10-02.
- C. Do a magnetic particle check of the machined surfaces per SOPM 20-20-01.
- D. Shot peen as indicated per SOPM 20-10-03.
- E. Build up repaired surfaces with chrome plate per SOPM 20-42-03. Grind to design dimensions and finish shown. Refer to SOPM 20-10-04.

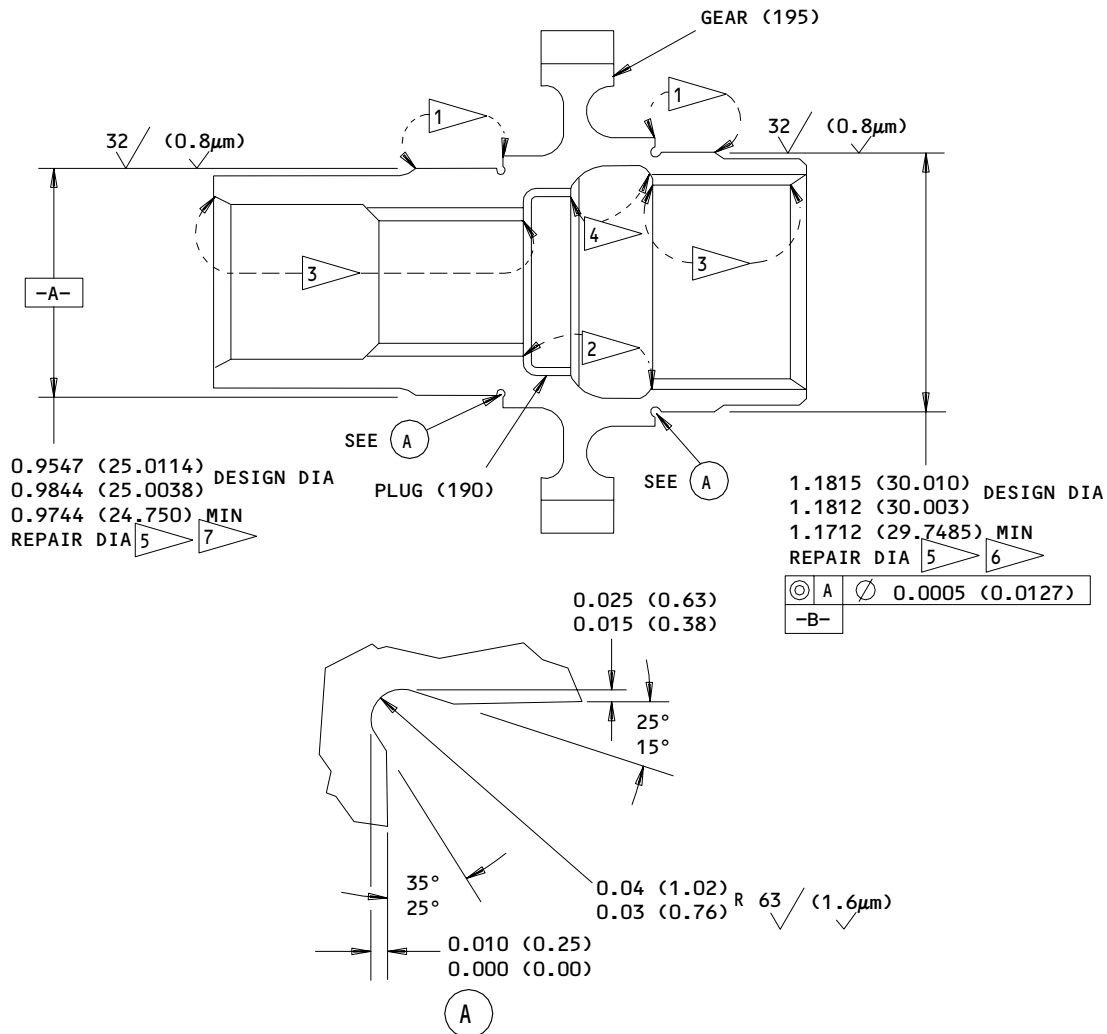
27-81-21

REPAIR 5-1

01.1

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REFINISH

CADMIUM PLATE GEAR (195) (F-15.23) ALL OVER EXCEPT AS NOTED. PLATING THICKNESS 0.0015-0.0004 (0.0038-0.0102) ALLOWABLE ON GEAR TEETH

- 1 NO FINISH THIS SURFACE
- 2 NO FINISH PRIOR TO PLUG INSTALLATION
- 3 UNCONTROLLED PLATING THICKNESS ALLOWED
- 4 AFTER PLUG INSTALLATION, PHOSPHATE COAT (F-18.02) EXCEPT OMIT FOLLOW-UP OIL TREATMENT. APPLY TWO COATS OF BMS 10-11, TYPE 1, PRIMER (F-20.03) FOLLOWED BY CORROSION PREVENTIVE COMPOUND (F-19.03)
- 5 BUILD UP WITH CHROME PLATE AND GRIND TO DIMENSIONS AND FINISH SHOWN. CHROME PLATE RUN OUT 0.00-0.08. NO CHROME PLATE ALLOWED IN FILLET RADIUS OR ON EDGE

REPAIR

- REF 5
- SHOT PEEN: (REF 20-10-03)
 0.017-0.046 SHOT SIZE
 0.003-0.006A2 INTENSITY 6
 0.010A2 INTENSITY 7
- 125 / (3.2μm) ALL OVER EXCEPT AS NOTED
 62 / (1.6μm) ON GEAR AND SPLINE TEETH
- MATERIAL: 9310 STEEL (GEAR TEETH CARBURIZED 0.012-0.023 (0.30-0.58) DEEP) 150-190 KSI
- ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

256T2620-1
 Gear Assy Repair
 Figure 601

GEAR SHAFT – REPAIR 6-1

256T2621-1

NOTE: Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may only require restoration of original finish, refer to Refinish instruction, Fig. 601.

1. Bearing Seat Repair (Fig. 601)

- A. Machine bearing seat, as required, within repair limits shown to remove defects. Refer to SOPM 20-10-02.
- B. Stress relieve per SOPM 20-10-02.
- C. Do a magnetic particle check of the machined surfaces per SOPM 20-20-01.
- D. Shot peen as indicated per SOPM 20-10-03.
- E. Build up repaired surfaces with chrome plate per SOPM 20-42-03. Grind to design dimensions and finish shown. Refer to SOPM 20-10-04.

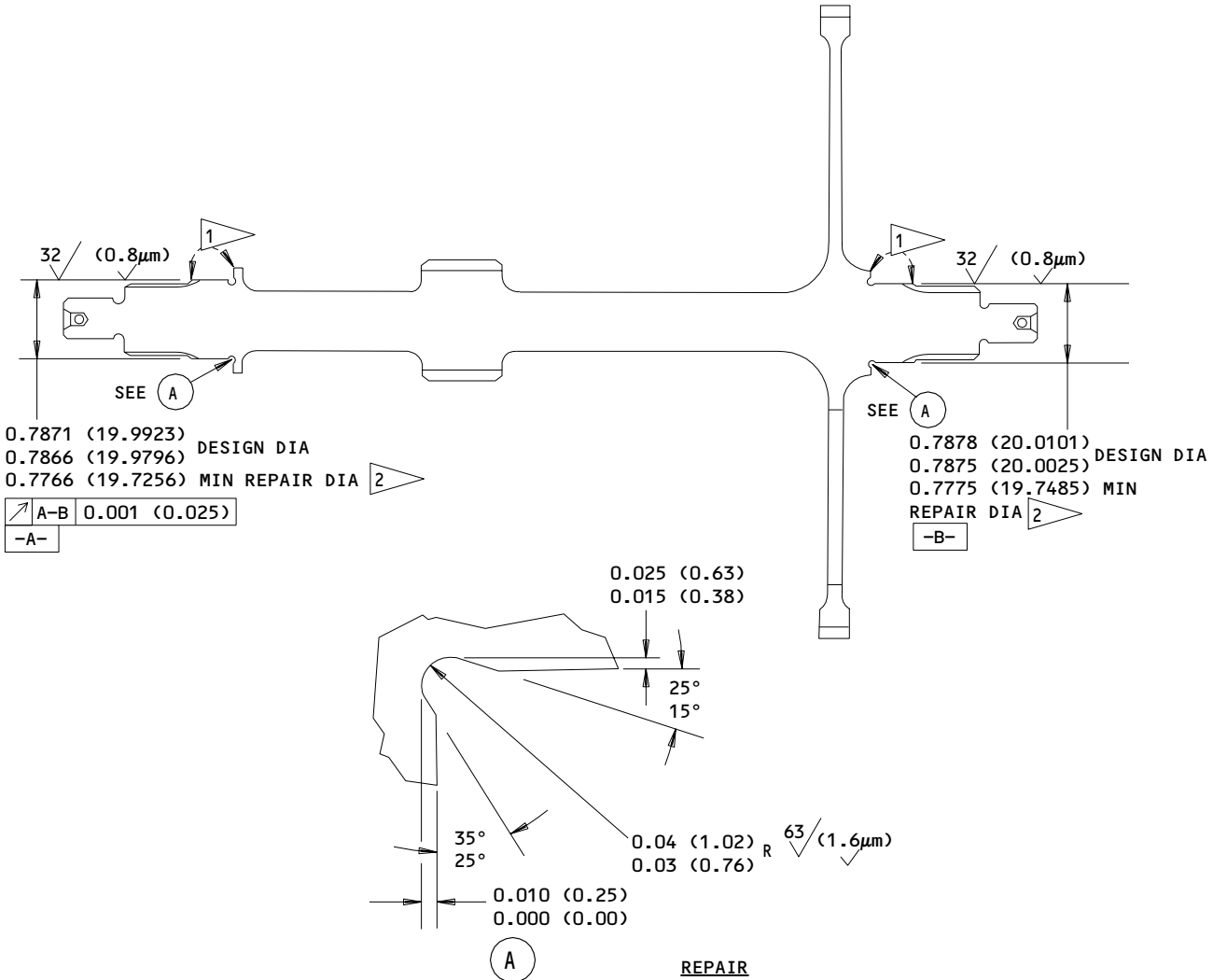
27-81-21

REPAIR 6-1

01.1

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REFINISH

CADMIUM PLATE (F-15.23) ALL OVER EXCEPT AS NOTED. PLATING THICKNESS 0.00015-0.0004 (0.0038-0.0102) ALLOWABLE ON GEAR TEETH

- 1 NO FINISH THIS SURFACE
- 2 BUILD UP WITH CHROME PLATE AND GRIND TO DIMENSIONS AND FINISH SHOWN. CHROME PLATE RUN OUT 0.00-0.08. NO CHROME PLATE ALLOWED IN FILLET RADIUS OR ON EDGE

REPAIR

REF 2

SHOT PEEN: (REF 20-10-03)
 0.017-0.046 SHOT SIZE
 0.014A2 INTENSITY

125 / (3.2μm) ALL OVER UNLESS NOTED

63 / (1.6μm) ON GEAR AND SPLINE TEETH

32 / (0.8μm) ON WORM

BREAK SHARP EDGES 0.008 (0.203)R
 MATERIAL: 9310 STEEL (GEAR TEETH CARBURIZED
 0.012-0.023 (0.30-0.58) DEEP)
 150-190 KSI

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

256T2621-1
 Gear Shaft Repair
 Figure 601

27-81-21

REPAIR 6-1

01.1

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FOLLOW-UP SHAFT - REPAIR 7-1

256T2623-1

NOTE: Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may only require restoration of original finish, refer to Refinish instruction, Fig. 601.

1. Bearing Seat Repair (Fig. 601)

- A. Machine bearing seat, as required, within repair limits shown to remove defects. Refer to SOPM 20-10-02.
- B. Stress relieve per SOPM 20-10-02.
- C. Do a magnetic particle check of the machined surfaces per SOPM 20-20-01.
- D. Shot peen as indicated per SOPM 20-10-03.
- E. Build up repaired surfaces with chrome plate per SOPM 20-42-03. Grind to design dimensions and finish shown. Refer to SOPM 20-10-04.

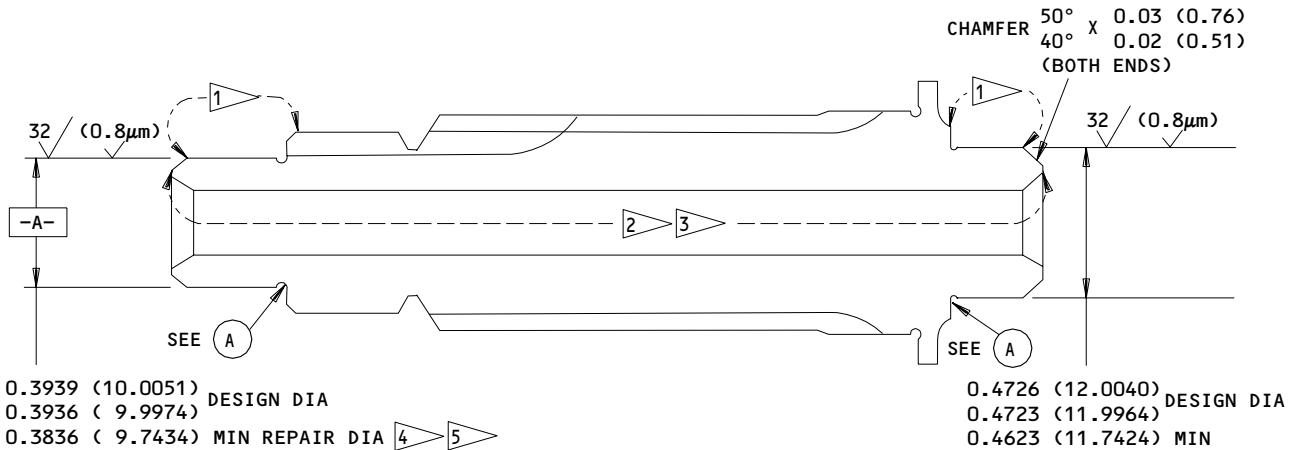
27-81-21

REPAIR 7-1

01.1

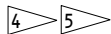
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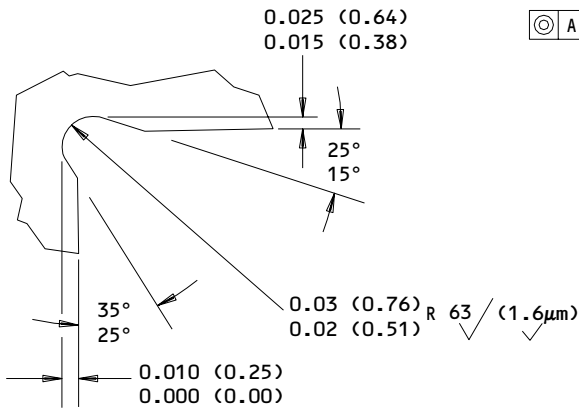


0.3939 (10.0051) DESIGN DIA
 0.3936 (9.9974)
 0.3836 (9.7434) MIN REPAIR DIA

0.4726 (12.0040) DESIGN DIA
 0.4723 (11.9964)
 0.4623 (11.7424) MIN REPAIR DIA



◎	A	∅	0.0005 (0.0127)
-B-			



REFINISH

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

- 1 NO FINISH THIS SURFACE
- 2 PHOSPHATE COAT INTERNAL BORE (F-18.02) EXCEPT OMIT FOLLOW UP OIL TREATMENT. APPLY TWO COATS BMS 10-11, TYPE 1, PRIMER (F-20.03) AND COAT WITH CORROSION PREVENTIVE COMPOUND (F-19.03).
- 3 UNCONTROLLED PLATING THICKNESS ALLOWED
- 4 BUILD UP WITH CHROME PLATE AND GRIND TO DIMENSIONS AND FINISH SHOWN. CHROME PLATE RUN OUT 0.00-0.08. NO CHROME PLATE ALLOWED IN FILLET RADIUS OR ON EDGE

REPAIR

- REF 4
- SHOT PEEN: (REF 20-10-03)
 0.017-0.046 SHOT SIZE
 0.006A2 INTENSITY 5
 0.010A2 INTENSITY 6
- 63 / (1.6µm) ON SPLINE TEETH
- 125 / (3.2µm) ALL OVER EXCEPT AS NOTED
- BREAK ALL SHARP EDGES APPROXIMATELY 0.008 (0.203)R
- MATERIAL: 4340 STEEL, 150-170 KSI
- ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

256T2623-1
 Follow-Up Shaft Repair
 Figure 601

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REPAIR 7-1

01.1

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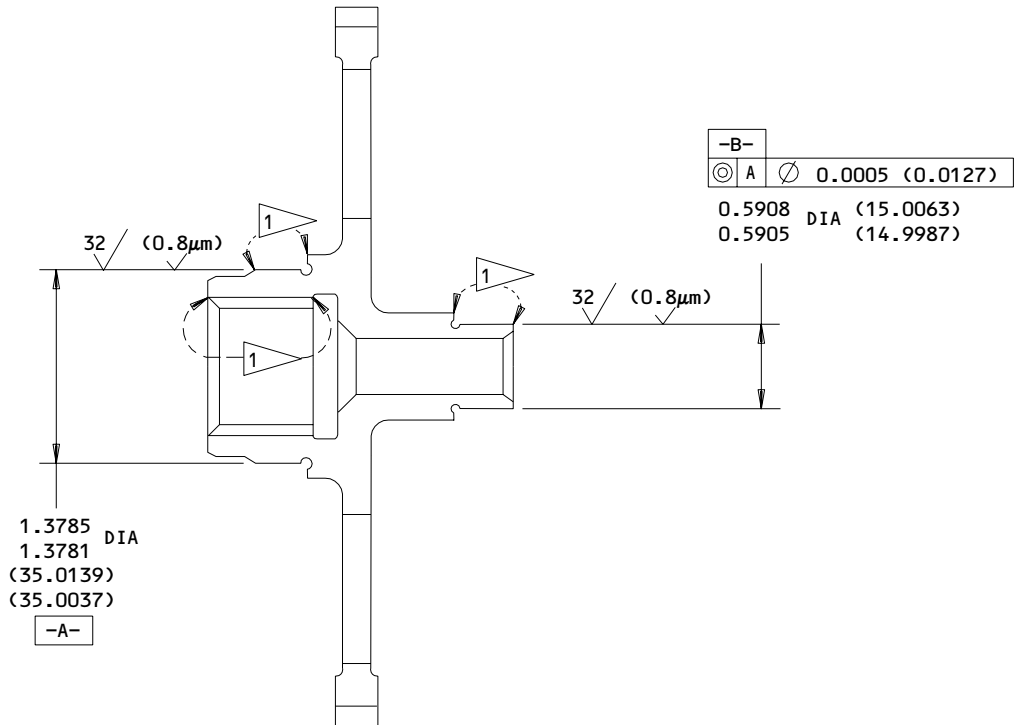
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FOLLOW-UP GEAR – REPAIR 8-1

256T2626-1

1. Plating Repair

NOTE: Repair consists of restoration of original finish. Refer to Refinish instructions Fig. 601 and to REPAIR-GEN for list of applicable standards.




REFINISH

CHROMIC ACID ANODIZE (F-17.04) ALL OVER AND APPLY ONE COAT OF BMS 10-11, TYPE 1, PRIMER EXCEPT IN AREAS NOTED

 NO PRIMER THIS SURFACE

MATERIAL: AL ALLOY

 (1.6µm) ON GEAR AND SPLINE TEETH

 (3.2µm) ALL OVER EXCEPT AS NOTED

BREAK ALL SHARP EDGES APPROXIMATELY 0.008 (0.203)R

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

Follow-Up Gear Repair
 Figure 601

27-81-21

REPAIR 8-1

01

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NAMEPLATE – REPAIR 9-1

256T2635-1

1. Nameplate Replacement

NOTE: Refer to REPAIR-GEN for list of applicable standard practices.

- A. Steel stamp part number and serial number on nameplate per SOPM 20-50-10.
- B. Install nameplate (250) on cover (90) per SOPM 20-50-05 using adhesive indicated in SOPM 20-50-12, type 70.

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REPAIR 9-1

01.1

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MISCELLANEOUS PARTS REFINISH – REPAIR 10-1

1. Repair of parts listed in Fig. 601 consists of restoration of original finish.

IPL FIG. & ITEM	MATERIAL	FINISH
<u>Fig. 1</u>		
Cover (5)	Al alloy	Chromic acid anodize (F-17.04) and apply one coat primer, BMS 10-11, type 1 (F-20.02). Primer optional in holes.
Drain cover (20)	Al alloy	Anodize (F-17.05) all over. Apply one coat BMS 10-11, type 1 primer (F-20.02) to external surfaces excluding faying surface and both drain holes.
Retainer (75)	Al alloy	Anodize (F-17.05) all over. Apply one coat BMS 10-11, type 1 primer (F-20.02) to external surfaces and bolt holes except at housing faying surface.
Follow-up gear (165)	4340 steel, 150-170 ksi	Cadmium plate (F-15.06) all over. Plating thickness 0.00015-0.00040 (0.0038-0.0102) on gear teeth. Uncontrolled plating thickness on internal spline.
Plug (175,190)	4130 steel, 125-145 ksi	Cadmium plate (F-15.06) all over.
Worm gear (215)	Al-Ni Bronze 110 ksi min.	Cadmium plate (F-15.06) all over. Plating thickness 0.00015-0.00040 Uncontrolled plating thickness on internal spline.
Quill shaft (230)	4340 steel, 180-200 ksi	Cadmium plate (F-15.23) all over. Uncontrolled plating thickness allowed on splines and ends of shafts.

Refinish Details
Figure 601

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REPAIR 10-1

01.1

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ASSEMBLY1. Equipment and Materials

NOTE: Equivalent substitutes may be used.

- A. Sealant -- BMS 5-26 (Ref 20-60-04)
- B. Lockwire -- MS20995C32 (Ref 20-50-02)
- C. Primer -- BMS 10-11, Type 1 (Ref 20-41-02)
- D. Grease -- MIL-G-23827 (Ref 20-60-03)
- E. Spanner Adapter -- A27051-3
- F. Wrench -- A27051-10
- G. Clamp -- A27054-11 (2 required)

2. Assemble Gearbox Assy (IPL Fig. 1)

- A. Insert bearing (135) into housing assembly (100) at worm gear end of gear shaft (245). Refer to SOPM 20-50-03.
- B. Attach retainer (75) using bolts (80A) and washers (85). Lockwire bolts using double twist method per SOPM 20-50-02. Seal seam between retainer (75) and housing assembly (100) with sealant.
- C. Press bearing (135) onto gear end of gear shaft (245). Refer to SOPM 20-50-03.
- D. Install gear shaft (245) into housing assembly (100) and through bearing (135).
- E. Temporarily install cover (90) using bolts (35A, 40A, 42), washers (45), and nuts (50).

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01.1

- F. Determine the thickness S1, S2 of the shims (200, 202). Refer to Fig. 701.
- (1) Measure the distance C from the faying surface of the housing assembly (100) to the centerline of the gear shaft (245).
 - (2) Remove the cover (90) and gear shaft (245).
 - (3) Apply grease to the splines of the follow-up shaft (220), and install the follow-up worm gear (215) and follow-up gear (165).
 - (4) Secure the follow-up shaft (220) in a vise with clamps A27054-11 and install washer (150) and nut (145A). Use adapter A27051-3 to tighten the nut to 260-275 lb-in (300-317 kg-cm). Bend the tab of the washer to secure the nut.
 - (5) Press the bearings (155, 160) on the follow-up shaft (220). Refer to SOPM 20-50-03.
 - (6) Measure the distance D between the outside faces of the outer races of bearings (155, 160) on the follow-up shaft (220), with an axial load of approximately 5 lb applied.
 - (7) Measure the distance B from the edge of the gear (215) to the outer race of bearing (160), and the distance A from the centerline of the gear teeth to the edge of the hub on the gear (215).
 - (8) Measure the depth (L, E) of the bores, from the faying surface, in the housing assembly (100) and cover (95).
 - (9) Starting with the same thickness of shims (200, 202) removed during disassembly, determine the end play X1, X2 at the ends of the shaft (220). Add or remove shims S1 (200) until $X1 = 0.002-0.006$ in. (0.051-0.152 mm) according to the procedure in Fig. 701. Then add or remove shims S2 (202) to adjust the end play X2 to 0.002-0.006 in. (0.051-0.152 mm).
- G. Install the follow up gear (225) with the attached bearings (205, 210). Fill the teeth of the gears (165, 215, 225) with grease.
- H. Attach the cover (95) with the bolts (35A, 42), washers (45), and nuts (50). Install the bolts with wet primer. Tighten the bolts (42) to 90-110 lb-in (104-127 kg-cm) and lockwire using the double-twist method per SOPM 20-50-02. Tighten the bolts (35A) to 50-80 lb-in (58-92 kg-cm). Seal the seam between the cover (195) and housing assembly (100) with sealant.
- I. Install the gear shaft (245). Turn the shaft at the point of engagement with the follow-up gear (215).

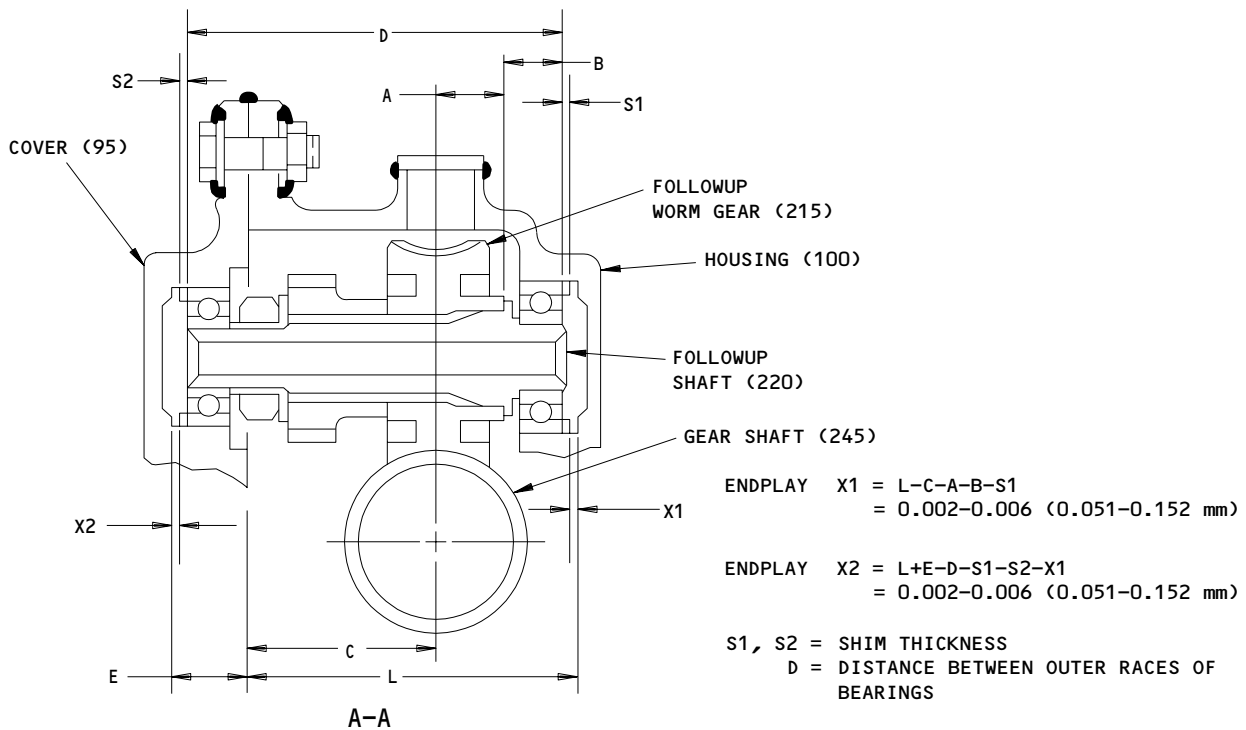
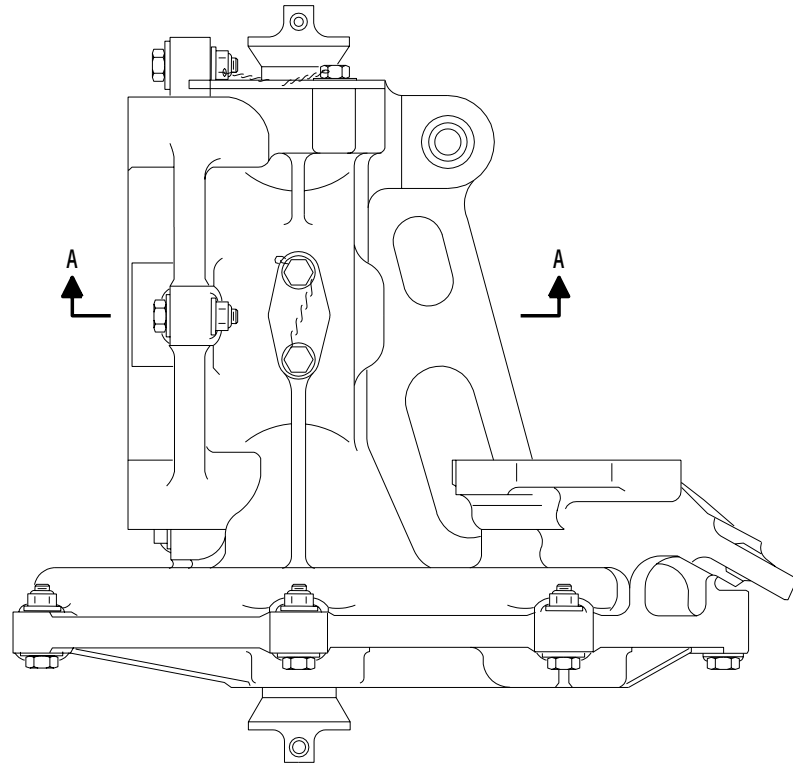
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**BOEING**
COMPONENT
MAINTENANCE MANUAL

- J. Press the bearings (130) on the gear assembly (170) per SOPM 20-50-03, and install into housing assembly (100). Fill the gear teeth with grease.
 - K. Press the bearings (130, 140A) on the gear assembly (185) per SOPM 20-50-03, and install into the housing assembly (100). Fill the gear teeth with grease.
 - L. Install the cover (90) using bolts (35A, 40A, 42), washers (45), and nuts (50). Fill the space between the cover (90) and bearing (130) on the gear assembly (185) with grease (Fig. 702). Install the bolts with wet primer. Tighten the bolts (35A, 41A) to 50-80 lb-in (58-92 kg-cm) and bolts (42) to 90-110 lb-in (104-127 kg-cm). Lockwire the bolts (40A, 42) using the double-twist method per SOPM 20-50-02. Seal the seam between the cover (90) and housing assembly (100) with sealant.
 - M. Install O-rings (235A, 240A) on quill shaft (230) per SOPM 20-50-06.
 - N. Coat faying surface and splines of quill shaft (230) with grease and install in gear assembly (185).
 - O. Apply grease to the splines of the gear shaft (245) and install the couplings (70). Fill the pocket between the coupling and bearing (135) at the worm gear end of the gear shaft (245) with grease (Fig. 702). Install the washers (65) and nuts (60). Use wrench A27051-10 to hold the couplings (70), and tighten the nuts to 160-240 lb-in (185-275 kg-cm). Install the cotter pins (55) per SOPM 20-50-02.
 - P. Attach the drain covers (20) with the bolts (25) and washers (30). Tighten the bolts to 22-33 lb-in (25-38 kg-cm) after installing with wet primer, and lockwire using the double-twist method per SOPM 20-50-02. Seal the seam between the cover (20) and housing assembly (100) with sealant.
 - Q. Test unit per Testing and Trouble Shooting.
3. Use standard industry practices and information contained in SOPM 20-44-02 to store this component.

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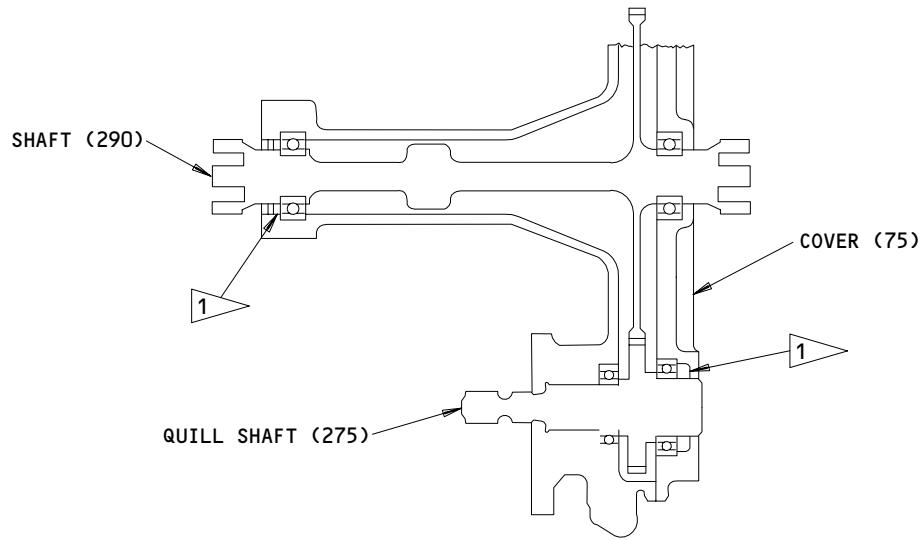


End Play Adjustment
 Figure 701

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ASSEMBLY
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01.1



1 FILL POCKET WITH GREASE

Assembly Details
Figure 702

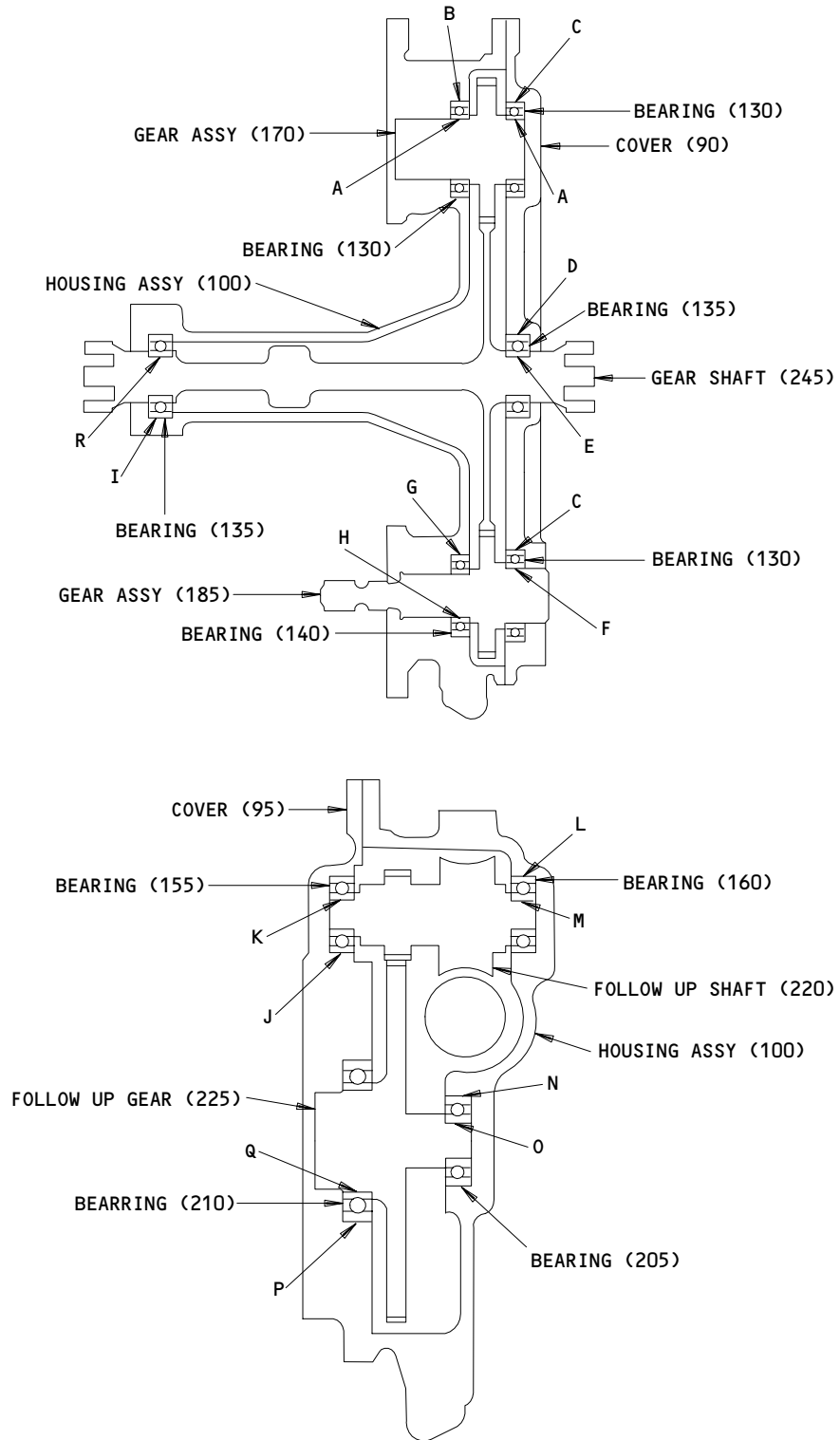
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01.101

ASSEMBLY
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FITS AND CLEARANCES



Fits and Clearances
Figure 801 (Sheet 1)

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FITS AND CLEARANCES
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Ref Letter Fig.801	Mating Item No. IPL Fig.1	Design Dimension				Service Wear Limit		
		Dimension		Assembly Clearance		Dimension		Maximum Clearance
		Min	Max	Min	Max	Min	Max	
A	ID 130	1.1807 (29.989)	1.811 (29.999)				1.1819 (30.0203)	0.0004 (0.0102)
	OD 170	1.1812 (30.002)	1.1815 (30.010)	-0.0008 (-0.0203) *[1]	-0.0001 (-0.0025) *[1]	1.1803 (29.9796)		
B	OD 130	1.8499 (46.987)	1.8504 (47.000)			1.8474 (46.924)		0.0030 (0.0762)
	ID 100	1.8504 (47.000)	1.8514 (47.026)	0.0000 (0.0000)	0.0015 (0.0381)		1.8534 (47.0764)	
C	OD 130	1.8499 (46.987)	1.8504 (47.000)			1.8474 (46.924)		0.0030 (0.0762)
	ID 90	1.8504 (47.000)	1.8514 (47.026)	0.0000 (0.0000)	0.0015 (0.0381)		1.8534 (47.0764)	
D	OD 135	1.6530 (41.986)	1.6535 (41.998)			1.6505 (41.9227)		0.0030 (0.0762)
	ID 90	1.6535 (41.999)	1.6545 (42.024)	0.0000 (0.0000)	0.0015 (0.0381)		1.6565 (42.0751)	
E	ID 135	0.7870 (19.9898)	0.7874 (19.9999)				0.7882 (20.0203)	0.0004 (0.0102)
	OD 245	0.7875 (20.0025)	0.7878 (20.0101)	-0.0008 (-0.0203)	-0.0001 (0.0025)	0.7866 (19.9796)		
F	ID 130	1.1807 (29.989)	1.1811 (29.999)				1.1819 (30.0203)	0.0004 (0.0102)
	OD 185	1.1812 (30.010)	1.1815 (30.003)	-0.0008 (-0.0203) *[1]	-0.0001 (-0.0025) *[1]	1.1803 (29.9796)		
G	OD 140	1.6530 (41.986)	1.6535 (41.998)			1.6505 (41.9227)		0.0030 (0.0762)
	ID 100	1.6535 (41.999)	1.6545 (42.024)	0.0000 (0.0000)	0.0015 (0.0381)		1.6565 (42.0751)	
H	ID 140	0.9839 (24.991)	0.9843 (25.001)				0.9855 (25.0317)	0.0004 (0.0102)
	OD 185	0.9844 (25.0038)	0.9847 (25.0114)	-0.0008 (-0.0203) *[1]	-0.0001 (-0.0025) *[1]	0.9835 (24.9805)		
I	OD 135	1.6530 (41.986)	1.6535 (41.998)					
	ID 100	1.6525 (41.974)	1.6535 (41.999)	-0.0010 (-0.0254) *[1]	-0.0005 (-0.0127)			

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

Fits and Clearances
Figure 801 (Sheet 2)

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FITS AND CLEARANCES
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BOEING
 COMPONENT
 MAINTENANCE MANUAL

Ref Letter Fig.801	Mating Item No. IPL Fig.1	Design Dimension				Service Wear Limit		
		Dimension		Assembly Clearance		Dimension		Maximum Clearance
		Min	Max	Min	Max	Min	Max	
J	OD 155	1.0232 (25.989)	1.0236 (25.999)	0.0000 (0.0000)	0.0012 (0.0304)	1.0212 (25.9385)	1.0260 (26.0604)	0.0024 (0.0610)
	ID 95	1.0236 (25.999)	1.0244 (26.019)					
K	ID 155	0.3934 (9.9924)	0.3937 (10.0000)	-0.0005 (-0.0127) *[1]	0.0001 (0.0025)	0.3930 (9.9822)	0.3943 (10.0152)	0.004 (0.0102)
	OD 220	0.3936 (9.9974)	0.3939 (10.0051)					
L	OD 160	1.1020 (27.990)	1.1024 (28.0000)	0.0000 (0.0000)	0.0012 (0.0304)	1.1000 (27.9400)	1.1048 (28.0619)	0.0024 (0.0610)
	ID 100	1.1024 (28.000)	1.1032 (28.021)					
M	ID 160	0.4721 (11.9913)	0.4724 (11.9990)	-0.0005 (-0.0127) *[1]	0.0001 (0.0025)	0.4717 (11.9812)	0.4730 (12.0142)	0.0004 (0.0102)
	OD 220	0.4723 (11.9964)	0.4726 (12.0040)					
N	OD 205	1.2593 (31.986)	1.2598 (31.998)	0.0000 (0.0000)	0.0015 (0.0381)	1.2568 (31.9227)	1.2628 (32.0751)	0.0030 (0.0762)
	ID 100	1.2598 (31.998)	1.2608 (32.024)					
O	ID 205	0.5903 (14.9936)	0.5906 (15.0012)	-0.0005 (-0.0127) *[1]	0.0001 (0.0025)	0.5899 (14.9835)	0.5912 (15.0165)	0.0004 (0.0610)
	OD 225	0.5905 (14.9987)	0.5908 (15.0063)					
P	OD 210	2.1649 (54.988)	2.1654 (55.001)	0.0000 (0.0000)	0.0017 (0.0431)	2.1624 (54.9250)	2.1684 (55.0774)	0.0030 (0.0762)
	ID 95	2.1654 (55.001)	2.1666 (55.031)					
Q	ID 210	1.3775 (34.988)	1.3780 (35.001)	-0.0010 (-0.0254) *[1]	-0.0001 (-0.0025) *[1]	1.3771 (34.9783)	1.3789 (35.0241)	0.0004 (0.0102)
	OD 225	1.3781 (35.003)	1.3785 (35.013)					
R	ID 245	0.7866 (19.9796)	0.7871 (19.9923)	-0.0001 (-0.0025)	0.0008 (0.0203)			
	OD 135	0.7870 (19.9898)	0.7874 (19.9999)					

*[1] INTERFERENCE FIT

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

Fits and Clearances
 Figure 801 (Sheet 3)

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FITS AND CLEARANCES
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Ref Letter Fig.801	Mating Item No. IPL Fig.1	Design Dimension				Service Wear Limit		
		Dimension		Assembly Clearance		Dimension		Maximum Clearance
		Min	Max	Min	Max	Min	Max	
	1			0.001 (0.127) 2	0.006 (0.152) 2			0.013 (0.330) 2

1 ASSEMBLY BACKLASH

2 BACKLASH MEASURED AT SPLINE PITCH DIA OF INPUT GEARS

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN () WHICH ARE IN MILLIMETERS

Fits and Clearances
Figure 801 (Sheet 4)

FOR TORQUE VALUES OF STANDARD FASTENERS, REFER TO 20-50-01			
ITEM NO. IPL FIG. 1	NAME	TORQUE	
		POUND-INCHES	POUND-FEET
25	BOLT	22-23 (25-38 KG-CM)	
35A,40A	BOLT	50-80 (58-92 KG-CM)	
42	BOLT	90-110 (104-127 KG-CM)	
60	NUT	160-240 (185-275 KG-CM)	
80A	BOLT	33-39 (38-45 KG-CM)	
145A	NUT	260-275 (300-317 KG-CM)	

Torque Table
Figure 802

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FITS AND CLEARANCES
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SPECIAL TOOLS, FIXTURES AND EQUIPMENT

NOTE: Equivalent substitutes may be used.

1. Check Fixture -- A27048-8
 2. Lock Assembly -- A27051-2
 3. Spanner Adapter -- A27051-3
 4. Clamp Assembly -- A27051-7
 5. Input Crank Assemblies -- A27051-8,-9
 6. Wrench -- A27051-10
 7. Dial Indicator with Magnetic Base
 8. Clamp -- A27054-11 (2 required) *[1]
- *[1] This tool included in Holding Fixture A27054-14

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SPECIAL TOOLS

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ILLUSTRATED PARTS LIST

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

2. Indentures show parts relationships as follows:

Assembly

Detail Parts for Assembly

Subassembly

Attaching Parts for Subassembly

Detail Parts for Subassembly

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

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

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

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

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

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

6. Parts Interchangeability

Optional
(OPT)

The parts are optional to and interchangeable with other parts having the same item number.

Supersedes, Superseded By
(SUPSDS, SUPSD BY)

The part supersedes and is not interchangeable with the original part.

Replaces, Replaced By
(REPLS, REPLD BY)

The part replaces and is interchangeable with, or is an alternate to, the original part.

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VENDORS

02758 NETWORKS ELECTRONIC CORP U S BEARING DIV
9750 DE SOTO AVENUE
CHATSWORTH, CALIFORNIA 91311-4409
FORMERLY U S BEARING DIV NETWORKS ELEC CORP

09455 BFM TRANSPORT DYNAMICS CORP
3131 WEST SEGERSTROM AVENUE PO BOX 1953
SANTA ANA, CALIFORNIA 92702-1953
FORMERLY TRANSPORT DYNAMICS AEROSPACE DIV, FABROID DIV
TRANSPORT DYNAMICS V17571 AND LEAR SEIGLER INC TRANSPORT
DIV V98076

16746 SPECLINE INCORPORATED
2230 MOUTON DR
CARSON CITY, NV 89706
FORMERLY IN SUN VALLEY, CALIFORNIA

21335 TORRINGTON CO FAFNIR BEARING DIV
59 FIELD STREET
TORRINGTON, CONNECTICUT 06790-1008
FORMERLY FAFNIR BRG AND TEXTRON INC FAFNIR DIV IN
NEW BRITAIN, CONNECTICUT

21760 SCHATZ MANUFACTURING CO
FAIRVIEW AVENUE PO BOX 1191
POUGHKEEPSIE, NEW YORK 12601
FORMERLY FEDERAL BRG CO AND SCHATZ MFG CO V53268
FORMERLY SCHATZ MFG CO

29337 HOOVER GROUP INC BALL AND ROLLER DIV
2220 PENDLEY ROAD PO BOX 899
CUMMING, GEORGIA 30130-8671
FORMERLY IN ERWIN, INDIANA, HOOVER UNIVERSAL CO

38443 MRC BEARINGS
402 CHANDLER STREET
JAMESTOWN, NEW YORK 14701-3802
FORMERLY MARLIN-ROCKWELL CORP DIV TRW AND TRW INC

40920 MPB MINIATURE PRECISION BEARING DIV
PRECISION PARK PO BOX 547
KEENE, NEW HAMPSHIRE 03431
FORMERLY MPB CORP AND MINIATURE BRG DIV MPB CORP

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BOEING
 COMPONENT
 MAINTENANCE MANUAL
VENDORS

43991 FAG BEARING INCORPORATED
 118 HAMILTON AVENUE
 STAMFORD, CONNECTICUT 06904
 FORMERLY NORMA-HOFFMAN BEARING CORPORATION
 FORMERLY NORMA FAG BEARINGS CORPORATION

50294 NEW HAMPSHIRE BALL BEARINGS INC
 9727 DESOTO AVE PO BOX 2515
 CHATSWORTH, CALIFORNIA 91311-4323
 FORMERLY NIPPON MINATURE BEARING CORP V23589 AND NMB
 AMERICA INC AND NMB INC

56644 AURORA BEARING CO
 970 SOUTH LAKE STREET
 AURORA, ILLINOIS 60506-5929

60380 TORRINGTON CO BEARINGS DIV SUBSIDIARY OF INGERSOLL-RAND CORP
 59 FIELD STREET PO BOX 1008
 TORRINGTON, CONNECTICUT 06790-4942
 FORMERLY TORRINGTON BEARING COMPANY

73134 IMO INDUSTRIES INC HEIM BEARINGS DIV
 60 ROUND HILL ROAD PO BOX 430
 FAIRFIELD, CONNECTICUT 06430
 FORMERLY INCOM INTL INC HEIM DIV; FORMERLY HEIM UNIVERSAL
 CORP INCOM INTL INC; FORMERLY HEIM DIV INCOM INTL

78118 SPLIT BALL BEARING DIV OF MPB CORP
 HIGHWAY 4
 LEBANON, NEW HAMPSHIRE 03766-7301

81376 SOUTHWEST PRODUCTS COMPANY
 2240 BUENA VISTA STREET
 IRVINDALE, CALIFORNIA 91706
 FORMERLY IN MONROVIA, CALIFORNIA 91016

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VENDORS

97613 SARGENT CONTROLS & AEROSPACE/KAHR BEARING DIV
5675 W BURLINGAME RD
TUCSON, ARIZONA 85743
FORMERLY AETNA STEEL PROD KAHR BEARING DIV V96579
FORMERLY SARGENT IND KAHR BEARING DIV, BURBANK, CALIFORNIA

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BOEING
 COMPONENT
 MAINTENANCE MANUAL

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
ABW4V5		1	105	3
AN960PD10		1	15	2
		1	30	4
		1	85	3
AN960PD416		1	45	27
BACB10AB4		1	105	3
BACB10BA10PP		1	155	1
BACB10BA12PP		1	160	1
BACB10BA15PP		1	205	1
BACB10BA20PP		1	135	2
BACB10BB25PP		1	140A	1
BACB10BB30PP		1	130	3
BACB10BB35PP		1	210	1
BACN10JC4		1	50	12
BACN10JC6		1	60	2
BSSR4804		1	105	3
BWG4-110		1	105	3
C005RRPP1P28LY1		1	140A	1
C005RRP0ZZ		1	140A	1
C006RRPP1P28LY1		1	130	3
C006RRP0ZZ		1	130	3
C007RRPP1P28LY19		1	210	1
C007RRP0ZZ		1	210	1
C100RRPP1P15LY19		1	155	1
C101RCPOZZ		1	160	1
C101RPP1P17LY19		1	160	1
C102RRPP1P17LY1		1	205	1
C102RRP0ZZ		1	205	1
C104RRP0ZZ		1	135	2
C104RRP1P28LY19		1	135	2
FN6907LLXV3		1	130B	3
HU4-134		1	105	3
KWB4-20CRG		1	105	3
LL100KS		1	155	1
LL100KSG20		1	155	1

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PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
LL101KS		1	160	1
LL101KSG20		1	160	1
LL102KS		1	205	1
LL102KSG20		1	205	1
LL104KS		1	135	2
LL104KSG20		1	135	2
MS19068-023		1	145A	1
MS19070-023		1	150	1
MS21209F1-15		1	110	6
MS21209F1-20		1	115	3
MS21209F4-20		1	120	9
MS24665-283		1	55	2
NAS1611-111		1	235A	1
NAS1611-113		1	240A	1
NAS563-15		1	10	2
		1	25	4
NAS563-25		1	80A	3
NAS564-27		1	42	3
NAS6604-8		1	35A	11
NAS6604H8		1	40A	1
PKTLL005P1		1	140A	1
PKTLL006P1		1	130	3
PKTLL007P1		1	210	1
PKTLL100P1		1	155	1
PKTLL101P1		1	160	1
PKTLL102P1		1	205	1
PKTLL104P1		1	135	2
WC4G1		1	105	3
WG4E		1	105	3
1905LLT1C1-01		1	140A	1
1907RRT1C1-01		1	210	1

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PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
256T2309-1		1	70	2
256T2311-1		1	65	2
256T2313-1		1	5	1
256T2611-1		1	1	RF
256T2612-1		1	100	1
256T2612-2		1	125	1
256T2614-1		1	90	1
256T2616-1		1	95	1
256T2618-1		1	75	1
256T2619-1		1	170	1
256T2619-2		1	180	1
256T2620-1		1	185	1
256T2620-2		1	195	1
256T2621-1		1	245	1
256T2623-1		1	220	1
256T2624-1		1	215	1
256T2625-1		1	165	1
256T2626-1		1	225	1
256T2628-1		1	230	1
256T2629-1		1	190	1
256T2629-2		1	175	1
256T2631-1		1	200	1
256T2631-10		1	200J	1
256T2631-11		1	200K	1
256T2631-12		1	200L	1
256T2631-2		1	200A	1
256T2631-3		1	200B	1
256T2631-4		1	200C	1
256T2631-5		1	200D	1
256T2631-6		1	200E	1
256T2631-7		1	200F	1
256T2631-8		1	200G	1
256T2631-9		1	200H	1
256T2633-1		1	20	2
256T2635-1		1	250	1
55282		1	105	3
6000TT		1	155	1
6001FTT		1	160	1
6002TT		1	205	1
6004FTT		1	135	2
9100LLT1C1-01		1	155	1
9100NPPFS428		1	155	1
9101LLT1C1-01		1	160	1
9101NPPFS428		1	160	1
9102LLT1C1-01		1	205	1

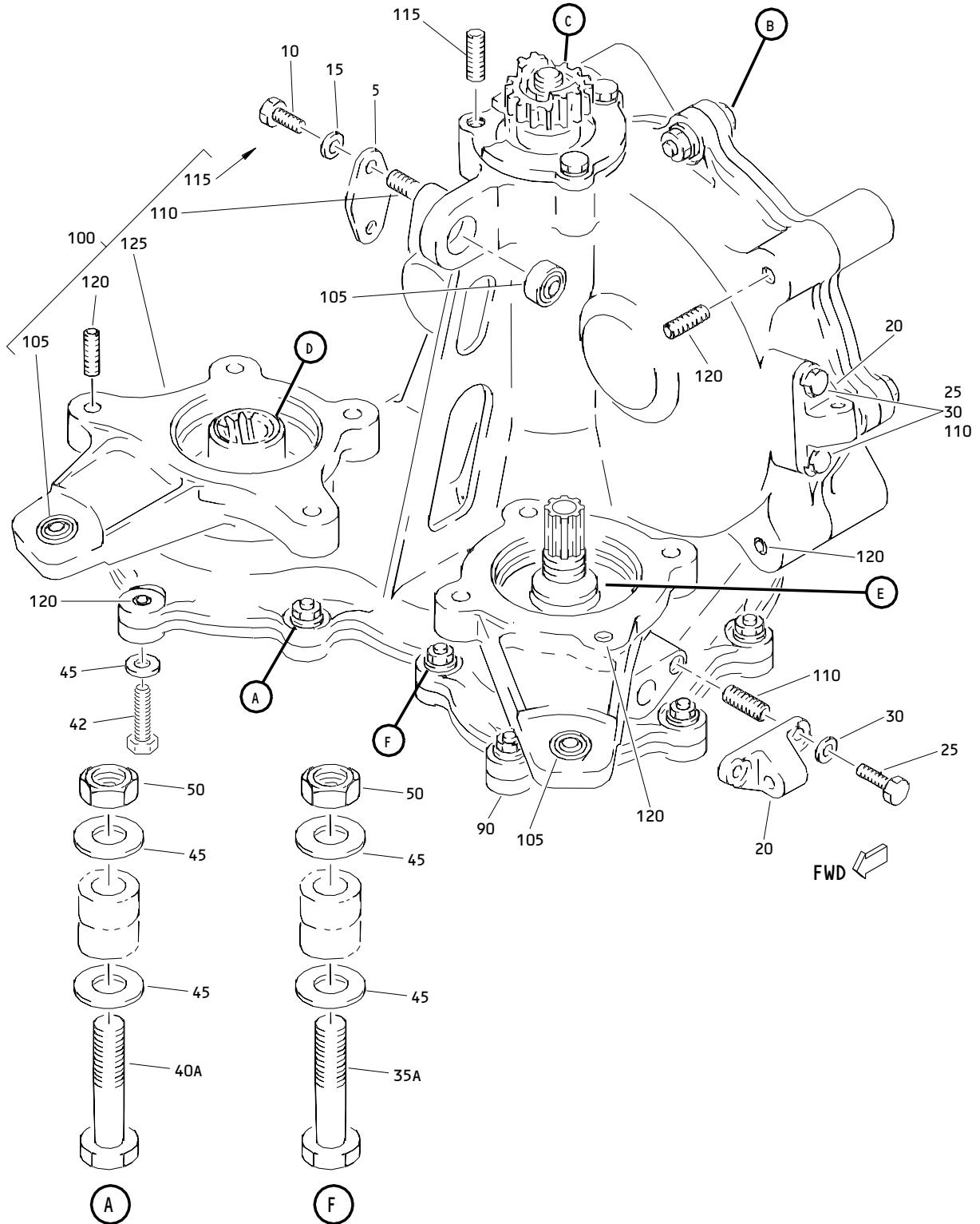
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PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
9102NPPFS428		1	205	1
9104LLT1C1-01		1	135	2
9104NPPFS428		1	135	2
9305PPFS428		1	140A	1
9306PPPRBFS428		1	130	3
9307PPPRBFS428		1	210	1
993L00		1	155	1
993L01		1	160	1
993L02PFS428		1	205	1
993L04		1	135	2

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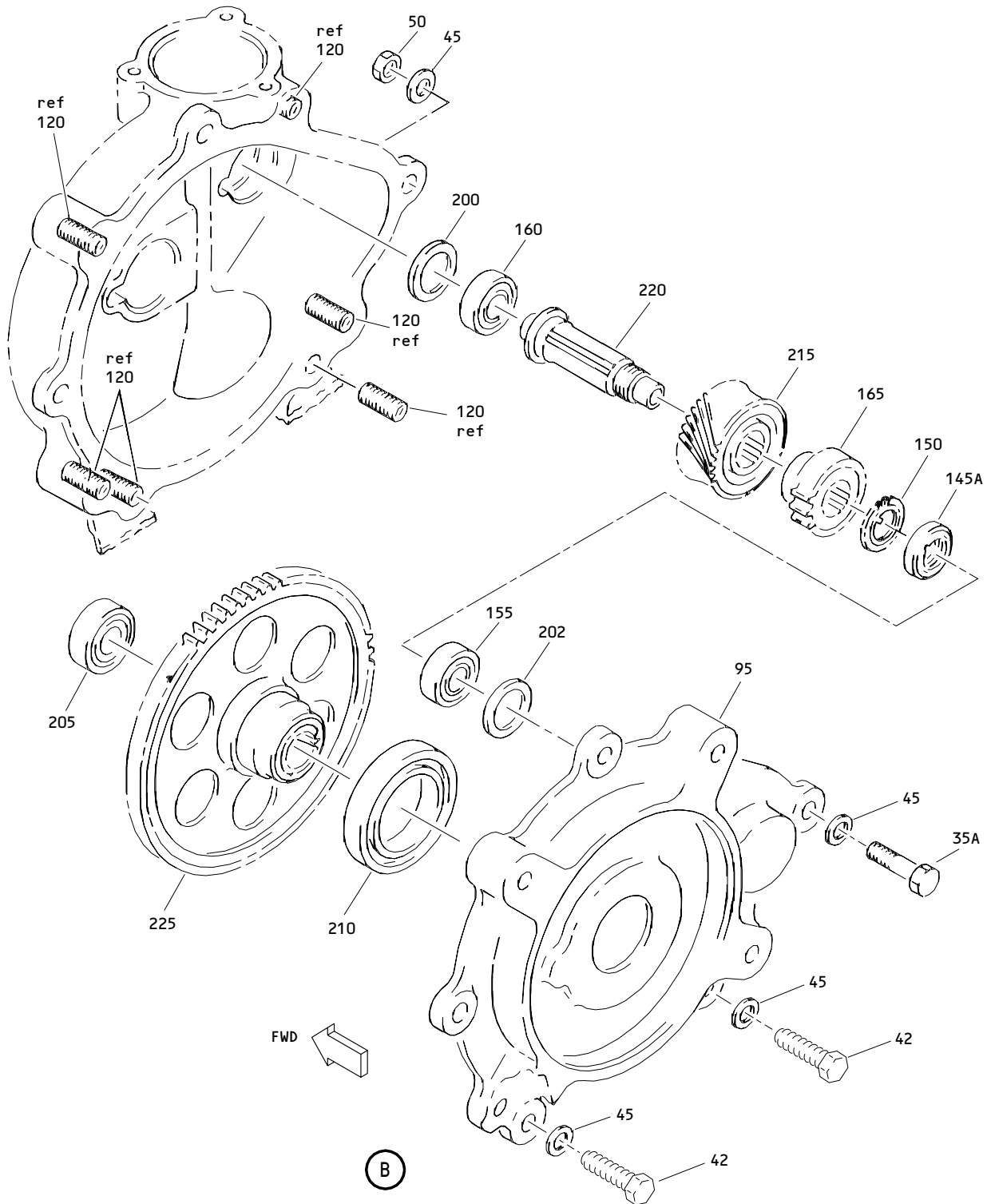
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Inboard Leading Edge Slat Drive Power Drive Unit Gearbox Assembly
 Figure 1 (Sheet 1)

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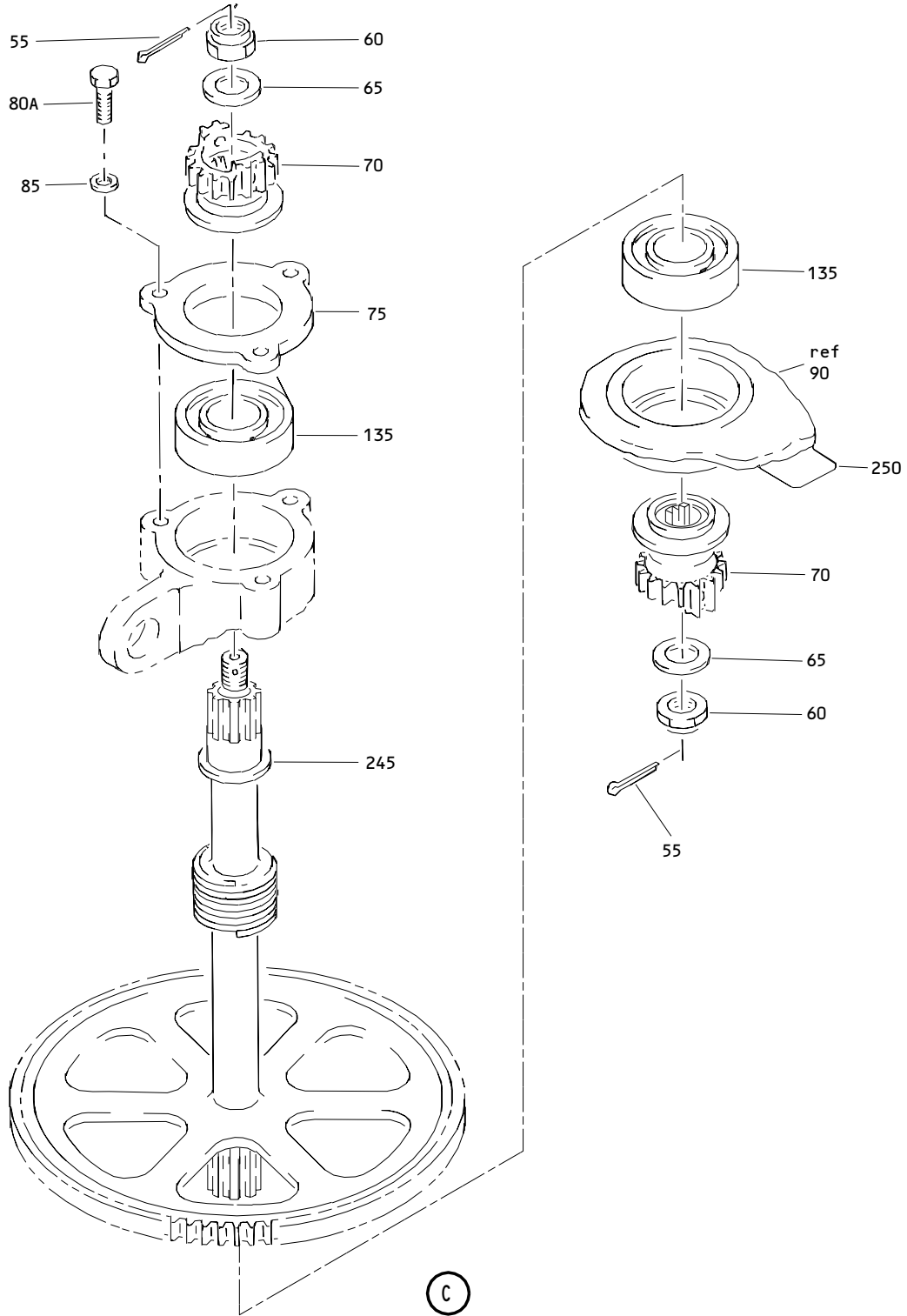
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Inboard Leading Edge Slat Drive Power Drive Unit Gearbox Assembly
 Figure 1 (Sheet 2)

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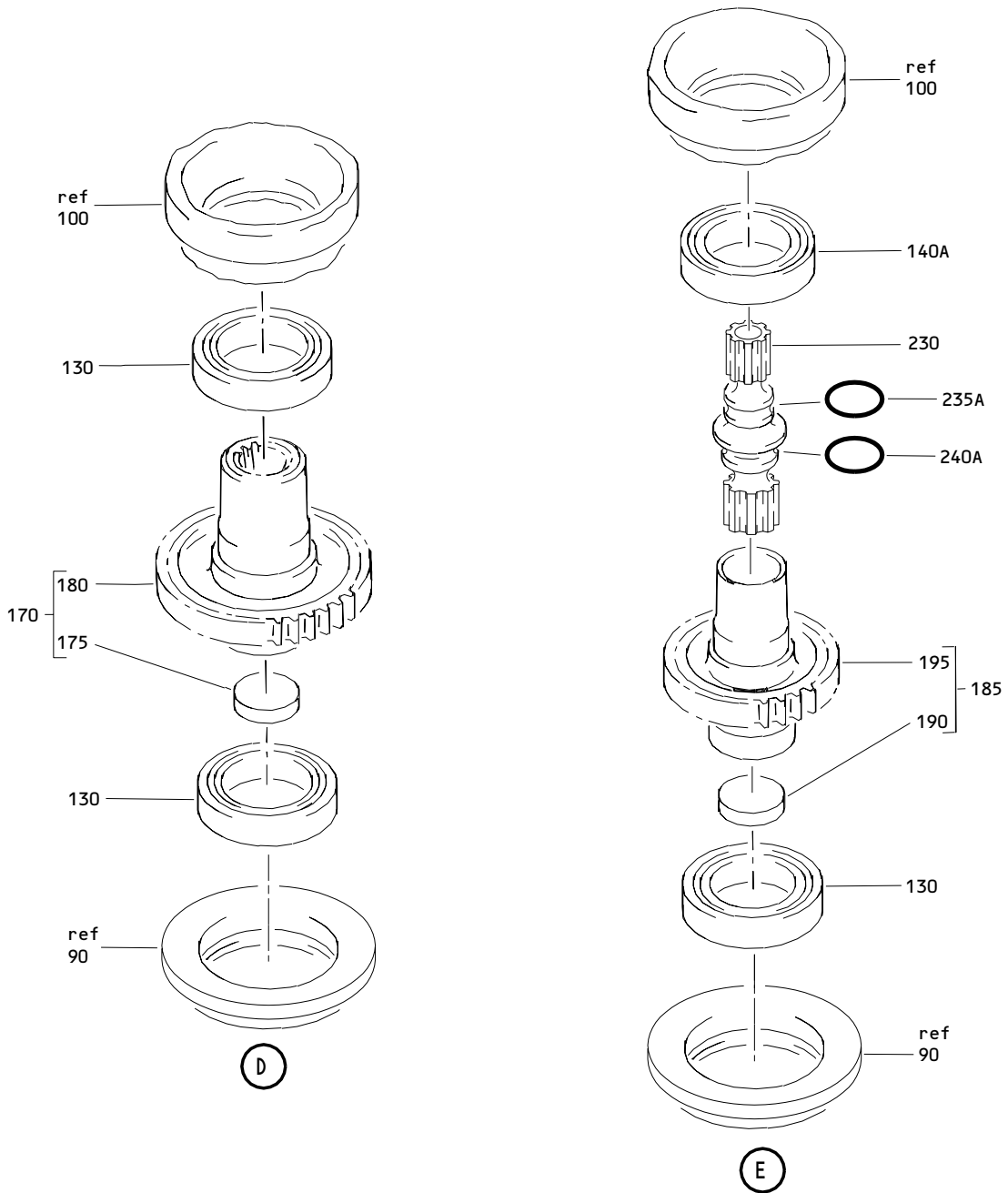
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Inboard Leading Edge Slat Drive Power Drive Unit Gearbox Assembly
Figure 1 (Sheet 3)

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Inboard Leading Edge Slat Drive Power Drive Unit Gearbox Assembly
 Figure 1 (Sheet 4)

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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01- -1	256T2611-1		GEARBOX ASSY-INBD LE SLAT DRIVE PWR DRIVE UNIT		RF
5	256T2313-1		.COVER-INSPECTION HOLE ATTACHING PARTS		1
10	NAS563-15		.BOLT		2
15	AN960PD10		.WASHER -----*		2
20	256T2633-1		.COVER-DRAIN ATTACHING PARTS		2
25	NAS563-15		.BOLT		4
30	AN960PD10		.WASHER -----*		4
35	NAS6604-9		DELETED		
R 35A	NAS6604-8		.BOLT		11
40	NAS6604H9		DELETED		
R 40A	NAS6604H8		.BOLT		1
R 42	NAS564-27		.BOLT		3
R 45	AN960PD416		.WASHER		27
R 50	BACN10JC4		.NUT		12
55	MS24665-283		.PIN-COTTER		2
R 60	BACN10JC6		.NUT		2
65	256T2311-1		.WASHER		2
70	256T2309-1		.COUPLING		2
75	256T2618-1		.RETAINER ATTACHING PARTS		1
80	NAS6603H5		DELETED		
R 80A	NAS563-25		.BOLT		3
85	AN960PD10		.WASHER -----*		3
90	256T2614-1		.RETAINER		1
95	256T2616-1		.COVER		1
100	256T2612-1		.HOUSING ASSY		1

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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
R 01-105	HU4-134		..BEARING- (V02758) (SPEC BACB10AB4) (OPT ABW4V5 (V50294)) (OPT BSSR4804 (V81376)) (OPT BSSR4804 (V81376)) (OPT KWB4-20CRG (V97613)) (OPT WG4E (V73134)) (OPT 55282 (V09455)) (OPT WC4G1 (V56644)) (OPT BWG4-110 (V16746))		3
110	MS21209F1-15		..INSERT		6
115	MS21209F1-20		..INSERT		3
120	MS21209F4-20		..INSERT		9
125	256T2612-2		..HOUSING		1
R 130	9306PPRBFS428		.BEARING- (V21335) (SPEC BACB10BB30PP) (OPT PKTLL006P1 (V78118)) (OPT C006RRPOZZ (V40920)) (OPT C006RRPP1P28LY196 (V40920)) (OPT ITEM 130B)		3
-130A	FN6906LLXV2		DELETED		
R -130B	FN6907LLXV3		.BEARING- (V60380) (OPT ITEM 130)		3

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BOEING
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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
R 01-135	LL104KSG20		.BEARING- (V38443) (SPEC BACB10BA20PP) (OPT LL104KS (V38443)) (OPT 6004FTT (V43991)) (OPT 9104LLT1C1-01 (V21760)) (OPT 9104NPPFS428 (V21335)) (OPT 993L04 (V29337)) (OPT PKTLL104P1 (V78118)) (OPT C104RRPOZZ (V40920)) (OPT C104RRP1P28LY196 (V40920)) (OPT C104RRP1P28LY19 (V40920))		2
R 140 140A	BACB20BB25PP 1905LLT1C1-01		DELETED .BEARING- (V21760) (SPEC BACB10BB25PP) (OPT 9305PPFS428 (V21335)) (OPT PKTLL005P1 (V78118)) (OPT C005RRPOZZ (V40920)) (OPT C005RRPP1P28LY196 (V40920))		1
R 145 145A 150	MS19068-23 MS19068-023 MS19070-023		DELETED .NUT .WASHER		1 1

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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
R 01-155	LL100KSG20		.BEARING- (V38443) (SPEC BACB10BA10PP) (OPT LL100KS (V38443)) (OPT 6000TT (V43991)) (OPT 9100LLT1C1-01 (V21760)) (OPT 9100NPPFS428 (V21335)) (OPT 993L00 (V29337)) (OPT 993L00 (V29337)) (OPT PKTLL100P1 (V78118)) (OPT C100RPP1P15LY196 (V40920))		1
R 160	LL101KSG20		.BEARING- (V38443) (SPEC BACB10BA12PP) (OPT LL101KS (V38443)) (OPT 6001FTT (V43991)) (OPT 9101LLT1C1-01 (V21760)) (OPT 9101NPPFS428 (V21335)) (OPT 993L01 (V29337)) (OPT PKTLL101P1 (V78118)) (OPT C101RCPOZZ (V40920)) (OPT C101RPP1P17LY196 (V40920))		1
165	256T2625-1		.GEAR-FOLLOWUP		1
170	256T2619-1		.GEAR ASSY-MOTOR INPUT ALT.		1
175	256T2629-2		..PLUG		1
180	256T2619-2		..GEAR		1
185	256T2620-1		.GEAR ASSY-MOTOR INPUT HYD.		1
190	256T2629-1		..PLUG		1
195	256T2620-2		..GEAR		1

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BOEING
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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-200	256T2631-1		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-200A	256T2631-2		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-200B	256T2631-3		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-200C	256T2631-4		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-200D	256T2631-5		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-200E	256T2631-6		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
200F	256T2631-7		DELETED		
200G	256T2631-8		DELETED		
200H	256T2631-9		DELETED		
200J	256T2631-10		DELETED		
200K	256T2631-11		DELETED		
200L	256T2631-12		DELETED		
202	256T2631-7		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-202A	256T2631-8		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-202B	256T2631-9		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-202C	256T2631-10		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-202D	256T2631-11		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR
-202E	256T2631-12		.SHIM-(THICKNESS TO BE DETERMINED UPON INSTALLATION)		AR

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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
R 01-205	LL102KSG20		.BEARING- (V38443) (SPEC BACB10BA15PP) (OPT PKTLL102P1 (V78118)) (OPT C102RRPOZZ (V40920)) (OPT C102RRPP1P17LY196 (V40920)) (OPT LL102KS (V38443)) (OPT 6002TT (V43991)) (OPT 9102LLT1C1-01 (V21760)) (OPT 9102NPPFS428 (V21335)) (OPT 993L02PFS428 (V29337))		1
R 210	1907RRT1C1-01		.BEARING- (V21760) (SPEC BACB10BB35PP) (OPT 9307PPPRBFS428 (V21335)) (OPT PKTLL007P1 (V78118)) (OPT C007RRPOZZ (V40920)) (OPT C007RPP1P28LY196 (V40920))		1
215	256T2624-1		.GEAR-FOLLOW UP WORM		1
220	256T2623-1		.SHAFT-FOLLOW UP		1
225	256T2626-1		.GEAR-FOLLOW UP		1
230	256T2628-1		.SHAFT-QUILL		1
235	PARKER2-111		DELETED		
R 235A	NAS1611-111		.PACKING		1
240	PARKER2-113		DELETED		
R 240A	NAS1611-113		.PACKING		1
245	256T2621-1		.SHAFT		1
250	256T2635-1		.NAMEPLATE		1

- Item Not Illustrated

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